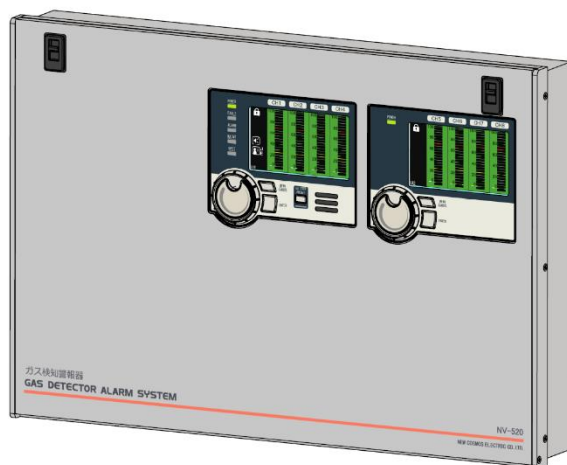




# Multi-Channel Gas Alarm System NV-520 Instruction Manual for Operation



Keep this manual for easy reference.

Prior to use, carefully read this manual as well as the NV-520 instruction manual for installation (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 If your unit has end-user-specific options, this manual will be superseded by your delivery specifications.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-175-00  
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, 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 (this document), 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 installation (No. GAE-174-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 this document.

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.

|  |
|--|
|  <b>DANGER</b>  |
| Indicates an imminently hazardous situation that can result in death or serious injury.  |
|  <b>WARNING</b>   |
| Indicates a potentially hazardous situation that may result in death or serious injury.  |
|  <b>CAUTION</b>   |
| Indicates a hazardous situation that may result in minor injury or property damage.  |
| <b>NOTICE</b>  |
| 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.

|             |  |
|-------------|--|
| <b>NOTE</b> | Provides supplemental or useful information on product handling. |
| <b>Ref.</b> | References for common procedure and/or related information.      |

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

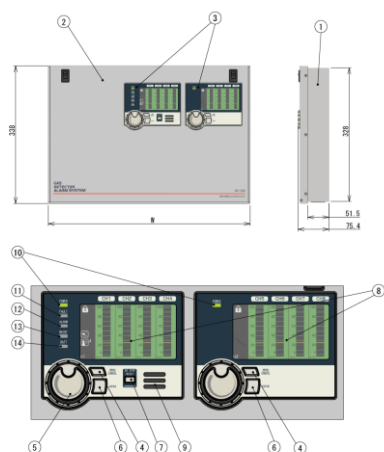
# Quick Index

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

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

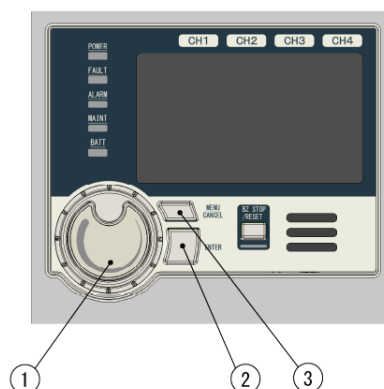
## Unit Dimensions and Components

Pages 7 to 13



## Operation

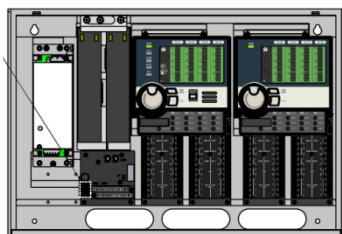
Pages 29 to 49



## Power-on/off

Pages 16 and 18

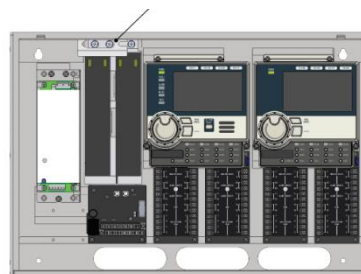
Power switch



## Maintenance

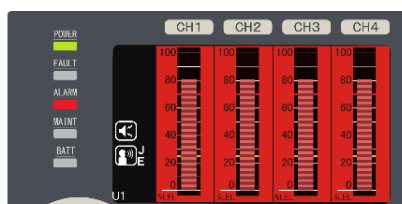
Pages 50 to 53

Battery case cover



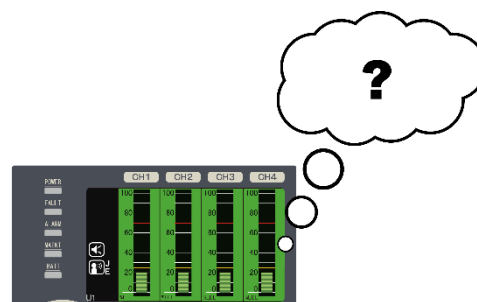
## Alarm Operation

Pages 19 to 22



## Error Messages and Troubleshooting

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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.

|  <b>DANGER</b> |  |
|---|--|
|                | <ul style="list-style-type: none"> <li>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.</li> </ul> |
|                | <ul style="list-style-type: none"> <li>This product is not explosion-proof and should not be installed in hazardous areas.</li> </ul>  |

|  <b>WARNING</b> |   |
|--|---|
|                 | <ul style="list-style-type: none"> <li>Ground the product to prevent electric shocks.</li> <li>In the event of a gas leak alarm, follow safety procedures in accordance with your company's regulations.</li> <li>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.</li> </ul> |

|  <b>CAUTION</b> |  |
|--|--|
|                 | <ul style="list-style-type: none"> <li><b>Use this product in accordance with the applicable laws and regulations.</b></li> <li><b>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.</b></li> <li>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.</li> <li>This product is not drip-proof and should be kept away from water or rain.</li> </ul> |
|                 | <ul style="list-style-type: none"> <li>Do not use radio wave-emitting devices (e.g., cell phones, wireless devices) within 30 cm of the product.</li> <li>Do not disassemble, modify, or alter the structure of the product or its electrical circuits. Doing so may compromise product's performance.</li> </ul>  |

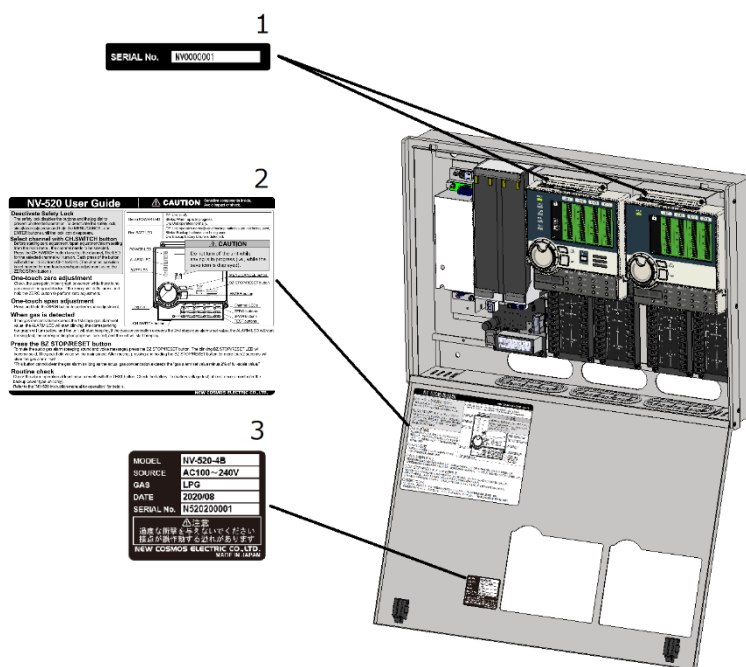
| <b>NOTICE</b>   |   |
|---|---|
|  | <ul style="list-style-type: none"> <li>Do not use organic solvents for cleaning the product. Organic solvents may negatively affect the product's exterior as well as internal components.</li> </ul> |



### 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.

| <div style="text-align: center;">  <b>WARNING</b> </div> |  |
|---|--|
|    | 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    | <b>Serial number label</b><br>Indicates the serial number of this product.  |
| 2    | <b>User guide label</b><br>Describes switch/button operation.   |
| 3    | <b>Power rating label</b><br>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" 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        | <p>Manages product operation.</p> <p>Fully understands the product operation method, the gas alarm facility, and the gas/fault alarm clearance method.</p> <p>Should carefully read this manual and familiarize themselves with the system characteristics and relevant work activities.</p> |
| Operator          | <p>Operates the product.</p> <p>Understands the product operation method, how to address gas/fault alarms, and daily work activities for the product under the supervisor's instruction.</p>   |
| Service personnel | <p>Carries out installation, failure cause investigation, maintenance and repair work for the product.</p> <p>Requires special knowledge and skills.</p> <p>Acts as New Cosmos authorized technician in principle.</p>   |






## 1.7 Batteries (for Backup Power Type Only)

This product uses two lead storage batteries.

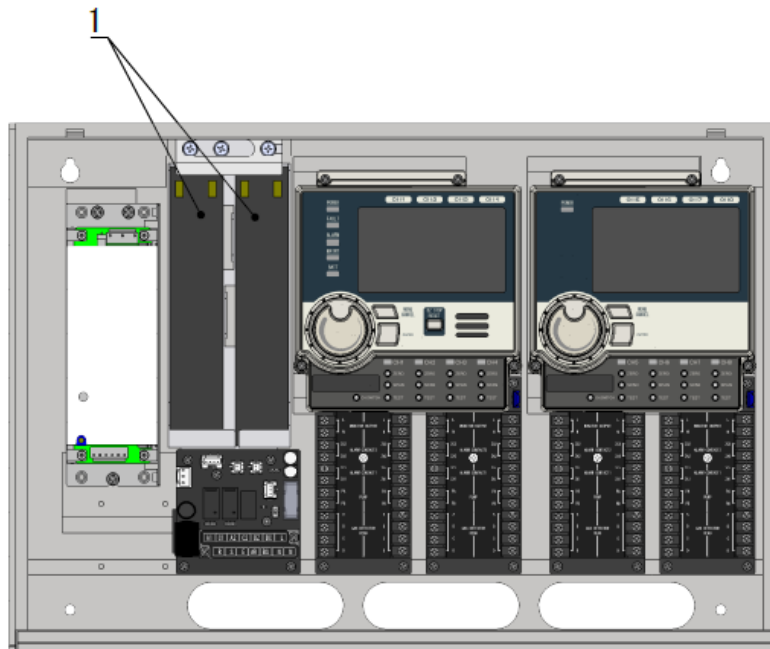
The batteries need to be replaced periodically.

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

Follow the precautions listed below for proper operation.

|  <b>WARNING</b> |   |
|--|---|
|                 | <p>Batteries may short-circuit, resulting in electric shock or burns.</p> <p>Follow the precautions listed below:</p> <ul style="list-style-type: none"> <li>• Avoid thermal, electrical and mechanical impact on the batteries.</li> <li>• 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.</li> <li>• 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.</li> <li>• Do not place tools or other metal objects on the batteries.</li> </ul> |
|  <b>CAUTION</b> |   |
|                | <ul style="list-style-type: none"> <li>• Do not mix new and old batteries.</li> <li>• Do not use other than specified batteries. The use of unspecified batteries may cause device failure.</li> </ul>  |
|               | <ul style="list-style-type: none"> <li>• Dispose of used batteries in accordance with the applicable laws and regulations.</li> <li>• 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.</li> <li>• 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.</li> <li>• Battery replacement must be performed by qualified personnel. Please contact New Cosmos or its authorized representative for replacement.</li> </ul>       |

### 1.7.1 Battery Location



| Item | Description                  |
|------|------------------------------|
| 1    | Lead storage battery x 2 pcs |

### 1.7.2 Battery Life




**Ref.** Refer to 12.1.3 “Battery Life” for full information.

### 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.



|  <b>WARNING</b> |  |
|--|--|
|                 | 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* <sup>1</sup>    | 1               | Mounting screw (M6 $\times$ 20) x 4 pcs   |         |
| Panel-mounting kit* <sup>2</sup>   | 1               | Mounting bracket  | x 2 pcs |
|                                    |                 | Mounting screw (M6 x 20)<br>Used to attach the brackets to NV-520 unit  | x 4 pcs |
|                                    |                 | Tension screws (M6 x 40)<br>Used to attach the NV-520 unit to the panel   | x 4 pcs |
|                                    |                 |   |         |
| Hex wrench set                     | 1* <sup>5</sup> | Used to install a gas detector  |         |
| Testing connector (test jig)       | 1               | Used to check the voltage of the input power  |         |
| Location label sheet* <sup>3</sup> | 1               | A set of labels indicating the installation locations of the gas detectors (location is printed on each label)<br>Usage: Affix the labels to fill the table label |         |
| Gas name label sheet* <sup>4</sup> | 1               | A set of labels with a gas name printed on each label<br>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<br>Usage: Affix it onto the product's front panel, etc.  |         |
| NV-520 instruction manual set      | 1* <sup>5</sup> | Instruction manual for installation (GAE-174-xx) x 1 pc<br>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.

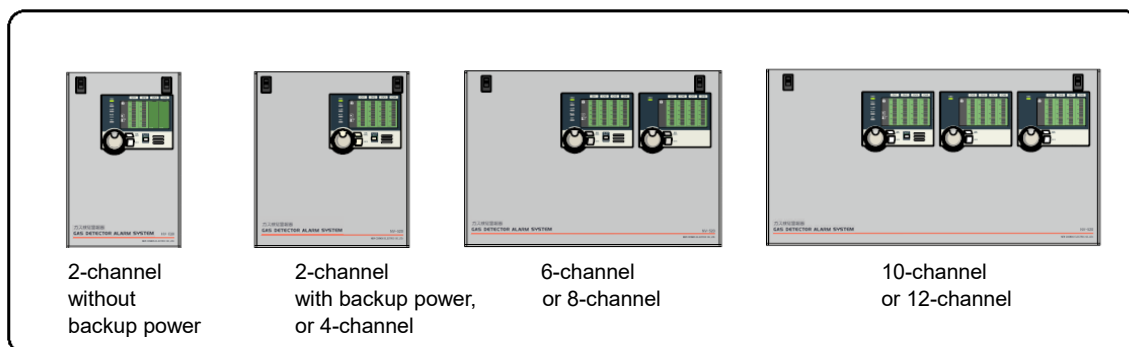
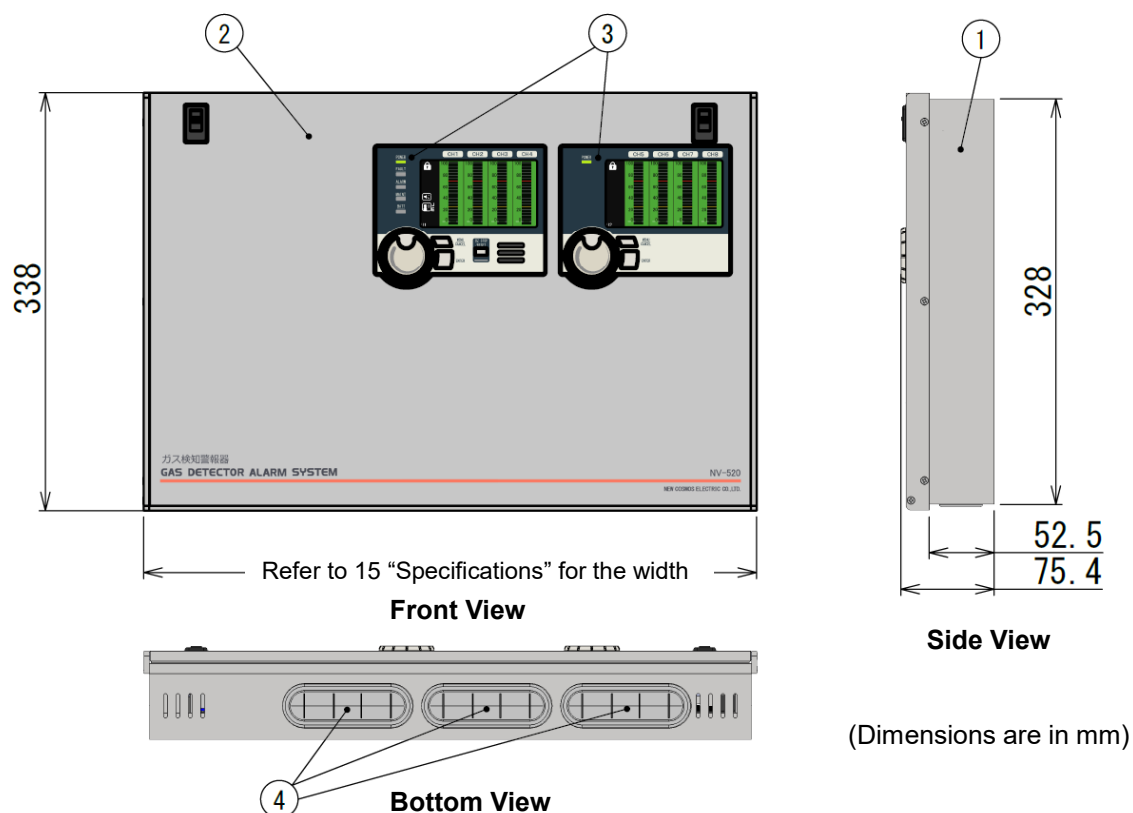
\*3. If the exact location name is not found, please manually enter the name of the location in a blank label, and use it.

\*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

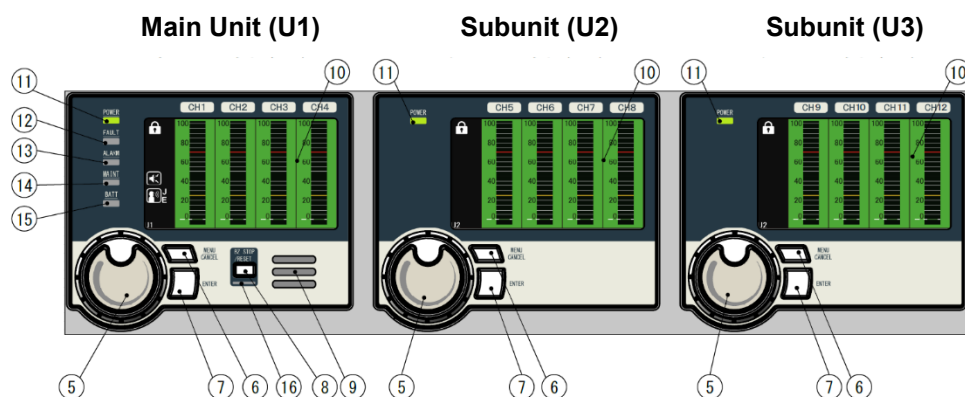


| Item | Component                | Description  |
|------|--------------------------|--|
| 1    | Case                     | —  |
| 2    | Front panel              | —  |
| 3    | Main unit and subunit(s) | Show the gas concentrations and alarm statuses. System can be operated using the buttons and 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.

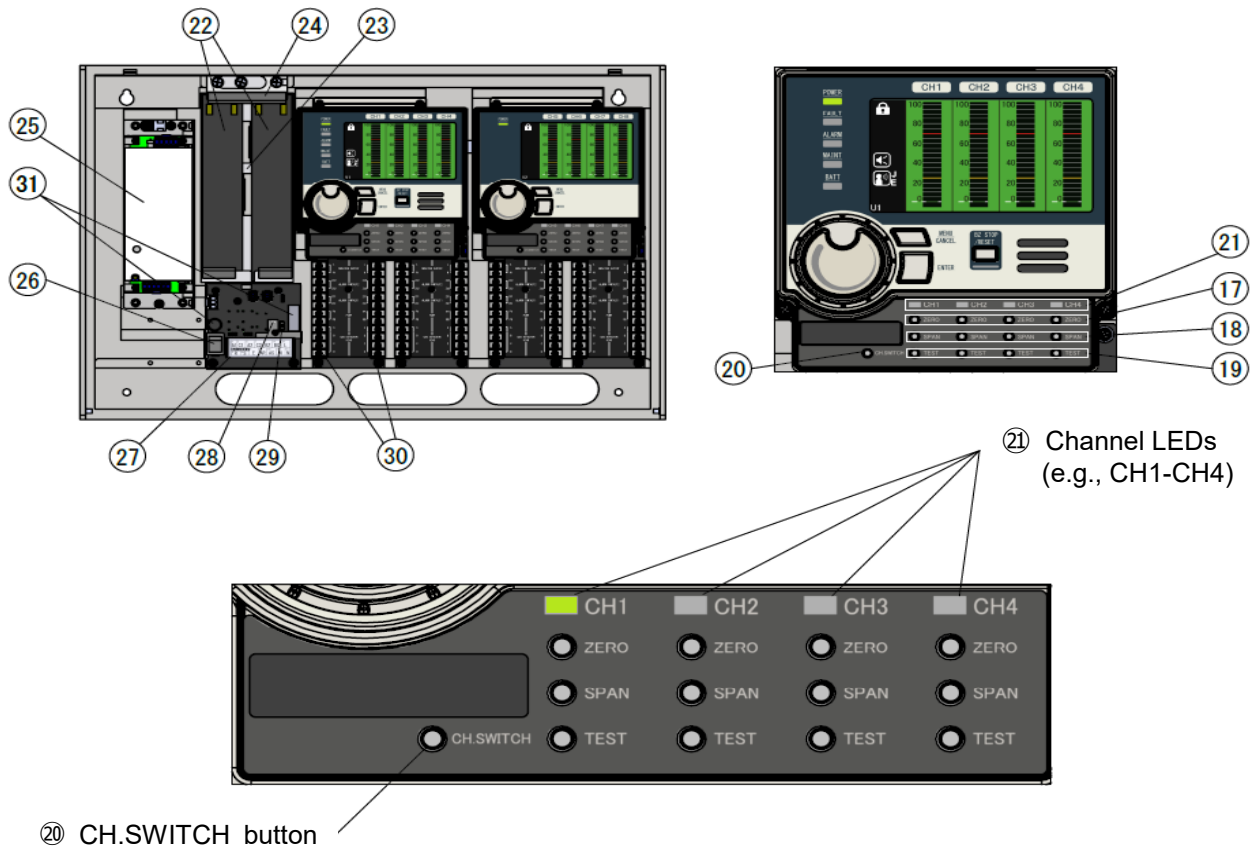
| Unit Type      | Specifications        | Model    |
|----------------|-----------------------|----------|
| Main Unit (U1) | Backup power type     | NVM52-1A |
| Main Unit (U1) | Non-backup power type | NVM52-1C |
| Subunit (U2)   | —                     | NVM52-2A |
| Subunit (U3)   | —                     | 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:<br>Off when the unit is off.<br>Blinks when warm-up is in progress.<br>Lights up when the unit operates normally.  |
| 12   | Yellow FAULT LED*     | Indicates operation status:<br>Off when the unit operates normally.<br>Blinks when a fault is detected.  |
| 13   | Red ALARM LED*        | Indicates alarm operation status:<br>Off when warm-up is in progress or the unit operates normally.<br>Blinks when 1st stage gas alarm activates.<br>Blinks rapidly when 2nd stage gas alarm activates.<br>Lights up when an audio alarm is muted.                                       |
| 14   | Red MAINT LED*        | Indicates maintenance mode status:<br>Off when the unit is in normal operation and not in maintenance mode.<br>Blinks when the unit is in maintenance mode 1.<br>Lights up when the unit is in maintenance mode 2 or in aging mode.  |
| 15   | Red BATT LED*         | Indicates backup power operation status:<br>Off when the unit operates normally and backup batteries are not being used. Blinks when backup batteries are being used.<br>Lights up when a backup battery failure is detected.<br>Note: This LED is always off for non-backup power type. |
| 16   | Red alarm status LED* | Indicates alarm status:<br>Off when the unit operates normally.<br>Blinks when a gas or fault alarm is detected.<br>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.



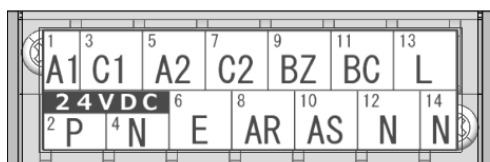
## 2.2.4 Collective Terminal Block

### AC Type



(Thread size: M3)

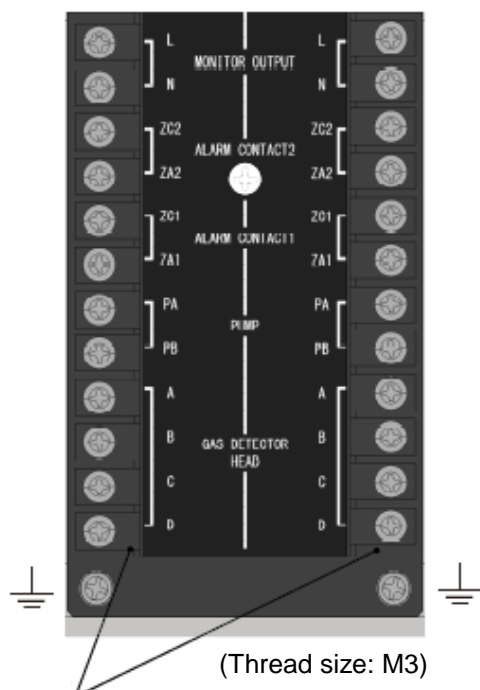
### DC Type



(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<br>DC type: 24 VDC (+)               |
|                           | 4   | S (N) | AC type: 100-240 VAC<br>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<br>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<br>Thread size: M3 (2 places) |

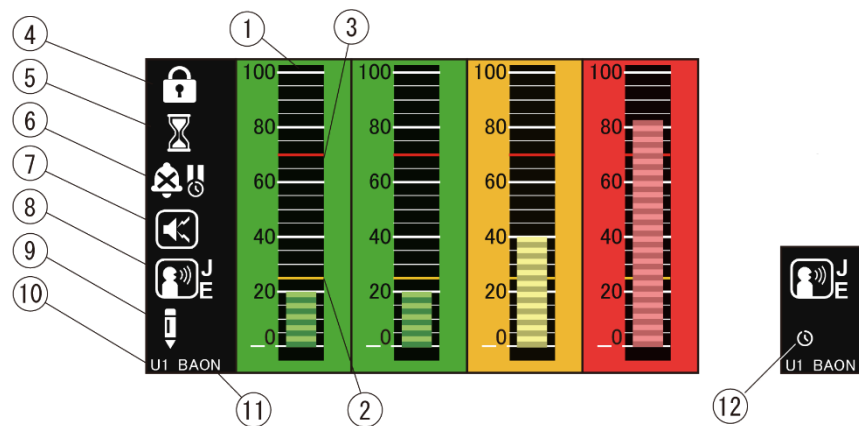
\* is printed next to the PCB-mounting screw (2 places).

\*\* As per delivery specifications.










**Ref.**

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

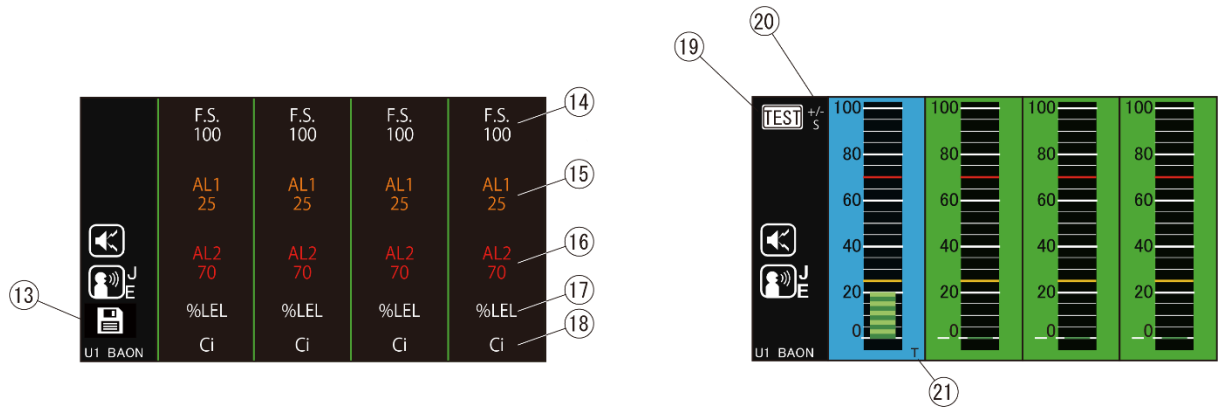
### 3 HOME Screen (Gas-Monitoring Screen)



HOME Screen

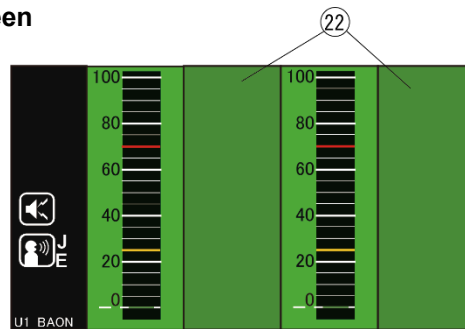
| Item | Component   |                       | Description   |
|------|---|-----------------------|---|
| 1    | Gas concentration bar graph   |                       | Displays gas concentration in bar graph form. The bar graph and background color change depending on the alarm level. They turn green 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<br>U2: Subunit, Channels 5–8<br>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.








Setup Details Screen

Test Mode Screen






Invalidated Channels

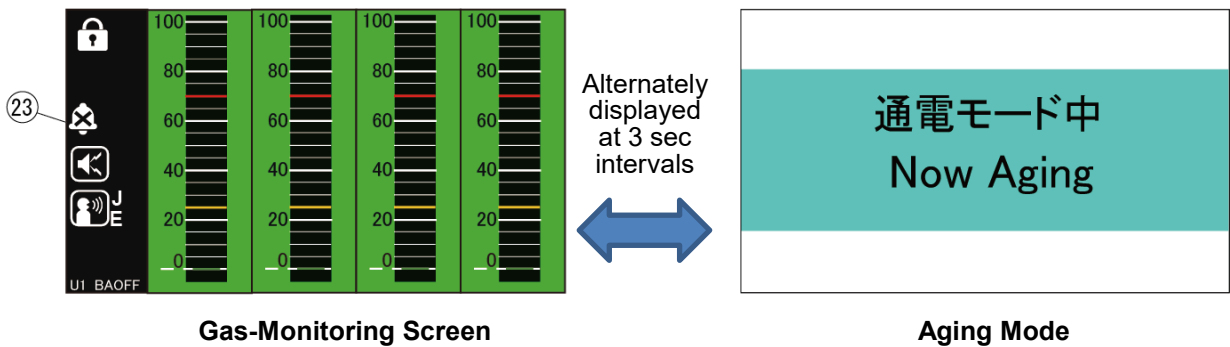
| Item | Component   |                                  | Description  |
|------|---|----------------------------------|--|
| 13   |  | Save icon                        | This icon appears when a setting is being saved. You cannot open the setting screen being saved. It replaces the Enter icon while 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  |  |
|---|--|
|  | <ul style="list-style-type: none"><li>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.</li></ul> |
|  | <ul style="list-style-type: none"><li>Do not turn off the unit while saving is in progress, i.e., while  (save icon) is displayed).</li></ul>     |

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” for more information.

## 4 External Outputs

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

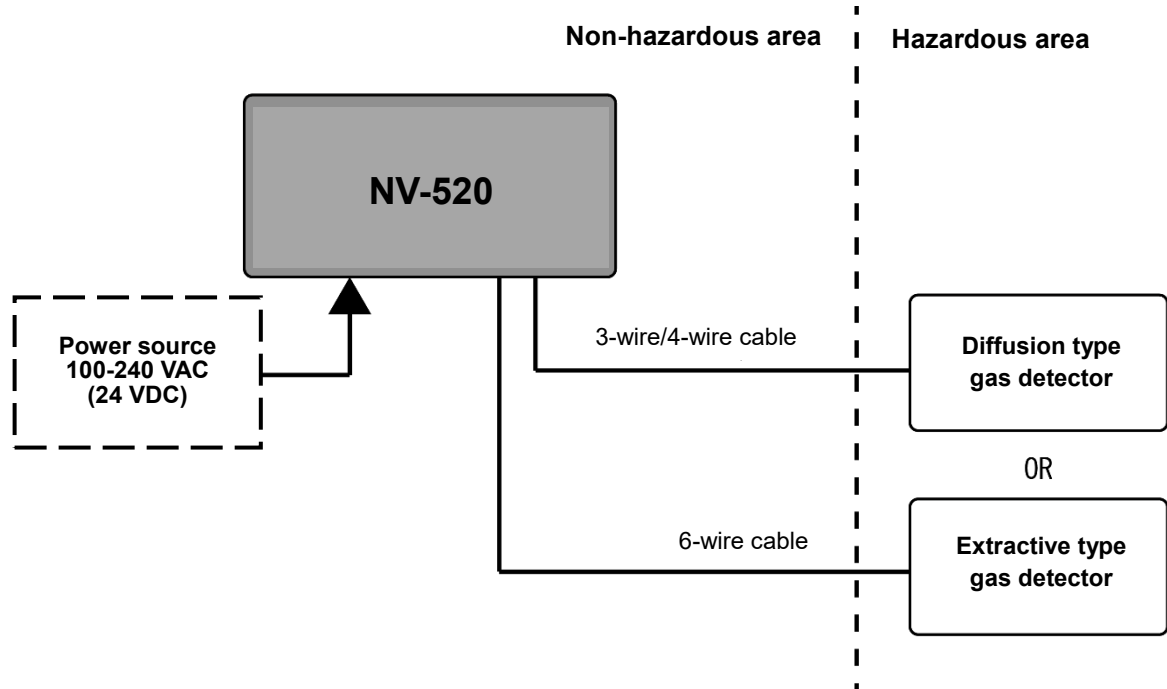
### CAUTION



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.

### Ref.

Refer to the NV-520 instruction manual for installation for the wiring procedure.

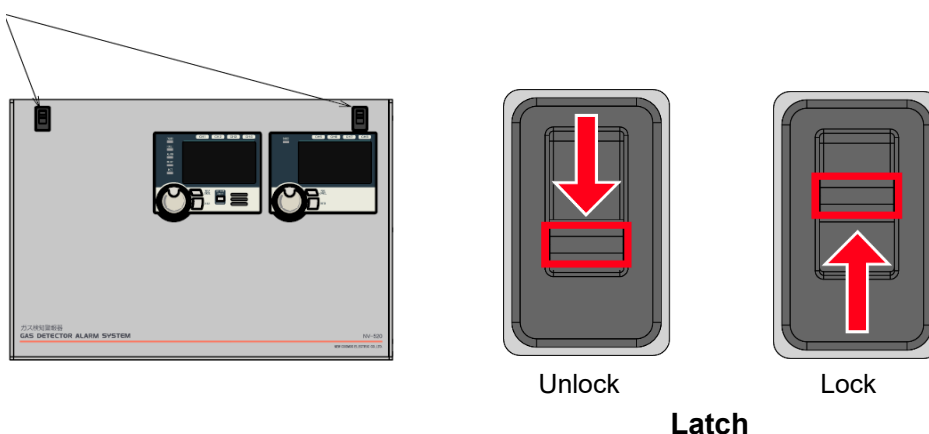
## 6 Power On/Off

### 6.1 Front Panel Open/Close



|  <b>CAUTION</b> |  |
|--|--|
|                 | <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul> |

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

Latch (2 places)

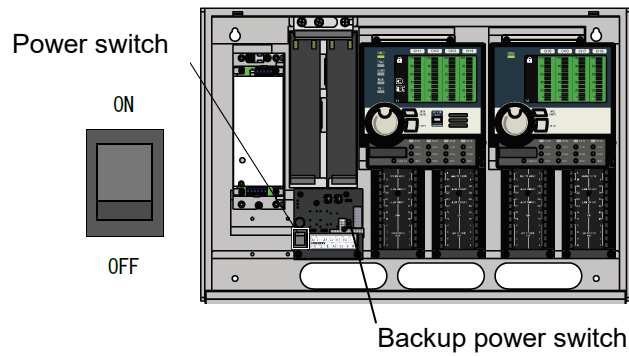


### 6.2 Power-on, Operation Flow and Power-off

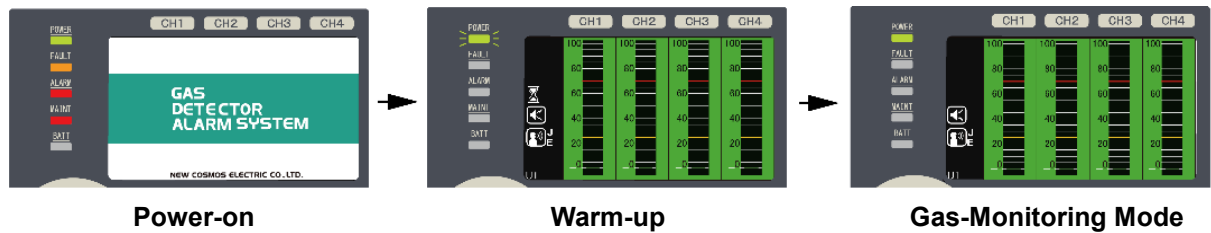
|  <b>CAUTION</b> |   |
|--|---|
|                 | <ul style="list-style-type: none"> <li>Turn on the product while no gas is present around the connected gas detectors.</li> <li>Check that all wiring is correct before turning on the external devices (e.g., signal towers, alarm horns, etc.) connected to this product.</li> <li>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.</li> <li>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.</li> <li>A gas alarm is inactive and a fault alarm is active, when in the warm-up cycle.</li> <li>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.</li> </ul> |

1. Power-on


Set the power switch to the on position to turn on the unit.  
For the backup power type, set both the power and backup power switches the on position.



2. Operation Flow



Operation Status


| Indication/Output  | Warm-up   | Gas-monitoring mode with no alarm |
|--|-----------|-----------------------------------|
| Warm-up icon  | Displayed | Not displayed                     |
| Green POWER LED  | Blinking  | On                                |
| Yellow FAULT LED   | Off       |                                   |
| Red ALARM LED  | Off       |                                   |
| Red MAINT LED  | Off       |                                   |
| Red BATT LED   | Off       |                                   |
| Voltage output   | 6 VDC     |                                   |
| Contacts   | Open      |                                   |

If the gas concentration exceeding the gas alarm set value is detected during gas-monitoring mode, a gas alarm will be activated. If an error or fault is detected within the unit itself or the connected gas detectors, a fault alarm will be activated.



3. Power-off

Set the power switch to the off position to turn off the unit.  
For the backup power type, set both the power and backup power switches the off position.

| NOTICE  |   |
|---|---|
|  | <p>(For backup power type only)</p> <ul style="list-style-type: none"><li>• After setting the power switch to ON, set the backup power switch to ON. Ensure that “BAON” is displayed in the bottom left corner of the Main Unit’s (U1) screen.</li><li>• To completely turn off the unit, set both the power and backup power switches to OFF.</li><li>• Backup power continues to be supplied to the unit when the backup power switch is on, even though the power switch is off. Set the backup power switch to OFF to completely turn off the unit.</li></ul> |

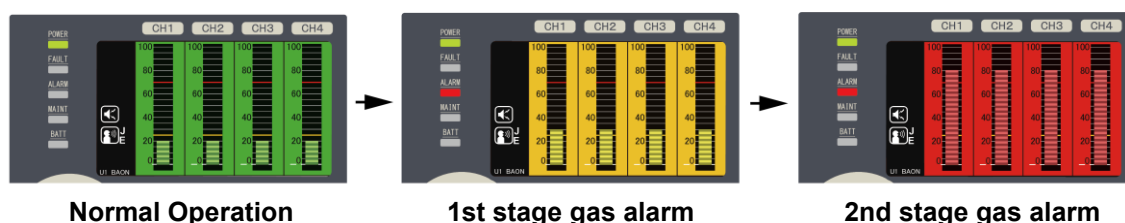
|             |   |
|-------------|---|
| <b>Ref.</b> | Refer to 10 “Backup Power Type” for more details. |
|-------------|---|

## 7 Alarm Operation

This product performs two kinds of alarm operations, gas alarm and fault alarm operations. This chapter explains the operation when an alarm activates as well as the method to clear it.

### 7.1 Gas Alarm Operation

If the gas concentration or test value exceeds the gas alarm set value, a gas alarm will activate. If the gas concentration exceeds the 1st stage gas alarm set value, the red ALARM LED will start blinking, the corresponding bar graph and its background will turn yellow, and the unit will start beeping. If the gas concentration exceeds the 2nd stage gas alarm set value, the red ALARM LED will start blinking rapidly, the corresponding bar graph and its background will turn red, and the unit will start beeping.



\*This picture shows a sample case of when the gas alarm activates at all four channels simultaneously.

**Gas Alarm Operation**

| Indication/output  |                  | Warm-up*          | Gas-monitoring mode |                     |
|--------------------|------------------|-------------------|---------------------|---------------------|
|                    |                  |                   | 1st stage gas alarm | 2nd stage gas alarm |
| Green POWER LED    |                  | Blinking          | On                  |                     |
| Yellow FAULT LED   |                  | Off               |                     |                     |
| Red ALARM LED      |                  | Off               | Blinking            | Rapid blinking      |
| Red MAINT LED      |                  | Off               |                     |                     |
| Red BATT LED       |                  | Off               |                     |                     |
| LCD                | Bar graph        | Gas concentration | Gas concentration   |                     |
|                    | Background color | Green             | Yellow              | Red                 |
| Voltage output     |                  | 6 VDC             | 12 VDC              |                     |
| Gas alarm contacts |                  | Not activated     | Activated           |                     |
| Beep sound         |                  | Muted             | Beeping             | Fast beeping        |
| Voice message      |                  | Muted             | Sounding            |                     |

\*Gas alarm is disabled when in the warm-up cycle.

#### Peak Hold Function

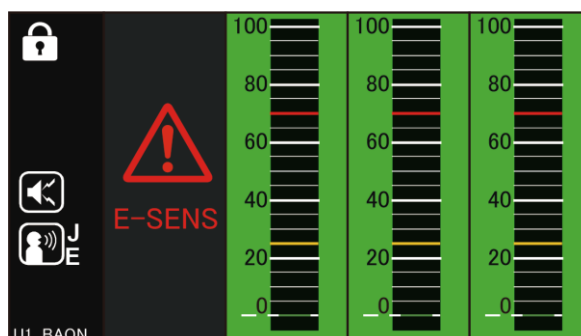
The highest marked concentration will be maintained as the peak value after a gas alarm has been activated. Once the peak hold function is activated, the new peak value will be updated and maintained on the bar graph even if the actual gas concentration falls below that value. The peak hold indication will be cleared when the gas alarm is cleared.

**Ref.**

Refer to 7.4 "Gas Alarm Clearance Method" for how to clear the gas alarm.

## 7.2 Fault Alarm Operation

This unit can detect an internal failure. The yellow FAULT LED, LCD and fault contact will activate depending on the nature of the failure. A corresponding error message (e.g., E-SENS) will be displayed on the screen, as well.



**Fault Alarm Operation**

| Indication/output |                  | Normal operation  | Fault alarm   |
|-------------------|------------------|-------------------|---------------|
| Green POWER LED   |                  | On                | On            |
| Yellow FAULT LED  |                  | Off               | Blinking      |
| Red ALARM LED     |                  | Off               | Off           |
| Red MAINT LED     |                  | Off               | Off           |
| Red BATT LED      |                  | Off               | Off           |
| LCD               | Bar graph        | Gas concentration | Error message |
|                   | Background color | Green             | Black         |
| Voltage output    |                  | 6 VDC             | 0 VDC         |
| Beep sound        |                  | Muted             | Beeping       |
| Voice message     |                  | Muted             | Sounding      |

### NOTE

- When you contact New Cosmos or its authorized representative for assistance for clearing a failure, please be sure to provide them with the error message or error code. Error codes can be viewed on the event history screen (page 42).
- A fault alarm will be automatically cleared when a fault is removed. When a fault alarm is cleared, the unit will automatically go into a warm-up cycle, then return to normal operation.
- When more than one fault alarm are activated then cleared, the unit will return to normal operation after warm-up cycles for all the channels are complete.

### Ref.

Refer to 13 “Error Messages and Solutions” for steps to take in the event of a failure, when an error message appears.

## 7.3 Audio Alarms (Beeping Sound and Voice Message)

In the event of a gas alarm or failure, the unit emits a beeping sound and a voice message to alert the user.

**Ref.**

Refer to 7.4 “Gas Alarm Clearance Method” for how to mute the audio alarm.

### 7.3.1 Voice Message

The unit can select up to two languages (as 1st and 2nd languages) for voice messages.

Example: When Japanese and English are selected as the 1st and 2nd languages, respectively, the audio alarm cycles through in the following sequence in case a gas alarm is present.

→ Beeping → “Gas alarm (in Japanese)” → Beeping → “Gas alarm (in English)” →

List of Voice Messages

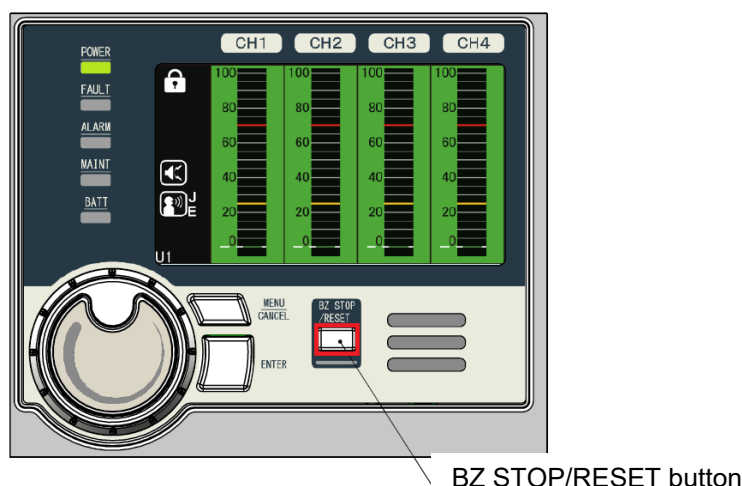
| Device status                   | Cause   | Beep sound | Voice message |                   |                    |           |
|---------------------------------|---|------------|---------------|-------------------|--------------------|-----------|
|                                 |   |            | Japanese      | English           | Simplified Chinese | Korean    |
| 1st stage gas alarm             | Gas concentration exceeds the 1st stage gas alarm set value   | √          | ガス漏れです        | Danger! Gas Alarm | 气体泄漏警报             | 가스경보입니다   |
| 2nd stage gas alarm             | Gas concentration exceeds the 2nd stage gas alarm set value   | √          | 가스漏れです        | Danger! Gas Alarm | 气体泄漏警报             | 가가경보입니다   |
| Device failure                  | The following failure(s) detected:<br>1. NV-520 unit failure<br>2. Received a failure alarm signal from the connected gas detector<br>3. NV-520 unit function error | √          | 本体が故障です       | Main Unit Failure | 主机故障               | 본체가 고장입니다 |
| Adjustment error                | Failed to adjust the sensor   | √          | 調整エラーです       | Adjustment Error  | 调整失败               | 교정에러입니다   |
| Low flow rate                   | Received a low flow rate signal from the connected gas detector   | √          | 流量が異常です       | Low Flow Rate     | 流量异常               | 유량에러입니다   |
| Gas alarm during maintenance    | Test alarm created during maintenance mode (simulated gas alarm for test purpose)   |            | 点検中です         | Test in Progress  | 维护中                | 점검중입니다    |
| Fault alarm during maintenance  | Test alarm created during maintenance mode (simulated device fault alarm for test purpose)  |            | 点検中です         | Test in Progress  | 维护中                | 점검중입니다    |
| Battery voltage test (Good)     | Battery voltage test shows that the battery condition is good   |            | 正常です          | Battery OK        | 电池正常               | 정상입니다     |
| Battery voltage test (Not good) | Battery voltage test shows that the battery voltage level is low  | √          | 電圧が低下しています    | Voltage is Low    | 电池电压低              | 전압이 낮습니다  |

## 7.4 Gas Alarm Clearance Method

This product employs a manual-resetting method to clear a gas alarm.

Even if the gas concentration falls below the “gas alarm set value minus 2% of full-scale value” after an alarm has been activated, the ALARM LED, LCD background color, and alarm contacts will not automatically return to their normal positions/statuses.

To return them to their normal positions/statuses, take the following steps:



### (1) Audio alarm mute

To mute the audio alarm (beep sound and voice message) for a gas alarm, press the BZ STOP/RESET button. The audio alarm will be muted, and the blinking ALARM LED will become solid.

To mute the audio alarm (beep sound and voice message) for a fault alarm, press the BZ STOP/RESET button. The audio alarm will be muted, and the FAULT LED will remain blinking.

### (2)-a Visual gas alarm clearance

After Step (1), press and hold the BZ STOP/RESET button for more than 2 seconds when the displayed gas concentration falls below the “gas alarm set value minus 2% of full-scale value.” The visual gas alarm will be cleared.

### (2)-b Visual fault alarm clearance

After Step (1), if the fault is removed, the visual fault alarm will be automatically cleared.

## NOTICE



If a gas alarm is not cleared after Step (2)-a, perform Steps (1) and (2)-a again.

### (3) Visual gas alarm clearance during intermittent gas-monitoring mode (for backup power type only)



Clearing a visual gas alarm that was activated during the intermittent gas-monitoring mode in Step (2)-a will restart the intermittent gas-monitoring cycle from the 13min 50 sec powered off state (see page 27 for the intermittent gas-monitoring mode). To completely turn off the unit, set the backup power switch to OFF.


## NOTE

- Even when the audio is muted (e.g., when the unit is in maintenance mode 2 or in aging mode), Steps (1) and (2)-a need to be performed to clear a gas alarm.
- If a gas or fault alarm newly occurs while the audio alarm is muted, the unit will start to beep and give voice message to alert the user.

## 8 Maintenance Mode



Maintenance mode is used to deactivate all relay contacts during maintenance or inspection. Maintenance mode 1 or 2 can be selected from the menu screen depending on your purpose. Maintenance mode can be set from Main Unit (U1) only. It cannot be set from a Subunit (U2 or U3).

|  <b>CAUTION</b> |  |
|--|--|
|                 | Exit maintenance mode immediately after the maintenance work is completed. |

|  <b>CAUTION</b>  |  |
|---|--|
| <ul style="list-style-type: none"> <li>Gas alarm is disabled when in maintenance mode 1.</li> <li>Both gas and fault alarms are disabled when in maintenance mode 2.</li> </ul> |  |

| NOTICE   |  |
|--|--|
| <ul style="list-style-type: none"> <li>Maintenance mode will be automatically cleared after 8 hours.</li> <li>Maintenance mode will be retained after the unit is turned off and then on; however, an 8-hour auto clearance will be reset.</li> <li>Switching from maintenance mode to aging mode will automatically exit the maintenance mode.</li> </ul> |  |

### Maintenance Mode Operation

| Mode       | Icon  | MAINT LED* | Contacts   | Voltage output   |
|------------|---|------------|--|--|
| Maint Off  | —   | Off        | Active<br>(will activate depending on the condition) |  |
| Maint. 1** |  | Blinking   | Inactive   | Normal (No alarm): 6 V<br>Gas alarm: 6 V<br>Fault alarm: 0 V |
| Maint. 2** |  | On         | Inactive   | Fixed at 6 V   |

\* MAINT LED is provided on Main Unit (U1) only.

\*\* Automatically cleared after 8 hours.







**NOTE** Zero suppression will be cleared once maintenance mode is activated.

**Ref.** Refer to 11.3 "Maintenance Mode Setting" for how to set the maintenance mode.

## 8.1 Gas Alarm Operation during Maintenance Mode

This chapter explains the unit operation when a gas alarm activates during maintenance mode. If a gas concentration or test value exceeds the alarm set value, a gas alarm will activate. All Units (U1, U2, and U3) operate in the manner as shown in table below.

**Gas Alarm Operation during Maintenance Mode**

| Indication/output  |         | Maintenance mode 1  |   | Maintenance mode 2  |   |
|--------------------|---------|---|---|---|---|
|                    |         | Normal operation  | Test mode   | Normal operation  | Test mode   |
| Green POWER LED    |         | On  |   |   |   |
| Yellow FAULT LED   |         | Off   |   |   |   |
| Red ALARM LED      |         | 1st stage gas alarm: Blinking<br>2nd stage gas alarm: Rapid blinking              |   |   |   |
| Red MAINT LED*     |         | Blinking  |   | On  |   |
| Red BATT LED       |         | Off   |   |   |   |
| LCD**              | Display | Gas concentration   | Test value and “T”  | Gas concentration   | Test value and “T”  |
|                    | Icon    |  |        |  |        |
|                    |         |   | and  |   | and  |
| Voltage output     |         | Fixed at 6 V  |   |   |   |
| Gas alarm contacts |         | Inactive  |   |   |   |
| Beep sound         |         | Beeping   |   | Muted   |   |
| Voice message      |         | Sounding  |   | Muted   |   |

\* MAINT LED is provided on Main Unit (U1) only.

\*\* The background color changes depending on the alarm level. It is lit in green during normal operation, turns yellow when 1st stage gas alarm activates, and then turns red when 2nd stage gas alarm activates.

### NOTICE



If the maintenance mode is cancelled while a gas alarm is activated, the audio alarm contact will activate and the voltage output will change from 6 V to 12 V.

## 9 Aging Mode

If the connected gas detector has not been powered for an extended period of time (e.g., the period from factory shipment to initial power-up), the gas concentration bar graph reading (sensor output) may take some time to stabilize. In this case, activate the aging mode as initial power-up to age the sensor inside the gas detector. After the bar graph reading has been fully stabilized, perform zero and span adjustments.



### CAUTION



Exit aging mode immediately after aging is completed.



### CAUTION

- In aging mode, all Units (U1, U2, and U3) operate in the same manner as they do in maintenance mode 2.
- Both gas and fault alarms are disabled when in aging mode.
- The backup batteries are discharged in aging mode.

### NOTICE



Set the backup power switch to OFF (i.e., “BAOFF” is displayed on the screen) before activating aging mode

### NOTICE

- Aging mode will be automatically cleared after 30 days.
- Aging mode is disabled while the backup power switch is set to ON (i.e., “BAON” is displayed on the screen).
- Setting the backup power switch to ON in aging mode will not turn on the backup power or will not display “BAON.”
- The TEST buttons are disabled when in aging mode. When in aging mode, pressing and holding the TEST button will not put a channel into test mode.
- The set aging mode will be retained after the unit is turned off and then on; however, a 30-day auto clearance will be reset.


### NOTE

Zero suppression will be cleared once the aging mode is activated.



## 9.1 Gas Alarm Operation during Aging Mode

Gas Alarm Operation during Aging Mode

| Indication/output        |      | Gas alarm operation   |
|--------------------------|------|---|
| Green POWER LED          |      | On  |
| Yellow FAULT LED         |      | Off   |
| Red ALARM LED            |      | 1st stage gas alarm: Blinking/2nd stage gas alarm: Rapid blinking                                   |
| Red MAINT LED            |      | On  |
| Red BATT LED             |      | Off   |
| LCD                      | LCD  | Gas-monitoring and aging mode screens alternately displayed   |
|                          | Icon | Aging mode icon  |
| Voltage output           |      | Fixed at 6 V  |
| Gas alarm contacts       |      | Inactive  |
| Beep sound/voice message |      | Muted   |

**Ref.** Refer to page 13 for the aging mode display.

### NOTICE

If the aging mode is cancelled while a gas alarm is activated, the audio alarm contact will activate and the voltage output will change from 6 V to 12 V.

## 10 Backup Power Type



A unit with two backup batteries is referred to as a “backup power type.”


In the event of a power outage, the backup batteries will provide emergency power to the unit for continuous gas monitoring during the power outage.

**In the event of a power outage**, the BATT LED will start blinking, and the backup batteries will provide power to the unit for continuous gas-monitoring operation.

**When the battery voltage decreases and reaches the discharge-cutoff voltage**, the unit will automatically stop battery discharge and then stop operation.

**When power is restored**, the BATT LED will turn off and the unit will return to normal operation. The unit will resume operation with a warm-up cycle when the power is back in case it stopped operation with over-discharged batteries.

|  <b>CAUTION</b> |   |
|--|---|
|                | <ul style="list-style-type: none"> <li>• “BAON” or “BAOFF” is displayed on the screen of the backup power type. If “BAON” or “BAOFF” is not displayed, please contact New Cosmos or its authorized representative for setting.</li> <li>• The backup batteries will not start providing power to the unit in the event of a power outage when the backup power switch is set to OFF. Ensure that the switch is set to ON (i.e., “BAON” is displayed on the screen).</li> <li>• The backup batteries are not charged when the backup power switch is set to OFF. Ensure that the switch is set to ON (i.e., “BAON” is displayed on the screen).</li> <li>• Check that the BATT LED is not lit. Perform a battery voltage test at least once a month during a routine check Refer to 11.6 “Battery Voltage Test” for the test procedure.</li> </ul> |

|  <b>CAUTION</b>   |  |
|--|--|
| <p>When the backup power starts to be supplied while the unit is in the menu screen (except while in the zero/span adjustment or test mode), the screen will forcefully return to the HOME screen.</p> |  |

### 10.1 Backup Power Operation in the Event of Power Outage

In the event of a power outage, the BATT LED will start blinking, and the backup batteries will start supplying power to the unit for continuous gas-monitoring operation.

#### Intermittent Gas-Monitoring Mode

The unit will continue to monitor gas for max. 120 minutes after a power outage breaks out, followed by intermittent gas monitoring at 15-minute intervals (70-second gas monitoring + 13min 50 sec power off). However, if the unit falls into a gas alarm status during the intermittent gas-monitoring mode, the mode will switch to continuous gas-monitoring mode.

**NOTICE**

- The duration of continuous/intermittent gas monitoring powered by the backup batteries will change depending on the number of connected gas detectors.
- Gas alarm accuracy is compromised during the intermittent gas-monitoring mode, as the sensor output becomes unstable in the intermittent gas-monitoring mode. As a result, a gas alarm may be activated even though the concentration does not reach the gas alarm set value.

Expected gas-monitoring durations are listed below. They are only an estimate, and no guarantee is provided. When a large number of gas detectors are connected (e.g., a 12-channel type unit) resulting in huge consumption of energy, the unit may cease the operation before going into the intermittent gas-monitoring mode, depending on the battery condition.

**Backup Power Duration**

| Continuous gas-monitoring duration | Intermittent gas-monitoring duration<br>(at approx. 15 min intervals) |
|------------------------------------|---|
| Max. 120 minutes                   | 2 days  |

**NOTE**

- The backup batteries are always charged while the unit is being powered.
- More than 90 hours are needed to fully charge the batteries.

**10.2 BATT LED****LED Status for Backup Power Type**

| Condition                                     | Green<br>POWER LED | Red<br>BATT LED* | Gas alarm function  |
|---|--------------------|------------------|---|
| Normal operation                              | On                 | Off              | Active  |
| Power outage and<br>provision of backup power | On                 | Blinking         | Active  |
| Failure of backup<br>batteries                | On                 | On               | Inactive during power outage<br>(Batteries need to be repaired) |
| After power is restored                       | On                 | Off              | Active  |
| After batteries have been<br>discharged       | Off                | Off              | Inactive<br>(Batteries need to be charged)                      |

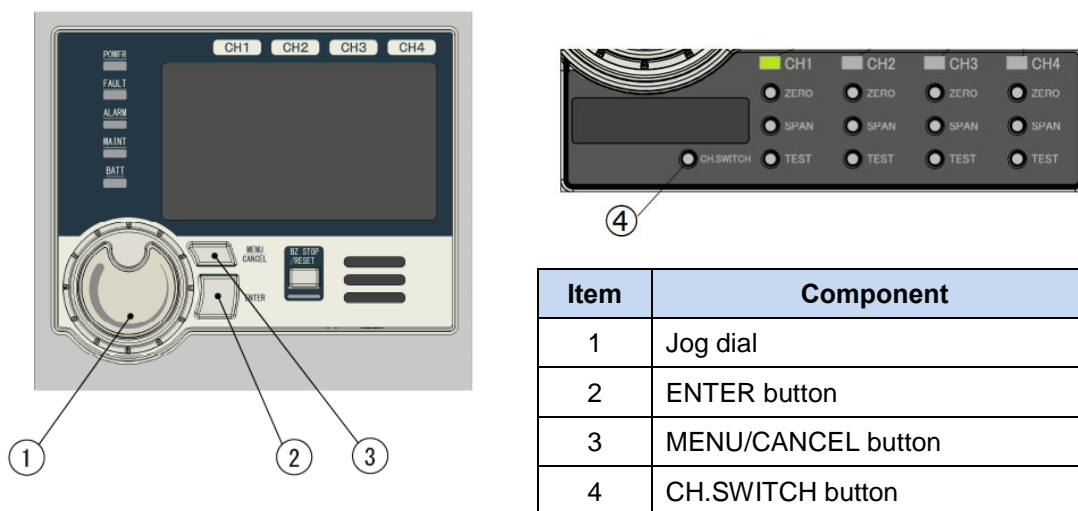
\*The BATT LED is always off when the unit is a non-backup power type.

# 11 Operation

## 11.1 Basic Operation

### 11.1.1 Buttons and Dial

The following buttons and dial are used for operation.



#### NOTE

The CH.SWITCH button should be pressed slowly. The unit may not react if it is pressed too quickly.

### 11.1.2 Deactivate Safety Lock

The safety lock disables the buttons and the jog dial to prevent unintended operation.

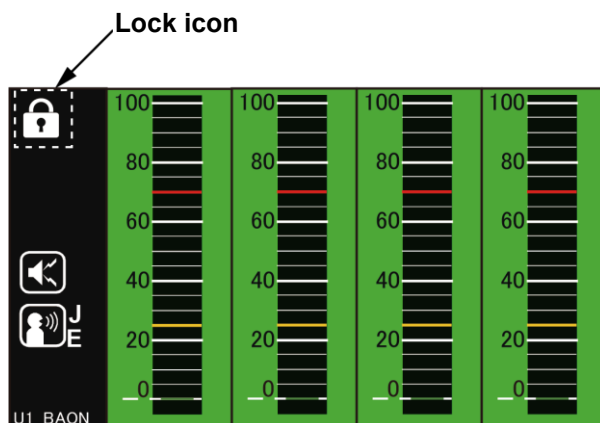
The lock icon appears in the top left corner of the screen when the lock is activated (locked).

Even while the lock is locked, it is possible to change the channel by pressing the CH.SWITCH button and view the setup details (full-scale value, alarm set values, unit of measurement and gas sensor type) for the selected channel by pressing the ENTER button.

To deactivate the safety lock, simultaneously press and hold the MENU/CANCEL and ENTER buttons until the lock icon disappears.

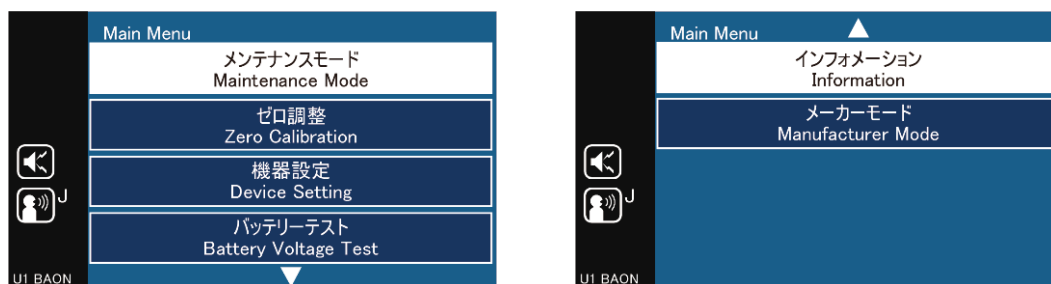
#### NOTE

The safety lock will automatically activate after 3 minutes if the unit is left idle while on the HOME screen.



## 11.2 Operation Menus

### 11.2.1 Main Menu



| Item                   | Description   |
|------------------------|---|
| Maintenance Mode*      | Maint. Off: Maintenance mode is off<br>Maint. 1: Maintenance mode 1 is on<br>Maint. 2: Maintenance mode 2 is on   |
| Zero Calibration       | Performs manual zero adjustment (It can adjust the reading to the desired value).                                 |
| Device Setting         | Changes the LCD backlight brightness and sets the aging mode.   |
| Battery Voltage Test** | Checks the battery life expectancy.   |
| Information            | Displays set information (e.g., full-scale values, alarm set values, etc.) and event history of gas/fault alarms. |
| Manufacturer Mode      | Only for supervisor/service personnel use. Not for operator use.  |

\* Maintenance mode can be set from Main Unit (U1) only.

\*\*Displayed for backup power type only.

### 11.2.2 Access to Main Menu

To go to the Main Menu, press the MENU/CANCEL button while on the HOME screen. The Main Menu consists of two pages. To go to the second page, turn the job dial.

If the lock icon appears in the top left corner of the screen, the safety lock must be deactivated to access the menus.

**Ref.** Refer to 11.1.2 “Deactivate Safety Lock” (page 29).

### 11.2.3 Select Item in Menu

Turning the jog dial allows you to cycle through the item options shown on each menu. Turn the jog dial to select the desired item. The selected item is highlighted in white.

To access the selected item, press the ENTER button for confirmation.


To undo the selection, press the MENU/CANCEL button. The screen will return to the previous screen.

**NOTE** For some item options, the NV-520 unit needs to be restarted to reflect their setup details.

### 11.3 Maintenance Mode Setting

Select maintenance mode from the Main Menu.

Maintenance mode can only be set from Main Unit (U1). It cannot be set from Subunits (U2 or U3).

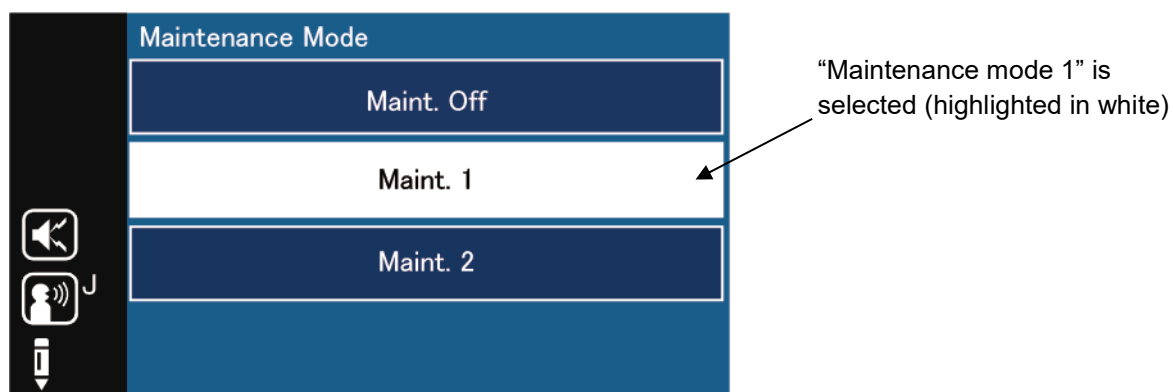
| ⚠ CAUTION   |  |
|---|--|
|  | Exit maintenance mode immediately after the maintenance work is completed. |

| ⚠ CAUTION   |  |
|---|--|
| <ul style="list-style-type: none"> <li>Gas alarm is disabled when in maintenance mode 1.</li> <li>Both gas and fault alarms are disabled when in maintenance mode 2.</li> </ul> |  |

| NOTICE   |  |
|--|--|
| <ul style="list-style-type: none"> <li>Maintenance mode will be automatically cleared after 8 hours.</li> <li>Maintenance mode will be retained after the unit is turned off and then on; however, an 8-hour auto clearance will be reset.</li> <li>Switching from maintenance mode to aging mode will automatically exit the maintenance mode.</li> </ul> |  |

#### To Enter Maintenance Mode:

- Deactivate the safety lock (page 29).
- Press the MENU/CANCEL button to go to the Main Menu while on the HOME screen.
- Select "Maintenance Mode" using the jog dial, and press the ENTER button to confirm. The Maintenance Mode screen will appear.



**Maintenance Mode Screen**

- Turn the jog dial to select "Maint. 1" or "Maint. 2" from the Maintenance Mode screen. The selected item is highlighted in white.
- Press and hold the ENTER button to confirm the selection. The selected mode will be set and the screen will return to the Main Menu. The NV-520 unit is now in the selected maintenance mode.

#### To Exit Maintenance Mode:



- Turn the jog dial to select "Maint. Off" from the Maintenance Mode screen.
- Press and hold the ENTER button to confirm the selection.


#### NOTE

Turning off the maintenance mode will turn off the aging mode.

## 11.4 Manual Zero Adjustment

This menu is used to manually adjust the unit's reading to zero per channel.

|  <b>CAUTION</b> |  |
|--|--|
|                 | <ul style="list-style-type: none"> <li>• Perform a zero adjustment while the connected gas detector is in clean air. Proper gas detection is not possible if a zero adjustment is performed while the gas detector is in a gas atmosphere.</li> <li>• Perform a zero adjustment at the initial power-up or after sensor replacement.</li> <li>• The external relay contacts are active during zero adjustment. Before performing a zero adjustment, set the unit to maintenance mode or release the interlocks of external devices, as needed.</li> <li>• Zero adjustment is disabled during a warm-up cycle. Perform a zero adjustment after the warm-up cycle is completed and the sensor output (reading) is stable.</li> </ul> |

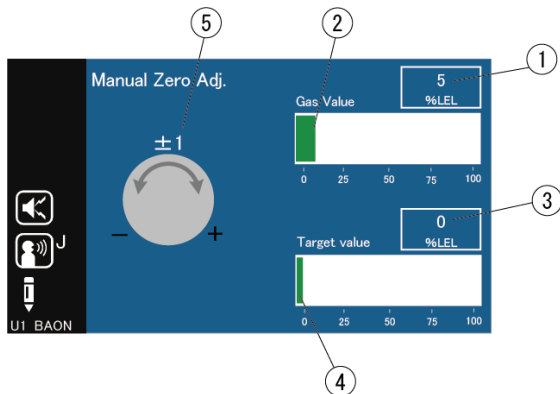
| NOTICE  |   |
|---|---|
|  | <p>Perform a zero adjustment on the connected gas detector. However, if a zero adjustment was performed on the gas detector but the NV-520 unit's reading does not show zero, perform a zero adjustment on the NV-520 unit.</p> |

| NOTICE  |  |
|---|--|
| <p>If the connected gas detector has not been powered for an extended period of time (e.g., the period from factory shipment to initial power-up), the gas concentration bar graph reading (sensor output) may take some time to stabilize.</p> |  |

**To Go to Manual Zero Adjustment Screen:**

1. Deactivate the safety lock (page 29).
2. Press the MENU/CANCEL button to go to the Main Menu while on the HOME screen.
3. Select “Zero Calibration” using the jog dial, and press the ENTER button to confirm. The Zero Calibration Menu screen will appear.
4. Select “Manual Zero Adj.” using the jog dial, then press the ENTER button to confirm. The Manual Zero Adj. screen will appear.

\*The target channel needs to be selected using the CH.SW button before entering the Manual Zero Adj. screen.

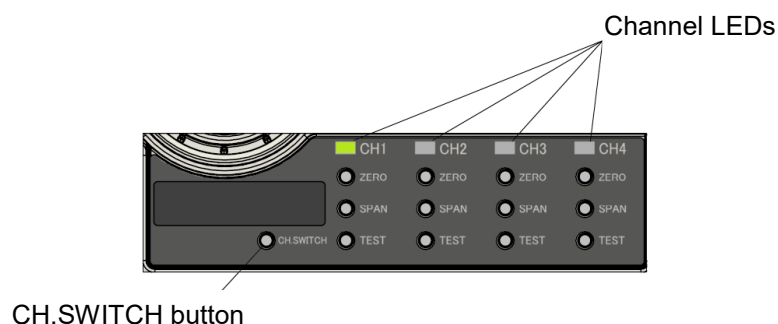


| Item | Item name                      | Description                     |
|------|--------------------------------|---------------------------------|
| 1    | Gas value                      | Current gas concentration value |
| 2    | Gas value in bar graph form    |                                 |
| 3    | Target value                   | Target gas concentration value  |
| 4    | Target value in bar graph form |                                 |
| 5    | Increment/decrement unit       | —                               |

| Component          | Description   |
|--------------------|---|
| ENTER button       | Press to change the increment/decrement unit. Each press cycles through unit options ( $\pm 1$ , $\pm 5$ , $\pm 10$ , $\pm 100$ , $\pm 1000$ ). Press and hold to confirm the selection or setting. |
| MENU/CANCEL button | Press to cancel the current operation and return to the Main Menu screen.   |
| Jog dial           | Turn to increase/decrease the target value.   |

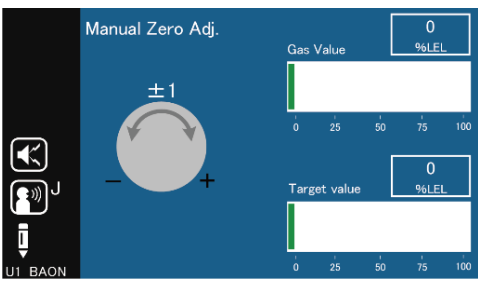
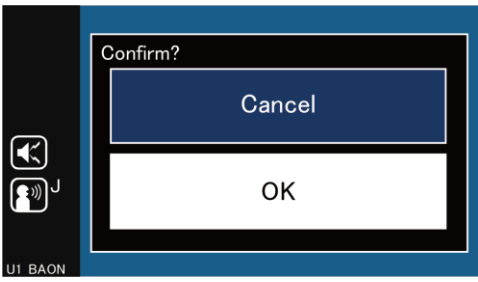
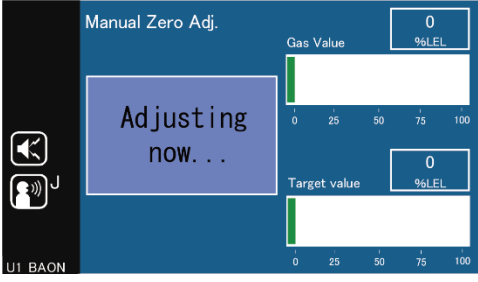
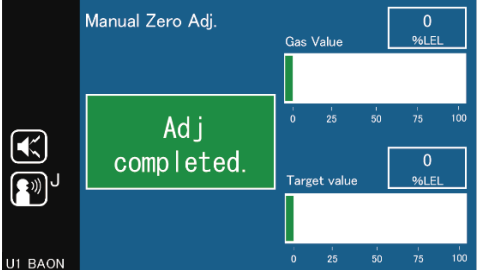
**To Select the Channel to Be Zero-Adjusted:**

Zero adjustment will be performed on the selected channel (the LED corresponding to the selected channel is lit). Select the channel by pressing the CH.SWITCH button.





## Manual Zero Adjustment Procedure

|   |  |
|---|--|
|    | <p>1. Set the target value to zero by turning the jog dial. Press and hold the ENTER button to confirm.</p>  |
|    | <p>2. The confirmation screen appears.<br/>Ensure that the channel LED for the target channel is lit.<br/>Select "OK" using the jog dial.<br/>Press the ENTER button to execute zero adjustment.</p> |
|   | <p>3. "Adjusting now" is displayed while zero adjustment is in progress.</p>   |
|  | <p>4. A successfully completed zero adjustment displays "Adj completed."<br/>Press the MENU/CANCEL button to return to the Main Menu screen.</p>   |

### NOTE

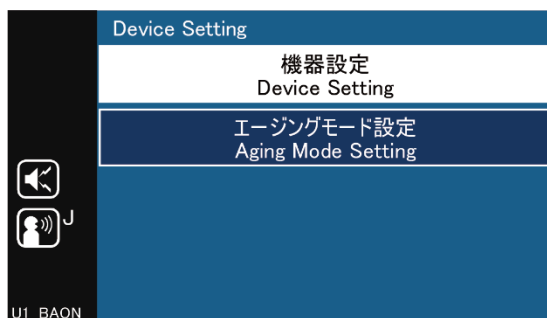
- A zero adjustment can be cancelled by pressing the MENU/CANCEL button before the zero adjustment is executed. However, once a zero adjustment is executed, it cannot be canceled.
- If an error message "W-CAL" appears on the screen, refer to 13 "Error Messages and Solutions" (page 54) for information on the necessary action to be taken.
- The sensor may be unstable immediately after the warm-up cycle. Perform a zero adjustment after ensuring that the sensor output (reading) is stable.
- It is not possible to move to any setting screen during a warm-up cycle or when a gas/fault alarm is activated.
- If the set value exceeds the adjustment range, an error will be produced.
- If a zero adjustment lasts for more than one minute, an error will be produced.

## 11.5 Device Setting

This menu is used to adjust the brightness of the LCD backlight and turn aging mode on/off.

### To Go to Device Setting Screen:

1. Deactivate the safety lock (page 29).
2. Press the MENU/CANCEL button to go to the Main Menu while on the HOME screen.
3. Select “Device Setting” using the jog dial, and press the ENTER button to confirm. The Device Setting screen will appear.
4. Select “Device Setting” for LCD backlight adjustment, or select “Aging Mode Setting” to turn aging mode on/off.



Device Setting Screen

| Item | Item/Component     | Description  |
|------|--------------------|--|
| 1    | Device Setting     | Adjusts the brightness of the LCD backlight.                                   |
| 2    | Aging Mode Setting | Turns aging mode on/off.<br>*This can be set from Main Unit (U1) only.         |
| 3    | ENTER button       | Press and hold to confirm the selection or setting.                            |
| 4    | MENU/CANCEL button | Press to cancel the current operation and return to the Device Setting screen. |
| 5    | Jog dial           | Turn to increase/decrease parameter value.                                     |



### 11.5.1 LCD Backlight Brightness Adjustment


|  |  |
|--|--|
|  | <ol style="list-style-type: none"> <li>1. Change the brightness to the desired level by turning the jog dial. Press and hold the ENTER button to confirm the value.<br/><br/>Settable range: 10–100</li> </ol> |
|  | <ol style="list-style-type: none"> <li>2. The confirmation screen appears. Select “OK” using the jog dial.<br/><br/>Press the ENTER button to complete the setting.</li> </ol>                                 |


### 11.5.2 Aging Mode Setting

This menu is used to turn aging mode on/off.

Aging mode can only be set from Main Unit (U1). It cannot be set from a Subunit (U2 or U3).

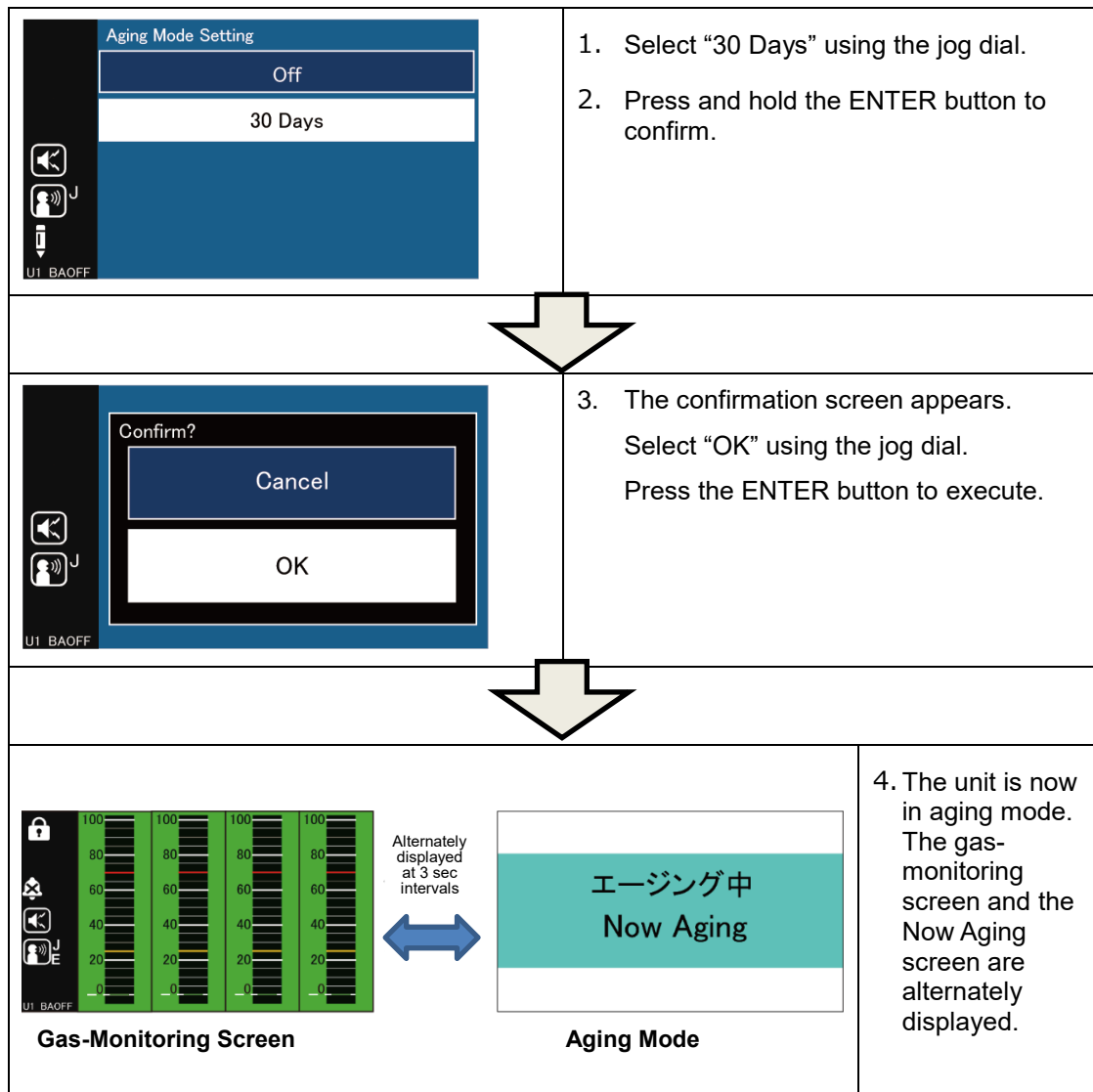
|  <b>CAUTION</b> |   |
|--|---|
|                 | <ul style="list-style-type: none"> <li>• Exit aging mode immediately after aging is completed.</li> <li>• In aging mode, all Units (U1, U2, and U3) operate in the same manner as they do in maintenance mode 2.</li> </ul> |

|  <b>CAUTION</b>   |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Both gas and fault alarms are disabled when in aging mode.</li> <li>• The backup batteries are discharged in aging mode.</li> </ul> |  |

| NOTICE  |  |
|---|--|
|  | <p>Set the backup power switch to OFF (i.e., “BAOFF” is displayed on the screen) before activating aging mode.</p> |

| NOTICE  |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Aging mode will be automatically cleared after approx. 30 days.</li> <li>• Aging mode is disabled while the backup power switch is set to ON (i.e., “BAON” is displayed on the screen).</li> <li>• The backup power switch is disabled when in aging mode. Setting the backup power switch to ON in aging mode will not turn on the backup power or will not display “BAON.”</li> <li>• The TEST buttons are disabled when in aging mode. When in aging mode, pressing and holding the TEST button will not put a channel into test mode.</li> <li>• The set aging mode will be retained after the unit is turned off and then on; however, a 30-day auto clearance will be reset.</li> <li>• Switching from maintenance mode to aging mode will automatically exit the maintenance mode.</li> </ul> |  |

### Aging Mode Setting Procedure




#### NOTE

Turning off the maintenance mode will turn off the aging mode.

11.6 Battery Voltage Test (for Backup Power Type Only)

This function is used to estimate the remaining battery life.  
This option is only displayed on the screen for a backup power type.

NOTICE



- The batteries may not be sufficiently charged for a battery voltage test if performed before initial power-up. A period of at most 90 hours is required to fully charge the batteries. If the result of a battery voltage test is not good, perform the test again after 90 hours.
- Perform a battery voltage test when the backup power switch is on (i.e. while “BAON” is displayed on screen).
- Perform a battery voltage test two times for accurate results. Perform the test once the previous test is complete and its result is displayed on screen.
- If a battery voltage test lasts for more than a few minutes while displaying “Testing in progress” on the screen, cancel the test by pressing the MENU/CANCEL button, then retry the test.

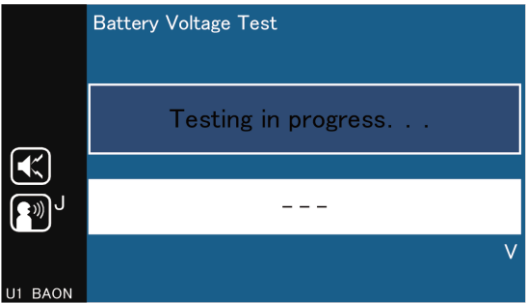
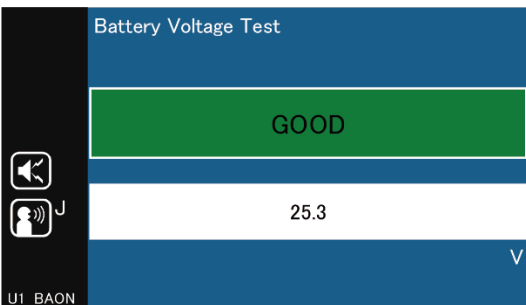
NOTICE

- A battery voltage test cannot be performed when the backup batteries are in use (i.e., when the BATT LED is blinking).
- If a battery voltage test is performed when no batteries are connected or when they are poorly connected, a “Voltage is low” warning will be displayed as the test result.

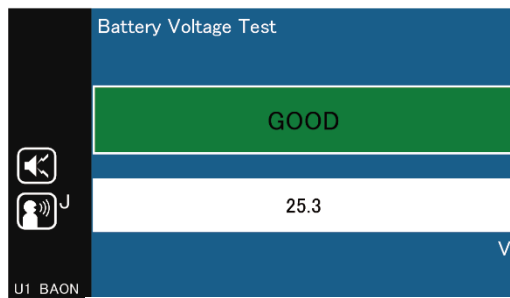
To Go to Battery Voltage Test Screen:

1. Deactivate the safety lock (page 29).
2. Press the MENU/CANCEL button to go to the Main Menu while on the HOME screen.
3. Select “Battery Voltage Test” using the jog dial, and press the ENTER button to confirm. The Battery Voltage Test screen will appear.

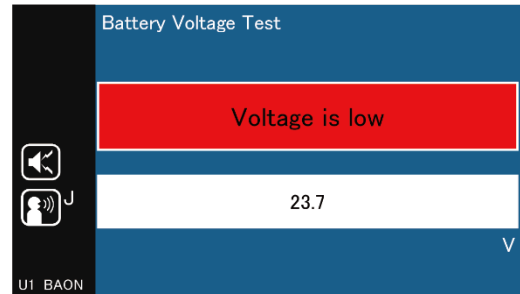
Battery Voltage Test Procedure

|   |   |
|---|---|
|  | <p>1. To start the battery voltage test, press the ENTER button.</p> <p>“Testing in progress...” is displayed as the test is being performed.</p> |
|  | <p>2. When the battery voltage test is completed, the test result will be displayed.</p> <p>Press the MENU/CANCEL button to end the test.</p>     |

## Test Result Display



Good



Charge/Replace Batteries

| Test result on screen | Beep sound | Voice message  |   | Battery condition      | Battery voltage  |
|-----------------------|------------|----------------|---|------------------------|--|
|                       |            | English        | Japanese<br>Chinese(simplified)<br>Korean |                        |  |
| GOOD                  | Muted      | Battery OK     | 正常です<br>这是正常的<br>정상입니다                    | Good                   | Good (24.7 V or more)  |
| Voltage is low        | Beeps      | Voltage is low | 電圧が低下しています<br>电压很低<br>전압가저하하고 있습니다        | Insufficiently charged | Battery level is low (24.6 V or less).<br><br>Charge the batteries. If it does not improve after 6 hours of charging, it means that the battery life is approaching its end. |

## NOTE

- Contact New Cosmos service personnel for battery replacement.
- Replace the batteries with new ones if they have been used for over three years, regardless of the frequency of use.

## Ref.

Refer to 12.1. 3 "Battery Life" for more information.

## 11.7 Information

The Information screen can be used to view the setup details and the event history (gas/fault alarms) of this product.

### To Go to Information Screen:

1. Deactivate the safety lock (page 29).
2. Press the MENU/CANCEL button to go to the Main Menu while on the HOME screen.
3. Select “Information” using the jog dial and press the ENTER button to confirm. The Information screen will appear.
4. The Information screen provides the following two options. Turn the jog dial to select “Configuration Data” or “Event History.” Press the ENTER button to confirm. The selected menu will appear.



Information Screen

| Menu option        | Description  |
|--------------------|--|
| Configuration Data | Displays the setup details for the selected channel.   |
| Event History      | Displays the gas/fault alarms per Unit (U1, U2 or U3). |

### 11.7.1 Configuration Data

The setup details of this product can be viewed from this menu.

Turn the jog dial to scroll down the page. Ensure the channel LED, corresponding to the channel whose setup details you want to view, is lit. To change the channel, use the CH.SWITCH button before entering the configuration data screen.

**Configuration Data**

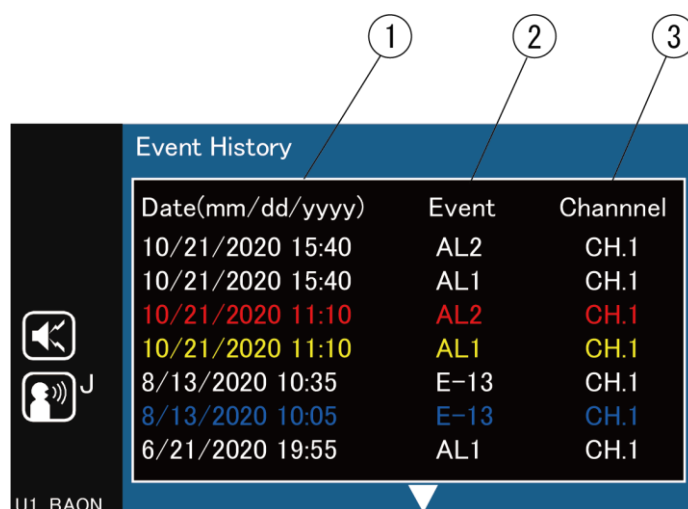
| Seq. | Item                 | Description/Function  |
|------|----------------------|---|
| 1    | Serial No.           | Displays the serial number of this product  |
| 2    | Product Name         | Displays "NV-520"   |
| 3    | Channel Number       | Displays the selected channel (e.g., CH1)   |
| 4    | Mfg. Date (dd/mm/yy) | Displays the manufacturing date of this product   |
| 5    | Full Scale Value     | Displays the full-scale value for the selected channel                                      |
| 6    | AL1 Set Value        | Displays the 1st stage gas alarm set value for the selected channel                         |
| 7    | AL2 Set Value        | Displays the 2nd stage gas alarm set value for the selected channel                         |
| 8    | Beep Sound*          | Displays the on/off status of beep sound  |
| 9    | Voice Message*       | Displays the on/off status of the voice message   |
| 10   | Alarm Volume*        | Displays the volume level of the audio (beeping sound and voice message)                    |
| 11   | 1st Language*        | Displays the 1st language   |
| 12   | 2nd Language*        | Displays the 2nd language   |
| 13   | Input Type           | Displays the gas sensor type (e.g., Ci, Cv)   |
| 14   | Backlight            | Displays the LCD backlight brightness level   |
| 15   | Backup Battery*      | Displays that the backup batteries are On or Off (connected or disconnected)                |
| 16   | Battery Mode*        | Displays the gas-monitoring mode in the event of a power outage: Continuous or Intermittent |
| 17   | Linear Code          | Displays the linear code  |
| 18   | Main Software Ver.   | Displays the version of the mainboard software  |
| 19   | Sound Software Ver.  | Displays the version of the sound software  |

\* Displayed on the screen of Main Unit (U1) only.



### 11.7.2 Event History

An event history of gas/fault alarms of this product can be viewed from this menu. Turn the jog dial to scroll down the page. The event history is shown per Unit and a maximum of 30 events can be displayed.



| Item | Description  |
|------|--|
| 1    | Date and time of alarm or fault event  |
| 2    | Contents of alarm or fault event   |
| 3    | Channel where an alarm or fault event occurred<br>*In case of a fault that occurs independent of the channel, "CH.0" is displayed. |

#### List of Events

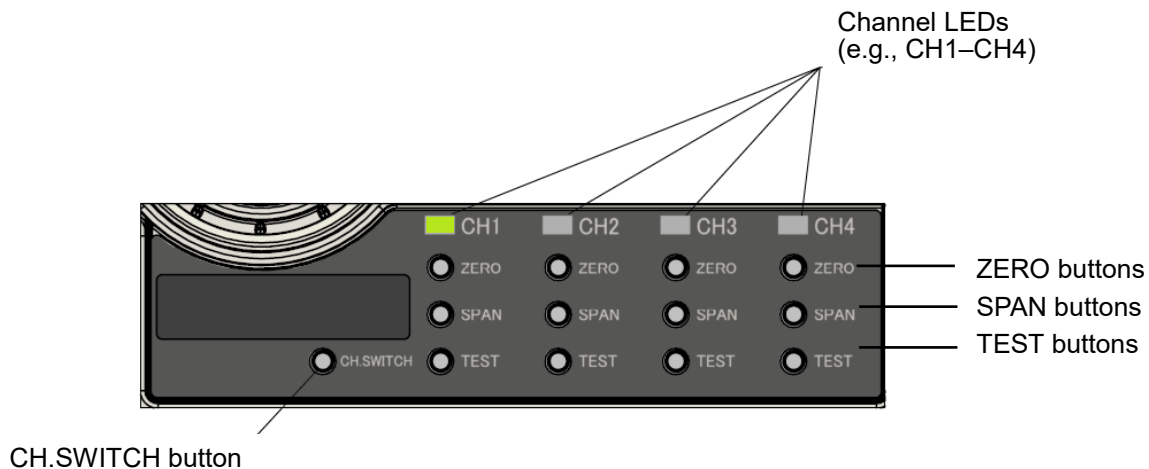
| Event | Description   | Text color while the event is going on | Text color when the event was cleared |
|-------|---|--|---------------------------------------|
| AL1   | 1st stage gas alarm   | Yellow                                 | White                                 |
| AL2   | 2nd stage gas alarm   | Red                                    | White                                 |
| E-XX  | Error code (E-1 to E-38) to indicate a fault alarm occurred | Blue                                   | White                                 |

#### NOTE


A maximum of 30 events can be displayed in the event history. If the number of events exceeds 30, older events will be overwritten in order of oldest to newest.

## 11.8 Other Operations

In addition to the operation menus found through the Main Menu screen, this product has the following button-operation menus.



| Component                     | Description  |
|-------------------------------|--|
| ZERO button (one per channel) | Press and hold to enter the one-touch zero adjustment mode |
| SPAN button (one per channel) | Press and hold to enter the one-touch span adjustment mode |
| TEST button (one per channel) | Press and hold to enter test mode                          |
| Channel LED (4 per Unit)      | LED for the channel selected by CH.SWITCH button lights up |

| NOTICE  |   |
|---|---|
|  | <ul style="list-style-type: none"> <li>During zero or span adjustment, or test mode, the external relay contacts are active. Before performing a zero/span adjustment or test, set the unit to maintenance mode or release the interlocks of external devices, as needed, to prevent their possible activation during adjustment or test.</li> <li>The unit cannot enter the one-touch zero adjustment, one-touch span adjustment or test mode during the warm-up cycle or when an error message (page 54) is displayed on the screen.</li> </ul> |

### NOTE

- The safety lock will activate (locked) after 3 minutes if the unit is left idle while on the HOME screen.
- If the lock icon appears in the top left corner of the screen, the safety lock must be deactivated (unlocked) to access the menus.

### Ref.

Refer to 11.1.2 “Deactivate Safety Lock” (page 29).

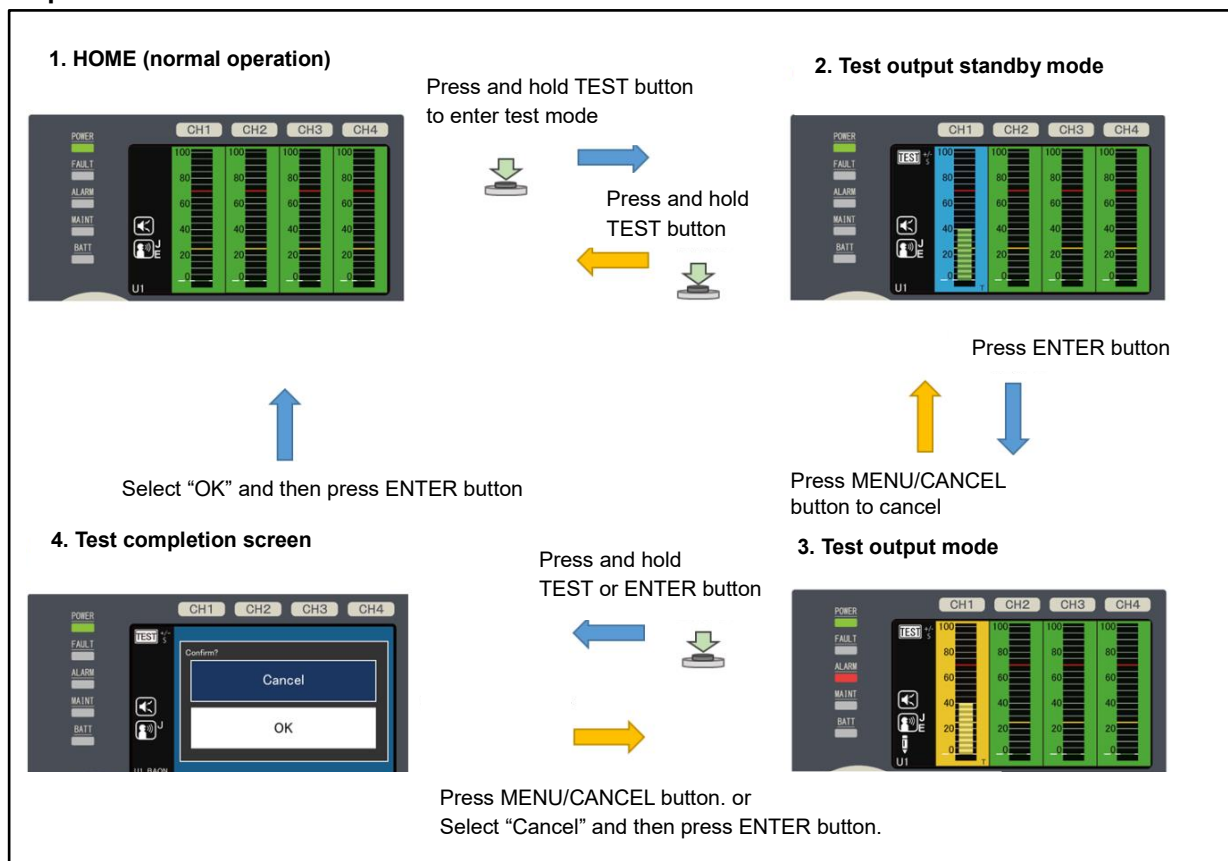
### 11.8.1 Test Mode

Test mode is used to check alarm operation per channel by increasing/decreasing the simulated gas concentration value to create a gas alarm condition. To enter test mode, press and hold the TEST button for the target channel while on the HOME screen. Refer to next page for the detailed test procedure. Test mode will be automatically cleared after 10 minutes.

#### NOTICE

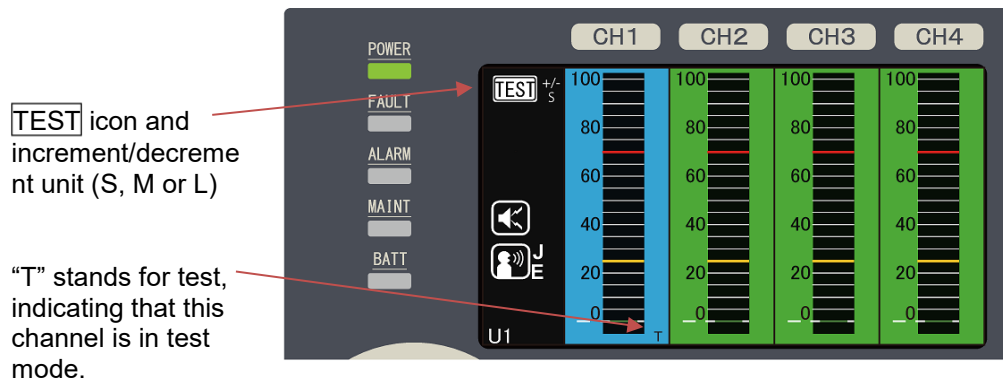
- It is not possible to set a channel to test mode during a warm-up cycle, including the warm-up cycle that starts after a failure has been restored.
- More than one channel in the same Unit can be put in test mode at the same time. However, setting a channel to test mode has to be done one at a time.
- It is not possible to set a channel to test mode when any channel in the same Unit experiences a failure.
- All channels in a Unit will automatically exit test mode and enter normal operation mode if any one of the channels experiences a failure during test mode. Even after being restored, they will remain in normal operation mode and will not return to test mode.
- No channels in a Unit will automatically exit test mode even if a gas alarm activates at any one of the channels during test mode.
- If test mode is automatically exited or suspended, the set gas concentration value(s) will not be saved.
- The TEST buttons are disabled when in aging mode. Therefore, when in aging mode, pressing and holding the TEST button will not put a channel into test mode.
- When the NV-520 unit is turned off during test mode, test mode will be automatically exited at the next power-up.

#### Operation Flow



## Alarm Test Procedure

1. Press and hold the TEST button for the target channel. The **TEST** icon will appear in the top left corner of the screen and the target channel will be highlighted in blue, which indicates that the target channel is now in test output standby mode.



### Test Output Standby Mode (E.g., CH1 is in test output standby mode)

#### NOTE

To set more than one channel to test mode, press and hold the TEST button for one channel after another.

#### NOTICE

While in the test output standby mode, a gas alarm does not activate even if the bar graph reading is changed to a value exceeding the gas alarm set value.

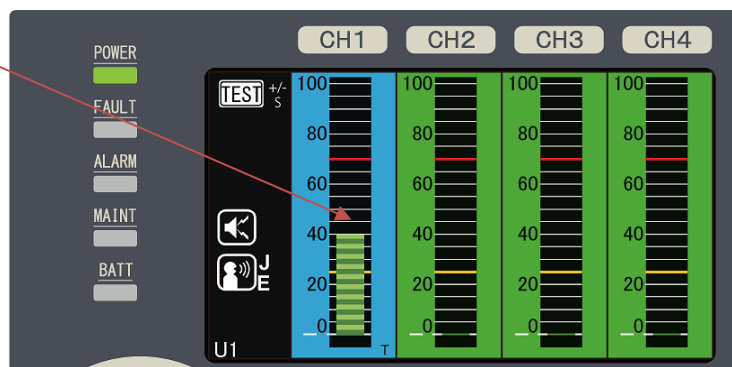
2. Turn the jog dial to set the bar graph reading (test value) to a value slightly exceeding the alarm set value.

It is possible to change the increment/decrement unit of the reading by pressing the TEST button. The increment/decrement unit (S, M or L) is displayed next to the **TEST** icon in the top left corner of the screen.

#### NOTE

When more than one channel is in test mode, you can switch between the channels by pressing the corresponding TEST button.

Turn the jog dial to change the bar graph reading.



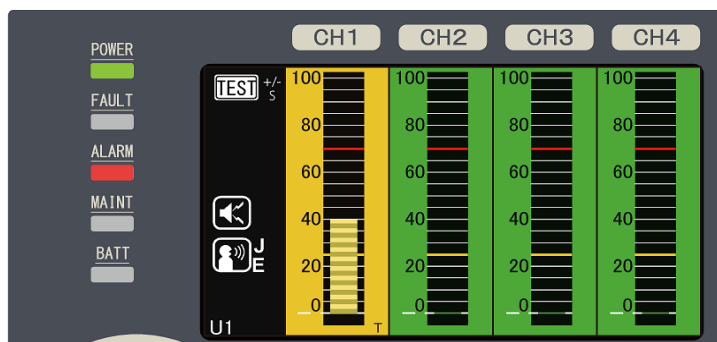
### Test Output Standby Mode (E.g., CH1 is in test output standby mode)

- Press the ENTER button to enter the test output mode. The unit will perform an alarm operation corresponding to the test value set in Step 2.

\*To return the channel to the test output standby mode, press the MENU/CANCEL button.

### NOTE

During the test output mode, a gas alarm can be activated.



**Test Output Mode (E.g., 1st stage gas alarm is activated for CH1)**

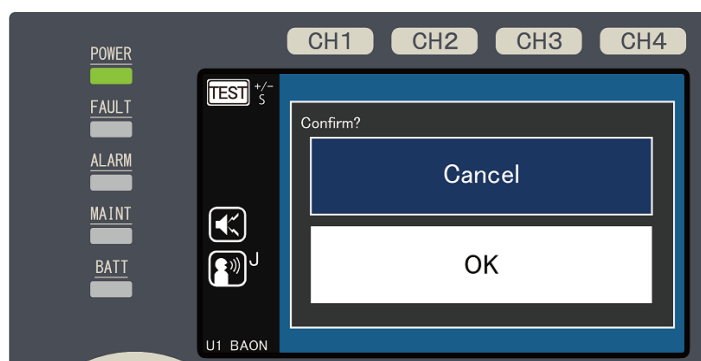
- Check that the unit produces a gas alarm properly. Press the BZ STOP/RESET button to mute the audio gas alarm. The gas alarm indication (test output mode) is retained on the screen.

\*To end the test mode without saving the current test value, perform Step 5.

\*To end the test mode while saving the current test value, perform Steps 6 to 8.

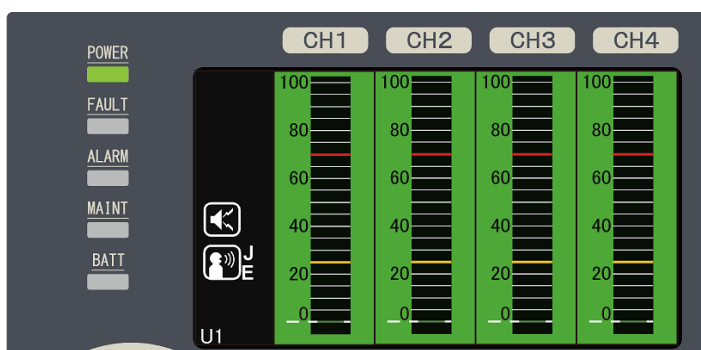
- Press the MENU/CANCEL button to return to the test output standby mode. Press and hold the TEST button. The test will end, and the screen will return to normal operation mode.
- Press and hold the TEST button (or ENTER button). A dialog box will appear asking you whether you want to end the test.
- Select "OK" using the jog dial.

\*To return to the previous screen, press the MENU/CANCEL button.



**Dialog box asking you if you want to end the test**

- Press the ENTER button. The test will end, and the screen will return to normal operation mode.



**Normal Operation Mode**

### 11.8.2 One-Touch Zero Adjustment

The one-touch zero adjustment allows adjusting the reading (zero point) to zero per channel. To enter this mode, press and hold the ZERO button for the target channel while on the HOME screen. Press the ENTER button to execute this adjustment. Upon completion of the adjustment, "Adj completed." will appear on the screen. To end the adjustment, press the MENU/CANCEL button and then hold the ZERO button.



#### CAUTION



- Perform a zero adjustment while the connected gas detector is in clean air. Proper gas detection is not possible if a zero adjustment is performed while the gas detector is in a gas atmosphere.
- Perform a zero adjustment at the initial power-up or after sensor replacement.
- The external relay contacts are active during zero adjustment. Before performing a zero adjustment, set the unit to maintenance mode or release the interlocks of external devices, as needed, to prevent their possible activation.
- Zero adjustment is disabled during the warm-up cycle. Perform a zero adjustment after the warm-up cycle is completed and the sensor output (reading) is stable.

#### NOTICE

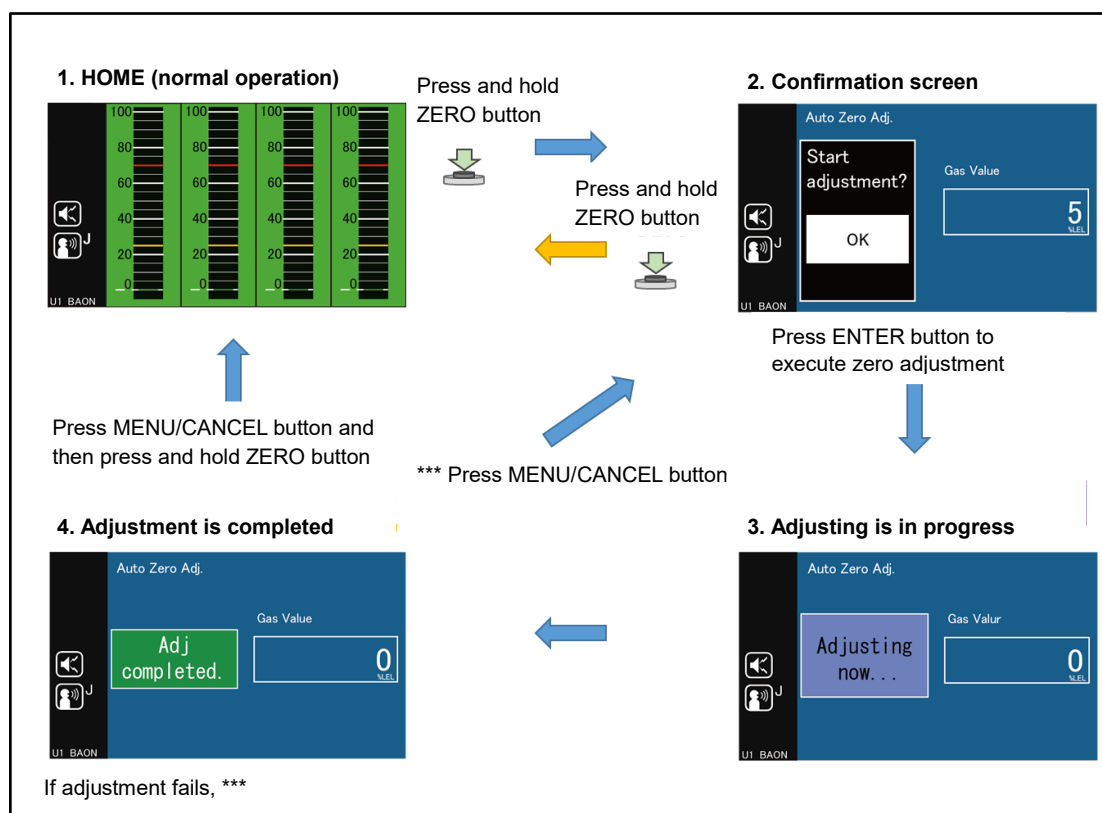


Do not press the CH.SWITCH button during zero adjustment, because it will switch channels.

#### NOTICE

- If the connected gas detector has not been powered for an extended period of time (e.g., the period from factory shipment to initial power-up), the gas concentration bar graph reading (sensor output) may take some time to stabilize.
- Once a zero adjustment is executed, it cannot be canceled.

#### Operation Flow



**NOTE**

- A zero adjustment can be cancelled by pressing the MENU/CANCEL button before the zero adjustment is executed. However, once a zero adjustment is executed, it cannot be canceled.
- If an error message “W-CAL” appears on the screen, refer to 13 “Error Messages and Solutions” (page 54) for information on the necessary action to be taken.
- The button operation to return to the HOME screen is not the same between manual zero adjustment and one-touch zero adjustment.

**11.8.3 One-Touch Span Adjustment**

This one-touch span allows adjusting the reading (span value) to “1.6 times of the 1st alarm set value” (fixed value) per channel. To enter this mode, press and hold the SPAN button for the target channel while on the HOME screen. Apply test gas (whose concentration is the 1st alarm set value x 1.6 times) to the corresponding gas detector. Press the ENTER button to execute span adjustment. Upon completion of the adjustment, “Adj completed.” appears on the screen. End the adjustment by pressing the MENU/CANCEL button and then holding the SPAN button.

**CAUTION**

- Perform a zero adjustment before a span adjustment.
- Perform a span adjustment at the initial power-up or after sensor replacement.
- The external relay contacts are active during span adjustment. Before performing a span adjustment, set the unit to maintenance mode or release the interlocks of external devices, as needed, to prevent their possible activation.
- Span adjustment is disabled during the warm-up cycle. Perform a span adjustment after the warm-up cycle is completed and the sensor output (reading) is stable.

**NOTICE**

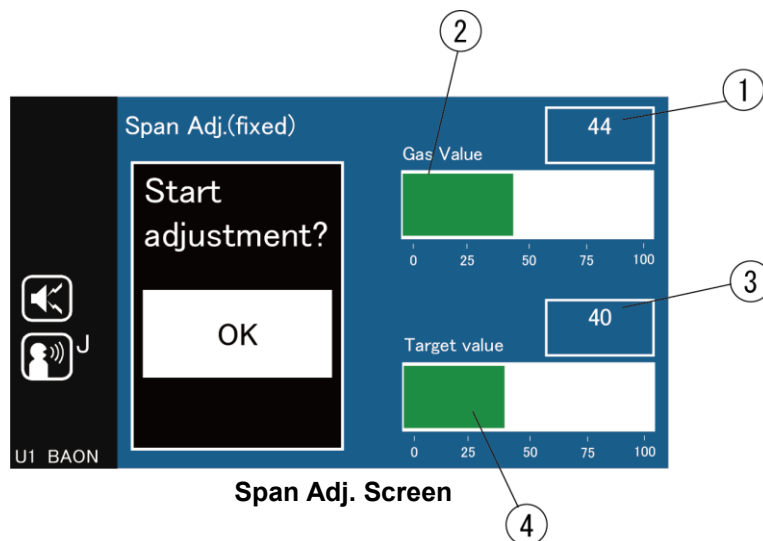
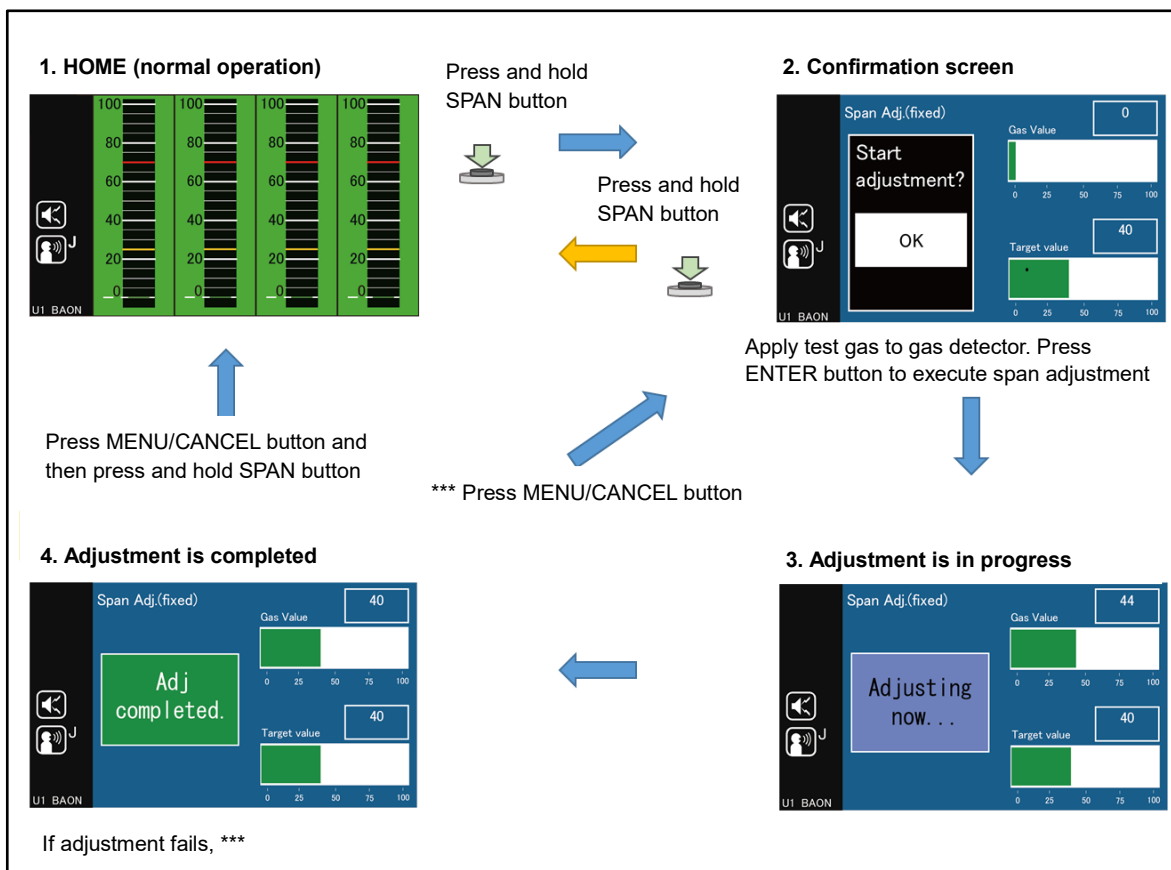
- Span adjustment is extremely dangerous and requires special attention because it uses actual gas. Therefore, it must be performed by a New Cosmos-authorized technician.
- Do not press the CH.SWITCH button during span adjustment, because it will switch channels.

**NOTICE**

- The span value should be within 0 to 100% of the full-scale value. If “1.6 times of the 1st alarm set value” exceeds 100% of the full-scale value, the span will be adjusted to the 100% full-scale value.
- Once a span adjustment is executed, it cannot be canceled.

Optional items (e.g., calibration kit, gas bag, tube) may be required for span adjustment depending on the gas type. Refer to the instruction manual for the gas detector for more information.

## Operation Flow



| Item | Component                         | Description  |
|------|-----------------------------------|--|
| 1    | Reading (current value)           | Displays the present test gas concentration value  |
| 2    | Bar graph reading (current value) |  |
| 3    | Reading (target value)            | Displays the 1st stage alarm set value x 1.6 times |
| 4    | Bar graph reading (target value)  |  |

### NOTE

A span adjustment can be cancelled by pressing the MENU/CANCEL button before the span adjustment is executed. However, once a span adjustment is executed, it cannot be canceled.

### Ref.

If an error message "W-CAL" appears on the screen, refer to 13 "Error Messages and Solutions" (page 54) for information on the necessary action to be taken.



## 12 Maintenance

This chapter explains the procedures for a routine check, periodical inspection and part replacement.

### 12.1 Routine Check and Periodical Inspection


Routine checks are carried out by the user, while periodical inspections are performed by New Cosmos or its authorized representative.

|                       | Action by         | Frequency             | Check item              | Procedure  |
|-----------------------|-------------------|-----------------------|-------------------------|--|
| Routine check         | Operator          | Daily                 | Visual check            | <ul style="list-style-type: none"> <li>• Check that the green POWER LED is lit and the unit operates.</li> <li>• Check that the red BATT LED is off.</li> <li>• Check that the yellow FAULT LED is not blinking.</li> <li>• Check the display (gas concentration bar graphs, icons, measurement unit, etc.) for any abnormal indication.</li> <li>• Check the unit for corrosion.</li> <li>• Check the mounting screws for corrosion.</li> </ul> |
|                       |                   | Monthly               | Circuit check           | <ul style="list-style-type: none"> <li>• Check the alarm operation using test mode (check that the unit produces a gas alarm properly).</li> <li>• Check the battery life expectancy through a battery voltage test (check that the battery voltage test result is good).</li> </ul>   |
| Periodical inspection | Service personnel | Half-yearly or Yearly | Sensor unit calibration | <ul style="list-style-type: none"> <li>• Contact New Cosmos or its authorized representative for inspection.</li> </ul>  |
|                       |                   |                       | Battery check           |  |

#### Important Notice for Periodical Inspection



To ensure the reliability of the gas detection and alarm system, it is vital to perform periodic maintenance and inspections. Further, it is necessary to perform inspections and calibrations using actual gas. It is highly recommended that a maintenance contract with a local New Cosmos representative be made for the performance of periodical inspections.

Installation, inspection, maintenance, calibration and proof testing shall only be performed by trained personnel.

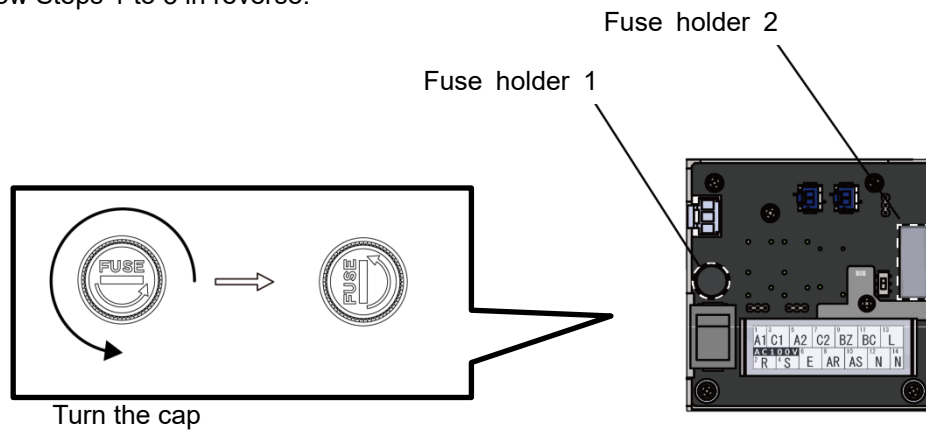
| NOTICE  |  |
|---|--|
|  | <ul style="list-style-type: none"> <li>• When in the test mode, the external relay contacts and voltage outputs are active (they are inactive when in the maintenance mode). If the external relay contacts/voltage outputs are being used to interlock external devices, release the interlocks, as needed, before checking the alarm operation using the test mode.</li> <li>• Notify those concerned before starting the gas alarm inspection.</li> </ul> |



### 12.1.1 Fuse Replacement

This product uses two fuses, which are housed in the fuse holders 1 and 2.

|  <b>WARNING</b> |   |
|--|---|
|                 | <ul style="list-style-type: none"> <li>Set the power switch to OFF before fuse replacement. Fuse replacement with the power on may cause injury or device failure.</li> <li>Use the specified fuses.</li> </ul> |







1. Pull the two latches down to the unlock position. Pull the front panel open (Ref. 6.1 on page 16).
2. Set the power switch to OFF.
3. Turn the cap counterclockwise to remove it from the fuse holder.
4. Pull and detach the fuse from the fuse holder. Install a new fuse into the fuse holder.
5. Follow Steps 1 to 3 in reverse.



|  <b>CAUTION</b> |  |
|--|--|
|                 | <p>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.</p> |

### 12.1.2 AC-DC Power Supply Unit Life

The service life of the AC-DC power supply unit is about five years after being shipped out.





|  <b>DANGER</b>  |   |
|--|---|
|                 | <ul style="list-style-type: none"> <li>Do not replace the AC-DC power supply unit in a place where combustible gas or ignitable material is present.</li> </ul>   |
|  <b>WARNING</b> |   |
|                 | <ul style="list-style-type: none"> <li>Set the power switch to OFF before AC-DC power supply unit replacement.</li> <li>Use the specified AC-DC power supply unit.</li> </ul>   |
|  <b>CAUTION</b> |   |
|                 | <ul style="list-style-type: none"> <li>AC-DC power supply unit replacement should be performed by service personnel only (i.e., neither operator nor supervisor).</li> <li>When replacing the AC-DC power supply unit, ensure that the harnesses do not get caught in the chassis.</li> </ul> |

### 12.1.3 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.

|  <b>DANGER</b>  |   |
|--|---|
|                 | <p>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.</p>  |
|  <b>WARNING</b> |   |
|                 | <ul style="list-style-type: none"> <li>Use the specified batteries.</li> <li>Set the power switch to OFF before battery replacement.</li> <li>Observe the following precautions for the safe use of batteries. Incorrect use of batteries may cause them to leak, heat, ignite or explode:             <ul style="list-style-type: none"> <li>Do not charge used batteries.</li> <li>Do not short-circuit batteries.</li> <li>Do not disassemble, deform or modify batteries.</li> <li>Do not heat or throw batteries into a fire.</li> <li>Do not expose/soak batteries to/in freshwater or seawater.</li> </ul> </li> </ul> |

| ⚠ CAUTION |   |
|-----------|---|
| ⊘         | <ul style="list-style-type: none"> <li>Do not remove the harness connected to the batteries.</li> </ul>   |
| !         | <ul style="list-style-type: none"> <li>Battery replacement should be performed by service personnel only (i.e., neither operator nor supervisor).</li> <li>Replace the two batteries at the same time.</li> </ul> |

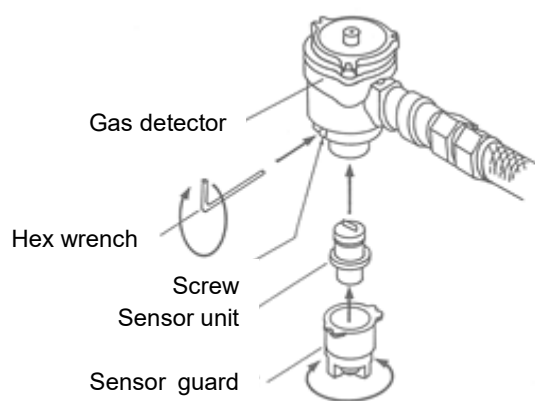
## 12.2 Sensor Unit Replacement

| ⚠ WARNING |   |
|-----------|---|
| !         | <ul style="list-style-type: none"> <li>Before opening any part of the gas detector, turn off the NV-520 unit. Energized detector may become a possible source of ignition.</li> </ul> |

| ⚠ CAUTION |   |
|-----------|---|
| !         | <ul style="list-style-type: none"> <li>Be careful not to damage or strike joint surfaces of the gas detector during sensor unit replacement. Keep joint surfaces clean and free from any damage. Contaminates such as scratches, fingerprints, dirt and oil may adversely affect the explosion-proof characteristics of the product.</li> <li>Incorrect replacement procedure may compromise the performance of the product.</li> <li>Perform zero and span adjustments after sensor unit replacement.</li> <li>Sensor unit replacement should be performed by service personnel only (i.e., neither operator nor supervisor).</li> </ul> |

### 12.2.1 Sensor Unit Replacement Procedure for KD-5A (B)-N Diffusion Type Gas Detector

- Set the power switch to OFF.  
(For the backup power type, set both the power and backup power switches to off.)
- Loosen the screw with hex wrench (M4).
- Rotate the sensor guard about 30 degrees counterclockwise to remove it.
- Pull down to remove the sensor unit.
- Install a new sensor unit. Reinstall the sensor guard and fully rotate it clockwise.
- Fully tighten the screw with hex wrench (M4).
- Set the power switch to ON.  
(For the backup power type, set both the power and backup power switches to ON.)
- Perform zero and span adjustments.

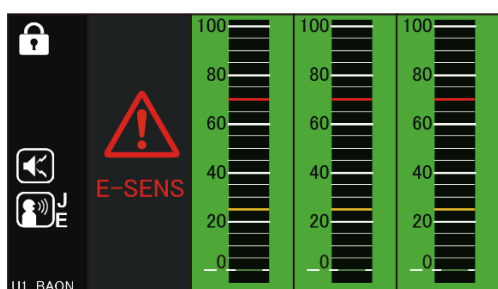


**Ref.** Refer to 6.2 "Power On/Off" for how to operate the power switch.

#### NOTE

- Return used sensors to New Cosmos or its authorized representative, or dispose of them in accordance with the applicable laws and regulations.
- For sensor unit replacement procedure for KD-2A/KD-3A gas detector, refer to the KD-2A/KD-3A gas detector's instruction manual.

## 13 Error Messages and Solutions



This product has a self-diagnosis function, and if a problem occurs with the device, the corresponding error message (e.g., E-SENS, W-CAL) will replace the gas concentration bar graph to alert the user, along with a beeping sound or a voice message. In addition, the corresponding error code (e.g., E-13) will be added to the event history, which can be viewed from the Information menu (page 42).

The table below lists major error messages and their corresponding solutions. If an error message is displayed, take

necessary actions by referring to the table below. If a message other than the ones listed in the table is displayed or if the problem persists after performing the corresponding solution, please contact New Cosmos or its authorized representative and provide them with the error message or error code.

| Error message on screen | Problem  | Possible cause  | FAULT LED | Voltage output | Solution  |
|-------------------------|--|---|-----------|----------------|---|
| E-SENS                  | Gas detector broken wire                             | Broken wire in cable A.   | Blinks    | 0 VDC          | Check and rewire it.<br>(Refer to NV-520 instruction manual for installation.)                                    |
|                         | Gas detector short-circuit                           | Broken wire in cable B.<br>Cables A and C are short-circuited.  |           |                |   |
|                         | Gas detector 1-5 mA input broken wire                | Broken wire in detector's signal cable.   |           |                |   |
|                         | Pyrolyzer broken wire                                | Broken wire in detector's pyrolyzer current cable.  |           |                |   |
| E-UNIT                  | Main PCB 24VDC power voltage error                   | Power voltage is too low.<br>(Even if power voltage is self-restored, the product may remain in an unstable state.) | Off       | 6 VDC          | AC type: Check the AC-DC power supply unit's service life.<br>AC/DC type: Check that the power voltage is stable. |
| W-CAL                   | Span adj. lower limit error                          | Incorrect gas concentration (calibration gas) was applied.  | Off       | 6 VDC          | Check that the gas type and concentration of calibration gas are correct. Perform span adjustment.                |
|                         | Span adj. upper limit error                          |   |           |                |   |
|                         | Zero adj. lower limit error                          | Gas is present in the vicinity of the gas detector.   |           |                | Check that there is no gas around the gas detector. Perform zero adjustment while the detector is in clean air.   |
|                         | Zero adj. upper limit error                          |   |           |                |   |
|                         | Pyrolyzer current adj. lower limit error             | Applied pyrolyzer current is too low.   |           |                | Contact New Cosmos or its authorized representative.  |
| W-UNIT                  | Broken wire in signal cable between Units (U1/U2/U3) | Broken wire in signal cable between Units, or poor wire harness connection between Units.                           | Off       | 6 VDC          | Check the wire harness connection between Units (U1/U2/U3) and reconnect. Restart the product.                    |
|                         | Setting or adjusting error                           | Product is in unstable state during device setting/detector adjustment  | Off       | 6 VDC          | Reset or readjust.  |

### NOTE

When an error is detected, the corresponding error message and the gas concentration bar graph will be displayed on the screen alternately.

## 14 Troubleshooting

Before requesting a repair, please refer to the table below. If the product does not return to normal operation after performing the corresponding steps in the table or if your issue is not found in the table, consult New Cosmos or its authorized representative.

If the product goes into any unintended mode during adjustment or setting, cease the use of the product and consult with your supervisor.

| Problem  | Probable cause   | Steps/Ref.   |
|--|--|--|
| Setting the power switch to ON does not turn the green POWER LED on.                       | Incorrect or loose wiring  | Check and rewire (refer to 7.3 “Wiring and Connection” of Instruction Manual for Installation).  |
|  | Blown fuse   | Replace the fuse with a new one (refer to 12.1.1 “Fuse Replacement”).  |
| Setting the power switch to ON does not turn the LCD on.                                   | Poor internal connection   | Contact us for repair.   |
| Red MAINT LED is lit or blinks.  | Product is in maintenance mode.  | Turn off maintenance mode (refer to 11.3 “Maintenance Mode Setting”).  |
| No contact output.   | Product is in maintenance mode.  | Turn off maintenance mode (refer to 11.3 “Maintenance Mode Setting”).  |
|  | Incorrect wiring   | Check and rewire (refer to 7.3 “Wiring and Connection” of Instruction Manual for installation).  |
|  | Gas alarm set value set in the gas detector and the one set in the product do not match. | Check the gas alarm set values on HOME screen (refer to “Items 15 and 16” on page 12).   |
| Cannot make zero/span adjustment.  | Product is in a warm-up cycle.   | Operate the product after the warm-up cycle is completed (refer to 6.2 “Power-on, Operation Flow and Power-off”).  |
| Cannot access the zero/span adjustment screen.   | Gas detectors’ setup details (full-scale value, gas alarm set values, etc.) are invalid. | Contact us or your supervisor for setting. When contacting us, please provide us with the gas detector’s sensor type (Ci or Cv) by checking the HOME screen (refer to “Item 18” on page 12). |
| Cannot operate.  | Safety lock is activated.  | Deactivate the lock (refer to 11.1.2 “Deactivate Safety Lock”).  |
| Cannot start a battery voltage test (i.e., cannot access the battery voltage test screen). | Backup battery switch is off (i.e., “BAOFF” is displayed on the LCD).                    | Set the backup battery switch to ON (i.e., “BAON” will replace “BAOFF”) (refer to 2.2.3 “Internal Appearance”).  |

# 15 Specifications

|   |            |  |          |          |                    |            |
|---|------------|--|----------|----------|--------------------|------------|
| Product                                       |            | Multi-channel gas alarm system   |          |          |                    |            |
| Model   |            | NV-520   |          |          |                    |            |
| Gas detector(s) to be connected* <sup>1</sup> |            | Detection principle: Catalytic combustion<br>Target gas: LPG   |          |          |                    |            |
| Power voltage* <sup>2</sup>                   |            | AC type: 100-240 VAC±10%, 50/60Hz<br>DC type: 24 VDC±10%   |          |          |                    |            |
| Power consumption* <sup>3</sup>               |            |  | AC type  |          | DC type            |            |
|   |            |  | Standard | Max.     | Standard           | Max.       |
|   |            | 2-channel  | 12 VA    | 15.6 VA  | 9.6 W              | 12.5 W     |
|   |            | 4-channel  | 22.4 VA  | 29.2 VA  | 17.9 W             | 23.3 W     |
|   |            | 8-channel  | 44.8 VA  | 58.3 VA  | 35.8 W             | 46.6 W     |
|   |            | 12-channel   | 67.3 VA  | 87.5 VA  | 53.8 W             | 70.1 W     |
|   |            | Backup power type  | + 4.0 VA | + 6.0 VA | Non-usable         | Non-usable |
| External outputs                              | Collective | • Signal output: Voltage output<br>• 1st stage gas alarm contact: Dry N.O. Max. load: 250 VAC 2A, 30 VDC 2A (resistive load)<br>• 2nd stage gas alarm contact: Dry N.O. Max. load: 250 VAC 2A, 30 VDC 2A (resistive load)<br>• Audio alarm contact: Dry N.O. Max. load: 250 VAC 2A, 30 VDC 2A (resistive load) |          |          |                    |            |
|   | Dedicated  | • Signal output: Voltage output<br>• 1st stage gas alarm contact: Dry N.O. Max. load: 250 VAC 2A, 30 VDC 2 A (resistive load)<br>• 2nd stage gas alarm contact: Dry N.O. Max. load: 250 VAC 2A, 30 VDC 2 A (resistive load)<br>• Pump power output: 24 VDC Max. 0.3 A* <sup>4</sup>                            |          |          |                    |            |
| Display                                       |            | Color LCD with backlight   |          |          |                    |            |
| Status indicator                              |            | Green POWER LED, red ALARM LED (1st stage gas alarm: blinks and 2nd stage gas alarm: blinks rapidly) and yellow FAULT LED  |          |          |                    |            |
| Gas alarm                                     |            | • 1st stage gas alarm: ALARM LED blinks red + LCD turns yellow + beeping + voice message played “Danger! Gas Alarm”<br>• 2nd stage gas alarm: ALARM LED rapidly blinks red + LCD turns red + fast beeping + voice message played “Danger! Gas Alarm”   |          |          |                    |            |
| Fault alarm                                   |            | FAULT LED blinks yellow + error message on-screen + fast beeping + voice message* <sup>5</sup>   |          |          |                    |            |
| Gas alarm clearance method                    |            | Manual-resetting   |          |          |                    |            |
| Alarm set value* <sup>2</sup>                 |            | As per the delivery specifications   |          |          |                    |            |
| Alarm accuracy                                |            | As per the connected gas detector  |          |          |                    |            |
| Response time                                 |            | As per the connected gas detector  |          |          |                    |            |
| Compliance                                    |            | RoHS directive (2011/65/EU + (EU) 2015/863)  |          |          |                    |            |
| Color of enclosure                            |            | Resin: DIC546 1/2 Metal: DIC548  |          |          |                    |            |
| Mass  |            | Non-backup power type  |          |          | Backup power type  |            |
|   |            | 2-channel: 3.2 kg  |          |          | 2-channel: 5.2 kg  |            |
|   |            | 4-channel: 3.4 kg  |          |          | 4-channel: 5.4 kg  |            |
|   |            | 6-channel: 5.6 kg  |          |          | 6-channel: 7.9 kg  |            |
|   |            | 8-channel: 6.0 kg  |          |          | 8-channel: 8.4 kg  |            |
|   |            | 10-channel: 7.3 kg   |          |          | 10-channel: 9.3 kg |            |
|   |            | 12-channel: 7.8 kg   |          |          | 12-channel: 9.8 kg |            |
| Dimensions                                    |            | 2-channel without backup power: W221mm×D71.5mm×H338mm  |          |          |                    |            |
|   |            | 2-channel with backup power: W299mm×D71.5mm×H338mm   |          |          |                    |            |
|   |            | 4-channel: W299mm×D71.5mm×H338mm   |          |          |                    |            |
|   |            | 6/8-channel W496mm×D71.5mm×H338mm  |          |          |                    |            |
|   |            | 10/12-channel: W644mm×D71.5mm×H338mm   |          |          |                    |            |

(Continued to next page)

|                             |   |
|-----------------------------|---|
| Operating temperature       | Non-backup power type: -10°C to 50°C<br>Backup power type: 0°C to 40°C<br>No rapid temperature change.  |
| Operating humidity          | 0 to 90% RH No condensation.  |
| Mounting method             | Wall-mounting or panel-mounting   |
| Ingress protection          | IP2X when installed   |
| Backup power type<br>*2*6*7 | In the event of a power outage, the unit will continue continuous gas monitoring for the next 120 minutes, followed by intermittent monitoring (70 seconds each at 15-minute intervals). The intermittent monitoring will last for max. 2 days. |

\*1. Only New Cosmos-manufactured gas detectors can be connected to this product.

\*2. Needs to be specified at the time of order.

\*3. Consumption power when the maximum number of gas detectors are connected.

\*4. Do not use the pump power output for any purposes other than intended. The output voltage changes depending on the specifications and operation status of the pump. The DC type is dependent on the power voltage, and the AC type is dependent on the battery voltage.

\*5. Voice message changes depending on the nature of the fault. Refer to 7.3.1 (page 21).

\*6. Gas alarm accuracy is compromised in the intermittent gas-monitoring mode, as the sensor output becomes unstable during this mode. Consequently, a gas alarm may be activated even though the concentration does not reach the gas alarm set value.

\*7. The duration of continuous gas monitoring may change depending on the number of connected gas detectors, gas detector type, and connection condition. If the duration of continuous gas monitoring is shortened, then intermittent gas monitoring may not follow the continuous gas monitoring.

\*Specifications above may be subject to change without notice for product improvement.

\*N.O.: Normally open



## 16 Warranty

The warranty period is one (1) year from the date of purchase.

You are entitled to a limited warranty if the product malfunctions due to a manufacturing defect during normal use in accordance with the instruction manual, specifications and labels.

### Warranty Scope

If the product fails or is found to be damaged due to a manufacturing defect during the warranty period, and used in accordance with the instruction manual and specifications, we will provide a free replacement and repair service. This warranty covers the New Cosmos product/parts only and does not cover third-party products/parts.

### Warranty Exclusions

The following will be repaired at the cost of the customer even during the warranty period.

- (1) Failures and damages incurred due to incorrect use, deliberate acts or negligence by the user.
- (2) Failures and damages caused by events of disaster, earthquake, storm and flood, lightning, extreme climate, abnormal power supply voltage, excessive electromagnetic interferences, or other acts of God.
- (3) Failures and damages resulting from repair and/or modification by non-New Cosmos certified technicians.
- (4) Consumables and failures and damages resulting from improper consumable replacement.
- (5) Other failures and damages not attributable to the manufacturer.

## 17 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.   |
| Target gas  | Specific gas to be detected, whose concentration is to be displayed and used to trigger alarms.   |
| Alarm set value   | A gas concentration value set on a gas detector for alarm activation.   |
| Alarm accuracy  | Difference between the alarm set value and the detected gas concentration that activates the alarms. It may also be expressed as a % with respect to the alarm set value.   |
| Operating temperature/humidity range                        | Ambient temperature/humidity range in which the gas detection and alarm system can operate normally.  |
| Maintenance and inspection                                  | Tasks performed to ensure that equipment operates normally and correctly.   |
| 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.  |
| Explosive atmosphere  | Mixture of air and flammable substances in the form of dust or vapor that are within their explosive limits.  |
| Zero suppression (or 20.9 suppression for oxygen detection) | For display units with a zero suppression (or 20.9 suppression) function, the bar graph display will continue to indicate “0” (or 20.9 vol%) until the target gas concentration detected by the detector exceeds the preset value. The preset value is stated in the delivery specifications. |
| Clean air or normal air                                     | Standard atmosphere, which contains 20.9 to 21.0% oxygen in dry conditions or an atmosphere without target gas or interference gases.   |
| Aging   | Calibration process of energizing a sensor for a certain period of time to stabilize the sensor output.   |



#### Revision History

| Document No. | Date      | Revision           |
|--------------|-----------|--------------------|
| GAE-175-00   | July 2023 | 00 (Initial issue) |
|              |           |                    |
|              |           |                    |

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

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