Single-Point Gas Alarm System
NV-120 series
Instruction Manual for Operation

Keep this manual for easy reference.
Prior to use, carefully read this manual as well as NV-120 series 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 If your unit has end-user-specific options, this manual will be superseded by your delivery specifications.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-154-03
September 2022

NEW COSMOS ELECTRIC CO.,LTD.

Related Manuals

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

(1) NV-120 series Instruction Manual for Installation, No. GAE-153-xx

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

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

One manual is provided per order, not per unit.

(2) NV-120 series Instruction Manual for Operation (this document), No. GAE-154-xx

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

- Basic construction and component names/functions
- Unit dimensions and components, power on/off and troubleshooting
- Operation modes and on-screen menus
- Maintenance procedure and consumable replacement

One manual is provided per order, not per unit.

(3) NV-120 series wiring diagram with gas detector, No. GAE-158-xx

This document shows typical wiring configurations when connected with a gas detector and provide supplement information for the installation.

One manual is provided per order, not per unit.

Introduction

Thank you for purchasing the New Cosmos NV-120 series single-point gas alarm system (“product” or “unit” hereafter).

Prior to use, please read this manual as well as NV-120 series instruction manual for installation (No. GAE-153-xx) and follow the instructions provided for correct use.

Periodic maintenance is essential to maintain the reliability of the product. Perform periodic maintenance checks in the manner described in this document.
Keep this manual in a safe place for easy reference.

This unit is used in connection with a gas detector (or gas detector head) that can detect a variety of combustible/toxic gases at the site (one target gas at one detector/time). Install the gas detector at a location where it is necessary to detect the target gas. Install the unit at a location convenient for monitoring the gas concentration.

This unit shows the gas concentration detected by the corresponding gas detector on its bar graph display. In case the detector detects a leak of the target gas that exceeds a preset limit or reduction of concentration to a level below a preset limit in the case of oxygen, the unit produces audio-visual alarms (e.g., LED, beep sound, voice message), thus helping prevent incidents such as low oxygen, gas poisoning and explosion.

There are various types of NV-120 series units. They are divided into four groups according to the gas detector types they are used with, and they are further divided into the following seven models according to the gas sensor types. The wiring, adjustments and other unit-related items can vary from group to group. This manual clearly specifies the name of the applicable group/model and shows that the information or instruction provided applies to a certain group/model only.

CE marking specification is applied to NV-120Mx which uses 24 VDC power supply. Refer to the “EU Declaration of Conformity” (separate document) for more information on the CE marking unit.

Group	Model Variation
Group 1	NV-120Hv
	NV-120Cv
Group 2	NV-120Sx
	NV-120Dx
Group 3	NV-120Mx
Group 4	NV-120Hi
	NV-120Ci

A few acts are prohibited without the prior consent of New Cosmos. Please note that 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. The aforementioned acts are the following:

- 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 the utmost care. If any incorrect description comes to your notice, please contact us for correction.

Symbols Used in this Instruction Manual

Symbols for Danger Levels

Operators' safety has been put first in designing this product. However, there exist some unavoidable risks due to the system characteristics. In this manual, safety symbols are divided into three categories, Danger, Warning and Caution, depending on the severity and magnitude of the risks. Carefully read the contents related to the precautions before 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.

DANGER

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

WARNING

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

CAUTION

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

NOTICE

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.

NOTE Provides supplemental or useful information on product handling.

Ref. Details the related information or procedure.

	Don’ts Indicates a prohibited action.
	Mandatory Indicates an action that must be done.
	Electrical hazard Warns of risk of electric shock under a certain condition.
	Explosive hazard Warns of a risk of explosion while handling explosive items.
	Corrosive hazard May cause burn or loss of sight if skin or eye comes into contact.

Quick Index

This page lists parts that may be often referenced.

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

Unit Dimensions and Components
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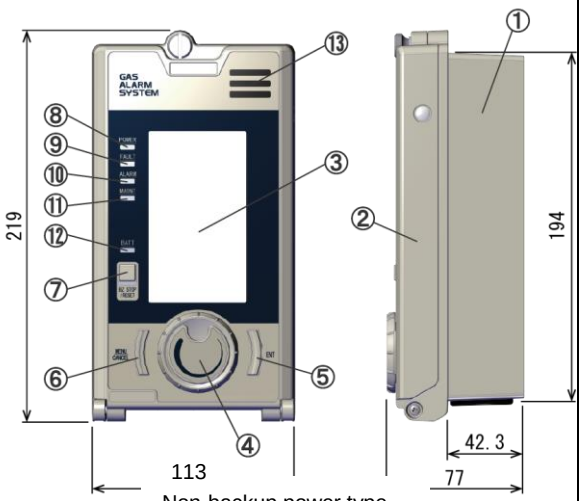

Non-backup power type

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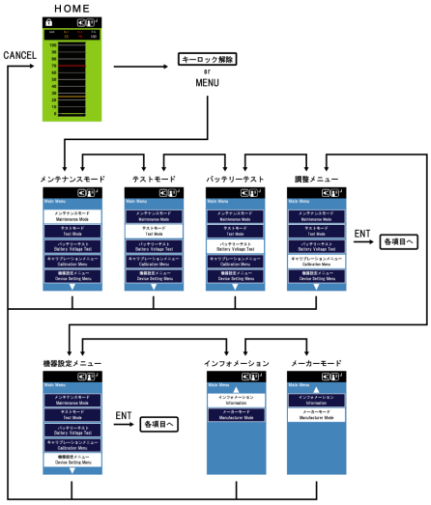

Power-on and Power-off
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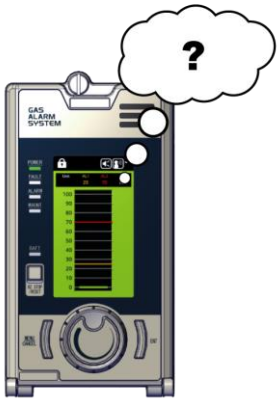


Table of Contents

1 General Precautions

1.1 Before Work

In order to ensure safe use, carefully read the precautions in this manual before turning on this product to prevent unexpected accidents. New Cosmos is not responsible for the cost incurred or any damage resulting from any usage other than that outlined in this document.

This chapter “General Precautions” provides a general description of methods of safely using this product as well as safety information and cautions related to this product.

1.2 Safety Precautions

Carefully read the following precautions for correct use.
Use this product in accordance with the applicable laws and regulations.
Wiring and installation should only be performed by a qualified electrician with knowledge of wiring/installation procedures in accordance with the applicable technical standards.

DANGER
• Operation check using actual gas is extremely dangerous and requires a special attention, because combustible gas may have a risk of explosion and toxic gas may be harmful to human health. It must be performed by qualified personnel or a New Cosmos authorized technician. • In the event of a gas alarm, take necessary actions to prevent gas poisoning. • This product is not explosion-proof and should not be installed in a hazardous area.

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

WARNING
• Ground the product to prevent electric shocks. • In the event of a gas leak alarm, follow safety procedures in accordance with your company's regulations.

CAUTION
• Do no use radio wave-emitting devices (e.g., cell phones, wireless devices) 30 cm of the product. • Do not disassemble, modify, or alter the structure of the product or its electrical circuits. Doing so may compromise product performance.

CAUTION
• Wiring and installation should only be performed by a qualified electrician with knowledge of wiring/installation procedures, in accordance with the applicable technical standards. • New Cosmos is not responsible for the cost incurred or any damage resulting from controlling external equipment (e.g., interlock) by using the product's outputs (e.g., analog output, alarm relay contact output). • Only use this product in accordance with the applicable laws and regulations. • This product is not drip-proof and should be kept away from splashing water or rain.

1.3 Warning and Caution Labels Affixed to Product

Warning and Caution labels are affixed to the areas or surrounding parts that are potentially dangerous and require a special attention.

WARNING
• To ensure safety, check the locations of the Warning and Caution labels and carefully read them prior to operation. • If Warning and Caution labels are missing, damaged or illegible, please contact us for replacement.

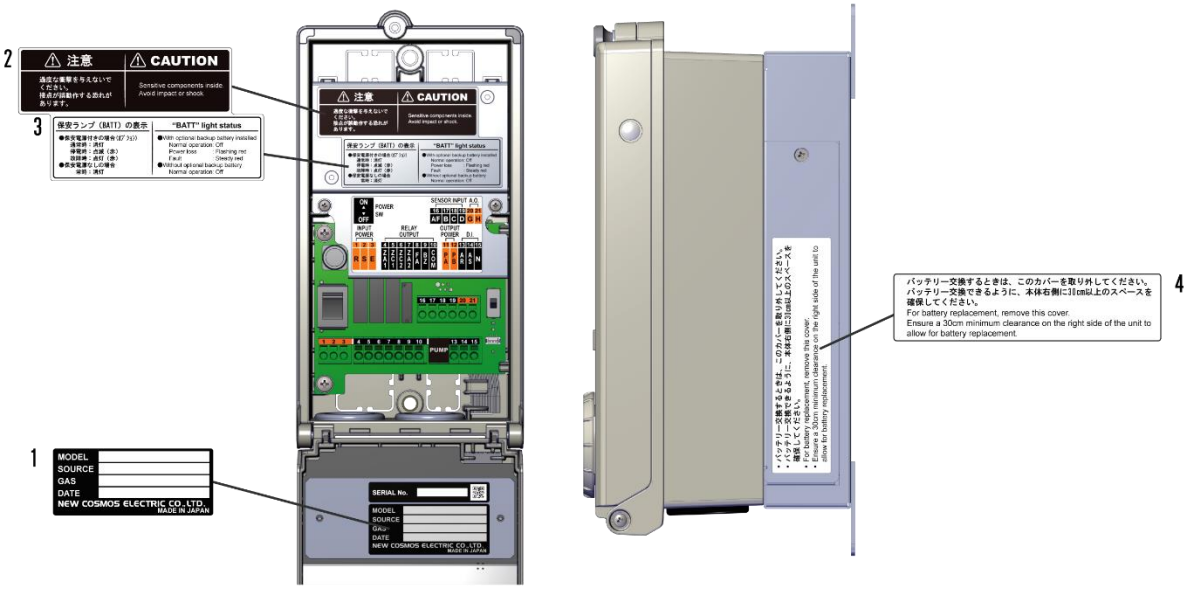
Warning and Caution labels use size and color that are appropriate to draw the attention of the operator and provide the risk levels with symbols.

- Refer to "1.3.1 Warning and Caution Labels Affixed to Product" for information on the labels affixed to the product. Read the labels to be alert to possible dangers and their locations and meet the requirements provided by the labels.
- Do not remove or damage the Warning and Caution labels.
- It is very dangerous to leave the Warning and Caution labels dirty or obscured. Please contact New Cosmos or its authorized representative for new labels.

1.3.1 Warning and Caution Labels Affixed to Product

WARNING
Do not relocate the Warning and Caution labels affixed to the product.

Carefully read the contents of the labels prior to use.



Item	Description
1	**Power rating label** Indicates the model, power source, target gas, and manufacturing date.
2	**Caution label** Indicates the cautions to be adopted while handling this product.
3	**BATT light status label** Describes the backup battery status that the BATT LED indicates.
4	**Caution label for battery replacement (only for backup power type unit)** Indicates cautions for installation space and battery replacement.

1.4 Working Clothes and Protective Equipment

WARNING
• Wear your company-specified working clothes and use protective equipment while working around the unit. • Wear the right size working clothes that do not interfere with the work.

1.5 Batteries

This product uses two lead storage batteries (when the unit is backup power type).
The batteries need to be replaced periodically.
The battery life varies depending on the frequency of use and environment conditions.
Follow the precautions below for proper operation.

⚠ WARNING

Batteries may short-circuit resulting in electric shock or burns.

Follow the precautions listed below:

- Avoid thermal, electrical and mechanical impact on the batteries.
- Do not disassemble the batteries. Do not insert external metal in the connections on the product's power or signal cable. Doing so may cause electric shock, heat, ignition or injury.
- In order to prevent rapid battery discharge, protect the battery's electrode from direct contact with other electrolytes or metal objects. Battery discharge may cause heat or battery leak.
- Store batteries in a clean and dry place at a temperature of 30°C or lower to prevent degradation.
- Do not place tools or other metal objects on the batteries.

⚠ CAUTION

- Do not mix new and old batteries.
- Use the specified batteries. Unspecified batteries may cause device failure.

⚠ CAUTION

- Dispose of batteries in accordance with the applicable laws and regulations.
- If abnormal odor, noise or smoke is observed during operation, cease the operation immediately and disconnect the power plug. Continued operation under such circumstances may cause a fire.
- Replace the batteries periodically. Using expired batteries may cause a battery leak, which will then result in a secondary disaster such as an electric leak, electric shock, smoke or ignition.

1.5.1 Battery Location

Item	Description
1	Battery x 2 pcs

1.5.2 Battery Replacement Procedure

Refer to “6.1.2 Battery Replacement”.

1.5.3 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/shorten the performance/life of the batteries and cause their terminal corrosion.

The battery life is about two years from the month of manufacture. After two years, replace the batteries even if they pass the battery voltage test.

“Two years” is only an estimate, and no guarantee is provided. The battery life may vary depending on several factors including frequency of use, temperature and usage or storage conditions.

DANGER	
	In order to prevent serious secondary disasters such as a broken battery case or ignition, replace the batteries periodically.

CAUTION	
	Using expired batteries will cause internal battery degradation, which may disable the unit to operate for designed hours with the backup batteries after power outage, or may cause an abnormal appearance such as a swollen battery case, battery leak or electric leak.

1.5.4 Battery Disposal

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

WARNING	
	Do not heat or throw batteries into a fire. Improper handling may lead to explosion.

WARNING	
	Do not open or disassemble batteries. Electrolyte is harmful, and its contact with eyes and skin is dangerous.

1.6 Product Disposal

Dispose of the used product in accordance with the applicable laws and regulations.

1.7 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-120 series instruction manuals for installation and operation. When the service life has expired, replacement is essential for continued reliable performance and other purposes.

1.8 Definition of Supervisor/Operator/Service Personnel

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

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

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.

Non-backup power type (Unit with no backup batteries)

Item	Qty.	Description
NV-120 unit	1	
Replacement fuse	1*3	250 V 2 A Φ5.2 × 20mm
Wall-mounting kit	1*1	Mounting screws (M5 × 15), pan-head x 2 pcs
Panel-mounting kit	1*2	Mounting bracket S x 1 pc Mounting screws (M5 × 15) x 2 pcs Pan-head, used for attaching bracket to unit Tension screw (M6 × 40) x 2 pcs Pan-head, used for attaching bracket to panel
Flat-head screwdriver	1*3	Used to open/close the terminal plugs
NV-120 series instruction manual set	1*3	Instruction manual for installation (GAE-153-xx) x 1 pc Instruction manual for operation (GAE-154-xx) x 1 pc
NV-120 series wiring diagram	1*3	Wiring diagram with gas detector (GAE-158-xx) x 1 pc
Inspection certificate	1	
Ferrite core	2	Protect the unit from electrical noise.
Cable tie	2	Used to secure the ferrite core.

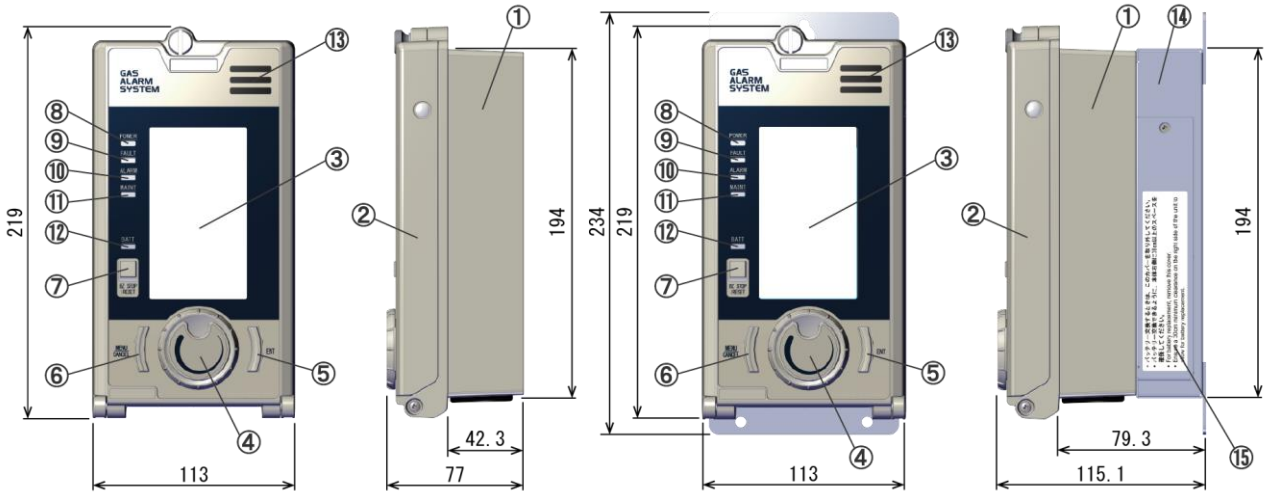
Backup power type (Unit with backup batteries)

Item	Qty.	Description
NV-120 unit	1	
Replacement fuse	1	250 V 2 A Φ5.2 × 20mm
Wall-mounting kit	1*1	Mounting screws (M5 × 15), pan-head x 3 pcs Upper mounting plate x 1 pc Lower mounting plate x 1 pc Mounting screw (M3 × 6) x 4 pcs Flat-head, used for attaching mounting plates to unit
Panel-mounting kit	1*2	Mounting bracket B x 1 pc Mounting screws (M5 × 8) x 2 pcs Pan-head, used for attaching bracket to unit Tension screw (M6 × 40) x 2 pcs Pan-head, used for attaching bracket to panel
Flat-head screwdriver	1*3	Used to open/close the terminal plugs
NV-120 instruction manual	1*3	Instruction manual for installation x 1 pc Instruction manual for operation (this document) x 1 pc
Inspection certificate	1	
Ferrite core	2	Protect the unit from electrical noise.
Cable tie	2	Used to secure the ferrite core.

*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. One screwdriver/manual is provided per order, not per unit.

2.2 Unit Dimensions and Components

2.2.1 Main Unit (Exterior Appearance)



Non-backup power type **Backup power type**

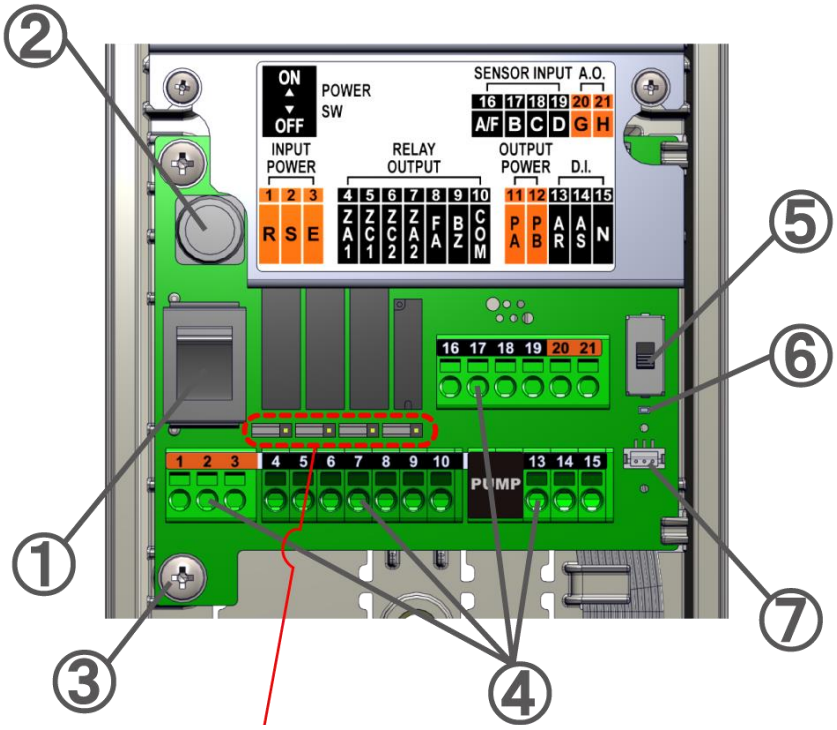
(mm)

Item	Component	Description
1	Case	–
2	Cover	–
3	LCD	Shows gas concentration on the display. Refer to “2.2.3 LCD” for details.
4	Jog dial	Turn to select item or increase/decrease the parameter value.
5	ENT button	Press and hold to confirm the selection or setting. Press to increase/decrease the parameter value.
6	MENU/CANCEL button	Press to switch to the menu, return to the previous menu or cancel the current operation.
7	BZ STOP/RESET button	Its LED flashes when a gas alarm activates. BZ STOP: Press to mute the audio alarm (beep sound and voice message). The flashing LED will become steadily lit. RESET: Press and hold to clear the peak hold indication and visual gas alarm. The LED will turn off. The RESET operation is enabled after the audio alarm is muted.
8	Green POWER LED	Indicates the operation status. Not lit when the unit is off. Flashes when the warm-up is in progress. Lit when the unit is operating normally.
9	Amber FAULT LED	Indicates the operation status. Not lit when the unit is operating normally. Flashes when a fault has been detected.
10	Red ALARM LED	Indicates the alarm operation status. Not lit when the warm-up is in progress or unit operates normally. Flashes when 1st stage gas alarm activates. Flashes rapidly when 2nd stage gas alarm activates.

Item	Component	Description
11	Red MAINT LED	Indicates the maintenance mode status. Not lit when it is not in the maintenance mode but in normal operation. Flashes when the unit is in maintenance mode 1. Lit when the unit is in maintenance mode 2.
12	Red BATT LED	Indicates the backup power status. Off indicates normal operation. Backup batteries are not used. Flashing indicates that backup batteries are being used. On indicates that backup battery failure has been detected. *This LED is always off when the unit is non-backup power type.
13	Audio opening	Opening or audio. Gas leak or device fault alarm will be issued by beep sound and voice message. Refer to “4.5 Audio Alarms” of NV-120 series instruction manual for operation.
14	Battery case	Comprise a backup power supply unit (backup battery x 2 pcs)
15	Battery lid	

2.2.2 Main Unit (Interior Appearance)

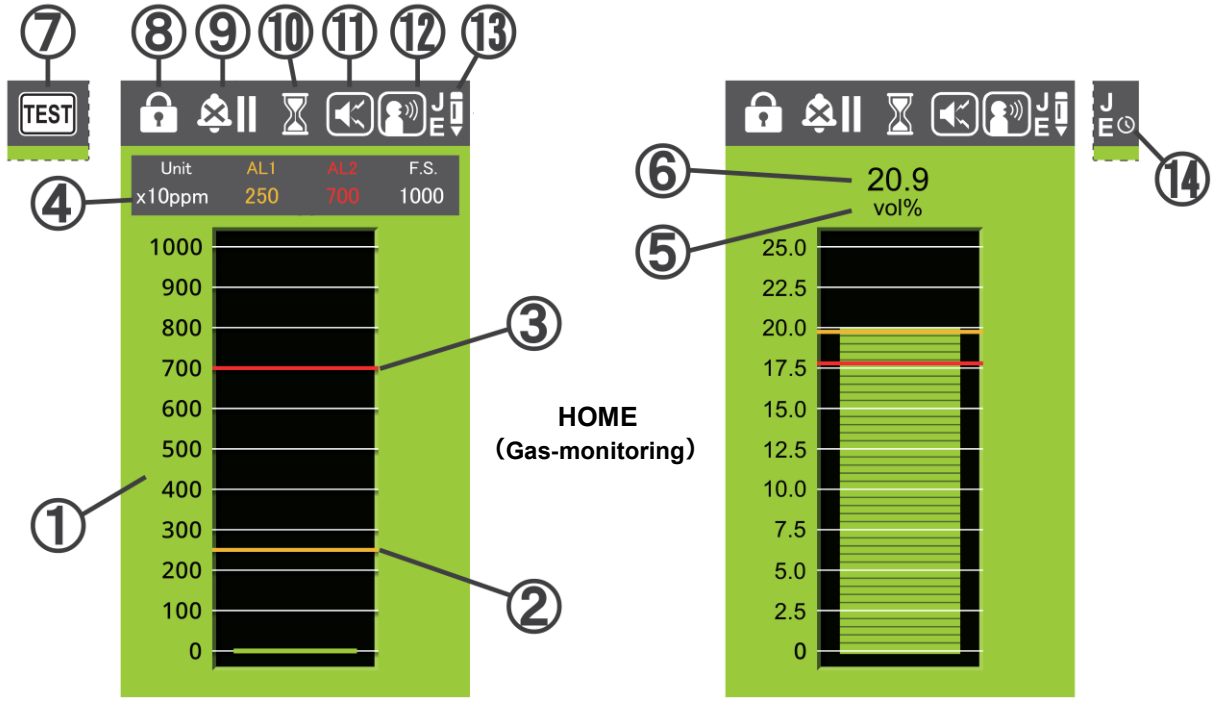
⚠ CAUTION	
	Do not touch the jumper pins inside. They are for device setting.



Do NOT touch these pin sockets.
They are for setting the jumper pins inside.

Item	Component	Description
1	Power switch	Press to turn on/off the unit.
2	Fuse holder	Houses a 2A fuse.
3	Earth terminal	Used for grounding the unit. Thread size: M4
4	Terminal block (4 places)	Used for external wiring.
5	Backup power switch	Turns on/off the backup power supply unit. *Only available for backup power type unit.
6	Backup power LED	Lit when the backup power switch is in the on position.
7	Analog output connector	Used for checking the analog output. Applicable connector: ZHR-3 (J.S.T.)

2.2.3 LCD

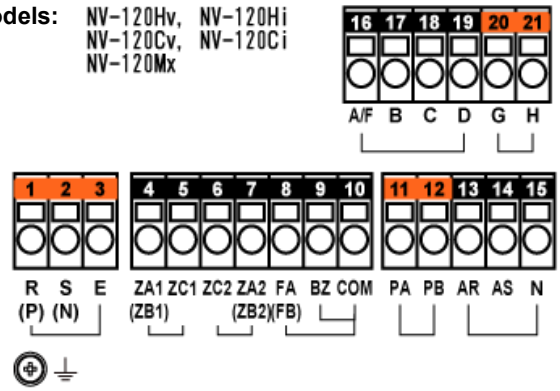


Target gas: Gas other than oxygen **Target gas: Oxygen**

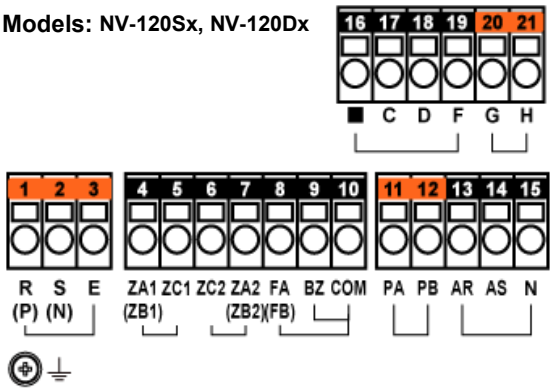
Item	Component		Description
1	Gas concentration bar graph		Displays the gas concentration and alarm set values.
2	1st stage gas alarm set value		Displays the 1st stage gas alarm set value with orange line.
3	2nd stage gas alarm set value		Displays the 2nd stage gas alarm set value with red line.
4	Unit (unit of measurement)		Displays the unit of measurement for the gas concentration. Note: “x10” is displayed when the largest value is greater than the four-digit limit. E.g., If the largest value is 10,000 ppm, then “1000” is displayed for the bar graph with “x10”.
	AL1 (1st stage gas alarm set value)		Displays the 1st stage gas alarm set value.
	AL2 (2nd stage gas alarm set value)		Displays the 2nd stage gas alarm set value.
	F.S. (full scale value)		Displays the full scale value.
5	Unit of measurement		Displays the unit of measurement for oxygen concentration.
6	Gas concentration		Displays the oxygen concentration. Note: This is displayed only when the target gas is oxygen.
7	TEST	Test icon	This icon is present when the unit is in test mode. It replaces the lock icon during the test mode.
8		Lock icon	This icon is present when the button/dial operation is locked.
9	/	Maintenance icon	This icon is present when the unit is in maintenance mode 1 or 2.
10		Warm-up icon	This icon is present when the unit is in warm-up cycle.
11	/	Speaker icon	This icon is present when the audio alarm is unmuted/muted.
12	/	Voice icon	This icon is present when the voice message is unmuted/muted.
13		ENT icon	Press and hold the ENT button for confirmation.
14		Internal process icon	This icon is present when an internal process is in progress. It replaces the ENT icon during the internal processing.

2.2.4 Terminal Blocks

Models: NV-120Hv, NV-120Hi
NV-120Cv, NV-120Ci
NV-120Mx



Models: NV-120Sx, NV-120Dx



Terminal	Identifier	Description
Power (Input)	R (P)	AC type: 100 to 240 VAC DC type: 24 VDC (+)
	S (N)	AC type: 100 to 240 VAC DC type: 24 VDC (-)
	E	Earth
(Earth terminal)	⏚	Earth Thread size: M4
AL1 (1st stage gas alarm)	ZA1 (ZB1)	1st stage gas alarm contact output Normally-open or Normally-closed*1
	ZC1	Common for ZA1 (ZB1)*2
AL2 (2nd stage gas alarm)	ZC2	Common for ZA2 (ZB2)*2
	ZA2 (ZB2)	2nd stage gas alarm contact output Normally-open or Normally-closed*1
Fault (Fault alarm)	FA (FB)	Fault contact output Normally-open or Normally-closed*1
Buzzer (Alarm sound)	BZ	Alarm sound contact output
Common	COM	Common for Fault and Buzzer contact outputs*2
Detector (Power output for pump)	PA	24 VDC (+)
	PB	24 VDC (-)
External switch	AR	External switch (button) input
	AS	
	N	
Detector	A/F	Gas detector*1
	B, C	
	C, D	
	D, F	
4-20mA OUT (Analog output)	G	Analog output signal (+)
	H	Analog output signal (-)

*1. As per delivery specifications.

*2. These common terminals are not connected (individual-common) by default, unless otherwise specified at the time of order. To connect them (to short-circuit the common lines: shared-common), refer to the attached wiring diagram (GAE-158-xx).

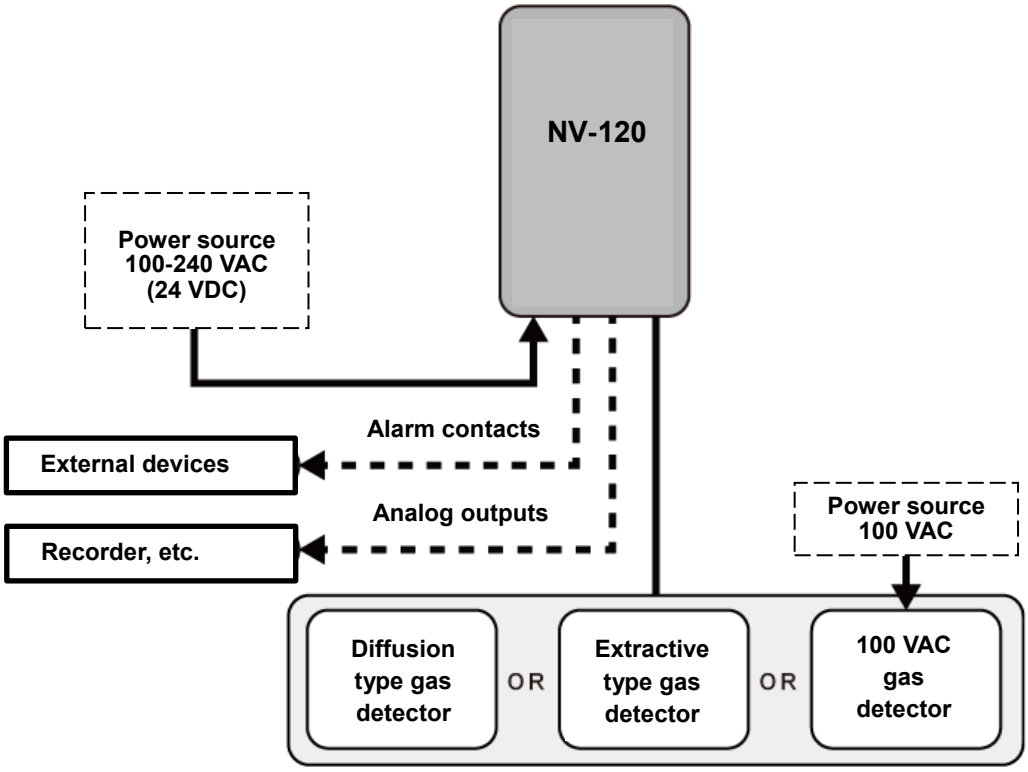
Contact Outputs

Outputs to external devices (e.g., signal towers, alarm horns, etc.) are referred as “contact outputs”.

NOTICE	
	• Contacts use mechanical relays, which can activate on exposure to magnet force. Install the product in a place free from a magnetic field. Do not use a magnet in the vicinity of the product. • Contacts use mechanical relays, which can activate on exposure to excessive shock or vibration. Install the product in a place free from shock and vibration. Set a delay time greater than one second for external devices connected to the product. • Use the product in a place where the rated load is not exceeded.

3 System Configuration

This NV-120 unit is paired with a gas detector (sold separately) to form a gas detection system. All the parts are connected with cables. The unit displays the gas concentration detected by the connected gas detector and produces audio-visual alarm if the concentration reaches a present limit.



Typical System Configuration

NOTE

- One gas detector, diffusion or extractive type, can be connected to each NV-120 unit. Use a protective cover (sold separately) for the gas detector for outdoor installation. Refer to the gas detector's instruction manual for details.
- Wiring differs depending on a connected gas detector.
- Refer to the NV-120 series instruction manual for installation for wiring procedure.

4 Operation

This section provides information and details the procedures for using this product.

- Operation at power-up
- Operation mode after power-up
- Gas alarm operation and clearance method
- Operation in the event of a fault
- Voice message and beep sound
- Backup power type specification

4.1 Power-on and Power-off

⚠ CAUTION
• Turn on the product while no gas is present around the connected gas detector. • Check that all wiring is correct before turning on the external devices (e.g., signal towers, alarm horns, etc.) connected to this product.

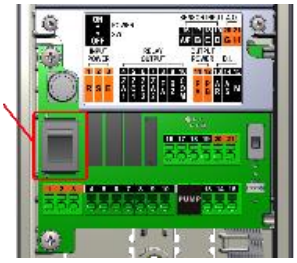
4.1.1 Power-on

1 Turn and loosen the knurled screw of the cover counterclockwise. Open the cover.

⚠ CAUTION
Hold the cover with your hand while opening/closing it. Flinging the cover may cause injury or product damage such as a broken LCD.

2 Set the power switch to the on position.

Power switch



NOTE When the warm-up cycle is completed, the unit will enter the gas-monitoring mode (normal operation).

Ref. Refer to “4.2.1 Power-up” for details about the warm-up operation.

3 Check that the backup power switch is in the on position (for your backup power type unit).

⚠ CAUTION

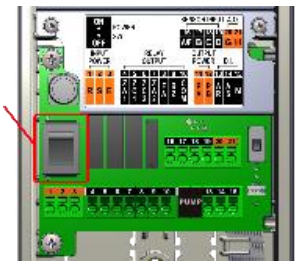
Backup power is not supplied when the backup power switch is in the off position.

4 Close the cover.
Firmly tighten the knurled screw.

4.1.2 Power-off

1 Turn and loosen the knurled screw of the cover counterclockwise. Open the cover.
2 Set the power switch to the off position.

Power switch



3 Set the backup power switch to the off position (for your backup power type unit).

NOTICE

Backup power continues to be supplied to the unit when the backup power switch is in the on position, even though the power switch is in the off position. Set the backup power switch to the off position to completely turn off the unit.

4 Close the cover.
Firmly tighten the knurled screw.

4.2 Operation Flow at Power-up

The power-up operation flow is as follows:

Power-up → Warm-up →Gas-monitoring mode (HOME screen)

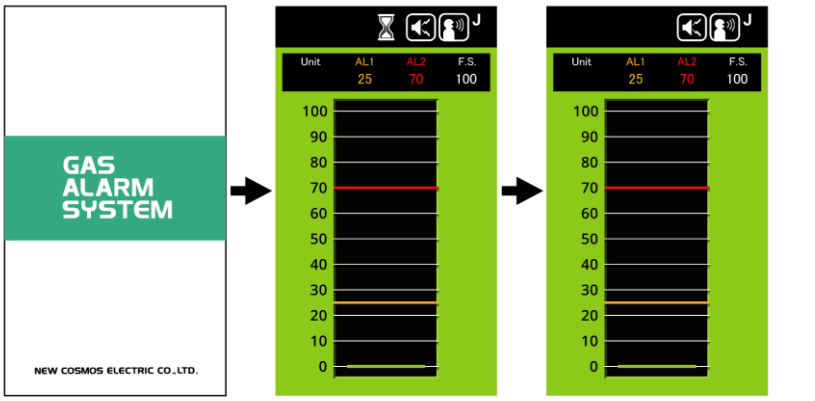
Ref. Refer to “4.2.1 Power-up” for information on the warm-up and normal operation.
Refer to “4.3 Gas Alarm Operation” for operation while a gas alarm is activated.

4.2.1 Power-up (Warm-up)

⚠ CAUTION

- When the sensor output is not stable, the external relay contact may possibly activate. To prevent possible activation of the external relay contact after the warm-up is completed, release the interlocks of the external devices, as needed.
- During the warm-up cycle, the analog signal is fixed at a certain value and the external relay contacts are deactivated.
- Zero or span adjustment is not possible during the warm-up cycle. Perform a zero or span adjustment after the warm-up cycle is completed and the reading becomes stable.

Set the power switch to the on position. The screen will change in the sequence shown below.



Start-up **Warm-up** **Normal operation (gas-monitoring mode)**

*These drawings are just for an example. The screen differs depending on the delivery specifications.

Indication/output	Power-on	Power-up	Warm-up	Normal operation (gas-monitoring mode)
Green POWER LED	On	Flashing		On
Amber FAULT LED	On	Off		
Red ALARM LED	On	Off		Normal operation: Off 1st stage gas alarm: Flashes. 2nd stage gas alarm: Flashes rapidly.
Red MAINT LED	On	Off		
Red BATT LED	Off			
Analog output	0mA		Fixed at 4mA, 17.4 mA or 10.7mA.*	Value corresponding to the gas concentration
Contacts	Inactive			Active

*Differs depending on the target gas:
Oxygen (F.S. 25 vol%): 17.4mA Oxygen (F.S. 50 vol%): 10.7mA Others: 4mA

NOTE

- Refer to “5.2 Maintenance Mode” for information on the display indication and outputs during the maintenance mode.
- The warm-up cycle lasts approx. 30 to 600 seconds (as per the delivery specifications) once the unit is powered.
- If the unit was powered off while in the maintenance mode, it will be in that maintenance mode when power is restored once more.

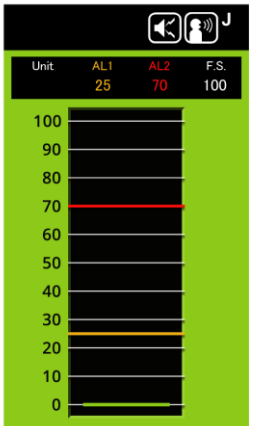
Ref. Refer to “4.3.1 Gas Alarm Operation during Normal Operation” for gas alarm operation during the warm-up cycle.

4.3 Gas Alarm Operation

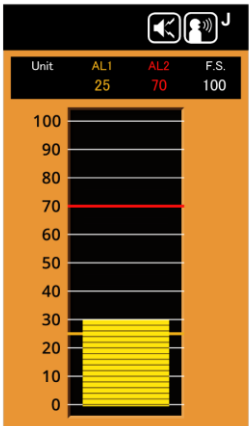
This section explains the operation when a gas alarm activates as well as the method to clear a gas alarm.

4.3.1 Gas Alarm Operation during Normal Operation

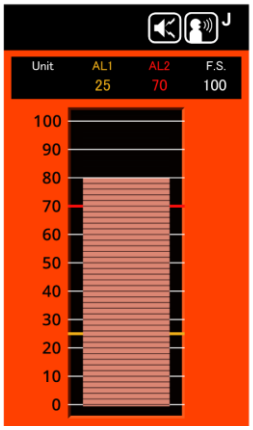
If the gas concentration or test value exceeds a preset value, a gas alarm will activate.
The background color changes depending on the alarm level. It turns green during normal operation, turns orange when 1st stage gas alarm activates, and turns red when 2nd stage gas alarm activates.



Normal Operation



1st stage gas alarm



2nd stage gas alarm

*These drawings are just for an example. The screen differs depending on the delivery specifications.

Indication/output		Warm-up	Normal operation (gas-monitoring mode)	
			1st stage gas alarm	2nd stage gas alarm
Green POWER LED		Flashing	On	
Amber FAULT LED		Off		
Red ALARM LED		Off	Flashing	On
Red MAINT LED		Off		
Red BATT LED		Off		
LCD	Bar graph	Gas concentration*1	Gas concentration	
	Background color	Green	Orange	Red
Analog output		Fixed at 4mA, 17.4mA or 10.7mA*2	Value corresponding to gas concentration	
Contacts		Inactive	Active	
Beep sound		Beeping*3		
Voice message		Sounding*3		

*1. The value gradually becomes close to zero. If it does not become zero, perform a zero adjustment while no gas around is present around the gas detector.
*2. Differs depending on the target gas.
Oxygen (F.S. 25vol%): 17.4mA
Oxygen (F.S. 50vol%): 10.7mA
Others: 4mA
*3. Can be changed in the settings.

4.3.2 Gas Alarm Operation during Maintenance Mode

This section explains the unit operation when a gas alarm activates while in the maintenance mode.

Alarm operation during maintenance modes 1 and 2

If a gas concentration or test value exceeds the alarm set value, a gas alarm will activate.

Indication/output		Maintenance mode 1		Maintenance mode 2	
		Normal operation	Test mode	Normal operation	Test mode
Green POWER LED		On			
Amber FAULT LED		Off			
Red ALARM LED		1st stage gas alarm: Flashing		2nd stage gas alarm: Flashing rapidly	
Red MAINT LED		Flashing		On	
Red BATT LED		Off			
LCD[*1]	Display	Gas concentration	Test value	Gas concentration	Test value
	Icon	Maintenance icon	Maintenance & test icons	Maintenance icon	Maintenance & test icons
Analog output		Value corresponding to gas concentration		Fixed at 4mA, 17.4mA or 10.7mA[*2]	
Contacts		Inactive (disabled)			
Beep sound		Muted (no beeping)			
Voice message		Sounding[*3]		Muted	

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

*2. Differs depending on the target gas.
Oxygen (F.S. 25vol%): 17.4mA
Oxygen (F.S. 50vol%): 10.7mA
Others: 4mA

*3. Can be changed in the settings.

4.3.3 Gas Alarm Clearance Method

(1) Auto-resetting and Manual-resetting

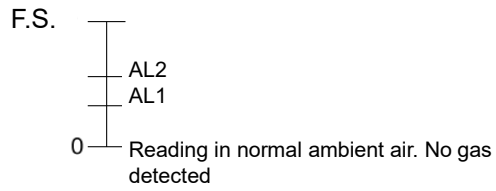
There are two methods to clear the gas alarm and specified at order placement.

Clearance method	Description
Auto-resetting	When the gas concentration falls below (exceeds) the “gas alarm set value minus (or plus) 2% of full scale value” after an alarm has been activated, the ALARM LED, relevant gas alarm icon and alarm contacts will automatically return to their normal positions/statuses.
Manual-resetting	Even if the gas concentration falls below (exceeds) the “gas alarm set value minus (or plus) 2% of full scale value” after an alarm has been activated, the ALARM LED, relevant gas alarm icon and alarm contacts will not automatically return to their normal positions/statuses. Pressing and holding the BZ STOP/RESET button cancels a gas alarm when the actual gas concentration falls below (or exceeds) the “gas alarm set value minus (or plus) 2% of full scale value”.

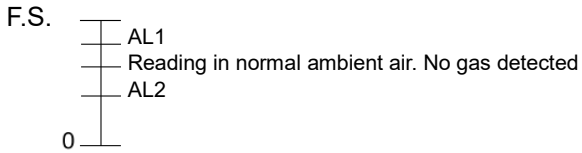
(2) Gas Alarm Mode

There are four kinds of gas alarm modes (H-H, L-L, H-L and L-H) and specified at order placement.

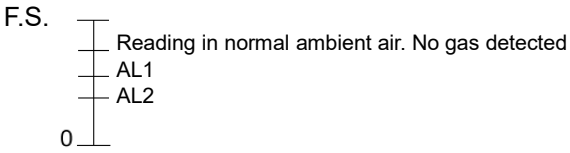
H-H mode (high- high limit alarm)



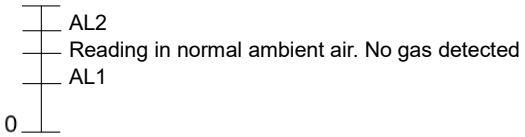
H-L mode (high-low limit alarm)



L-L mode (low- low limit alarm)



L-H mode (low-high limit alarm)



4.3.4 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 visual gas alarm is cleared.

Refer to “4.6 BZ STOP/RESET Button” for details on how to clear the visual gas alarm.

4.4 Operation in Event of Failure

This unit can detect an internal failure. The amber FAULT LED, LCD, and fault contact will activate depending on the nature of the failure. The corresponding error code will be displayed on the LCD.

Indication/output	Normal operation	In the event of a failure
Green POWER LED	On	
Amber FAULT LED	Off	On
Red ALARM LED	Off	
Red MAINT LED	Off	
Red BATT LED	Off	
LCD	Gas concentration	"Error code" and "gas concentration" displayed alternately
Analog output	Value corresponding to gas concentration	≤ 0.6mA
Fault contact	Not activated	Activated
Beep sound	Beeping*	
Voice message	Sounding*	

*Can be changed in the settings.

NOTE When you contact New Cosmos or its authorized representative for repair, please provide the error code shown on the LCD.

Ref. Refer to "7 Error Codes and Solutions" for steps to take in the event of a failure.

4.5 Audio Alarms

In the event of a gas alarm or failure, the unit emits a beeping sound and a voice message to alert the user. Refer to "4.6 BZ STOP/RESET Button" for the procedure to mute the audio.

Item	Icon	Description
Voice message		Unmuted To the right of the icon, letters corresponding to the selected languages are displayed. The 1st language is displayed on the upper line and the 2nd language on the lower line. J: Japanese, E: English, C: Chinese and K: Korean
		Muted
Beep sound		Unmuted
		Muted

4.5.1 Voice Message

The unit can select up to two languages (1st and 2nd languages) for voice message. Refer to “5.6.1 (4) Spoken Language”.
Example: When Japanese and English are selected as the 1st and 2nd languages respectively, the audio alarm cycles through in the following sequence if a 1st stage gas alarm is present.

→ 5 beeps → “Gas alarm (in Japanese)” → 5 beeps → “Gas alarm (in English)” →

Device status	Cause	Beep sound	Voice message			
			Japanese	English	Chinese	Korean
1st stage gas alarm	Gas concentration exceeds the 1st stage gas alarm set value.	√	ガス警報です	Danger! Gas Alarm	气体泄漏警报	가스 경보입니다
2nd stage gas alarm	Gas concentration exceeds the 2nd stage gas alarm set value.	√	ガス警報です	Danger! Gas Alarm	气体泄漏警报	가스 경보입니다
Main unit failure	Main unit failure	√	本体が故障です	Main unit failure	报警部故障	본체 고장입니다
Detector failure	Received a failure alarm signal from the connected gas detector.	√	検知部が異常です	Detector failure	检测器异常	검지기 이상입니다
Main unit error	Main unit function error	√	本体エラーです	Main unit error	报警部功能异常	본체 에러입니다
Adjustment error	Failed to adjust the sensor.	√	調整エラーです	Adjustment error	调整失败	교정 에러입니다
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	유량 에러입니다
Gas alarm during maintenance	Test alarm (gas alarm) created during maintenance mode for a simulated dangerous situation.		点検中です	Test in progress	维护中	점검중입니다
Fault alarm during maintenance	Test alarm (device fault alarm) created during maintenance mode.		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 Okay	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

NOTE The beep sound does not sound when the beep sound function is set to off.

4.6 BZ STOP/RESET Button

The BZ STOP/RESET has two key operations.

(1) Audio alarm mute

To mute the audio alarm (beep sound and voice message), press the BZ STOP/RESET button.

- In the event of a gas alarm
  The flashing BZ STOP/RESET LED will become steadily lit, and the audio alarm will be muted.
  The peak value will be maintained and displayed on the bar graph.
  It is possible to mute the audio alarm by using an external switch connected to the unit's external switch terminal.
- In the event of a device failure
  The flashing BZ STOP/RESET LED will become steadily lit, and the audio alarm will be muted.
- In the event of a device error
  The flashing BZ STOP/RESET LED will become steadily lit, and the audio alarm will be muted.

(2) Visual gas alarm clearance

To clear the visual gas alarm, press and hold the BZ STOP/RESET button.
This function is available only when the unit's gas alarm clearance method is manual-resetting.

NOTE

- First, press the BZ STOP/RESET button to mute the audio alarm, and then press and hold it to clear the visual gas alarm. The visual gas alarm cannot be cleared by holding the button while the audio alarm is not muted (while the BZ STOP/RESET LED is on).
- It is not possible to clear the visual gas alarm (and activated gas alarm contacts) as long as the actual gas concentration exceeds the gas alarm set value.

4.7 Backup Power Type

A unit with two backup batteries is referred to as “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 flashing, 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 the 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 if it stopped operation with over-discharged batteries.

⚠ CAUTION

- Backup power is not supplied when the backup power switch is in the off position. Check that the switch is in the on position.
- Perform a battery voltage test and visually check that the BATT LED is not on at least once a month during the routine check. Refer to “5.4 Battery Voltage Test” for the test procedure.

4.7.1 BATT LED

⚠ CAUTION

(For backup power type unit) While the BATT LED is on (steady red), backup power will not be provided from the backup batteries even if the main power fails, and a gas leak will not be properly alerted. If the BATT LED turns on, contact New Cosmos or its authorized representative for repair.

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

Condition	Green POWER LED	Red BATT LED	Gas alarm function
Normal operation	On	Off	Active
Power fails and backup power is provided.	On	Flashing	Active
Backup batteries failure	On	On	Inactive during power outage (Batteries need to be repaired)
Power is restored	On	Off	Active
Batteries discharged	Off	Off	Inactive (Batteries need to be charged)

4.7.2 Continuous and Intermittent Gas-monitoring Modes

Models: NV-120Ci and NV-120Cv

The unit will continue gas-monitoring for 120 minutes after a power outage breaks out, followed by intermittent gas-monitoring (10-second gas-monitoring at 15-minute intervals). However, if the unit falls into a gas alarm status during the intermittent gas-monitoring mode, the mode will switch to the continuous gas-monitoring mode.

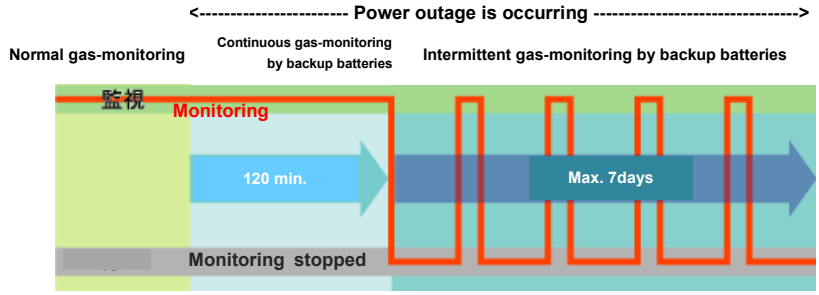
*1. When an extractive type gas detector is connected, the intermittent gas-monitoring duration will be shortened.

*2. Gas alarm accuracy is compromised during the intermittent gas-monitoring mode, since the sensor output becomes unstable during 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.

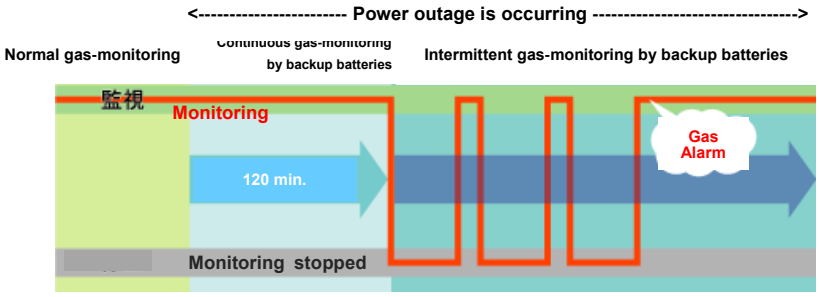
Expected gas-monitoring durations are listed below. They are just an estimate, and no guarantee is provided.

Qty. of batteries	Continuous gas-monitoring duration		Intermittent gas-monitoring duration	
	Diffusion type gas detector connected	Extractive type gas detector connected	Diffusion type gas detector connected	Extractive type gas detector connected
2 pcs	120 minutes		Max. 7 days	Max. 2 days

During normal operation



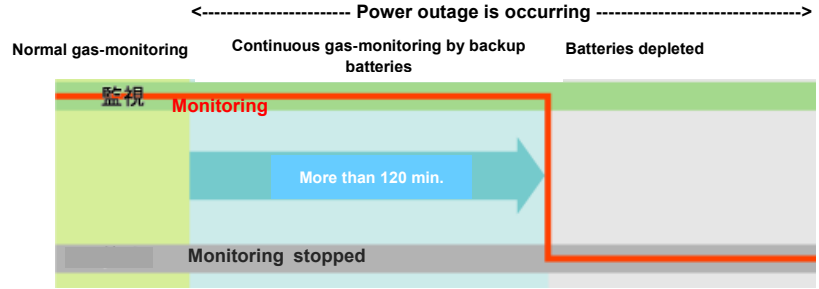
In the event of a gas alarm during the intermittent gas-monitoring mode



Models other than NV-120Ci and NV-120Cv

The continuous gas-monitoring will continue for more than120 minutes after a power outage starts. The duration differs depending on the delivery specifications. Expected gas-monitoring durations are listed below. They are just an estimate, and no guarantee is provided.

Continuous gas-monitoring duration	
Diffusion type gas detector connected	Extractive type gas detector connected
More than 120 minutes	



5 Operation Menus

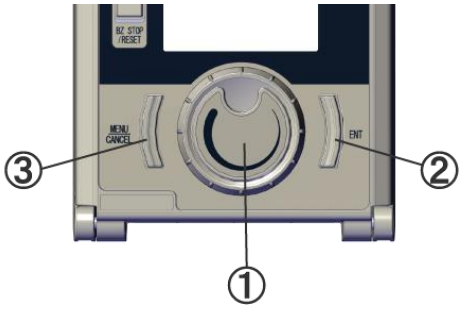
5.1 Overview of Operation Menus

This product has the menus shown in the table below.

Menu	Description
Maintenance Mode	Sets the maintenance mode to: Off: Maintenance mode is off. Maint.1: Maintenance mode 1 is on. Maint.2: Maintenance mode 2 is on.
Test Mode	Manually changes the test value (gas concentration) to start an alarm test.
Battery Voltage Test	Checks the battery life expectancy. *Not available for non-backup power type unit.
Calibration Menu	Performs calibrations such as zero/span adjustments.
Device Setting Menu	Changes the languages for voice message, alarm volume, and alarm set values or turns on/off (mute/unmute) the audio.
Information	Displays set information (e.g., full scale, alarm set values) and event history.
Manufacturer Mode	Only for supervisor/service personnel use. Not for operator use.

5.1.1 Buttons and Dial

The following buttons and dial are used for operation.



Item	Component
1	Jog dial
2	ENT button
3	MENU/CANCEL button

NOTE Slowly and firmly press the button or turn the jog dial. The unit may not react to too soft or too fast press or turn.

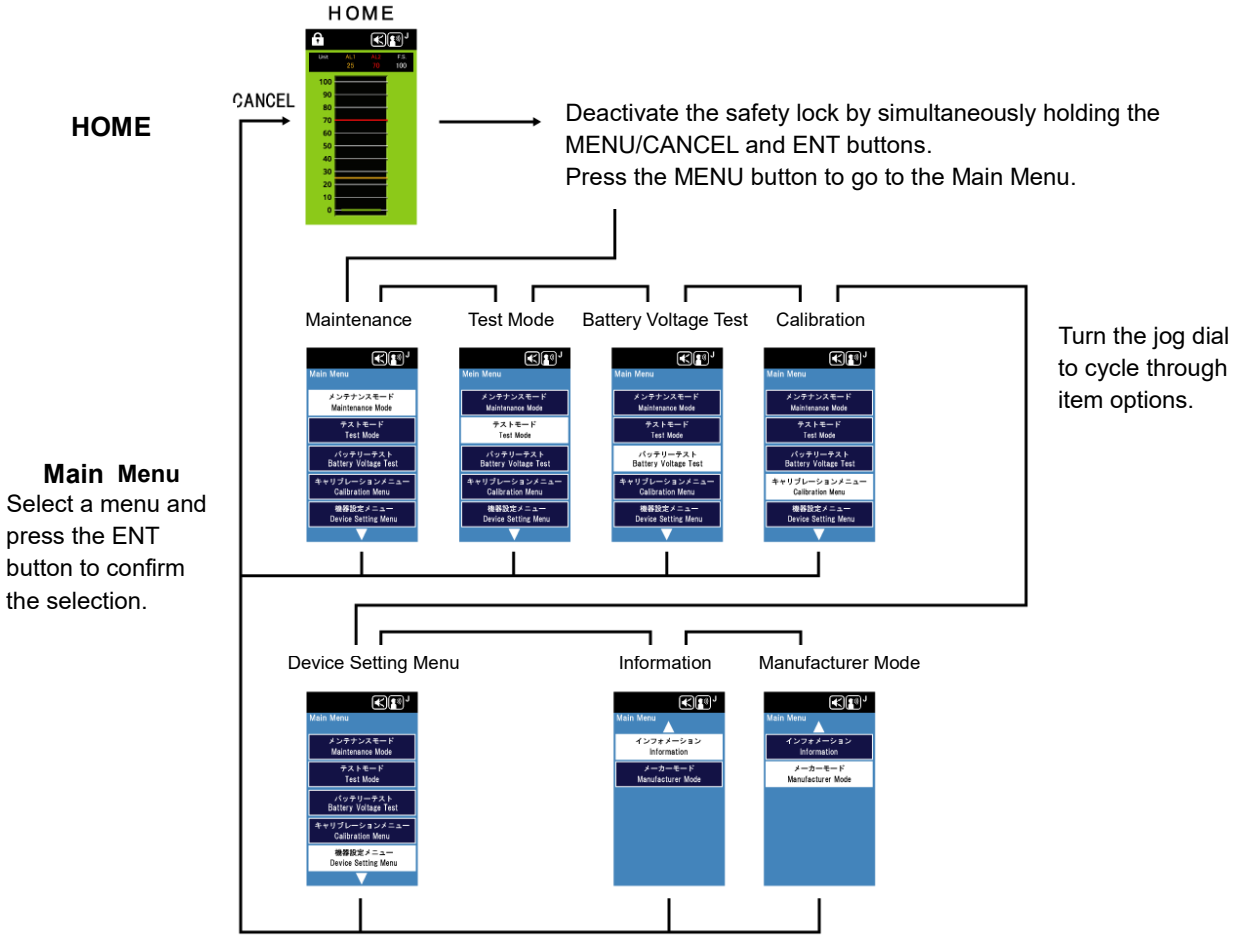
5.1.2 Access to Main Menu

To go to the Main Menu, press the MENU/CANCEL button while on the HOME screen.

NOTE

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

Ref. Refer to “5.1.5 Deactivate Safety Lock” for the lock deactivation procedure.



5.1.3 Select Item in Menu

Turning the jog dial cycles through the item options shown on each menu.
Select the desired item, then enter the ENT button to access/operate that item.
To return to the previous screen, press the CANCEL button.

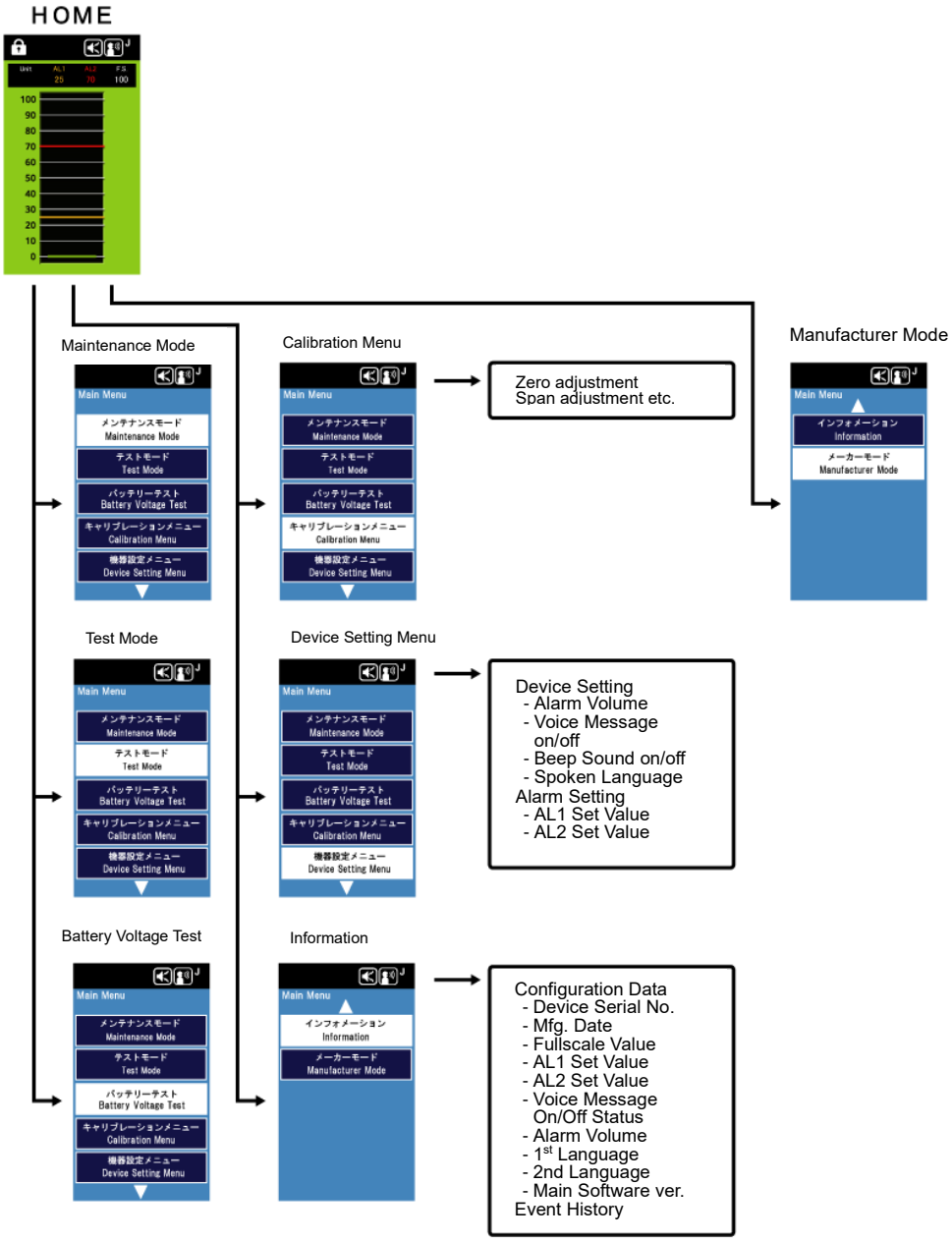
5.1.4 Menu Operation

Turn the jog dial to select a desired item.
The selected item is highlighted in white.
Enter the ENT button to confirm the selection and access that item.

Turn the jog dial to operate each item.
Press the ENT button for confirmation.

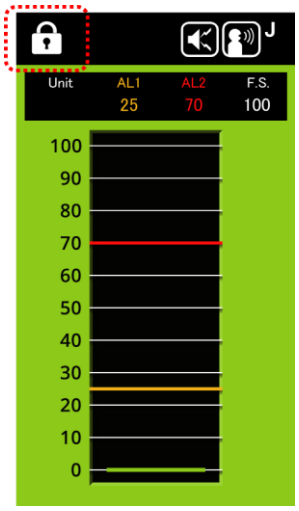
To return to the previous step, press the CANCEL button.

Menus Overview



5.1.5 Deactivate Safety Lock

The safety lock disables the buttons and the jog dial to prevent unintended operation.
The lock icon is shown on the top left corner of the screen while the lock is activated (locked).



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

5.2 Maintenance Mode

The maintenance mode is used to deactivate all analog outputs and relay contacts during maintenance or inspection work. There are two kinds of maintenance modes that can be selected as per requirement.

NOTICE

The maintenance icon is displayed during the maintenance mode. The unit will automatically return to the gas-monitoring mode (normal operation) after 8 hours, regardless of whether it was left idle or not.

Maintenance Mode Operation

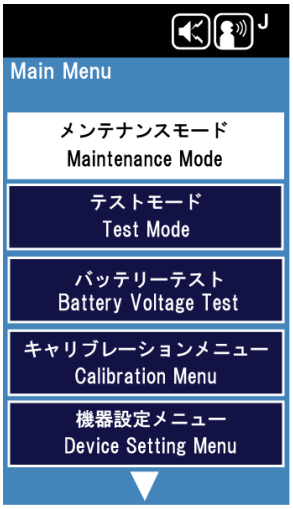
Mode	Icon	MAINT LED	Contacts	Analog output
Off	—	Off	Active	Gas concentration
Maintenance 1		Flashing	Inactive	Gas concentration
Maintenance 2		On	Inactive	Fixed at 4mA, 17.4mA or 10.7mA*

*Differs depending on the target gas.
Oxygen (F.S. 25vol%): 17.4mA
Oxygen (F.S. 50vol%): 10.7mA
Others: 4mA

5.2.1 Enter Maintenance Mode

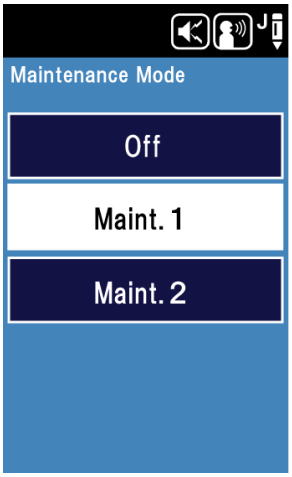
1 **Deactivate the safety lock.**
The Main Menu will be displayed.

2 **Select the maintenance mode.**
The selected item will be highlighted in white.



3 **Press the ENT button.**

4 **Turn the jog dial to select the mode.**
The selected item will be highlighted in white.



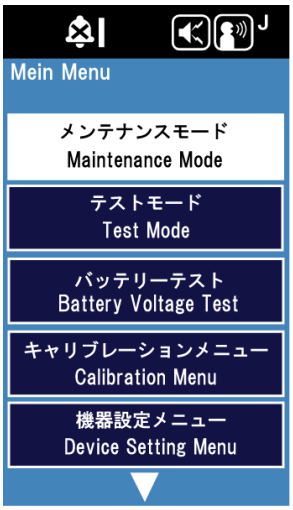
“Maintenance mode 1” is selected (highlighted in white).

Maintenance Mode

On screen item	Description
Off	Gas-monitoring mode (normal operation)
Maint.1	Maintenance mode 1
Maint.2	Maintenance mode 2

5 Press and hold the ENT button for confirmation.

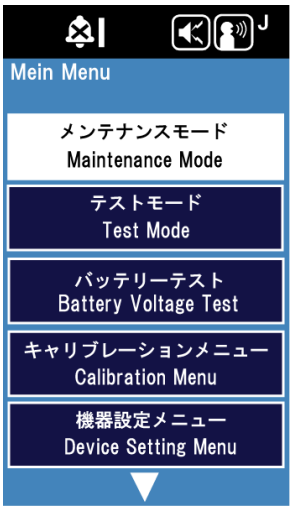
The selected mode will be set, and the screen will return to the Main Menu.



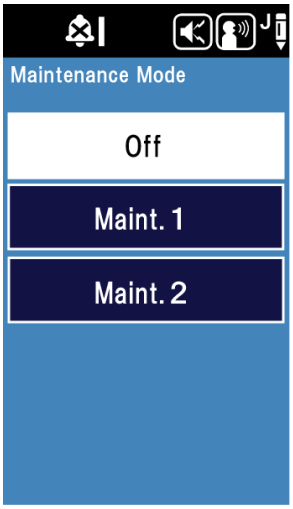
“Maintenance mode 1” is on, and the corresponding icon is displayed.

5.2.2 Exit Maintenance Mode

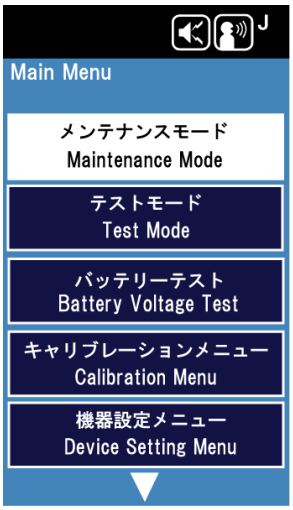
1 Select the maintenance mode while Maintenance mode 1 or 2 is on.



2 Turn the jog dial to select “Off”.



3 **Press and hold the ENT button.**
The maintenance mode will be cancelled and the screen will return to the Main Menu.



NOTE Up to step 2, it is possible to cancel the operation by pressing the CANCEL button. The screen will return to the Main Menu.

5.3 Test Mode

The test mode is used to increase or decrease a simulated gas concentration value to activate an alarm for maintenance/test purpose.

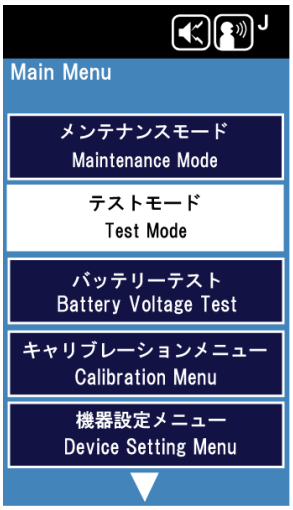
NOTICE

- While in the test mode, the external relay contacts and analog output are active. Set the unit to the maintenance mode or release the interlocks of external devices, as needed, before using the test mode.
- The unit will automatically return to the gas-monitoring mode (normal operation) after the test mode lasts for 10 minutes, regardless of whether it was left idle or not.
- The unit cannot enter the test mode during the warm-up cycle.

Operation Procedure

1 **Deactivate the safety lock.**
The Main Menu will be displayed.

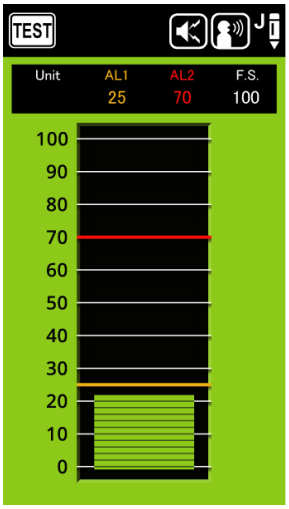
2 **Select the test mode.**
The selected item will be highlighted in white.



3 **Press the ENT button.**
The unit will enter the test mode.

NOTE
The simulated gas concentration (test value) is “0” by default.
The simulated oxygen concentration (test value) is “20.9 vol%” by default.

4 **Turn the jog dial to set the reading (test value) to a desired value.**
The reading can be changed from –10% to 110% of the full scale.



Button Operation

Button/dial	Operation
ENT button	Press and hold to save the test value.
MENU/CANCEL button	Press to cancel the current operation and return to the Main Menu screen.
Jog dial	Turn to adjust the test value.

NOTE
When the full scale is 100 ppm, the reading can be changed from –10 ppm to 110 ppm instead of from –10% to 110%.

5 **To exit the test mode, press and hold the ENT button or press the CANCEL button.**

- If the CANCEL button is pressed, the test value will not be saved and the screen will return to the Main Menu.
- If the ENTER button is held down, the screen will move to the confirmation screen shown below.
  To save the test value, select “OK” and press the ENT button.
  To go back to the previous step, select “Cancel” and press the ENT button.

5.4 Battery Voltage Test

This function is used to estimate the remaining battery life.
Only available for backup power type unit.

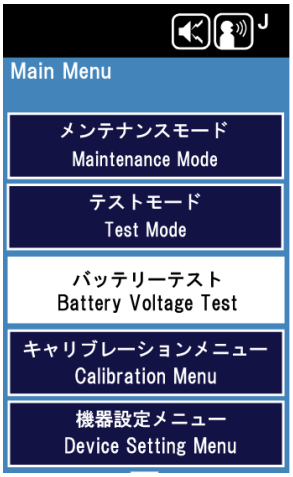
NOTICE

- The battery level may not be good enough before the initial power-up. Up to 24 hours is needed to fully charge the batteries. If the battery voltage test result is not “OK”, perform the test again 24 hours later.
- The battery test is not possible while the backup batteries are being used (BATT LED is flashing).
- Once the battery voltage test starts, it cannot be cancelled.

Operation Procedure

1 **Deactivate the safety lock.**
The Main Menu will be displayed.

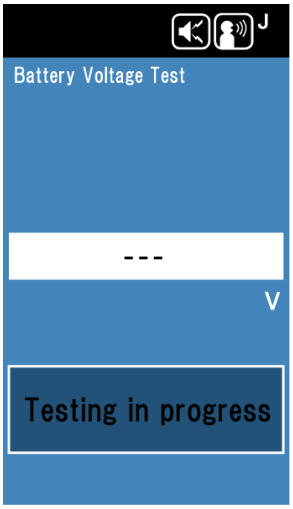
2 **Select “Battery Voltage Test”.**
The selected item will be highlighted in white.



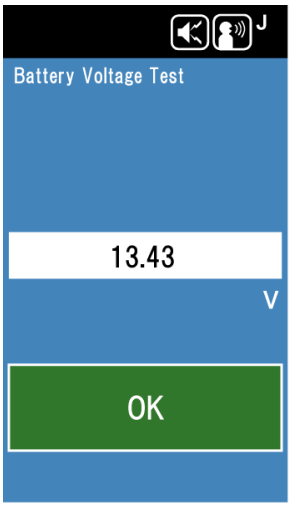
3 Press the ENT button.

The battery voltage test will start.

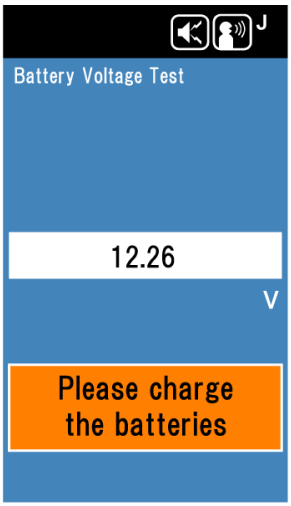
“Testing in progress” is displayed during the battery voltage test.



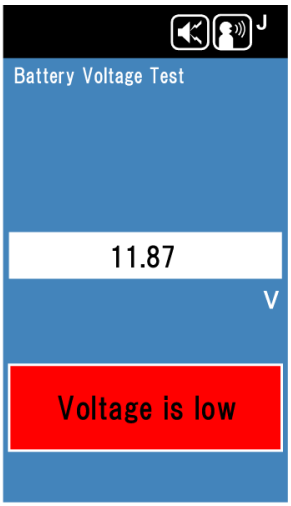
When the battery voltage test is completed, the test result will be displayed.



Good



Charge needed



Replacement needed

Message on screen	Battery condition	Description
OK	Good	Batteries are good.
Please charge the batteries	Charge is needed.	Battery level is low. Charge the batteries. If it does not improve after charging, it indicates that the end of the battery life is approaching.
Voltage is low	Replacement is needed.	Battery voltage is very low. Replace the batteries with new ones.

*1. Contact New Cosmos service personnel for battery replacement.

*2. Replace the batteries with new ones if used over two years, regardless of the frequency of use.

4 Press the CANCEL button.

The battery voltage test will end.

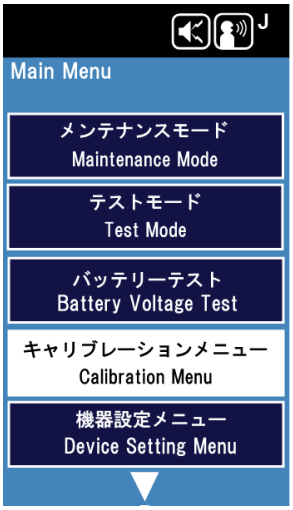
5.5 Calibration Menu

The Calibration Menu is used to perform zero and span adjustments on this product.

Operation Procedure

1 **Deactivate the safety lock.**
The Main Menu will be displayed.

2 **Select “Calibration Menu”.**
The selected item will be highlighted in white.



3 **Press the ENT button.**
The unit will enter the Calibration Menu.

Calibration Menu

Item	Function	Target gas	
		Other than oxygen	Oxygen
Manual Zero Adj.	Manually performs a zero adjustment.	√	
Auto Zero Adj.	Automatically performs a zero adjustment	√	
Manual Span Adj.	Manually performs a span adjustment.	√	
Span Adj. (fixed)	Sets the span to the fixed value (1st stage gas alarm set value x 1.6 times).	√	
Auto Span Adj.	Performs a span adjustment by using peak hold function.	√	
Span Adj. (20.9 vol%)	Sets the span to 20.9 vol%.		√
Clear Span Adj. (20.9 vol%)	Clears the 20.9 vol% span.		√

NOTE

- For 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 pre-set value. The pre-set value is given in the delivery specifications.
- For NV-120Mx units, the 20.9 suppression is disabled if connected with an oxygen detector (e.g., KD-12O).

NOTICE

For “NV-120Mx” and “NV-120Dx” units, perform zero and span adjustments in the connected gas detector, unless the zero/span adjustment function is not available in the gas detector. If the zero point of this product itself drifts, perform zero and span adjustments on this product.

5.5.1 Manual Zero Adj.

This is to manually adjust the reading to zero.

NOTICE

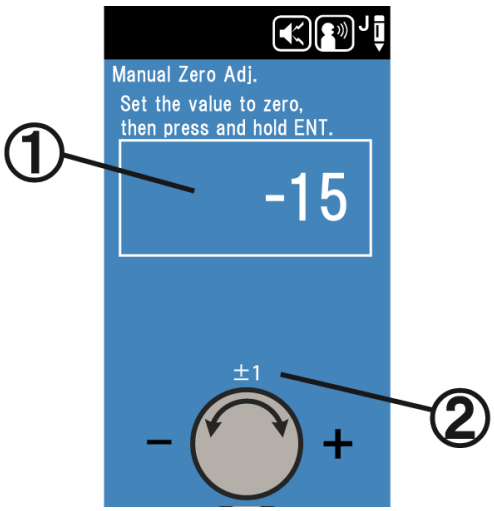
- If the connected gas detector has not been energized for a period of time (e.g., from factory to initial power-up), it may take some time for the gas concentration reading (sensor output) to stabilize.
- For NV-120Mx, NV-120Sx and NV-120Dx units, perform a zero adjustment in the connected gas detector. However, if a zero adjustment was performed in the gas detector but the reading of this product does not show zero, perform a zero adjustment on this product.
- Once the zero adjustment is started, it cannot be cancelled.

⚠ 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 in a gas atmosphere.
- Perform a zero adjustment at the initial power-up or sensor replacement.
- During the zero adjustment, the external relay contacts are active. Before performing a zero adjustment, set the unit to the maintenance mode or release the interlocks of external devices, as needed.
- Zero or span adjustment is not possible during the warm-up cycle. Perform a zero or span adjustment after the warm-up cycle is completed and the reading becomes stable.

Operation Procedure

1. **Deactivate the safety lock.**
   The Main Menu will be displayed.
2. **Select “Calibration Menu”.**
   The selected item will be highlighted in white.
3. **Press the ENT button.**
   The unit will enter the Calibration Menu.
4. **Select Manual Zero Adj.**
   The selected item will be highlighted in white.
5. **Press the ENT button.**
   The unit will enter the Manual Zero Adj. screen.

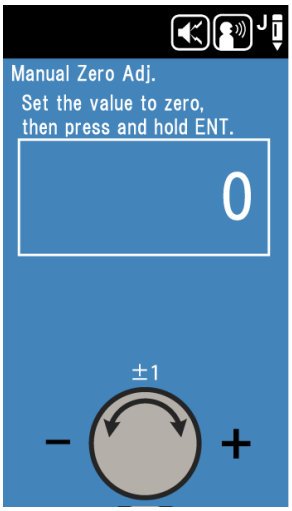


Item	Component	Description/function
1	Reading	Displays the currently measured gas concentration.
2	Increment/decrement unit	Displays the increment/decrement unit.

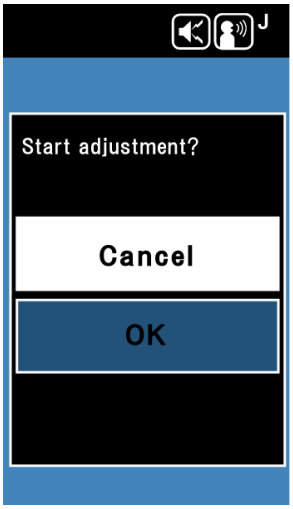
Button Operation

Button/dial	Operation
ENT button	Press to change the increment/decrement unit. Each press of the ENT button cycles through unit options (±1, ±5, ±10, ±100, ±1000). Press and hold to confirm the setting.
MENU/CANCEL button	Press to cancel the current operation and return to the Main Menu screen.
Jog dial	Turn to adjust the reading.

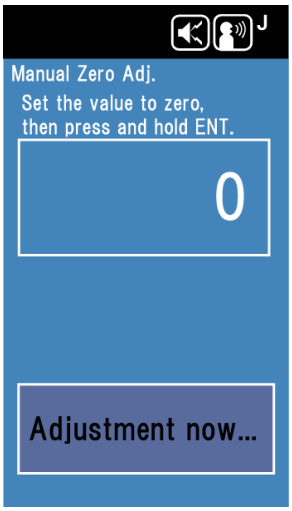
6 With the jog dial and the ENT button, adjust the reading to “0”.



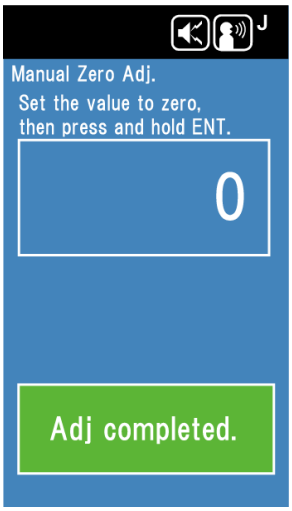
7 **Press and hold the ENT button for confirmation.**
To execute, select “OK”.
To return to the previous step, select “Cancel”.



8 **Select “OK” and press the ENT button.**
A zero adjustment will start.
“Adjustment now...” is displayed while zero adjustment is in progress.



A successfully completed zero adjustment displays the following screen.



9 **Press the CANCEL button.**
The screen will return to the Calibration Menu.

NOTE

- Up to step 7, it is possible to cancel the zero adjustment by pressing the CANCEL button.
- If error code “E-19” or “E-20” is displayed, refer to “7 Error Codes and Solutions”.

5.5.2 Auto Zero Adj.

This is to automatically adjust the reading to zero.

NOTICE

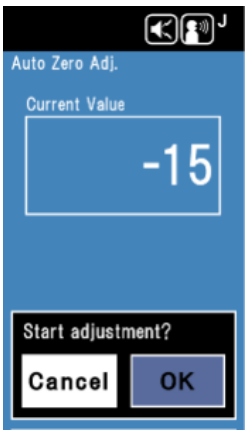
- If the connected gas detector has not been energized for a period of time (e.g., from factory to initial power-up), it may take some time for the gas concentration reading (sensor output) to stabilize.
- For NV-120Mx, NV-120Sx and NV-120Dx units, perform a zero adjustment in the connected gas detector. However, if a zero adjustment was performed in the gas detector but the reading of this product does not show zero, perform a zero adjustment on this product.
- Once the zero adjustment is started, it cannot be cancelled.

⚠ CAUTION

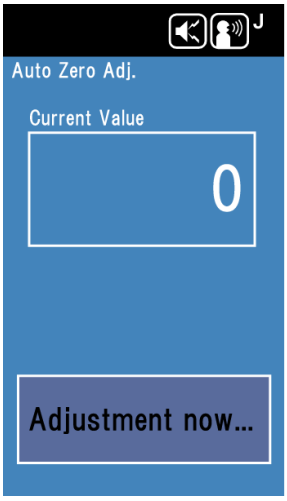
- Perform a zero adjustment while the connected gas detector is in clean air. Proper gas detection is not possible if a zero adjustment is performed in a gas atmosphere.
- Perform a zero adjustment at the initial power-up or sensor replacement.
- During the zero adjustment, the external relay contacts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

Operation Procedure

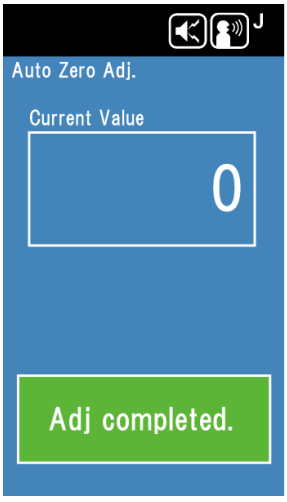
1. **Deactivate the safety lock.**
   The Main Menu will be displayed.
2. **Select “Calibration Menu”.**
   The selected item will be highlighted in white.
3. **Press the ENT button.**
   The unit will enter the Calibration Menu.
4. **Select “Auto Zero Adj.”.**
   The selected item will be highlighted in white.
5. **Press the ENT button.**
   The unit will enter the Auto Zero Adj. screen.



6 **Select “OK” and press the ENT button.**
A zero adjustment will start.
“Adjustment now...” is displayed while zero adjustment is in progress.



A successfully completed zero adjustment displays the following screen.



7 **Press the CANCEL button.**
The screen will return to the Calibration Menu.

NOTE

- Up to step 5, it is possible to cancel the zero adjustment by pressing the CANCEL button.
- If error code “E-19” or “E-20” is displayed, refer to “7 Error Codes and Solutions”.

5.5.3 Manual Span Adj.

This is to perform a span adjustment by using calibration gas.

NOTICE

- A span adjustment requires a special attention because actual gas is used. It must be performed by New Cosmos authorized service personnel.
- For NV-120Mx, NV-120Sx and NV-120Dx units, perform a span adjustment in the connected gas detector.
- Once the span adjustment is started, it cannot be cancelled.

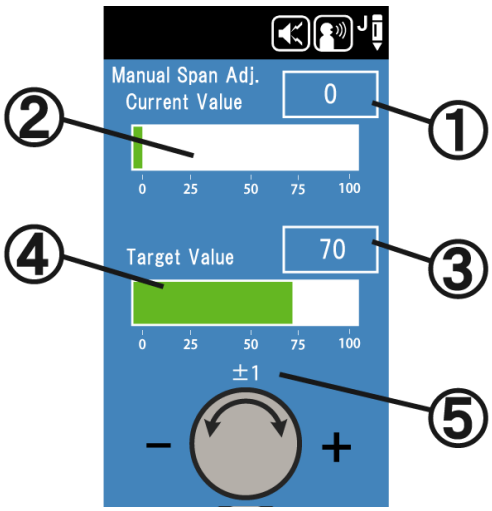
Optional items required for a span adjustment vary depending on the gas type. Refer to the instruction manual for the gas detector.

⚠ CAUTION

- Perform a span adjustment after a zero adjustment.
- Perform a span adjustment at the initial power-up or sensor replacement.
- During the span adjustment, the external relay contacts are active. Before performing a span adjustment, set the unit to the maintenance mode or release the interlocks of external devices, as needed.
- Zero or span adjustment is not possible during the warm-up cycle. Perform a zero or span adjustment after the warm-up cycle is completed and the reading becomes stable.

Operation Procedure

1. **Deactivate the safety lock.**
   The Main Menu will be displayed.
2. **Select “Calibration Menu”.**
   The selected item will be highlighted in white.
3. **Press the ENT button.**
   The unit will enter the Calibration Menu.
4. **Select “Manual Span Adj.”.**
   The selected item will be highlighted in white.
5. **Press the ENT button.**
   The unit will enter the Manual Span Adj. screen.
6. **Set the target reading (Target Value) to the calibration gas concentration with the jog dial and the ENT button.**



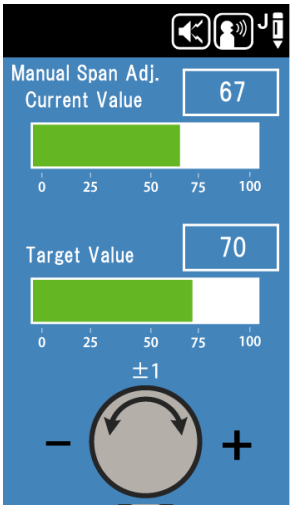
Item	Component	Description/function
1	Current reading	Displays the currently measured gas concentration.
2	Current bar graph	Displays the currently measured gas concentration in bar graph form.
3	Target reading	Displays the target reading. Set the target reading with jog dial.
4	Target bar graph	Displays the target reading in bar graph form.
5	Increment/decrement unit	Displays the increment/decrement unit.

Button Operation

Button/dial	Operation
ENT button	Press to change the increment/decrement unit. Each press of the ENT button cycles through unit options (±1, ±5, ±10, ±100, ±1000). Press and hold to confirm the setting.
MENU/CANCEL button	Press to cancel the current operation and return to the Main Menu screen.
Jog dial	Turn to set the target reading.

7 Apply calibration gas to the gas detector (sensor) and allow the gas concentration to become fully stable.

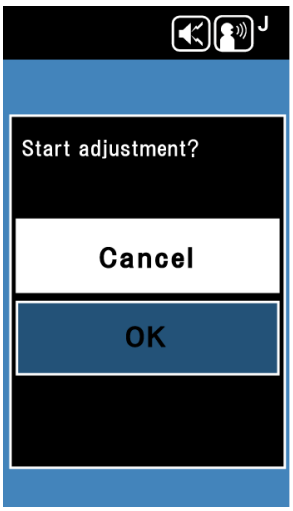
The gas concentration will be displayed.



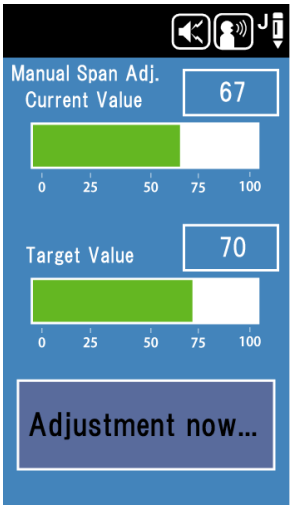
8 When the displayed gas concentration becomes stable, press the ENT button.

To execute, select “OK”.

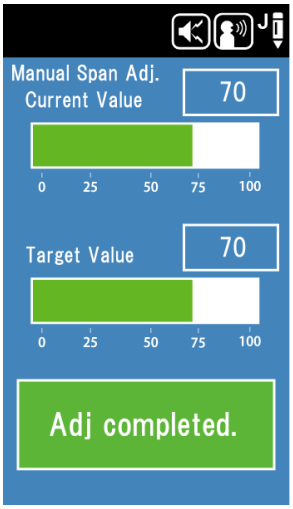
To return to the previous step, select “Cancel”.



9 **Select “OK” and press the ENT button.**
A span adjustment will start.
“Adjustment now...” is displayed while span adjustment is in progress.



A successfully completed span adjustment displays the following screen.



10 **Press the CANCEL button.**
The screen will return to the Calibration Menu.

NOTE

- Up to step 8, it is possible to cancel the zero adjustment by pressing the CANCEL button.
- If error code “E-17” or “E-18” is displayed, refer to “7 Error Codes and Solutions”.

5.5.4 Span Adj. (fixed)

This is to perform a span adjustment by using the calibration gas 1.6 times higher than the 1st stage gas alarm set value.

NOTICE

- A span adjustment requires a special attention because actual gas is used. It must be performed by New Cosmos authorized service personnel.
- For NV-120Mx, NV-120Sx and NV-120Dx units, perform a span adjustment in the connected gas detector
- The target value can be changed from 0% to 100% of the full scale. If 1.6 times higher than the 1st stage gas alarm set value exceeds the 100% full scale value, the span will be automatically adjusted to the 100% full scale value.
- Once the span adjustment is started, it cannot be cancelled.

Optional items required for a span adjustment vary depending on the gas type. Refer to the instruction manual for the gas detector.

⚠ CAUTION

- Perform a span adjustment after a zero adjustment.
- Perform a span adjustment at the initial power-up or sensor replacement.
- During the span adjustment, the external relay contacts are active. Before performing a span adjustment, set the unit to the maintenance mode or release the interlocks of external devices, as needed.
- Zero or span adjustment is not possible during the warm-up cycle. Perform a zero or span adjustment after the warm-up cycle is completed and the reading becomes stable.

Operation Procedure

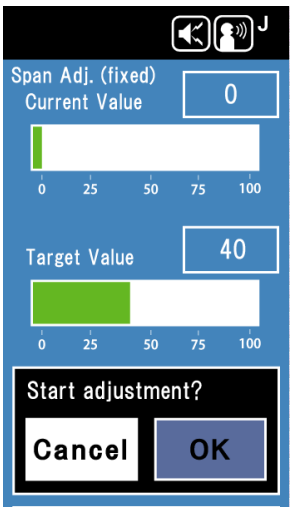
1 **Deactivate the safety lock.**
The Main Menu will be displayed.

2 **Select “Calibration Menu”.**
The selected item will be highlighted in white.

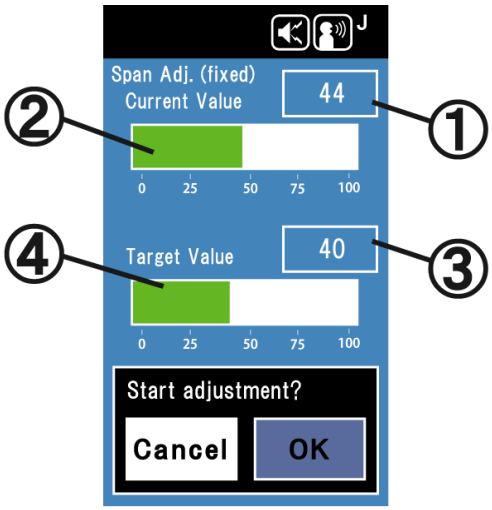
3 **Press the ENT button.**
The unit will enter the Calibration Menu.

4 **Select “Span Adj. (fixed)”.**
The selected item will be highlighted in white.

5 **Press the ENT button.**
The unit will enter the Span Adj. (fixed) screen.

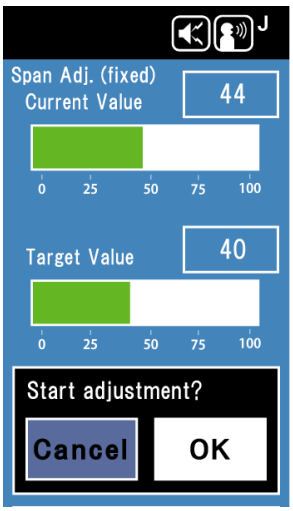


6 Apply the calibration gas (1.6 times higher than the 1st stage gas alarm set value) to the gas detector (sensor) and allow the gas concentration to become fully stable.

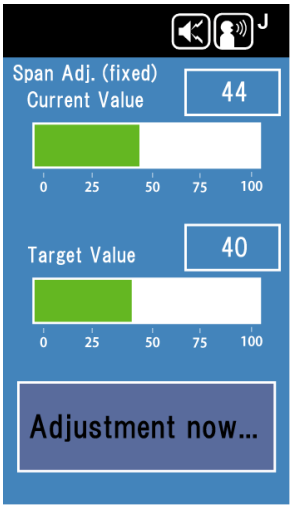


Item	Component	Description/function
1	Current reading	Displays the currently measured gas concentration.
2	Current bar graph	Displays the currently measured gas concentration in bar graph form.
3	Target reading	Displays a value 1.6 times higher than the 1st stage gas alarm set value.
4	Target bar graph	Displays a value 1.6 times higher than the 1st stage gas alarm set value in bar graph form.

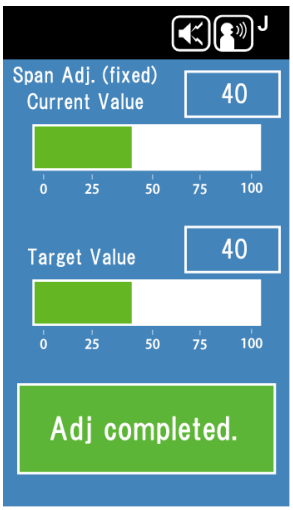
7 When the displayed gas concentration becomes stable, press the ENT button.
To execute, select “OK”.
To return to the previous step, select “Cancel”.



8 **Select “OK” and press the ENT button.**
A span adjustment will start.
“Adjustment now...” is displayed while span adjustment is in progress.



A successfully completed span adjustment displays the following screen.



9 **Press the CANCEL button.**
The screen will return to the Calibration Menu.

NOTE

- Up to step 7, it is possible to cancel the zero adjustment by pressing the CANCEL button.
- If error code “E-17” or “E-18” is displayed, refer to “7 Error Codes and Solutions”.

5.5.5 Auto Span Adj.

This is to perform a span adjustment by using calibration gas.

NOTICE

- A span adjustment requires a special attention because actual gas is used. It must be performed by New Cosmos authorized service personnel.
- For NV-120Mx, NV-120Sx and NV-120Dx units, perform a span adjustment in the connected gas detector.

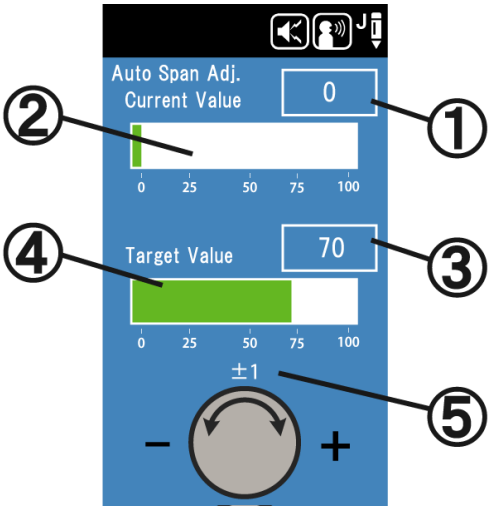
Optional items required for a span adjustment vary depending on the gas type. Refer to the instruction manual for the gas detector.

⚠ CAUTION

- Perform a span adjustment after a zero adjustment.
- Perform a span adjustment at the initial power-up or sensor replacement.
- During the span adjustment, the external relay contacts are active. Before performing a span adjustment, set the unit to the maintenance mode or release the interlocks of external devices, as needed.
- Zero or span adjustment is not possible during the warm-up cycle. Perform a zero or span adjustment after the warm-up cycle is completed and the reading becomes stable.

Operation Procedure

1. **Deactivate the safety lock.**
   The Main Menu will be displayed.
2. **Select “Calibration Menu”.**
   The selected item will be highlighted in white.
3. **Press the ENT button.**
   The unit will enter the Calibration Menu.
4. **Select “Auto Span Adj.”**
   The selected item will be highlighted in white.
5. **Press the ENT button.**
   The unit will enter the Auto Span Adj. screen.
6. **Set the target reading (Target Value) to the calibration gas concentration with the jog dial and the ENT button.**



Item	Component	Description/function
1	Current reading	Displays the currently measured gas concentration.
2	Current bar graph	Displays the currently measured gas concentration in bar graph form.
3	Target reading	Displays the target reading. Set the target reading with jog dial.
4	Target bar graph	Displays the target reading in bar graph form.
5	Increment/decrement unit	Displays the increment/decrement unit.

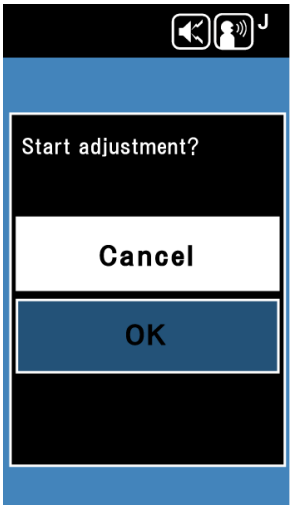
Button Operation

Button/dial	Operation
ENT button	Press to change the increment/decrement unit. Each press of the ENT button cycles through unit options (±1, ±5, ±10, ±100, ±1000). Press and hold to confirm the setting.
MENU/CANCEL button	Press to cancel the current operation and return to the Main Menu screen.
Jog dial	Turn to set the target reading.

7 Press and hold the ENT button for confirmation.

To execute, select “OK”.

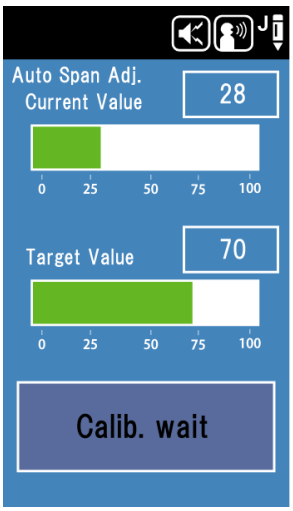
To return to the previous step, select “Cancel”.

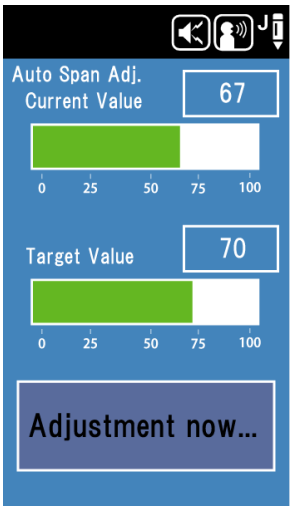


8 Select “OK” and press the ENT button.

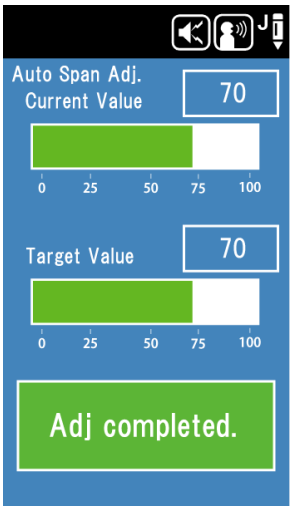
9 Apply calibration gas to the gas detector (sensor).

“Adjustment now...” is displayed while span adjustment is in progress.





A successfully completed span adjustment displays the following screen.



10 Press the CANCEL button.
The screen will return to the Calibration Menu.

NOTE

- Up to step 7, it is possible to cancel the zero adjustment by pressing the CANCEL button.
- If error code “E-17” or “E-18” is displayed, refer to “7 Error Codes and Solutions”.

5.5.6 Span Adj. (20.9 vol%)

This is to automatically set the span to 20.9 vol%. It is used only when the target gas is oxygen.

NOTICE

- A span adjustment requires a special attention because actual gas is used. It must be performed by New Cosmos authorized service personnel.
- For NV-120Mx, NV-120Sx and NV-120Dx units, perform a span adjustment in the connected gas detector.
- Once the span adjustment is started, it cannot be cancelled.

Optional items required for a span adjustment vary depending on the gas type. Refer to the instruction manual for the gas detector.

⚠ CAUTION

- At initial power-up or sensor replacement, perform a clear-span adjustment (refer to "5.5.7 Clear Span Adj.") before a span adjustment.
- During the span adjustment, the external relay contacts are active. Before performing a span adjustment, set the unit to the maintenance mode or release the interlocks of external devices, as needed.
- Zero or span adjustment is not possible during the warm-up cycle. Perform a zero or span adjustment after the warm-up cycle is completed and the reading becomes stable.

Operation Procedure

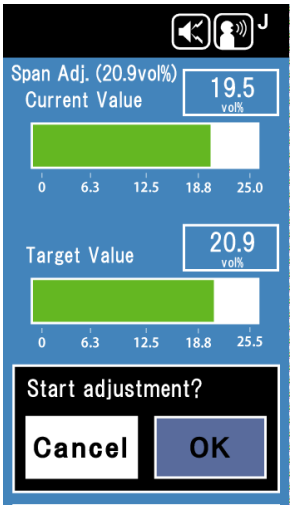
1 **Deactivate the safety lock.**
The Main Menu will be displayed.

2 **Select "Calibration Menu".**
The selected item will be highlighted in white.

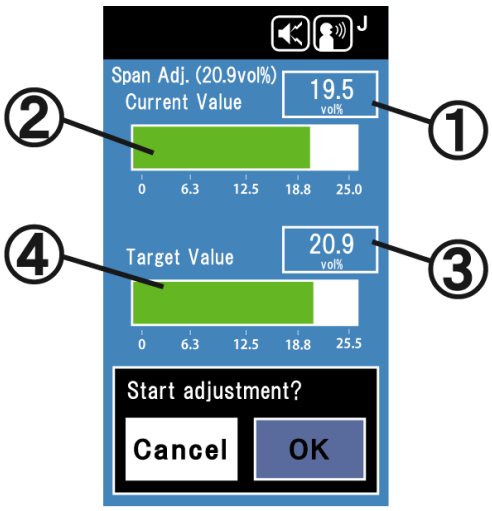
3 **Press the ENT button.**
The unit will enter the Calibration Menu.

4 **Select "Span Adj. (20.9 vol%)".**
The selected item will be highlighted in white.

5 **Press the ENT button.**
The unit will enter the Span Adj. (20.9 vol%) screen.



6 **Check that the gas detector (sensor) is in clean air.**

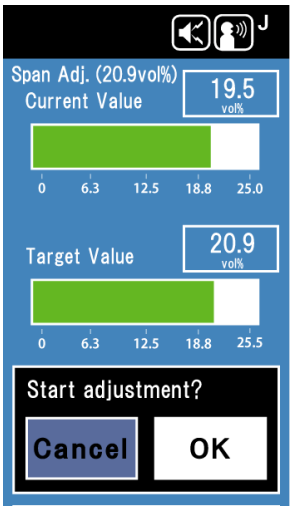


Item	Component	Description/function
1	Current reading	Displays the currently measured gas concentration.
2	Current bar graph	Displays the currently measured gas concentration in bar graph form.
3	Target reading	Displays the target reading “20.9%”.
4	Target bar graph	Displays the target reading in bar graph form.

7 Press the ENT button.

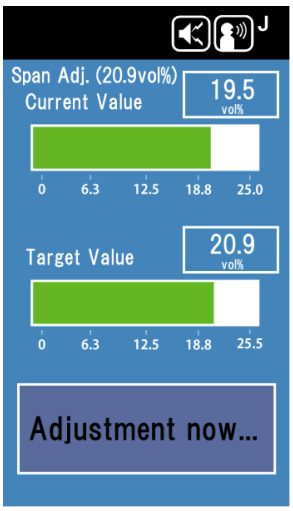
To execute, select “OK”.

To return to the previous step, select “Cancel”.

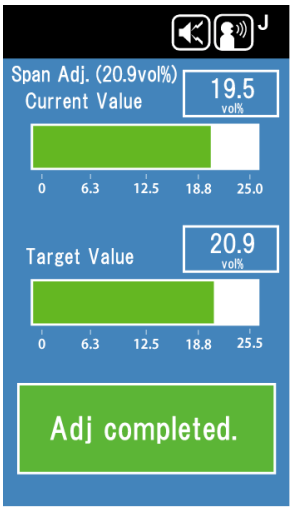


A span adjustment will start.

“Adjustment now...” is displayed while span adjustment is in progress.



A successfully completed span adjustment displays the following screen.



8 **Press the CANCEL button.**
The screen will return to the Calibration Menu.

NOTE

- Up to step 7, it is possible to cancel the zero adjustment by pressing the CANCEL button.
- If error code “E-17” or “E-18” is displayed, refer to “7 Error Codes and Solutions”.

5.5.7 Clear Span Adj. (20.9 vol%)

This is to clear the 20.9 vol% span. It is used only when the target gas is oxygen.

Operation Procedure

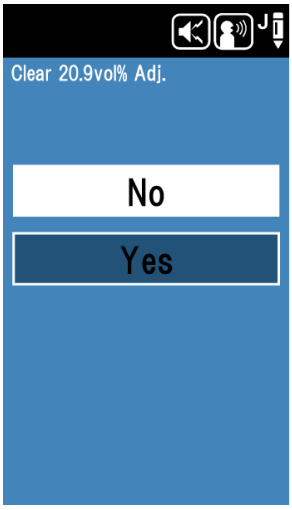
1 **Deactivate the safety lock.**
The Main Menu will be displayed.

2 **Select “Calibration Menu”.**
The selected item will be highlighted in white.

3 **Press the ENT button.**
The unit will enter the Calibration Menu.

4 **Select “Clear Span Adj. (20.9 vol%).**
The selected item will be highlighted in white.

5 **Press the ENT button.**
The unit will enter the Clear Span Adj. (20.9 vol%) screen.



Button Operation

Button/dial	Operation
ENT button	Press and hold to confirm the selection.
MENU/CANCEL button	Press to cancel the current operation and return to the Calibration Menu.
Jog dial	Turn to select the desired item.

6 **Turn the jog dial to select “Yes”.**

7 **Press and hold the ENT button to confirm the selection.**
To execute, select “OK”.
To return to the previous step, select “Cancel”.

8 **Select “OK” and press the ENT button.**
The 20.9 vol% span will be cleared.

9 **The screen will return to the Device Setting screen.**

5.6 Device Setting Menu

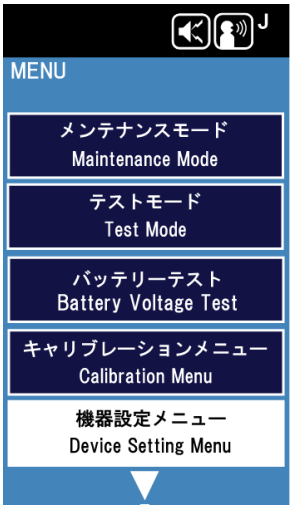
From the Device Setting Menu, it is possible to adjust device and alarm setups.

CAUTION
This menu should only be operated by supervisor. Incorrect setting may cause incorrect operation.

Operation Procedure

1 **Deactivate the safety lock.**
The Main Menu will be displayed.

2 **Select “Device Setting Menu”.**
The selected item will be highlighted in white.



3 **Press the ENT button.**
The unit will enter the Device Setting Menu.

Device Setting Menu

Item	Description/function
Device Setting	Makes setups for the device.
Alarm Setting	Makes setups for the alarm.

5.6.1 Device Setting

This is to make setups for audio alarm.

Operation Procedure

1 **Deactivate the safety lock.**
The Main Menu will be displayed.

2 **Select “Device Setting Menu”.**
The selected item will be highlighted in white.

3 **Press the ENT button.**
The unit will enter the Device Setting Menu.

4 **Select “Device Setting”.**
The selected item will be highlighted in white.

5 Press the ENT button.
The unit will enter the Device Setting screen.
There are the following five items.

Item	Description/function
Alarm Volume	Adjusts the sound level of beeping and voice message.
Voice Message	Turns on/off (unmute/mute) the voice message.
Beep Sound	Turns on/off (unmute/mute) the beep sound.
Spoken Language	Sets the languages for voice message.

(1) Alarm Volume

This item is used to adjust the sound level of beep sound and voice message.

Operation Procedure

1 Deactivate the safety lock.
The Main Menu will be displayed.

2 Select “Device Setting Menu”.
The selected item will be highlighted in white.

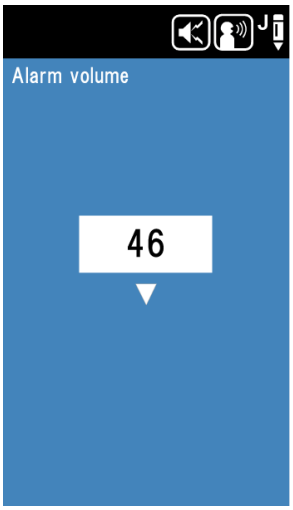
3 Press the ENT button.
The unit will enter the Device Setting Menu.

4 Select “Device Setting”.
The selected item will be highlighted in white.

5 Press the ENT button.
The unit will enter the Device Setting screen.

6 Select “Alarm Volume”
The selected item will be highlighted in white.

7 Press the ENT button.
The unit will enter the Alarm Volume screen.



Button Operation

Button/dial	Operation
ENT button	Press to view the value. Press and hold to confirm the set value.
MENU/CANCEL button	Press to cancel the current operation and return to the Device Setting screen.
Jog dial	Turn to set the value.

8 **Turn the jog dial to set the value.**

9 **Press and hold the ENT button.**
To execute, select “OK”.
To return to the previous step, select “Cancel”.

10 **Select “OK” and press the ENT button.**
The setting will be saved.

11 **The screen will return to the Device Setting screen.**

(2) Voice Message On/Off

This item is used to turn on/off (unmute/mute) the voice message.

Operation Procedure

1 **Deactivate the safety lock.**
The Main Menu will be displayed.

2 **Select “Device Setting Menu”**
The selected item will be highlighted in white.

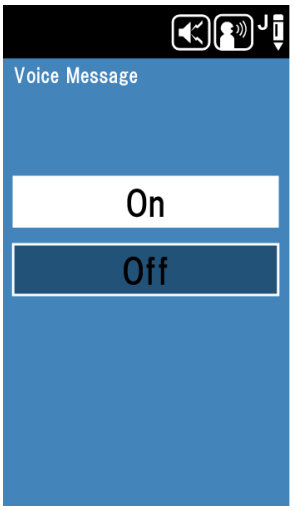
3 **Press the ENT button.**
The unit will enter the Device Setting Menu.

4 **Select “Device Setting”.**
The selected item will be highlighted in white.

5 **Press the ENT button.**
The unit will enter the Device Setting screen.

6 **Select “Voice Message”**
The selected item will be highlighted in white.

7 **Press the ENT button.**
The unit will enter the Voice Message screen.



Button Operation

Button/dial	Operation
ENT button	Press and hold to confirm the selection or setting.
MENU/CANCEL button	Press to cancel the current operation and return to the Device Setting screen.
Jog dial	Turn to select the desired item.

8 **Turn the jog dial to select the desired item: On or Off.**

9 **Press and hold the ENT button for confirmation.**
To execute, select “OK”.
To return to the previous step, select “Cancel”.

10 **Select “OK” and press the ENT button.**
The selection (voice message on/off status) will be saved.

11 **The screen will return to the Device Setting screen.**

(3) Beep Sound On/Off

This item is used to turn on/off (unmute/mute) the beep sound.

Operation Procedure

1 Deactivate the safety lock.
The Main Menu will be displayed.

2 Select “Device Setting Menu”.
The selected item will be highlighted in white.

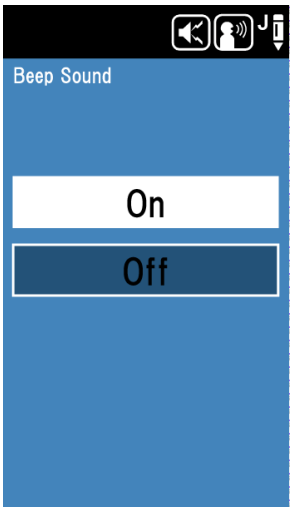
3 Press the ENT button.
The unit will enter the Device Setting Menu.

4 Select “Device Setting”
The selected item will be highlighted in white.

5 Press the ENT button.
The unit will enter the Device Setting screen.

6 Select “Beep sound”.
The selected item will be highlighted in white.

7 Press the ENT button.
The unit will enter the Beep Sound screen.



Button Operation

Button/dial	Operation
ENT button	Press and hold to confirm the selection.
MENU/CANCEL button	Press to cancel the current operation and return to the Device Setting screen.
Jog dial	Turn to select the desired item.

8 Turn the jog dial to select the desired item: On or Off.

9 Press and hold the ENT button for confirmation.
To execute, select “OK”.
To return to the previous step, select “Cancel”.

10 **Select “OK” and press the ENT button.**
The selection (beep sound on/off status) will be saved.

11 **The screen will return to the Device Setting screen.**

(4) Spoken Language

This item is used to select the languages for voice message.

Operation Procedure

1 **Deactivate the safety lock.**
The Main Menu will be displayed.

2 **Select “Device Setting Menu”.**
The selected item will be highlighted in white.

3 **Press the ENT button.**
The unit will enter the Device Setting Menu.

4 **Select “Device Setting”.**
The selected item will be highlighted in white.

5 **Press the ENT button.**
The unit will enter the Device Setting screen.

6 **Select “Spoken Language”**
The selected item will be highlighted in white.

7 **Press the ENT button.**
The unit will enter the Spoken Language screen.

Button Operation

Button/dial	Operation
ENT button	Press to move to the next screen. Press and hold to confirm the selection or setting.
MENU/CANCEL button	Press to cancel the current operation and return to the Device Setting screen.
Jog dial	Turn to select the desired item.

8 **Turn the jog dial to select the desired 1st language.**

9 **Press the ENT button.**
The unit will enter the 2nd language selection mode.

10 **Turn the jog dial to select the desired 2nd language.**

11 **Press and hold the ENT button for confirmation.**
To execute, select “OK”.
To return to the previous step, select “Cancel”.

12 **Select “OK” and press the ENT button.**
The selection (spoken languages) will be saved.

13 **The screen will return to the Device Setting screen.**

5.6.2 Alarm Setting

This is to set the alarm set values.

NOTICE

The alarm set values cannot be set while a gas alarm is activated.

Operation Procedure

1. **Deactivate the safety lock.**
   The Main Menu will be displayed.
2. **Select “Device Setting Menu”.**
   The selected item will be highlighted in white.
3. **Press the ENT button.**
   The unit will enter the Device Setting Menu.
4. **Select “Alarm Setting” with the jog dial.**
   The selected item will be highlighted in white.
5. **Press the ENT button.**
   The unit will enter the Alarm Setting screen.

There are two option items below.

Item	Description	Settable range
AL1 Set Value	Sets the 1st stage gas alarm Set value.	H-H mode: 5% of F.S. ≤ Set value ≤ AL2 L-L mode: AL2 ≤ Set value ≤ F.S. value H-L mode: AL2 ≤ Set value ≤ F.S. value L-H mode: 0 ≤ Set value ≤ AL2
AL2 Set Value	Sets the 2nd stage gas alarm Set value.	H-H mode: AL1 ≤ Set value ≤ F.S. value L-L mode: 0 ≤ Set value ≤ AL1 H-L mode:0 ≤ Set value ≤ AL1 L-H mode: AL1 ≤ Set value ≤ F.S. value

Ref. Refer to “4.3.3 (2)” for more information about the gas alarm mode.

(1) AL1 Set Value

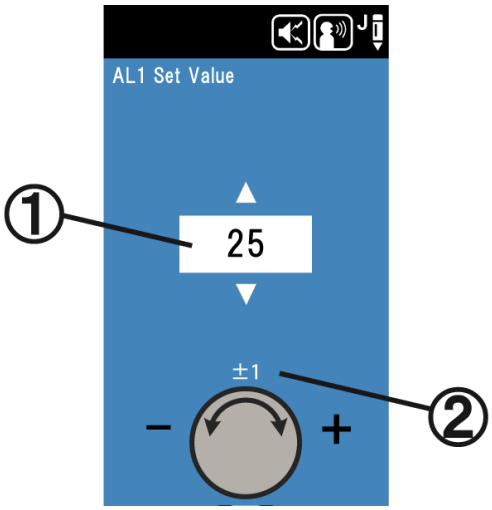
This sets the 1st stage gas alarm set value.

Operation Procedure

1. **Deactivate the safety lock.**
   The Main Menu will be displayed.
2. **Select “Device Setting Menu”.**
   The selected item will be highlighted in white.
3. **Press the ENT button.**
   The unit will enter the Device Setting Menu.
4. **Select “Alarm Setting”.**
   The selected item will be highlighted in white.
5. **Press the ENT button.**
   The unit will enter the Alarm Setting screen.

6 **Select “AL1 Set Value”**
The selected item will be highlighted in white.

7 **Press the ENT button.**
The unit will enter the AL1 Set Value screen.



Item	Component	Description/function
1	1st stage gas alarm set value	Sets the 1st stage gas alarm set value.
2	Increment/decrement unit	Displays the increment/decrement unit.

Button Operation

Button/dial	Operation
ENT button	Press to change the increment/decrement unit. Each press of the ENT button cycles through unit options (±1, ±5, ±10, ±100, ±1000). Press and hold to confirm the setting.
MENU/CANCEL button	Press to cancel the current operation and return to the Alarm Setting screen.
Jog dial	Turn to adjust the value.

8 **Turn the jog dial to set the value.**

9 **Press and hold the ENT button for confirmation.**
To execute, select “OK”.
To return to the previous step, select “Cancel”.

10 **Select “OK” and press the ENT button.**
The 1st stage gas alarm set value will be set.

11 **The screen will return to the Alarm Setting screen.**

(2) AL2 Set Value

This sets the 2nd stage gas alarm set value.

Operation Procedure

1 **Deactivate the safety lock.**
The Main Menu will be displayed.

2 **Select “Device Setting Menu”.**
The selected item will be highlighted in white.

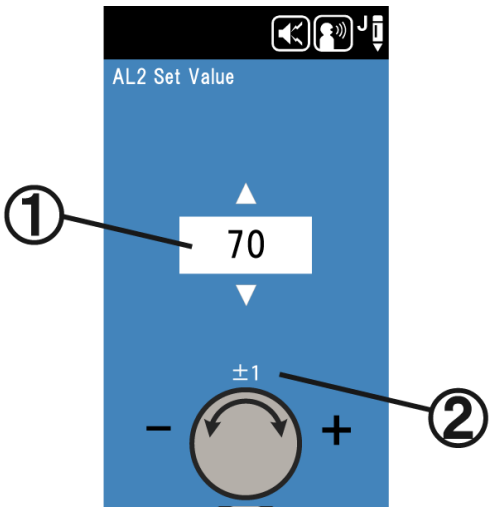
3 **Press the ENT button.**
The unit will enter the Device Setting Menu.

4 **Select “Alarm Setting”.**
The selected item will be highlighted in white.

5 **Press the ENT button.**
The unit will enter the Alarm Setting screen.

6 **Select “AL2 Set Value”.**
The selected item will be highlighted in white.

7 **Press the ENT button.**
The unit will enter the AL2 Set Value screen.



Item	Component	Description/function
1	2nd stage gas alarm set value	Sets the 2nd stage gas alarm set value.
2	Increment/decrement unit	Displays the increment/decrement unit.

Button Operation

Button/dial	Operation
ENT button	Press to change the increment/decrement unit. Each press of the ENT button cycles through unit options (±1, ±5, ±10, ±100, ±1000). Press and hold to confirm the setting.
MENU/CANCEL button	Press to cancel the current operation and return to the Alarm Setting screen.
jog dial	Turn to adjust the value.

8 Turn the jog dial to set the value.

9 Press and hold the ENT button for confirmation.

To execute, select “OK”.

To return to the previous step, select “Cancel”.

10 Select “OK” and press the ENT button.

The 2nd stage gas alarm set value will be set.

11 The screen will return to the Alarm Setting screen.

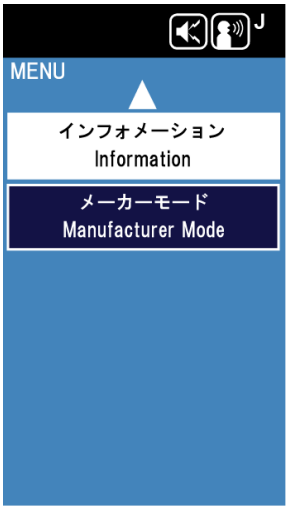
5.7 Information

Form the information menu, the setup details and alarm/fault event history can be viewed.

Operation Procedure

1 **Deactivate the safety lock.**
The Main Menu will be displayed.

2 **Select “Information”.**
The selected item will be highlighted in white.



3 **Press the ENT button.**
The unit will enter the Information screen.

Information Menu

Menu	Description
Configuration Data	Displays the setup details.
Event History	Displays the alarm/fault events.

5.7.1 Configuration Data

The setup details can be viewed from this menu.

Operation Procedure

1 **Deactivate the safety lock.**
The Main Menu will be displayed.

2 **Select “Information”.**
The selected item will be highlighted in white.

3 **Press the ENT button.**
The unit will enter the Information screen.

4 **Select “Configuration Data”.**
The selected item will be highlighted in white.

5 **Press the ENT button.**
The unit will enter the Device Set Data (configuration data) screen.

Configuration Data

Seq.	Item	Description/function
1	Serial No.	Displays the product’s serial number.
2	Mfg. Data (dd/mm/yy)	Displays the product’s manufacturing date.
3	Fullscale Value	Displays the full scale value of the product.
4	AL1 Set Value	Displays the 1st stage gas alarm set value of the product.
5	AL2 Set Value	Displays the 2nd stage gas alarm set value of the product.
6	Voice Message	Displays the on/off status of voice message.
7	Alarm volume	Displays the volume level of voice message and alarm sound.
8	1st Language	Displays the 1st language.
9	2nd Language	Displays the 2nd language.
10	Main Software Ver.	Displays the software version of the main board.
11	Sub Software A Ver.	Displays the software version of the sub-board A.
12	Sub Software R Ver.	Displays the software version of the sub-board R.
13	Sub Software B Ver.	Displays software version of the sub-board B. *Displays only for backup power type unit. “B” stands for battery.
14	Sound Software Ver.	Displays the software version of the audio data.

5.7.2 Event History

The alarm or fault events of this product can be reviewed from this menu.
Up to 30 events can be viewed.

Operation Procedure

1 **Deactivate the safety lock.**
The Main Menu will be displayed.

2 **Select “Information”.**
The selected item will be highlighted in white.

3 **Press the ENT button.**
The unit will enter the Information screen.

4 **Select “Event History”.**
The selected item will be highlighted in white.

5 **Press the ENT button.**
The unit will enter the Event History screen.

Event	Description	Text color while event is going on.	Text color when event has been cleared.
AL1	1st stage gas alarm	Amber	White
AL2	2nd stage gas alarm	Red	White
E - XX	Error (E-1 to E-42)	Blue	White

6 Maintenance

This chapter explains the routine check, periodical inspection and part replacement procedure.

6.1 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.

<table>
<tr><th></th><th>Action by</th><th>Frequency</th><th>Check item</th><th>Procedure</th></tr>
<tr><td rowspan="3">Routine check</td><td rowspan="3">Supervisor</td><td>Daily</td><td>Visual check</td><td>• Check that the green POWER LED is lit and the unit operates.
• Check the display (gas concentration bar graph, icons, measurement unit etc.).
• Check the unit for corrosion.
• Check mounting screws for corrosion. Replace any worn or damaged parts.</td></tr>
<tr><td rowspan="2">Monthly</td><td rowspan="2">Circuit check</td><td>• Check the alarm operation using the test mode.</td></tr>
<tr><td>• Check the battery life expectancy by the battery voltage test.</td></tr>
<tr><td rowspan="2">Periodical inspection</td><td rowspan="2">Service personnel</td><td rowspan="2">6 months
or
Yearly</td><td>Sensor unit calibration</td><td rowspan="2">• Contact New Cosmos or its authorized representative for inspection.</td></tr>
<tr><td>Backup power supply unit check</td></tr>
</table>

Important Notice for Periodical Inspection

In order 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 by using actual gas (combustible or poisonous 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

- While in the test mode, the external relay contacts and analog output are active. (The external relay contacts are not active while in the maintenance mode.) If the external relay contact outputs are used to interlock external devices, release the interlocks, as needed, before checking the alarm operation using the test mode.
- Notify those concerned before starting the gas alarm inspection.

6.1.1 Fuse Replacement

WARNING

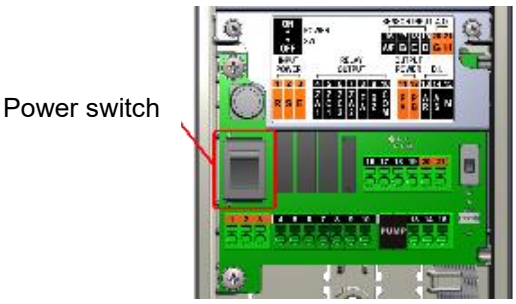
- Set the power switch to the off position before fuse replacement. Fuse replacement with the power on may cause injury or device failure.
- Use the specified fuse.

1 Turn and loosen the knurled screw of the cover counterclockwise. Open the cover.

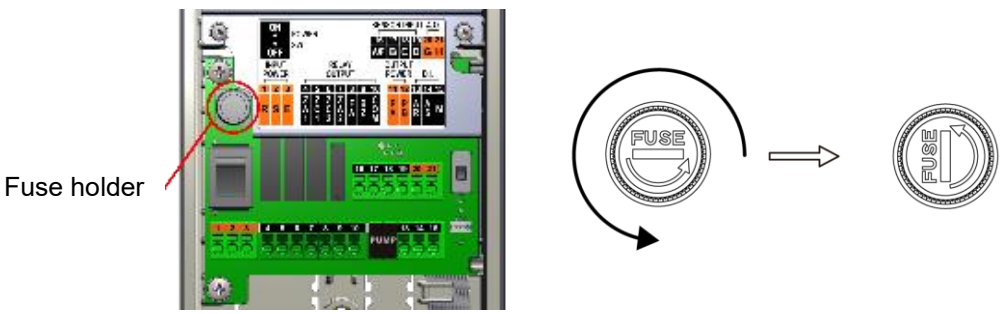
CAUTION

Hold the cover with your hand while opening/closing it. Flinging the cover may cause injury or product damage such as a broken LCD.

2 Set the power switch to the off position.



3 While turning the fuse holder counterclockwise, pull and detach it from the unit. Pull and remove the fuse from the fuse holder.



4 Replace the fuse with a new one.

5 Reinstall the fuse holder by taking the reverse order 1 to 3.

6.1.2 Battery Replacement

The battery life is about two years from the month of manufacture.

⚠ WARNING

Use the specified batteries.

Set the power switch to the off position before battery replacement.

Observe the following precautions for safe use of batteries.

Incorrect use of batteries may cause them to leak, heat, ignite or explode.

- Do not charge used batteries.
- Do not short-circuit batteries.
- Do not disassemble, deform or modify batteries.
- Do not heat or throw batteries into a fire.
- Do not expose/soak batteries to/in freshwater or seawater.

⚠ CAUTION

- Battery replacement should be performed by service personnel, neither operator nor supervisor.
- Replace both batteries at the same time.
- Ensure that the harnesses are not caught in by the battery lid when installing it.

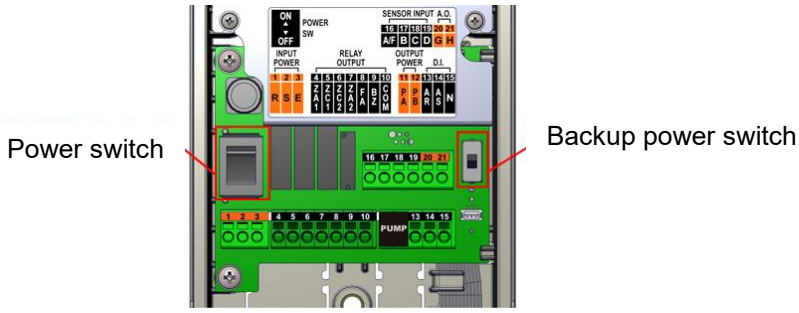
1 Turn and loosen the knurled screw of the cover counterclockwise. Open the cover.

⚠ CAUTION

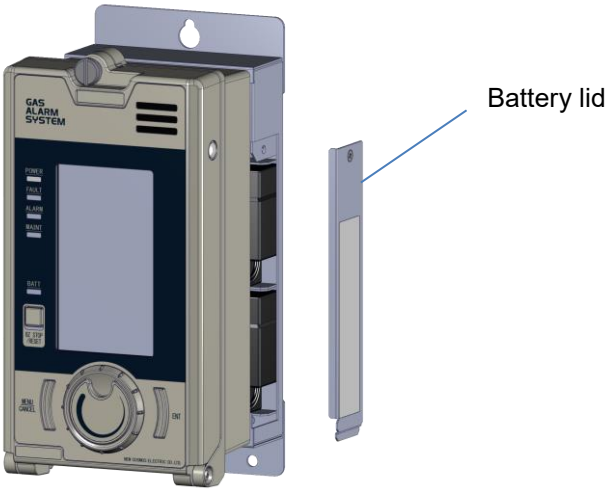
Hold the cover with your hand while opening/closing it. Flinging the cover may cause injury or product damage such as a broken LCD.

2 **Set the backup power switch to the off position.**

3 **Set the power switch to the off position.**



4 **Remove the screw from the battery case. Remove the battery lid.**



5 **Pull the two batteries. Disconnect the two battery connectors from the connectors on the unit. Remove the batteries from the unit.**

6 **Insert two new batteries into the unit. Connect the two connectors.**

7 **Push and completely insert the batteries.**

8 **Attach the battery lid to the unit.**
9 **Set the backup power switch to the on position.**
10 **Set the power switch to the on position.**

6.1.3 AC-DC Power Supply Unit Replacement

The service life of the AC-DC power supply unit is five years from the month of manufacture.

DANGER	
	Do not replace the AC-DC power supply unit in a place where combustible gas or ignitable material is present.

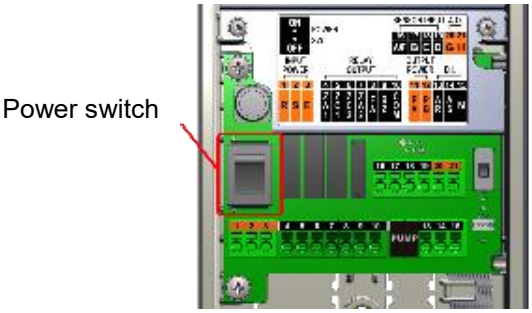
WARNING	
	Set the power switch to the off position before AC-DC power supply unit replacement. Use the specified AC-DC power supply unit.

CAUTION	
	Battery replacement should be performed by service personnel, neither operator nor supervisor.

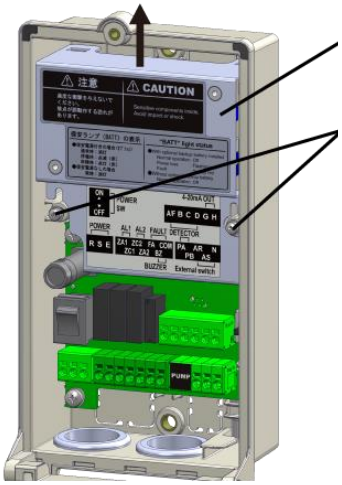
1 Turn and loosen the knurled screw of the cover counterclockwise. Open the cover.

CAUTION	
	Hold the cover with your hand while opening/closing it. Flinging the cover may cause injury or product damage such as a broken LCD.

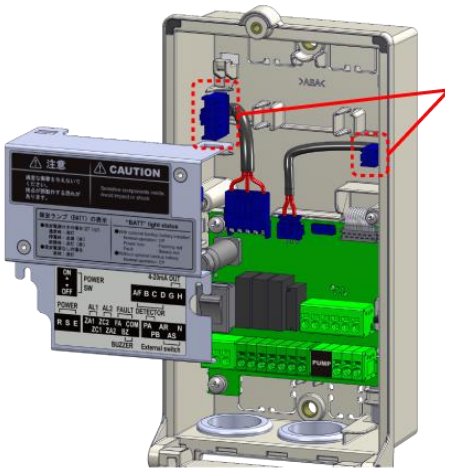
2 Set the power switch to the off position.



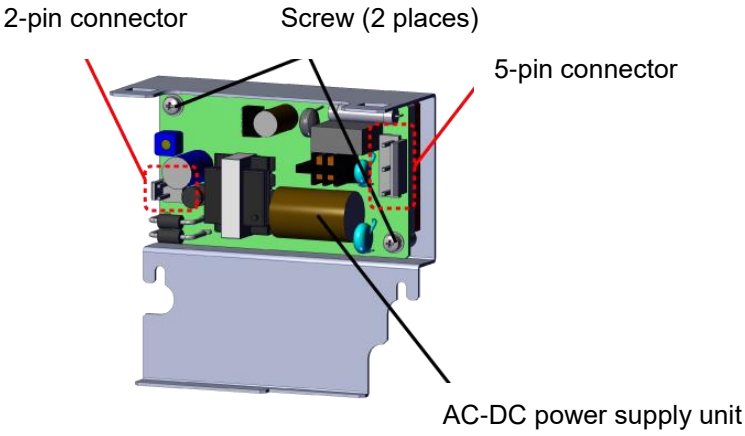
3 Loosen the two screws. Slide the switching cover up.



4 Disconnect the two connectors from the AC-DC power supply unit. Detach the switching cover from the unit.



5 Remove the two screws that attach the AC-DC power supply unit to the cover. Replace the AC-DC power supply unit with a new one.
Ensure that the new AC-DC power supply unit is placed in the correct orientation.



6 Reinstall the AC-DC power supply unit by taking the reverse order 1 to 4.

7 Error Codes and Solutions

This product has a self-diagnosis function, and if a problem occurs with the device, the corresponding error code will be displayed to alert the user along with a beeping sound or a voice message.
If a code other than the ones listed is displayed or if the problem persists after performing the corresponding solution, please contact New Cosmos or its authorized representative.

Error Codes and Solutions

Error code	Fault LED	Fault contact	Analog output	Problem	Possible cause	Solution
E-6	On	Activated	≤ 0.6mA	Gas detector broken wire	Broken wire of line A	Check the wiring and rewire. (Refer to NV-120 series instruction manual for installation)
E-7	On	Activated	≤ 0.6mA	Gas detector short-circuit	Broken wire of line B Line A and line C short-circuited	
E-8	On	Activated	≤ 0.6mA	Gas detector 4-20mA input broken wire	Broken wire of line D	
E-9	On	Activated	≤ 0.6mA	Gas detector 1-5mA input broken wire	Broken wire for detector signal	
E-10	On	Activated	≤ 0.6mA	Pyrolyzer broken wire	Broken wire of detector's pyrolyzer line	
E-11	On	Activated	≤ 0.6mA	Low flow rate	Flow rate is low at gas detector.	Check the gas detector for flow rate.
E-17	Off	Not activated	Gas concentration value	Span adj. lower limit error	Incorrect gas concentration (calibration gas) was applied.	Check that gas type and concentration of calibration gas are correct. Perform span adjustment.
E-18	Off	Not activated	Gas concentration value	Span adj. upper limit error	Incorrect gas concentration (calibration gas) was applied.	
E-19	Off	Not activated	Gas concentration value	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.
E-20	Off	Not activated	Gas concentration value	Zero adj. upper limit error	Gas is present in the vicinity of the gas detector.	

NOTE There are some errors where the corresponding error code and current gas concentration are alternately displayed on screen. In case of error codes where the FAULT LED is lit solid (e.g., E-11), only the corresponding error code is displayed.

8 Troubleshooting

Before requesting 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 using the product and consult with your supervisor.

Problem	Probable cause	Steps	Action by
Setting power switch to on position does not turn on green POWER LED.	Incorrect or loose wiring. Blown fuse.	Check and rewire. (5.3 Wiring of Instruction Manual for Installation) Replace the fuse with a new one. (6.1.1 Fuse Replacement)	Supervisor
Setting power switch to on position does not turn on LCD.	Poor internal connection.	Contact us for repair.	Supervisor
Red MAINT LED is lit or flashes.	Product is in maintenance mode.	Set the product to gas-monitoring mode. (5.2 Maintenance Mode)	Supervisor
No contact output.	Product is in maintenance mode.	Set the product to gas-monitoring mode. (5.2 Maintenance Mode)	Supervisor
	Incorrect wiring.	Check and rewire. (5.3 Wiring of Instruction Manual for installation)	Supervisor
	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. (5.6.2 Alarm Setting)	Supervisor
Cannot make or adjust setting.	Product is in warm-up cycle.	Operate the product after the warm-up cycle is completed. (4.2.1 Power-up)	Service personnel
Cannot operate.	Safety lock is active.	Deactivate the lock. (5.1.5 Deactivate Safety Lock)	Operator

9 Specifications

<table>
<tr><td>Product</td><td colspan="7">Single-point gas alarm system</td></tr>
<tr><td>Model</td><td>NV-120Mx</td><td>NV-120Cv</td><td>NV-120Ci</td><td>NV-120Hv</td><td>NV-120Hi</td><td>NV-120Dx</td><td>NV-120Sx</td></tr>
<tr><td>Detection principle</td><td>-
(4-20mA input)</td><td colspan="2">Catalytic</td><td colspan="2">Hotwire semiconductor</td><td>Electrochemical</td><td>Galvanic cell</td></tr>
<tr><td>Target gas</td><td>As per connected gas detector</td><td colspan="4">Combustible gas</td><td>Toxic gas</td><td>Oxygen</td></tr>
<tr><td>Detection range</td><td colspan="7">As per connected gas detector</td></tr>
<tr><td>Power voltage</td><td colspan="7">AC type: 100 to 240 VAC±10% or DC type: 24 VDC (18 to 26.4 VDC) *1</td></tr>
<tr><td rowspan="4">Power consumption *2</td><td></td><td colspan="2">AC type</td><td colspan="2">DC type</td><td colspan="2"></td></tr>
<tr><td></td><td>Standard</td><td>Max.</td><td>Standard</td><td>Max.</td><td colspan="2"></td></tr>
<tr><td>Non-backup power type</td><td>2.0 VA</td><td>3.4 VA</td><td>2.0 W</td><td>3.4 W</td><td colspan="2"></td></tr>
<tr><td>Backup power type</td><td>2.1 VA</td><td>4.7 VA</td><td>-</td><td>-</td><td colspan="2"></td></tr>
<tr><td>External outputs</td><td colspan="7">・Power output: 24 VDC ± 10% Max.0.3 A
・Signal output: 4-20 mA analog or 1-5 V *1
In the event of failure: ≤ 0.6 mA (for 4-20 mA type) and
≤ 0.25 V (for 1-5 V type)
・1st stage gas alarm contact: Dry, N.O. or N.C.*1
Max. load: 250 VAC 2 A, 30 VDC 2 A (resistive load)
・2nd stage gas alarm contact : Dry, N.O. or N.C.*1
Max. load: 250 VAC 2 A, 30 VDC 2 A (resistive load)
・Fault contact: Dry, N.O. or N.C.*1
Max. load: 250 VAC 2A, 30 VDC 2 A (resistive load)
・Audio alarm contact: Dry, N.O.
Max. load: 250 VAC 2A, 30 VDC 2 A (resistive load)</td></tr>
<tr><td>Display</td><td colspan="7">Color LCD with backlight</td></tr>
<tr><td>Status indicator</td><td colspan="7">Green POWER LED, red ALARM LED (1st stage gas alarm: flashes and 2nd stage gas alarm: flashes rapidly) and amber FAULT LED</td></tr>
<tr><td>Gas alarm</td><td colspan="7">・1st stage gas alarm: ALARM LED flashes red + LCD turns orange + beeping + voice message “Gas alarm”
・2nd stage gas alarm: ALARM LED rapidly flashes red + LCD turns red + fast beeping + voice message “Gas alarm”</td></tr>
<tr><td>Fault alarm indication</td><td colspan="7">FAULT LED lit amber + error code on display + fast beeping + voice message*3</td></tr>
<tr><td>Gas alarm clearance method</td><td colspan="7">Manual-resetting or auto-resetting *1</td></tr>
<tr><td>Alarm set value</td><td colspan="7">As per delivery specifications</td></tr>
<tr><td>Alarm accuracy</td><td colspan="7">As per connected gas detector</td></tr>
<tr><td>Response time</td><td colspan="7">As per connected gas detector</td></tr>
<tr><td>Compliance</td><td colspan="7">EMC directive (2014/30/EU/SI 2016 No.1091) *4 and RoHS directive
(2011/65/EU+(EU)2015/863/SI 2012 No.3032) *5</td></tr>
<tr><td>Color</td><td colspan="7">Case and cover: DIC546 1/2 Backup battery unit: Munsell 10Y8.5/1</td></tr>
<tr><td>Mass</td><td colspan="7">Non-backup power type: Approx. 750g
Backup power type: Approx. 2.2kg</td></tr>
<tr><td>Dimensions</td><td colspan="7">Non-backup power type: W113mm×D77mm×H219mm
Backup power type: W113mm×D115mm×H234mm</td></tr>
<tr><td>Operating temperature</td><td colspan="7">Non-backup power type: –10 to 50°C
Backup power type: 0 to 40°C No rapid temperature change.</td></tr>
</table>

Operating humidity	0 to 90%RH No condensation.	
Mounting method	Wall-mounting or panel-mounting	
Ingress protection	IP2X when installed	
Backup power type *1, 6 and 7	Without intermittent gas-monitoring mode	In the event of a power outage, the unit will continue continuous gas-monitoring for another 120 minutes or more.
	With intermittent gas-monitoring mode	In the event of a power outage, the unit will continue continuous gas-monitoring for another 120 minutes, followed by intermittent monitoring (10 seconds each at 15-minute intervals). The intermittent monitoring will last for max. 7 days when connected to diffusion type gas detector and max. 2 days when connected to extractive type.

*1. Must be specified at the time of ordering.
*2. Consumption power of the connected gas detector is excluded.
*3. Voice message changes depending on the nature of the fault.
*4. CE marking specification applies to NV-120Mx which uses 24 VDC power. Refer to the “EU Declaration of Conformity” (separate document) for information on the CE marking unit.
*5. None of the hazardous substances restricted by the RoHS directive is used in this product.
*6. Backup power type units are all AC type units. Only NV-120Ci and NV-120Cv models have intermittent gas-monitoring mode.
*7. Gas alarm accuracy is compromised during the intermittent gas-monitoring mode, since the sensor output becomes unstable during this mode, as a result, a gas alarm may be activated even though the concentration does not reach the gas alarm set value.

*Only New Cosmos-manufactured gas detector can be connected to this product.
*Specifications above may be subject to change without notice.
*N.O.: Normally open.
*N.C.: Normally closed.

10 Warranty

The warranty period is one (1) year from the date of purchase.
You are entitled to the 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 not third-party product/parts.

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

(1) Failures and damages incurred by incorrect use, deliberate acts or negligence of the user.
(2) Failures and damages caused by 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.

11 Glossary

Term	Definition
Alarm unit	Device that indicates the gas concentration and activates an alarm according to the signals received from a connected gas detector.
Backup power supply unit	Battery unit that provides emergency power to the product when the input power source or main power fails.
Backup power type and non-backup power type	There are NV-120 units with and without backup batteries attached. They are called “Backup power type” and “non-backup power type” respectively.
Gas detector (or gas detector head)	Device used to detect the presence of a target gas and to give its concentration 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, concentration displayed, and used to trigger alarms.
Alarm set value	A gas concentration value that is set on a gas detector for alarm activation.
Detection range	A range of target gas concentrations that can be displayed and trigger alarms.
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 which are within their explosive limits.
LEL (or LFL)	Lower Explosive Limit (or Lower Flammable Level). Lowest concentration (percentage) of a gas or vapor in air capable of producing a flash fire, or explosion in the presence of an ignition source like arc, flame or heat.
%LEL	Concentrations of combustible gas given in terms of percent of the lower explosion limit.
vol%	Gas concentrations given in terms of percent of cubic volume.
ppm	Gas concentrations given in terms of millionth part of cubic volume.
Zero suppression (or 20.9 suppression for oxygen detection)	For indicator 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 pre-set value. The pre-set value is given in the delivery specifications.
Clean air or normal air	Standard atmosphere which contains 20.9 to 21.0% oxygen in dry condition or atmosphere without target gas or interference gases.

Revision History

Document No.	Date	Revision
GAE-154-00	December 2019	0 (Initial issue)
GAE-154-01	December 2020	1
GAE-154-02	October 2021	2
GAE-154-03	September 2022	3

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

Authorized representative:

Manufacturer:

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NEW COSMOS ELECTRIC CO.,LTD.