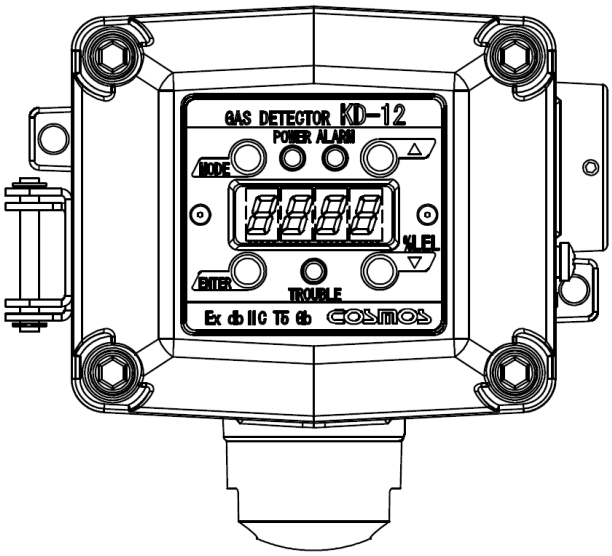
Diffusion type Gas Detector

Model KD-12

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.

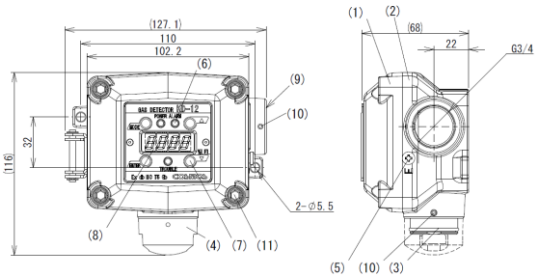
CE

New Cosmos Electric Co., Ltd.

Instruction Manual No.
GAE-030-10
August 2017

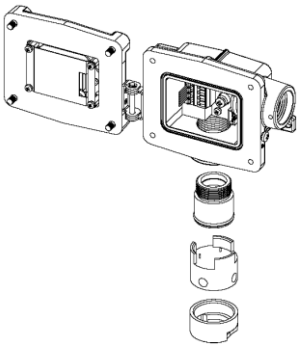
• Nomenclature

See pages 4 to 6.



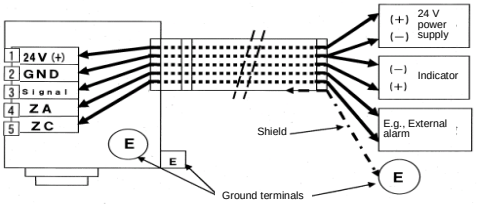
• Replacement of Sensor Unit

See pages 30 and 31.



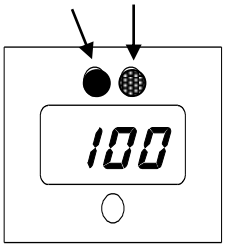
• Wiring and Connecting Methods

See pages 13 to 16.



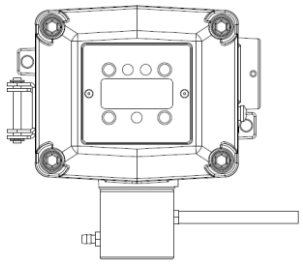
• Display and Operation in Each Mode

See page 19.



• Maintenance Check and Operation Methods

See pages 21 to 29.



• Troubleshooting

See page 32.

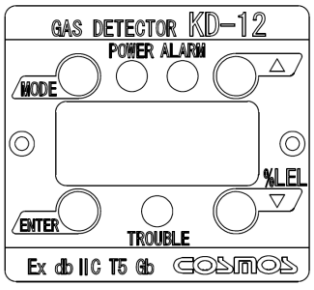


Table of Contents

1. Introduction

- Thank you for purchasing the KD-12 Diffusion 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. The product detects gas leakage at an early stage in industrial facilities (e.g., gas production plants and depots, chemical plants, paint factories, and power plants), and outputs the gas concentration value in analog signal form while displaying the gas concentration value.
  If the gas concentration reaches a preset alarm level, the red ALARM indicator will flash and turn ON an external contact output, thus helping to prevent disasters such as explosion accidents and fires.
- 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.

⚠ 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.
- The cable entry device and blanking elements shall be of ATEX certified in type of explosion protection flameproof enclosure ‘’db’’, suitable for the condition of use and correctly installed.
- Unused apertures shall be closed with suitable ATEX certified blanking elements.
- Fastener type M5 x 16 shall have a yield stress factor of min. 450 N/mm2.

⚠ 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.
- Do not disassemble the product or modify the construction or electric circuits of the product. Otherwise, the explosion-proof construction of the product may be adversely affected.
- 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 protective cover (optional) if the product is installed outdoors.
- Use the product in accordance with applicable laws and regulations.
- Hydrocarbon gas except the target gas might be detected, so consider the measurement environment.

Special Condition for Safe Use

- If used in an ATEX hazardous area, an ATEX-certified cable gland must be used according to EN 60079-0:2012+A11:2013 and EN 60079-1:2014. (Not included)
- If used in an IECEx hazardous area, an IECEx-certified cable gland must be used according to IEC 60079-0:2011 Edition 6.0 and IEC 60079-1:2014 Edition 7.0. (Not included)
- Fasteners (M5x16 hexagonal head screws) shall have yield stress of at least 450 N/mm^2.
- Cable entry requirements for cable gland:

  Thread size…… G3/4 or PF3/4

  Minimum depth of engagement …. 10.86mm

  Minimum thread engagement…….. 6 threads
- The dimensions of a flameproof joint between the case and the case cover of the KD-12 flameproof housing must meet the minimum requirements specified in EN/IEC60079-1. Please contact the manufacturer for inspection, repair or adjustment of the flameproof joint.

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 Accessory set Two M5 screws: 2 pcs M4 x 4 hexagon socket head screw:1pc Hexagon wrench (nominal dia. 4): 1 each (see note 1) Instruction Manual (see note 1) MJ-1 Magnetic Stick (see note 1)	Protective cover (see note 2) Horizontal type: KW-41 Vertical type: KW-42 PB-1 2B Pole Mounting Bracket (see note 2) SK-1 Sensor Replacement Jig (see note 2) GCP-09 Calibration Cap (see note 2) Z-001K Gas Calibration Kit 2 bulb hand pump Capillary for 2 bulb hand pump

Note: 1. A hexagon wrench, Instruction Manual, and MJ-1 Magnetic Stick are provided for each order.
2. The optional items are for use only by the KD-12.

⚠ WARNING

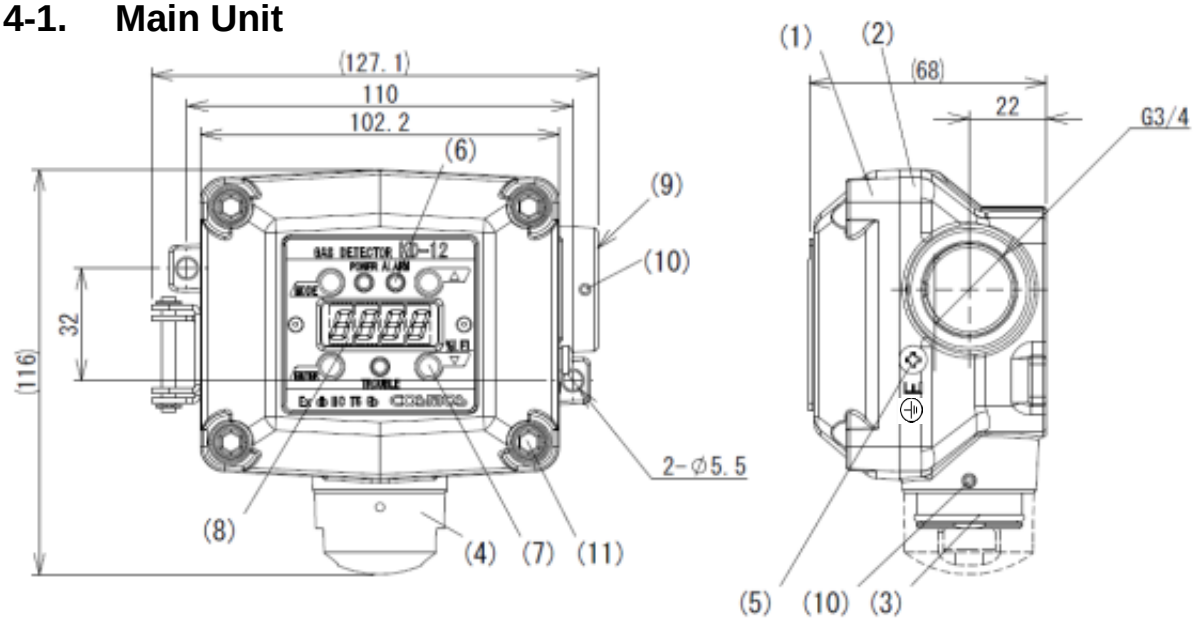
- Do not use the magnetic stick for any purposes other than the operation of this product.
- Keep in mind that when the magnetic stick attracts magnetic objects, tools, iron pieces, etc., your hands may become pinched and injured.
- Do not touch the magnet if you are allergic to metal, otherwise your skin may become chapped or reddened.
- Generally speaking, magnets break easily and the corrosion of the magnet progresses from the fracture location. Fragments of the magnet may also get in your eyes or injure your skin.
- The components of the magnetic stick may melt into water. Do not drink water exposed to the magnetic stick.
- Keep the magnetic stick away from electronic medical devices, such as cardiac pacemakers, or the magnetic stick may obstruct the normal operation of the device.

⚠ CAUTION

- Keep the magnetic stick away from magnetic tapes, floppy disks, and prepaid cards. Otherwise, they may become magnetized and the information that they hold may be lost.
- Keep the magnetic stick away from high-precision devices, such as personal computers and watches. Otherwise, they may malfunction.

4. External Dimensions and Nomenclature

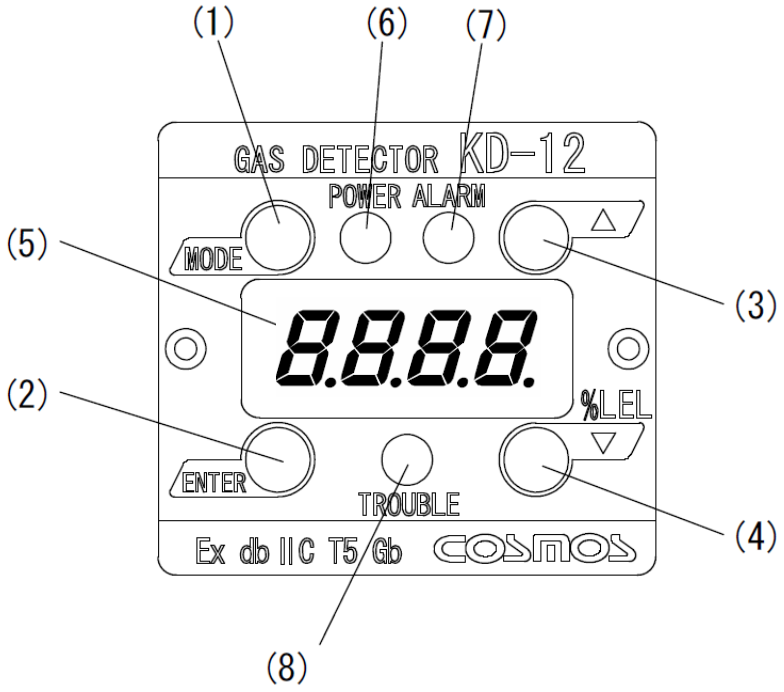
4-1. Main Unit



Item	Component	Description/Function
(1)	Case cover	---
(2)	Case	---
(3)	Sensor unit	Incorporates a built-in gas sensor.
(4)	Sensor guard	Protects the sensor unit.
(5)	Earth terminal (external)	Used for grounding the frame.
(6)	Status lights (3 places)	Indicate the status of the unit: power (green), alarm (red), and fault (yellow)
(7)	Magnetic switches (4 places)	Insert the magnetic stick into each magnetic switch opening to operate.
(8)	Display	Displays the gas concentration, parameter value and status message.
(9)	Cable entry	Thread size: G3/4 or PF3/4. Pitch=1.81mm. Depth of engagement: 10.86mm. Minimum engaged threads: 6 threads. Applicable cable gland*1 must be provided by end user.
(10)	M4x4 Hexagonal set screw (2 places)	To secure the cable gland (cable fitting) and the sensor unit. Use 2mm hex key wrench (not included).
(11)	M5x16 Hexagonal head screws (4 places)	To secure the case cover. Use 4mm hex key wrench (included).

*1: Cable gland should be ATEX-certified according to EN 60079-0:2012+A11:2013 for use in an ATEX hazardous area, and EN 60079-1:2014, and IECEx-certified according to IEC 60079-0:2011 Edition 6.0 and IEC60079-1:2014 Edition 7.0 for use in an IECEx hazardous area.

4-2. Display and Control Blocks

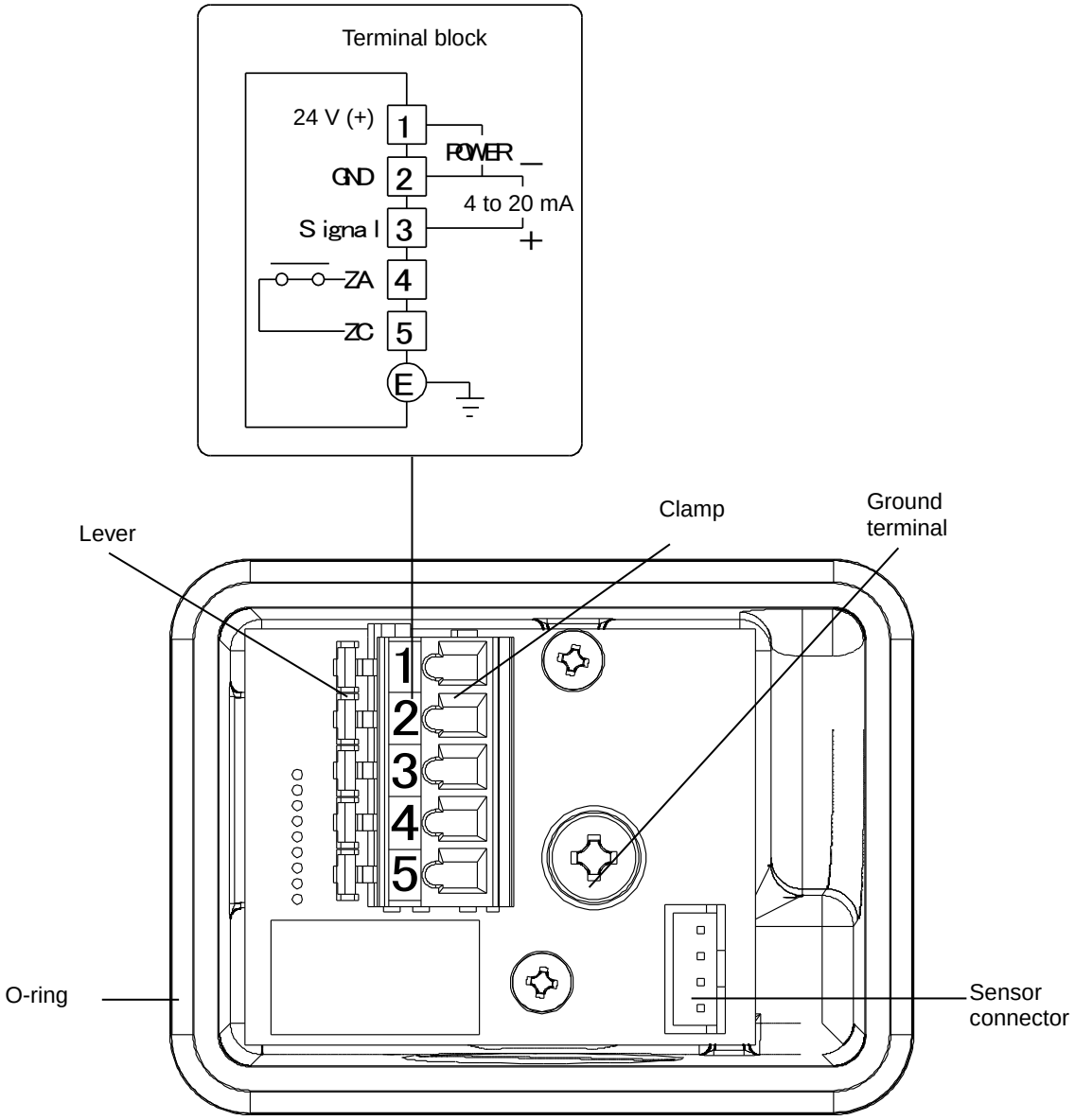


Magnetic Switches Use the magnetic stick (MJ-1) to operate the magnetic switches.		
Item	**Component**	**Description/Function**
(1)	[MODE] switch	Changes the operation mode or cancels the current operation.
(2)	[ENTER] switch	Confirms a setting or executes an operation.
(3)	[UP] switch	Increases the parameter value.
(4)	[DOWN] switch	Decreases the parameter value.

Item	**Component**	**Description/Function**
(5)	Display	Displays gas concentration, parameter value and status message.

Status Lights		
Item	**Component**	**Description/Function**
(6)	[POWER] light (green)	When lit, the unit is on.
(7)	[ALARM] light (red)	When lit, alarm notification.
(8)	[TROUBLE] light (yellow)	When lit, fault (device error) detected.

4-3. Terminal Block



Number	Name	Description
1	24 V (+)	Power supply voltage (positive)
2	GND	Power supply voltage(-) and analog signal (negative) common
3	Signal	4- to 20-mA(+) analog signal
4	ZA	External contact
5	ZC	
⏚	Ground terminal	Used to ground the frame.

5. Installation

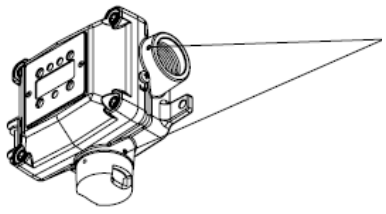
5-1. Installation Method

⚠ WARNING

- The cable entry device and blanking elements shall be of ATEX certified in type of explosion protection flameproof enclosure ‘’db’’, suitable for the condition of use and correctly installed.
- If used in an ATEX hazardous area, an ATEX-certified cable gland must be used according to EN 60079-0:2012+A11:2013 and EN 60079-1:2014 Edition 7.0. (Not included)
- If used in an IECEx hazardous area, an IECEx-certified cable gland must be used according to IEC 60079-0:2011 Edition 6.0 and IEC60079-1:2014 Edition 7.0. (Not included)
- Unused apertures shall be closed with suitable ATEX certified blanking elements.
- Fastener type M5 x 16 shall have a yield stress factor of min. 450 N/mm2.
- The dimensions of flameproof joint between casing and casing cover of KD-12 flameproof housing are exceeding the minimum requirements stated EN/IEC60079-1. Please contact the manufacturer for inspection, repair and/or adjustments of this flameproof.
- Cable entry requirements for cable gland and sensor:

- Cable gland	- Sensor
Thread size: G3/4 or PF3/4	Thread size: M27
Pitch: 1.81mm	Pitch: 1.5mm
Min. depth of engagement: 10.86mm	Min. depth of engagement: 8.25mm
Min. thread engagement: 6 threads	Min. thread engagement: 5.5 threads

- Securly tighten the hexagonal set screws to ensure that no movement of the cable gland is possible.



Hexagonal set screws (2 places)
Screw Specifications
Size: M4x4
Screw length for securing cable gland: 3, 4, 5 or 6 mm
Screw length for securing sensor unit: 3 or 4 mm
Material: Stainless steel

Note: The head of each screw shall be flush with the surface of the fitting.

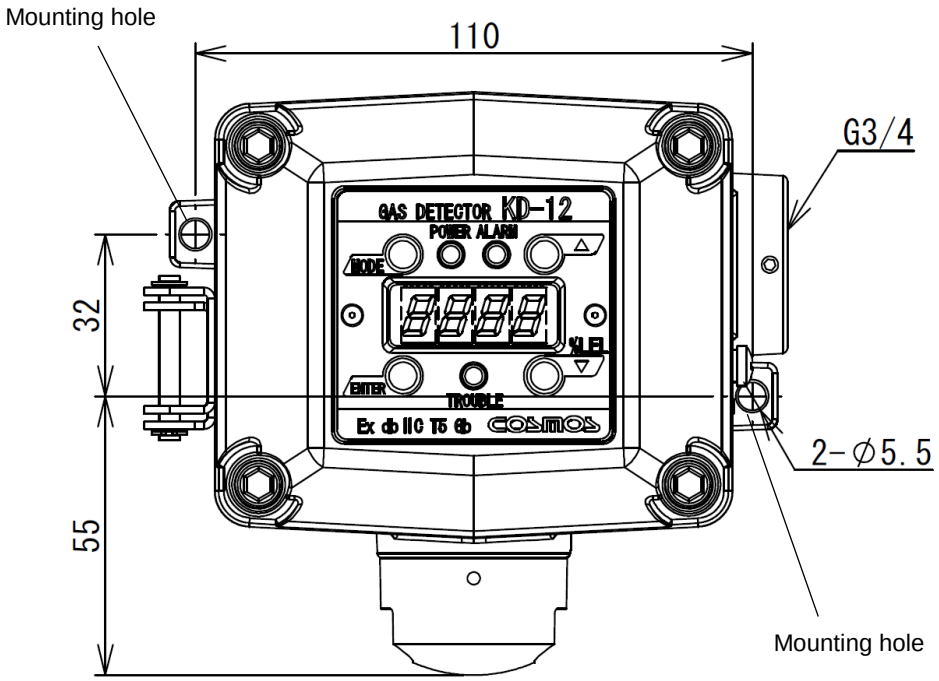
⚠ CAUTION

- Be careful not to damage the gas detector when installing it. Otherwise, the explosion-proof performance of the gas detector will be lost.
- Do not install the product in the following places.
  - Places where the ambient temperature exceeds the operating temperature range (−10°C to 50°C).
  - Places where condensation occurs.
  - Places where water is directly sprayed.
  - Places subject to corrosive gas.
  - 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.
- 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).
- The installing height of the gas detector has an important relation to the specific gravity of the target gas to be detected. Install the gas detector in accordance with required regulations.

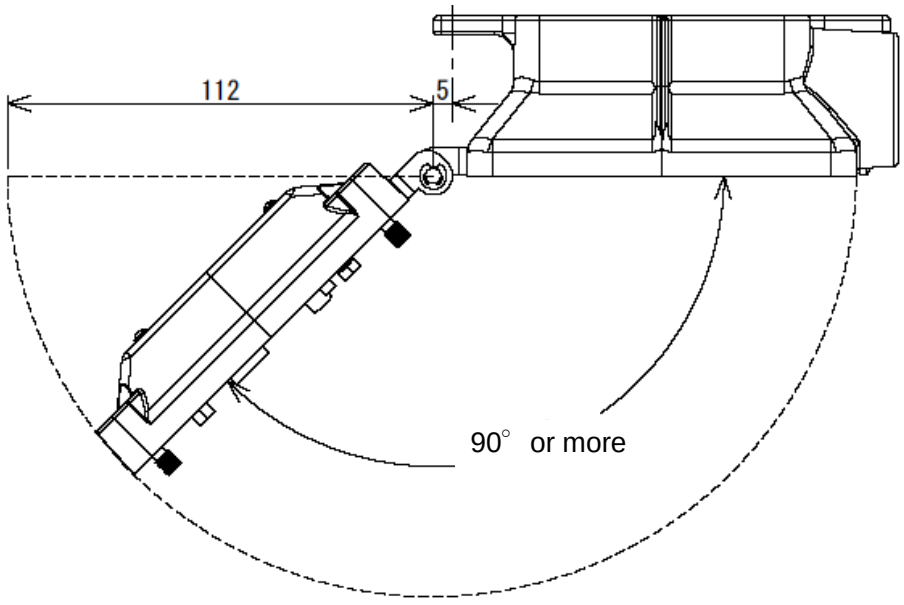
• Installing Height

Type of gas	Installing height	Remarks
Gas heavier than air (Example: LPG)	A maximum of 10 cm above the floor. (Height to the sensor guard tip)	Keep a space of approximately 7 cm from the sensor guard tip for ease of maintenance and inspection.
Gas almost the same as air in specific gravity (Example: Carbon monoxide)	75 to 150 cm above the floor. (Height to the sensor guard tip)	Decide the height by considering the specific gravity and mounting environment.
Gas lighter than air (Example: City gas and hydrogen)	Near the ceiling	Decide the height by considering arrangements for ease of maintenance (e.g., a scaffold).

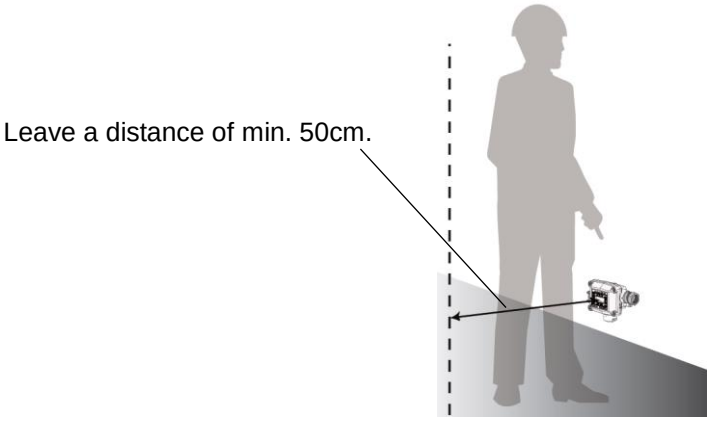
- Mount the main unit to the wall with the M5 screws that are provided with the product. Be sure to install the protective cover (optional) when mounting the main unit outdoors. Mount the main unit with a 2B pole mounting bracket (optional) when mounting the main unit to a 2B pole. Refer to *5-3 Mounting of Options* for details of optional products.



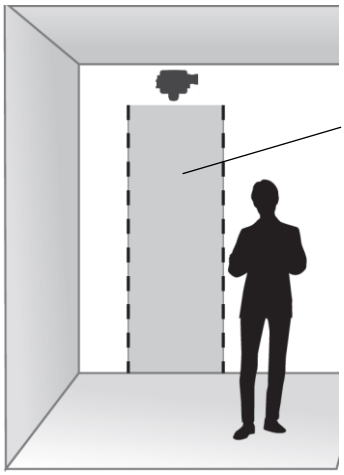
- The casing cover of the gas detector needs be opened at the time of wiring. Therefore, when installing the gas detector, provide sufficient space to enable the casing cover to be opened to at least 90°.



- It is necessary to operate the detector during inspection or maintenance work. Therefore, leave a distance of 50cm or more between the front side of the detector and the object in front of it when installing it.

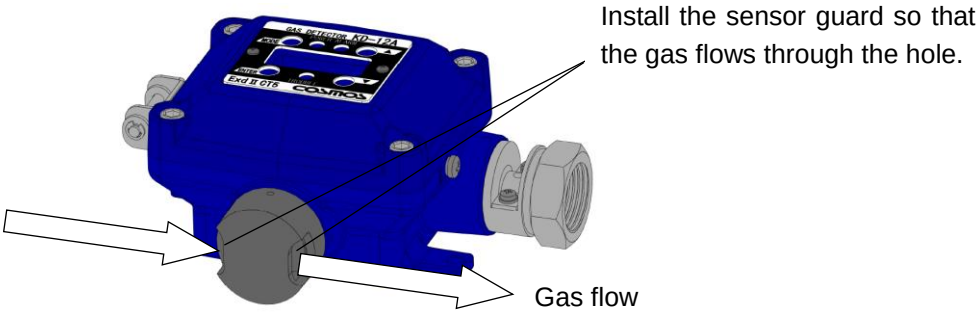


- When installing this diffusion type gas detector on the ceiling or a higher location, make sure to leave enough space just below the detector to allow for inspection or maintenance activities. When installing the detector at a height more than 3m from the floor, we recommend you to use a suction type gas detector with a sampling tube up to the ceiling.



- A sensor guard is not necessary when installing the detector on the ceiling or a higher location. However, when installing the detector on a lower place like the floor, a sensor guard is required in order to protect the sensor from water splash.

- Consider the direction of the gas flow and the hole of the sensor guard when installing.

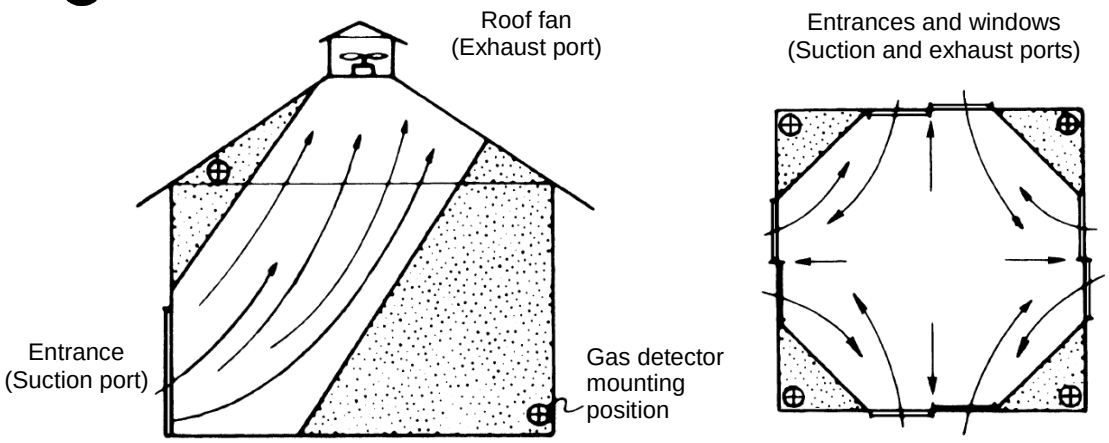


5-2. Examples of Installation Positions

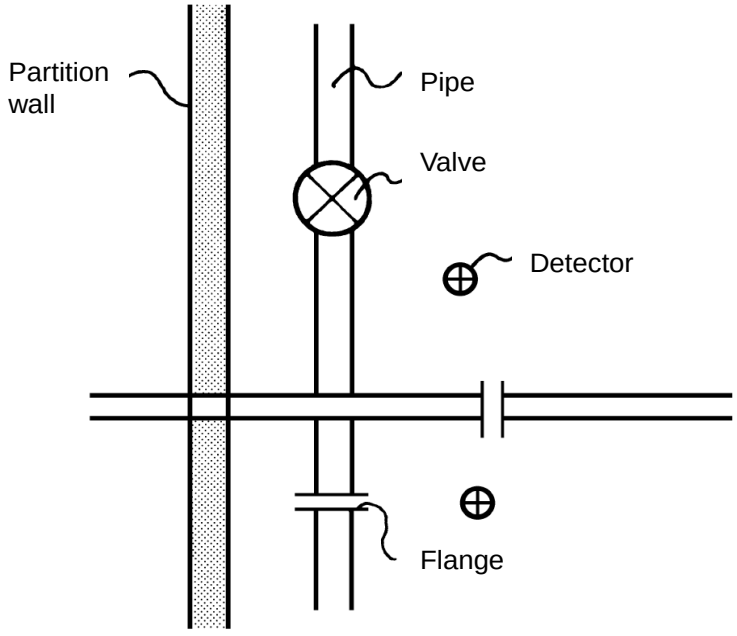
- Install the product in places where gas easily accumulates.

Places where gas easily accumulates.

Gas detector



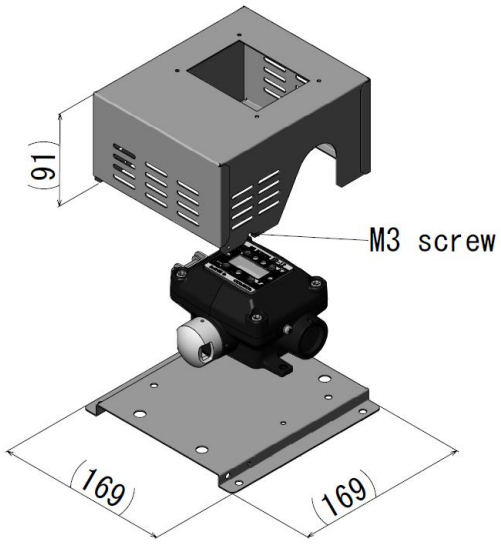
Example of Installation Position



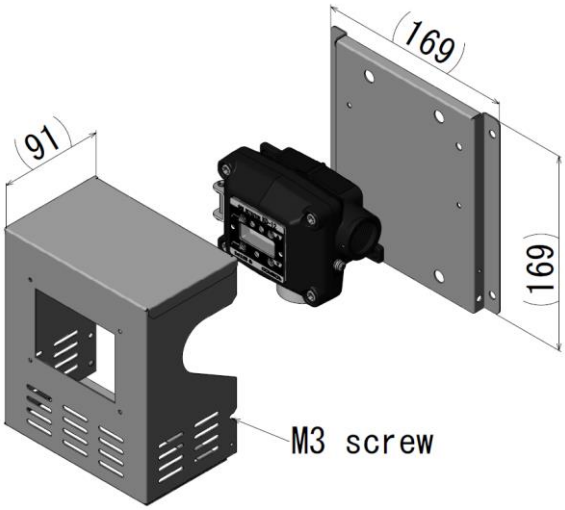
Example of Outdoor Installation Position

5-3. Mounting of Optional items

•Protective Cover



Horizontal Type (KW-41)

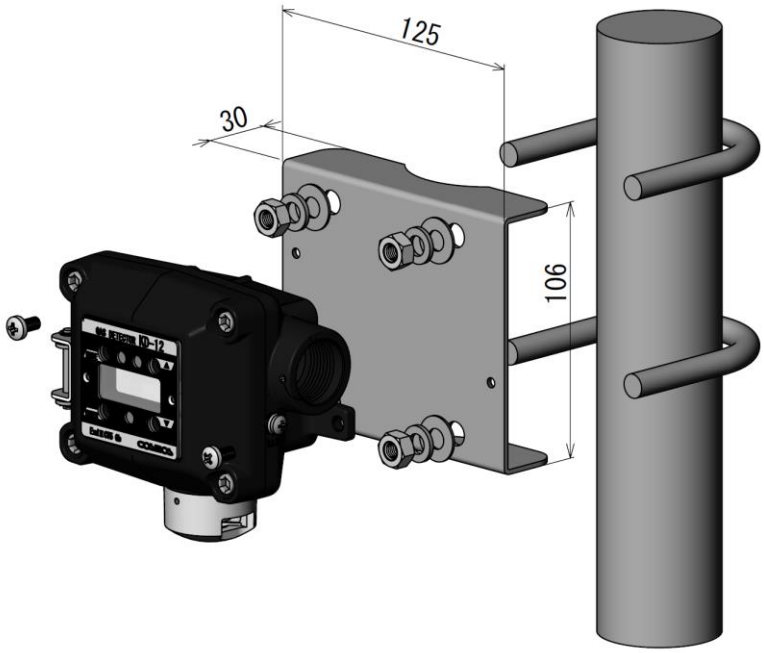


Vertical Type (KW-42)

⚠ CAUTION

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

• 2B Pole Mounting Bracket



6. Wiring Method

6-1. Wiring Work

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

⚠ WARNING

- The cable entry device and blanking elements shall be of ATEX certified in type of explosion protection flameproof enclosure ‘’db’’, suitable for the condition of use and correctly installed.
- Unused apertures shall be closed with suitable ATEX certified blanking elements.

⚠ 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.

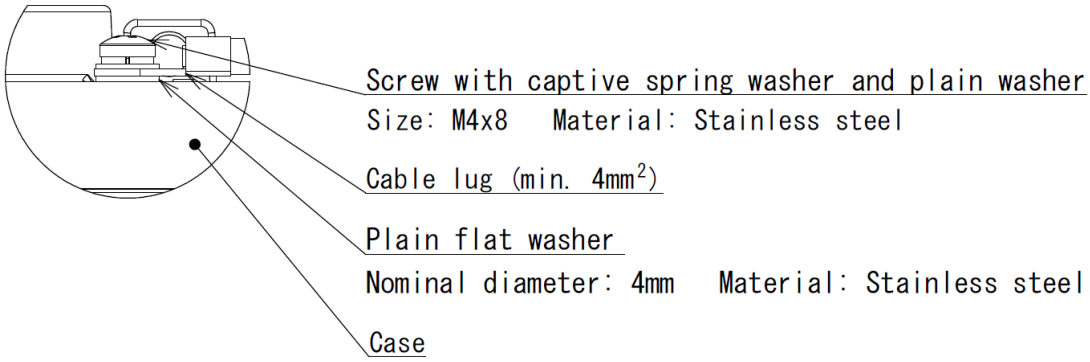
Cable Work

- Use a shielded cable, such as CVV-S with a thickness of 1.25 to 2.00 mm^2. Lay all cables in protective tubes, such as metal conduits or carbon steel pipes, or other protective structure, such as a concrete duct.
- When using the external contact function of the product, which requires a five-conductor cable, make sure that the maximum diameter of the cable conductor is 1.25 mm^2. When using only the analog signal function, which requires a three-conductor cable, without the external contact function, make sure that the maximum diameter of the cable conductor is 2.00 mm^2.

6-2. Wiring and Connection

⚠ WARNING

- Before opening the case cover of the gas detector, be sure to eliminate possible source of ignition. Disconnect the power supply to the detector and all devices connected to it (e.g. indicator unit and signal converter).
- Be sure to ground the product to prevent electric shocks.
- Use a conductor with a cross-sectional area of at least 4mm^2 for external grounding.
- Place a plain flat washer between the case and the terminal.



⚠ CAUTION

- Connect wires to their corresponding terminals.
- Keep the connection cable (power and signal lines from the detector) away from other power lines.
- When closing the case cover, make sure that it does not catch on the gasket or any loose cables and that the cables are not overly stressed.

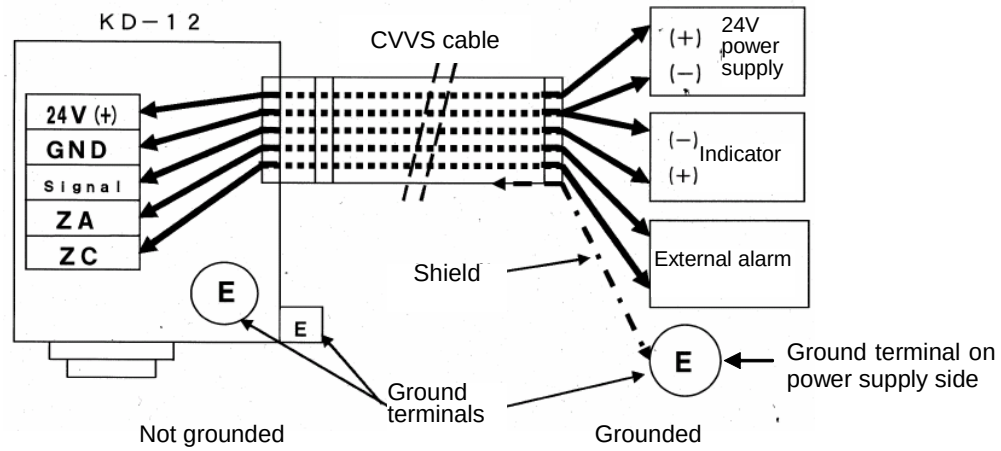
Connecting Power Supply and Signal Wires

- Provide dedicated breakers, if needed, to lines that are connected to peripheral devices, such as indicator units and signal converters.
- Use a dedicated cable, such as CVV-S (with a thickness of 1.25 to 2.00 mm^2).
- Make sure that the power supplied to the product is within the specified voltage range.
- Make sure that the load resistance of the signal line, including the resistance of the wire, is 300 ohm or less.

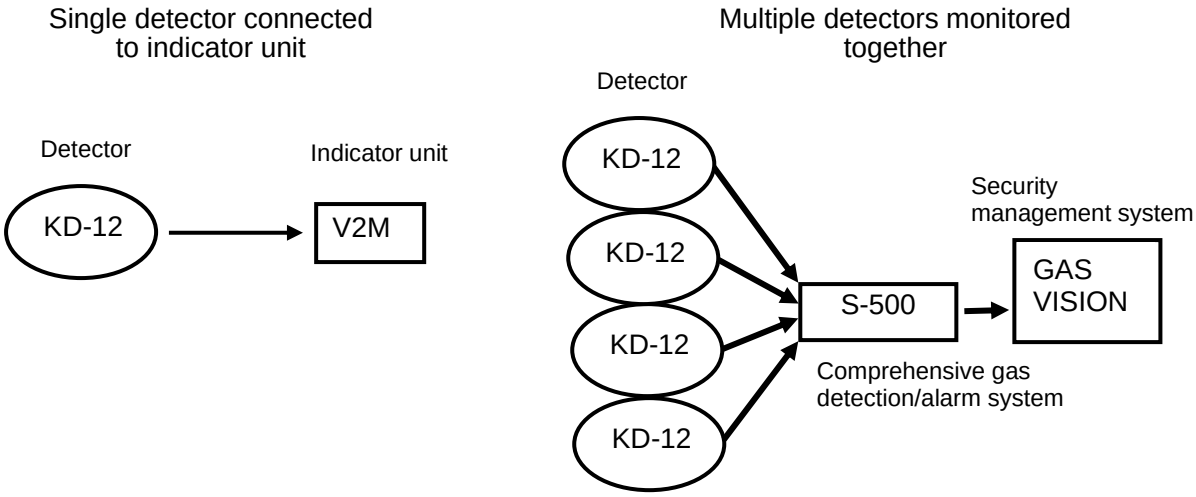
MEMO

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

Connection Example with Power Supply Side Grounded



System Configuration Example



- For details, refer to the Instruction Manual of each device.

Typical Connection Procedure

(1) Prepare a power supply that can provide 24 V.
(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 using the provided hexagon wrench with a nominal diameter of 4 mm, and open the casing cover of the main unit.

(3) Press the lever of the terminal block with a flat-blade screwdriver.

(4) The clamp will open. Insert the lead wire.

(5) Connect the positive side of the power supply to the 24 V+ terminal.

(6) Connect the negative side of the power supply to the GND terminal.

(7) The lead wire will be automatically secured when the screwdriver is lifted.

(8) Check that the power supply cords are securely connected to the terminals. This completes the power supply preparations.

(9) Wire the analog signal and external contact terminals, if required.

(10) Tighten the hexagon socket bolts (tightening torque : 0.8 – 2.4 N･m) on the four corners of the main unit and close the casing cover of the main unit.

⚠ CAUTION

- When lowering the lever of the terminal block, be careful not to allow the flat-blade screwdriver to slip off of the lever. Otherwise, the flat-blade screwdriver may damage the harness or circuit board.
- When closing the casing cover, make sure that the power supply cord, harness, and O-ring are not caught by the casing cover.

7. Precautions before Use

⚠ CAUTION

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

● 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.
- Measure the gas concentration with a portable gas detector and confirm the safety before entering the detection site.

8. Display at Start-up (Initial Delay)

⚠ CAUTION

- Check that there is no gas around the product before starting the product.
- If the sensor output is not stable, the external contact point may operate after the initial delay. Release the interlock of the external equipment if necessary.
- During the initial delay, the analog signal fixed at 4 mA will be output and the external contact will not operate.

MEMO

- The magnetic stick is not operable during the initial delay.
- The initial delay lasts approximately 30 seconds after the power is turned ON.

(1) When the power supply is turned ON, all of the indicator lamps (green, red, and yellow lamps) and the display block are lit.

(2) While the indicator lamps (green, red, and yellow lamps) are lit, the following items will be lit for approximately 1 second each.

Software version number (of the main unit)
↓
Full scale — Example [2000] ppm
When the full-scale value is 2000 ppm.
↓
Alarm set value — Example [500] ppm
When the alarm set value is 500 ppm.

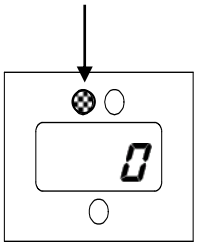
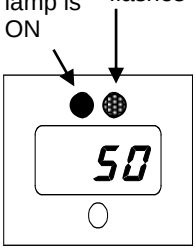
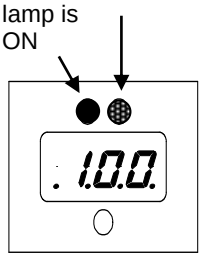
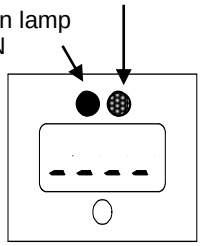
(3) Then the POWER indicator (green lamp) will be flashed for approximately 25 seconds.

(4) When the POWER indicator (green lamp) is lit, the start-up of the main unit is completed and the main unit will be in gas monitor mode.

MEMO

- If the sensor unit has not been turned ON for a long time after the product is shipped from factory, it may take some time for the sensor output to stabilize.
- If needed, turn ON the product for approximately one week, and make the zero adjustment and span adjustment. Refer to *11.3 Calibration Method* for the adjustments.

9. Display and Operation in Each Mode

<table>
<tr><td></td><td></td><td colspan="4">In excess of alarm set value</td></tr>
<tr><td rowspan="2"></td><td rowspan="2">At start-up
(Initial delay)</td><td rowspan="2">Gas monitor mode</td><td rowspan="2">Test mode</td><td colspan="2">Maintenance mode</td></tr>
<tr><td>Gas monitor mode</td><td>Test mode</td></tr>
<tr><td rowspan="2">Contents of display</td><td>Green lamp flashes
  </td><td>Green lamp is ON
Red lamp flashes
  </td><td>Green lamp is ON
Red lamp flashes
  </td><td colspan="2">Red lamp flashes
Green lamp is ON
  </td></tr>
<tr><td>The value according to gas concentration is displayed.
The value gradually approaches zero.</td><td>Gas concentration is displayed.</td><td>[Set concentration]

A full-scale test from −10% to 110% is possible.</td><td>[– – – –]
[Gas concentration]

Displayed alternately</td><td>[– – – –]
[Test value]

Displayed alternately</td></tr>
<tr><td>Analog signal
4 to 20 mA</td><td>Fixed at 4 mA</td><td>Gas concentration value is output.</td><td>Test value is output</td><td>Gas concentration value is output.</td><td>Test value is output.</td></tr>
<tr><td>Contact operation</td><td>Does not operate (OFF).</td><td>Operates (ON).</td><td>Operates (ON).</td><td>Does not operate (OFF).</td><td>Does not operate (OFF).</td></tr>
</table>

10. Trouble Alarm

- The product has a self-inspection function, and the trouble alarm will operate if a problem occurs.
- The product will inform the user of the problem details with the display shown in the following table when the trouble alarm operates.
- When the trouble alarm is generated, the analog signal will be approximately 0.9 mA or below.

Screen display	Trouble indicator	Problem details	Probable cause	Remedy
E-24	Yellow lamp flashes	Power supply voltage drop error	The power supply voltage is low.	Check the power supply voltage.
E- 8 E- 9	Yellow lamp flashes	Sensor error	The sensor connector is disconnected or the sensor wire has broken.	Check that the sensor connector is securely connected. If a sensor connector failure or broken wire has possibly occurred, contact your local representative.
E- 6 E- 7	Lamp is OFF	Zero-point adjustment error	There is gas in the ambient air.	After checking the ambient air, make the zero adjustment again.
E- 4 E- 5	Lamp is OFF	Span adjustment error	The gas concentration applied for adjustment is wrong.	After checking the type and concentration of gas, make a span adjustment again. If the type and concentration of gas is suitable, make span rough adjustment.

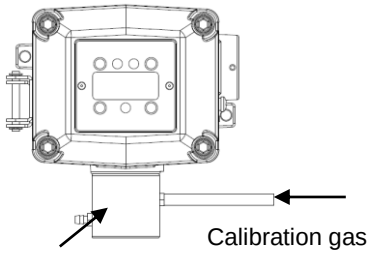
- If a screen other than the above is displayed, refer to the *12. Troubleshooting* section. If the product does not reset to normal operation after taking the measures shown in the table or if the problem is not listed in the table, contact your local representative.

- If the product goes into any unintended mode during adjustment or setting, cease operating the product and contact your local representative..

11. Maintenance Check and Operation Method

11-1. Daily Inspection and Periodical Inspection

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

<table>
<tr><th></th><th>Frequency</th><th>Checking item</th><th>Contents of inspection</th></tr>
<tr><td rowspan="3">Daily inspection</td><td>At least once per month</td><td>Visual inspection</td><td>• The status of lamp (green POWER indicator) is lit.
• The concentration display of the gas concentration indicator.
• Clogging of sensor unit mesh.
• Corrosion of sensor unit mesh.
• Corrosion of the main unit.
• Corrosion of mounting screw.
If a failure is found, replace the parts.</td></tr>
<tr><td rowspan="2">Minimum intervals of 2 to 3 months</td><td>Alarm operation check with real gas</td><td>Apply inspection gas to the gas detector and check the operation of the alarm.
• Use the calibration cap, apply inspection gas, and check the operation of the alarm.
 
</td></tr>
<tr><td>Condition around gas detector</td><td>Check that nothing interrupts the diffusion of gas around the gas detector.</td></tr>
<tr><td>Periodical inspection</td><td>At least once per year</td><td colspan="2">Consult your local representative.</td></tr>
</table>

- Use optional products to make actual gas inspections.

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 poisonous gas), to carefully conduct inspection and calibration. It is highly recommended that you consider periodical inspections under a maintenance contract with New Cosmos Electric Ltd. or your local representative.

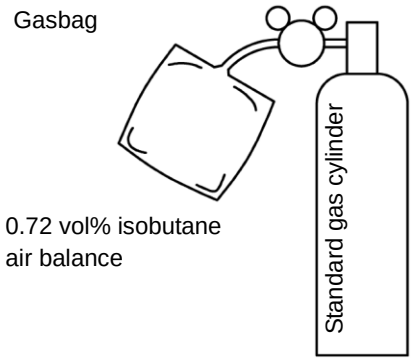
11-2. Preparing Calibration Gas

- Calibration gas is used for actual gas inspection.

- The following example shows how to prepare 0.72 vol% (40%LEL) isobutane as a reference gas.

With a standard gas cylinder

.



With no calibration gas cylinder

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

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

⚠ DANGER

- Make sure that there are no flammables nearby when handling flammable gas with a concentration over LEL (lower explosive limit).

(1) Drawing raw gas

Connect a gas bag to an isobutane 99vol% cylinder and draw a little more than you actually need.

Bend back the hose and pinch with a pinch cock so the gas does not leak from the bag.

(2) Drawing a fixed amount of raw gas

Connect a 10ml syringe to a gas bag and draw 7.2ml of raw gas. (Draw a little more than you actually need then discharge the excess.)

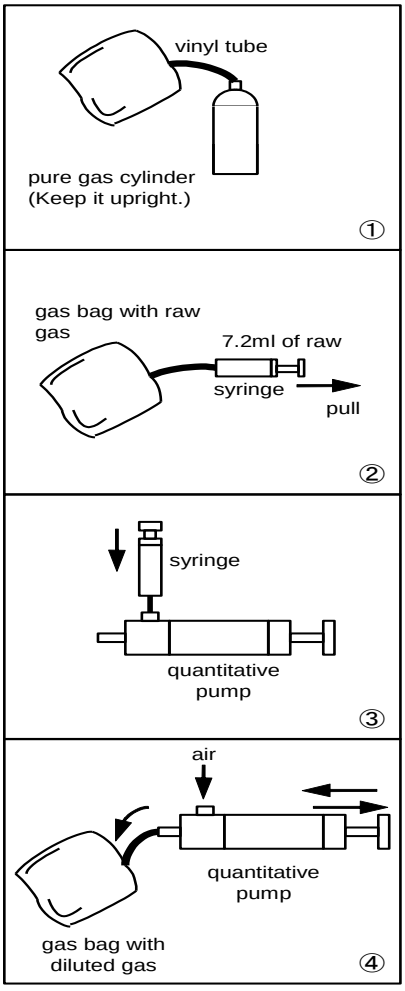
(3) Transferring raw gas into a quantitative pump

Connect a syringe to the inlet of a quantitative pump then pull out the pump's piston. Raw gas in the syringe is sucked into the pump. Remove the syringe and pull the piston all the way out (100ml).

(4) Making diluted gas

Connect an empty gasbag to the outlet of the quantitative pump then push in the pump's piston.

Move the piston back and forth 9 times to add air in order to make diluted gas.



Memo

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

7.2ml/(100ml×10)=0.0072

0.72vol% diluted gas is made.

Isobutane's lower explosive limit (LEL) is 1.8vol%.

0.72/1.8×100=40.0

40%LEL diluted gas is made.

11-3. Calibration Method

● Maintenance Mode

⚠ CAUTION

- While in maintenance mode, the external contact does not operate when the concentration of gas reaches or exceeds the alarm set value. The product in maintenance mode maintains the current status while the display shows [- - - -]. This mode is canceled by repeating the same operation(1 to 6), turning the product OFF, or waiting 8 hours.

(1) While in gas monitor mode, press the MODE switch of the main unit first. Then press the UP switch with the magnetic stick within approximately 2 seconds.

(2) The main unit displays CAL. . first, followed by . . 0. .
(The product is ready to work but nothing has been operated.)

(3) Press the UP or DOWN switch of the main unit with the magnetic stickic and adjust the value to . . 0. .

(4) Press the ENTER switch of the main unit.

- - - -
Gas concentration

(5) When the above items are displayed alternately, the product has been set to maintenance mode.

(6) Upon completion of this mode, the product will automatically return to gas monitor mode.

(7) While - - - - is displayed, the maintenance mode is being executed.

(8) This mode will be canceled by repeating the same operation (1 to 6 above), turning the product OFF, or waiting for 8 hours.

Carefully handle and make settings with the magnetic stick because the magnet is very powerful. For details, refer to *3. Contents of Package*.

● Zero Adjustment

- The external contact may operate. Therefore, set the product to maintenance mode if needed.

MEMO Conduct the zero adjustment in a place where there is no ambient gas.

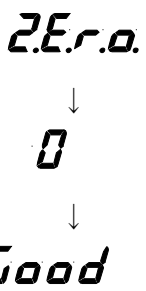
(1) While in gas monitor mode, press the MODE switch of the main unit first. Then press the UP switch with the magnetic stick within approximately 2 seconds.

(2) The main unit displays CAL. first, followed by 0. (The product is ready to work but nothing has been operated.)

(3) Press the UP or DOWN switch of the main unit with the magnetic stick and adjust the value to 1.

(4) Press the ENTER switch of the main unit.

(5)



(6) When the above items are displayed, the zero adjustment is completed.

(7) Upon completion of the zero adjustment, the product will automatically return to gas monitor mode.

- If an error is displayed, refer to 10. Trouble Alarm.
- Carefully handle and make settings with the magnetic stick because the magnet is very powerful. For details, refer to 3. Contents of Package.

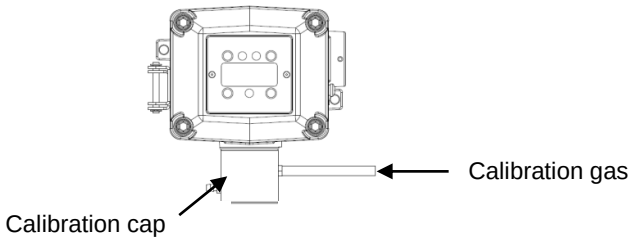
● Span Fine-tuning

MEMO

Be sure to conduct the zero adjustment before performing span fine-tuning.

> **⚠ CAUTION**
>
> - The external contact may operate during span fine-tuning. Set the product to maintenance mode or release the interlocks of the external devices if needed before performing span fine-tuning.
> - Only New Cosmos Electric Co., Ltd. maintenance service members or personnel who have completed a maintenance seminar can perform fine-tuning.

(1) Apply calibration gas corresponding to the equipment.



(2) Sufficiently stabilize the gas.

(3) While in gas monitor mode, press the MODE switch of the main unit first. Then press the UP switch with the magnetic stick within approximately 2 seconds.

(4) The main unit displays CAL. first, followed by 0.
(The product has completed starting but nothing has been operated.)
Example: After zero adjustment, 1 will be displayed.

(5) Press the UP or DOWN switch of the main unit with the magnetic stick and adjust the value to 2.

(6) Press the ENTER switch of the main unit.

(7) The main unit displays SF. first, followed by the present gas concentration.

(8) Press the UP or DOWN switch of the main unit with the magnetic stick, and adjust the display of the main unit to the actual span gas concentration.

(9) Press the ENTER switch.

(10) The span fine-tuning is completed when Good is displayed.

(11) Upon completion of the span fine-tuning, the product will automatically return to gas monitor mode.

(12) Remove the gasbag.

- Perform span rough adjustment if E-4 or E-5 is displayed.
- If an error is displayed, refer to *10. Trouble Alarm*.
- Carefully handle and make settings with the magnetic stick because the magnet is very powerful. For details, refer to *3. Contents of Package*.

● Span Rough Adjustment

• Perform span rough adjustment if E- 4 or E- 5 is displayed.

> **⚠ CAUTION**
>
> - The external contact may operate during span rough adjustment.
> Before performing span rough adjustment, set the product to maintenance mode or release the interlocks of the external devices if needed.
> - Only New Cosmos Electric Co., Ltd. maintenance service members or personnel who have completed a maintenance seminar can perform span rough adjustment.

(1) Apply calibration gas corresponding to the equipment.

(2) Sufficiently stabilize the gas.

(3) While in gas monitor mode, press the MODE switch of the main unit first. Then press the UP switch with the magnetic stick within approximately 2 seconds.

(4) The main unit displays CAL. . first, and displays . . .0. .
(The product is ready to work but nothing has been operated.)
Example: After zero adjustment, . . . 1. will be displayed.

(5) Press the UP or DOWN switch of the main unit with the magnetic stick and adjust the value to . . . 7. .

(6) Press the ENTER switch of the main unit.

(7) The main unit displays Sr. . . first, and displays the present gas concentration.

(8) Press the UP or DOWN switch of the main unit with the magnetic stick, and adjust the display of the main unit close to the actual span gas concentration.

(9) Press the ENTER switch.

(10) The span rough adjustment is completed when Good is displayed.

(11) On completion of the span rough adjustment, the product will automatically return to gas monitor mode.

(12) Remove the gasbag.

MEMO

Precise adjustment is not performed only by span rough adjustment. Perform span fine-tuning after span rough adjustment.

- If an error is displayed, refer to *10. Trouble Alarm*.
- Carefully handle and make settings with the magnetic stick because the magnet is very powerful. For details, refer to 3*. Contents of Package*.

● Full-scale and Alarm Set Value Display

- The full-scale and alarm set values are only displayed. They cannot be changed.

(1) While in gas monitor mode, press the MODE switch of the main unit first. Then press the UP switch with the magnetic stick within approximately 2 seconds.

(2) The main unit displays CAL. first, and displays 0 .
(The product is ready to work but nothing has been operated.)
Example: After zero adjustment, 1 will be displayed.

(3) Press the UP or DOWN switch of the main unit with the magnetic stick and adjust the value to 4 .

(4) Press the ENTER switch of the main unit.

F.S.d.P.
↓
F.S.
↓
Full scale
↓
AL.
↓
Alarm set value

(5) When the above items are displayed in sequence and repeatedly, the user can check the full-scale and alarm set values.

(6) After the full-scale and alarm set values are displayed, the product will automatically return to gas monitor mode.

- Carefully handle and make settings with the magnetic stick because the magnet is very powerful. For details, refer to *3. Contents of Package*.

● Test Mode

• Test values are adjusted and used for tests in this mode.

> ⚠ **CAUTION**
>
> ● The external contact may operate while the product is in test mode.
> Before setting the product to test mode, set the product to maintenance mode or release the interlocks of the external devices if needed.

(1) While in gas monitor mode, press the MODE switch of the main unit first. Then press the UP switch with the magnetic stick within approximately 2 seconds.

(2) The main unit displays CAL. first, and displays .0. .
(The product is ready to work but nothing has been operated.)
Example: After zero adjustment, .1. will be displayed.

(3) Press the UP or DOWN switch of the main unit with the magnetic stick and adjust the value to .10. .

(4) Press the ENTER switch of the main unit.

TEST.
↓
Test value

(5) When the above items are displayed, the test operation of the product in a concentration range from −10% to 110% of the full scale.
The test operation of the product is possible in a concentration range from −200 to 2200 ppm if the full scale of the product is 2000 ppm.
The test operation of the product is possible in a concentration range from −10%LEL to 110%LEL if the full scale of the product is 100%LEL.

(6) Press the UP or DOWN switch of the main unit and set the desired calibration concentration. Then the test will start.
If the setting is outside the operating range, LLLL or HHHH will be displayed.

(7) To quit the test mode, press the ENTER or MODE switch.

(8) When the test is finished with the ENTER switch pressed, the tested value will be saved.
When the test is finished with the MODE switch, the previously saved value will remain.

• Carefully handle and make settings with the magnetic stick because the magnet is very powerful. For details, refer to *3. Contents of Package*.

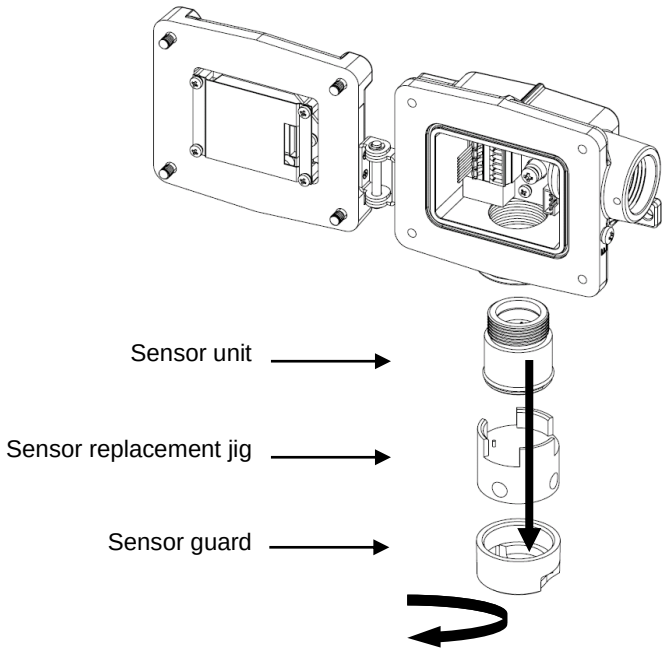
11-4. Replacement of Sensor Unit

⚠ WARNING

- Be sure to turn OFF the indicator unit, signal converter or main body equipment before replacing a sensor unit. Otherwise, they may become a source of ignition.
- Be sure that the sensor and the sensor connector have been firmly connected to the detector before the power is turned on. If the sensor and the detector are incorrectly connected, the detector cannot detect gas.
- The dimensions of flameproof joint between casing and casing cover of KD-12 flameproof housing are exceeding the minimum requirements stated EN/IEC60079-1. Please contact the manufacturer for inspection, repair and/or adjustments of this flameproof.

⚠ CAUTION

- Only New Cosmos Electric Co., Ltd. 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 a sensor failure may result.
- The external contact may operate when replacing the sensor unit if the sensor output is not stable. Release the interlocks of the external devices if needed.
- When removing or mounting the sensor unit, do not twist the harness of the sensor connector.
- When closing the casing cover, make sure that the power supply cord, harness, or O-ring is not caught by the casing cover.



(1) Turn OFF the power supply connected to the product.

(2) Loosen the bolt with a hexagon socket on each of the four corners of the main unit with the provided hexagon wrench with a nominal diameter of 4 mm, and open the casing cover of the main unit.

(3) Disconnect the sensor connector.

(4) Dismount the sensor guard.

(5) Use the sensor replacement jig, and turn and pull out the sensor unit.

(6) Insert a new sensor unit and tighten the sensor unit by using the sensor replacement jig.

(7) Connect the sensor connector.

(8) Check that the sensor connector is connected securely.

(9) Mount the sensor guard.

(10) Tighten the bolt with a hexagon socket (tightening torque : 0.8 – 2.4 N・m) on each of the four corners of the main unit with the provided hexagon wrench with a nominal diameter of 4 mm, and close the casing cover of the main unit.

(11) Turn ON the power supply connected to the product.

(12) When the sensor unit has been replaced, it is necessary to make zero adjustment and span adjustment after keeping the product turned ON for approximately one week to stabilize the sensor output.

(13) Be sure to make zero adjustment first, followed by span adjustment.

(14) If an error is displayed, refer to *10. Trouble Alarm*.

MEMO

- The sensor replacement jig is an optional product.
- Return the used sensor unit to your local representative.

12. Troubleshooting

- Before requesting repairs, refer to the following table. Consult your New Cosmos representative if the product does not return to normal after taking the corresponding remedies shown below or if the defective condition is not found in the table.
- If the product goes into an unintended mode at the adjustment or setting stage, stop operating the product immediately and consult the system administrator.

Defective condition	Probable cause	Remedy	Reference page
The green power lamp is not lit.	Incorrect wiring connection.	Check and redo the wiring.	P. 13 Wiring and Connection
The yellow lamp to indicate an error is flashed and the error code is displayed.	E-24 Low-voltage state	Check the power supply voltage.	
	E- 8 E- 9 The sensor unit is defective, the connector is disconnected, or the sensor wires are broken.	Check that the sensor connector is connected securely.	P. 13 Wiring and Connection
		If there is a possibility that the sensor is defective or sensor wires are broken, contact your local representative.	
The detected gas concentration and - - - - are flashing alternately.	The product is in maintenance mode.	Return the product to gas monitor mode.	P. 24 Maintenance Mode
There is no alarm contact output.	The product is in maintenance mode.	Return the product to gas monitor mode.	P. 24 Maintenance mode
	Incorrect wiring connection.	Check and reconnect the wiring.	P. 13 Wiring and Connection
	The alarm point setting is wrong.	Check the alarm setting.	P. 28 Full-scale and Alarm Set Display
The analog signal does not change	The product is in test mode.	Return the product to gas monitor mode	P. 29 Test mode
A value and HHHH are flashing alternately.	The sensor output is high.	The concentration of gas is in excess of the full scale. Check the ambient environment.	
A value and LLLL are flashing alternately.	The sensor output is low.	Conduct zero adjustment after checking that the air around the product is not contaminated with gas.	P. 25 Zero adjustment
No adjustment or setting is possible.	The product is operated during the initial delay time.	Operate the product after the 30-second initial delay time.	P.18 Display at Start-up (Initial Delay)

13. Specifications

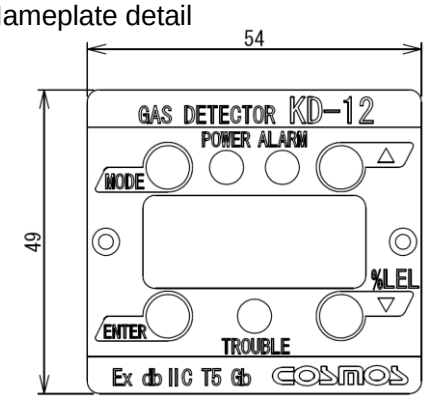
Model	KD-12
Detection principle	【KD-12A】Hot-wiresemiconductor sensor 【KD-12B】Catalytic sensor 【KD-12C】Thermal conductivity sensor
Sampling method	Diffusion type
Detection gas	Depends on the specifications.
Detection range	Depends on the specifications.
Gas concentration display	Four-digit digital LED display
Alarm set value	Depends on the specifications.
Alarm accuracy	• Combustible gas: ±25% of alarm set value under identical conditions. • Toxic gas: ±30% of alarm set value under identical conditions.
Alarm delay	• Combustible gas: Within 30 seconds with gas concentration that is 1.6 times as high as the level of alarm set concentration. • Toxic gas: Within 60 seconds with gas concentration that is 1.6 times as high as the level of alarm set concentration.
Warning display	• Gas alarm (one stage only) : Red LED lamp flashes • Trouble alarm (sensor disconnection, sensor zero drop, power supply voltage error, or internal EEPROM communication error) : Yellow LED lamp flashes
External output	Gas concentration analog signal • 4 to 20 mA DC (common to the negative side of power supply) • 0.9 mA DC or less at the time of Trouble alarm. • Make sure that the load resistance of the analog signal is less than 300 ohm including the wiring resistance. Gas alarm contact (one stage only) • 1a no-voltage contact output/Non-latching • Rated load: 0.5 A at 250 VAC or 0.5 A at 30 VDC (resistance load)
Explosion-proof Class	Ex d IIC T5 (Japan), Ⓔx II 2 G Ex db IIC T5 Gb (Europe) Ex db IIC T5 Gb (IECEx)
Approvals	EC-type examination certificate : DEMKO 08 ATEX 143870 X (CE 0518 Ⓔx II 2 G Ex db IIC T5 Gb) EMC : EN61000-6-4:2001, EN50270:2006 - Type 2 Performance testing : The measuring function of the KD-12 gas detector for explosion protection, according to Annex II clause 1.5.5, 1.5.6 and 1.5.7 of the Directive 94/9/EC, is not covered in this certificate. IECEx : ULD 13.0001X (Ex db IIC T5 Gb)
Standards for hazardous locations	EN 60079-0:2012+A11:2013, EN 60079-1:2014 IEC 60079-0:2011 Edition 6.0, IEC 60079-1:2014 Edition 7.0
Degree of protection	IP65 (Exterior)
Applicable cable	Cable outer diameter (10 to 13 mm) • In the case of a 5-conductor cable (for power supply, gas concentration analog signal, and gas alarm contact): CVV-S 1.25 mm^2. • In the case of a 3-conductor cable (for power supply and gas concentration analog signal) CVV-S 2 mm^2

Operating temperature and humidity ranges	• Temperature: −10°C to 50°C • Humidity 10% to 90% (0 to 50°C). (No radical temperature or humidity changes and no condensation)
Power supply	24 VDC (18 to 30 VDC)
Power consumption	3 W max.
Size	128 (W) x 116 (H) x 68 (D) mm (excluding protruding parts)
Weight	Approx. 1.2 kg
Mounting method	Wall mounting

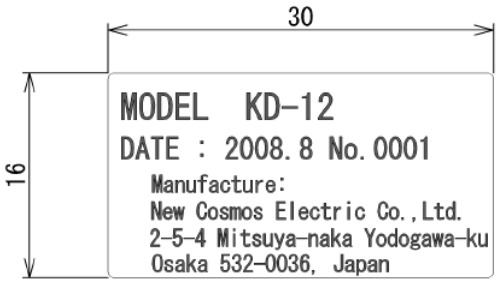
The above specifications are subject to change without notice.
If your specifications are nonstandard, refer to the delivery specifications.

14. Markings of explosion-proof

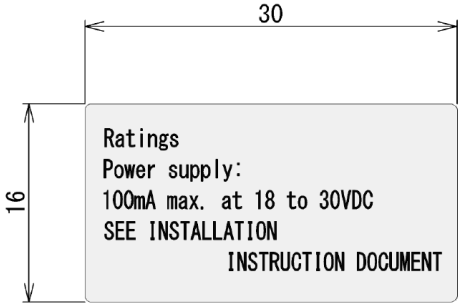
-Nameplate detail



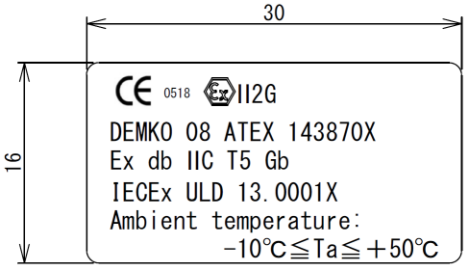
-Serial number label detail



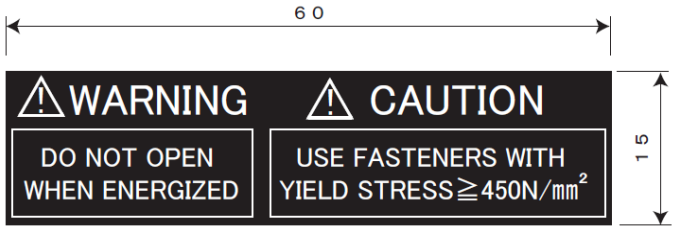
-Rated label detail



-Certificate label detail



-Warning label detail



-List of hazardous locations standard

EN 60079-0:2012+A11:2013
EN 60079-1:2014
IEC 60079-0:2011 Edition 6.0
IEC 60079-1:2014 Edition 7.0

15. Warranty

New Cosmos Electric Company Limited (hereafter referred to as “New Cosmos”) offers the following as the sole and exclusive limited warranty available to the Customer.
This warranty is in lieu of, and the 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 (Customer) and no other person or entity 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 apply to consumables, including but not limited to fuses and filters. Certain other accessories not specifically listed here may have different warranty periods.
If after examination of an allegedly defective product returned to New Cosmos, with freight prepaid, should it be found that the product fails to conform to this warranty, the Customer’s only remedy and New Cosmos’s only obligation shall be, at New Cosmos’s sole discretion, replacement or repair of the non-conforming product or refund of the original purchase price of the non-conforming product. In no event shall 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 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.

16. Life Expectancy

- The period of designed life expectancy of the product under standard environmental conditions is approximately five years after the date of purchase.
  The period of designed life expectancy after the expiration of the warranty period is a rough standard on the condition that the product is used with specified gas calibration performed. New Cosmos, however, does not guarantee the specified period of designed life expectancy. The product may become unusable before the next calibration is performed.

- The life of the hot wire semiconductor-type sensor incorporated in the KD-12A is approximately five years after the date of purchase.
  The sensor may not detect gas correctly with the lapse of approximately five years. Replace the sensor at intervals of approximately five years. 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 toxic gas. New Cosmos, however, does not guarantee the specified life of the sensor.

- The life of the catalytic combustion-type sensor incorporated in the KD-12B is approximately three years after the date of purchase.
  The sensor may not detect gas correctly with the lapse of approximately three years. Replace the sensor at intervals of approximately three years. 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 toxic gas. New Cosmos, however, does not guarantee the specified life of the sensor.

- The life of the thermal conductivity-type sensor incorporated in the KD-12C is approximately five years after the date of purchase.
  The sensor may not detect gas correctly with the lapse of approximately three years. Replace the sensor at intervals of approximately five years. 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 toxic gas. New Cosmos, however, does not guarantee the specified life of the sensor.

17. Detection principle

17-1. 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).

17-2. 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 reduces. 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.

17-3. 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℃) 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.

18. 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.)

NEW COSMOS ELECTRIC CO.,LTD.

EU DECLARATION of CONFORMITY

No.CE0002-00

We, New Cosmos Electric Co., Ltd, 2-5-4 Mitsuya-naka, Yodogawa-ku, Osaka 532-0036 Japan declares under our sole responsibility that the product described below is in compliance with the following directives.

Type of the equipment:	Fixed gas detector
Model:	KD-12 series (KD-12A, KD-12B, KD-12C, KD-12D, KD-12O, KD-12R, KD-12BSIL, KD-12AH, KD-12BH, KD-12RH)

Directive: Electro Magnetic Compatibility Directive (EMC): 2014/30/EU
Harmonized standard: EN50270:2006

Directive: Restriction of Hazardous Substances Directive (RoHS): 2011/65/EU
Harmonized standard: EN50581:2012

Directive: Potentially Explosive Atmospheres (ATEX):2014/34/EU
Harmonized standard: EN60079-0:2012+A11:2013,
EN60079-1:2014
Marking: Ⓔx II 2 G Ex db IIC T5 Gb

Quality Assurance Notification:	Notification No. SIRA 13 ATEX M570
Notified Body:	Sira Certification Service Identification No. 0518

EC-Type-Examination Certificate:	08 DEMKO ATEX 143870X
Notified Body:	UL international DEMKO A/S

Technical documentations stored in 2-5-4 Mitsuya-naka, Yodogawa-ku, Osaka 532-0036 Japan

Place: Osaka, Japan
Date: Aug 9, 2017

Signature: Hiroshi Kasahara H. Kasahara
General Manager,
Quality Control Department 2,
Quality Control Division

COSMOS Gas Detection Systems

Manual Revision History

Edition No.	Date	Revisions
GAE-030-00	November 2007	00
GAE-030-01	December 2008	01
GAE-030-02	May 2009/09/25	02
GAE-030-03	August 2009	03
GAE-030-04	December 2010	04
GAE-030-05	November 2011	05
GAE-030-06	May 2013	06
GAE-030-07	September 2013	07
GAE-030-08	July 2014	08
GAE-030-09	November 2016	09
GAE-030-10	August 2017	10

Additional copies of this Instruction Manual are available.
Contact the following address for ordering information.

Authorized representative:

Manufacturer:

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