Quality Management System <ISO 9001>

For the continuous development of our quality management system, we obtained ISO 9001 certification, the global standard for quality management systems, in 1996. As a manufacturer of safety equipment, we will continue to strive for continuous improvement of our quality management system and deliver high quality products to our customers.

Environmental Management System <ISO14001>

We acquired ISO 14001 certification, the global standard for environmental management systems, in 2000 with the aim of becoming an environmentally friendly company. We are working to develop products that do not place a burden on the environment from development and manufacturing to transportation, use, and disposal, as well as products that contribute to the promotion of carbon neutrality.

NEW COSMOS ELECTRIC CO., LTD.

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TEL. +66-95-558-5067

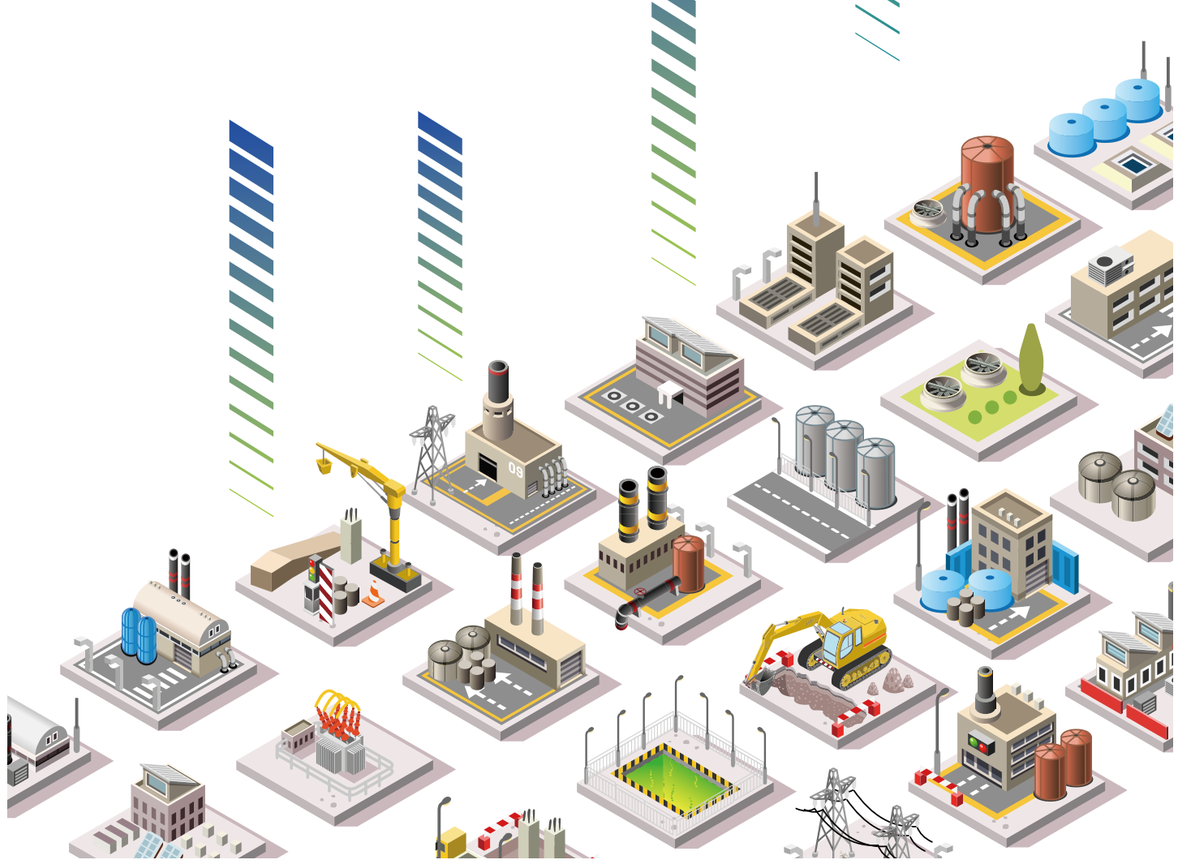
SAFETY WARNING
Carefully read the instruction manual prior to use.
Select and use the device designed to detect the required type of gas. Use of a wrong sensor type may cause an accident.

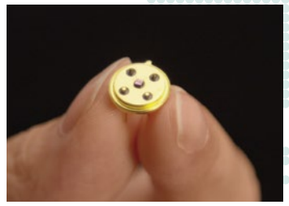
(P)202208B500

COSMOS

Gas Detection and Alarm Systems

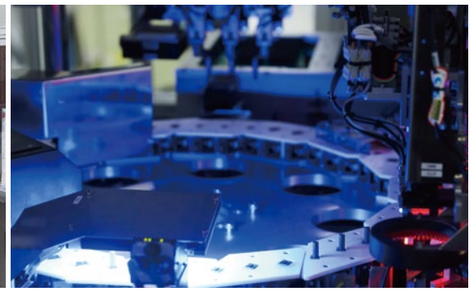
PRODUCT GUIDE





About New Cosmos Electric

1. New Cosmos Electric, succeeded in developing the world's first residential gas alarm in 1964, and still 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 after sales support 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.



PRODUCT CATEGORY and CONTENTS

GAS DETECTOR HEADS P.3-8

DIFFUSION TYPE

EXTRACTIVE TYPE

ALARM/INDICATOR UNITS P.9-12

SINGLE POINT

MULTI POINT

PANEL MOUNT UNIT

GAS ALARM SYSTEMS P.13-14

GAS DETECTOR with ALARM

SIMPLIFIED GAS ALARM SYSTEM

DIFFUSION TYPE GAS DETECTOR HEAD with DISPLAY

KD-12 SERIES

Features

- Rugged, compact and lightweight
- Various explosion proof
- Water and dust proof (IP65)
- Easy sensor replacement
- Various type of models available (HART, SIL2, Extractive type)

- Energy Industry
- Civil Engineering and Construction
- Transportation and Communications
- Petrochemical Plant
- Environment
- Agriculture and Livestock Industries
- Steel Industry
- Electrical Equipment, Machinery, and Various Manufacturing Industries
- Detection inside Boilers and Furnaces
- Semiconductor Fab
- Government, Schools, and Research Institutions
- Maintenance, Service, etc.

Approvals

- CE marking
- UKCA
- IECEx
- ATEX
- ANZEX
- China Ex (NEPSI)*1
- Korea Ex (KOSHA)*2
- India Ex (PESO)
- Taiwan Ex (ITLI)*3
- Japan Ex

*1. Only KD-12A/B/C/R/D/O *2. Only KD-12A/B *3. Only KD-12A/B/C/O

Gas Alarm
(KD-12B)

Normal Operation
(KD-12D)

Easy Sensor Replacement
(KD-12D)

Easy Maintenance
with a Magnetic Stick

Desktop Type
*Non explosion-proof

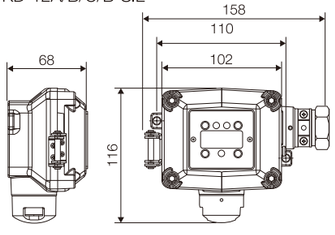
Specifications

Model	KD-12A	KD-12B	KD-12C	KD-12R	KD-12D		KD-12O	KD-12B-SIL	KD-12AH/BH	
Target Gas	Combustible gas, Toxic gas *1		Hydrogen, Helium, Carbon dioxide	Methane, Carbon dioxide	Carbon monoxide	Hydrogen sulfide	Oxygen	Combustible gas, Toxic gas	Combustible gas	
Sensor Type	Hot wire semiconductor	Catalytic	Thermal conductivity	NDIR	Electrochemical cell		Galvanic cell	Catalytic	Hot wire semiconductor	Catalytic
Detection Range	ppm	%LEL	Vol%	ppm, %LEL, vol%	ppm	ppm	vol%	%LEL	ppm	%LEL
Power Supply	24 VDC (±20%)									
Power Consumption	3 W max.									
Repeatability	F.S: ±20%	F.S: ±5%	F.S: ±5%	F.S: ±10%	F.S: ±10%	F.S: ±10%	±0.5vol%	F.S: ±5%	F.S: ±20%	F.S: ±10%
External Output	Gas concentration analog signal • 4-20 mADC (common to the negative side of power supply) Gas alarm contact (one stage only) *2 • 1a no-voltage contact output, Non-latching • HART Communication Protocol Rev. 7.5 (option) *except KD-12C									
Approvals	II 2 G Ex db IIC T5 Gb (ATEX) Ex db IIC T5 Gb (IECEx) Ex d IIC T5 (Japan EX) IP65 rating								II 2 G Ex db IIC T5 Gb (ATEX) Ex db IIC T5 Gb (IECEx) IP65 rating	
Operating Temperature *3	-10 to +50 °C			-10 to +40 °C			0 to +40 °C	-10 to +40 °C		
Operating Humidity *4	10 to 90 %RH (0 to 50 °C)			30 to 85 %RH			30 to 85 %RH	10 to 90 %RH (0 to 50 °C)		
Weight	Approx. 1.2 kg			Approx. 1.3 kg				Approx. 1.2 kg		

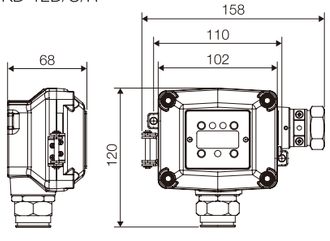
*1. Only combustible gas for ATEX certified models *2. Screwless type only *3. No rapid temperature change *4. No rapid humiddity changes, No condensation

External Dimensions

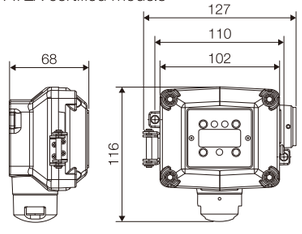
KD-12A/B/C/B-SIL



KD-12D/O/R



ATEX certified models



EXTRACTIVE TYPE GAS DETECTOR HEAD with DISPLAY

PD-12 SERIES

Features

- Extractive type with hydrogen explosion proof
- Various explosion proof
- Water and dust proof (IP65)
- Easy sensor replacement

- Energy Industry
- Civil Engineering and Construction
- Transportation and Communications
- Petrochemical Plant
- Environment
- Agriculture and Livestock Industries
- Steel Industry
- Electrical Equipment, Machinery, and Various Manufacturing Industries
- Detection inside Boilers and Furnaces
- Semiconductor Fab
- Government, Schools, and Research Institutions
- Maintenance, Service, etc.

Approvals

- CE marking
- UKCA
- IECEx
- ATEX
- ANZEX
- China Ex (NEPSI)*
- Korea Ex (KOSHA)*
- India Ex (PESO)
- Taiwan Ex (ITLI)
- Japan Ex

* Only PD-12A/B

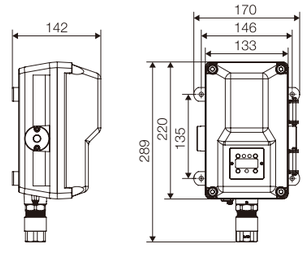
PD-12B

Specifications

Model	PD-12A	PD-12B	PD-12C
Target Gas	Combustible gas, toxic gas, etc. *1		
Sensor Type	Hot wire semiconductor	Catalytic	Thermal conductivity
Detection Range	ppm	%LEL	Vol%
Repeatability	F.S: ±20%	F.S: ±5%	F.S: ±5%
Power Supply	24 VDC (18 to 30 VDC)		
Power Consumption	7.5 W max.		
Flow Rate	Over 0.5 L/min		
External Output	• 4-20 mADC (common to the negative side of power supply) • 1a no-voltage contact output (Automatic return)		
Approvals	II 2G Ex d IIB + H2 T4 Gb (ATEX) *1 Ex d IIB + H2 T4 X (Japan EX) IP65 rating		
Operating Temperature *2	-10 to +50 °C		
Operating Humidity *3	10 to 90 %RH (0 to 50 °C)		
Weight	Approx. 5.2 kg		

*1. Some are not ATEX approved. For further information, please ask. *2. No rapid temperature change *3. No rapid humidity changes, No condensation

External Dimensions



SEMICONDUCTOR GAS DETECTOR
PS-7/PS-7-M

Features
- Automatic sampling flow control
- Easy replacement of sensor unit and pump unit
- Various gases can be detected by changing sensor units

PS-7

Semiconductor Fab
Environment
Electrical Equipment, Machinery, and Various Manufacturing Industries
Government, Schools, and Research Institutions

Approvals
- CE marking

Nomal Operation (PS-7)

Gas Alarm (PS-7)


PoE Type (PS-7-M)


Transportable Type (PGD-120)

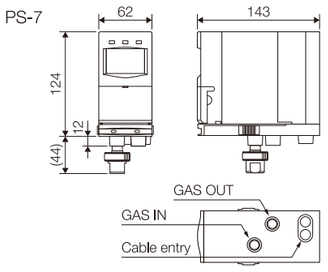
Specifications

Model	PS-7	PS-7-M
Target Gas	Combustible gas, Toxic gas, Oxygen	
Sensor Type	Electrochemical cell, Hot wire semiconductor, Galvanic cell	Electrochemical cell, Hot wire semiconductor, Catalytic combustion Galvanic cell
Transport System	Flow rate: 0.5 mL/min, Teflon, 4 mm in ID x 6 mm in OD, Length: Up to 20 m	
Power Supply	24 VDC ±10% PoE (Power over Ethernet, IEEE 802.3af/ANSI X3.263)	
Power Consumption	Approx. 6 W	Approx. 9 W
Alarm Indication	• Gas alarm (1st and 2nd stage) • Low flow alarm • Sensor trouble alarm/Incorrect sensor inserting alarm • Pyrolyzer wire break alarm *1	
External Output	• 4-20 mADC (shared with the power source negative terminal) • Gas alarm contact (1st and 2nd): 1a no-voltage contact/Non-latching • Fault contact (Open collector/Non-latching)	• Digital signal Ethernet100base-Tx (Modbus/TCP) • Digital signal RS-485 (Modbus/RTU)
Applicable Cable	• 3C or 4C shielded control cable (ϕ8-11 mm) × 2 • Digital signal Ethernet100base-Tx and PoE : LAN cable, CAT-5e or higher (PS-7M)	
Operating Temperature *2	0 to +40 °C	
Operating Humidity *3	30 to 85 %RH	
Weight	Approx. 1.0 kg	Approx. 1.3 kg

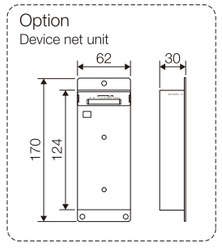
*1. Only for the model with a pyrolyzer. *2. No rapid temperature change *3. No rapid humidity change, No condensation

External Dimensions

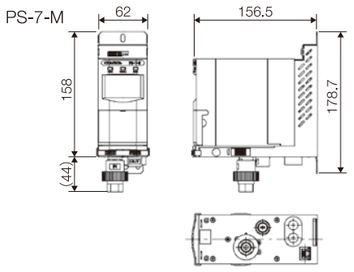
PS-7



Option
Device net unit



PS-7-M

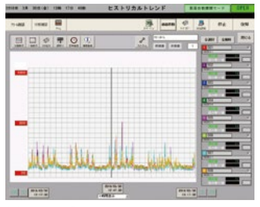


ODOR (ENVIRONMENT) DETECTOR
COD-203

Features
- Realizing the visualization of the air environment
- Continuous monitoring of chemical substances in clean rooms
- Built-in ultra-sensitive sensor
- Compact and lightweight

Petrochemical Plant
Semiconductor Fab
Environment
Government, Schools, and Research Institutions


Monitor Screen (Fixed-point monitoring)

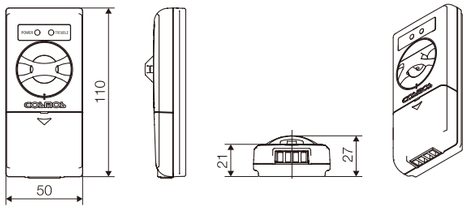

Monitor Screen (Real-time monitoring)

Specifications

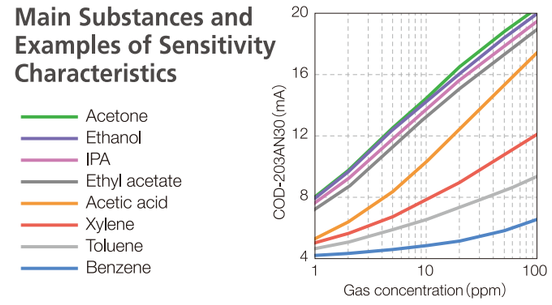
Model	COD-203A			COD-203B
Calibration Gas	Ethanol			Toluene
Sensor Type	Hot wire semiconductor			
Power Supply	DC24 V ±6 V			
Power Consumption	Approx. 2 W			
External Output	Analog 4 to 20 mA			
Full Scale	100ppm	200ppm	200ppm	5ppm
Recommended Location	Indoor / Working place		Clean room	
Operating Temperature *1	5 to +35 °C			
Operating Humidity *2	30 to 85 %RH			
Weight	Approx. 0.2 kg			

*1. No rapid temperature change *2. No rapid humidity change, No condensation

External Dimensions



Main Substances and Examples of Sensitivity Characteristics



DIFFUSION TYPE GAS DETECTOR HEAD
KD-14A/KD-14B

Specifications

Model	KD-14A	KD-14B
Target Gas	Combustible gas, Toxic gas,etc.	
Sensor Type	Hot wire semiconductor	Catalytic
Detection Range	ppm	%LEL
Power Supply	24 VDC (±20%)	
Repeatability	±20%	F.S: ±5%
Approvals	IP65 Ex d IIC T5 (TIIS)	
Operating Temperature *1	-10 to +50 °C	
Operating Humidity *2	10 to 90 %RH	
Dimensions	W158 x H116 x D68 mm	
Weight	Approx. 1.2 kg	

*1. No rapid temperature change *2. No rapid humidity changes, No condensation

DIFFUSION TYPE GAS DETECTOR HEAD
KD-2A/KD-3A

Specifications

Model	KD-2A	KD-3A
Target Gas	Combustible gas, Toxic gas,etc.	
Sensor Type	Hot wire semiconductor, Catalytic or Thermal conductivity	
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Explosion-Proof	d2G4	d3acG4/d3cG4
Operating Temperature *1	-10 to +40 °C	
Operating Humidity *2	10 to 85 %RH	
Dimensions	W144 x H180 x D100 mm	
Weight	Approx. 1.2 kg	

*1. No rapid temperature change *2. No rapid humidity changes, No condensation

DIFFUSION TYPE GAS DETECTOR HEAD
KD-5A/KD-5B

Specifications

Model	KD-5A	KD-5B
Target Gas	Combustible gas, Toxic gas,etc.	
Sensor Type	Hot wire semiconductor, Catalytic or Thermal conductivity	
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Explosion-proof	d3aG4	d2G4
Operating Temperature *1	-10 to +60 °C	
Operating Humidity *2	10 to 85 %RH	
Dimensions	W141 x H192 x D194 mm	
Weight	Approx. 1.0 kg	

*1. No rapid temperature change *2. No rapid humidity changes, No condensation

DIFFUSION TYPE GAS DETECTOR HEAD
KS-2D-N/KS-20-N

Specifications

Model	KS-2D-N	KS-20-N
Target Gas	Toxic gas	Oxygen
Sensor Type	Electrochemical	Galvanic cell
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Explosion-proof	Intrinsically safe explosion-proof 3nG5 when combined with a Zener barrier	
Operating Temperature *1	0 to +40 °C	
Operating Humidity *2	30 to 85 %RH	
Dimensions	W102 x H200 x D75 mm	
Weight	Approx. 1.5 kg	

*1. No rapid temperature change *2. No rapid humidity changes, No condensation

EXTRACTIVE TYPE GAS DETECTOR HEAD
PD-14A/PD-14B

Specifications

Model	PD-14A	PD-14B
Target Gas	Combustible gas, Toxic gas, etc.	
Sensor Type	Hot wire semiconductor	Catalytic
Detection Range	ppm	%LEL
Repeatability	± 20%	F.S: ± 5%
Detection Range	As per specifications	
Power Supply	24 VDC (18 to 30 VDC)	
Applicable Cable	Cable outer diameter: 10.5 mm to 14.5 mm 6-conductor shielded cable: CVV-S 1.25 mm² or 2.0 mm²	
Approvals	IP65 Ex d IIB + H_2T4 (TIIS)	
Operating Temperature *1	-10 to +50 °C	
Operating Humidity *2	10 to 90 %RH	
Dimensions	W133 x H260 x D132 mm	
Weight	Approx. 5.2 kg	

*1. No rapid temperature change *2. No rapid humidity changes, No condensation

EXTRACTIVE TYPE GAS DETECTOR HEAD
PE-2CC/PE-2DC

Specifications

Model	PE-2CC	PE-2DC
Target Gas	Combustible gas, Toxic gas,etc.	
Sensor Type	Hot wire semiconductor, Catalytic or Thermal conductivity	
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Power Source for Pump	100 VAC ±10%	24 VDC ±10%
Explosion-Proof	d2G4	
Operating Temperature *1	-10 to +40 °C	
Operating Humidity *2	30 to 85 %RH	
Applicable Cable	6C shielded cable: CVV-S 0.75 mm² to 2.0 mm²	
Dimensions	W122 x H390 x D196 mm (excluding accessories)	
Weight	Approx. 6.2 kg	

*1. No rapid temperature change *2. No rapid humidity changes, No condensation

EXTRACTIVE TYPE GAS DETECTOR HEAD
PS-2DP-N/PS-2DE-Ex

Specifications

Model	PS-2DP-N	PS-2DE-Ex
Target Gas	Toxic gas	
Sensor Type	Electrochemical	
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Power Source for Pump	100 VAC ±10% or 24 VDC ±10%	
Air Supply		Instrumentation air0.3-0.7 MPa
Explosion-Proof	Non-explosion-proof	Intrinsically safe explosion-proof 3nG5 when combined with a Zener barrier
Operating Temperature *1	0 to +40 °C	
Operating Humidity *2	30 to 85 %RH	
Applicable Cable	2C+2C shielded cable: CVV-S 0.75 mm² to 2.0 mm² shielded	2C shielded cable: CVV-S 0.75 mm² to 2.0 mm² shielded
Dimensions	W300 x H350 x D100 mm	
Weight	Approx. 5.0 kg	

*1. No rapid temperature change *2. No rapid humidity changes, No condensation

EXTRACTIVE TYPE GAS DETECTOR HEAD
PS-20P-N/PS-20E-Ex

Specifications

Model	PS-20P-N	PS-20E-Ex
Target Gas	Oxygen	
Sensor Type	Galvanic cell	
Detection Range	As per specifications	
Power Source for Sensor	Supplied from the indicator unit	
Power Source for Pump	100 VAC ± 10% or 24 VDC ±10%	
Air Supply		Instrumentation air 0.3-0.7 MPa
Explosion-Proof	Non-explosion-proof	Intrinsically safe explosion-proof 3nG5 when combined with a Zener barrier
Operating Temperature *1	0 to +40 °C	
Operating Humidity *2	30 to 85 %RH	
Applicable Cable	2C+2C shielded cable: CVV-S 0.75 mm² to 2.0 mm² shielded	2C shielded cable: CVV-S 0.75 mm² to 2.0 mm² shielded
Dimensions	W300 x H350 x D100 mm	
Weight	Approx. 5.0 kg	

*1. No rapid temperature change *2. No rapid humidity changes, No condensation

SINGLE POINT GAS ALARM SYSTEM
NV-120 SERIES

Features
- Color LCD for gas concentration display and various settings
- Available in 4 languages with voice alarming
- Improved operability with jog dial

Energy Industry
Petrochemical Plant
Steel Industry
Semiconductor Fab
Civil Engineering and Construction
Environment
Electrical Equipment, Machinery, and Various Manufacturing Industries
Government, Schools, and Research Institutions
Transportation and Communications
Agriculture and Livestock Industries
Detection inside Boilers and Furnaces
Maintenance, Service, etc.

Approvals
- CE marking (NV-120Mx)


Normal Operation


Gas Alarm

Fault Alarm

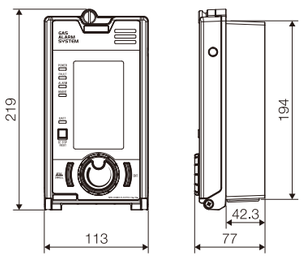
Improved Operability with Jog Dial

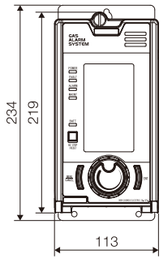
Specifications

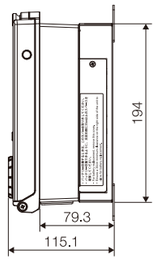
Model	NV-120Mx	NV-120Cv	NV-120Ci	NV-120Hv	NV-120Hi	NV-120Dx	NV-120Sx
Connectable Detectors	KD-12 PD-12	KD-5	KD-14 PE-2DC	KD-5	KD-14 PE-2DC	KS-2D PS-2DP	KS-2O PS-2OP
Power Supply	AC type: 100 to 240 VAC ±10% or DC: 24 VDC (18 to 26.4 VDC) *1						
Power Consumption *2	Non-backup power type: 2.0 VA (Standard)/3.4 VA (Max) Backup power type: 2.1 VA (Standard)/4.7 VA (Max)						
External Output	• Power output: 24 VDC ±10% Max.0.3 A • Signal output: 4-20 mA analog or 1-5 V *1 In the event of failure: ≤ 0.6 mA (for 4-20 mA type) and ≤ 0.25 V (for 1-5 V type) • Alarm1, Alarm2, Fault • Energised/de-energised & latching, non-latching						
Operating Temperature	Non-backup power type: -10 to +50 °C Backup power type: 0 to +40 °C						
Operating Humidity	0 to 90 %RH						
Dimensions	Non-backup power type: W113 mm × D77 mm × H219 mm Backup power type: W113 mm × D115 mm × H234 mm						
Weight	Non-backup power type: Approx. 750 g Backup power type: Approx. 2.2 kg						

*1. Must be specified at the time of ordering. *2. Consumption power of the connected gas detector is excluded.

External Dimensions







INDICATOR PANEL
UV-810 SERIES

Features
- Maximum15 V3 indicator units install available
- Wide variety of input power sources and external output

Energy Industry
Petrochemical Plant
Steel Industry
Semiconductor Fab
Civil Engineering and Construction
Environment
Electrical Equipment, Machinery, and Various Manufacturing Industries
Government, Schools, and Research Institutions
Transportation and Communications
Agriculture and Livestock Industries
Detection inside Boilers and Furnaces
Maintenance, Service, etc.


UV-810

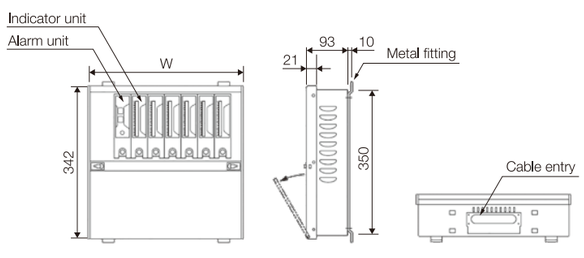

UVB-810

Specifications

Model	UV-810/UVB-810 *
Number of Indicator Units	Up to 15 points (line up: 3/6/9/12/15 point type) *
External Outputs	Terminal for collective alarm • Alarm1, Alarm2, Fault • Energised/de-energised & latching,non-latching *Collective alarm contacts of 1st alarm and 2nd alarm can be changed to 1b contact (need to specify) Terminal for individual alarm • Alarm1, Alarm2, Fault Analog output • Gas concentration analog output signal: 4-20 mA, selectable from 1-5 V (need to specify)
Power Supply	AC specification: 100-240 VAC ±10% DC specification: 24 VDC ±10% (need to specify)
Operating Temperature	-10 to +40 °C (excluding rapid temperature change)
Operating Humidity	10 to 90 %RH (excluding rapid temperature change, non-condensing)
Weight	UV-810=5.5-13.5 kg UVB-810=8.0-16 kg (depends on the number of units)

* Including backup battery (Up to 6 points)

External Dimensions



	Mounting Points	Dimensions of W (mm)
UV-810	3	236
	6	350
	9	526
	12	640
	15	814
UVB-810	3	414
	6	642

PANEL MOUNT UNIT
VAS/V3 SERIES

Features
- Easy to notice the alarm status with LED bar graph
- Can be replaced in the existing COSMOS indicator unit
- VAS can give various outputs to external devices

- Energy Industry
- Petrochemical Plant
- Steel Industry
- Semiconductor Fab
- Civil Engineering and Construction
- Environment
- Electrical Equipment, Machinery, and Various Manufacturing Industries
- Government, Schools, and Research Institutions
- Transportation and Communications
- Agriculture and Livestock Industries
- Detection inside Boilers and Furnaces
- Maintenance, Service, etc.

Approvals
- CE marking (VSC-4B+V3 type M)

Alarm Unit (VAS)/
Indicator Unit (V3)

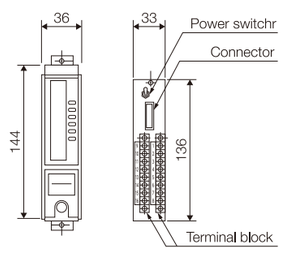
V3 with Single Case

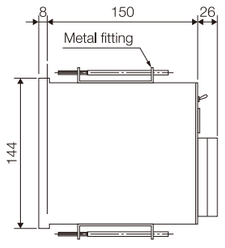
Specifications

Model		VAS
External Output	Alarm Contact	1c no-voltage for 1st and 2nd stage alarm (100 VAC/1 A resistance load)
	Trouble Contact	1a no-voltage (100 VAC/1 A resistance load, 24 VDC, 1 A resistance load)
	Buzzer Contact	
Power Supply		24 VDC ±10%
Power Consumption		Approx. 3.5 W (24 V for alarm)
Operating Temperature		-10 to +40 °C
Operating Humidity		10 to 90 %RH
Weight		Approx. 600 g (including 450 g single case)

Model		V3	
Type		Hv, Hi, Cv, Ci, Tv, Ti, D, O	M
Alarm Levels		Adjustable within the detection range for 1st and 2nd stage alarm	
Power Supply		24 VDC ±10%	
Power Consumption		Approx. 4.0 W (excluding power consumption of extractive gas detector)	Approx. 5.0 W (excluding power consumption of detector)
External Output	Contact Output	1c no-voltage, 1a for fault	
	Analog Output	4-20 mADC	
Operating Temperature		-10 to +40 °C	
Operating Humidity		10 to 90 %RH	
Weight		Approx. 600 g (including 450 g single case)	

External Dimensions





MULTI POINT GAS ALARM SYSTEM
NV SERIES

Features
- Equipped with 2 days backup power supply (optional)
- Easy to operate multifunction
- Robust design

NV-400

- Energy Industry
- Petrochemical Plant
- Steel Industry
- Semiconductor Fab
- Civil Engineering and Construction
- Environment
- Electrical Equipment, Machinery, and Various Manufacturing Industries
- Government, Schools, and Research Institutions
- Transportation and Communications
- Agriculture and Livestock Industries
- Detection inside Boilers and Furnaces
- Maintenance, Service, etc.

NV-500

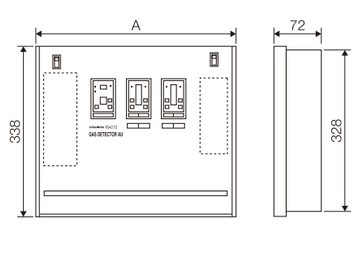
NV-410

NV-600HS

Specifications

Model		NV-500	NV-400/NV-410	NV-600/NV-600HS
Target Gas		LPG, Methane/Gasoline (LEL)	Methane (LEL)	NV-600: Combustible gas (LEL) NV-600HS: Combustible gas (ppm and LEL)
Connectable Detectors		Diffusion type: KD-5A-N/KD-5B-N, KD-2A/KD-3A, KD-14 Extractive type: PE-2DC, PD-14		
Number of Indicator Units		Up to 12 units		
Sensor Type		Catalytic	Hot wire semiconductor	Catalytic/Hot wire semiconductor
Power Supply		AC type: 100 to 240 VAC±10% or DC: 24 VDC (18 to 26.4 VDC)		
External Output	Individual Alarm Contact	Alarm1	Alarm1, Alarm2	
	Individual Voltage Output	0-6-12 VDC		
	Collective Alarm Contact	Alarm1	Alarm1, Alarm2	
	Centralized Monitor Panel Output	0-6-12 VDC		
	External Buzzer Contact	Alarm1	Alarm1, Alarm2	
	External Buzzer Voltage Output	12 VDC		
Operating Temperature		0 to +40 °C		
Operating Humidity		0 to 90 %RH		
Weight		As per specifications 5.0 kg~		
Options		External buzzer, Panel mounting attachement		

External Dimensions



Dimension table (mm)

Mounting Points	Dimensions of A	Notes
2	220	No back up power supply
2	298	With back up power supply
4	421	In common
6	495	
8	569	
10	643	
12	717	

Weight table (kg)*

Mounting Points	No back up power supply	With back up power supply
2	4.0	
2		7.0
4	6.5	9.0
6	7.5	10.0
8	8.5	11.0
10	9.5	12.0
12	10.5	13.0

*In the event of all points are implemented

SIMPLIFIED GAS ALARM SYSTEM
B-780/KD-5

Features
- Compact and light weight
- 3 types of external output
- Suitable for different target gas applications
- Operation check can be done easily

B-780


KD-5

- Civil Engineering and Construction
- Government, Schools, and Research Institutions
- Environment
- Transportation and Communications
- Electrical Equipment, Machinery, and Various Manufacturing Industries
- Detection inside Boilers and Furnaces


Non-explosion-proof
Detector Head (GD-1B)

Specifications

Alarm Unit

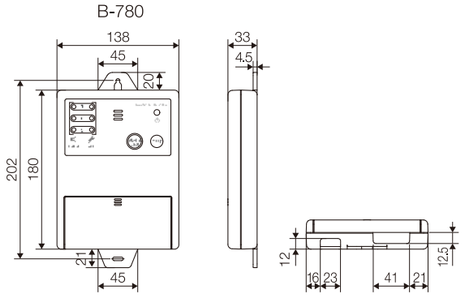
Model	B-780
Target Gas	Methane (LNG)/LPG
Power Voltage	AC type: 100 to 240 VAC
Number of Connected Detectors	Up to 3 units
Connectable Detectors	KD-5G, KD-5GM, KD-5T, KD-5M, GD-1B
External Outputs	(1) 6 VDC at nomal operation, 12 VDC at gas alarm, and 0 VDC at fault alarm
	(2) 100/220 VAC, 1 A
	(3) Alarm Energised/de-energised
Weight	420 g
Operating Temperature	-10 to 40 °C

Detector Head

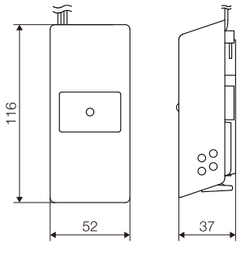
Model	KD-5G	KD-5GM	KD-5T	KD-5M	GD-1B
Target Gas	LPG	Methane	LPG	Methane	LPG
Detection Range	1/100 to 1/4 %LEL				
Power Voltage	DC type: 24 VDC (18 to 26, 4 VDC)				
Explosion-Proof	d2G4		N/A		N/A
Operating Temperature	-10 to +60 °C			-10 to +50 °C	-10 to +40 °C
Weight	Approx. 1.5 kg				Approx. 200 g

External Dimensions

B-780



GD-1B



SINGLE POINT GAS DETECTOR with INDICATOR and ALARM
KS-7 SERIES

Features
- Clear flowing LED lights for gas alarm indication
- Automatic backup power for more than 2 weeks (350 hrs.)
- Compact, lightweight and easy installation

KS-7D

- Steel Industry
- Government, Schools, and Research Institutions
- Semiconductor Fab
- Transportation and Communications
- Civil Engineering and Construction
- Agriculture and Livestock Industries

Approvals
- CE marking


Normal Operation (KS-7O)


Gas Alarm (KS-7O)


KS-7R


With Battery Unit (Option)

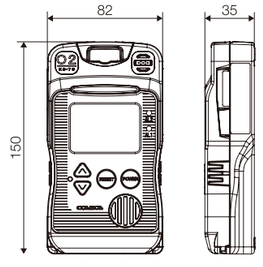

KS-7OF, Separate Sensor Unit (Option, Available for only KS-7O)

Specifications

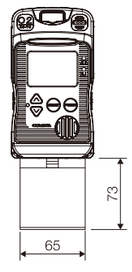
Model	KS-7O	KS-7D	KS-7R
Target Gas	Oxygen	Carbon Monoxide	Carbon Dioxide
Sensor Type	Galvanic cell Sensor	Electrochemical	NDIR Sensor
Detection Range	0 to 25.0 vol% or 0 to 50.0 vol%	0 to 75 ppm, 0 to 150 ppm, 0 to 250 ppm, or 0 to 4000 ppm	360 to 5,000 ppm
Power Supply	24 VDC ±10%		
Power Consumption	Monitoring: 1 W, During alarm: 3 W		
Alarm Set Value	For 25.0 vol%: 1st stage 19.0 vol% 2nd stage: 18.0 vol% For 50.0 vol%: 1st stage 18.0 vol% 2nd stage: 25.0 vol%	For F.S. 75 ppm: 25/50 ppm For F.S. 150 ppm: 50/100 ppm For F.S. 250 ppm: 50/150 ppm For F.S. 400 ppm: 50/150 ppm	AL1: 2,000ppm AL2: 5,000ppm
External Output	Gas concentration analog output: 4-20 m ADC Alarm1, Alarm2, Fault Latching, non-latching		
Operating Temperature *1	-10 to +40 °C	-5 to +40 °C	-10 to +50 °C
Operating Humidity *2	30 to 85 %RH		0 to 85 %RH
Weight	Approx. 300 g		
Opions	Separate Sensor Unit (KS-7OF) Battery Unit KS-7xB	Battery Unit KS-7xB	Battery Unit KS-7xB

*1. No rapid temperature change *2. No rapid humidity, No condensation

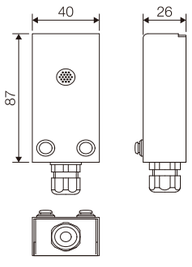
External Dimentions



Battery unit



Separate sensor unit



Classification of Explosive Gases and Explosion Protection

Classification of Explosive Gases

Classification as per the Japanese Standards

•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 Toluene Benzene Methane	Ethanol Isopentyl acetate 1-Butanol Butane Acetic anhydride Ethyl acetate Propane Methanol	Gasoline Hexane	Acetaldehyde Ethyl ether	
2	Coal gas	Ethylene Ethylene oxide			
3	Water gas Hydrogen	Acetylene			Carbon disulfide

•Explosion Classes

Class	Minimum gap with 25 mm-length path which permits the flame propagation (mm)
1	> 0.6
2	0.4 < gap ≤ 0.6
3	≤ 0.4

* Explosion is categorized into three classes according to the minimum gap to allow for flame propagation, determined by using a standard container for explosion gas.

•Ignition Groups

Group	Ignition Temperature (°C)
G1	> 450
G2	≤ 450
G3	≤ 300
G4	≤ 200
G5	≤ 135

* Ignition is categorized into five groups according to the ignition temperature of explosive gases.

Classification as per the IEC Standards

•Equipment Groups and Temperature Classes of Typical Explosive Gases

Equipment Group \ Temperature Class	T1	T2	T3	T4	T5	T6
IIA	Acetone Ammonia Ethyl acetate Toluene Benzene Methane Ethane Acetic acid Isobutane	1-Butanol Propane Methanol Acetic anhydride	n-Hexane	Acetaldehyde		
IIB	Carbon monoxide	Ethanol Ethylene Ethylene oxide		Ethyl ether		
IIC	Hydrogen	Acetylene				Carbon disulfide

•Equipment Groups

Flameproof Enclosure

Group	Maximum Experimental Safe Gap (mm)
IIA	≥ 0.9
IIB	< 0.9
IIC	≤ 0.5

Intrinsic Safety

Group	Minimum Ignition Current (MIC) Ratio
IIA	> 0.8
IIB	0.45 ≤ MIC ≤ 0.8
IIC	< 0.45

•Temperature Classes

Class	Surface Temperature (°C)
T1	≤ 450
T2	≤ 300
T3	≤ 200
T4	≤ 135
T5	≤ 100
T6	≤ 85

* Source: ISO/IEC 80079-20-1:2017

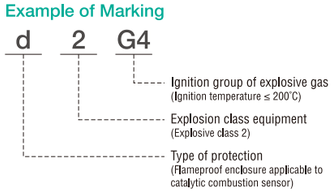
Classification of Explosion Protection

Symbols as per the Japanese Standards

Item	Symbol	Description
Type of protection	d	Flameproof enclosure
	o	Oil immersion
	f	Pressurization
	e	Increased safety
	ia, ib	Intrinsic safety
	s	Special measures
Gas Group	1	Applicable to explosion class 1 gases/vapors
	2	Applicable to explosion classes 1&2 gases/vapors
	3a	Applicable to explosion classes 1&2 gases/vapors + water gas + H_2
	3b	Applicable to explosion classes 1&2 gases/vapors + CS_2
	3c	Applicable to explosion classes 1&2 gases/vapors + C_2H_2
	3n	Applicable to all gases
Ignition Group of Explosive Gas	G1	Ignition temperature > 450°C
	G2	Ignition temperature ≤ 450°C
	G3	Ignition temperature ≤ 300°C
	G4	Ignition temperature ≤ 200°C
	G5	Ignition temperature ≤ 135°C

* Only Intrinsically safe equipment can be used in Zone 0.

Example of Marking

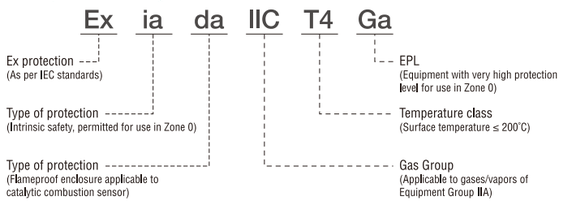


Symbols as per the IEC Standards

Item	Symbol	Description
Ex Protection	Ex	Explosion-proof structure in conformity to the IEC-harmonized standards
Type of Protection	da	Flameproof enclosure
	db	Flameproof enclosure
	dc	Flameproof enclosure
	pv	Pressurization
	pxb	Pressurization
	pyb	Pressurization
	pzc	Pressurization
	eb	Increased safety
	ec	Increased safety
	ob	Oil immersion
	oc	Oil immersion
	ia	Intrinsic safety
	ib	Intrinsic safety
	ic	Intrinsic safety
Gas Group	II	For industrial applications
	IIA	Applicable to gases/vapors of Equipment Group IIA
	IIB	Applicable to gases/vapors of Equipment Group IIB
	IIC	Applicable to gases/vapors of Equipment Group IIC
Temperature Class	T1	Surface temperature ≤ 450°C
	T2	Surface temperature ≤ 300°C
	T3	Surface temperature ≤ 200°C
	T4	Surface temperature ≤ 135°C
	T5	Surface temperature ≤ 100°C
	T6	Surface temperature ≤ 85°C
Equipment Protection Level (EPL)	Ga	Equipment with very high protection level for use in Zone 0
	Gb	Equipment with high protection level for use in Zone 1
	Gc	Equipment with enhanced protection level for use in Zone 2

* Source: IEC 60079-0:2017

Example of Marking



* Source: IEC 60079-0:2017

Danger of Combustible and Toxic Gases and Vapors

Gas/Vapor	Chemical Formula	Flammable Range (vol%)	Explosion Class	Ignition Group	Flash Point (°C)	TLV (ppm)	Specific Gravity of Gas (air=1)
Hydrogen	H_2	4.0 – 75.0	3	G1	(gas)	—	0.07
Methane	CH_4	5.0 – 15.0	1	G1	(gas)	—	0.55
Propane	C_3H_8	2.1 – 9.5	1	G2	(gas)	—	1.60 I
n-Butane	C_4H_{10}	1.6 – 8.5	1	G2	(gas)	—	2.05
Isobutane	C_4H_{10}	1.8 – 8.4 I	*1	*1	(gas)	—	2.00 I
n-Pentane	C_5H_{12}	1.5 – 12.5	1	G3	< -40	1,000	2.49
Ethylene	C_2H_4	2.7 – 36	2	G2	(gas)	200	0.98 I
Propylene	C_3H_6	2.0 – 11.0	1	G1	(gas)	500	1.49
Butylene (cis-2-Butene)	C_4H_8	1.7 – 9.0 I	*1	*1	(gas)	—	1.9 I
Acetylene	C_2H_2	1.5 – 100	3	G2	(gas)	—	0.90
Toluene	$C_6H_5CH_3$	1.2 – 7.1	1	G1	4	20	3.18
o-Xylene	$C_6H_4(CH_3)_2$	1.0 – 6.0	1	G1	32	100	3.66
Methanol	CH_3OH	6.0 – 36	1	G2	11	200	1.10
Ethanol	C_2H_5OH	3.3 – 19	1	G2	13	(STEL1,000)	1.59
Acetone	$(CH_3)_2CO$	2.1 – 13	1	G1	-20	250	2.00
Methyl ethyl ketone	$CH_3COC_2H_5$	1.8 – 11.5	1	G2	-9	200	2.48
Ethyl acetate	$CH_3COOC_2H_5$	2.0 – 11.5	1	G2	-4	400	3.04
Butyl acetate	$CH_3COO(CH3)_2CH_3$	1.7 – 7.6	1	G2	22	50	4.01
Town gas (methane)	—	As per Methane	*1	*1	(gas)	—	0.55
LPG (Isobutane)	—	As per Isobutane	*1	*1	(gas)	—	2.0 I
Gasoline	—	1.0 – 7.0	1	G3	< -20	300	3~4
Kerosene	—	0.7 – 5 I	1	G3	37–65	200mg/m³	4.5 I
n-Hexane	$CH_3(CH_2)_4CH_3$	1.1 – 7.5	1	G3	-22	50	2.79
Butadiene	CH_2=CHCH=CH_2	2.0 – 12	2	G2	(gas)	2	1.87
Acetaldehyde	CH_3CHO	4.0 – 60	1	G4	-39	(C25)	1.52
Polyvinyl chloride	CH_2=CHCl	3.6 – 23	1	*1	(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	0.60 I
Hydrogen sulfide	H_2S	4.0 – 44	2	G3	(gas)	1(10*2)	1.19
Chlorine	Cl_2	— —	—	—	—	0.1	2.5 I
Sulfur dioxide	SO_2	— —	—	—	—	(STEL0.25)	2.25 I
Benzene	C_6H_6	1.3 – 7.1	1	G1	-11	0.5	2.70
Acrylonitrile	CH_2=CHCN	3.0 – 17	1	G1	0	2	1.83
Methyl bromide	CH_3Br	10.0 – 16.0 I	*1	*1	—	1	3.3 I
Ethylene oxide	CH_2CH_2O	3.6 – 100	2	G2	(gas)	1	1.52
Hydrogen cyanide	HCN	5.6 – 40	1	G1	-18	(C4.7)	0.93
Phosgene	$COCl_2$	— —	—	—	—	0.1	3.4 I
Hydrogen chloride	HCl	— —	—	—	—	(C2)	1.3 I
Arsine	AsH_3	4.5 – 78 I	—	—	—	0.005	2.70 I
Phosphine	PH_3	1.8 – I	—	—	—	0.05	1.17 I
Silane	SiH_4	1.37 – 100 I	—	—	—	5	1.3 I
Diborane	B_2H_6	0.8 – 88 I	—	—	—	0.1	0.96 I
Germane	GeH_4	— —	—	—	—	0.2	2.65 I
Dichlorosilane	SiH_2Cl_2	4.1 – 99 I	—	—	—	—	3.48 I
Hydrogen selenide	H_2Se	— —	—	—	—	0.05	2.8 I
Fluorine	F_2	— —	—	—	—	0.1	1.3 I
Nitrogen dioxide	NO_2	— —	—	—	—	0.2	1.58 I
Chlorine trifluoride	ClF_3	— —	—	—	—	(C0.1)	3.18 I
Hydrogen fluoride	HF	— —	—	—	—	0.5	0.7 I
Hydrogen bromide	HBr	— —	—	—	—	(C2)	2.8 I

NOTE
· The flammable range, explosion class, ignition group, flash point and specific gravity are derived from the Recommended Practices for Explosion-Protected Electrical Installation in General Industries issued by the National Institute of Industrial Safety (TIIS) on March 31, 2006. The entries marked with "I" are derived from the International Chemical Safety Cards (ICSCs).
· The TLVs are the ones released by ACGIH in 2020. There are three types of TLVs, TWA, STEL and Ceiling. The values of STEL and Ceiling are noted in brackets with "STEL" or "C".
*1. Not provided in the Recommended Practices for Explosion-Protected Electrical Installation in General Industries.
*2. When in the oxygen deficiency state as per Article 2 (2) in the Ordinance on Prevention of Anoxia, etc. (a state under which the oxygen concentration in the air is less than 18%, or in which the concentration of hydrogen sulfide in the air is 10ppm or more).

Flammable Range (Explosive Range)

When mixed with air or oxygen, a combustible gas within a specific concentration range will generate an explosion on contact with an ignition source. This range is called explosive range. The lowest concentration of the range is the Lower Explosive Limit (LEL) and the highest is the Upper Explosive Limit (UEL).

Threshold Limit Value (TLV)

TLVs refer to airborne concentrations of chemical substances (e.g., toxic gas) and represent occupational exposure limits under which workers may work repeatedly for 8 hours a day, day after day, without adverse health effects. Established as guidelines by the American Conference of Governmental Industrial Hygienists (ACGIH) and Japan Society for Occupational Health.