1 Point type Oxygen Detection / Alarm System

Model NV-100S

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.

New Cosmos Electric Co., Ltd.

Instruction manual No.
GAE-015
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Table of Contents

1. Introduction

Thank you for purchasing an NV-100S single-point oxygen detection/alarm system.

This safety device is used to monitor oxygen concentration. It indicates oxygen leakage and oxygen deficiency by alarm lamps and an alarm sound when the concentration reaches a preset level.
Thoroughly read this instruction manual before using the equipment so it can be used correctly. Read the instruction manual of a gas detector as well.

Symbols

The following symbols are used for safety purposes:

⚠**DANGER** : Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠**WARNING** : Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

⚠**CAUTION** : Indicates a potentially hazardous situation which, if not avoided, may result in minor injury or moderate injury. It may also be used to alert against unsafe practices.

MEMO : Operational advice and or instruction.

2. Safe Operation

Carefully read the following so you can use the equipment correctly.

Read and understand all applicable laws and regulations and ensure that you are in complete compliance with the laws and regulations before installing or operating the equipment.

Installing, wiring, and other works concerning the equipment should be carried out by qualified persons, following all applicable federal, state, and local health and safety laws and regulations including OSHA.

⚠DANGER

Operation checks using actual gas are very dangerous because combustible gas may explode and toxic gas is harmful. An inspection must be carried out beforehand by persons with sufficient expertise or our service staff.

⚠WARNING

- Ground the equipment in order to prevent electric shocks.
- In case of an alarm, carry out your predetermined measures for gas leakage.
- This equipment is not explosion-proof. Install it in a non-hazardous area.

⚠CAUTION

- Do not dissemble, alter the equipment, or change its structure and electric circuit. It may affect performance of the equipment.
- If you control an interlock of external equipment etc. with equipment's output signal, we are not responsible for any injuries or damages caused by it.
- The equipment is not waterproof. Install it in a place where it will not get wet.
- Follow all related laws and regulations when using the equipment.
- Do not use any equipment that generates electrical noises such as cellular phones or radio-communications within 30 cm of the alarm panel.

3. Unpacking

The following standard components are packed together with the oxygen detector/alarm. Carefully check the contents against the list when unpacking. If any components are missing or damaged, contact our dealer or agency. We will deliver or replace the components.

NV-100S main body		1
Gas detector head		1
Fuse 1A	Without a backup power source	1
	With a backup power source	2
Parts to embed in a panel (panel-embedded type only)		1
NV-100S instruction manual (this book)		1
Test results of the equipment		1
Warranty		1

Option (separately sold)

Rainproof cover	KW-31 for a diffusion type gas detector head KS-2O	1

4. System Structure

This equipment consists of a part that detects gas (gas detector head) and a part that indicates gas concentration and sets off an alarm (indicator and alarm unit). The parts are connected by cables.

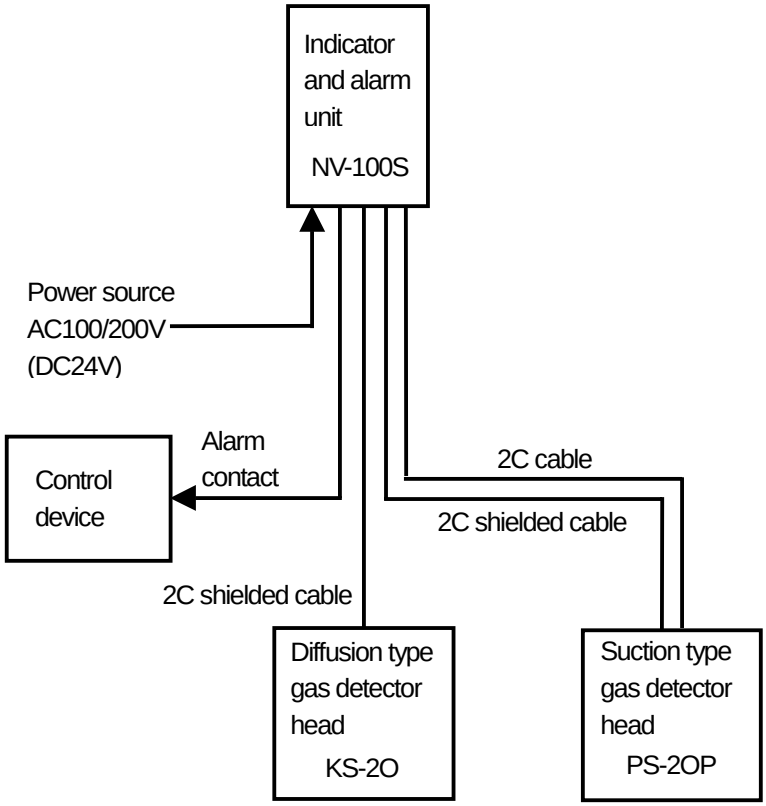


Fig. 1 System Structure

⚠CAUTION

The indicator and alarm unit is not an explosion-proof construction. Install it in a non-hazardous area.

MEMO

- One gas detector (either diffusion or suction type gas detector) can be connected. Use a rainproof cover (option) if you install the equipment outdoor.
- The number of cores of cables differs according to the gas detector head connected.

5. Dimensions and Part Names

5-1 Indicator and Alarm Unit

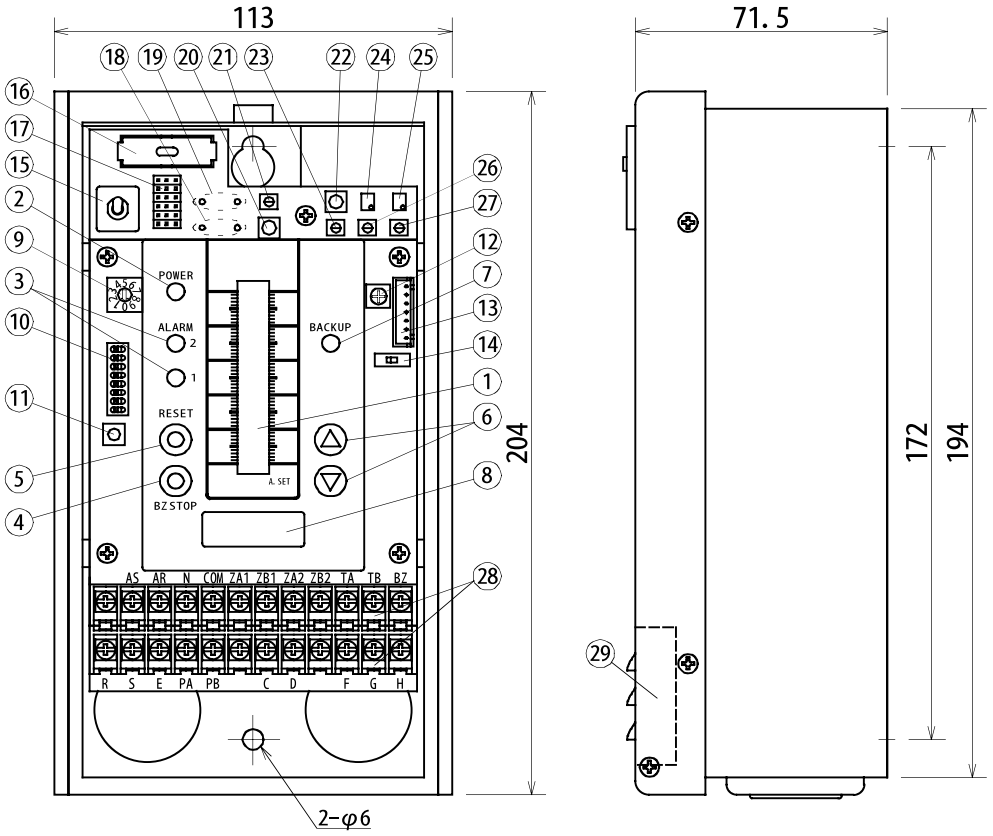


Fig. 2 Dimensions of the Indicator and Alarm Unit (without a backup power source)

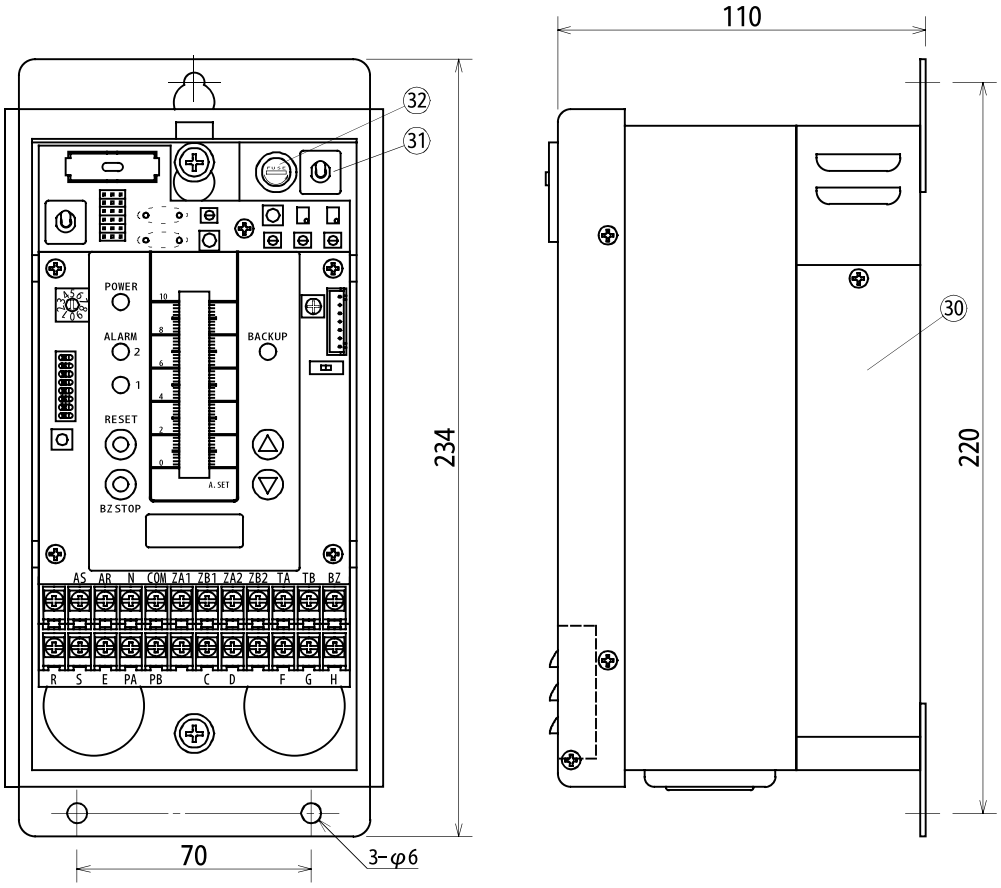


Fig. 3 Dimensions of the Indicator and Alarm Unit (with a backup power source)

No.	Name	Function
1	Gas concentration indicator	This LCD bar graph meter with backlight indicates gas concentration and the preset alarm value.
2	Power lamp (POWER)	It is green during normal operation and orange on a sensor failure. It blinks green when the equipment is turned on and also after a failure has been taken care of to show that the equipment is warming up.
3	Alarm lamp (ALARM)	A red lamp blinks to indicate oxygen leakage and oxygen deficiency and lights up when the buzzer stops.
4	Buzzer stop key (BZ STOP)	When this key is pressed, the alarm sound stops and the blinking Alarm lamp lights up.
5	Reset key (RESET)	When this key is pressed after the buzzer stops and the reading goes back to a normal value, the Alarm lamp goes off. It does not go off when the key is pressed before the buzzer stops.
6	Alarm setting key (△▽)	Use these keys to change the preset alarm value. Press △ to increase the set value and press ▽ to decrease it.
7	Backup lamp (BACKUP)	It is off in normal state and it blinks red during a power failure. (Equipment with an optional backup power source only.)
8	Message window	Displays messages during operation of functions. Oxygen concentration is displayed according to specifications.
9	Mode switch	Use to set a mode such as maintenance mode 1, 2, etc.
10	Function switch	Use to set functions.
11	Enter key	Use to set functions.
12	SOUND volume control	To control alarm buzzer volume. Adjust it when you want to lower the sound.
13	Program connector	Use to write in the program. Usually, it is not used.
14	Program switch	Use to write in the program. Usually, select the left side.
15	Power switch	A switch to open/close the equipment's power source.
16	AC power source fuse	φ5.2 × 20L 1A glass fuse.
17	Jumper pin	It is used for various settings. No setting by a customer is necessary.
18	Sensor signal check terminal (SIGNAL)	A terminal to check gas sensor signals.
19	Sensor current check terminal (CURR CHECK)	Not used in this equipment.
20	Battery test key (B. TEST)	To test the battery's life. This key cannot be used if the equipment does not have a backup power source.
21	Sensor current adjustment control (CURR)	Not used in this equipment.
22	Test button (TEST)	Use this button for performance tests.
23	Test control (TEST)	A control to adjust what the indicator indicates when the Test button is pressed.
24	Zero adjustment volume (ZERO)	A control to adjust the gas sensor's zero point.
25	Span adjustment volume (SPAN)	A control to calibrate the indicated value of gas concentration.
26	Analog output adjustment volume (L)	A control to adjust analog output 4 mA (1V)
27	Analog output adjustment volume (H)	A control to adjust analog output 20 mA (5V)
28	Terminal block	A terminal block to connect external wirings.
29	Speaker	To sound an alarm. Oxygen leakage and oxygen deficiency are notified with the alarm sound.
30	Backup power source unit	Supplies power from a built-in battery in the event of a power failure.
31	Battery switch	A switch to open/close the battery of the optional backup power source.
32	Battery fuse	φ5.2 × 20L 1A glass fuse

5-2 Gas Detector

Refer to the gas detector's instruction manual for its dimensions.

6. Installation and Wiring

6-1 How to Install the Indicator and Alarm Unit

The equipment can be hung on a wall or embedded in a panel.

⚠WARNING

The indicator and alarm unit is not an explosion-proof construction. Install it in a non-hazardous area.

⚠CAUTION

- The indicator and alarm unit must be installed in a place where someone is always present and is easy to read so that taking countermeasures and notifying others in case of an alarm is possible.
- Do not place the indicator and alarm unit in a place with vibration, electric noise, or corrosive gas. Avoid places with a high temperature or humidity as well.

MEMO

As to the gas detector to be connected, refer to its instruction manual.

(1) How to install on a wall

① Make holes on the wall as shown in Fig. 4.

② If the equipment has a backup power source, attach two mounting plates on the top and bottom of the equipment.

③ Align anchors with the holes, then insert a bolt in the upper hole.

④ Insert it in the hole on top of the equipment, insert the other bolt in the bottom hole, then tighten both bolts.

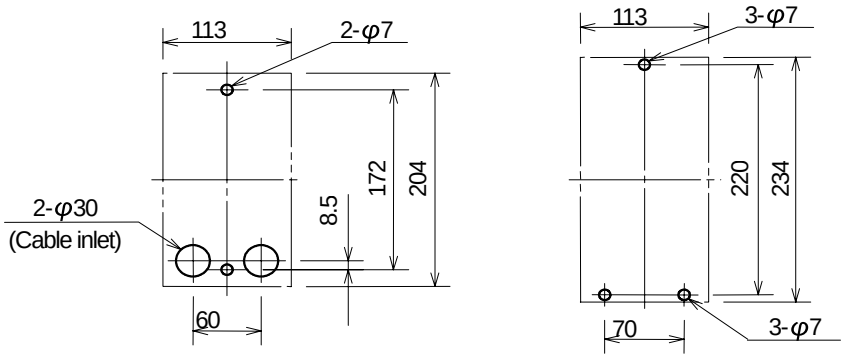


Fig. 4 Dimensions for Hanging the Equipment on the Wall

MEMO

- Size of mounting holes differs depending on whether the equipment has a backup power source.
- If the equipment has no backup power source, a cable can be connected from the back and bottom of the equipment. It will be hidden when it is connected from the back. If the equipment has a backup power source, a cable can be connected only from the bottom.
- Leave a 30 cm space under the equipment's body for maintenance work. If the equipment has a backup power source, also leave a 30 cm space on the right side of the equipment for changing batteries.

(2) How to embed in a panel

① Cut out a rectangular opening in the panel as shown in Fig. 5.

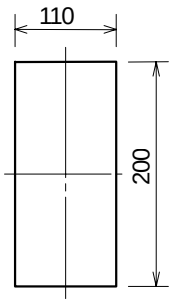


Fig. 5 Dimensions to Cut a Panel

② Insert the equipment into the opening from front.

Attach the backplate on back of the equipment using the attaching screws as shown in Fig. 6. Then, fasten it to the panel with fixing screws. The equipment can be attached to a 1.6 to 6 mm thick panel.

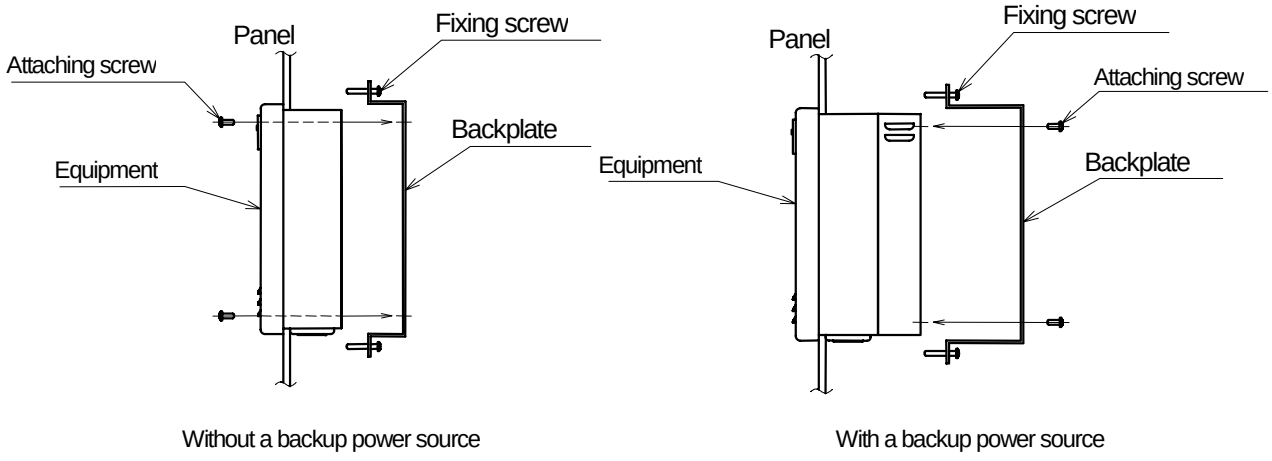


Fig.6 Embedding in a Panel

MEMO

- Leave a 30 cm space under the equipment's body for maintenance work. If the equipment has a backup power source, also leave a 30 cm space on the right side of the equipment for changing batteries.

6-2 How to Install the Gas Detector

Refer to the gas detector's instruction manual.

6-3 Wiring Method

Refer to the gas detector's instruction manual as well.

⚠WARNING

- Turn OFF the indicator and alarm unit's power before opening the cover of the gas detector. Opening the cover when the power is on may cause a fire.
- Ground the equipment's main body and the gas detector.

⚠CAUTION

- Make sure that terminal codes of the indicator and alarm unit side and the gas detector side are correct.
- Use shielded cables and wire them separated from the power line as much as possible.
- When intrinsically safe wiring is needed, connect a Zener barrier (BT-150).
  - External wiring work for intrinsically safe explosion proof should follow all applicable federal, state, and local health and safety laws and regulations.
  - Use a 2C shielded cable of 0.75 mm or 2 mm^2 for the intrinsically safe circuit. The cable length should be 500 m or less.
  - Ground the barrier separately. Class A grounding is required.
  - Keep the intrinsically safe circuit from contact with the non-intrinsically-safe circuit.

(1) Wiring of power source

Prepare a circuit breaker to connect the power source to the indicator and alarm unit.

(2) Connecting to the gas detector

Make sure that terminal codes of the indicator and alarm unit side and the gas detector side are correct.
Use shielded cables and wire them as far from the power line as possible.

(3) Connecting the external alarm contact

⚠CAUTION

- Use the external alarm contact only for external alarm equipment and alarm indicators.
- Make sure that a load current and voltage do not exceed the contact's capacity.
- If you control an interlock, etc. using this equipment's external alarm contact, we are not responsible for any injuries or damages caused by it.

First alarm contact	No voltage 1c contact (AC100V 2A resistance load)	COM	ZA1	ZB1
Second alarm contact	No voltage 1c contact (AC100V 2A resistance load)	COM	ZA2	ZB2
Trouble alarm contact	No voltage 1c contact (AC100V 2A resistance load)	COM	TA	TB
Buzzer contact	No voltage 1a contact (AC100V 2A resistance load)	COM	BZ	
Terminal for external alarm stop (AS) and external reset (AR)		AS	AR	N

Alarm can be stopped or reset externally by connecting an external switch.

(4) Connecting the analog output terminal

Gas concentration around the gas detector can be continuously monitored and recorded by connecting a recorder to the analog output terminal. There are G (+) and H (-) terminals on the terminal block. Standard output is 4-20 mA. Input resistance of the recorder should be 500Ω or less.

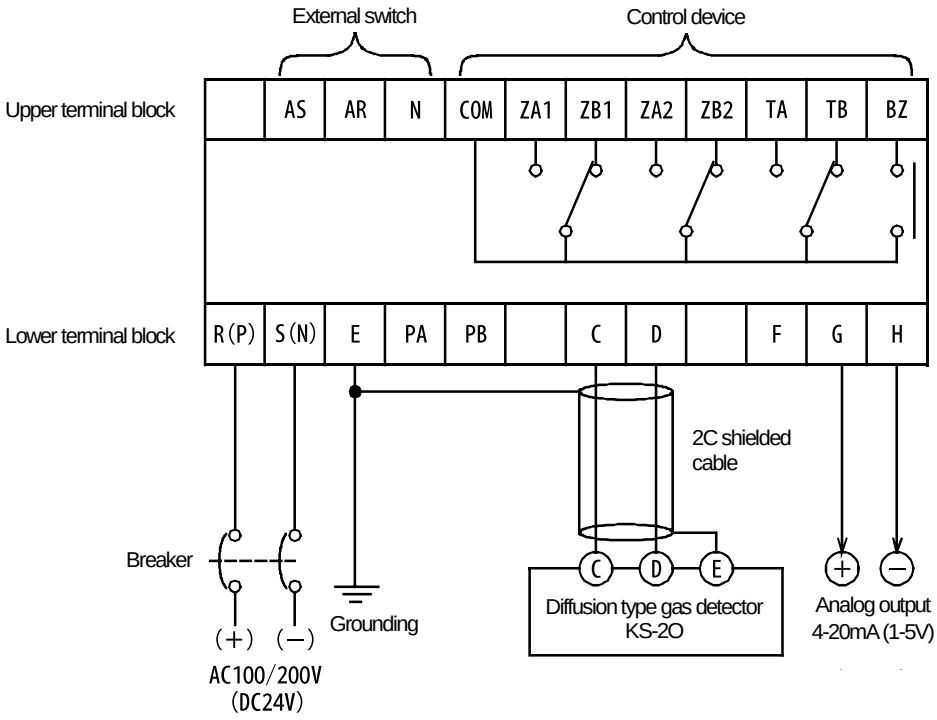


Fig. 7 Circuit (Diffusion type gas detector head)

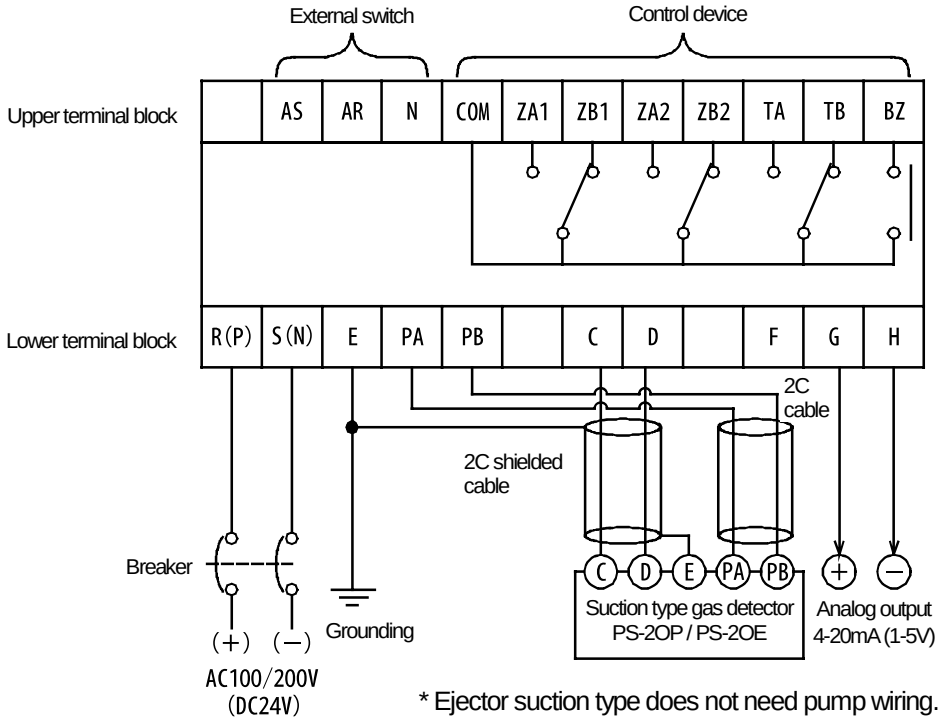
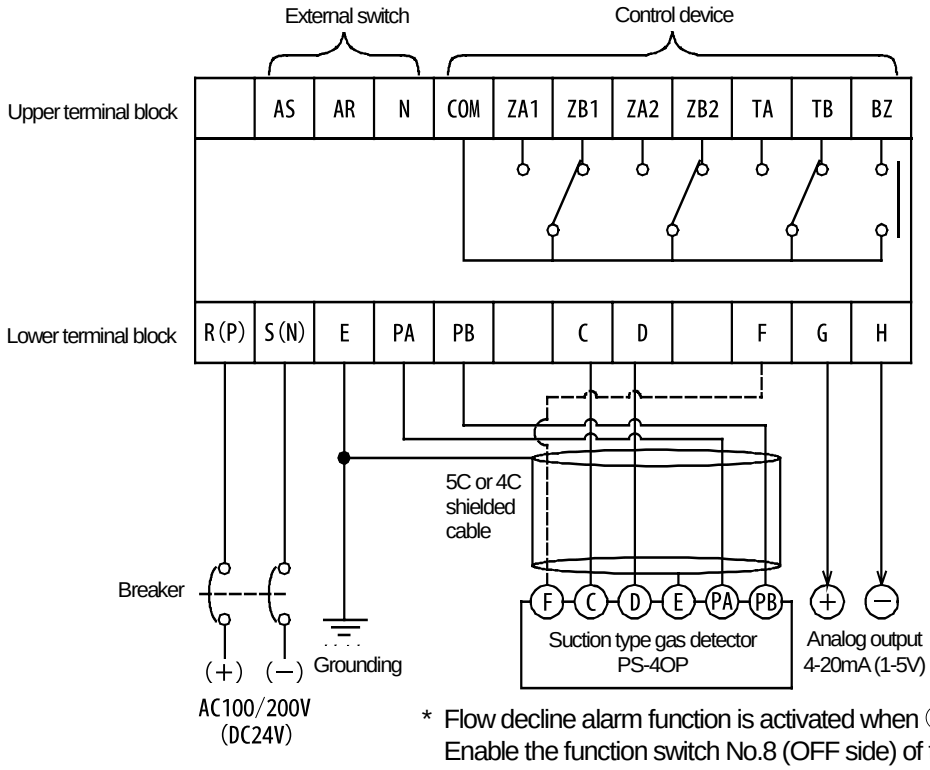


Fig.8 Circuit (Suction type gas detector head)



* Flow decline alarm function is activated when Ⓕ is wired. Enable the function switch No.8 (OFF side) of the indicator and alarm unit to use the function.

Fig.9 Circuit (Suction type gas detector head PS-4OP)

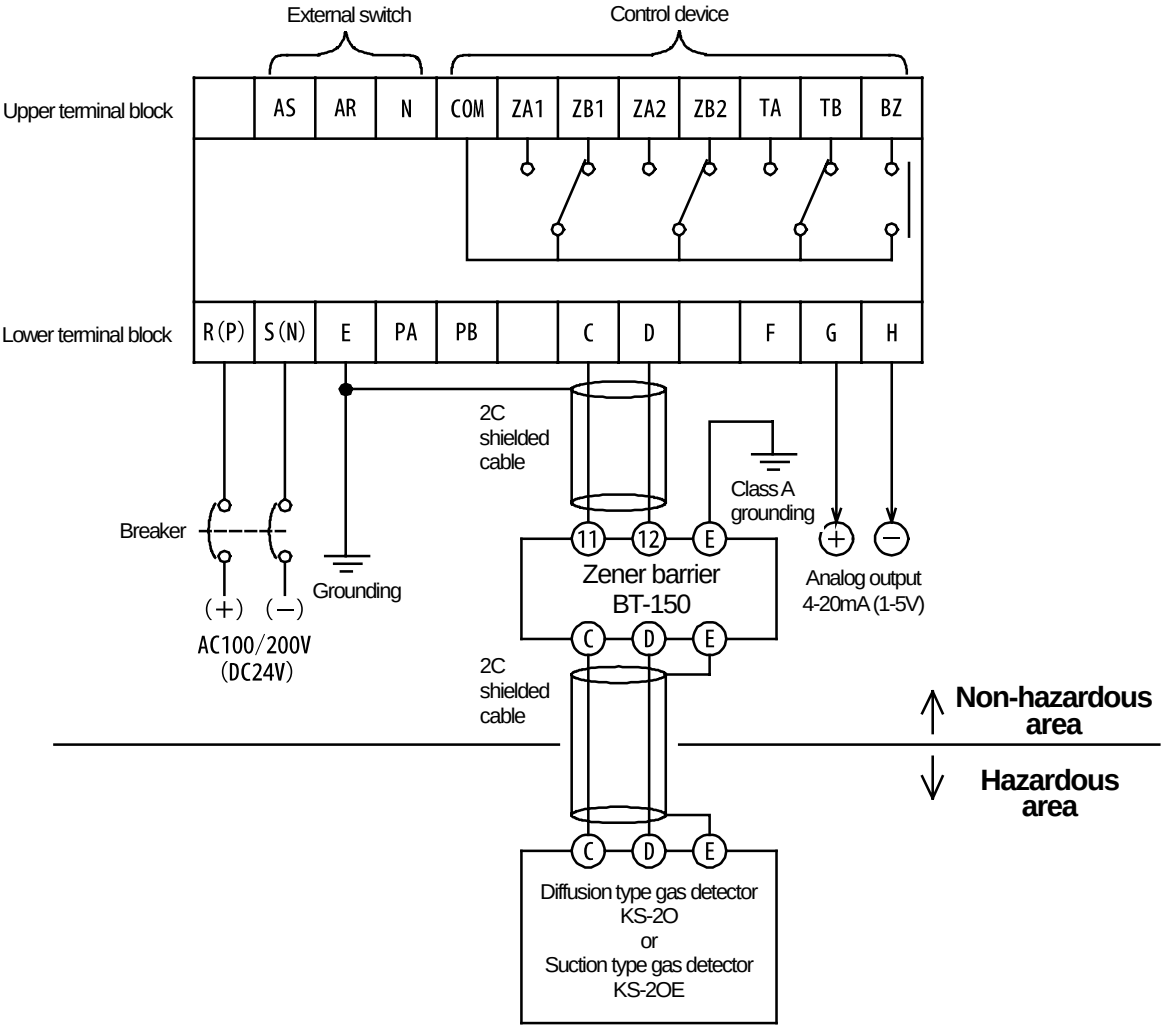


Fig.10 Circuit (Intrinsically safe explosion proof)

7. Operating Instructions

7-1 Notes to Users

⚠CAUTION

- Make sure that all parts are correctly connected before turning on the power. Check that the terminals of the gas detector and the indicator and alarm unit are correctly connected.
- Do not connect a load to the external alarm contact that exceeds the rated capacity.

7-2 Procedures

(1) Turning ON the power

① Turn ON the Power switch. If the equipment has a backup power source, turn ON the Battery switch as well.

② The gas concentration indicator displays gas concentration and a preset alarm value. The Power lamp blinks green to show that the equipment is warming up. The message window indicates gas concentration according to specifications.

③ The Power lamp stops blinking and lights up green and normal operation starts. Warming up takes about thirty seconds.

(2) 21vol% adjustment

① Perform 21vol% adjustment on the gas detector side. (Refer to the gas detector's instruction manual.)

② Set the Mode switch at 2 to select maintenance mode 2. (Cancel 21vol% suppression.)

③ Confirm that the Gas concentration bar graph indicates 21vol%. If it does not, turn the Span adjustment volume (SPAN) to match 21vol%.

④ Set the Mode switch at zero to return to normal mode.

⚠CAUTION

- Make sure that air around the gas detector is clean when carrying out 21vol% adjustment. If air is not clean, the adjustment will not be performed correctly.

MEMO

- A precision screwdriver (flat 1.3mm) is necessary to adjust 21vol% and span adjustment volumes.

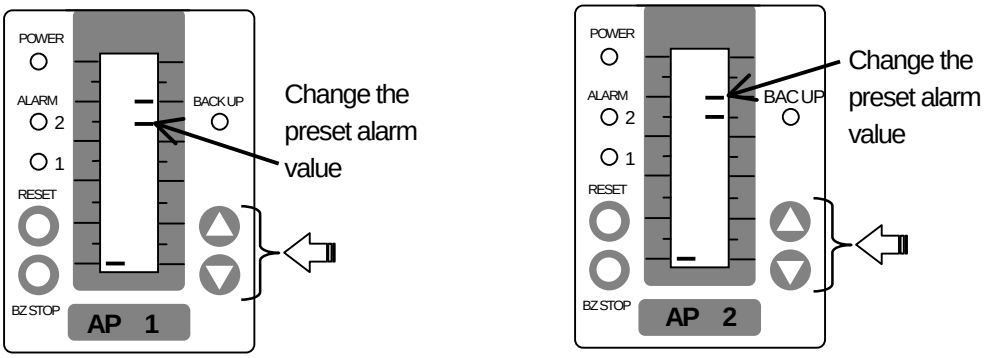
(3) Setting alarms

An alarm value is set as you specified at the time of delivery. If you want to change it, follow the procedures below.

① Confirm that it is under normal mode (Mode switch 0) then press the Enter key.

② The message window displays AP 1. Use the Alarm Setting keys (△▽) to change the preset alarm value (Second preset alarm value for Lower limit alarm specification, Lower limit preset alarm value for Upper/Lower limit alarm specification, and First preset alarm value for Upper limit alarm specification).

③ Press the Enter key and the message window displays AP 2. Use the Alarm Setting keys (△▽) to change the preset value (First preset alarm value for Lower limit alarm specification, Upper limit preset alarm value for Upper/Lower limit alarm specification, and Second preset alarm value for Upper limit alarm specification).



④ Press the Enter key again to complete the change of the preset alarm value. The message window disappears and normal operation starts.

(4) Alarm sound

1) Canceling the alarm sound

If the alarm sound is not necessary, set the Function switch 2 at ON to cancel the sound. Only the alarm lamp (ALARM) blinks when alarming.

2) Adjusting the buzzer volume

Turning down the SOUND volume control can lower buzzer volume. The sound is set at max at the time of delivery.

⚠CAUTION

Keep the sound at max unless there is a particular reason for lowering it.

(5) Equipment with a backup power source

The equipment with a backup power source has a function to check the battery's life. Follow the procedures below to check the battery's life.

① Confirm that the normal mode (Mode switch 0) is selected, then press the Battery Test key down for five seconds. The Backup lamp blinks red and the message window indicates the battery voltage.
② A voice message will let you know whether the battery is in good condition or not. Change the battery when the message says its power runs out.
③ After hearing the voice message, release the Battery Test key to return to normal mode.

MEMO

- The equipment has a function to check the battery's life. Use this function during monthly inspections, etc.
- The battery test is only a simple test. To find out the battery's actual life, turn OFF the Power switch and carry out a discharge test.
- Replace the battery every three years.
- The Battery Test key cannot be used in maintenance mode 1 and 2. Use the key in normal mode.

(6) Checking analog output

Terminals G and H of the terminal block can output 4-20 mA (1-5V).

① Connect a tester to terminals G and H. Adjust the indicated value to zero using the Test control while pressing down the Test button. Check output on the tester. You do not need to adjust if it reads 4 mA (1V). If it is off, adjust by turning Analog Output Adjustment volume (L).

② Adjust the indicated value to full scale using the Test control while pressing down the Test button. Check output on the tester. You do not need to adjust if it reads 20 mA (5V). If it is off, adjust by turning the Analog Output Adjustment volume (H).

③ Repeat procedures ① and ② several times until 4-20 mA (1-5V) are read.

7-3 Operation of the Equipment

(1) When gas is detected

- For Lower limit alarm specification

  When the reading of the Gas concentration bar graph falls below the first preset alarm value, the first Alarm lamp blinks and an alarm sound is heard. When the reading falls below the second preset alarm value, the second Alarm lamp blinks.
- For Upper/Lower limit alarm specification

  When the reading of the Gas concentration bar graph exceeds the upper limit preset alarm value, the second Alarm lamp blinks and an alarm sound is heard. When the reading falls below the lower limit preset alarm value, the first Alarm lamp blinks and an alarm sound is heard.
- For Upper limit alarm specification

  When the reading of the Gas concentration bar graph exceeds the first preset alarm value, the first Alarm lamp blinks and an alarm sound is heard. When the reading exceeds the second preset alarm value, the second Alarm lamp blinks. At the same time, the peak hold value blinks on the indicator.

MEMO

- The alarm sound is cancelled when the function switch ② is set at ON.

(2) Canceling the Alarm

The method of canceling the alarm differs according to the alarm mode. Refer to the specifications for each mode.

- Self-retention type
  - ① Press the Buzzer Stop (BZ STOP) key. The alarm sound stops and the blinking Alarm lamp lights up. When using an external alarm stop terminal, you can stop the buzzer by an external switch.
  - ② When the Reset key is pressed after the reading becomes within the limits of the preset alarm value, the Alarm lamp goes off. Peak hold indication also goes off in the case of an Upper limit alarm specification. When using an external reset terminal, you can reset by an external switch.

MEMO

The Reset key does not work if pressed before the BZ STOP operation.

- Auto-restore type
  - ① When the reading becomes within the limits of the preset alarm value, the alarm sound stops and the Alarm lamp goes off automatically.
  - ② During the alarm, the alarm sound can be stopped by pressing the Buzzer Stop (BZ STOP) key.

(3) In case of a failure

1) When the gas detector is out of order

The Power lamp lights up orange, an alarm sound is heard, and the message window displays the type of the failure.

(Failure E: Cable failure, F: Flow decline)

MEMO

- The alarm sound is cancelled when the function switch ② is set at ON.

2) When the Buzzer Stop (BZ STOP) key is pressed

When the BZ STOP key is pressed, the alarm sound stops.

3) After the failure has been fixed

The Power lamp changes from orange to blinking green and the equipment goes into warming up state. After warming up, it returns to its normal state.

(4) Equipment with a backup power source

1) In case of a power failure

The Backup lamp blinks red and the battery starts supplying power to the equipment so that it can continue monitoring oxygen leakage and oxygen deficiency.

2) When the battery voltage lowers below the final voltage

The battery automatically stops discharging power and the equipment stops entirely.

3) When power is recovered

The Backup lamp goes off and the equipment returns to its normal operation. When power is recovered after the equipment stops because of over discharge, the equipment starts operating from warming up state.

(5) Function switches

⚠CAUTION

- If you change the setting for Function switches, the equipment cannot perform as it is supposed to (For example, no alarm sound goes off even when there is oxygen leakage or oxygen deficiency). Do not change the setting unless you completely understand features of the Function switches.

The equipment's Function switches (No. 10 in "Fig. Dimensions of the Indicator and Alarm Unit" in 5-1)

Function switch no.	Function	OFF	ON
1	Alarm sound	Always OFF	—
2	Alarm sound ON/OFF	ON	OFF
3	Ten second alarm delay ON/OFF	OFF	ON
4	Zero suppression function ON/OFF	Always OFF	—
5	Self-retention / Auto-restore	Self-retention	Auto-restore
6	Trouble alarm : normally open / close	Normally open	Normally close
7	Heater disconnection alarm ON/OFF	—	Always ON
8	Flow decline alarm ON/OFF	ON	OFF

7-4 When an Alarm Occurs

⚠DANGER

- Before entering the detecting site, make sure that oxygen concentration at the site is the same level as the atmospheric oxygen concentration. Oxygen concentration of 18vol% or less may cause fatal accidents due to oxygen deficiency.

⚠WARNING

- In case of an alarm, carry out your predetermined measures for oxygen leakage or oxygen deficiency.

MEMO

- When oxygen leakage or oxygen deficiency occurs indoors, open windows and doors to let fresh air in.

7-5 How to Replace Batteries (when the equipment has a backup power source)

⚠CAUTION

- Replace two batteries at the same time.
- Do not catch the harness when attaching the battery cover.

① Detach the battery cover on the right side of the backup power source unit.

② Detach the battery connector and take out the batteries.

③ Insert new batteries and attach the connector.

④ Put the battery cover back.

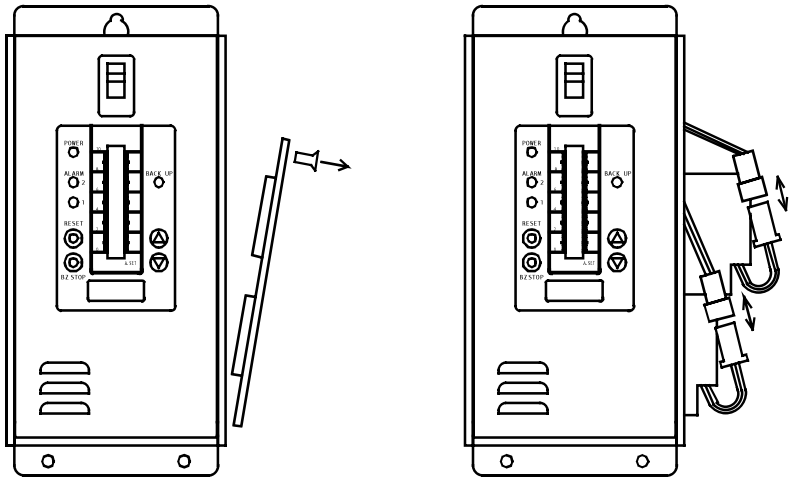


Fig. 11 How to replace the batteries

7-6 Maintenance Functions

⚠WARNING

- When adjustment in a mode is completed, always set the Mode switch at zero to return to normal mode. If the switch is left at another mode, the equipment cannot properly alarm you of oxygen leakage and oxygen deficiency.
- The message window intermittently displays "_____" during maintenance mode to prevent you from forgetting to return to normal mode after adjustment.
- Do not change the setting for modes 3 to 9. If the setting is changed, the equipment cannot properly alarm you of oxygen leakage and oxygen deficiency.

NV-100S has maintenance mode functions. Select a mode using the Mode switch to use each function. The functions of the modes are described in the following table.

Mode switch no.	Mode name	Function	Remarks
0	Normal mode	Normal state to monitor oxygen leakage and oxygen deficiency	• Use the equipment in this mode.
1	Maintenance mode 1	—	• Not in use.
2	Maintenance mode 2	21vol% adjustment	• Adjust 21vol% by a volume for trial run or after changing a gas sensor. • Cancel 21vol% suppression function. • The alarm contact and the buzzer contact do not operate.
3-9	—	Only used for adjustment at factory	• Do not use them.

8. Maintenance and Inspections

Maintenance and inspections are very important for the equipment because the purpose of the equipment is to secure safety. Maintenance and inspections are the users' responsibility. We can offer Maintenance inspections if you make a maintenance contract with us. (Contact our dealer/agency for detailed information.)
As for maintenance and inspections of a gas detector, refer to the gas detector's instruction manual.

Carry out Regular inspections and Maintenance inspections following the table below.

Item	Frequency	Inspection details
Regular inspections (Inspections that the users are responsible for)	Daily	• POWER lamp (green) check Check that the POWER lamp (green) of the indicator unit lights up and the equipment operates normally.
		• Gas concentration bar graph indication check Check that the graph indicates normally.
	Monthly	• Alarm operation check by the TEST button Press the TEST button to check that an alarm sound is heard.
Maintenance inspections (We offer)	Annually or more frequently	• We perform at your request.

Maintenance Inspections re Recommended

Maintenance and inspections are very important to maintain reliability of a gas detection and alarm system. It is necessary to carefully perform inspections and calibration using actual gas. This is why we recommend making a maintenance contract with us to continue periodic inspections.

⚠CAUTION

- Note that a connected external alarm or lamp goes on when the TEST button is pressed.
- Carry out inspections of detection and alarm with a frequency that meets all applicable laws and regulations.

9. Troubleshooting

Check the following before requesting repair work.

Problem	Cause	Action	Section to refer
• The Power lamp does not light up even after the Power switch is turned ON.	• Wires are not correctly connected.	• Check and fix wiring correctly.	• Refer to 6-3.
	• Wires are not connected properly.	• Retighten the terminals.	
	• A commercial power source fuse is disconnected.	• Replace the fuse.	
• Although the Power lamp lights up when the Power switch is turned ON, gas concentration is not displayed.	• The Mode switch is not set at zero.	• Set the Mode switch at zero.	• Refer to 7-6.
• The message window intermittently displays "————————."	• The mode is set at the maintenance mode.	• Set the Mode switch at zero to return to normal mode.	• Refer to 7-6.
• The Power lamp lights up orange.	• The equipment and the gas detector are not properly connected.	• Check wiring and re-tighten the terminals.	• Refer to 6-3.
• Battery voltage is low.	• The equipment has not been used for a long period of time.	• Turn on the electricity and wait until the battery voltage becomes 24V or more.	• Refer to 7-2 (5).

10. Specifications

10-1 Indicator and Alarm Unit

Model	NV-100S
Principle of detection	Galvanic cell
Gases to be detected	Oxygen (oxygen leakage/oxygen deficiency)
Indicating range	As specified
Gas concentration indicator	LCD bar graph meter with backlight
Standard preset alarm value	As specified (The value can be adjusted within measuring range.)
Alarm accuracy	Within ±1.0vol% of the preset alarm value (Conforms to JIS T 8201)
Response time	For oxygen deficiency: Within 5 seconds when the oxygen concentration is 10vol% on condition that the preset alarm value is 18vol% and the operating temperature is 20±2℃. For oxygen leakage: Within 30 seconds when the oxygen concentration is 1.6 times as high as a preset alarm value.
Alarm indication	For Lower limit alarm specification: First alarm: First Alarm lamp blinks red and an alarm sound is heard. Second alarm: First and second Alarm lamps blink red and an alarm sound is heard. For Upper/Lower limit alarm specification: Upper limit alarm: Second Alarm lamp blinks red and an alarm sound is heard. Lower limit alarm: First Alarm lamp blinks red and an alarm sound is heard. For Upper limit alarm specification: First alarm: First Alarm lamp blinks red and an alarm sound is heard. Second alarm: First and second Alarm lamps blink red and an alarm sound is heard.
Trouble indication	Power lamp lights up orange, the failure type is indicated, and an alarm sound is heard.
Alarm output terminal (common) First alarm contact Second alarm contact Trouble alarm contact Buzzer contact	 No voltage 1c contact (Contact capacity: AC100V 2A resistance load) No voltage 1c contact (Contact capacity: AC100V 2A resistance load) No voltage 1c contact (Contact capacity: AC100V 2A resistance load) No voltage 1a contact (Contact capacity: AC100V 2A resistance load)
External reset terminal	Terminals for external alarm stop and reset
Analog output	4-20 mA (standard)　1-5 V (option)
Alarm delay	Delay mode can be set. (Delay time: About 10 seconds)
21vol% suppression function	21vol% suppression function (standard)
Power source	AC100-240V 50/60Hz (standard) DC24V (option)
Power consumption	Diffusion type: 12VA / 17VA (with a backup power source) Suction type: 4VA per unit to be added
Backup power source (Equipment with a backup power source only)	Battery: Gastight lead battery (12V 0.8Ah×2) Backup time: 60 minutes or more Function to prevent over discharge: Stops discharging at the battery's final voltage Charge time: About 12 hours
Maintenance mode	Maintenance mode 2 External output: The alarm contact and the buzzer contact do not operate. 21vol% suppression function is canceled.
Temperature range	0 to 40℃
Installation	Wall-hanged or panel-embedded
Painting color	Munsell 2.5PB7.0/1.0
Dimensions	Without a backup power source: W113×D71.5×H204 mm　About 1.5 kg With a backup power source:　W113×D110×H234 mm　About 3 kg
Remarks	Do not use any equipment that generates electric waves such as cellular phones or radios within 30 cm of the indicator and alarm unit.

10-2 Gas Detector

Refer to the gas detector's instruction manual.

11. Consumable Parts and Spare Parts

Contact our dealer/agency when you need consumable parts and spare parts for NV-100S.

12. Warranty

We warrant the equipment against defects for one full year from date of purchase. If the equipment malfunctions after it has been installed and is used as described in the installation instructions, instruction manual, and specifications during the warranty period, we will repair the equipment based on the terms described in the warranty. See the warranty for detailed information. The warranty shall be invalidated if the equipment is used improperly or not used as described in the instruction manual or installation instructions.

13. Service Life

Service life of the equipment is seven years when installed and used as described in the installation instructions and the instruction manual.
Replace with a new one after seven years for proper performance.

14. Glossary

Indicator / Alarm unit:	A unit that receives signals from a gas detector, 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 a gas detector and indicator/alarm unit in order to maintain their performance during a power failure.
Flow meter:	A meter to measure gas flow in a 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 an 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:	A range of gas concentration that can be indicated and set off an alarm.
Alarm accuracy:	Difference between a preset alarm value and gas concentration when an alarm actually occurs or the percentage of the difference compared to the preset alarm value.
Response time:	Time it takes from when a 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 performs 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 dangerous atmosphere where an explosive gas may mix with air and explode or start a fire. An area where a gas may be present.
Non-hazardous area:	An area where electric equipment is set up and that has no potential to create a dangerous atmosphere.
Dangerous atmosphere:	Atmosphere within an explosive limit where an explosive gas and air are mixed.
LEL (Lower Explosive Limit):	The lowest concentration of a 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.)