

RM-5000 Series

Multi-unit Case

5000-02W/5000-02R

5000-04W/5000-04R

5000-06W/5000-06R

5000-08W/5000-08R

5000-10W/5000-10R

5000-12W/5000-12R

Operating Manual

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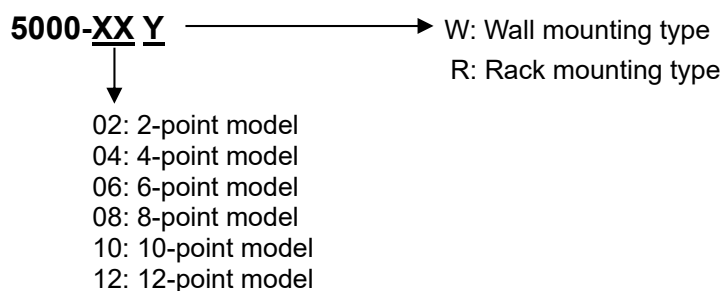
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Outline of the Product

1-1. Preface

Thank you for choosing our multi-unit case* "5000-XXY" model for use with the RM-5000 series.

- The multi-unit case comes in the following models with different specifications:



This manual explains how to use the multi-unit case and its specifications.

It contains information required for using the multi-unit case properly. Not only the first-time users but also the users who have already used the product must read and understand the operating manual to enhance the knowledge and experience before using the multi-unit case.

1-2. Purpose of use

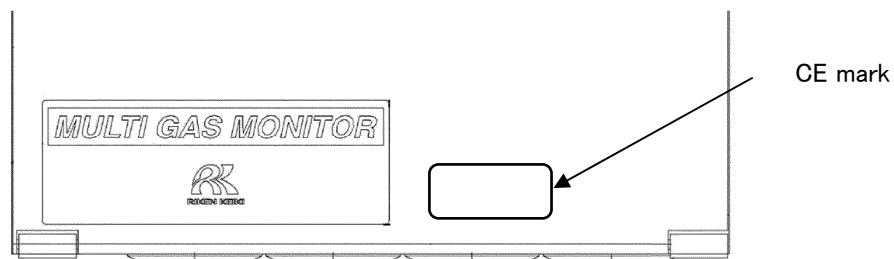
- The multi-unit case is a multi-point unit for use with the RM-5000 series. The multi-unit case, having a power supply unit, is ready for instrumentation only by connecting the commercial power supply, mounting an indicator/alarm unit (option) and buzzer unit (option), and connecting a detector head (option) to it.
- Various indicator/alarm units of the RM-5000 series can be laid out in a desired way.

1-3. Definition of DANGER, WARNING, CAUTION, and NOTE

 DANGER	This message indicates that improper handling may cause serious damage on life, health or assets.
 WARNING	This message indicates that improper handling may cause serious damage on health or assets.
 CAUTION	This message indicates that improper handling may cause minor damage on health or assets.
NOTE	This message indicates advice on handling.

1-4. Method of confirmation for CE marking type

The product specifications will vary depending on the specific standards and explosion-proof certification. Check the actual product specifications before use.



CE marking type name plate
(DC spec. only)

2

Important Notices on Safety

2-1. Danger cases



DANGER

This is not an explosion-proof unit.

2-2. Warning cases



WARNING

- Buzzer unit and indicator/alarm unit
Do not connect the multi-unit case to units other than the specified RM-5000 series indicator/alarm unit and buzzer unit. Otherwise, the multi-unit case or equipment connected to it may be damaged.
- Power supply
Before turning on the multi-unit case, always check that the power supply voltage is compliant with the specifications.
- Need of grounding circuit
Do not cut the grounding circuit inside or outside the multi-unit case or disconnect the wire from the grounding terminal. In both of the cases, the multi-unit case will be in danger.
- Defects in protective functions
When seeming defects are found in the protective functions, such as protective grounding and fuses, do not start the multi-unit case. Before starting the multi-unit case, check the protective functions for defects.
- Fuse
To prevent fire, use a fuse with the specified ratings for the multi-unit case.
Turn the POWER switch OFF and cut the mains power before replacing a fuse.
Do not use an unspecified fuse or short-circuit the fuse holder.
For more information on fuses, please contact RIKEN KEIKI.
- External connection
Before connecting the multi-unit case to external equipments or external control circuit, securely connect it to a protective grounding circuit.
- Attaching/detaching
Attach the buzzer unit and indicator/alarm unit by inserting along the rail into the multi-unit case. To detach them, pull them out while pressing the lock lever on the lower part of the buzzer unit and indicator/alarm unit. The lock lever mechanism may be broken if you detach the buzzer unit and indicator/alarm unit from the multi-unit case while they are locked. Use a correct procedure to attach and detach them.
- Operation in a gas
Do not operate the multi-unit case in a place where combustible gases or vapors are present. Operating the multi-unit case in such an environment will lead to extreme dangers.

2-3. Precautions



CAUTION

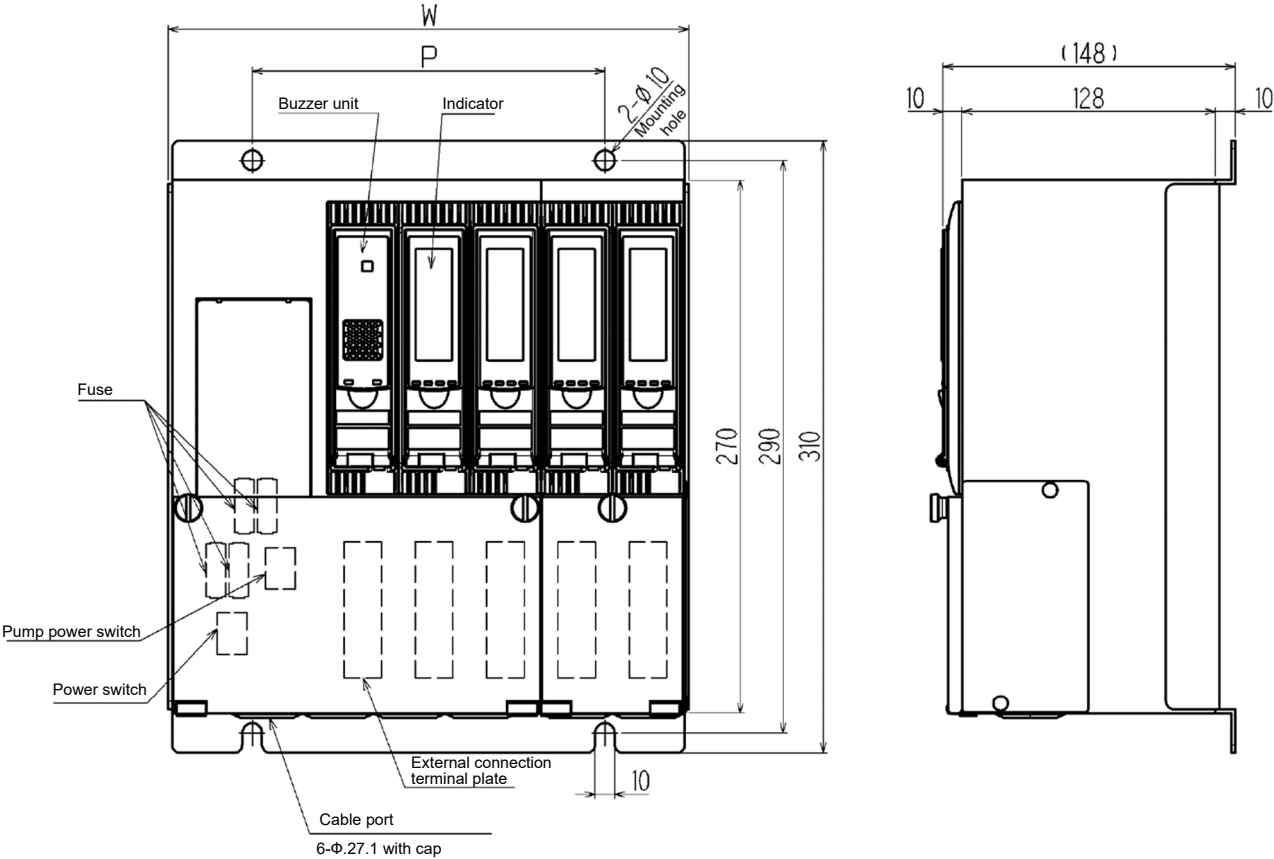
- Do not use a transceiver or mobile phone, etc. near the multi-unit case.
Radio wave from a transceiver near the multi-unit case or its cables may disturb operations. If a transceiver or other such device is used, it must be used in a place where it disturbs nothing.
- To restart the multi-unit case, you must wait five seconds or more before doing it.
Restarting the multi-unit case in less than five seconds may cause errors.
- The safety and quality of the product cannot be guaranteed if this operating manual is ignored when operating or maintaining the multi-unit case or it is altered in any way or repaired using unspecified parts. We will not be liable for any accidents caused by these conditions.
- Careful consideration should be given to instrumentation to maintain safety even when a trouble like disconnection of power/signal cable or unexpected malfunction or failure occurs.
- This is an electrical appliance. Be careful that it may be affected, in rare cases, by power supply noises, static electricity, and electromagnetic noises. Before using this product in an environment with such noises, provide for protective measures against them.
- Do not disassemble/modify the multi-unit case, or change the settings if not necessary.
Disassembling/Modifying the multi-unit case will invalidate the warranty of the performance.
Changing the settings without understanding the specifications may cause alarm malfunctions.
Please use the multi-unit case properly in accordance with the operating manual.
- Do not forget to perform a regular maintenance.
Since this is a safety unit, a regular maintenance on it and the detector head must be performed to ensure safety.

3

Product Components

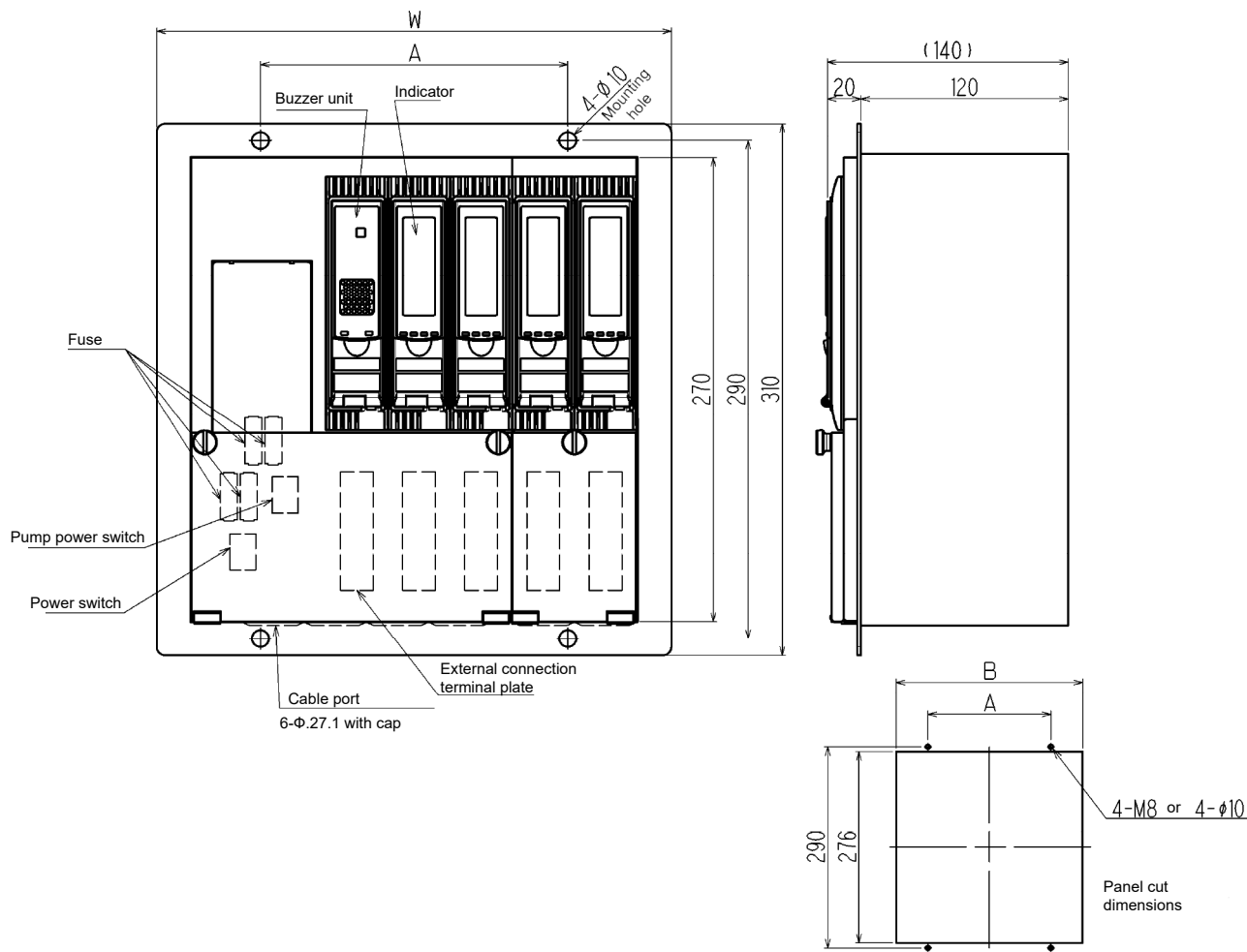
3-1. Outline drawing

3-1-1. Wall mounting type



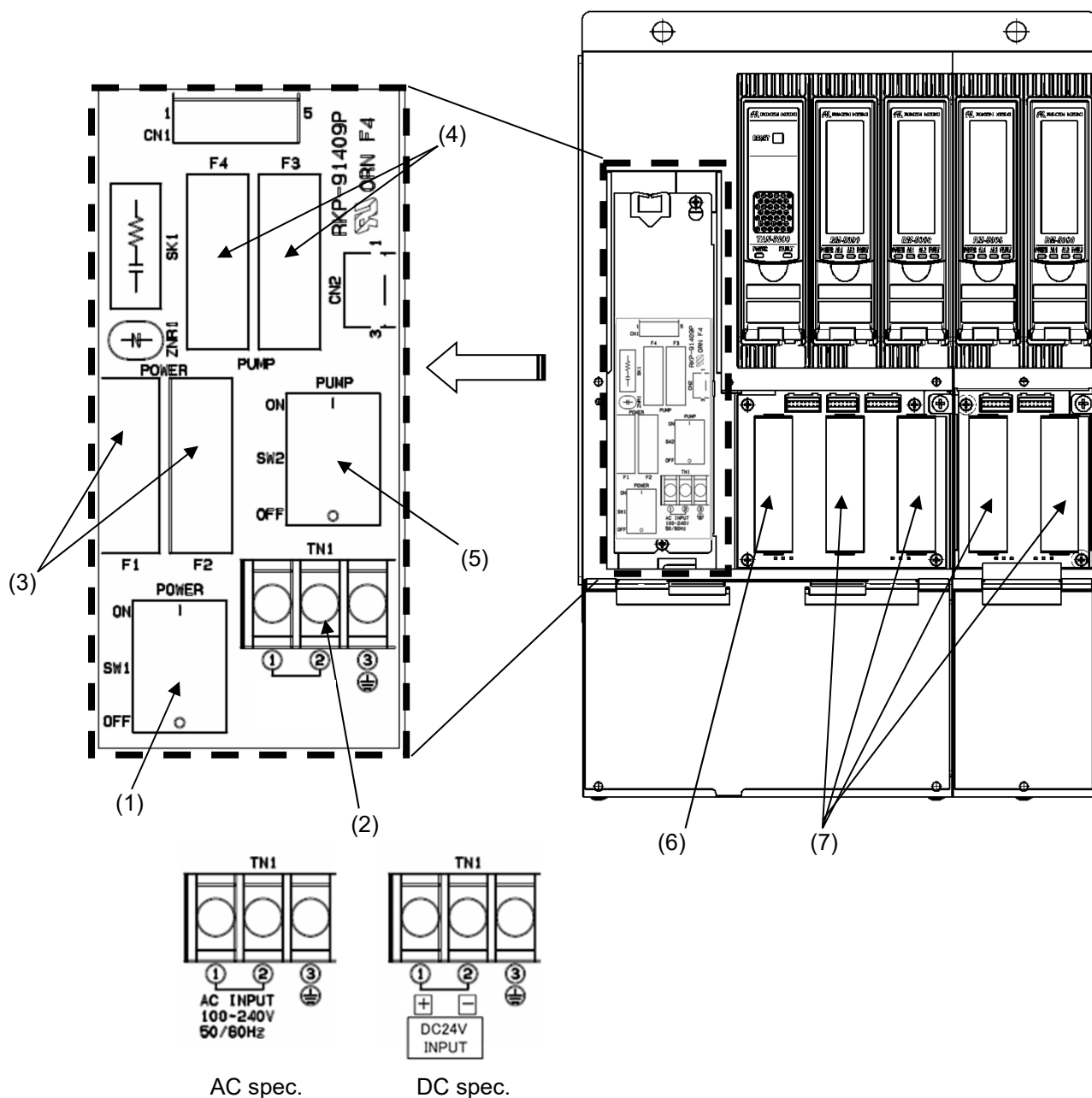
Indicator/alarm unit quantity	2	4	6	8	10	12
Dimensions (mm)						
W	191	263	336	408	480	552
P	106	178	250	322	366	474

3-1-2. Rack mounting type



Indicator/alarm unit quantity	2	4	6	8	10	12
Dimensions (mm)						
W	226	298	370	442	515	586
A	106	178	250	322	366	474
B	198	270	342	414	486	558

3-2. Names and functions for each part

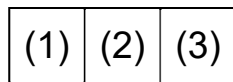


- (1) Power switch:.....Main power switch.
- (2) Power input terminal plate:Connect a power cable to it.
- (3) Power fuse:Main fuse for the power supply.
- (4) Pump power supply fuse:Fuse for the pump power supply.
- (5) Pump power switch:.....Switch for the pump power supply.
- (6) Terminal plate for buzzer unit:Connect output signals of the buzzer unit.
- (7) Terminal plate for indicator/alarm unit: ...Terminal plate for the detector head and alarm contact output.

3-3. Terminal signal chart

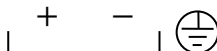
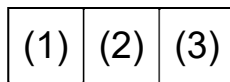
Power input terminal plate

Power supply unit(AC spec.)



Power input
100 to 240 VAC
50/60 Hz

Power supply unit(DC spec.)



Power input
24 VDC

Terminal plate for buzzer unit

RS-485 input-output*1	A	(1)	(7)	T.ALM1	Common first alarm contact output
	B	(2)	(8)		
Buzzer stop signal input	EX. BZ-STOP	(3)	(9)	T.ALM2	Common second alarm contact output
Test input	EX.TEST	(4)	(10)		
24 VDC output	+	(5)	(11)	T.FAULT	Common fault alarm contact output
	-	(6)	(12)		
Grounding terminal	FG		(13)	EX.RESET	Reset signal input
			(14)	COM	Common

Terminal plate for indicator/alarm unit

Power supply for pump*2	*2	(1)	(7)	ALM1	First alarm contact output
		(2)	(8)		
Detector head	DETECTOR	(3)	(9)	ALM2	Second alarm contact output
			(10)		
		(4)	(11)	FAULT	Fault alarm contact output
		(5)	(12)		
Grounding terminal	FG		(13)	+	4 - 20 mA output
			(14)	-	

*1 The RS-485 input-output depends on the specifications of the indicator/alarm unit.

*2 The power supply for the pump is: (1) L, (2) N for AC spec., (1) +, (2) - for DC spec.

4

How to Use

4-1. Before using the multi-unit case

Not only the first-time users but also the users who have already used the product must follow the operating precautions.

Ignoring the precautions may damage the multi-unit case, resulting in inaccurate gas detection.

4-2. Attaching and detaching procedures for each unit

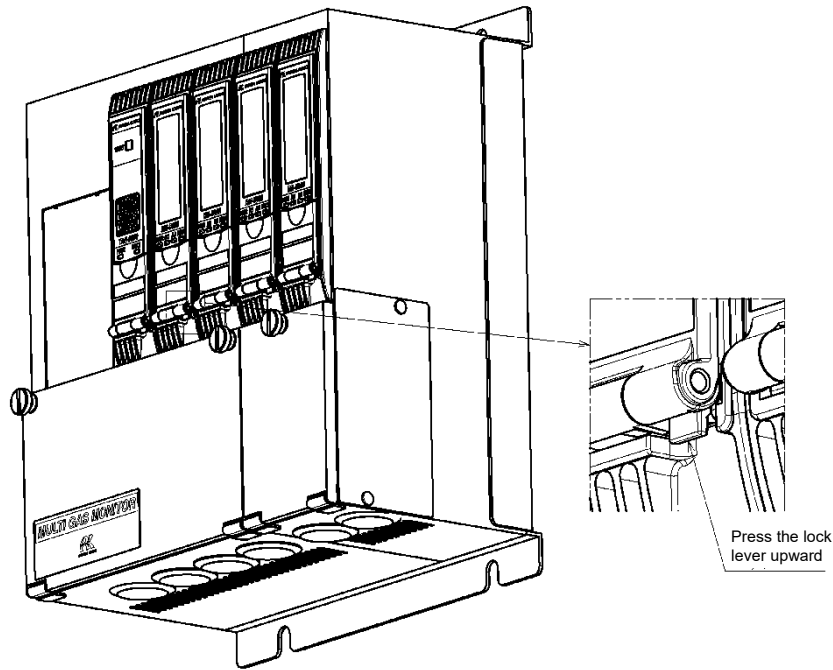
Detach or attach the RM-5000 series indicator/alarm unit and buzzer unit from the multi-unit case according to the following procedures.

(1) Attaching procedure

- Open the front cover of the indicator/alarm unit and buzzer unit.
- Make sure that the power switch is OFF.
- Insert the target units along the rail into the multi-unit case.
- Insert it until a click is heard and you feel that it is locked in.
- Make sure that the target units do not come off.

(2) Detaching procedure

- Open the front cover of the indicator/alarm unit and buzzer unit.
- Turn OFF the power switch of the target units.
- While lifting the lock lever on the lower right of the target units, hold the front cover and pull it out of the multi-unit case.
- Close the front cover of the target units.

**CAUTION**

- Be sure to attach or detach a unit using the above procedures. Otherwise, the lock lever mechanism may be broken.
- Turn off the power of a unit before attaching or detaching it. Otherwise, a failure may be caused.
- Each unit is a precision device. Be careful not to drop it when detaching it. Dropping the unit compromises its original performance or causes malfunctions.

4-3. Precautions for installation points



CAUTION

This is a precision device. Because the multi-unit case may not provide the specified performance in some places (environments), check the environment in the installation site, and then take appropriate actions if necessary.

Do not install the multi-unit case in a place with vibrations or shocks.

The multi-unit case consists of sensitive electronic parts. The multi-unit case must be installed in a stable place without vibrations or shocks and it cannot drop.

Do not install the multi-unit case in a place exposed to water, oil or chemicals.

When selecting installation points, avoid a place where the multi-unit case is exposed to water, oil or chemicals.

Do not install the multi-unit case in a place where the temperature drops below -10°C or rises over 40°C.

The operating temperature of the multi-unit case is -10 to 40°C. The multi-unit case must be installed in a stable place where the operating temperature is maintained and do not change suddenly.

Do not install the multi-unit case in a place exposed to direct sunlight or sudden changes in the temperature.

When you select installation sites, avoid a place where it is exposed to direct sunlight or radiant heat (infrared rays emitted from a high-temperature object), and where the temperature changes suddenly. Condensation may be formed inside the multi-unit case.

Keep the multi-unit case (and its cables) away from noise source devices.

When selecting installation points, avoid a place where high-frequency/high-voltage devices exist.

Do not install the multi-unit case in a place where maintenance of the multi-unit case cannot be performed or where handling the multi-unit case involves dangers.

Regular maintenance of the multi-unit case must be performed.

Do not install the multi-unit case in a place where the machinery must be stopped when maintenance is performed in its inside, where parts of the machinery must be removed to perform maintenance, or where the multi-unit case cannot be removed because tubes or racks prevent access to it. Do not install the multi-unit case in a place where maintenance involves dangers, for example, near a high-voltage cable.

Do not install the multi-unit case in machinery which is not properly grounded.

Before installing the multi-unit case in machinery, the machinery must be grounded properly.

Do not install the multi-unit case in a place where other gases exist around it.

The multi-unit case must not be installed in a place where other gases exist around it.

4-4. Precautions for system designing



CAUTION

An unstable power supply and noise may cause malfunctions or false alarms.
The descriptions in this section must be reflected on the designing of a system using the multi-unit case.

Using a stable power supply

The external output and alarm contact of the buzzer unit may be activated when the power is turned on, The external output and alarm contact of the multi-unit case may be activated when the power is turned on, when momentary blackout occurs, or while the system is being stabilized. In such cases, use a UPS (uninterrupted power supply), or take appropriate actions on the receiving side of output signals. The multi-unit case must be provided with the following power supply.

Power supply voltage	AC spec. : 100 - 240 VAC $\pm 10\%$ (Terminal voltage of the multi-unit case) DC spec. : 24 VDC $\pm 10\%$ (Terminal voltage of the multi-unit case)	
Allowed time of momentary blackout	AC spec. Up to 100 milliseconds (To recover from the momentary blackout for 100 milliseconds or more, restart the multi-unit case.) DC spec. Up to 10 milliseconds (To recover from the momentary blackout for 10 milliseconds or more, restart the multi-unit case.)	<u>Example of actions</u> To ensure continuous operation and activation, install a UPS (uninterrupted power supply) outside the multi-unit case.
Others	Do not use it with a power supply of large power load or high-frequency noise.	<u>Example of actions</u> Use a line filter to avoid the noise source if necessary.

Heat radiation designing

When it is installed in the closed instrumentation board, attach ventilation fans above and below the board.

Introducing protective measures against lightning

If cables are installed outside the factory/plant, or if internal cables are installed in the same duct as the cables coming from outside the factory/plant, "lightning" will cause problems. Because lightning acts as a large emission source while cables act as a receiving antenna, devices connected to the cables may be damaged.

Lightning cannot be prevented. Cables installed in a metal conduit or under the ground cannot be completely protected from inductive lightning surge caused by lightning. Although complete elimination of disasters caused by lightning is impossible, the following protective measures can be taken.

Protection against lightning	<u>Take appropriate measures in accordance with the importance of the facilities and the environment.</u> • Connect the transmission signal route by using optical fiber. • Provide protection by a lightning arrester (cable safety retainer). (Although inductive lightning surge can be transmitted through the cable, it is prevented by installing a lightning arrester before the field devices and central processing equipment. For information on how to use a lightning arrester, please contact the manufacturer.)
Grounding	In addition to lightning, there are more sources of surge noise. To protect units from these noise sources, the units must be grounded.

- * The lightning arrester has a circuit to remove a surge voltage which damages field devices, so that signals may be attenuated. Before installing a lightning arrester, verify that it works properly.

Proper use of alarm contact

The alarm contact of the multi-unit case is used to transmit signals to activate an external buzzer or alarm lamp. Do not use the multi-unit case for controlling purpose (e.g., controlling the shutdown valve).

**CAUTION**

The "b" contact (break contact) under de-energized state may be opened momentarily by a physical shock, such as external force.

When the "b" contact is selected for the alarm contact, take appropriate actions to prepare for a momentary activation, for example, add signal delay operation (approximately one second) to the receiving side of the "b" contact.

The specifications for the alarm contact of the multi-unit case are based on the resistant load conditions. If inductive load is used at the alarm contact, the following errors will occur easily because counter electromotive force is generated at the contact.

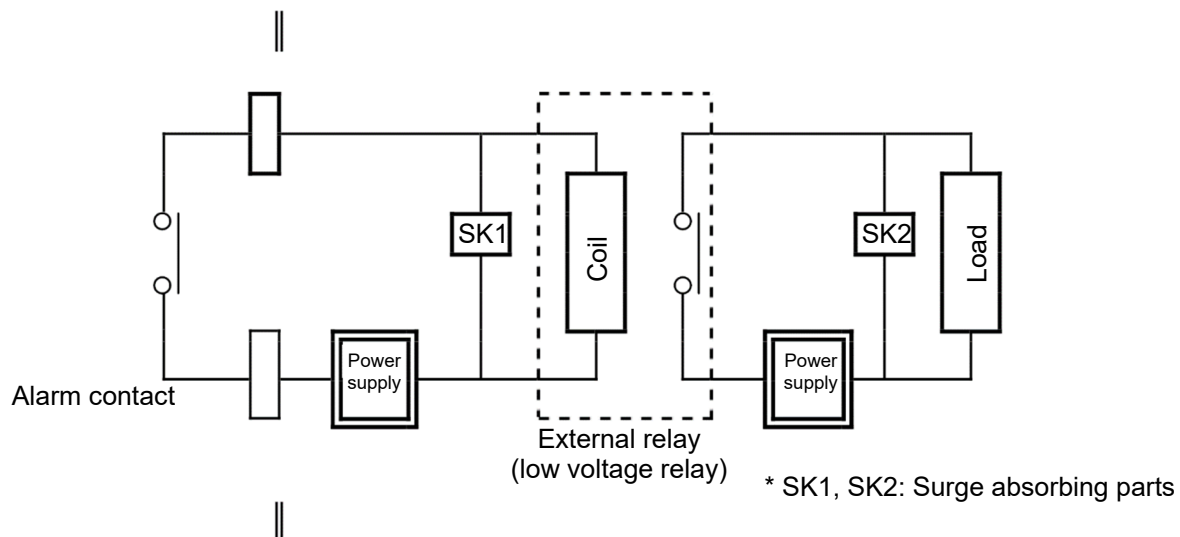
- Deposition, defective insulation or defective contact at the relay contact
- Damage of any electric parts due to high-voltage generated inside the multi-unit case
- Abnormal operations by an out-of-control CPU

**CAUTION**

- In principle, do not activate inductive load at the alarm contact of the multi-unit case. (In particular, never use the inductive load to activate a fluorescent lamp or motor.)
- If inductive load is activated, relay it with an external relay (contact amplification). However, because the coil of an external relay also involves inductive load, select a relay at a lower voltage (100 VAC or below), and then protect the contact of the multi-unit case with an appropriate surge absorbing part, such as a CR circuit.

If load is to be activated, appropriate measures must be taken to stabilize the operation of the multi-unit case and protect the alarm contact referring to the following information.

- Relay it with an external relay at a lower voltage of 100 VAC or below (contact amplification). At the same time, the surge absorbing part SK1 suitable for the specifications must be attached to the external relay.
- In addition, the surge absorbing part SK2 must be attached to the loaded side of the external relay if necessary.
- It may be recommended that the surge absorbing part should be attached to the contact for certain load conditions. It must be attached to an appropriate position by checking how the load is activated.



How to improve the difference of indicated value between Indicator alarm unit and the upper system.

When a potential difference is generated between "FG" and "COM" on the terminal, there might occur a difference of indicated value between the Indicator alarm unit and the upper system that are connected by 4-20mA signal.

Then, short "FG" and "COM". Since this method may be susceptible to external noise, do not attempt to do this if there is no difference.

If it is not possible to improve by this method, please consider the correspondence with insulation etc. between 4-20 mA signal.

Terminal plate for buzzer unit

RS-485 input-output	A	(1)	(7)	T.ALM1	Common first alarm contact output
	B	(2)	(8)		
Buzzer stop signal input	EX. BZ-STOP	(3)	(9)	T.ALM2	Common second alarm contact output
Test input	EX.TEST	(4)	(10)		
24 VDC output	+	(5)	(11)	T.FAULT	Common fault alarm contact output
	-	(6)	(12)		
Grounding terminal	FG		(13)	EX.RESET	Reset signal input
			(14)	COM	Common


 Short

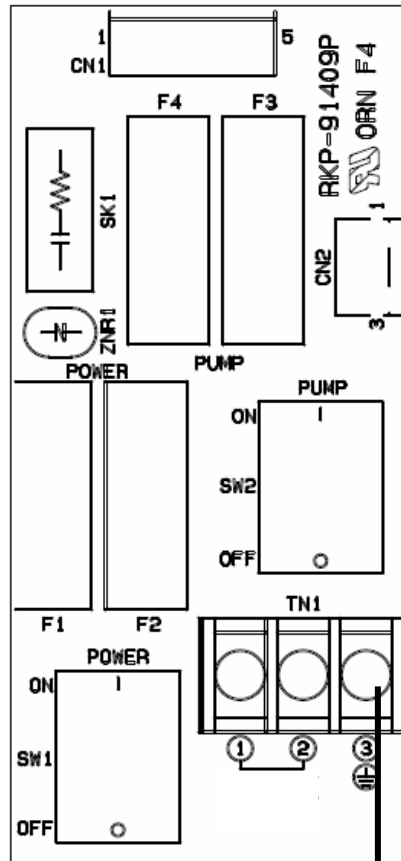
4-5. Grounding

Connect the multi-unit case to your grounding terminal.



WARNING

Before turning on the multi-unit case, do not forget to connect it to a grounding terminal. For stable operation of the multi-unit case and safety, it must be connected to a grounding terminal. Do not connect the grounding wire to a gas pipe. The grounding must be made as D type grounding (below 100 Ω of grounding resistance).



≡ Grounding terminal

5

Connection between Devices

5-1. Connection of power supply

The power supply specifications of the multi-unit case are 100 to 240 VAC $\pm 10\%$, 50/60 Hz or 24 VDC $\pm 10\%$. Prepare a power supply that complies with the specifications.

Before supplying power, connect the multi-unit case to your grounding terminal. The grounding resistance must be D type (below 100 Ω). After the multi-unit case is grounded and it is in a safe state, connect the power supply and other cables.

5-2. Connection to contact output

The indicator/alarm unit outputs the individual alarm contacts, i.e., the first and second alarm contacts and fault alarm contact. The buzzer unit outputs the common first and second alarm contacts and common fault alarm contact.

The contact capacities are 100 VAC 0.5 A and 30 VDC 1.5 A (all resistant loads). Configure an auxiliary relay circuit when you connect a load over the contact capacities.

5-3. Connection to 4 - 20 mA output

Individual 4 - 20 mA signals from the indicator/alarm unit are output.

The maximum allowable load to be connected is 300 Ω . Use a shielded cable equivalent to CVVS for connection.

5-4. Connection to RS-485 output

From the terminal plate for the buzzer unit, the RS-485 from the indicator/alarm unit (option of the indicator/alarm unit) is output.

The allowable load to be connected depends on the system designing conditions. Use a shielded cable equivalent to KPEV-S for connection.

5-5. Connection to signal inputs

To the terminal plate for the buzzer unit, buzzer stop signals (only if the buzzer unit and the indicator/alarm unit are the lock-in type), alarm test signals, and reset signals can be input.

Use the no-voltage "a" contact for input signals.

5-6. Connection to detector head

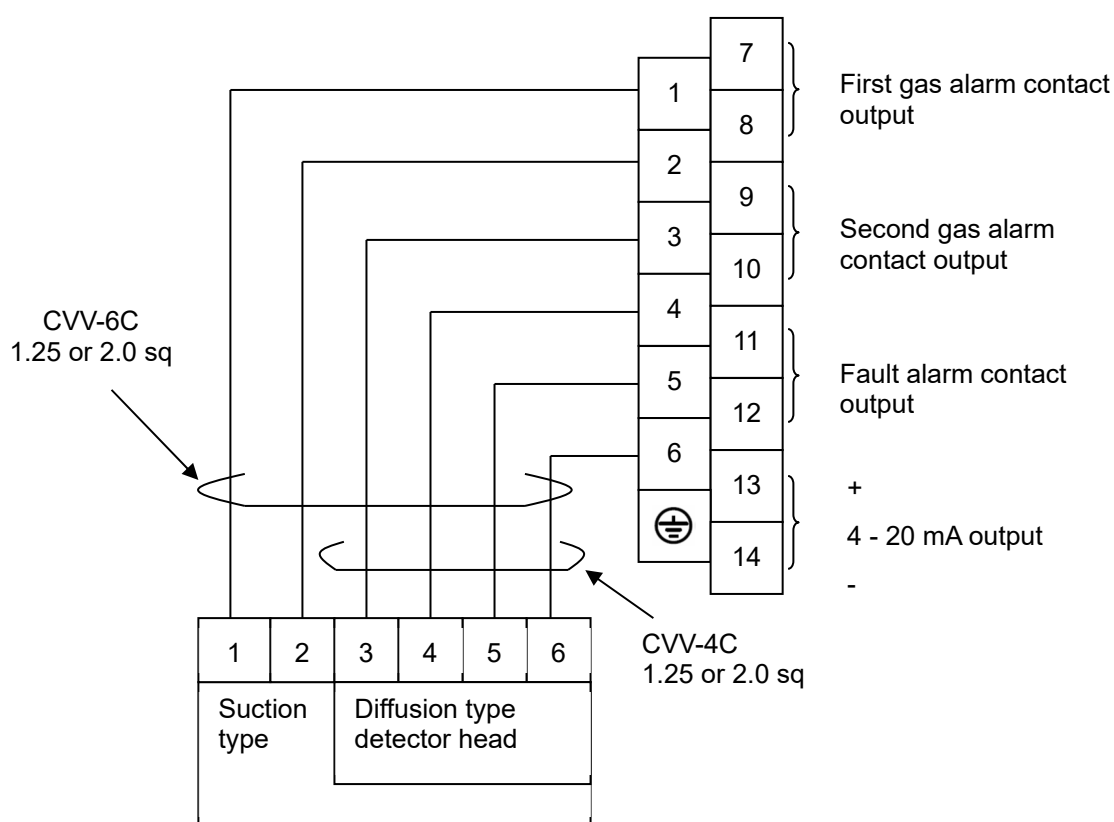


CAUTION

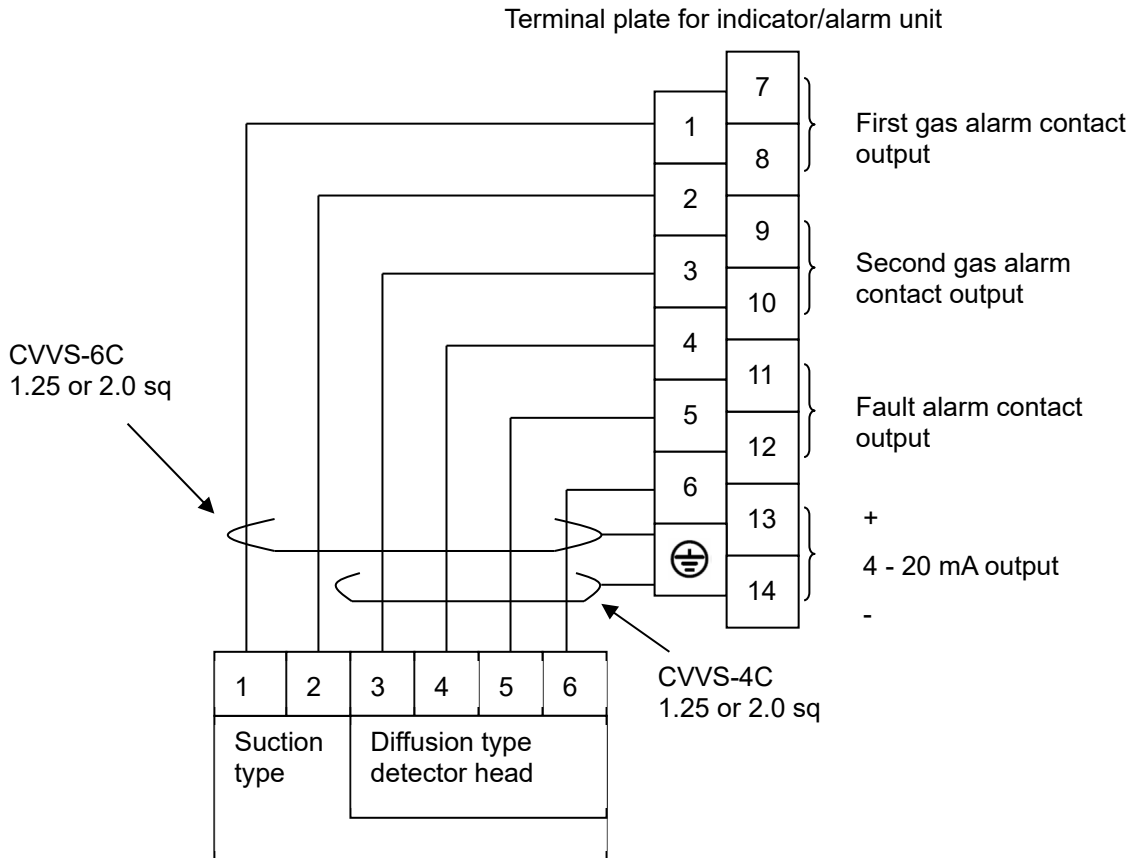
- Before connecting the detector head, read also the operating manual of the detector head.
- Before connecting the AC power line for the pump to the suction-type detector head, make sure that the multi-unit case and the detector head have the same power supply specifications. The output power from the AC power terminal for the pump is equivalent to the input power to the multi-unit case.

GP-5001/NC-5001/NC-5001W/SP-5001 AC spec.

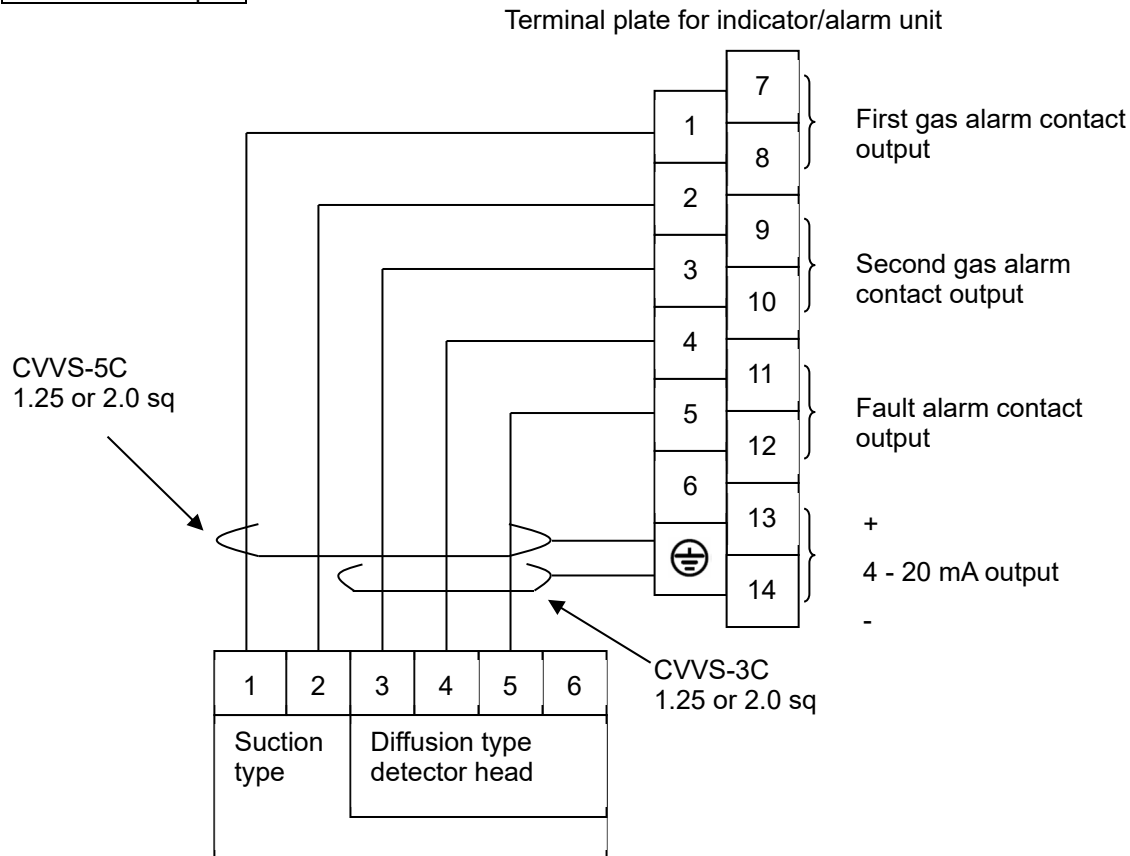
Terminal plate for indicator/alarm unit



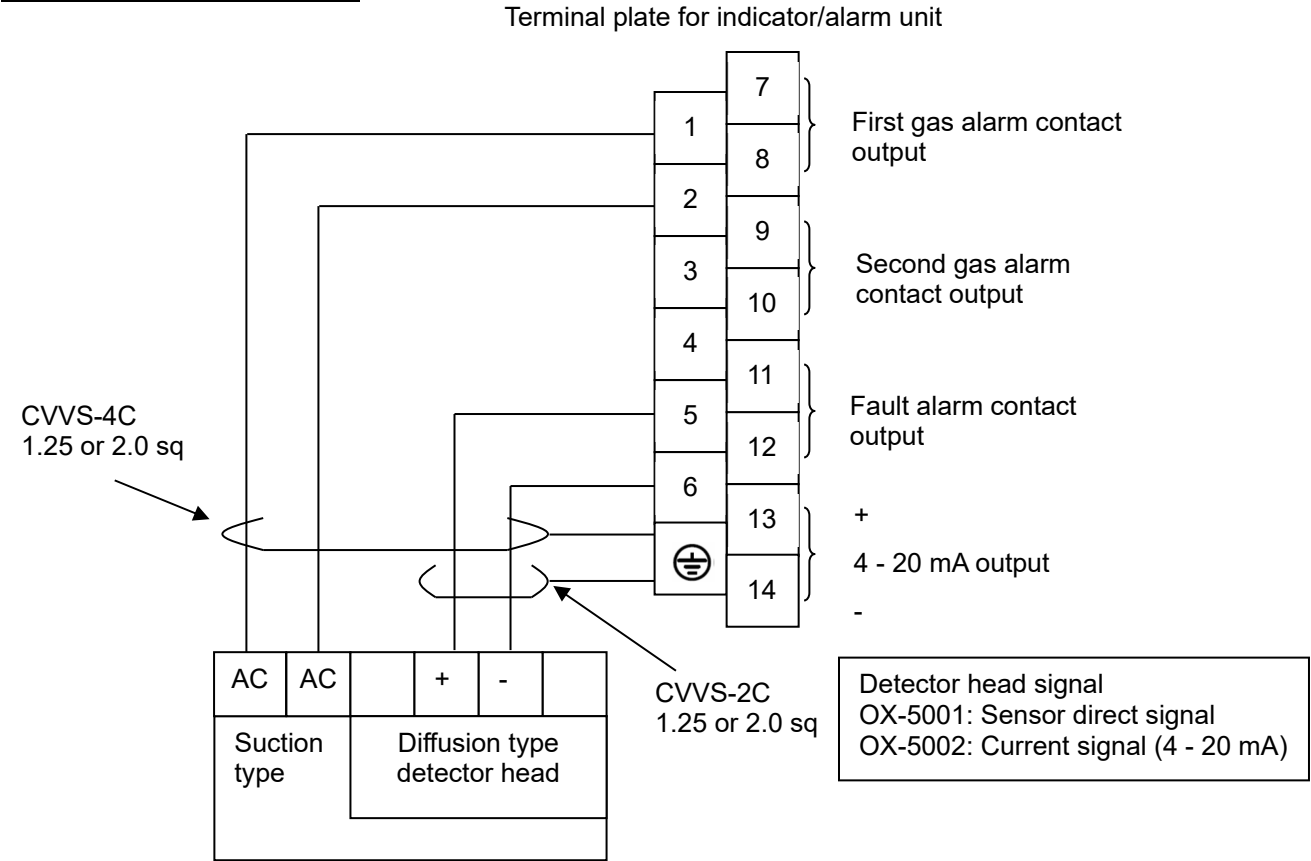
NP-5001 AC spec.



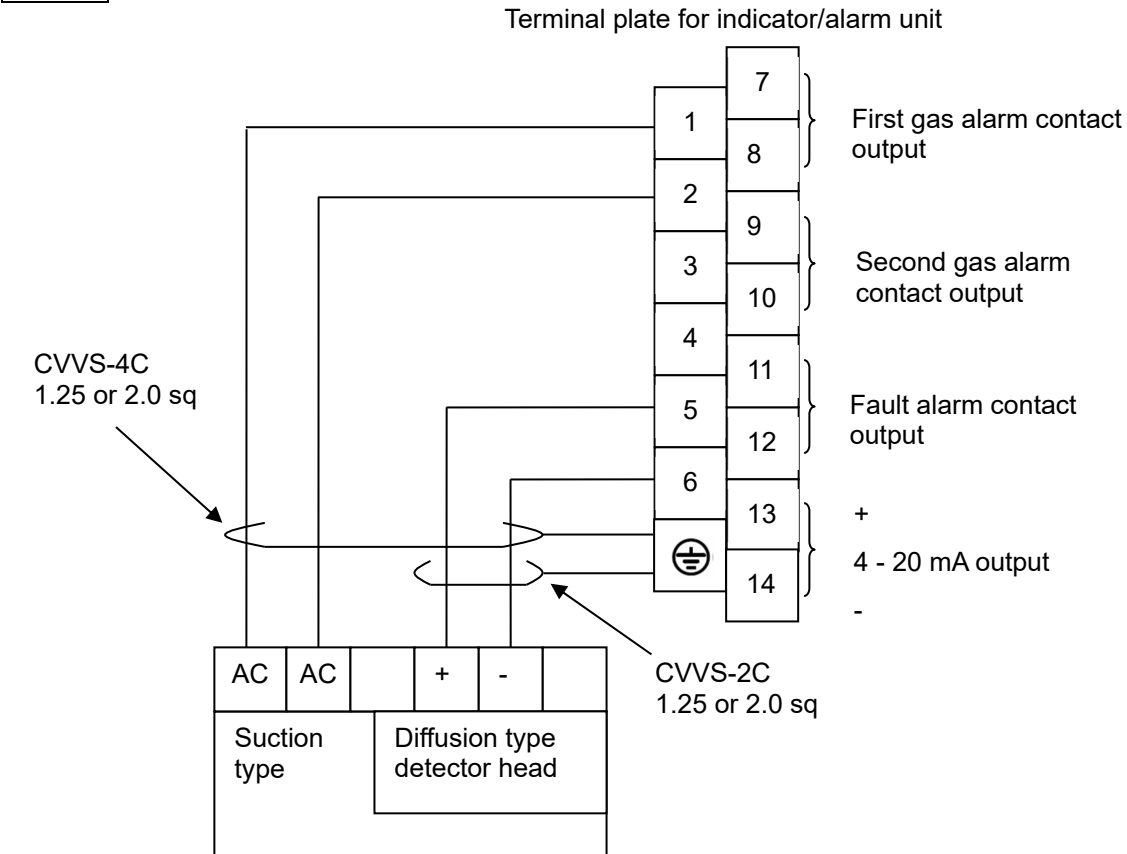
GH-5001 AC spec.



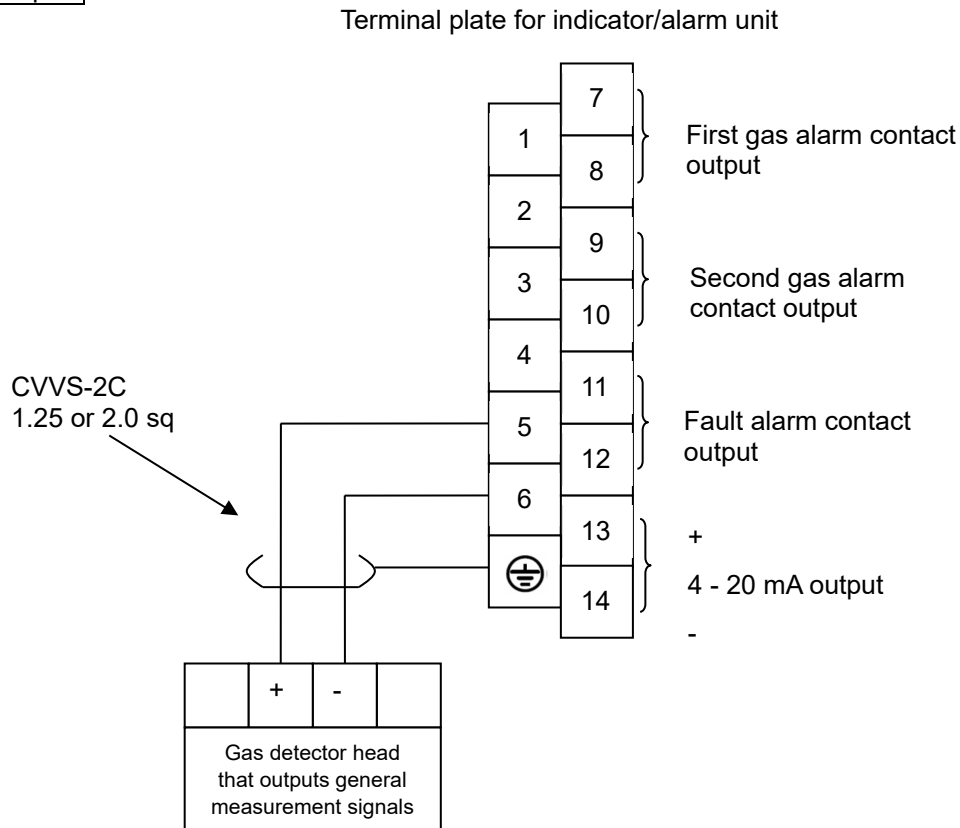
OX-5001/OX-5002 AC spec.



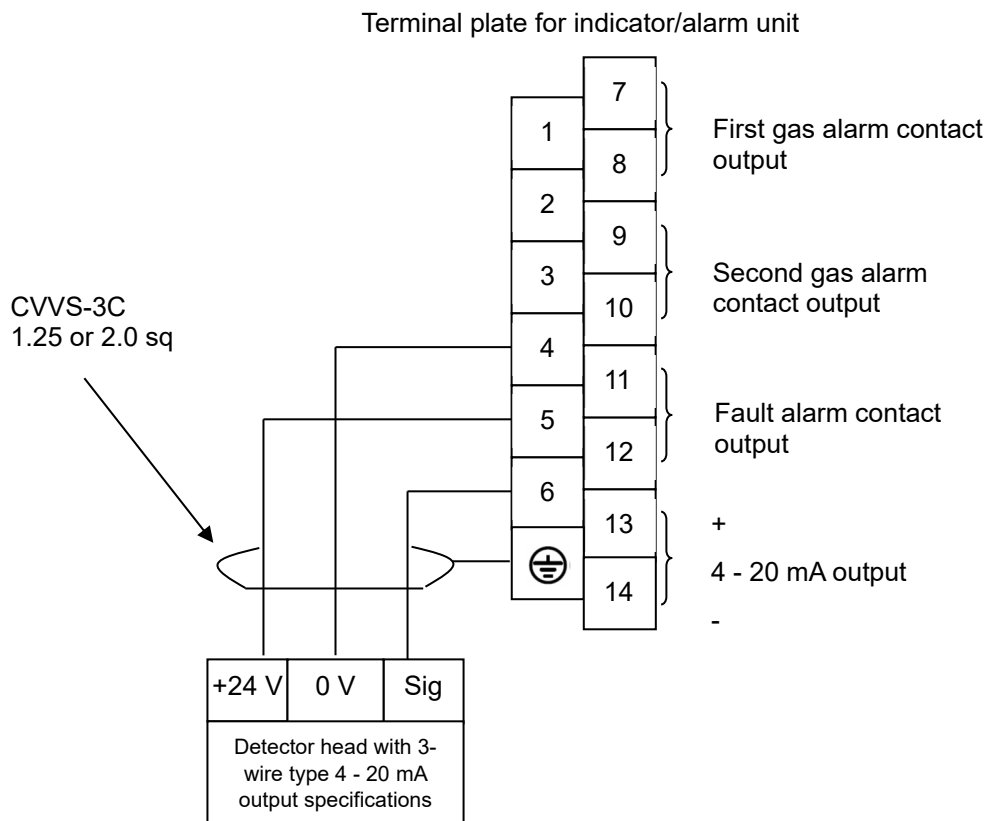
EC-5002



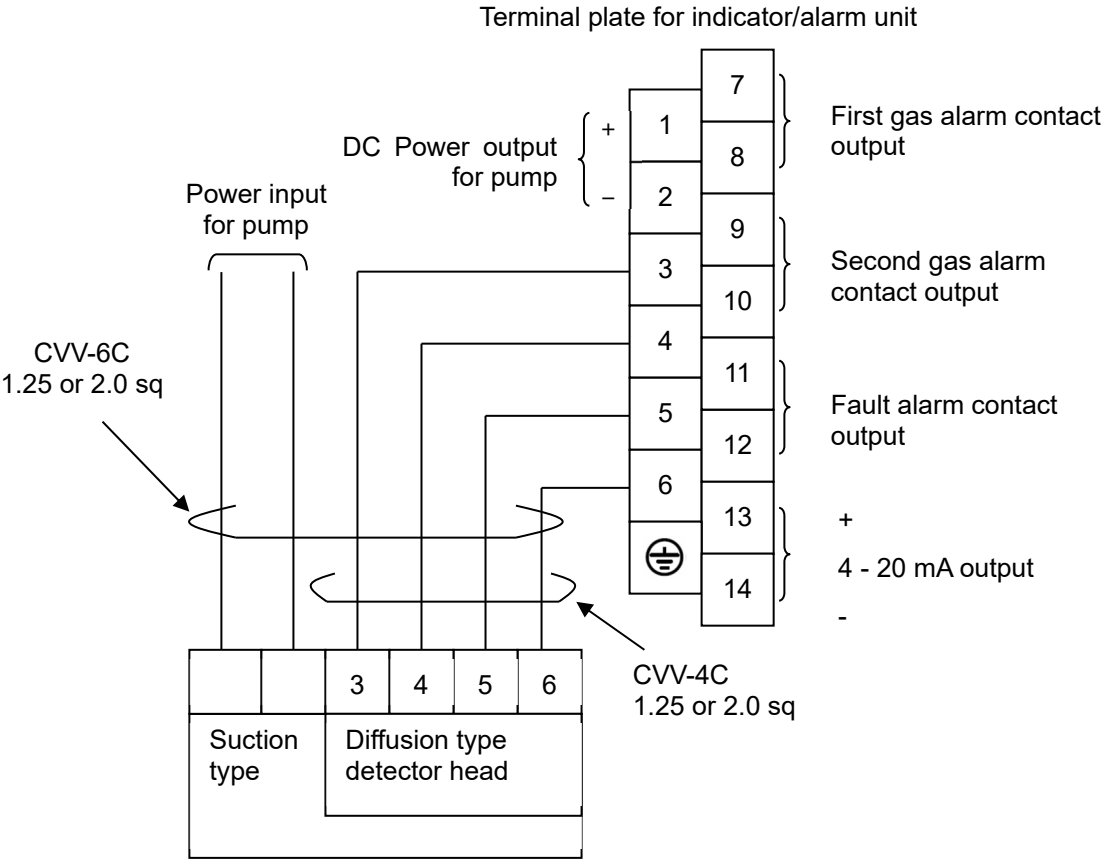
RM-5002 AC spec.



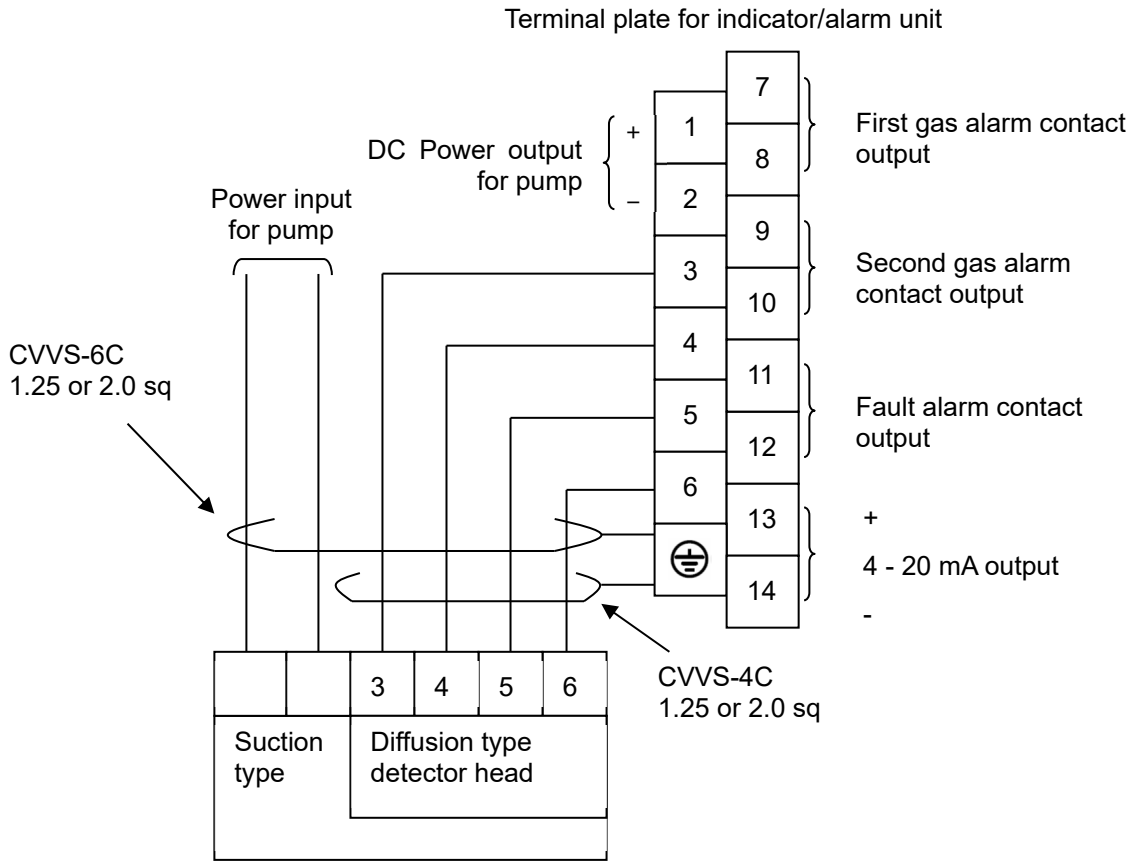
RM-5003 AC spec.



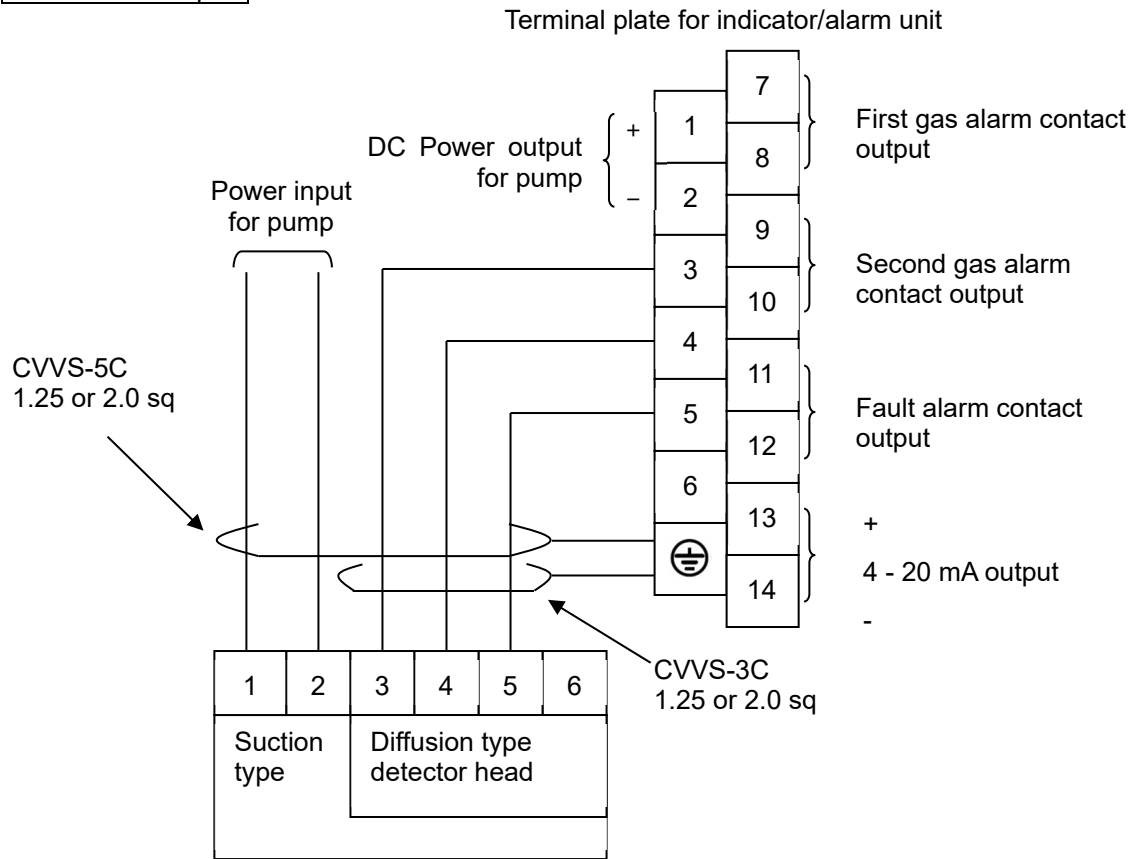
GP-5001/NC-5001/NC-5001W/SP-5001 DC spec.



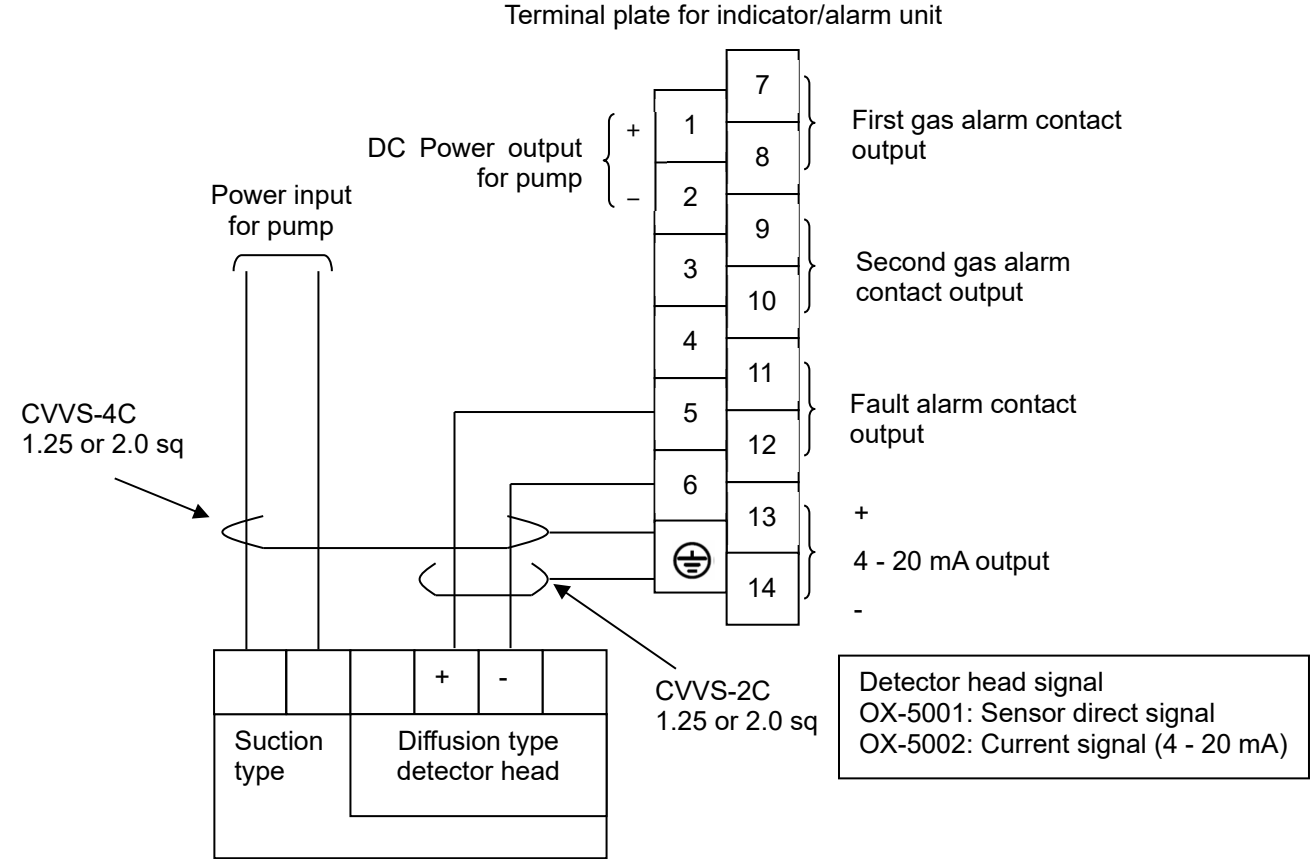
NP-5001 DC spec.



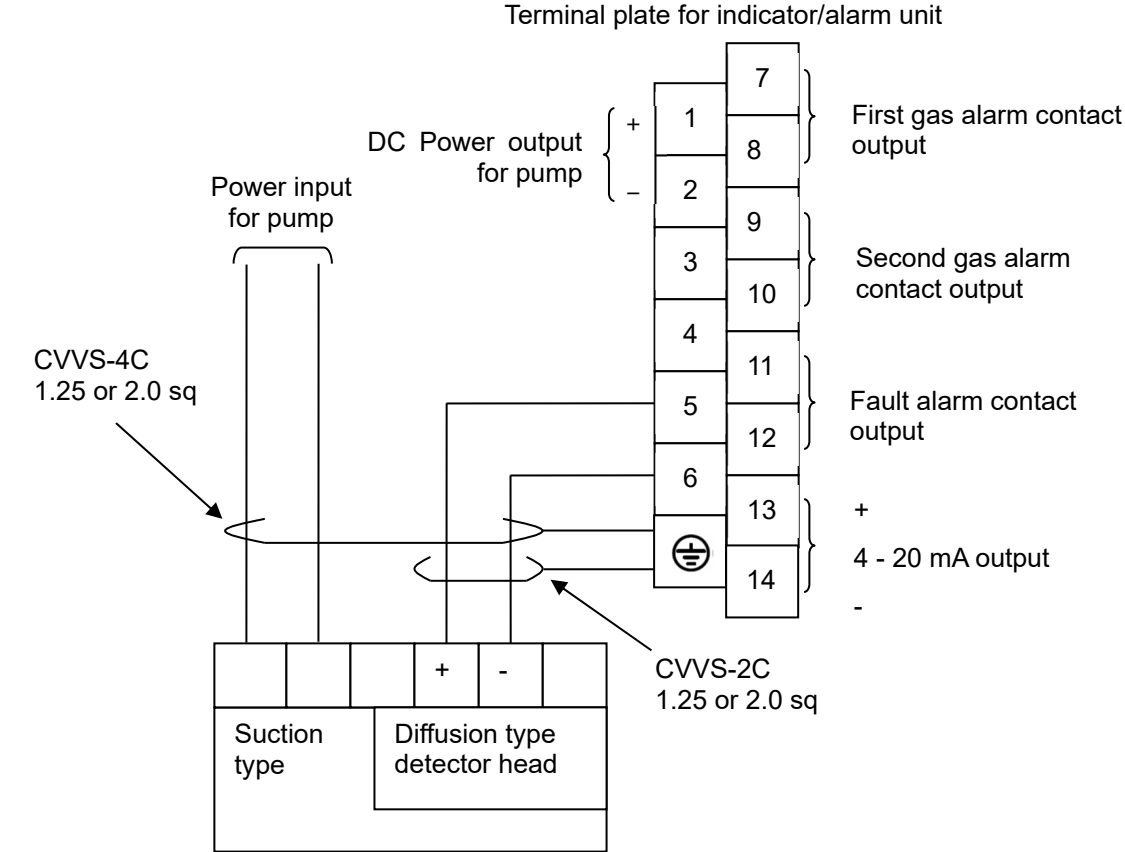
GH-5001 DC spec.



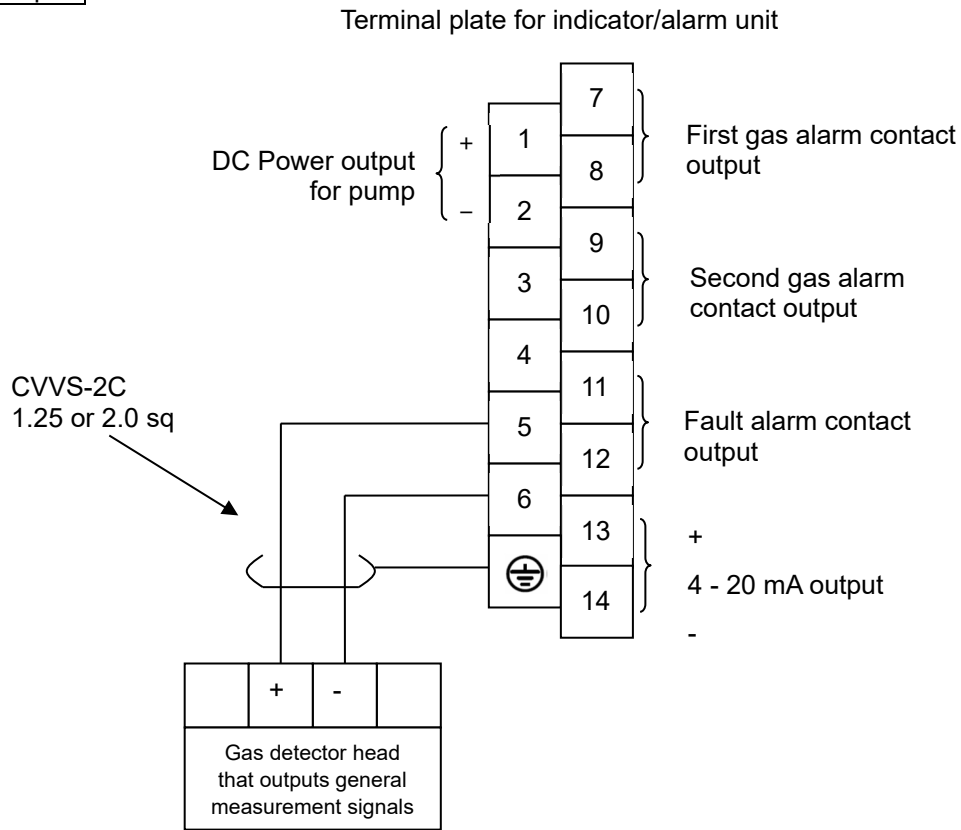
OX-5001/OX-5002 DC spec.



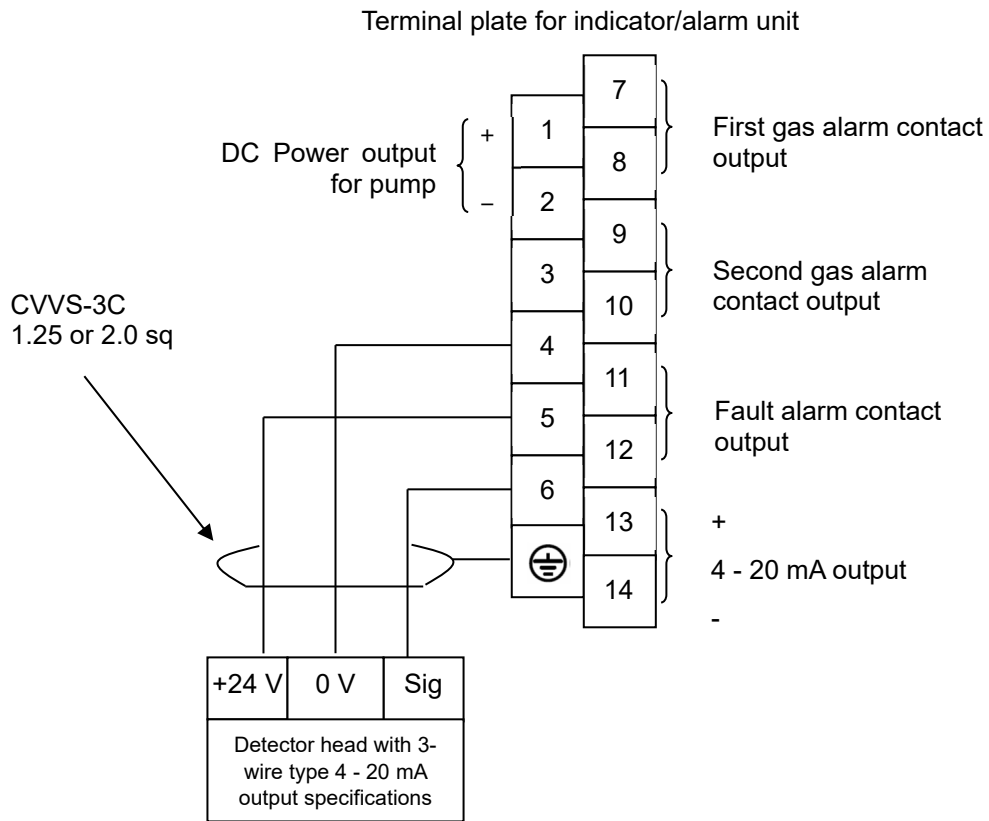
EC-5002 DC spec.



RM-5002 DC spec.



RM-5003 DC spec.



6

Product Disposal

Dispose of the product as industrial waste (incombustible) in accordance with local regulations.

<Disposal in EU member states>

- Waste Electrical and Electronic Equipment (WEEE) directive



The symbol on the product shown on the left indicates that the product and its individual parts must not be disposed of with general or household waste, and must be sorted and disposed of appropriately.

Proper disposal will help prevent potential negative effects on human health and the environment.

To ensure proper treatment, collection, and recycling of the product at the time of its disposal, please use the return and collection system available in your country. For more information on collecting and recycling used products, please contact the dealer or supplier from whom you purchased the product.

7

Product Specifications

7-1. List of specifications

Model	5000-02W/5000-04W/5000-06W/5000-08W/5000-10W/5000-12W	
Power supply	AC spec. : 100 - 240 VAC $\pm 10\%$, 50/60 Hz	DC spec.* : 24 VDC $\pm 10\%$
Utility	24 VDC output AC output for pump power supply	24 VDC output DC output for pump power supply
Operating temperatures	-10 - 40°C (at a constant condition)	
Operating humidities	Below 95% RH (Non-condensing)	
Structure	Wall mounting type	
External dimensions	Approx. 191 (W) x 310 (H) x 148 (D) mm (5000-02W) (projection portions excluded) Approx. 263 (W) x 310 (H) x 148 (D) mm (5000-04W) (projection portions excluded) Approx. 336 (W) x 310 (H) x 148 (D) mm (5000-06W) (projection portions excluded) Approx. 408 (W) x 310 (H) x 148 (D) mm (5000-08W) (projection portions excluded) Approx. 480 (W) x 310 (H) x 148 (D) mm (5000-10W) (projection portions excluded) Approx. 552 (W) x 310 (H) x 148 (D) mm (5000-12W) (projection portions excluded)	
Weight	Approx. 4.5 kg (5000-02W) Approx. 6.5 kg (5000-04W) Approx. 8.5 kg (5000-06W) Approx. 10.5 kg (5000-08W) Approx. 12.0 kg (5000-10W) Approx. 14.0 kg (5000-12W)	
Remarks	External terminal: Screw terminal, size M3	

* For CE marking specifications, only DC spec. is available.

Model	5000-02R/5000-04R/5000-06R/5000-08R/5000-10R/5000-12R	
Power supply	AC spec. : 100 - 240 VAC $\pm 10\%$, 50/60 Hz	DC spec. : 24 VDC $\pm 10\%$
Utility	24 VDC output AC output for pump power supply	24 VDC output DC output for pump power supply
Operating temperatures	-10 - 40°C (at a constant condition)	
Operating humidities	Below 95% RH (Non-condensing)	
Structure	Rack mounting type	
External dimensions	Approx. 226 (W) x 310 (H) x 140 (D) mm (5000-02R) (projection portions excluded) Approx. 298 (W) x 310 (H) x 140 (D) mm (5000-04R) (projection portions excluded) Approx. 370 (W) x 310 (H) x 140 (D) mm (5000-06R) (projection portions excluded) Approx. 442 (W) x 310 (H) x 140 (D) mm (5000-08R) (projection portions excluded) Approx. 515 (W) x 310 (H) x 140 (D) mm (5000-10R) (projection portions excluded) Approx. 586 (W) x 310 (H) x 140 (D) mm (5000-12R) (projection portions excluded)	
Weight	Approx. 6.0 kg (5000-02R) Approx. 8.0 kg (5000-04R) Approx. 10.0 kg (5000-06R) Approx. 12.0 kg (5000-08R) Approx. 14.0 kg (5000-10R) Approx. 16.0 kg (5000-12R)	
Remarks	External terminal: Screw terminal, size M3	

* For CE marking specifications, only DC spec. is available.