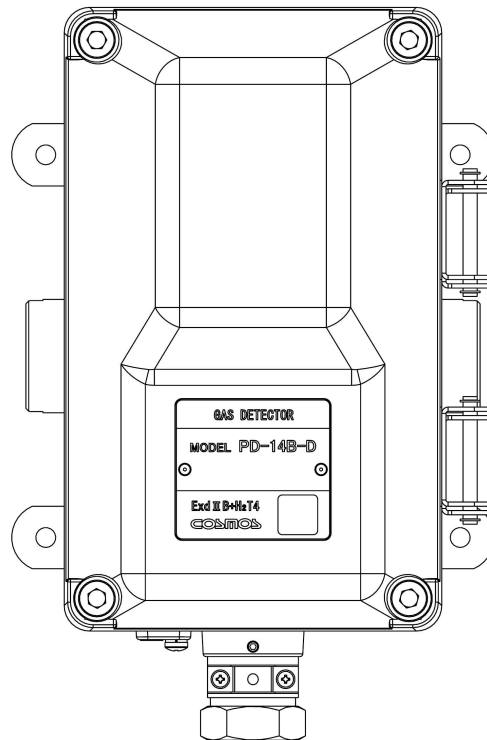


Extractive type Gas Detector

Model PD-14

Instruction Manual



- Keep this instruction manual where it is readily accessible.
- Thoroughly read this instruction manual before using the equipment so it can be used safely and correctly.
- This manual provides information concerning standard specifications. If the specifications of your model are nonstandard, refer to the delivery specifications.



NEW COSMOS ELECTRIC CO., LTD.

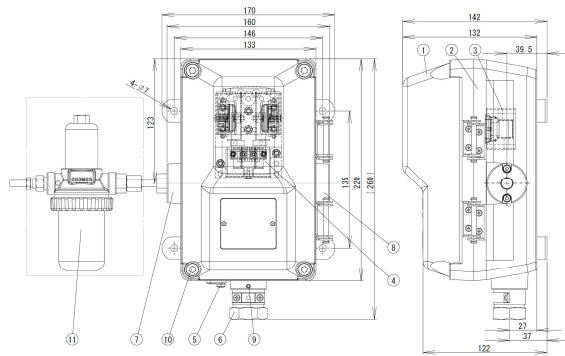
Instruction Manual No.

GAE-044

August 2012

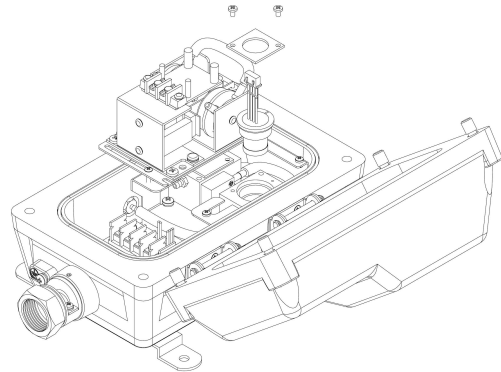
- **Part Names and Functions**

See page 4 to 6.



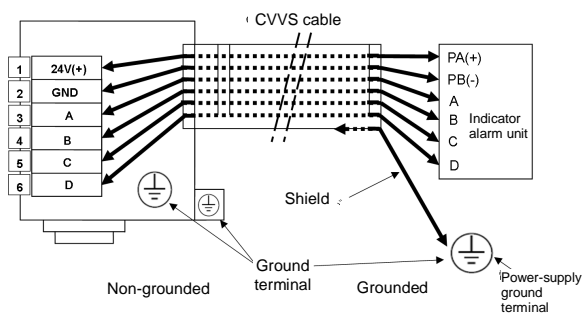
- **Replacement of Sensor Unit**

See page 20 to 21.



- **Wiring and Connecting Methods**

See page 11 to 14.



- **Maintenance Check and Operation Methods**

See page 16 to 23.

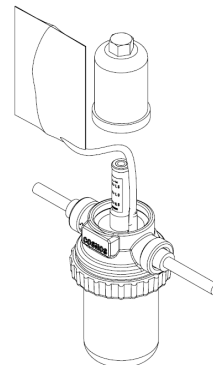


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1. Introduction




- Thank you for purchasing PD-14 Extractive type Gas Detector.
- In order to ensure the correct and safe operation of this product, be sure to read this manual before use.
- This product detects various types of gas including combustible gas and detects gas leakage at an early stage in industrial facilities (e.g., gas manufacturing facilities, chemical plants, paint factories, and power plants),
- Following PD-14s are available, according to the gas sensor incorporated.

Model	Detection Principle
PD-14A-D	Hot wire semiconductor sensor
PD-14B-D	Catalytic combustion sensor
PD-14C-D	Thermal conductivity sensor

- Maintenance and inspection are indispensable to the reliable performance of the Gas Detection/Alarm System. Be sure to perform the maintenance checks described in this manual.

Explanation of Symbols

The following symbols are used to indicate and classify precautions in this manual.

 DANGER	Indicates information that, if not heeded, is likely to result in death or serious injury.
 WARNING	Indicates information that, if not heeded, could possibly result in death or serious injury.
 CAUTION	Indicates information that, if not heeded, could result in minor injury, or damage to the product.
MEMO	Indicates advice on handling the product.

2. Precautions

- Read this manual completely and be sure you understand the information provided herein before attempting to use the product.
- Abide by all applicable laws and regulations when using this product.



WARNING

- Be sure to ground the product to prevent electric shocks.
- If there is a gas leak alarm, take the necessary measures in accordance with your company's regulations.



CAUTION

- All necessary work for the product including wiring and installation should be carried out by suitably trained personnel in accordance with applicable code of practice.
- Inspection, maintenance and repair of the equipment should be carried out by suitably trained personnel in accordance with applicable code of practice.
- To avoid damaging the explosion-proof structure, never attempt to disassemble this product.
- Do not install the product in places or near places where silicone sealant or gas is used. Otherwise, the performance of the product may be adversely affected.
- Be sure to provide a protection cover (optional) if the product is installed outdoors.
- Use the product in accordance with applicable laws and regulations.

3. Contents of Package

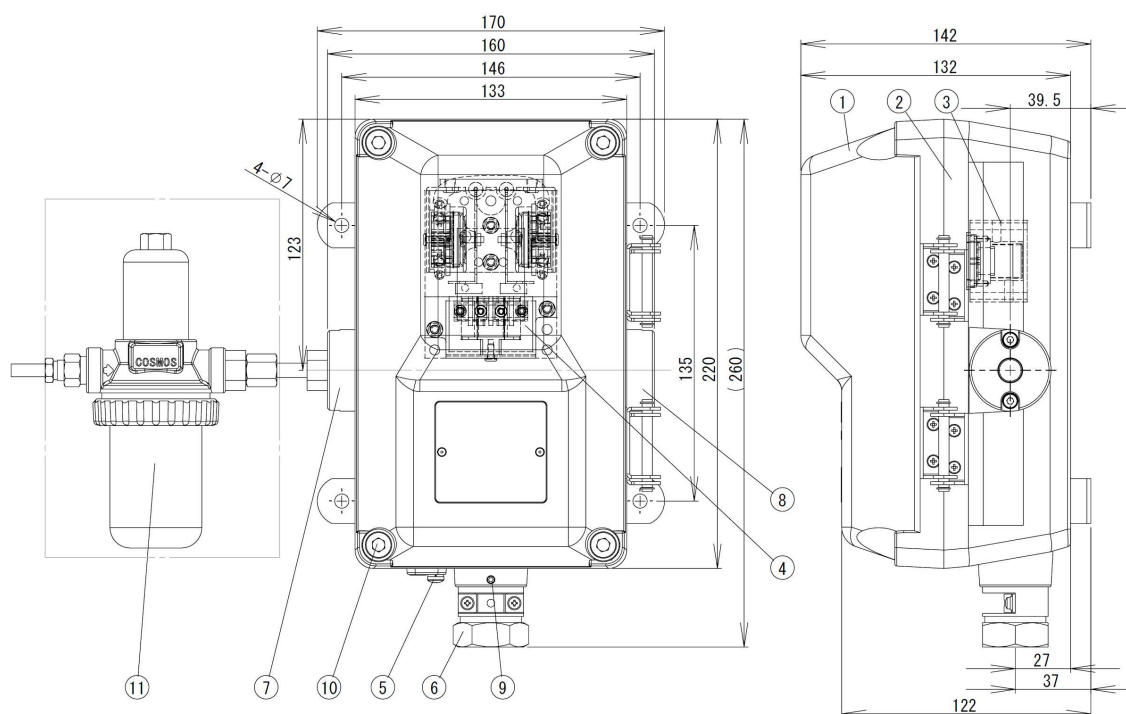
- The product is provided with the following items. Make sure that none of these items is missing.
- Although the product is packed and shipped with the utmost care, contact your New Cosmos representative if there should be any damage or missing items.

Accessories	Optional items
Detector head Gas collector PF-N3 (see note 1) Flow checker FC-32 (see note 2) Attachment set (see note 3) Pressure tight packing (each of dia.13, 13.5, 14, 14.5) Two washers (dia. 14) Clamp type B Four M6 screws Two joints Hexagon wrench (each of nominal dia. 2 and 6: see note 4) Instruction manual (see note 4)	Protective cover (see note 5) Auto drain AD-40 (see note 6)

- Note: 1. It is put on the tip of sampling hose in order to drain rain drop/water splash. Do not use the collector when the sampling is made in ducts, furnaces and closed cabinet.
2. Specifications of the flow checker FC-32 vary according to the requirement. Refer to the specification sheets for the details.
3. Pressure-tight-packing dia. 15, washer dia. 15, and A clamp are built in the product as standard.
4. A pair of hexagon wrenches and instruction manual are provided for each order.
5. It is used when the detector is installed outdoor.
6. The auto drain is designed to automatically discard the accumulated moisture from gas sampling hose from pits/furnaces.

4. External Dimensions and Part Names

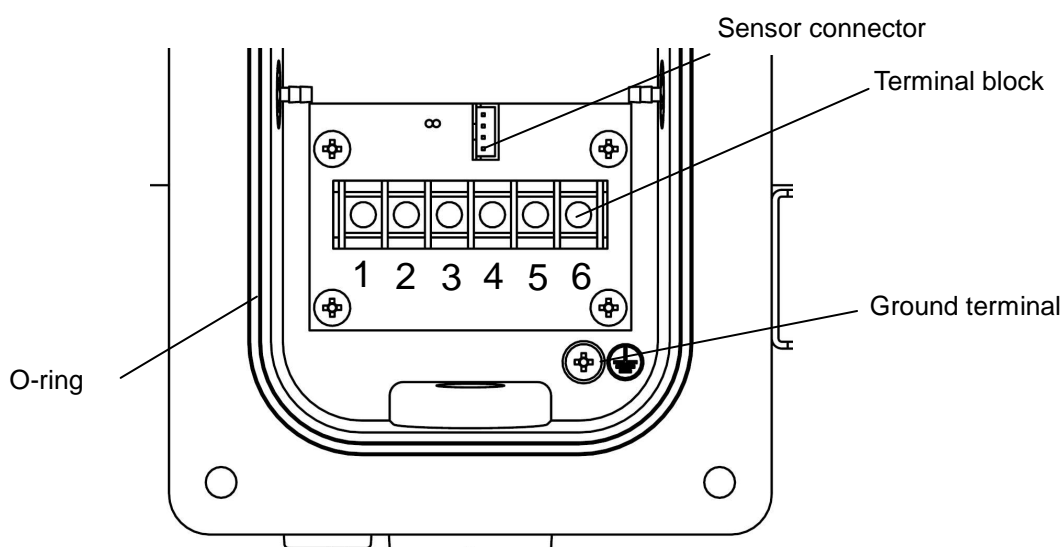
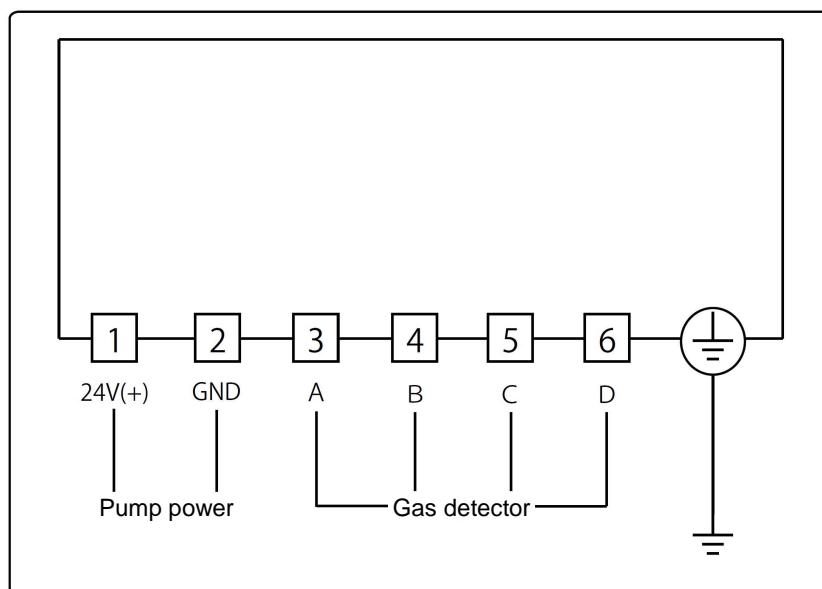
4-1. Main Unit




Number	Name	Description
1	Casing cover	
2	Casing	
3	Sensor unit	Incorporates a gas sensor.
4	Pump unit	Draws sample gas and exhaust it.
5	Ground terminal	Used when grounding the frame.
6	Cable gland	Used for securing the cable. (Size: G 3/4)
7	Gas inlet	Inlet for sampled gas. (Size: Rc 1/4)
8	Gas outlet	Exhaust outlet for sampled gas. (Size: Rc 1/4)
9	Hexagon socket locking screw	Used for securing the cable gland with a hexagon wrench of nominal diameter 6 mm.
10	Hexagon socket bolt	Used for securing the casing cover with a hexagon wrench of nominal diameter 6 mm.
11	Flow checker FC-32	Prevents dust from entering the gas inlet. (Size: Rc 1/4)

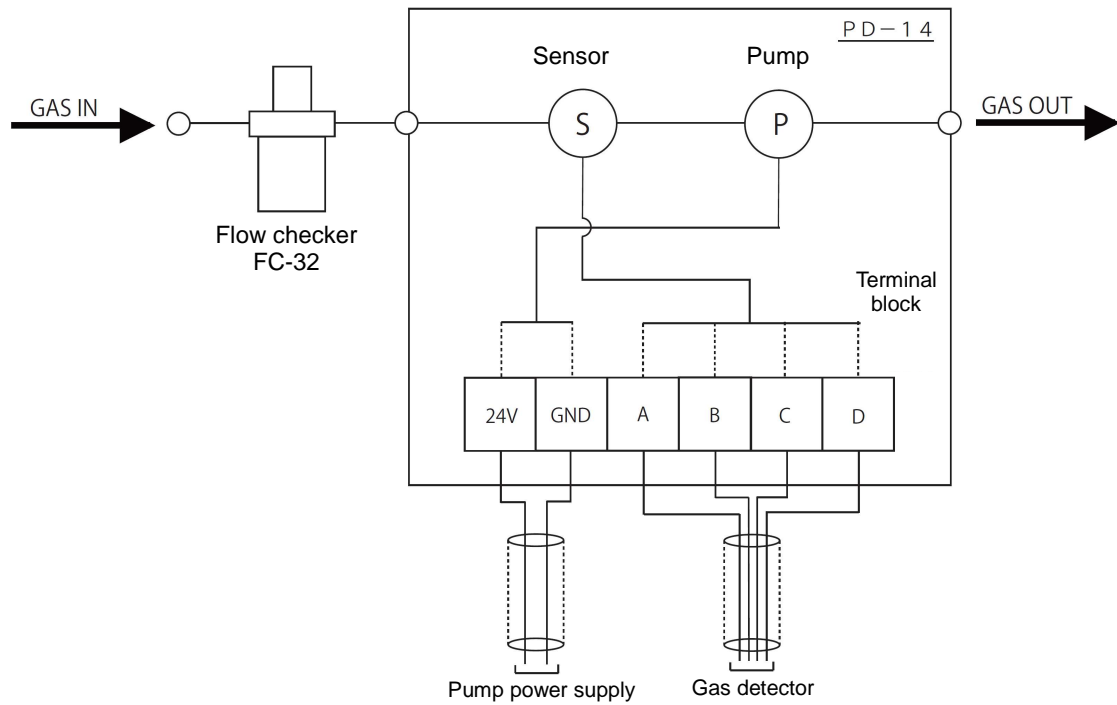
4-2. Terminal Block

Terminal Block



Number	Name	Description
1	24V(+)	Pump power supply PA(+)
2	GND	Pump power supply PB(-)
3	A	Gas detector
4	B	
5	C	
6	D	
	Ground terminal	Used to ground the frame.

4-3. Flow Diagram



Main components and functions

- 1) Sensor : Converts gas concentration detected to an electrical signal. One from the catalytic combustion sensor, hot-wire semiconductor sensor or thermal conductivity sensor is on the detector.
- 2) Pump : Draw the sample gas through sampling pipe from the detection point.
- 3) Terminal block : Terminal block for external connection.
Refer to 6. *Wiring Method* for details.

5. Installation

5-1. Installation Method



CAUTION

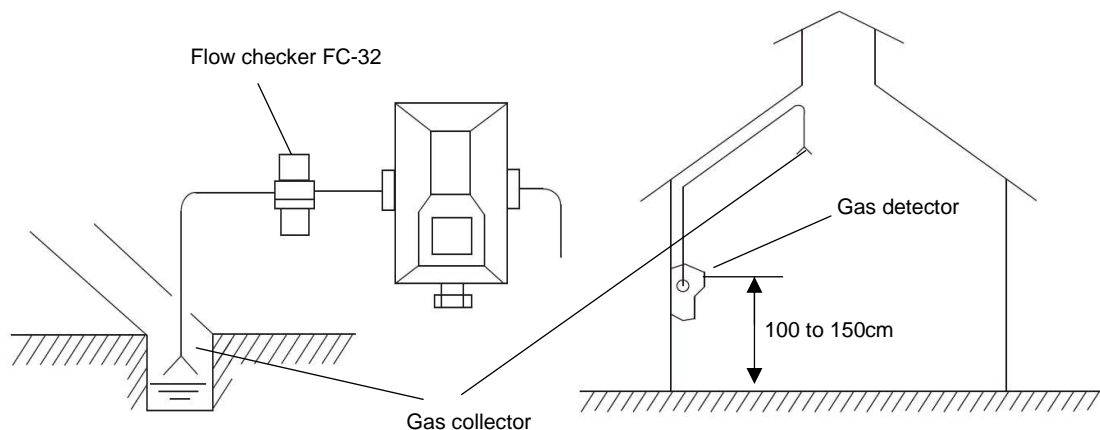
- Be careful not to damage the gas detector when installing. Otherwise, the explosion-proof performance of the gas detector will be lost.
- Use appropriate piping material considering type of gas to be detected.
- Maximum length of the piping should be less than 20m. pay attention that the response time of the detector shall be delayed when the length of the piping is longer due to transport time of sampled gas. And the length of the piping should be as short as possible when the type of gas to be detected is highly absorbent gases.
- Do not install the product in the following places.
 - Places where the ambient temperature exceeds the operating temperature range (-10 to 50 degrees C)
 - Places where condensation occurs or water is directly sprayed.
 - Places subject to corrosive gas.
 - Places where are in direct sunshine.
 - Places close to equipment that generates high frequencies or a magnetic field.
 - Places where silicone sealant is used or likely to be used.
 - Places where silicone gas is used or likely to be used.
- Do not install the gas detector or tip of sampling pipe where vapor which contains silicone, or the sensor may be adversely affected.
- Install the gas detector in places where it can be maintained and inspected with ease.
- Install the gas detector in places free from vibration.
- Install the gas detector in places free from sudden temperature changes.
- Keep the gas detector free from Impacts.
- When installing the gas detector outdoors, be sure to install the protective cover (optional).
- Install auto drain (option) when the gas is sampled near the outlet of steam or where likely to suck the water.
- The pressure of gas inlet port should be plus or minus 1kPa and the pressure of outlet port should be less than 1kPa.

- 1) Locate the tip of gas sampling pipe to be appropriate for the specific gravity of gas to be detected. It must also be placed in a location where the target gases are likely to accumulate.

Installing height

Type of gas	Installing height	Remarks
Gas heavier than air (example: LPG)	A maximum of 10cm above the floor. (Height to sensor guard)	Keep a space of approximately 7cm from the sensor guard tip for maintenance and inspection.
Gas nearly equal to air (example: carbon monoxide)	75 to 150cm above the floor. (Height to sensor guard)	Decide the height by considering the specific gravity and mounting environment.
Gas lighter than air (example: hydrogen)	Near the ceiling	Decide the height by considering arrangements for maintenance.

- 2) Install the gas detector in places where it can be maintained and inspected with ease. Following are locations where leaked gas may accumulate and appropriate locations for installation of gas detectors.



Example of detection in pipe and pit

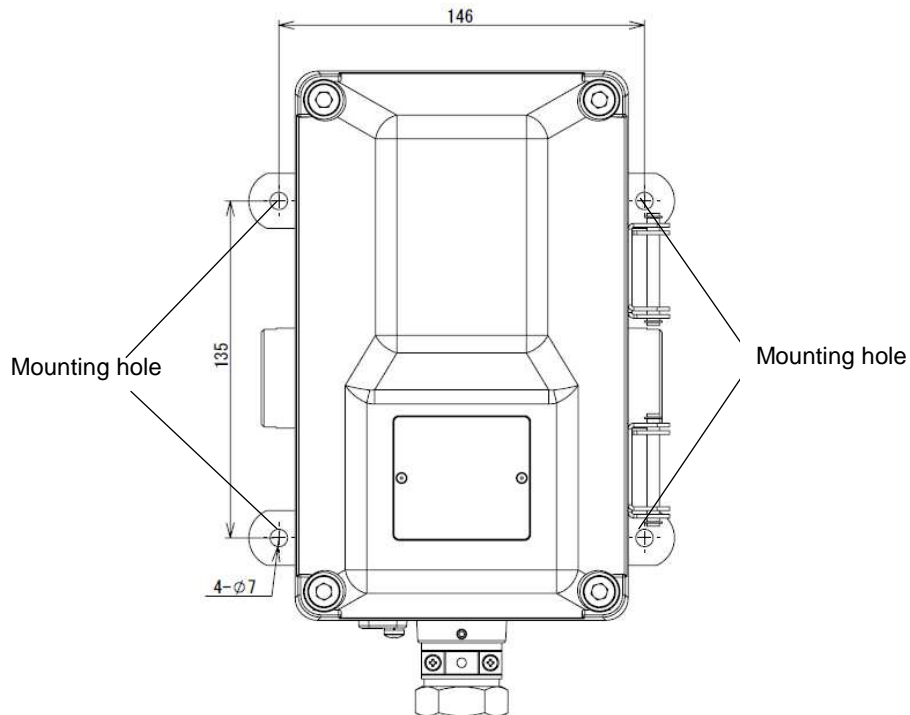
Example of detection at high altitude



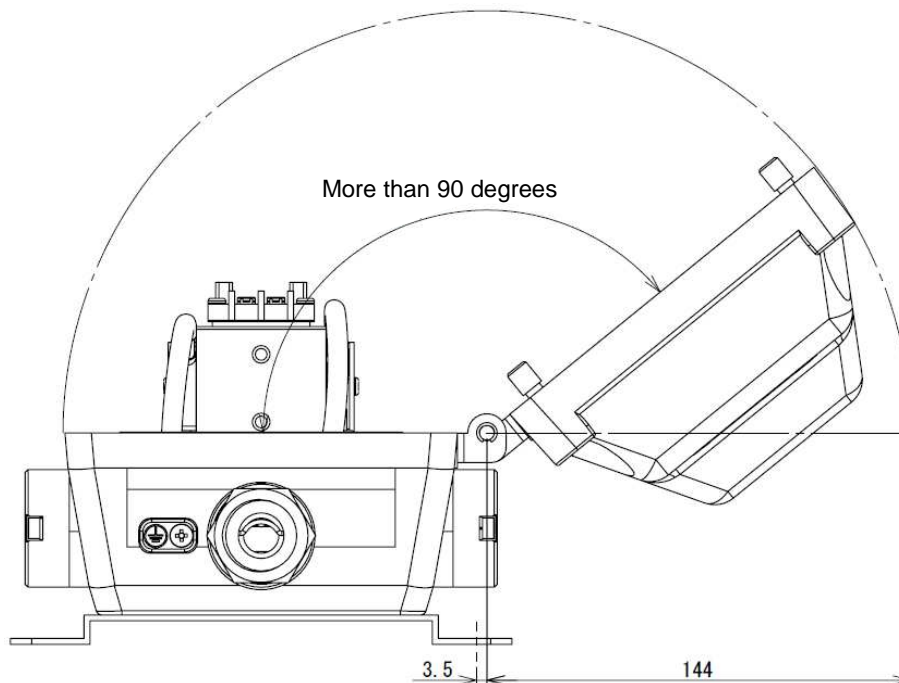
CAUTION

- Place the gas collector above the water level.

- 3) Mount the main unit to the wall with M6 screws. It is necessary to open the casing cover at the time of wiring and replacing sensor. Install the gas detector in places where the cover opening angle can be more than 90 degrees. Be sure to install the protective cover (optional) when mounting the main unit outdoors. (Refer to 5-2. *Mounting of Optional Items* for details of optional product.)



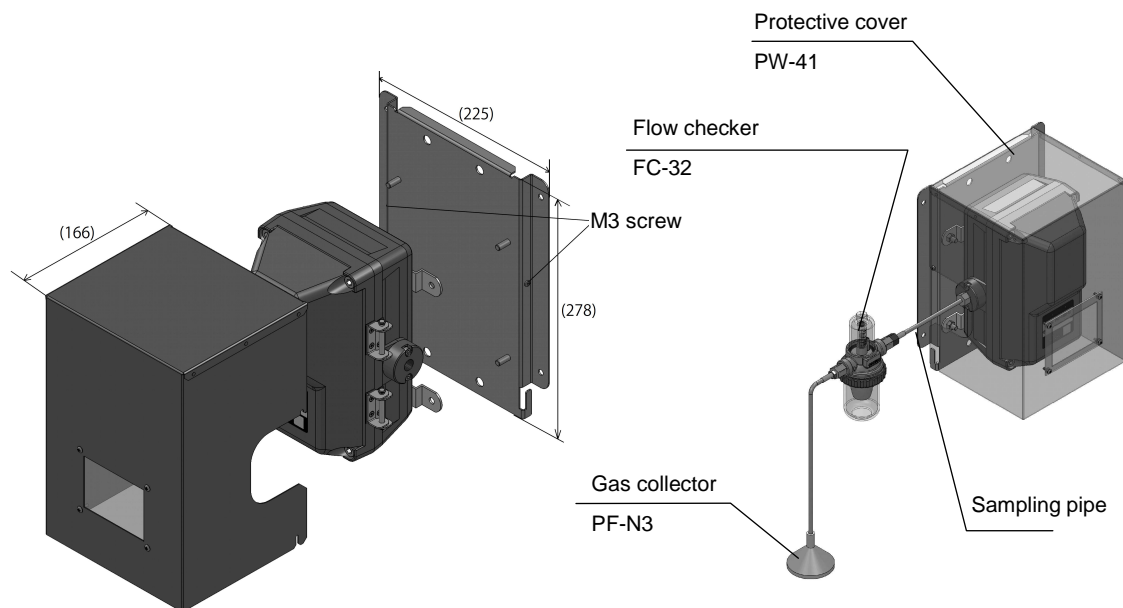
Mounting holes of the body



The size when the casing cover is opened

5-2. Mounting of Optional Items

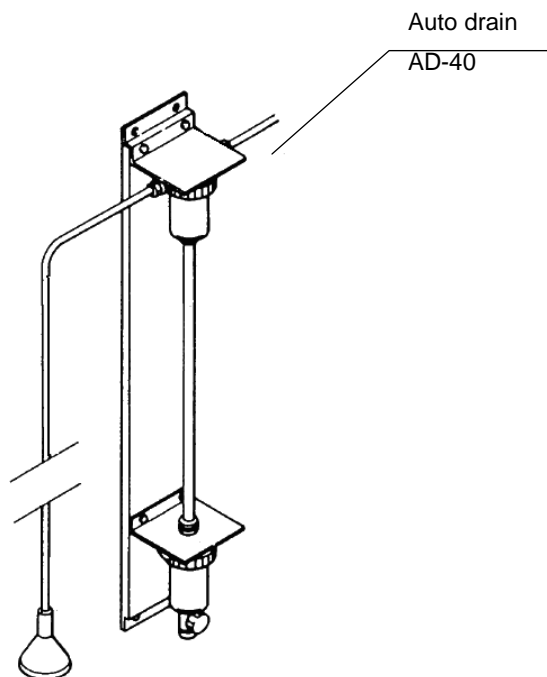
- Protective cover



CAUTION

- Secure the casing cover with M3 screws if strong winds are expected.

- Auto drain AD-40



6. Wiring Method

6-1. Wiring work

- Be sure to provide explosion-proof wiring if the product is used in hazardous places.



CAUTION

- All necessary work for the product including wiring and installation should be carried out by suitably trained personnel in accordance with applicable code of practice.

Cable work

- Use shielded cables, such as CVV-S (0.75 to 2.00mm²). As needed, to protect from damage, lay all cables in protective tubes of metal conduits or carbon steel pipes, or lay cables in protective structure of metal or concrete duct.
- When using the explosion-proof packing lead-in method, refer to the following table and use a cable with finished diameter matching the inner diameter of packing. In order to prevent the spread of explosive gas or fire, securely tighten the cable gland.
- It is recommended not to connect two cables together. If it is unavoidable, however, connect them or branch them within the explosion-proof casing of main unit.

Cable outer dia.	Packing	Washer	Clamp	Accessory
	Inner dia.	Inner dia.		Optional item
10 – 10.4	11.5	11	C clamp	Optional item
10.5	12	11		
11	12	12		
11.5	12.5	12	B clamp	Accessory
12	13	14		
12.5	13.5	14	A clamp	
13	14	14		
13.5	14	14		
14	14.5	15		
14.5	15	15		Built-in accessory

* “A pressure-tight packing of 15 in diameter, a washer of 15 in diameter, and an A clamp” corresponding to cable of 14.5 in diameter, are built into the standard model.

* Each pressure-tight packing of 13, 13.5, 14 and 14.5 in diameter, two washers of 14 in diameter, and one B clamp are provided with the standard model, to correspond to cables of 12 to 14 in diameter.

* If the cable is less than 12 in diameter, select the corresponding pressure-resistant packing, washer, and clamp from the above table and order them from New Cosmos.

6-2. Wiring and Connection



WARNING

- Before opening the casing cover of the gas detector, be sure to turn off the product and all devices (e.g. indicator unit and signal converter) connected to the product.
- If the power is turned ON, the power supply may become a source of ignition.
- Be sure to ground the product to prevent electric shocks.
- Do not damage the surface of the detector, or the explosion-proof performance may be adversely affected.



CAUTION

- Wire the connecting terminals correctly.
- Separate connection cables from other power lines as far as possible.

Connecting power supply and signal wires

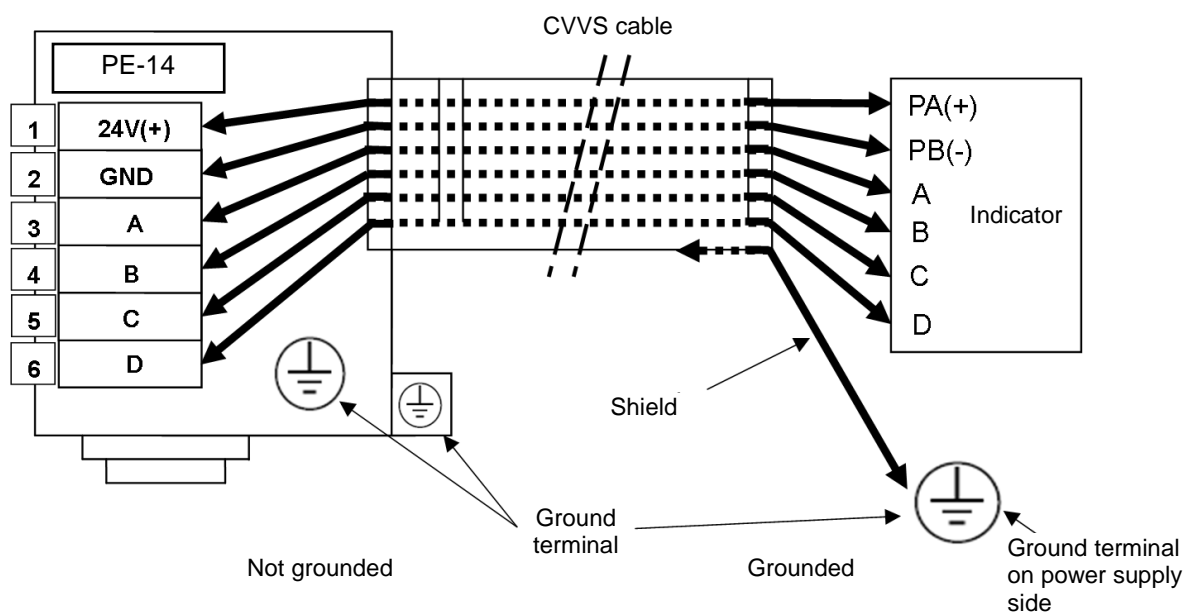
- 1) Connecting power supply
Provide dedicated breakers, if needed, to lines that are connected to peripheral devices, such as indicator units and signal converters.
- 2) Connecting between indicator unit and gas detector
Use appropriate cable for installation site, such as 600V vinyl insulated wire (VI), VCT, or CVV (0.75 to 2.00mm²).

MEMO

- The length of wiring should be less than 10 ohm of the single line resistance.
The following are the examples.
 - 0.75mm² wire: within 400 meter
 - 1.25mm² wire: within 600 meter
 - 2.00mm² wire: within 1 kilometer

MEMO

- If the main unit is grounded on the power supply side, do not connect a shielded cable to the ground terminal in the gas detector, or otherwise two-point grounding will result.



Refer to the Instruction Manual on each device for details.

Typical connection procedure

- 1) Prepare power supply which can provide 24V DC.
(Do not turn on the power supply before wiring the main unit.)
- 2) Loosen the hexagon socket bolts on the four corners of the main unit with provided hexagon wrench of nominal diameter 6 mm to open the casing cover.



- 3) Remove the screws on the cable ground and run cables through it.
- 4) Remove the screws on the terminal block.
- 5) Connect the positive electrode of power supply to 24 V+ terminal.
- 6) Connect the negative electrode of power supply to GND terminal.



- 7) Check the power supply codes are securely connected to terminals to complete the preparation of power supply.
- 8) Wire the sensor output terminals.
- 9) Tighten the hexagon socket bolts on four corners with hexagon wrench and close the casing cover.



CAUTION

- When closing the casing cover, make sure not to catch the power supply cord, harness, or O-ring in the casing cover.

7. Precautions before Use



CAUTION

- Before turning ON any devices (e.g., indicator unit, signal converter) connected to the product, double check all the connections are correct. Make sure that the gas detector and indicator unit or signal converter, in particular, are properly connected.

- **In Case of Gas Leakage**



DANGER

- Without panicking, check that there is no fire around the product. Do not touch any electric switches under any conditions. Sparks from turning electric switches ON or OFF may cause ignition.



WARNING

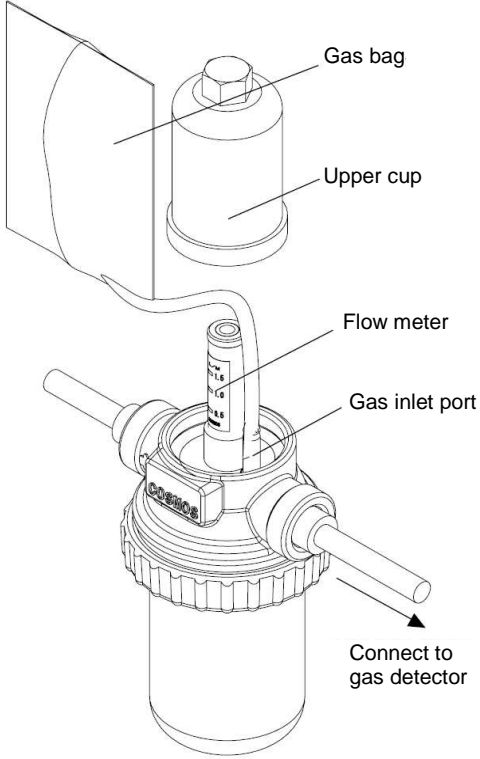
- If there is a gas leak alarm, take the necessary measures specified by your company.
- If a gas leak occurs indoors, open the windows and doors to ventilate the room.
- Check the gas leakage location and promptly take the necessary measures.

8. Maintenance Check and Operation Method

8-1. Daily Inspection and Periodical Inspection

- Daily inspections are conducted by the user, while periodical inspections are conducted by your local representative.

	Frequency	Checking item	Contents of inspection
Daily inspection	At least once a month	Visual inspection	<ul style="list-style-type: none">· Corrosion of the gas detector.· Corrosion of mounting screws. If a failure is found, replace the parts.· Flow rate Check the flow rate by reading the scale on flow checker FC-32. The normal flow rate is more than 0.7L/min. If the flow rate is decreased, check the following possible causes. If there is no improvement in the flow rate by replacing filters, replace suction pump after checking sampling tip and pipe.<ul style="list-style-type: none">· Clogging of sampling tip/gas collector· Clogging of sampling pipe· Clogging of filter

	Frequency	Checking item	Contents of inspection
Daily inspection	More than once every 2 to 3 months	Alarm operation check with real gas	<ul style="list-style-type: none"> · Apply inspection gas to the gas detector and check the alarm activation. · Remove the upper cup of flow checker FC-32 and connect to a gas bag as below, and apply inspection gas. 
Periodical inspection	At least once a year	Consult your local representative.	

Periodical Inspections

In order to maintain the reliability of the gas detection/alarm system, it is extremely important to conduct maintenance and inspections.

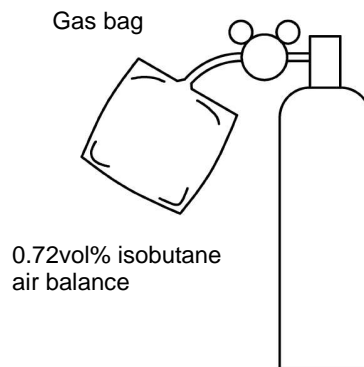
Moreover, it is necessary to use actual gas (combustible gas or toxic gas), to carefully conduct inspection and calibration. It is highly recommended that you consider periodical inspections under a maintenance contract with your local representative.

8-2. Preparing Calibration Gas

- Calibration gas is used for actual gas inspection.
- The following example shows how to prepare a standard gas of 0.72vol% (40%LEL) isobutane.

With standard gas cylinder

- Fill a gas bag with standard gas as shown the figure below.
- Evacuate the air from gas bag completely before filling the gas to prevent gas concentration error due to the air in gas bag.



MEMO

- Use urethane gas bag. Leave for about 30 minutes after filling gas to bring humidity in gas bag close to the ambient condition before use.

Without standard gas cylinder

- Use Gas Calibration Kit (optional item) and pure gas cylinder (isobutane 99 vol% or more). Dilute isobutane with air to produce calibration gas of 0.72 vol% (40%LEL).

MEMO

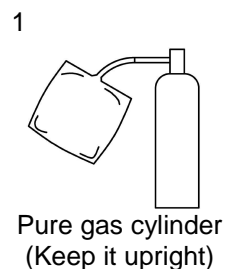
This calibration gas can be used to check the alarm function. Check the concentration by Gas Detector XP-3110 or a similar device before using for calibration.



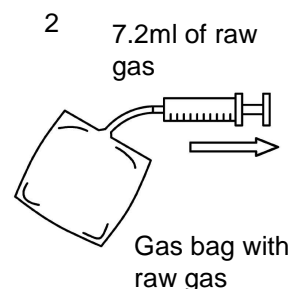
DANGER

- Make sure that there are no flammables nearby when handling combustible gas.

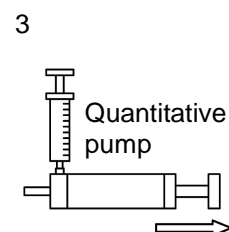
- 1) Connect gas bag to pure gas cylinder and fill with gas slightly more than necessary. Bend back the hose and clamp by pinchcock to prevent the gas from leaking.



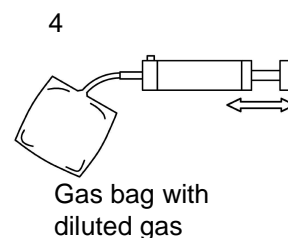
- 2) Connect 10 ml syringe to gas bag and take 7.2 ml of raw gas. (Take the gas slightly more than necessary and then carefully discharge the excess gas.)



- 3) Connect syringe to the inlet of quantitative pump, and pull the piston to fill pump with raw gas in the syringe. Remove the syringe and pull the piston all the way out (100 ml).



- 4) Connect empty gas bag to the outlet of quantitative pump and push the piston. Move the piston back and forth for 9 times to add air and make dilute gas.



If you take 7.2 ml of raw gas and move the piston for 10 times (a back-and-forth motion: 100 ml),

$$7.2 \text{ ml} / (100 \text{ ml} \times 10 \text{ times}) = 0.0072$$

0.72 vol% dilute gas is made.

Lower explosive limit (LEL) of isobutane: 1.8vol%.

$$0.72 / 1.8 \times 100 = 40.0$$

40 %LEL dilute gas is made.

8-3. Replacement of Sensor Unit



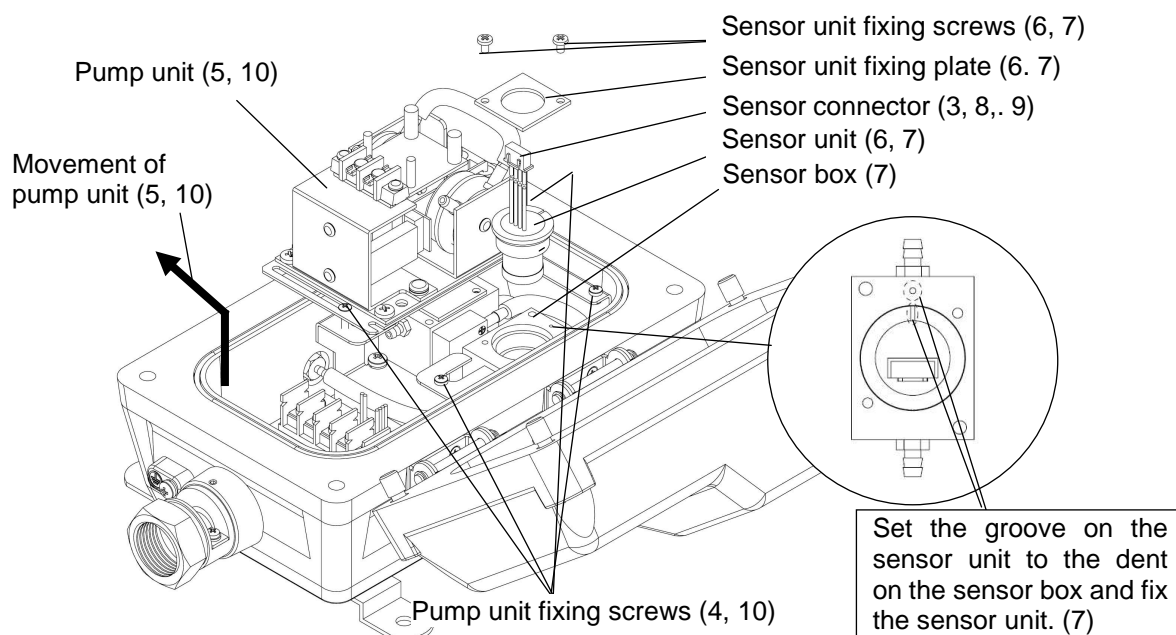
WARNING

- Be sure to turn OFF the indicator unit or signal converter before replacing a sensor unit. The electric power may become a source of ignition.
- Do not damage the surface of detector when sliding the sensor unit, or the explosion proof performance may be adversely affected.



CAUTION

- Some sensor types need to rewrite the setting data of the detector. Only your local representative's maintenance service members or personnel who have completed a maintenance seminar can replace the sensor unit.
- Be sure to handle the sensor unit with care. Do not drop or throw the sensor unit. Otherwise, the sensor wire may be disconnected or the sensor unit may be damaged.
- When removing and mounting the sensor unit, do not twist the harness of sensor connector.
- When closing the casing cover, make sure not to catch the power supply cord, harness, or O-ring in the casing cover.
- When replacing the sensor unit, make sure that the wiring and piping are not disconnected, loosened, or damaged.



- 1) Turn OFF the power supply connected to the product.
- 2) Loosen the hexagon socket bolts on each four corners with the provided hexagon wrench of nominal diameter 6 mm, and open the casing cover. (Refer to 4-1. Main Unit)
- 3) Disconnect the sensor connector.
- 4) Loosen 4 fixing screws of pump unit.
- 5) Pull the pump unit up and slide to left.
- 6) Remove 2 sensor fixing screws and remove the fixing plate and sensor unit.
- 7) Fit a new sensor unit and fix the sensor unit fixing plate, then tighten the screws.
* Set the groove on the sensor unit to the dent on the sensor box and fix the sensor unit.
- 8) Connect securely to the sensor connector.
- 9) Place the pump unit back to the same position and tighten 4 screws.
- 10) Tighten the hexagon socket bolts on each four corners with the provided hexagon wrench of nominal diameter 6 mm, and close the casing cover of the main unit. (Refer to 4-1. Main Unit)
- 11) Turn ON the power supply connected to the product.
- 12) After replacing the sensor unit, it is necessary to perform zero adjustment and span adjustment again, after applying power for about one week to stabilize the sensor output.
- 13) Be sure to perform zero adjustment first, followed by span adjustment.
- 14) If an error message is displayed, refer to 10. Trouble Alarm.

MEMO

- It is possible to replace the sensor unit without removing tube connected to the pump unit.
- Return the used sensor unit to your local representative.

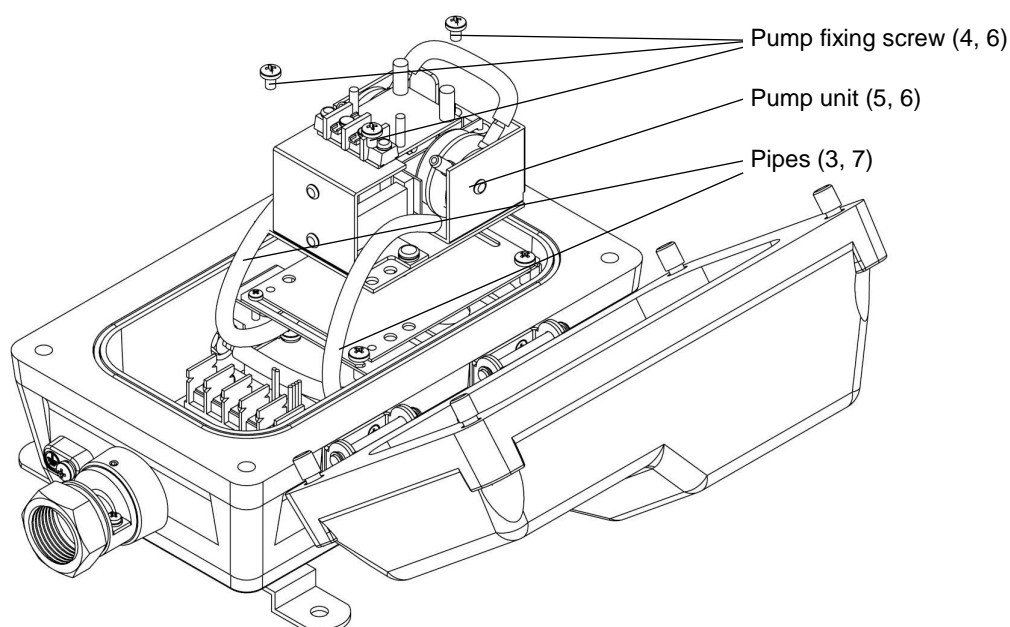
8-4. Replacement of Pump Unit

WARNING

- Be sure to turn OFF the indicator unit or signal converter before replacing a sensor unit. The electric power may become a source of ignition.
- Do not damage the surface of detector when sliding the sensor unit, or the explosion proof performance may be adversely affected.

CAUTION

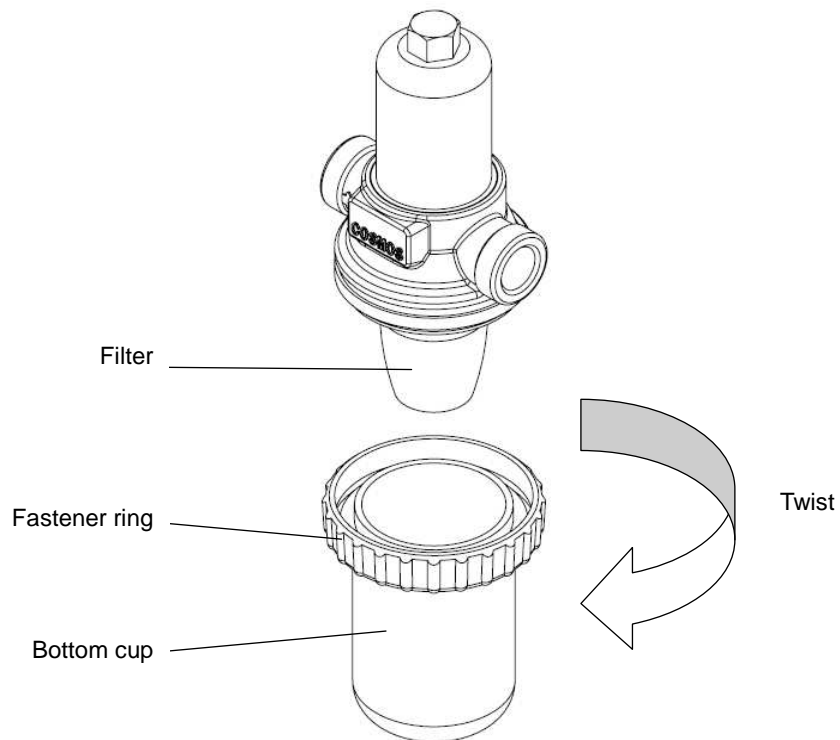
- After replacing the pump unit, make sure that all of the wiring and piping connections are firmly connected.



- 1) Turn OFF the power supply connected to the product.
- 2) Loosen the hexagon socket bolts on each four corners with the provided hexagon wrench of nominal diameter 6 mm, and open the casing cover. (Refer to 4-1. *Main Unit*)
- 3) Disconnect 2 pipes connected to the pump unit.
- 4) Loosen 3 fixing screws of pump unit.
- 5) Remove the pump unit.
- 6) Fix a new pump unit with 3 fixing screws of pump unit.
- 7) Connect 2 pipes to the pump unit.
- 8) Tighten the hexagon socket bolts on each four corners with a hexagon wrench of nominal diameter 6 mm and close the casing cover. (Refer to 4-1. *Main Unit*)
- 9) Turn ON the power supply connected to the detector.
- 10) Read the flow rate of flow checker FC-32. The normal flow rate is more than 0.7L/min.

8-5. Replacement of Filter for Flow Checker (FC-32)

- If the flow rate returns to normal value (more than 0.7L/min) by removing the bottom filter of flow checker FC-32, the filter is possibly being clogged. Please replace the filter when necessary according to the procedure described below.
- 1) Loosen the fastener ring of flow checker to remove the bottom cup.
 - 2) Pull the filter downward to remove.
 - 3) Replace the filter with a new one and fix the bottom cup back on.
 - 4) Confirm the flow rate is normal value (more than 0.7L/min).



9. Specifications

Corresponding sensor type	PD-14A: Hot wire semiconductor PD-14B: Catalytic combustion PD-14C: Thermal conductivity
Sampling method	Extractive
Target gas	Depends on the specifications
Detection range	Depends on the specifications
Suction flow rate	More than 0.7 L/min
Explosion-proof class	Ex d II B+H2 T4 (Japan)
Degree of protection	IP 65
Applicable cable	Cable outer diameter: 10 to 14.5 mm 6-core cable (for power supply, sensor power, sensor output) CVV-S 0.75 mm ² , 1.25 mm ² or 2.0 mm ² * Interconnection resistance should be less than 10 ohms
Operating temperature and humidity	· Temperature: -10 to 50 degrees C · Humidity: 10 to 90 %RH (0 to 50 degrees C) * No radical temperature or humidity changes and no condensation
Power supply	24V DC +/- 10%
Power consumption	7W max.
Dimensions	133 (W) x 260 (H) x 132 (D) mm (excluding protrusions)
Weight	Approx. 5.2kg
Mounting method	Wall mount

The above specifications are subject to change without notice.

If your specifications are nonstandard, refer to the delivery specifications.

10. Warranty

New Cosmos Electric Company Limited (New Cosmos) offers the following as the sole and exclusive limited warranty available to the customer.

This warranty is in lieu of, and customer waives, all other warranties of any kind or nature, expressed or implied, including without limitation, any warranty for merchantability or fitness for a particular purpose. The remedies set forth herein are exclusive.

New Cosmos warrants to the original purchaser and no other person or entity (the customer) that the gas detection product supplied by New Cosmos shall be free from defects in materials and workmanship for a period of one (1) year from the date of purchase. This warranty does not include consumables, such as fuses, filters, etc. Certain other accessories not specifically listed here may have different warranty periods.

After examination of an allegedly defective product returned to New Cosmos, with freight prepaid, should the product fail to conform to this warranty, the customer's only remedy and New Cosmos's only obligation shall be, at New Cosmos's sole option, replacement or repair of such non-conforming product or refund of the original purchase price of the non-conforming product. In no event will New Cosmos be liable for any other special, incidental or consequential damages or losses of any kind whatsoever, including but not limited to, loss of anticipated profits and any other loss caused by reason of non-operation of the product.

This warranty is valid only if the product is maintained and used in accordance with New Cosmos's instructions and/or recommendations. New Cosmos shall be released from all obligations under this warranty in the event repairs or modifications are made by persons other than its own or authorized service personnel or if the warranty claim results from physical abuse or misuse of the product.

11. Life Expectancy

- The design period longevity under a general environmental condition of this container is about five years from purchase. The design life expectancy after the guaranteed term passes is not the one to guarantee this. It is only a guide when a prescribed gas is proofread and it uses it. It might be impossible to use between the proofreading and the proofreading schedule for the next term.

- The life of the sensor after the date of purchase under a general environmental condition is recommended in the table below. The sensor may not detect gas correctly with the lapse of the sensor life. Replace the sensor at intervals of the sensor life.

The life of the sensor is specified on the condition that the sensor is serviced properly and that the sensor is not exposed to high-density gas or sensor poisoning gas. New Cosmos, however, does not guarantee the specified life of the sensor.

Model	Detection principle	Sensor life
PD-14A	Hot wire semiconductor	Approx. 5 years
PD-14B	Catalytic combustion	Approx. 3 years
PD-14C	Thermal conductivity	Approx. 5 years

12. Detection Principle

12-1. Catalytic Combustion

Catalytic combustion occurs on the catalyst even at a gas concentration below the lower limit of combustion due to the operation of the catalyst applied to the platinum coil. The electrical resistance of the platinum coil increases because of the rise in the temperature at this point. This difference is extracted as deviation voltage in the bridge circuit.

Detection of combustible gases is possible up to the lower explosion limit (LEL).

12-2. Hot Wire Semiconductor

When a metal-oxide semiconductor heated by a platinum coil adsorbs an electron-donating gas, such as a combustible gas, its electron concentration increases and the thermal conductivity of the semiconductor improves. As a result, the temperature of the semiconductor falls and the resistance of the platinum wire reduce. This difference is extracted as deviation voltage in the bridge circuit.

The feature of this sensor is its extreme sensitivity at low temperatures, which makes it suitable for sensitive detection.

12-3. Thermal Conductivity

As compared to when only air is present around the sensor, the heat dissipation state of the detection piece (heated to around 150°C) to which an inert substance is applied and sintered on a platinum wire varies with the increase or decrease in the thermal conductivity of the gas, and the temperature of the detection piece changes. This difference is almost proportional to the gas concentration, and therefore, the difference in the resistance of the platinum wire can be extracted as deviation voltage of the bridge circuit.

Although only gases whose thermal conductivity is different from air can be measured, it is possible to detect high-concentration gases between 0% and 100% by volume.

13. Glossary

Indicator / Alarm unit:	A unit that receives signals from the gas detector and indicates gas concentration and alarms.
Detector:	A unit that detects gas concentration and converts it to electric signals.
Backup power source device:	A device that supplies power to the gas detector, indicator / alarm unit in order to maintain its performance during a power failure.
Flow meter:	A meter to measure air flow in gas sampling pipe.
Gas collector:	A gas collecting probe that enhances gas collection efficiency and blocks water and dust.
Diffusion type:	A method to detect gas by utilizing convection and diffusion of gas.
Explosion proof construction:	A totally enclosed structure. When an explosive gas explodes in a container, the container can resist the pressure and prevent the ignition of explosive gases outside of it.
Preset alarm value:	A preset value for the alarm to go off when gas concentration reaches a certain value.
Gas to be detected:	Gas that is detected and indicated which sets off an alarm.
Detection range:	Range of gas's concentration that can be indicated and set off an alarm.
Alarm accuracy:	Difference between the preset alarm value and gas concentration when an alarm actually occurs or as the percentage of the difference compared to the preset alarm value.
Response time:	Time it takes from when the gas detector is exposed to a gas with a concentration higher (lower) than the preset alarm value until an alarm goes off.
Temperature range:	Range of temperature where the equipment can perform its functions.
Maintenance and inspections:	Work to guarantee that the equipment perform its required functions.
Calibration gas:	Gas used to calibrate scales of the equipment.
Peak hold:	A function to constantly update and hold the peak value of input signals.
Hazardous area:	An area in a plant or facility with a hazardous atmosphere where explosive gases may mix with air and explode or start a fire. An area where gas may be present.
Non hazardous area:	An area where electric equipment that has no potential to create a hazardous atmosphere.
Hazardous atmosphere:	Atmosphere within the explosive limit where explosive gas and air are mixed.
LEL:	Lower Explosive Limit. The lowest concentration of flammable gas that will explode when mixed with air and ignited.

(Quoted from gas detection terms and detector tube gas meter terms used by the Industrial Gas Detector Alarm Association)

Manual Revision History

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