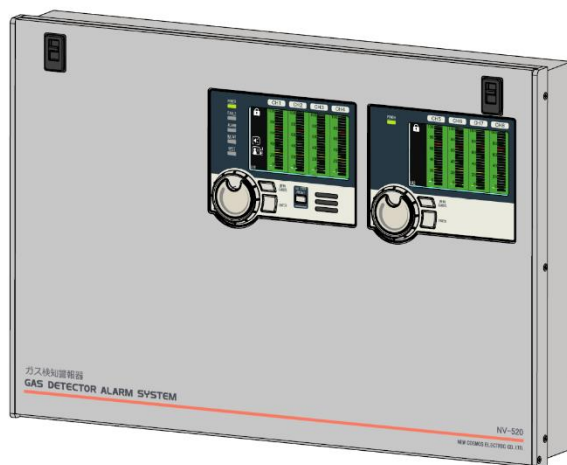




Multi-Channel Gas Alarm System NV-520 Instruction Manual for Installation



Keep this manual for easy reference.

Prior to use, carefully read this manual as well as the NV-520 instruction manual for operation (separate document) for correct use.

This manual describes the standard model. If your unit has end-user-specific options, this manual will be superseded by your delivery specifications.



Instruction Manual No.
GAE-174-00
July 2023

NEW COSMOS ELECTRIC CO., LTD.

Related Manuals

The following documents have been prepared to guide your installation and use of this product.

(1) NV-520 Instruction Manual for Installation (this document), No. GAE-174-xx

This document is intended for supervisors and service personnel who are concerned with the installation of this product. It provides the following information to ensure correct installation of the product:

- Safety precautions
- Unit dimensions and components, and precautions for unpacking
- Installation precautions

(2) NV-520 Instruction Manual for Operation, No. GAE-175-xx

This document is intended for supervisors, operators and service personnel who are concerned with the operation and maintenance of this product. It provides the following information to ensure safe use of the product:

- Unit dimensions and components, and power on/off
- Operation modes and on-screen menus
- Maintenance procedure, consumable replacement and troubleshooting

Introduction

Thank you for purchasing the New Cosmos NV-520 multi-channel gas alarm system ("product" or "unit" hereafter).

Prior to use, please read this manual as well as the NV-520 instruction manual for operation (No. GAE-175-xx) and follow the instructions provided for the correct use of the product.

This product is used in connection with multiple gas detectors at the site to form a multi-channel gas alarm system (2 to 12 channels). Install gas detectors at a location that necessitates the detection of the target gas and install this product at a location convenient for monitoring the gas concentrations.

This unit displays the gas concentrations detected by the corresponding gas detectors on its bar graph displays. In the event that the detector detects a leak of the target gas exceeding the preset limit, the unit will produce audio-visual alarms (e.g., LED, beep sound, voice message), thus helping prevent incidents such as fire and gas explosions.

Periodic maintenance is essential to maintain the reliability of the product. Periodic maintenance checks must be performed in the manner described in the NV-520 instruction manual for operation.

Keep this manual in a safe place for easy reference.

The following acts are prohibited without the prior consent of New Cosmos. Please note that the use of this product will be treated as your acceptance of these terms. If you do not agree to these terms, do not use this product and immediately consult your local sales representative.

- Modification of this product and its related components
- Reverse-engineering of this product and its related components
- Analysis of this product and its related components including disassembly and reverse compilation
- Transfer of this product and its related components to a third party
- Third-party use of this product and its related components for any reason, including lease and licensing

Precautions

Unauthorized copying and replication of the contents of this manual, in whole or in part, are strictly prohibited.

The contents of this manual are subject to change without notice.

This manual has been prepared with utmost care. If you come across any incorrect descriptions please contact us for correction.

Symbols Used in this Instruction Manual

Symbols for Danger Levels

The safety symbols in this manual are divided into three categories: Danger, Warning and Caution. These categories depend on the severity and magnitude of the risks. Operators' safety has been put first in designing this product. However, there exist some unavoidable risks due to the system characteristics. Please read the contents related to the precautions carefully before beginning operation and maintenance work.

This manual uses Danger, Warning, Caution and Notice symbols to draw attention to procedures, materials, methods and processes that require particular attention.


Indicates an imminently hazardous situation that can result in death or serious injury.

Indicates a potentially hazardous situation that may result in death or serious injury.

Indicates a hazardous situation that may result in minor injury or property damage.

Indicates a hazardous situation that will not result in injury but may cause a product, facility or related equipment damage or failure.

Other Signs and Symbols

This manual also uses the following signs and symbols.

	Provides supplemental or useful information on product handling.
	References for common procedure and/or related information.

	Don'ts Indicates a prohibited action.
	Mandatory Indicates an action that must be done.
	Electrical hazard Warns of risk of electric shock under certain conditions.
	Explosive hazard Warns of a risk of explosion while handling explosive items.
	Corrosive hazard Contact with the skin or eyes may cause burns or loss of sight.

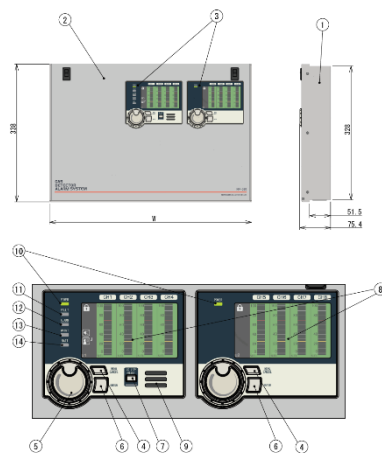
Quick Index

This page lists parts that may be often referenced throughout the document.

Prior to use, please read the precautions in 1 “General Precautions”.

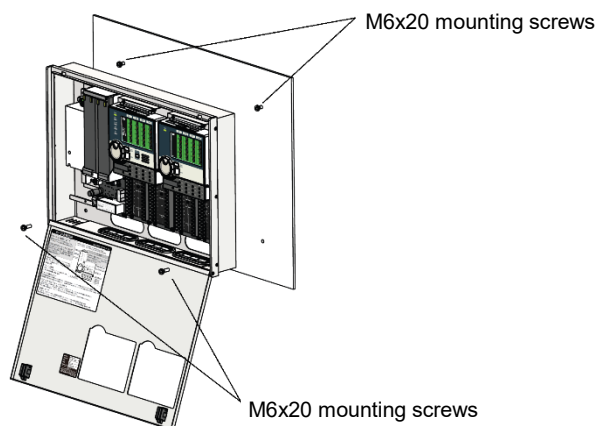
Unit Dimensions and Components

Pages 8 to 14



Installation

Pages 18 to 24



Wiring and Connection

Pages 25 to 34

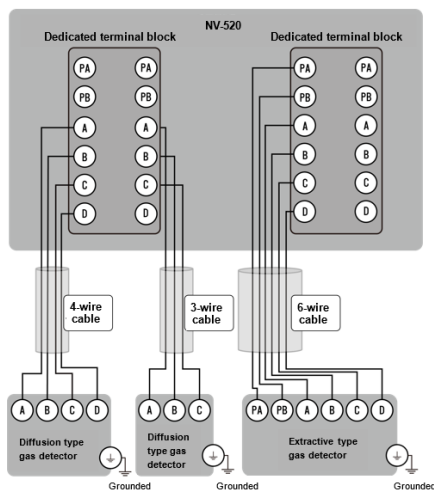


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1 General Precautions

1.1 Before Work

To ensure safe use of the product and prevent unexpected accidents, please read the precautions in this manual carefully before turning on this product. New Cosmos is not responsible for any accidents resulting from any usage other than that outlined in this document.

This chapter provides a general description for safe use of this product, as well as safety and caution information related to this product.

1.2 Safety Precautions

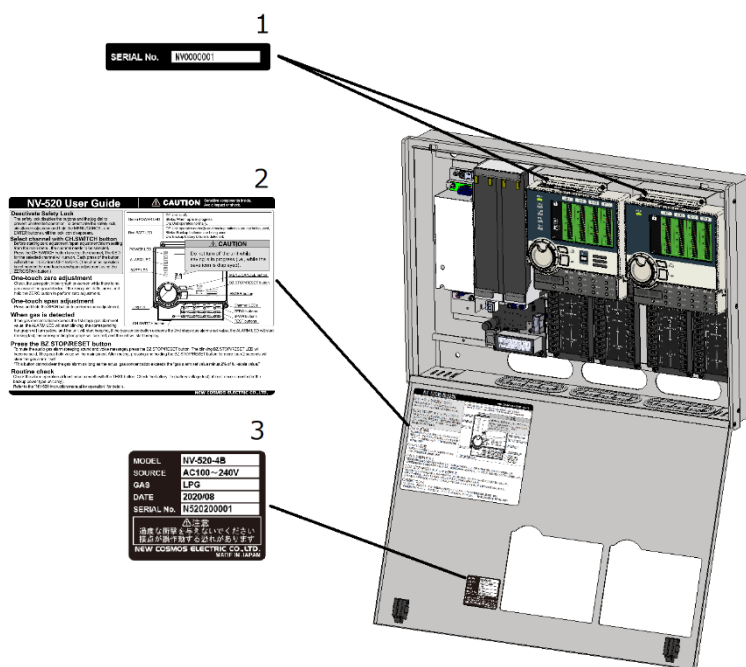
Please read the following precautions carefully for correct use.

 DANGER	
	Operation check using actual gas is extremely dangerous and requires special attention, because combustible gas may have a risk of explosion. It must be performed by qualified personnel or a New Cosmos-authorized technician.
	This product is not explosion-proof and should not be installed in hazardous areas.
 WARNING	
	- Ground the product to prevent electric shocks. - In the event of a gas leak alarm, follow safety procedures in accordance with your company's regulations. - This product is heavyweight. Handle it with care not to drop it. Failure to do so may cause injury or property damage such as damaged floor.
 CAUTION	
	Use this product in accordance with the applicable laws and regulations. Wiring and installation should only be performed by a qualified electrician with sufficient knowledge of wiring/installation procedures, in accordance with the applicable technical standards. - New Cosmos assumes no responsibility or liability for any injury or damage resulting from the use of this unit's output signals to control external devices such as interlocks. - This product is not drip-proof and should be kept away from water or rain.
	- Do not use radio wave-emitting devices (e.g., cell phones, wireless devices) within 30 cm of the product. - Do not disassemble, modify, or alter the structure of the product or its electrical circuits. Doing so may compromise product's performance.
NOTICE	
	Do not use organic solvents for cleaning the product. Organic solvents may negatively affect the product's exterior as well as internal components.

1.3 Labels Affixed to Product

Warning and Caution labels are affixed to the areas or surrounding parts that are potentially dangerous and require special attention. Please read the contents of the labels carefully prior to use.

 WARNING	
	Do not relocate the labels affixed to the product.
	If Warning and Caution labels are missing, damaged or illegible, please contact New Cosmos or its authorized representative for replacement or new labels. It is very dangerous to leave the Warning and Caution labels dirty or obscured.



Item	Description
1	Serial number label Indicates the serial number of this product.
2	User guide label Describes switch/button operation.
3	Power rating label Indicates the model, power source, target gas, month of manufacture, serial number, and precautions to be adopted while handling this product.

1.4 Disposal

Used products, components and/or batteries should be disposed of in accordance with the applicable laws and regulations.

1.5 Service Life

The service life of this product is 10 years. The unit can operate for up to 10 years with standard installation and operation in accordance with the NV-520 instruction manuals for installation and operation. When the service life has expired, replacement is essential for continued reliable performance and other purposes. The 10 year service life is only an estimate and not guaranteed.

Ref.

Refer to 12 "Maintenance" of NV-520 instruction manual for operation for the replacement parts, which may require replacement before this product's service life (10 years) expires.

1.6 Definition of Supervisor/Operator/Service Personnel

This manual is intended for personnel concerned with the use/installation/maintenance of this product. Concerned personnel are divided into three categories according to safety level, skills and experience. This manual specifies the name of the applicable category and shows that the information or instruction given below applies to that category only.

Supervisor	Manages product operation. Fully understands the product operation method, the gas alarm facility, and the gas/fault alarm clearance method. Should carefully read this manual and familiarize themselves with the system characteristics and relevant work activities.
Operator	Operates the product. Understands the product operation method, how to address gas/fault alarms, and daily work activities for the product under the supervisor's instruction.
Service personnel	Carries out installation, failure cause investigation, maintenance and repair work for the product. Requires special knowledge and skills. Acts as New Cosmos authorized technician in principle.

1.7 Batteries (for Backup Power Type Only)

This product uses two lead storage batteries.

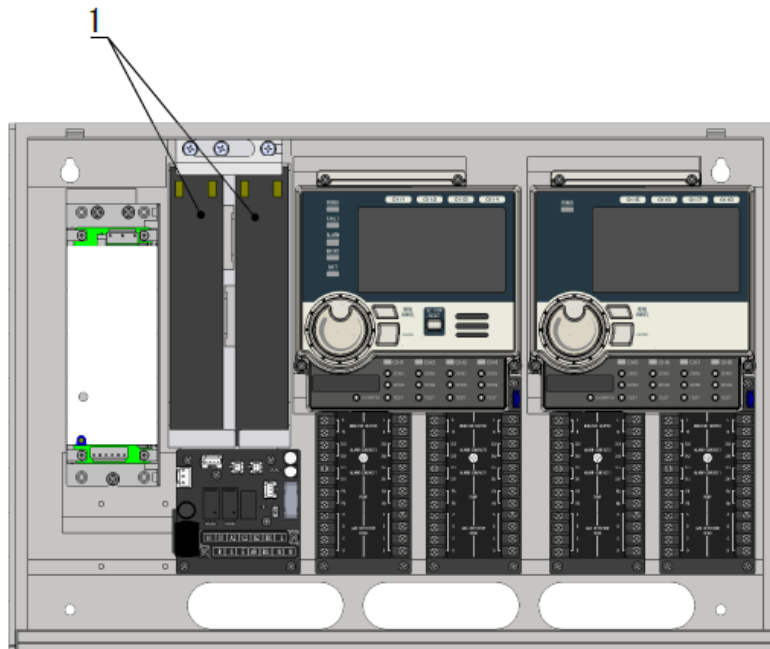
The batteries need to be replaced periodically.

The replacement cycle changes depending on the frequency of use and environmental conditions.

Follow the precautions listed below for proper operation.

 WARNING	
	Batteries may short-circuit, resulting in electric shock or burns. Follow the precautions listed below: • Avoid thermal, electrical and mechanical impact on the batteries. • Do not disassemble the batteries. Do not insert metal objects in the battery connections and their power/signal cables. Doing so may result in electric shock, excessive heat, ignition or injury. • To prevent rapid battery discharge, protect the battery's electrodes from direct contact with other electrodes or metal objects. Battery discharge may cause heat or battery leaks. • Do not place tools or other metal objects on the batteries.
 CAUTION	
	• Do not mix new and old batteries. • Do not use other than specified batteries. The use of unspecified batteries may cause device failure.
	• Dispose of used batteries in accordance with the applicable laws and regulations. • If abnormal odor, noise or smoke is observed during operation, cease the operation immediately and disconnect the power to the product. Continued operation under such circumstances may cause a fire. • Replace the batteries periodically. Using expired batteries may cause a battery leak, which will then result in a secondary disaster such as an electric leak, electric shock, smoke or ignition. • Battery replacement must be performed by qualified personnel. Please contact New Cosmos or its authorized representative for replacement.

1.7.1 Battery Location



Item	Description
1	Lead storage battery x 2 pcs

1.7.2 Battery Life

If this product is to be kept unused or stored for an extended period of time, the batteries must be removed. Leaving the batteries inside while the product is not in use or being stored for an extended period of time may impair/reduce the performance/life of the batteries and cause their terminal corrosion.

The battery life is three years (when used at 25°C) after being shipped out. After three years, replace the batteries even if they pass the battery voltage test.

“Three years” is only an estimate and not guaranteed. The replacement cycle may change depending on several factors including frequency of use, temperature and usage or storage conditions.

 DANGER	
	To prevent serious secondary disasters such as a broken battery case or ignition, replace the batteries periodically. Using expired batteries will cause internal battery degradation, which may prevent the product from operating for the designed hours with backup batteries after a power outage, or may result in an abnormal appearance such as a swollen battery case, battery leak or electric leak.

1.7.3 Battery Disposal

Used batteries must be disposed of as hazardous waste in accordance with the applicable laws and regulations.

The Waste Electrical and Electronic Equipment (WEEE) directive (2012/19/EU) is intended to promote recycling of electrical and electronic equipment and their components at end of life. This symbol (crossed-out wheeled bin) indicates separate collection of waste electrical and electronic equipment in the EU countries. This product uses batteries. Batteries must be recycled or disposed of properly. At the end of their life, batteries must undergo separate collection and recycling from general or household waste. Please use the return and collection system available in your country for the disposal of the batteries.



 WARNING	
	Do not heat or throw batteries into a fire. Improper handling may lead to an explosion.
	Do not open or disassemble batteries. Battery electrolyte is harmful, and any contact with eyes and skin is dangerous.

2 Unit Structure

2.1 Package Contents

A standard package consists of the following items. If any items are missing or damaged, please contact New Cosmos or its authorized representative for replacement.

Item	Quantity	Description	
NV-520 unit	1	—	
Replacement fuse	2	250 V, 5 A $\Phi 5.2 \times 20$ mm	
Wall-mounting kit* ¹	1	Mounting screw (M6 $\times$ 20) x 4 pcs	
Panel-mounting kit* ²	1	Mounting bracket	x 2 pcs
		Mounting screw (M6 x 20) Used to attach the brackets to NV-520 unit	x 4 pcs
		Tension screws (M6 x 40) Used to attach the NV-520 unit to the panel	x 4 pcs
Hex wrench set	1* ⁵	Used to install a gas detector	
Testing connector (test jig)	1	Used to check the voltage of the input power	
Location label sheet* ³	1	A set of labels indicating the installation locations of the gas detectors (location is printed on each label) Usage: Affix the labels to fill the table label	
Gas name label sheet* ⁴	1	A set of labels with a gas name printed on each label Usage: Affix the labels to fill the table label	
Table label for gas name/location	1	A label of a blank table for channel/gas name/location Usage: Affix it onto the product's front panel, etc.	
NV-520 instruction manual set	1* ⁵	Instruction manual for installation (GAE-174-xx) x 1 pc Instruction manual for operation (GAE-175-xx) x 1 pc	
Inspection certificate	1	—	

*1. Provided when "wall-mounting" was specified at the time of order.

*2. Provided when "panel-mounting" was specified at the time of order.

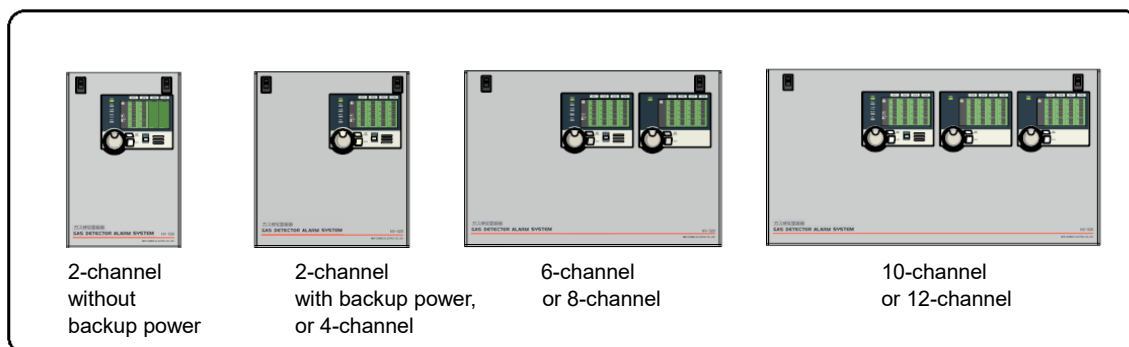
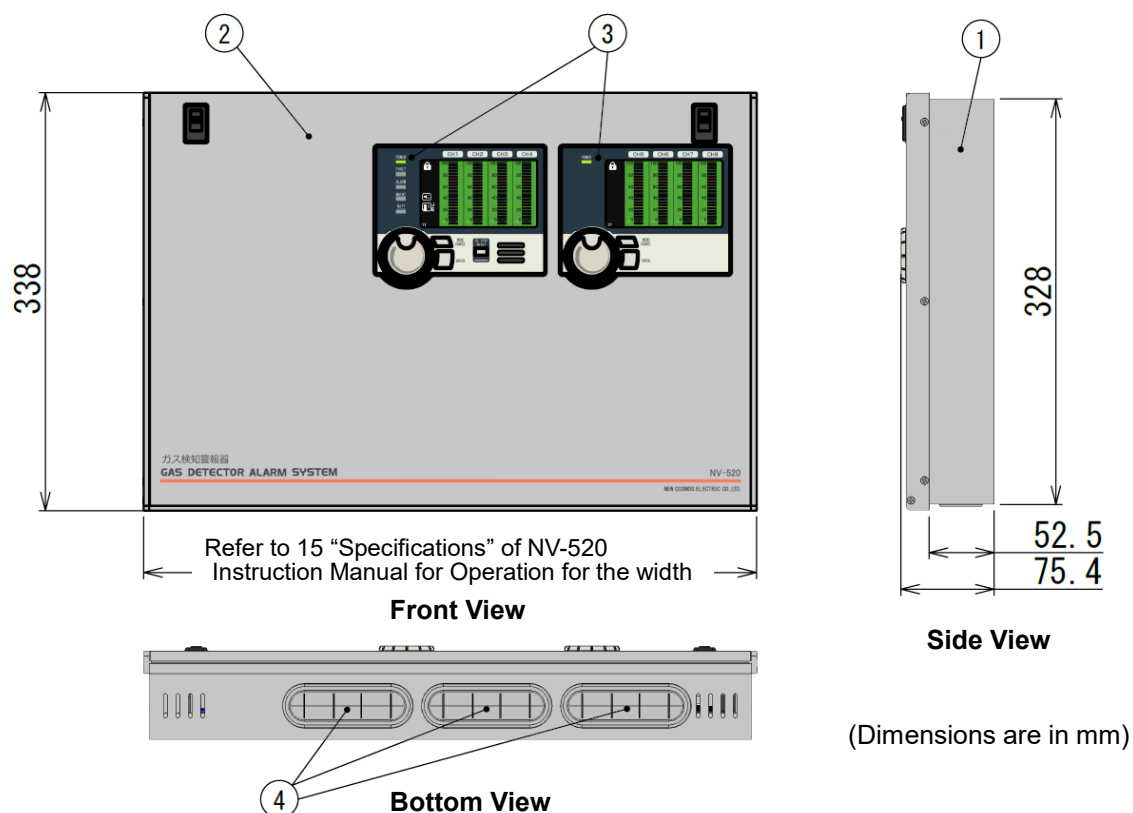
*3. If the exact location name is not found, please manually enter the name of the location in a blank label, and use it.

*4. Feel free to use blank labels if needed.

*5. One set is provided per order, not per unit.

2.2 Unit Dimensions and Components

2.2.1 External Appearance

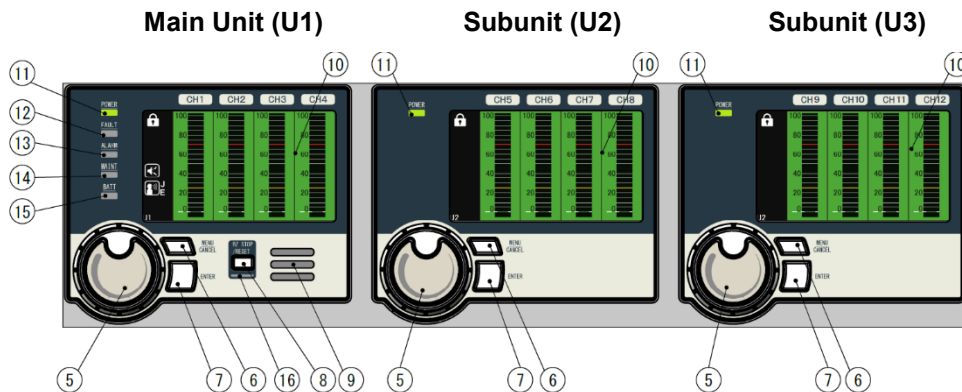


Item	Component	Description
1	Case	—
2	Front panel	—
3	Main unit and subunit(s)	Show the gas concentrations and alarm statuses. System can be operated using the buttons and jog dial on them.
4	Cable grommet(s)	Used to cover the cable entry located on the bottom. Split open the grommet as needed. The number of cable entries changes depending on the case type.

2.2.2 Main Unit and Subunits

It is possible to create a gas alarm system with up to 12 detection points using a combination of the Main Unit (U1) and Subunits (U2/U3). U1 displays gas concentrations sent via Channels 1 to 4, U2 displays gas concentrations sent via Channels 5 to 8, and U3 displays gas concentrations sent via Channels 9 to 12, in bar graph form.

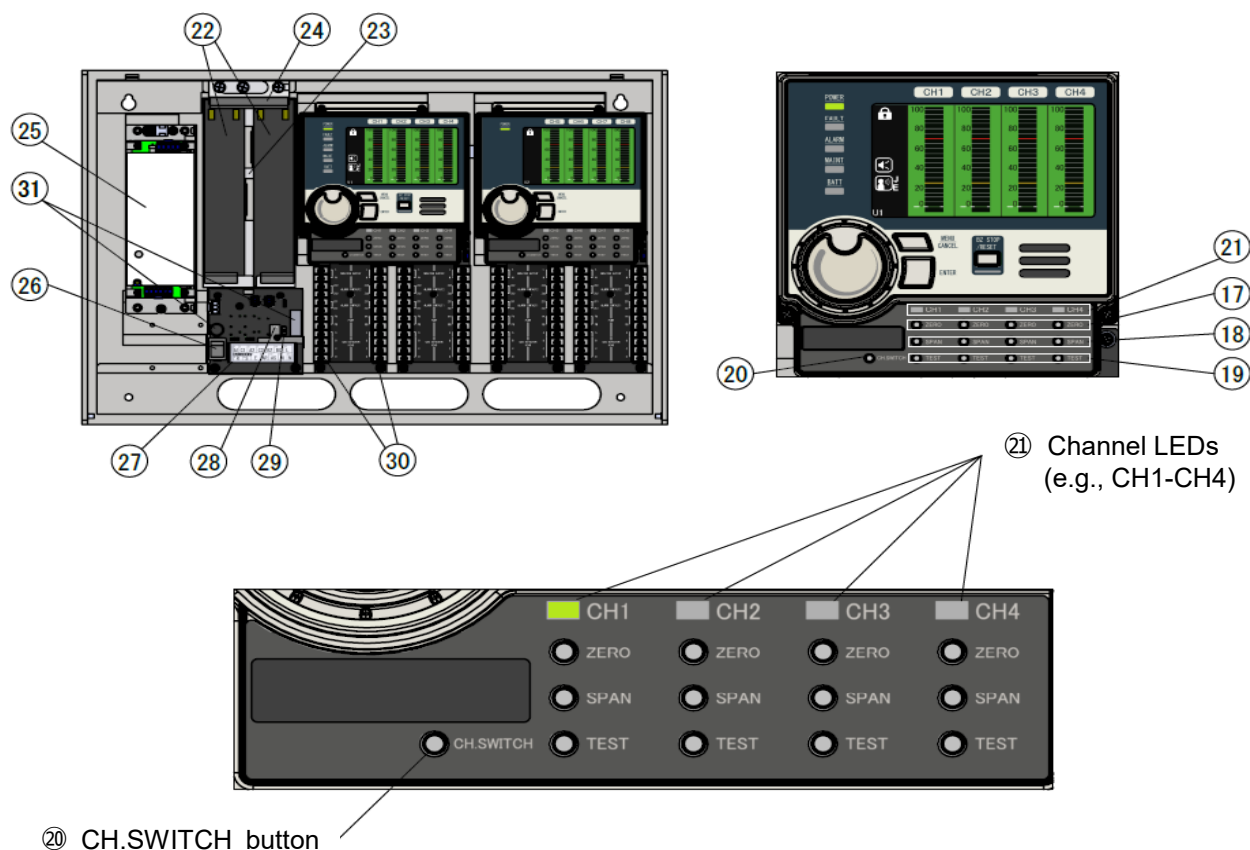
Unit Type	Specifications	Model
Main Unit (U1)	Backup power type	NVM52-1A
Main Unit (U1)	Non-backup power type	NVM52-1C
Subunit (U2)	—	NVM52-2A
Subunit (U3)	—	NVM52-3A



Item	Component	Description
5	Jog dial	Turn to select an item or increase/decrease parameter value.
6	MENU/CANCEL button	Press to switch to the Main Menu, or to cancel the current operation.
7	ENTER button	Press and hold/Press to confirm the selection or setting.
8	BZ STOP/RESET button*	Press to mute the audio alarm (beep sound and voice message).
9	Audio vents*	Opening for audio. A gas leak or device fault alarm will be issued by beep sound and voice message.
10	LCD	Shows gas concentrations in bar graph form (refer to 3 "HOME Screen").
11	Green POWER LED	Indicates operation status: Off when the unit is off. Blinks when warm-up is in progress. Lights up when the unit operates normally.
12	Yellow FAULT LED*	Indicates operation status: Off when the unit operates normally. Blinks when a fault is detected.
13	Red ALARM LED*	Indicates alarm operation status: Off when warm-up is in progress or the unit operates normally. Blinks when 1st stage gas alarm activates. Blinks rapidly when 2nd stage gas alarm activates. Lights up when an audio alarm is muted.
14	Red MAINT LED*	Indicates maintenance mode status: Off when the unit is in normal operation and not in maintenance mode. Blinks when the unit is in maintenance mode 1. Lights up when the unit is in maintenance mode 2 or in aging mode.
15	Red BATT LED*	Indicates backup power operation status: Off when the unit operates normally and backup batteries are not being used. Blinks when backup batteries are being used. Lights up when a backup battery failure is detected. Note: This LED is always off for non-backup power type.
16	Red alarm status LED*	Indicates alarm status: Off when the unit operates normally. Blinks when a gas or fault alarm is detected. Lights up when an audio alarm is muted.

*Provided on Main Unit (U1) only.

2.2.3 Internal Appearance



Item	Component	Description
17	ZERO button	Press and hold to enter the one-touch zero adjustment mode.
18	SPAN button	Press and hold to enter the one-touch span adjustment mode.
19	TEST button	Press and hold to enter test mode.
20	CH.SWITCH button	Used to select the channel to be set or adjusted.
21	Channel LED	The LED corresponding to the selected channel lights up in green.
22	Battery (2 places)*	Supplies backup power to the unit in the event of a power outage.
23	Battery case*	Houses two batteries.
24	Battery lid*	Remove the battery lid for battery replacement.
25	AC-DC power supply unit**	Used to convert AC power to DC power.
26	Power switch	Used to turn the unit on/off.
27	Collective terminal block	Provided for multiple channels and used for external wiring (refer to 2.2.4 on next page).
28	Backup power switch LED	Lights up in red when the backup power switch is set to on.
29	Backup power switch***	Used to set the backup power supply to on/off.
30	Dedicated terminal block	One block is provided for each channel and used for external wiring (refer to 2.2.5 on next page).
31	Fuse holder (2 places)	Houses a fuse.

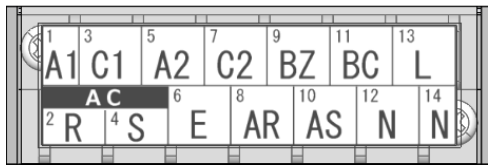
* Provided for backup power type only.

** Provided for AC type only.

***Enabled for backup power type only.

2.2.4 Collective Terminal Block

AC Type



(Thread size: M3)

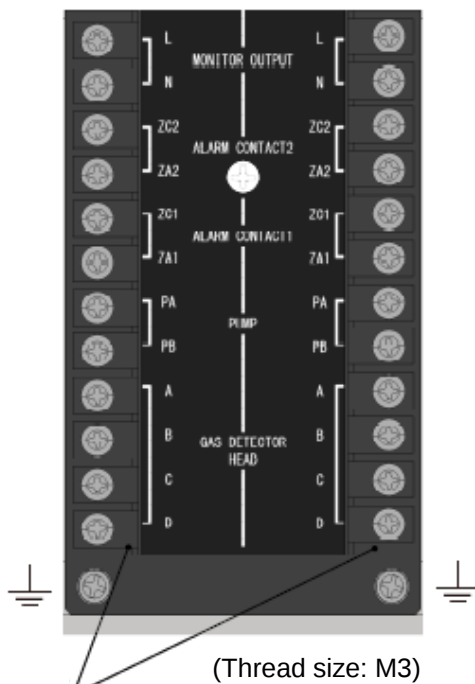
DC Type



(Thread size: M3)

Terminal	No.	ID	Function
1st stage gas alarm	1	A1	1st stage gas alarm contact output
	3	C1	Common with A1
2nd stage gas alarm	5	A2	2nd stage gas alarm contact output
	7	C2	Common with A2
Audio alarm	9	BZ	Audio alarm contact output
	11	BC	Common with BZ
Collective voltage output	13	L	Voltage output (+)
	14	N	Voltage output (-)
Power (input)	2	R (P)	AC type: 100-240 VAC DC type: 24 VDC (+)
	4	S (N)	AC type: 100-240 VAC DC type: 24 VDC (-)
	6	E	Earth
External switch	8	AR	External switch input
	10	AS	
	12	N	
(Earth terminal)	*		Used for grounding the unit Thread size: M3 (2 places)

2.2.5 Dedicated Terminal Block



(Thread size: M3)

Dedicated terminal blocks

Terminal	ID	Function
Dedicated voltage output	L	Voltage output (+)
	N	Voltage output (-)
2nd stage gas alarm	ZC2	Common with ZA2
	ZA2	2nd stage gas alarm contact output
1st stage gas alarm	ZC1	Common with ZA1
	ZA1	1st stage gas alarm contact output
Pump	PA	Power for pump 24 V (+)
	PB	Power for pump GND (-)
Detector	A	Gas detector**
	B	
	C	
	D	
(Earth terminal)		Used for grounding the unit Thread size: M3 (2 places)

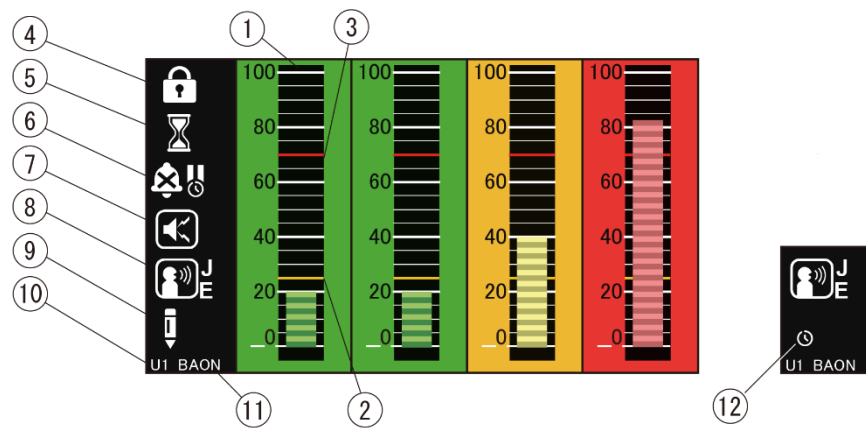
* "" is printed next to the PCB-mounting screw (2 places).

** As per delivery specifications.

Ref.

Refer to 4 "External Outputs" for the functions of the collective/dedicated terminal block.

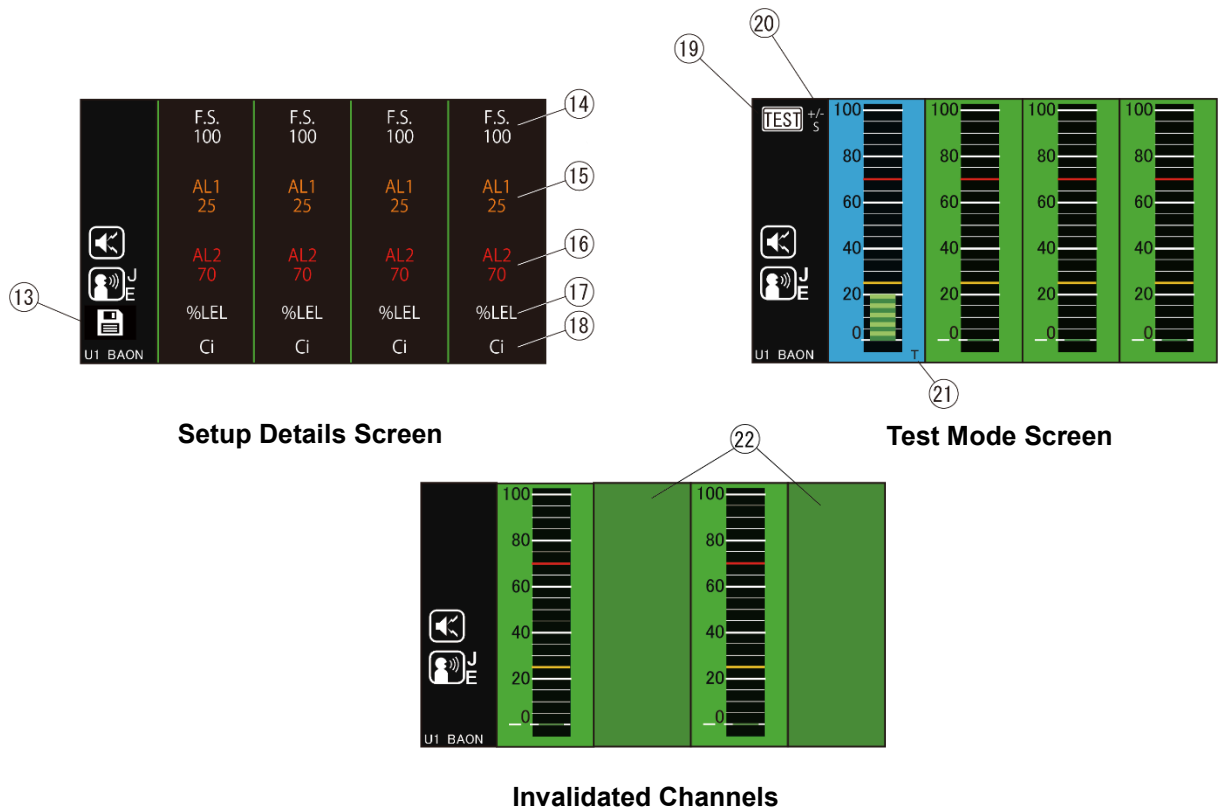
3 HOME Screen (Gas-Monitoring Screen)



HOME Screen

Item	Component		Description
1	Gas concentration bar graph		Displays gas concentration in bar graph form. The bar graph and background color change depending on the alarm level. They turn green during normal operation, yellow when 1st stage gas alarm activates, and red when 2nd stage gas alarm activates.
2	1st stage gas alarm set value		Displays the 1st stage gas alarm set value as a yellow line.
3	2nd stage gas alarm set value		Displays the 2nd stage gas alarm set value as a red line.
4		Lock icon	This icon appears when the button/dial operation is locked to prevent unintended operation.
5		Warm-up icon	This icon appears when the unit is in a warm-up cycle.
6		Maintenance 1 icon	This icon appears when the unit is in maintenance mode 1/2.
		Maintenance 2 icon	
7		Beep sound icon	This icon appears when the audio alarm is unmuted.
8		Voice unmute icon	This icon appears when the voice message is unmuted/muted.
		Voice mute icon	
9		Enter icon	Press and hold the ENTER button to confirm the setting while this icon appears.
10	Unit number (U1/U2/U3)		U1: Main Unit, Channels 1–4 U2: Subunit, Channels 5–8 U3: Subunit, Channels 9–12
11	BAON/BAOFF*		Indicates on/off status of the backup batteries.
12		Internal process icon	This icon appears when an internal process is in progress. It replaces the Enter icon during internal processing.

*Displayed for Main Unit (U1) of backup power type only.



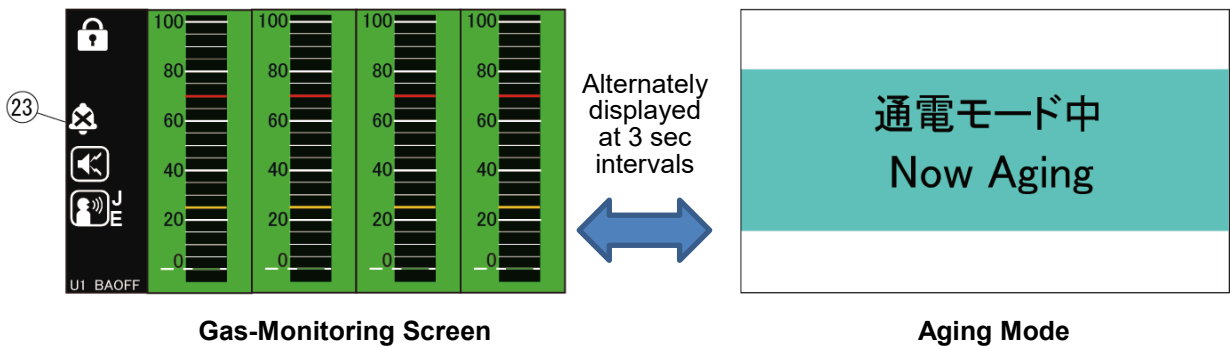
Item	Component		Description
13		Save icon	This icon appears when a setting is being saved. You cannot open the setting screen being saved. It replaces the Enter icon while saving.
14	F.S.*		Displays the full-scale value.
15	AL 1*		Displays the 1st stage gas alarm set value.
16	AL2*		Displays the 2nd stage gas alarm set value.
17	Unit of measurement*		Displays the unit of measurement for gas concentration.
18	Gas sensor type*		Displays the connected gas detector's sensor type (Ci or Cv).
19		Test icon	This icon appears when the unit is in test mode.
20		Increase/decrease by small step	This icon appears when the unit is in test mode. Select from 3 options (S/M/L) for bar graph increment/decrement unit. "S" allows to increase or decrease by 1 bar with 1 turn of the jog dial, "M" by 3 bars, and "L" by 10 bars at one time.
		Increase/decrease by medium step	
		Increase/decrease by large step	
21	T (test mode indication)		"T" appears for the channel that is in test mode.
22	Invalidated channels**		The channels set to be invalidated are displayed in solid color (no bar graph) as shown in the figure above.

* See the setup details on the screen by pressing the ENTER button while on the HOME screen. You can return to the HOME screen by pressing the ENTER button again. If you do not do so, the screen will automatically return to the HOME screen after 30 minutes if the unit is left idle.

**CH1 will never be invalidated.

NOTICE	
	The alarm status cannot be checked while the setup details are displayed on the screen. After checking the setup details, press the ENTER button again to return to the HOME screen.
	Do not turn off the unit while saving is in progress, i.e., while  (save icon) is displayed).

Aging Mode Indication



Item	Component		Description
23		Aging mode icon	This icon appears during the sensor's aging process.

Ref. Refer to 9 “Aging Mode” of the NV-520 instruction manual for operation for more information.

4 External Outputs

External output		Terminal	Description	Operation		
				Normal (No alarm)	Gas alarm	Fault alarm
Collective terminal block	1st stage gas alarm contact output	A1-C1	Contact(s) will activate in response to a gas alarm that occurs in any channel.	Open	Closed	
	2nd stage gas alarm contact output	A2-C2		Open	Closed	
	Audio alarm contact output	BZ-BC	Contact will activate in response to an audio alarm that occurs in any channel.	Open	Closed	Closed
	Voltage output	L-N	Voltage will be output depending on the alarm state of the NV-520 unit. L: Positive (+) N: Negative (-)	6 VDC	12 VDC	0 VDC
Dedicated terminal block	1st stage gas alarm contact output	ZA1-ZC1	Contact(s) will activate in response to a gas alarm that occurs in the relevant channel.	Open	Closed	
	2nd stage gas alarm contact output	ZA2-ZC2		Open	Closed	
	Voltage output	L-N	Voltage will be output depending on the alarm state of the relevant channel. L: Positive (+) N: Negative (-)	6 VDC	12 VDC	0 VDC
	Pump power output	PA-PB	Power supplied to the gas detector's pump.	24 VDC		



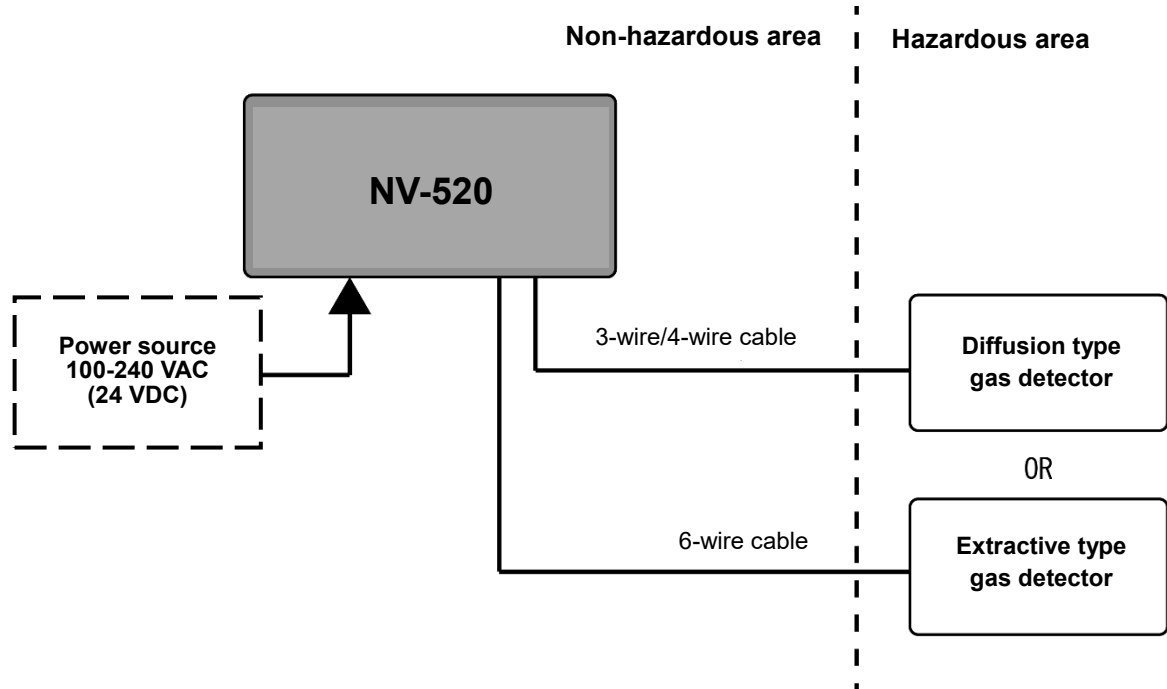
CAUTION



The contacts use mechanical relays, which may falsely activate if exposed to excessive impacts or vibration, or magnetic force. Install the product free from impacts, vibration and magnetic force.

5 System Configuration

This NV-520 unit is connected with gas detectors (sold separately) to form a gas detection system. All the parts are connected with cables. The NV-520 unit displays the gas concentrations detected by the connected gas detectors and produces audio-visual alarms when the gas concentrations reach preset limits.



Typical System Configuration

NOTE

- Diffusion or extractive type gas detectors can be connected to the NV-520 unit. Use a protective cover (sold separately) for each gas detector for outdoor installation. Refer to the gas detector's instruction manual for details.
- Wiring differs depending on the type of the connected gas detector.

6 Preparation

6.1 Tools

The below tools required for installation are not included, and should be prepared by the user:

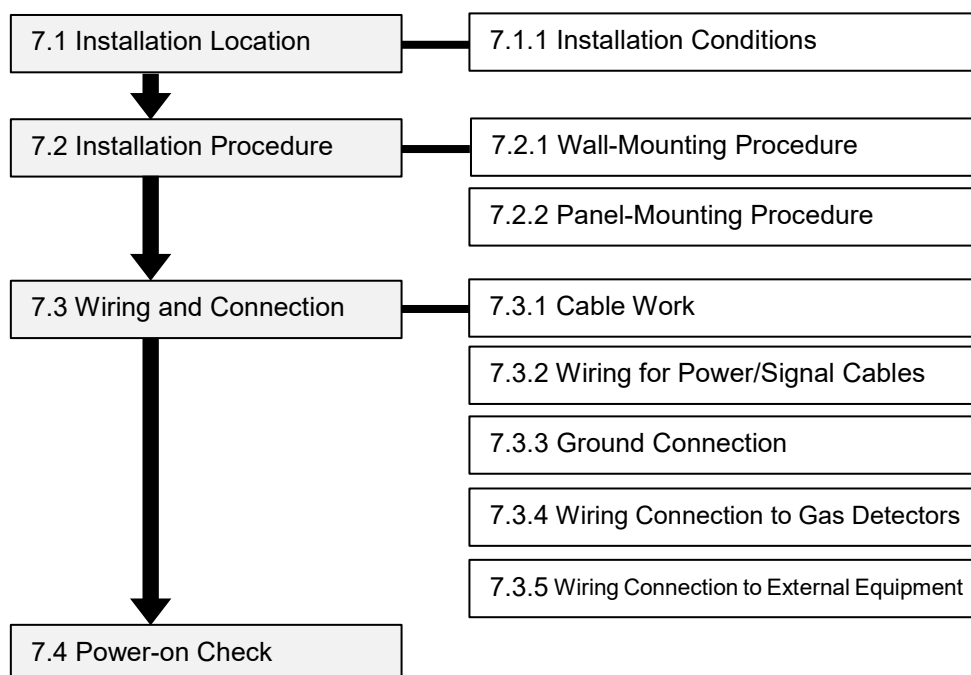
- Phillips screwdriver #3: Used for M6 screw installation

6.2 Packing Material Disposal

Packing materials (e.g., corrugated cardboard, plastic bags) used for the product and its accessories should be disposed of in accordance with the applicable laws and regulations.

7 Installation

This chapter describes the installation flow and procedures.
Refer to the product specifications for proper installation.



Installation Flow

 DANGER	
	Do not touch the battery terminals. Short-circuited terminals may become a possible source of ignition.

 WARNING	
	This product is not explosion-proof and should not be installed in hazardous areas.
	- Ground the product to prevent electric shocks. Class D grounding is mandatory. - In the event of a gas leak alarm, follow the safety procedures in accordance with your company's regulations. - The contacts use mechanical relays, which may falsely activate if exposed to excessive impacts or vibration. Install the product in a place free from any impacts and vibration. Set a delay time greater than one second for external devices connected to this product. - Avoid installing the product in the vicinity of equipment that can generate high frequencies. High frequencies may cause malfunction. - This product is heavyweight. Handle it with care not to drop it. Failure to do so may cause injury or property damage such as damaged floor.

NOTICE	
	Do not use organic solvents for cleaning the product. Organic solvents may negatively affect the product's exterior as well as internal components.

 CAUTION	
	• Install the product in a place free from corrosive gas, high temperature and/or high humidity. Failure to do so may cause product damage or malfunction. • Adding a ferrite core to the power cable is recommended, in case the product needs to be installed in a place exposed to electrical noise, such as in the vicinity of equipment that is a source of electrical noise, such as a boiler or a motor. • The power cable and the detector cable must be wired separately; they should not be bundled together. • Take care not to damage the surface of the product (e.g., scratches) during installation. • Install the product in a place where it can easily be accessed for maintenance or inspection. • This product is not drip-proof. Install it indoors and keep it away from water or rain.
	• Do not install the product in a place exposed to direct sunlight. Sudden temperature change inside the unit may impair the product's performance. • This product needs to be periodically checked and maintained. Do not install the product in a place that may pose a danger during maintenance or inspection. • Do not install the product in the following conditions: - Ambient temperatures beyond the specified operating temperature range - Condensation prone area - Exposure to sudden temperature/humidity changes - Exposure to water spray - Presence of corrosive gas - Proximity to equipment that can generate high frequencies or magnetic fields - Proximity to heat or an ignition source - Exposure to vibration - Installation on a ceiling

Ref.

For the gas detector's installation procedure, refer to its instruction manual.

7.1 Installation Location

7.1.1 Installation Conditions

Install the product in a place where, in the event of crises such as a gas leak alarm, it can be easily notified and addressed. The required space for installation is explained below.

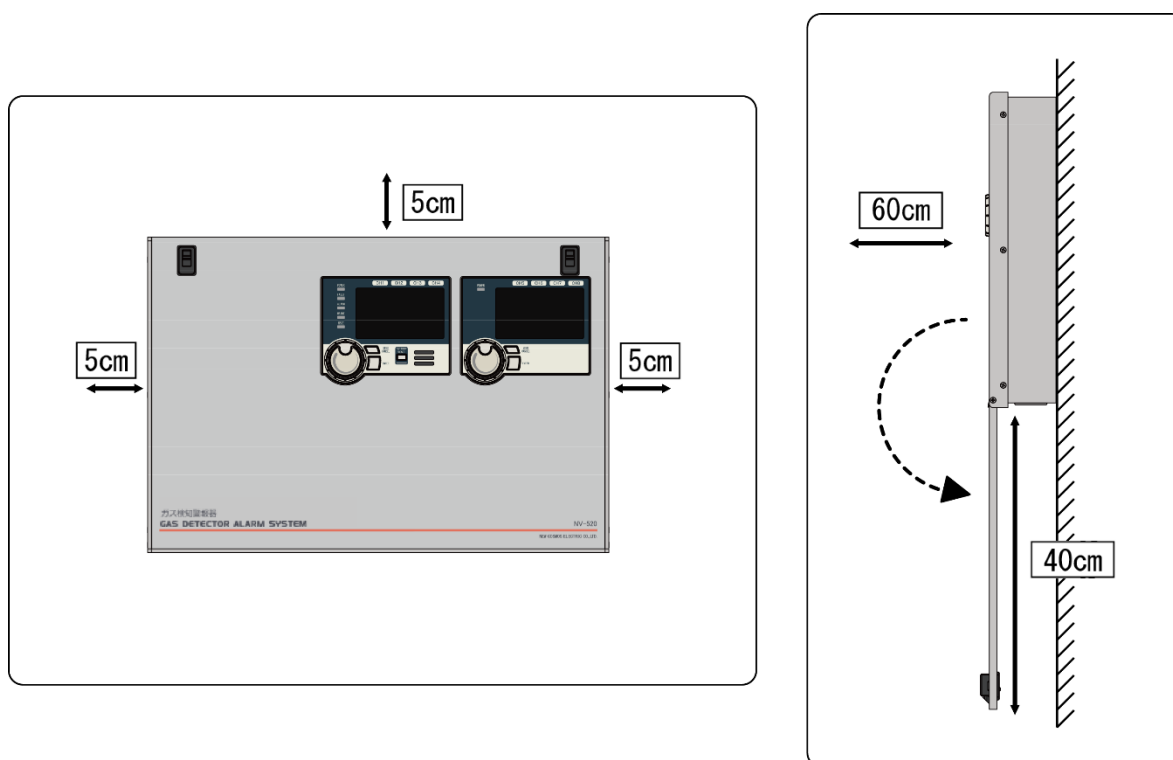
(a) Required Space for Installation

Top: Keep a distance of 5 cm or more above the product.

Sides: Keep a distance of 5 cm or more between each side of the product and any other object.

Front: Keep a distance of 60 cm or more between the front of the product and any other object. The product needs to be opened from the front during maintenance or inspection.

Bottom: Keep a distance of 40 cm or more below the product. This space is required for opening/closing the front panel.



(b) Installing the Product in a High Location

The installation of the product in a high place is not recommended; however, if you need to install it in a high place, leave space below the product for maintenance and inspection work which may require a stepladder.

Ref.

For the gas detector's installation procedure, refer to its instruction manual.

7.2 Installation Procedure

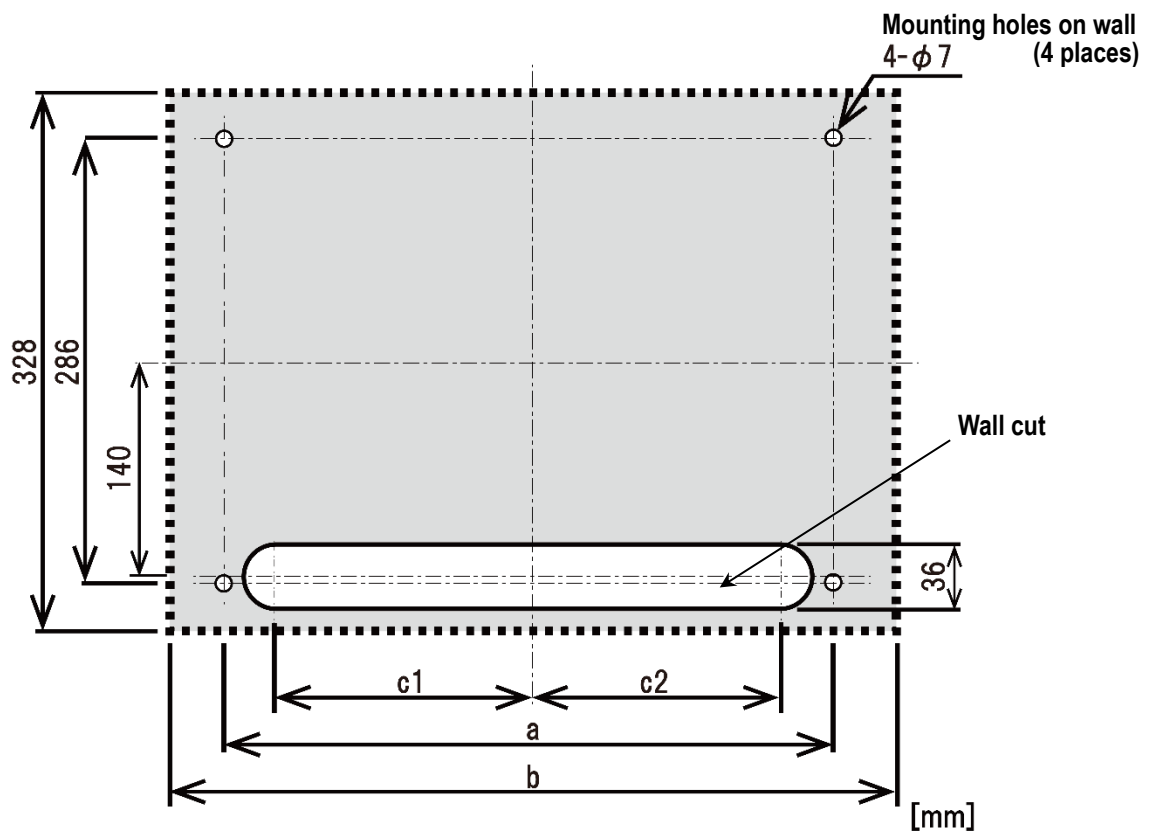
There are two installation methods: wall-mounting and panel-mounting.

⚠ WARNING	
!	Turn off the product by setting the POWER switch to OFF before starting the installation. For the backup power type, set both the POWER and backup power switches to OFF. Failure to do so may cause a device failure.

7.2.1 Wall-Mounting Procedure

This product can be installed directly onto a wall using the four screws.

- (1) Cut four mounting holes in the wall by referring to the figure and table below.

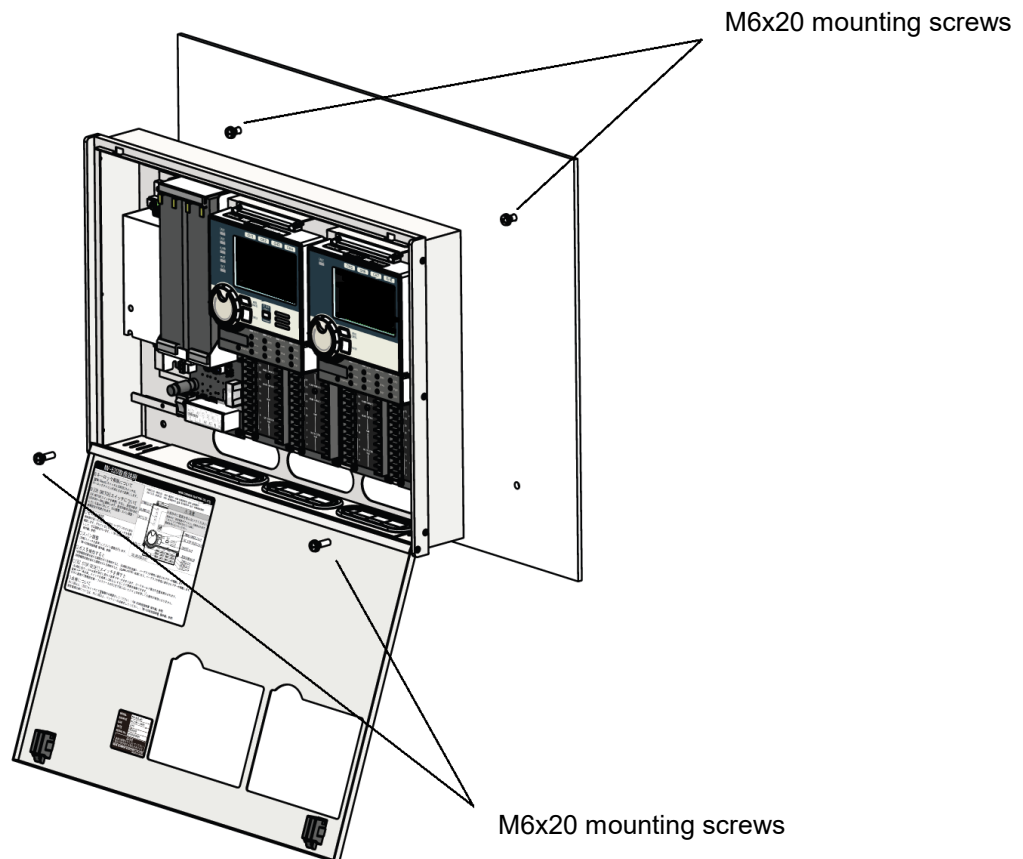


Case type	Width a (mm)	Width b (mm)	Width c1 (mm)	Width c2 (mm)
2-channel without backup power	152	212	35	35
2-channel with backup power/ 4-channel	230	290	90	90
6-channel/8-channel	417	487	119	177
10-channel/12-channel	565	635	157	251

NOTE

This product has cable openings on its rear and bottom. When using the bottom cable opening(s), it is not necessary to cut a hole in the wall for cable entry. When using the rear cable opening(s), a wall cut (c1 + c2 width) must be made. Also, cables can be hidden when using the rear cable opening(s).

- (2) Install a female threaded wall anchor or wall plug or wall plug into each of the four wall-mounting holes, and tighten two mounting screws into the two top wall anchors.
- (3) Hang the case on the two top screws (Step 2) by sliding these screws through the case's upper mounting holes. Tighten two mounting screws into the two lower anchors. Firmly tighten all four screws to fix the case to the wall.

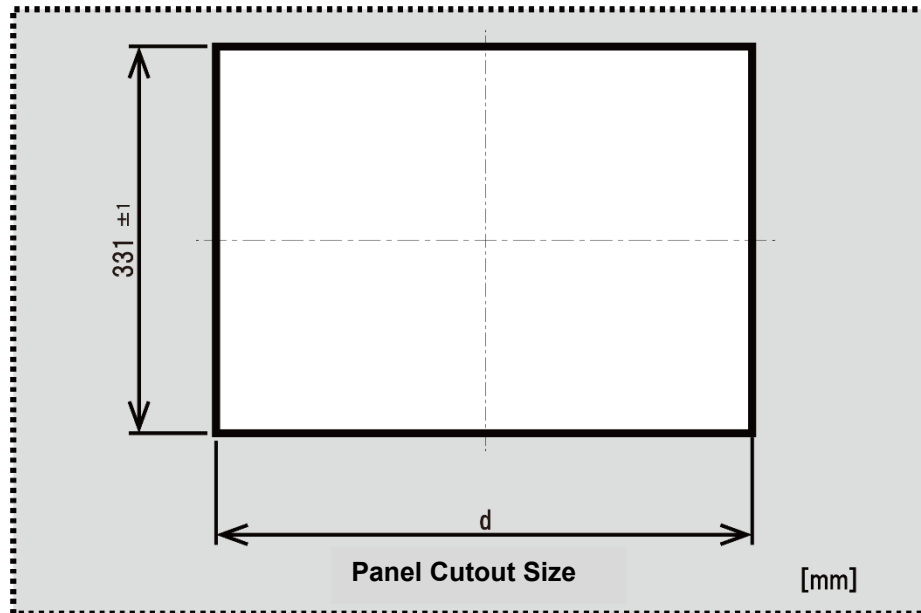
**NOTE**

To prevent the product from falling in the event of an earthquake, etc., use female threaded wall anchors or wall plugs to ensure that the product is firmly secured to the wall.

7.2.2 Panel-Mounting Procedure

This product can also be installed on a panel (1.6 to 6 mm thick).

- (1) Remove the cable grommets from the case bottom so that the case can be smoothly engaged into the panel.
- (2) Cut a square cutout in the panel by referring to the figure and table below.



Case type	Width d (mm)
2-channel without backup power	215±1
2-channel with backup power/4-channel	293±1
6-channel/8-channel	490±1
10-channel/12-channel	638±1

- (3) Insert the case through the square cutout.

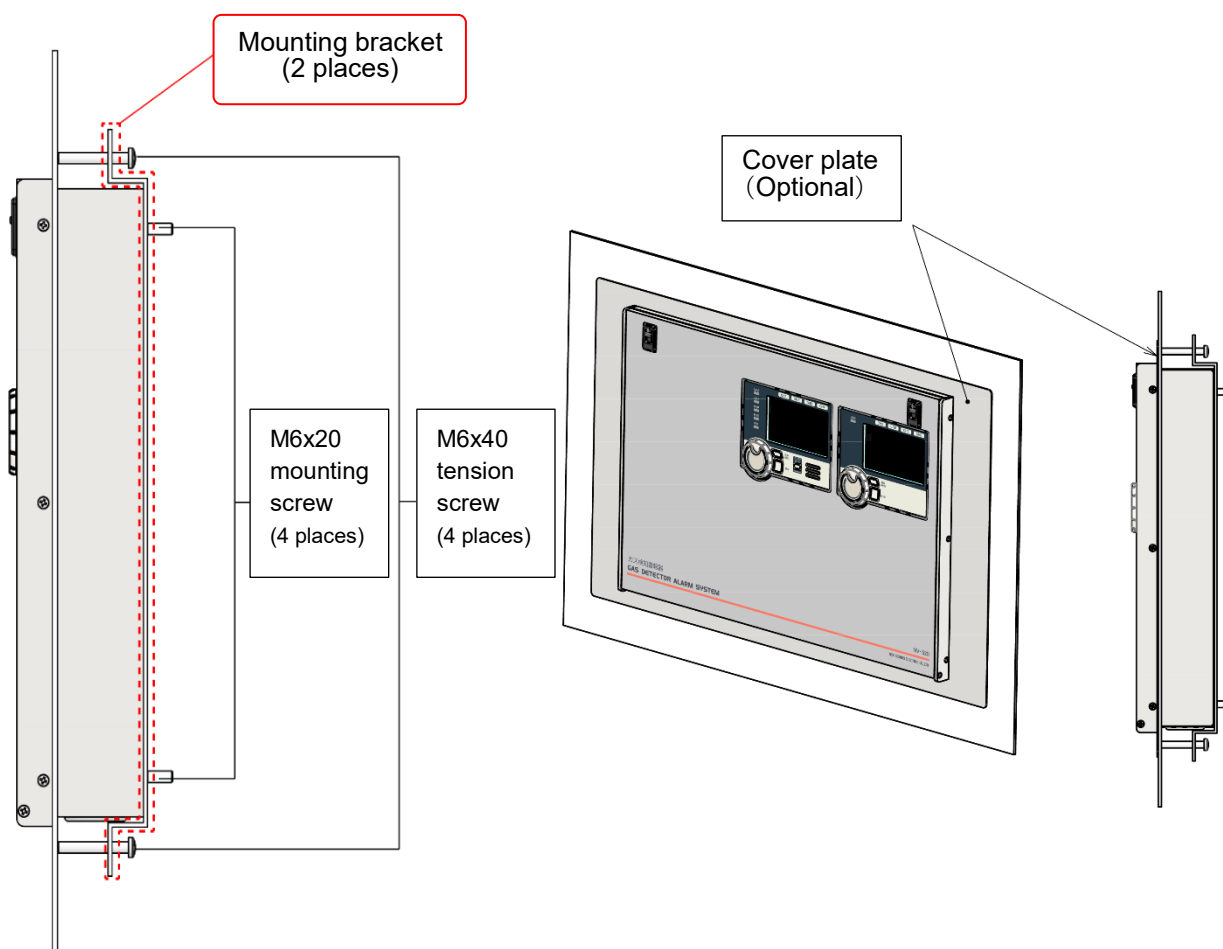
- (4) Attach the two mounting brackets to the case by tightening the four M6x20 mounting screws (provided).
- (5) Secure the mounting brackets to the panel by tightening the four M6x40 tension screws (provided).

Screw type	Recommended tightening torque
M6×20	100 cN · m
M6×40	50 cN · m

NOTE

- This product can be installed on a 1.6–6 mm thick panel.
- Refer to the table above for the proper tightening torque.

In case of replacing a NV-500 unit with a NV-520 unit, place a cover plate (sold separately) to conceal the gap around the unit.

**CAUTION**

Tighten the screws with the proper tightening torque. Excessive tightening may deform the case or damage the mounting brackets.

- (6) Install the cable grommets back into the case bottom.

7.3 Wiring and Connection

7.3.1 Cable Work

Be careful not to damage the cable surfaces. Keep them free from any damage.

 WARNING	
	- To prevent electric shocks, turn off the product by setting the POWER switch to OFF before installation/wiring/gas detector replacement. For the backup power type, set both the POWER and backup power switches to OFF. - Ground the product and gas detectors to prevent electric shocks.

 CAUTION	
	- Refer to the terminal markings on the product and the gas detector to ensure that the wires between them are correctly connected. Incorrect wiring may cause a device failure. - Keep the connection cables (power and signal cables from this product and its connected gas detectors/external equipment) away from other power cables. - While wiring, avoid excessive stress on the cables. - Gas detectors must be installed by qualified personnel or a New Cosmos-authorized technician. Please contact New Cosmos or its authorized representative for the installation of additional gas detectors. Incorrect wiring and setup may cause a device failure.

Collective Terminal Block

Terminal	ID	Cable type
1st stage gas alarm	A1	CVV cable with 0.75 mm ² to 2.00 mm ² wires
	C1	
2nd stage gas alarm	A2	
	C2	
Audio alarm	BZ	
	BC	
Collective voltage output	L	CVVS cable with 0.75 mm ² to 2.00 mm ² wires
	N	
Power (input)	R (P)	CVV cable with 0.75 mm ² to 2.00 mm ² wires
	S (N)	
	E	
External switch	AR	
	AS	
	N	

Dedicated Terminal Block

Terminal	ID	Cable type
Dedicated voltage output	L	CVVS cable with 0.75 mm ² to 2.00 mm ² wires
	N	
2nd stage gas alarm	ZC2	CVV cable with 0.75 mm ² to 2.00 mm ² wires
	ZA2	
1st stage gas alarm	ZC1	
	ZA1	
Pump	PA	Refer to the instruction manuals for gas detectors.
	PB	
Detector	A	CVV cable with 0.75 mm ² to 2.00 mm ² wires *Refer to 7.3.4 "Wiring Connection to Gas Detectors".
	B	
	C	
	D	

- Use a rubber, plastic or metal sheathed cable appropriate for the installation environment. The cable should have a circular cross-section and its outer surface should be smooth and even. For protection, the cable(s) should be sheathed in a protective casing, such as a metal conduit or a carbon steel pipe. Other protective structures such as metal or concrete ducts are also acceptable.
- It is not recommended to connect a cable with another cable; however, if you need to connect cables, direct or branching connections of cables should be done inside the flameproof enclosure.
- When using a flameproof cable gland with a gasket, use a cable whose outer diameter matches the inner diameter of the gasket by referring to the table below or gas detector's instruction manual. Fully tighten the cable gland to prevent the formation of a flame path for explosive gas or fire.

KD-5A (B)-N Detector

Cable outer dia.(mm)	Gasket inner dia. (mm)	Washer inner dia. (mm)
Φ10-Φ10.9	Φ11	Φ12
Φ11-Φ11.9	Φ12	Φ12
Φ12-Φ12.9	Φ13	Φ14

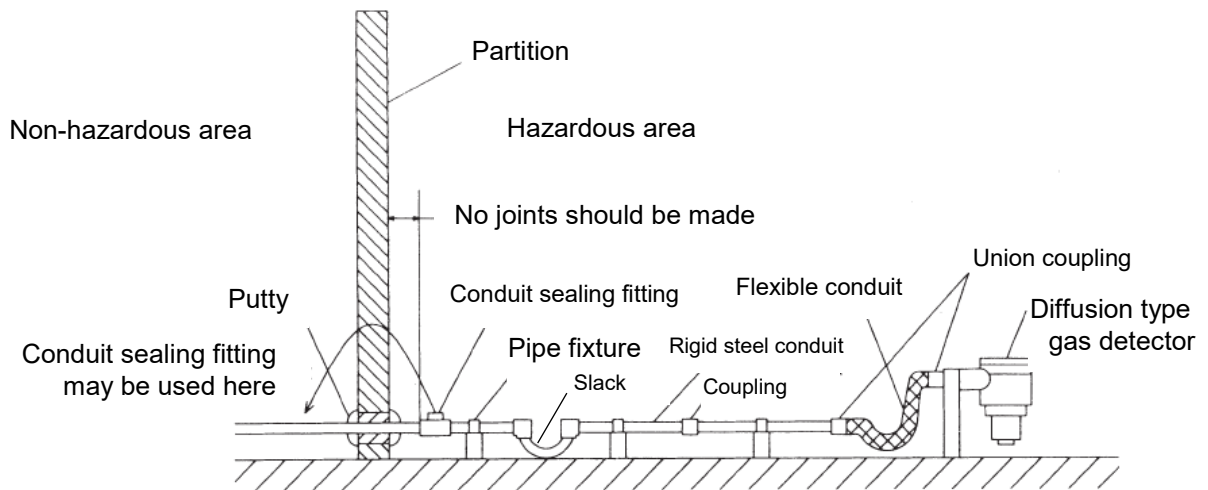
Explosion-proof (flameproof enclosure) wiring using metal conduits

Explosion-proof (flameproof enclosure) wiring is required for installation of the connected gas detectors in hazardous areas.

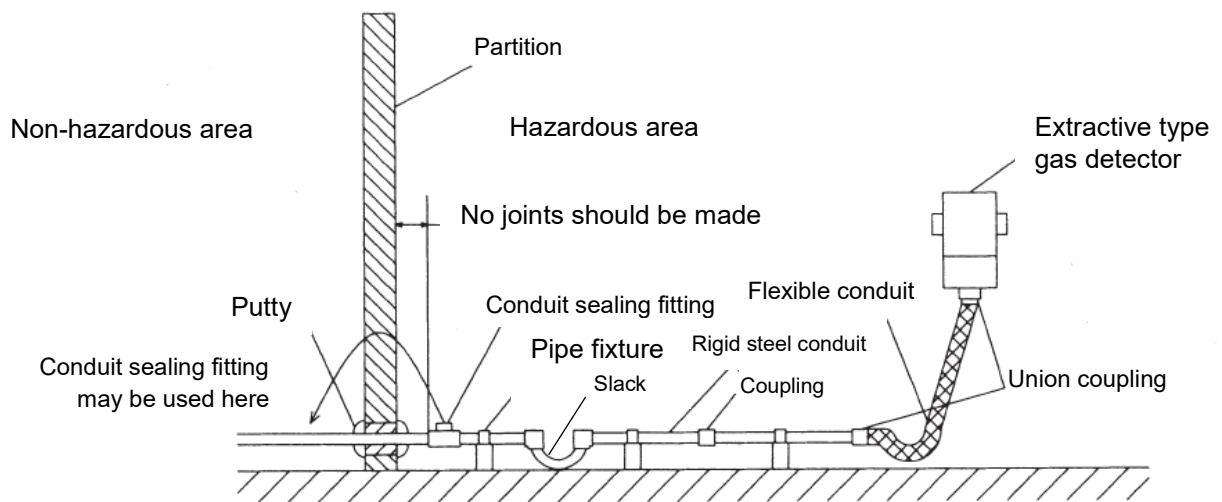
 DANGER	
	This product is not explosion-proof and should not be installed in hazardous areas.
 WARNING	
	Prior to wiring or opening any part of the gas detector, set the POWER switch of this product to OFF to eliminate a possible source of ignition. For the backup power type, set both the POWER and backup power switches to OFF.
 CAUTION	
	- Wiring and installation of explosion-proof gas detectors (flameproof enclosure) should only be performed by a qualified electrician with sufficient knowledge of explosion-proof wiring/installation procedures, in accordance with the applicable standards/guidelines. - Select the appropriate rubber, vinyl or polyethylene insulated cable by considering the ambient humidity and temperature, and the presence of corrosive substances. - Sheath all cables in rigid steel conduits (JIS C 8305). To prevent the formation of a flame path for explosive gas or fire inside the conduits, use conduit sealing fittings and fill the joints with putty (refer to the figures on next page). - When flexibility is required, use explosion and water proof flexible conduits. The entry of rain or other liquids inside the gas detector may cause function loss or malfunction of the detector. - Waterproof the joints between conduits, fittings and joint boxes. The entry of rain or other liquids inside the gas detector may cause function loss or malfunction of the detector.

NOTE

- Natural disasters such as an earthquake could result in a secondary disaster such as a broken cable. To prevent this, the cable may have slack (tension relief spot) when installed.
- Use parallel pipe threads (JIS B 0202) for connections between conduits, fittings and joint boxes. The New Cosmos product comes with PF3/4 (G3/4) female threads. Engage at least five threads per connection and then, firmly tighten with a lock nut.



Typical Connection for Diffusion Type Gas Detector



Typical Connection for Extractive Type Gas Detector

7.3.2 Wiring for Power/Signal Cables

- If needed, use a dedicated breaker for the power cable going to the product.
- Ensure that the power voltage supplied to the product is within the specifications.
- Ensure that the load resistance of the signal cable (voltage output), including the resistance of the wire, is 1.2k– 50k ohm.

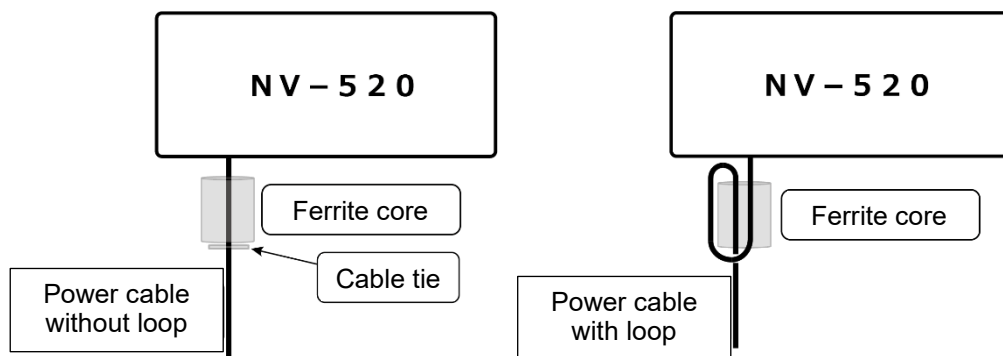
NOTE

Use ring wire connectors to connect the wires to the terminals inside the product to prevent unintended disconnection of the wires from the terminal block in the event of an earthquake. In addition, the wires should have sufficient length to allow them to fully travel without tension on the terminals.

How to install a ferrite core to the power cable

Install a ferrite core to the power cable as shown in the figure below.

 CAUTION	
	• When installing a ferrite core to the power cable, ensure that the cable does not get caught in the core. • When installing a ferrite core to the power cable, it is recommended to loop the cable around the ferrite core. However, if it is difficult, install it without a loop. • When installing a ferrite core without a loop, add a cable tie to tighten the ferrite core to the power cable, if it is loose. • Install a ferrite core as close to the NV-520 unit as possible.



Ferrite Core Installation

7.3.3 Ground Connection

⚠ CAUTION

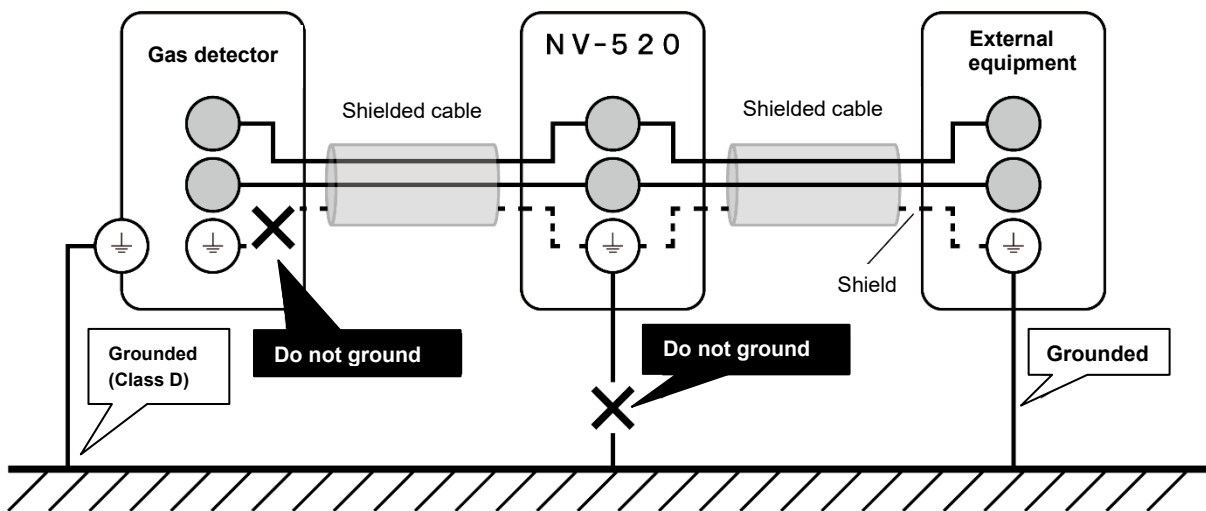


Wiring and installation should only be performed by a qualified electrician with sufficient knowledge of wiring/installation procedures, in accordance with the applicable standards/guidelines.

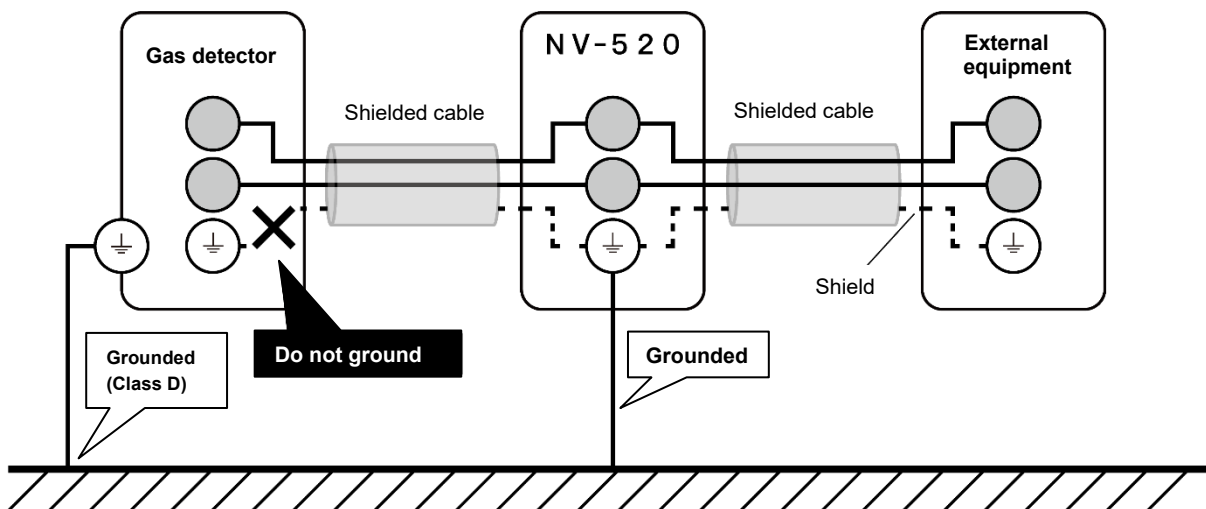
NOTE

Single-point grounding (grounding at a single point) is mandatory. When the external equipment or NV-520 unit is grounded, do not connect the shield cable to the terminal inside the gas detector ($\perp$). Doing so would create a 2-point grounding.

(a) Typical wiring connection when the external equipment is grounded



(b) Typical wiring connection when the NV-520 unit is grounded



7.3.4 Wiring Connection to Gas Detectors

For wiring between this product and a gas detector, use a cable with 0.75mm² to 2mm² wires such as a 600V vinyl insulated cable (1V), VCT cable, or CVV cable. The cable length should be as specified in the table below.

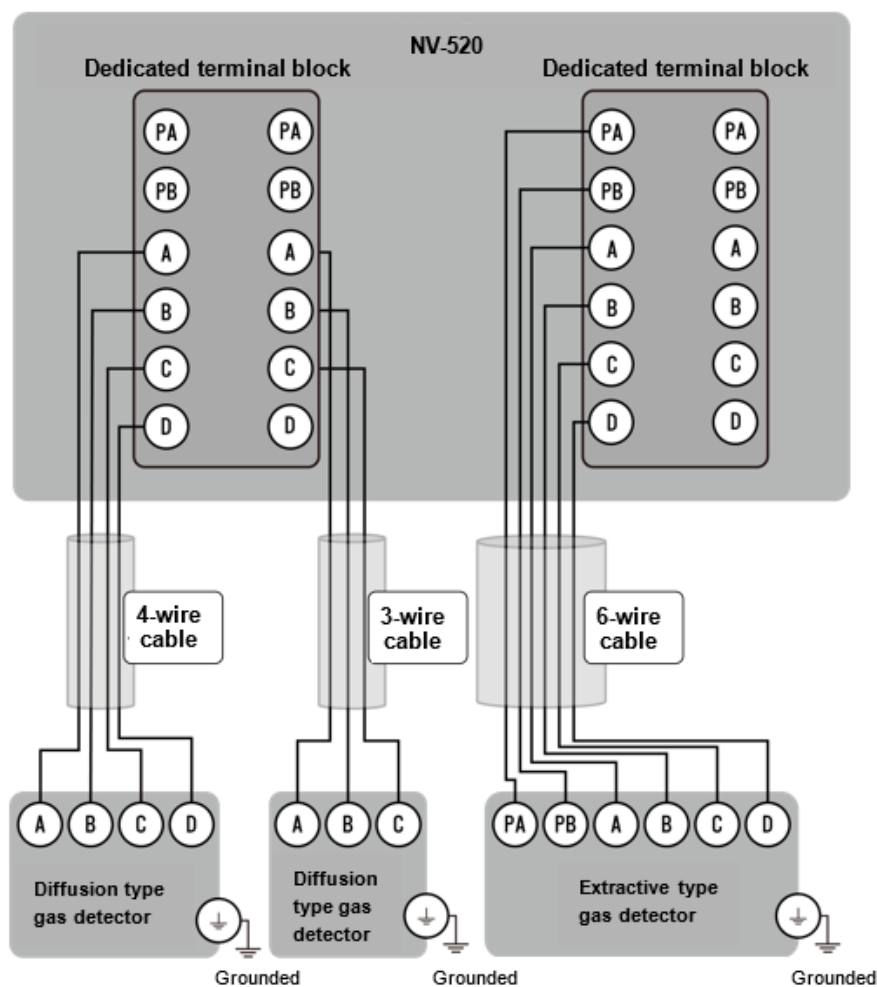
Wire cross-section	Cable length
0.75 mm ²	Max. 200 m
1.25 mm ²	Max. 600 m
2.00 mm ²	Max. 1 km



CAUTION

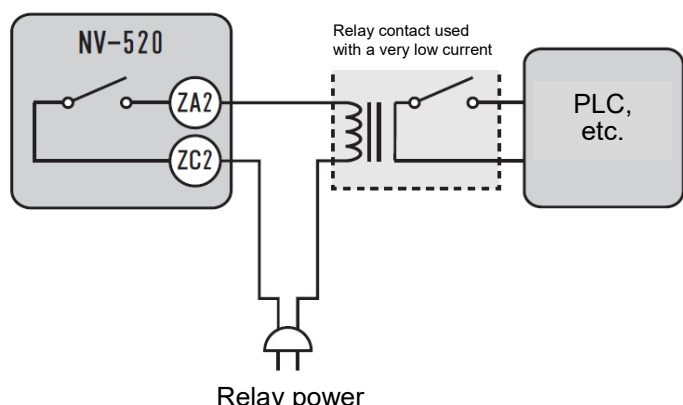


- Refer to the terminal markings on the product and the gas detector to ensure that the wires between them are correctly connected. Incorrect wiring may cause a device failure.
- Keep the connection cables (power and signal cables from this product and its connected gas detectors/external equipment) away from other power cables.



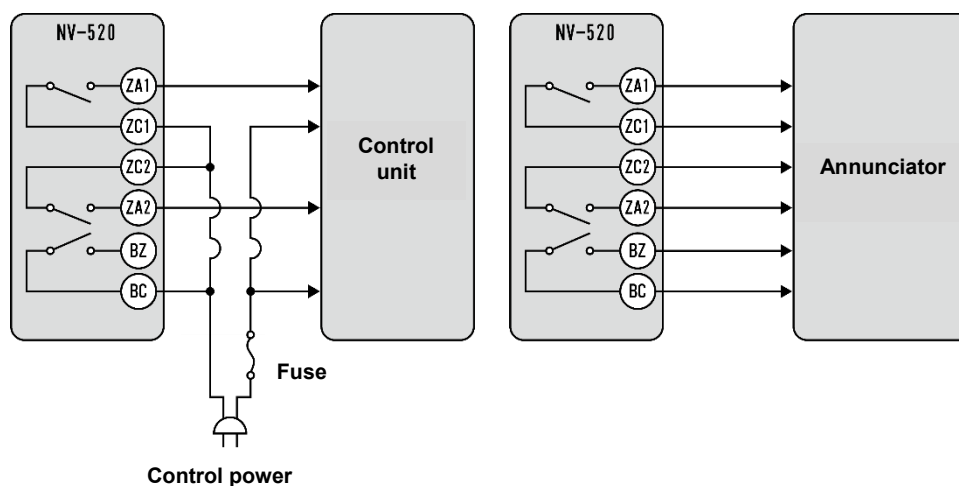
7.3.5 Wiring Connection to External Equipment

⚠ CAUTION	
	New Cosmos assumes no responsibility or liability for any injury or damage resulting from the use of this unit's output signals to control external devices such as interlocks.

⚠ CAUTION	
	- This product's external alarm contacts should be used for controlling an external gas alarm/indicator (e.g., alarm horn, signal tower). - The load current/voltage should not exceed the contact's rating. - If a relay contact is used with a very low current load (e.g., used as a digital input to a PLC), it may result in insufficient contact of this relay contact. To avoid insufficient contact, ensure that the load current going to the relay contact is 100 mA* or higher. Perform operation test before use. Typical configuration when the relay contact (normally open) is used with a very low current load  * 100 mA is only an estimate and not guaranteed.

(a) Wiring connection to external control unit/annunciator

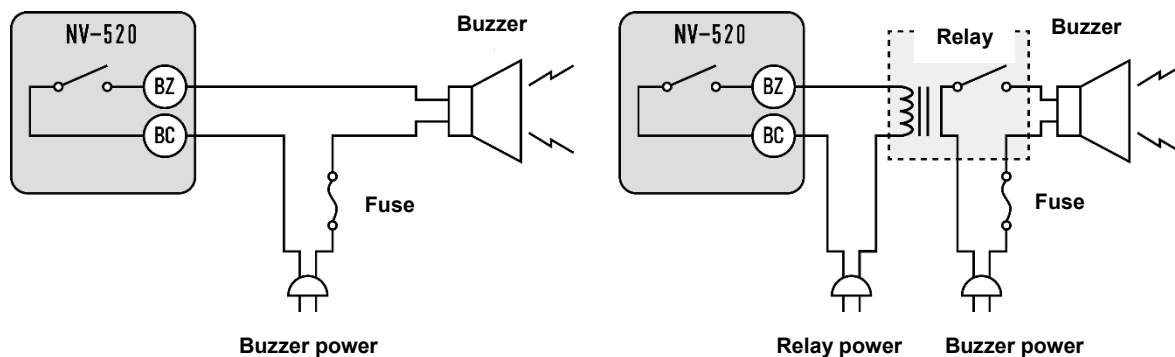
This product has dry contacts (normally open or normally closed) for the 1st stage gas alarm, 2nd stage gas alarm and fault alarm. Each contact will activate when its own threshold is exceeded.



Typical Wiring Connection to External Control Unit or Annunciator (Normally Open)

(b) Wiring connection to external buzzer (e.g., alarm horn, siren)

This product has a dry contact (normally open) for an external buzzer. The contact will activate when its own threshold is exceeded. For an electromagnetic buzzer, the buzzer rating should not exceed half of the contact's rating. Add a fuse to the buzzer's electronic circuit.



Wiring Connection to Low Capacity Buzzer

Wiring Connection to High Capacity Buzzer

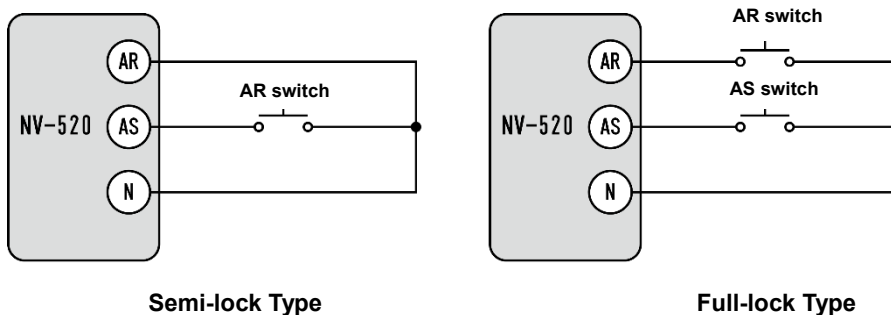
Typical Wiring Connection to External Buzzer**(c) Wiring connection to external reset switch**

This product is equipped with external switch terminals for "AR" (alarm reset) and "AS" (alarm silent). Closing the AS and N terminals and the AR and N terminals will reset an alarm.

For the semi-lock type, which mutes and resets an alarm simultaneously, connect the AS terminal to the AR switch on the external instrumentation panel or the operator console. The alarm can now be reset using the external switch on the external instrumentation panel or the operator console.

For the full-lock type, which mutes and resets an alarm separately, connect the AS terminal to the AS switch and the AR terminal to the AR switch on the external instrumentation panel or the operator console. The alarm can now be muted and reset using the external switches on the external instrumentation panel or the operator console.

 CAUTION	
	For the alarm reset switch, use a dedicated circuit which is independent from other circuits.



Semi-lock Type

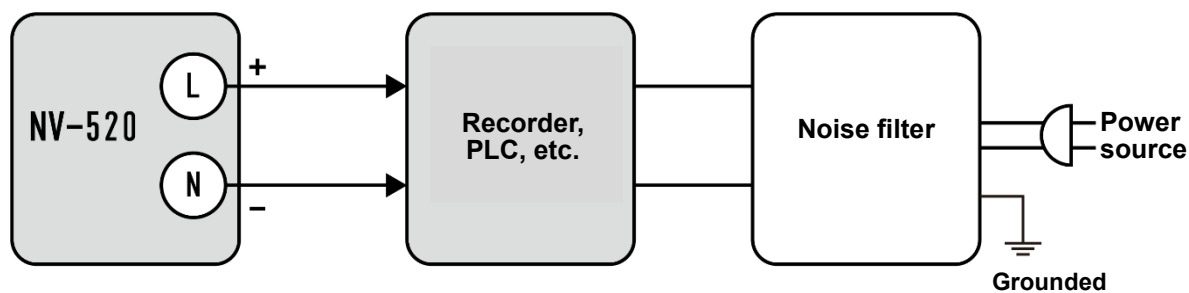
Full-lock Type

Typical Wiring Connection to Alarm Reset Switch

(d) Wiring connection for voltage output

The voltage (0/6/12 V) will be output from the terminals “L” and “N”, depending on the alarm status (0V: fault alarm, 6V: no gas alarm, 12V: gas alarm). These terminals can be connected to a recorder, PLC, etc.

 CAUTION	
	- When wiring this product to a PLC, separate the PLC's power from this product's. Add a noise filter near the PLC power. - Ensure that the load resistance of external equipment is 1.2k– 50k ohm.



Typical Wiring Connection to Recorder, PLC, etc.

7.4 Power-on Check

Upon the completion of the installation, check that the product starts up normally.

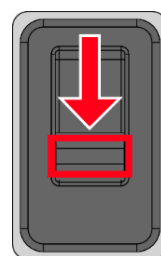
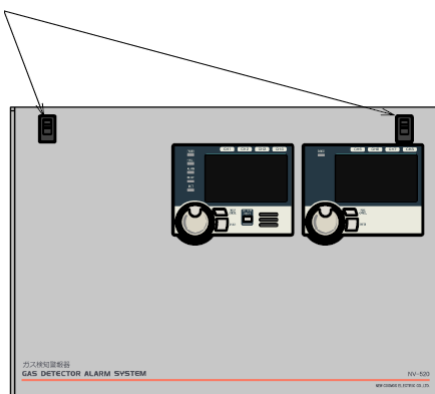
 CAUTION	
	Do not connect the product's external alarm contacts to a load exceeding their capacity.
	- Turn on the product while no gas is present around the connected gas detectors. - Check that all wiring is correct before turning on the external devices (e.g., signal towers, alarm horns, etc.) connected to this product. - Check that all wiring is correct before turning on the product. Ensure that the terminal markings on the product and gas detectors match. - If the sensor is unstable, the external relay contacts may be activated upon the completion of a warm-up cycle. Release the interlocks of external devices, as needed, to prevent their possible activation. - A gas alarm is inactive and a fault alarm is active, when in the warm-up cycle. - If a broken sensor wire is restored during the warm-up cycle, the warm-up cycle may be completed before the sensor becomes stable. Release the interlocks of external devices, as needed, to prevent their possible activation. - If the sensor output is unstable during the warm-up cycle, the product operation may also become unstable. To prevent possible activation of gas alarm/contact, set the product to maintenance mode 2, as needed. Refer to 8 "Maintenance Mode" of the NV-520 instruction manual for operation for information on the maintenance mode.

Check Procedure

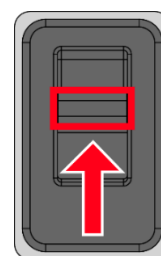
 CAUTION	
	- Hold the front panel with your hand while opening/closing it. Flinging the front panel open may cause injury or product damage. Flinging the front panel close may cause unintended activation of the alarm contacts. - Ensure that the latches are in the lock position after closing the front panel. If the latches are not in the lock position, the front panel will loosen or open over time by vibration, etc., which may cause injury or product damage such as a broken LCD.

(1) Pull the two latches down to the unlock position. Pull the front panel open.

Latch (2 places)



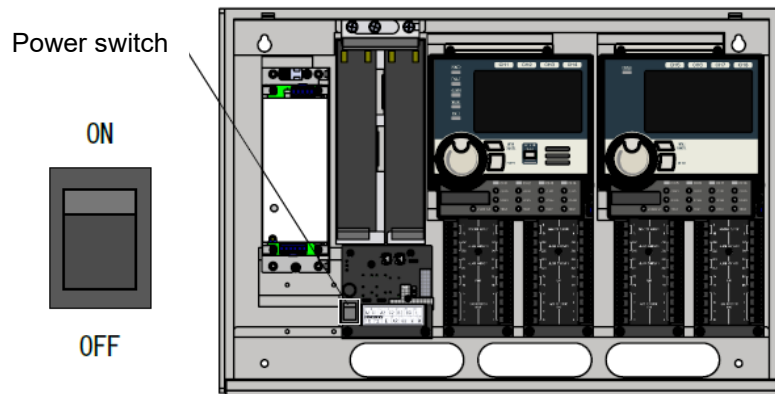
Unlock



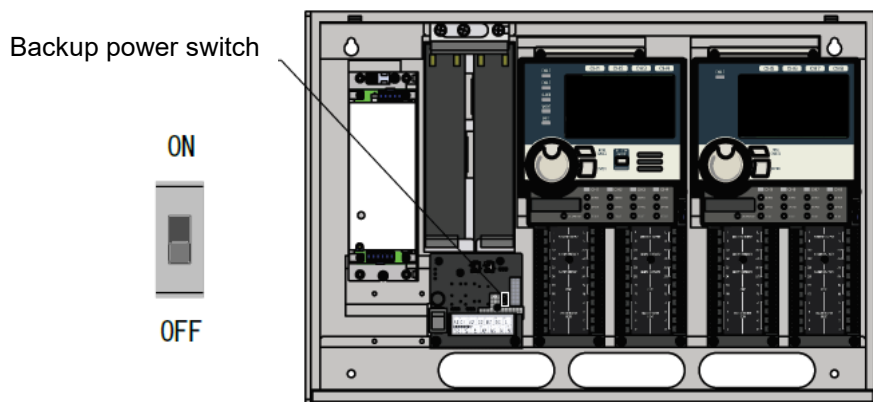
Lock

Latch

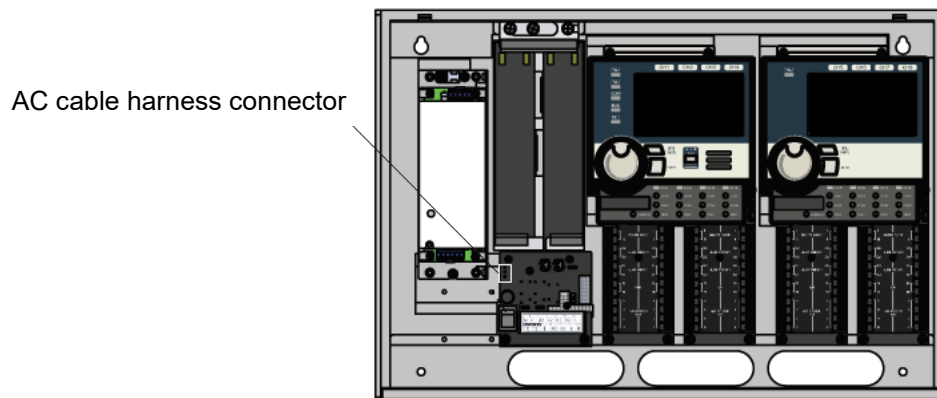
- (2) Ensure that the power switch is in the off position.



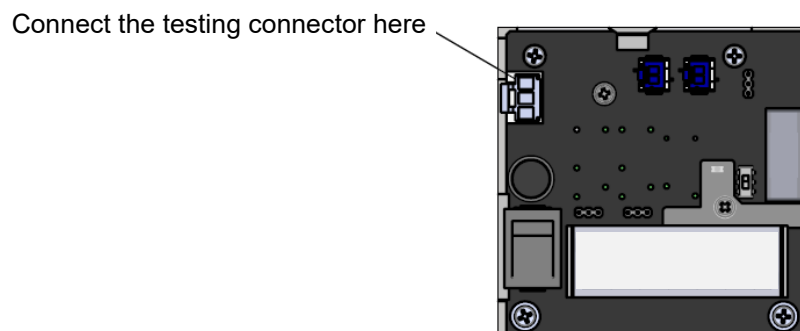
- (3) (Backup power type only) Check that the backup power switch is in the off position.



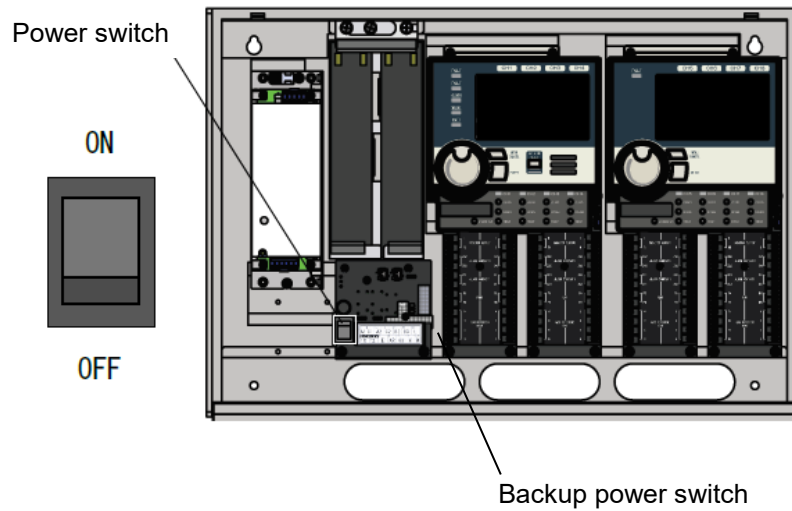
- (4) Disconnect the connector from the AC cable harness connector.



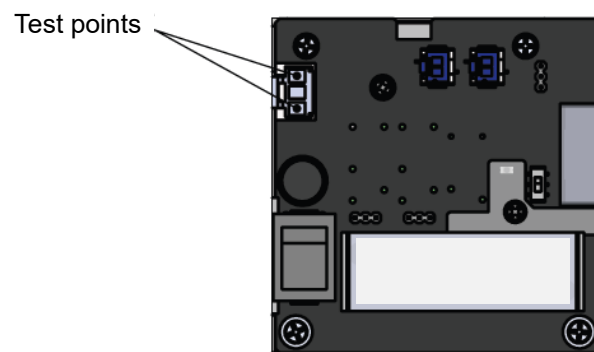
- (5) Connect the testing connector (provided test jig) to the AC cable harness connector to prevent short circuits.



- (6) Set the power switch to the on position to turn on the unit.



- (7) Measure the voltage between the test points with a digital multimeter. Check that the measured value is in the specified range (100 to 240 VAC $\pm$ 10% or 24 VDC $\pm$ 10%).



- (8) Set the power switch to the off position, and disconnect the testing connector.
- (9) Connect the connector removed in Step (4) back to the AC cable harness connector.
- (10) Set the power switch to the on position again.
- (11) (Backup power type only) Set the backup power switch to the on position.
- (12) Check that the NV-520 unit normally turns on.

8 Glossary

Term	Definition
Backup power type and non-backup power type	There are NV-520 units with and without attached backup batteries. They are called “backup power type” and “non-backup power type,” respectively.
Gas detector	Device used to detect the presence of a target gas and provide its concentration information in the form of an electrical signal.
Diffusion type	Gas sampling method using convective diffusion while placing a gas detector at a detection point.
Extractive type	Gas sampling method using a pump.
Hazardous area	An area in which an explosive atmosphere is present, or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of electrical apparatus.
Non-hazardous area	An area in which an explosive atmosphere is not expected to be present in quantities such as to require special precautions for the construction, installation and use of electrical apparatus.

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Revision History

Document No.	Date	Revision
GAE-174-00	July 2023	00 (Initial issue)

Additional copies of this instruction manual may be purchased. Contact New Cosmos or its authorized representative for ordering.

Authorized representative:**Manufacturer:**

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