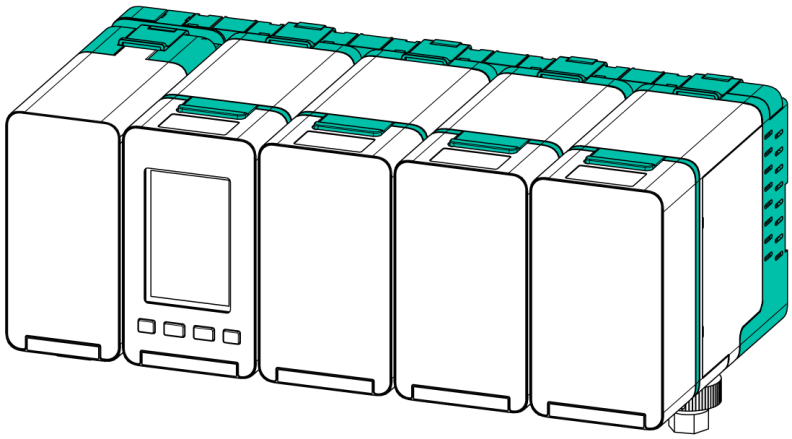
PS-8 Series Gas Detector

for use in semiconductor manufacturing plant

Instruction Manual for Operation



Keep this manual for easy reference.
Read and understand this manual carefully before using this product correctly.
This manual describes the standard model. If your unit has end-user-specific options, this manual will be superseded by your delivery specifications.

CE

Instruction Manual No.
GAE-179-00
December 2024

NEW COSMOS ELECTRIC CO.,LTD.

Related Manuals

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

PS-8 Series Instruction Manual for Installation, No. GAE-178

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

PS-8 Series Instruction Manual for Operation (this document), No. GAE-179

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:

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

PS-8 Series Instruction Manual for Communication, No. GAE-180

This document is intended to provide the communication specifications and procedure to establish communication with external devices.

Introduction

Thank you for purchasing the New Cosmos PS-8 series extractive type gas detector (“product” or “unit” hereafter).

Prior to use, please read this manual as well as the related manuals and follow the instructions provided for correct use of the product.

Periodic maintenance is essential to maintain the reliability of the product. Periodic maintenance must be performed in the manner described in this document.

Keep this manual in a safe place for easy reference.

This product is a gas detector designed for use in semiconductor manufacturing plants. It monitors semiconductor process gases or flammable gases (e.g., hydrogen) that may be present in a cylinder cabinet, exhaust duct, or workspace within a semiconductor manufacturing plant. The unit displays the measured gas concentrations on its screen and transmits them as an analog signal, contact signal, and/or Ethernet signal to external equipment. If the gas concentration level reaches a preset threshold, the alarm LEDs will start blinking and simultaneously activate the external relay contacts (1st and 2nd gas alarm contacts), providing early detection of a potential gas leak.

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

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

Notation Rules for Registered Trademarks

* Modbus® is a registered trademark of Modicon Inc. (AEG Schneider Automation International S.A.S).

- All other company names and product names used in this manual are trademarks or registered trademarks of their respective companies.
- The trademarks or registered trademarks used in this document are not accompanied by a TM or ® symbol.

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

This manual uses the following notations in addition to the aforementioned hazard level classifications.

NOTE Provides supplemental or useful information on product handling.

Ref. References with related content and common procedures.

Symbol Marks

This manual uses the following symbol marks to outline the contents of the description.

	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 risk of explosion while handling explosive items.
	Corrosive hazard May cause burn or loss of sight if skin or eye comes into contact.

Model Variations

This product is divided into the following models according to the sensor unit and functions that meet the customer's specifications.

Main Unit

Model	Power Supply		Output Signal		Collective Contact Output (AL1, AL2 and Fault)
	PoE	24 VDC	Ethernet	Analog Signal	
PS-8M	✔	✔	✔	✔	✔
PS-8N		✔		✔	✔

Subunit

Model	Power Supply	Output Signal	Contact Output
PS-8S	None*1	None*2	None*3

*1: Power is supplied from the main unit.

*2: If analog signal output is required, an expansion unit with an AO module (sold separately) needs to be added.

*3: If at least one of the sensor channels generates a gas alarm or fault alarm, a collective gas or fault alarm contact output is generated by the main unit. If a dedicated gas or fault alarm contact output is required for each sensor channel, an expansion unit with a DO module (sold separately, up to two channels per DO module) is required. The collective alarm contacts (AL1, AL2, and Fault) are located in the main unit, not in the subunits.

Expansion Unit

Model	Module Type	Function	Remarks
PS-8EU*	PS-8EUM-AO	Analog output	Up to four channels can be supported by each AO module.
	PS-8EUM-DO	Contact output dedicated to each individual sensor channel (AL1, AL2, and Fault)	Up to two channels can be supported by each DO module.
	PS-8EUM-AI	Analog input	Up to two channels can be supported by each AI module.

*4: A maximum of two modules can be installed in one expansion unit.

Sensor Unit

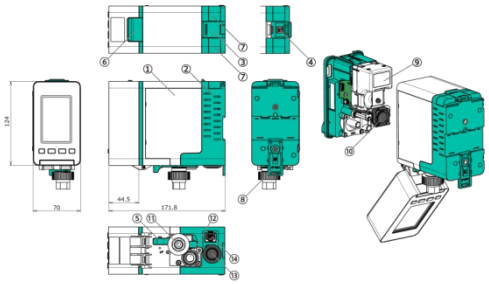
Model	Sensor Type	Detection Principle
CDS-7	Toxic gas sensor	Electrochemical sensor
CHS-7	Flammable gas sensor	Hot wire semiconductor sensor
COS-7	Oxygen sensor	Galvanic cell sensor

Quick Index

This page lists parts that may be often referenced.
Prior to use, please read the precautions in 1 “General Precautions”.

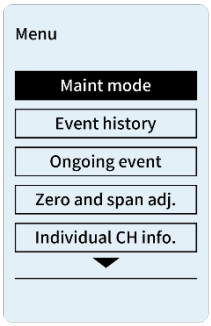
Unit Dimensions and Components

Pages 7 to 22



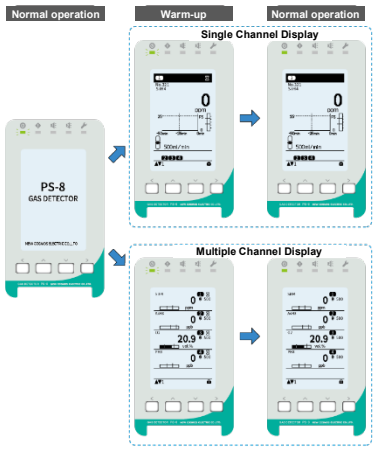
Operation

Pages 38 to 67



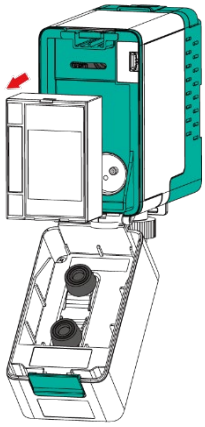
Power On/Off

Pages 25 to 26



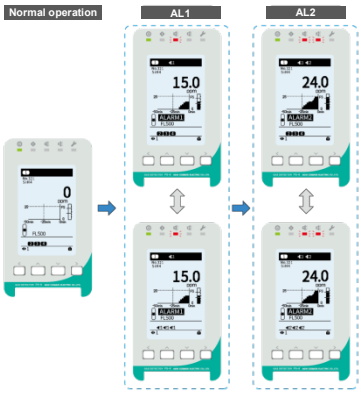
Maintenance

Pages 89 to 99



Alarm Operation

Pages 27 to 35



Troubleshooting

Pages 100 to 103

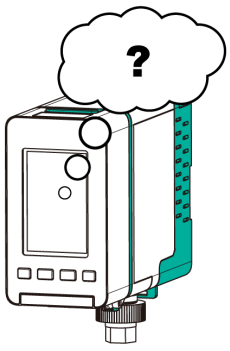


Table of Contents

1 General Precautions

1.1 Before Work

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

Do not use the product in a manner other than that described in this document. Doing so may impair the electrical/mechanical protection functions of the product.

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

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

DANGER	
	• Do not put your face close to the exhaust port of this unit. Doing so may cause the inhalation of oxygen-free air or toxic gases that are harmful to human health.

DANGER	
	• Operation check using actual gas is extremely dangerous and requires a special attention, because flammable 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. • If the liquid leaks from the sensor due to vibration or shock and gets on your hands or clothes, wash them with water immediately. Moreover, if the liquid gets into your eyes or ears, wash them with plenty of water as first aid and seek immediate medical advice. • This product is not explosion-proof and must not be installed in a hazardous area.

WARNING	
	• Ground the product to prevent electric shocks. • In the event of a gas leak alarm, follow safety procedures in accordance with your company's regulations. • This product is heavyweight. Handle it with care not to drop it. Failure to do so may cause injury or property damage such as damaged floor.

CAUTION
• Do not use radio wave-emitting devices (e.g., walkie-talkies, cell phones, wireless devices) in the vicinity 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 must only be performed by a qualified electrician with sufficient knowledge of wiring/installation procedures, in accordance with the applicable technical standards. • New Cosmos is not liable for any cost incurred or any damage resulting from controlling external equipment (e.g., interlock) by using the product's outputs (e.g., analog output, alarm 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 water or rain.

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

NOTICE
• New Cosmos is not liable for any cost incurred or any damage resulting from a measurement data or information breach.

1.3 Labels Affixed to Product

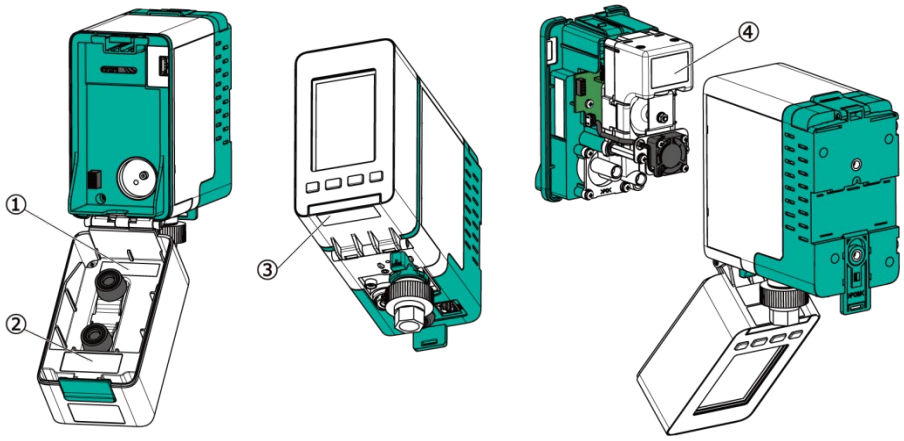
Danger, Warning and Caution labels are affixed to the areas or surrounding parts that are potentially dangerous and require a special attention. Prior to use, please read the instructions in these labels.

WARNING
• Do not relocate the labels affixed to the product.

WARNING
• If Danger, Warning and Caution labels are missing, damaged or illegible, please contact New Cosmos or its authorized representative for replacement. It is extremely dangerous to leave the labels dirty or obscured.

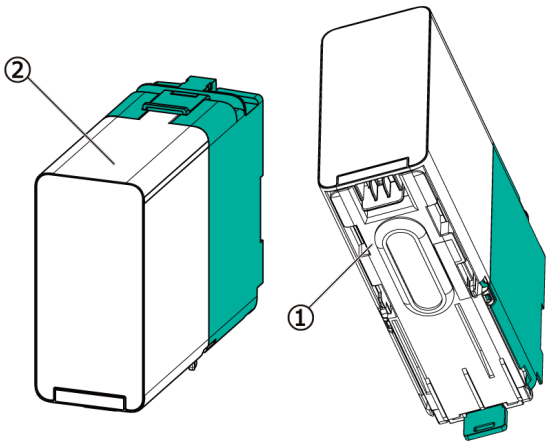
Prior to use, please read these labels. Labels that are not specified below are for control by New Cosmos. Operation and maintenance work of the appliance is not affected.

Labels for Main Unit and Subunit



Item	Description
①	**Serial number label** Indicates the serial number of the product.
②	**Power rating label** Indicates the model and the power supply specifications.
③	**Environmental label** Indicates the applicable certification markings.
④	**Pump serial number label** Indicates the serial number of the pump.

Labels for Expansion Unit



Item	Description
①	**Serial number label** Indicates the serial number of the product and applicable certification markings.
②	**Caution label** Indicates the precautions to be adopted while removing the front case.

CE Marking

This product complies with the CE marking requirements.
Refer to the EU Declaration of Conformity before use.
Note: CE marking applies only when the maximum load for the gas alarm/fault alarm contacts of 30 VDC 1.0 A (resistive load) is used.

1.4 Disposal

Used product, components, sensor units, and/or batteries must be disposed of as hazardous waste in accordance with the applicable laws and regulations.

1.5 Service Life

The service life of this product is 10 years. The unit can operate for up to 10 years with standard installation and operation in accordance with the PS-8 series instruction manuals for installation and operation. When the service life has expired, replacement is essential for continued reliable performance and other purposes. “10 years” is only an estimate, and no guarantee is provided.

Ref. Refer to 12 “Maintenance” for the replacement parts, which may require replacement before this product’s service life (10 years) expires.

1.6 Definition of Supervisor/Operator/Service Personnel

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

Supervisor	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 for installation, maintenance, and repair. Acts as New Cosmos authorized technician in principle.

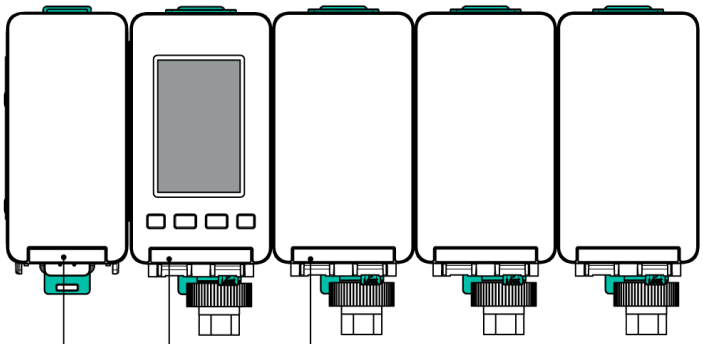
2 System Configuration

This section explains the PS-8 system configuration.

Up to three subunits and up to four expansion units (up to eight modules, two modules per expansion unit) can be connected to a single main unit to form a gas detection system (a maximum of 4 channels or 4 gases).

Up to eight external gas detectors can be connected to the system via AI modules (two external gas detectors per AI module).

A main unit can be used as a stand-alone detector as well.



Expansion Unit
- Status LEDs
- Up to two modules can be installed in each expansion unit.
- Module variations
  - (1) AO module
    -> Dedicated analog output
  - (2) DO module
    -> Dedicated gas/fault alarm contact output
  - (3) AI module
    -> Analog input

Main Unit (gas detector)
- Status LEDs
- LCD
- Operation keys
- External outputs
  - (1) Collective gas/fault alarm contact outputs (AL1, AL2 and Fault)
  - (2) Analog output
  - (3) Modbus TCP (Ethernet) communication*

*As per the delivery specifications

Subunit (gas detector)
- Status LEDs

3 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.

Main Unit and Accessories

Item	Qty.	Description
Main unit	1	–
Half union	2	R1/4-ϕ6 mm or R1/4-ϕ1/4 inch[*1] Polypropylene (PP) One inner and one sleeve included
Filter element (FE-1)[*2]	1	12 pcs, for MF-50 filter unit
Mounting screw	2	M4×12, for wall-mounting
Outlet spacer	1	Use when installing a metal tube fitting
Activated carbon filter outer sleeve (KF-6S-□)	1[*3]	–
Flat-bladed screwdriver	1[*4]	Use to open/close the terminal block's slots
PS-8 series instruction manual set	1[*4]	Instruction Manuals for Installation, Operation, and Communication

*Sensor unit is not included and sold separately. It will be separately delivered when ordered.

Subunit and Accessories

Item	Qty.	Description
Subunit	1	–
Half union	2	R1/4-ϕ6 mm or R1/4-ϕ1/4 inch[*1] Polypropylene (PP) One inner and one sleeve included
Filter element (FE-1)[*2]	1	12 pcs, for MF-50 filter unit
Mounting screw	2	M4×12, for wall-mounting
Outlet spacer	1	Used when installing a metal tube fitting
Joint	1	Used for connecting two adjacent units
Activated carbon filter outer sleeve (KF-6S-□)	1[*3]	–

*Sensor unit is not included and sold separately. It will be separately delivered when ordered.

Expansion Unit and Accessories

Item	Qty.	Description
Expansion unit	1	–
Module	1 or 2[*5]	A combination of AO/DO/AI modules
PCB address label	1	–
Joint	1	Used for connecting two adjacent units
Mounting screw	2	M4×12, for wall-mounting

Optional Items (Sold Separately)

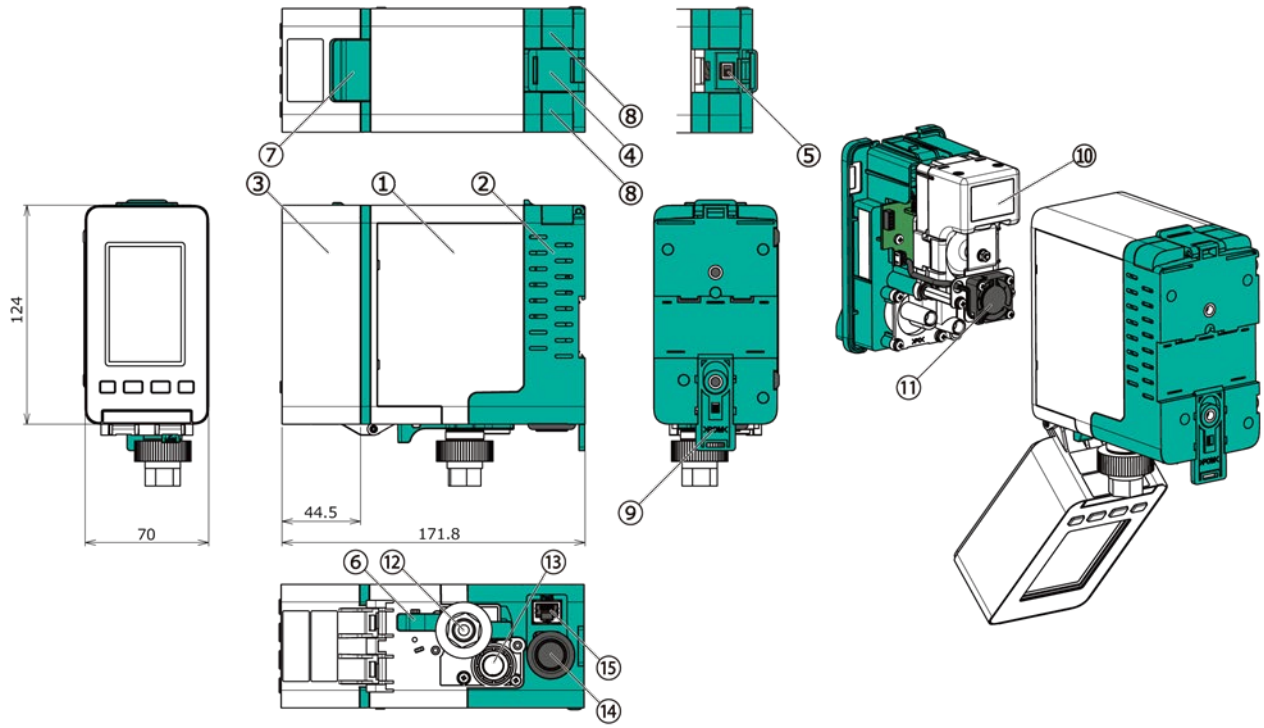
Item	Qty.
Filter unit (MF-51)[*6]	As ordered
Gas collector (PF-D1)	As ordered

*1: φ1/4 inch half union should be specified at the time of ordering.
*2: For detection of highly adsorptive gases (e.g., HF, F_2), a filter element (FE-1) should not be used. Remove the filter element (FE-1) from the filter unit (MF-50).
*3: Provided when a sensor unit with a built-in pyrolyzer (sold separately) was ordered. One activated carbon filter inner sleeve (KF-6S-Y1) comes with the sensor unit. The activated carbon filter inner sleeve needs to be installed in the activated carbon filter outer sleeve.
*4: One screwdriver/manual set is provided per system, not per unit.
*5: Quantity is as ordered.
*6: Recommended for detection of highly adsorptive gas (e.g., HCl, Cl_2, NH_3) other than HF and F_2.

4 Unit Dimensions and Components

4.1 Main Unit (M)

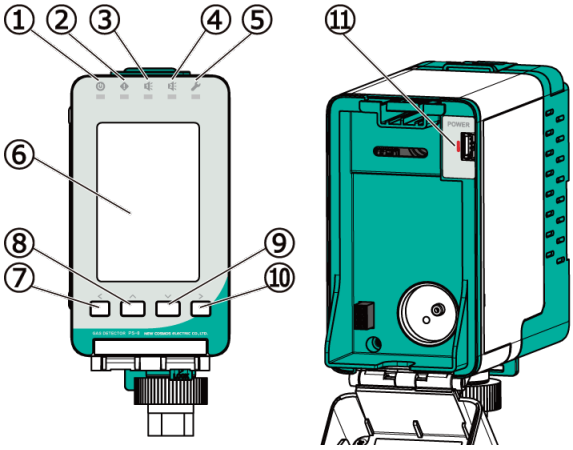
4.1.1 Exterior Appearance



(Dimension unit : mm)

Item	Component	Description
①	Front case	A combination of a front case and a front cover is called “front module”.
②	Rear case	
③	Front cover	
④	Case fixing latch	Secures the rear case to the front case.
⑤	Power switch	Turns the unit on/off.
⑥	Case fixing lever	Secures the rear case to the front case.
⑦	Front cover open/close latch	Press to open the front cover for sensor unit/sampling module replacement.
⑧	Connector cover (2 places)	Cover for the connector. Remove the cover when connecting with other unit.
⑨	DIN rail release lever	Pull down this lever to remove the unit from the DIN rail.
⑩	Sampling module	Pumps the gas in and out.
⑪	Fan	Fan for cooling. Provided with a sampling module.
⑫	Gas inlet	Gas intake port. A filter unit (MF-50) is attached to the gas inlet.
⑬	Gas outlet	Gas exhaust port
⑭	Grommet	Cable entry
⑮	Communication connector (RJ-45)	Connects a LAN cable for Ethernet communication. *Provided on PS-8M only. For PS-8N, this connector is closed with a sealing plate to prevent cable connection.

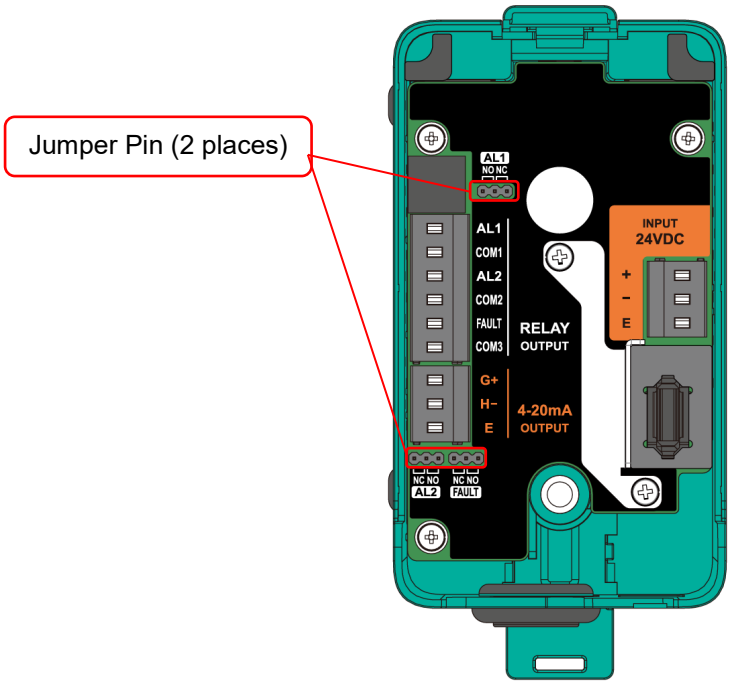
4.1.2 LED and Keys



Item	Component		Description
①		Power LED (Green)	Indicates the operational status of either one of the connected channels. The LED status will take precedence in Blinking rapidly > Blinking > Lit. Not lit: when the unit is off. Blinking: when the warm-up is in progress. Blinking rapidly: when the sensor is off. Lit: when the unit operates normally.
②		Fault LED (Yellow)	Indicates a fault condition of either one of the connected channels. Not lit: when the unit operates normally. Blinking: when a fault is detected.
③		AL1 LED (Red)	Indicates the 1st stage gas alarm status of either one of the connected channels. Not lit: when the warm-up is in progress or unit operates normally. Blinking: when a 1st stage gas alarm is activated.
④		AL2 LED (Red)	Indicates the 2nd stage gas alarm status of either one of the connected channels. Not lit: when the warm-up is in progress or unit operates normally. Blinking: when a 2nd stage gas alarm is activated.
⑤		Maintenance LED (Blue)	Indicates the maintenance mode status of either one of the connected channels. The LED status will take precedence in Lit > Blinking rapidly > Blinking. Not lit: when the unit is in normal operation and not in maintenance mode. Blinking: when the unit is in maintenance mode 1. Blinking rapidly: when the unit is in maintenance mode 2. Lit: when the unit is in aging mode.
⑥	LCD		Displays gas concentration values, alarm statuses, etc. Refer to 4.1.4 “LCD” for details.
⑦	<	Left key	Used to select an item or cancel the current operation.
⑧	^	Up key	Used to select an item or increase the parameter value.
⑨	v	Down key	Used to select an item or decrease the parameter value.
⑩	>	Right key	Used to select an item or confirm the selection or setting.
⑪	Sensor power LED (Red)		Indicates the sensor operational status. Not lit: when the sensor is off. Blinking: when the sensor is on.

4.1.3 External Wiring Terminals

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

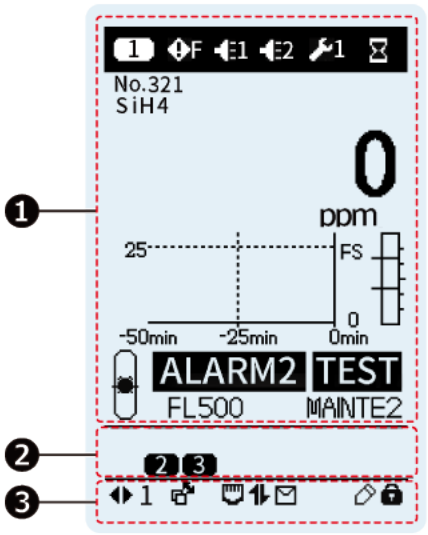


Identifier		Terminal	Description
INPUT 24VDC	+	Power input	24 VDC (+)
	–		24 VDC (–)
	E		Earth
RELAY OUTPUT	AL1	Collective gas alarm output (1st stage)	1st stage gas alarm contact output that is collectively generated if at least one of the sensor channels generates a 1st stage gas alarm
	COM1		Common with AL1
	AL2	Collective gas alarm output (2nd stage)	2nd stage gas alarm contact output that is collectively generated if at least one of the sensor channels generates a 2nd stage gas alarm
	COM2		Common with AL2
	FAULT	Collective fault alarm output	Fault alarm contact output that is collectively generated if at least one of the sensor channels generates a fault alarm
	COM3		Common with FAULT
4-20mA OUTPUT	G+	Analog output	Analog output + (4-20 mA)
	H–		Analog output –
	E		Earth

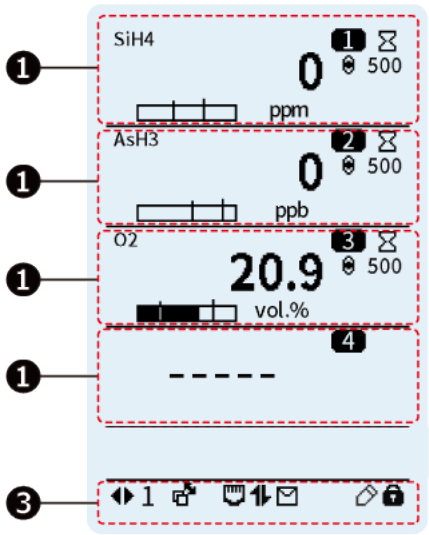
Ref. Refer to 5 “External Outputs” for the operation of the terminals.

4.1.4 LCD

There are two types of display formats: single channel display and multiple channel display.
You may change the display format as required by following the steps: “Device Information” -> “Home screen adj”.
Refer to 10.11 “Device Information” for more information.



Single Channel Display

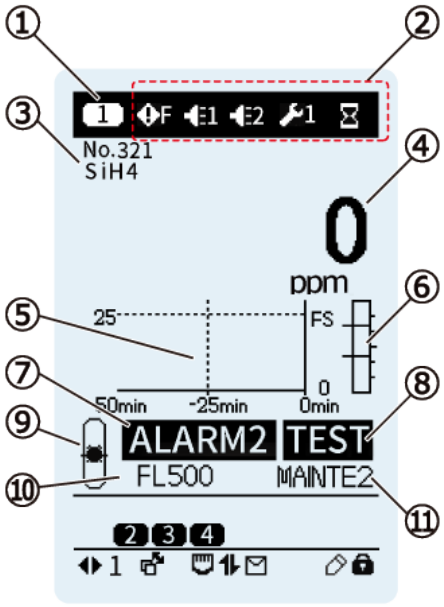


Multiple Channel Display

Item	Name	Description
❶	Main status pane (pages 11-14)	Displays the status information on the selected sensor channels. For invalid channels (i.e., a channel with no gas sensor installed), their gas concentrations will be replaced by “– – – – – ”.
❷	Sensor channel status pane (page 15)	Displays all sensor channels connected to the product, except for invalid channels and channels displayed in the main status pane ❶. When an event (e.g., a gas alarm, fault alarm) occurs, the relevant sensor channel(s) and event icon(s) are alternately displayed.
❸	Device status pane (page 15)	Displays the status and other information of the product.

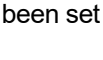
❶ Main Status Pane

Single Channel Display



Item	Name/Icon		Description	
①	Sensor channel	1 to 16	Displays the sensor channel number.	
②	Event icon A		Displays icons indicating sensor status such as gas alarm, fault alarm, maintenance mode. Refer to the next page for details.	
③	Tag name and gas name		Displays the tag name and gas name.	
④	Gas concentration		Displays the gas concentration value.	
⑤	Trend graph		Displays the trend graph for gas concentrations. The trend graph is fixed at zero (or 20.9 % for oxygen) when in maintenance mode 2.	
⑥	Gas concentration bar graph		Displays the gas concentration and gas alarm set values in bar graph form.	
⑦	Event icon B		Displays a sensor status icon such as gas alarm, fault alarm, etc. Refer to the next page for details.	
⑧	Test icon	TEST	Appears during gas or fault alarm test mode.	
⑨	Flow rate icon	Lit	Normal	Displays the pump's flow rate.
		Blinking	High	
		Blinking	Insufficient	
		Slowly blinking	Low	
⑩	FL value		Displays the current FL value. The flow rate is normal when the FL value is 500 ±10%. However, the FL value is just an estimate, and no guarantee is provided.	
⑪	Maintenance icon/Remaining time	MAINTE1	Displays "MAINTE1" and remaining time alternately when in maintenance mode 1.	
		MAINTE2	Displays "MAINTE2" and remaining time alternately when in maintenance mode 2.	

② Event Icon A

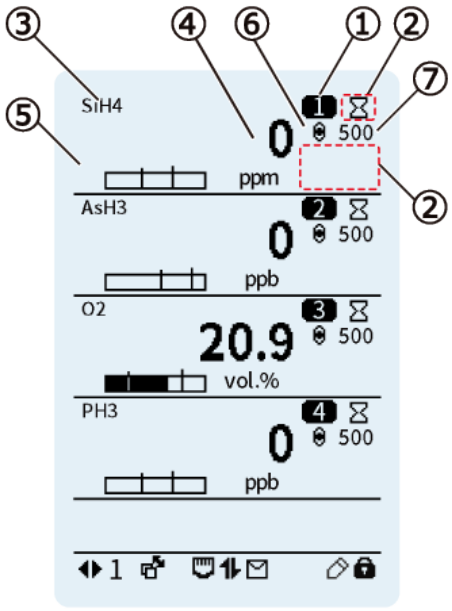
Name	Icon	Description
Warm-up icon		Appears during the warm-up cycle.
Fault alarm icon		Appears when a device failure occurs.
		Appears when a communication error occurs between units.
		Appears when a sensor failure occurs.
		Appears when the flow rate is low.
		Appears when a fan failure occurs.
		Appears when a device error occurs. (Gas monitoring continues)
Gas alarm icon		Appears when a 1st stage gas alarm is activated.
		Appears when a 2nd stage gas alarm is activated.
Maintenance icon		Appears when in maintenance mode 1.*1
		Appears when in maintenance mode 1.*2
		Appears when in maintenance mode 2.*1
		Appears when in maintenance mode 2.*2
Aging mode icon		Appears when in aging mode.
Internal process icon		Appears when an internal process is in progress.

*1: Maintenance mode has been set via a communication channel such as Web Server, smartphone app, and Modbus.
*2: Maintenance mode has been set by the PS-8 unit itself.

⑦ Event Icon B

Name	Icon	Description
Fault alarm icon		Appears when a device failure occurs.
		Appears when a communication error occurs between units.
		Appears when a sensor failure occurs.
		Appears when the flow rate is low.
		Appears when a fan failure occurs.
Gas alarm icon		Appears when a 1st stage gas alarm is activated.
		Appears when a 2nd stage gas alarm is activated.

Multiple Channel Display



Item	Name/Icon		Description	
①	Sensor channel	1 to 16	Displays the sensor channel number.	
②	Event icon C		Displays icons indicating sensor status such as gas alarm, fault alarm, maintenance mode, alarm test, etc. Refer to the next page for details.	
③	Gas name		Displays the gas name.	
④	Gas concentration/Aging mode/ Event icon D		Displays the gas concentration value. Displays the gas concentration value and aging mode icon alternately when in aging mode. Displays a relevant event icon blinking when an event is taking place. Refer to the next page for details on the event icons.	
⑤	Gas concentration bar graph		Displays the gas concentration and gas alarm set values in bar graph form.	
⑥	Flow rate icon	Lit	Normal	Displays the pump's flow rate.
		Blinking	High, insufficient, or low	
⑦	FL value		Displays the current FL value. The flow rate is normal when the FL value is 500 ±10%. However, the FL value is just an estimate, and no guarantee is provided.	

② Event Icon C

Name	Icon	Description
Warm-up icon		Appears during the warm-up.
Test icon		Appears during gas or fault alarm test mode.
Maintenance icon		Appears when in maintenance mode 1.*1
		Appears when in maintenance mode 1.*2
		Appears when in maintenance mode 2.*1
		Appears when in maintenance mode 2.*2
Aging mode icon		Appears when in aging mode.
Fault alarm icon		Appears when a device failure occurs.
		Appears when a communication error occurs between units.
		Appears when a sensor failure occurs.
		Appears when the flow rate is low.
		Appears when a fan failure occurs.
		Appears when a device error occurs. (Gas monitoring continues)
Gas alarm icon		Appears when a 1st stage gas alarm is activated.
		Appears when a 2nd stage gas alarm is activated.
Internal process icon		Appears when an internal process is in progress.

*1: Maintenance mode has been set via a communication channel such as Web Server, smartphone app, and Modbus.
*2: Maintenance mode has been set by the PS-8 unit itself.

④ Gas Concentration/Event Icon D

Name	Icon	Description
Fault alarm icon	FAULT	Blinking when a device failure occurs.
	COMM.	Blinking when a communication error occurs between units.
	SENSOR	Blinking when a sensor failure occurs.
	FLOW	Gas concentration value and this icon are displayed alternately when the flow rate is low.
	FAN	Gas concentration value and this icon are displayed alternately when a fan failure occurs.
Gas alarm icon	ALARM1	Gas concentration value and this icon are displayed alternately when a 1st stage gas alarm is activated.
	ALARM2	Gas concentration value and this icon are displayed alternately when a 2nd stage gas alarm is activated.

❷ Sensor Channel Status Pane

During normal operation, the sensor channel status pane displays all sensor channels connected to this product, except for invalid channels and channels displayed in the main status pane. When an event (e.g., gas alarm, fault alarm) occurs, the relevant sensor channel(s) and event icon(s) are alternately displayed.

Name	Icon	Description
Sensor channel	1 to 16	Displays all sensor channels connected to the product, except for invalid channels and channels displayed in the main status pane.
Maintenance icon	1	Appears when in maintenance mode 1.*1
	1	Appears when in maintenance mode 1.*2
	2	Appears when in maintenance mode 2.*1
	2	Appears when in maintenance mode 2.*2
Aging mode icon	×	Appears when in aging mode.
Fault alarm icon	D	Appears when a device failure occurs.
	S	Appears when a sensor failure occurs.
		Appears when a communication error occurs between units.
	F	Appears when the flow rate is low.
		Appears when a fan failure occurs.
	D	Appears when a device error occurs. (Gas monitoring continues)
Test icon	T	Appears during gas or fault alarm test mode.
Gas alarm icon	1	Appears when a 1st stage gas alarm is activated.
	2	Appears when a 2nd stage gas alarm is activated.

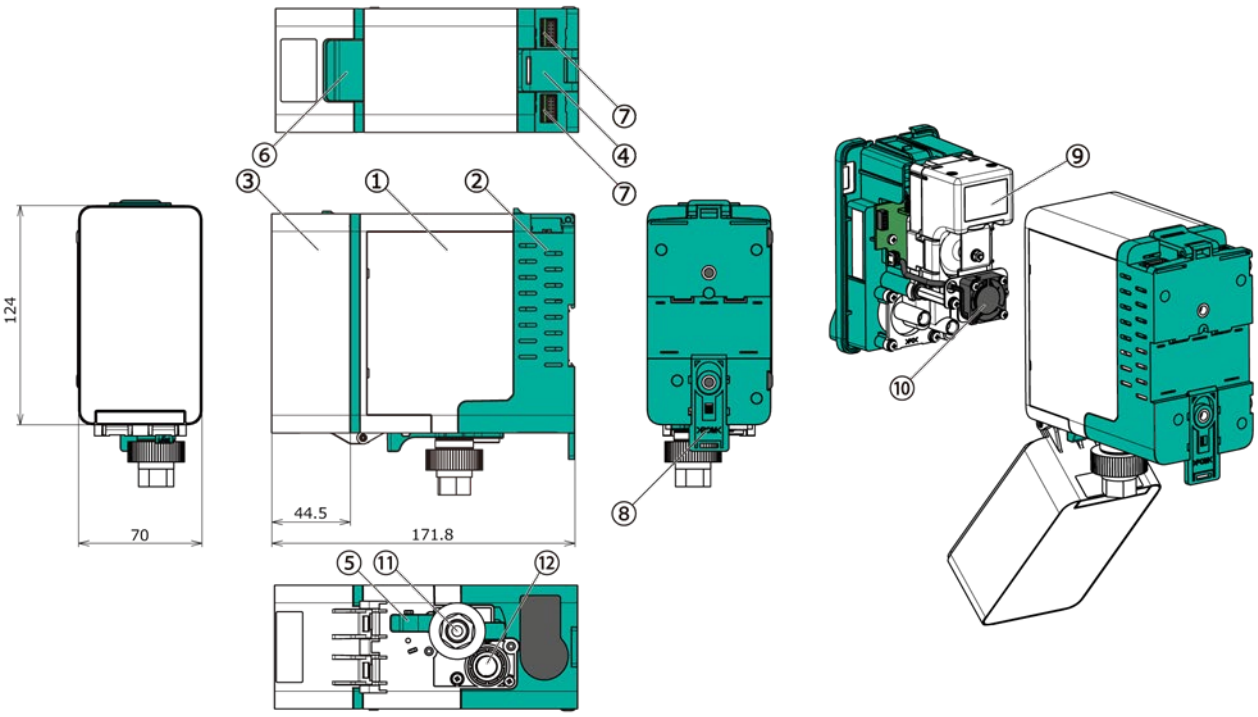
*1: Maintenance mode has been set via a communication channel such as Web Server, smartphone app, and Modbus.
*2: Maintenance mode has been set by the PS-8 unit itself.

❸ Device Status Pane

Name	Icon	Description
Page icon	1 or 1	Displays the page number.
Channel auto cycle icon		The gas concentration screen automatically cycles through the channels while this icon is present. Refer to 10.13. B for how to turn on/off this function.
Ethernet icon		Appears when Ethernet communication is enabled.
Modbus icon		Appears when Modbus communication is enabled.
Mail icon		Appears when the mail alert function is on.
Pencil icon		Press and hold [>] to save the setting when this icon is present.
Lock icon		Appears when the safety lock is activated (locked).

4.2 Subunit (S1/S2/S3)

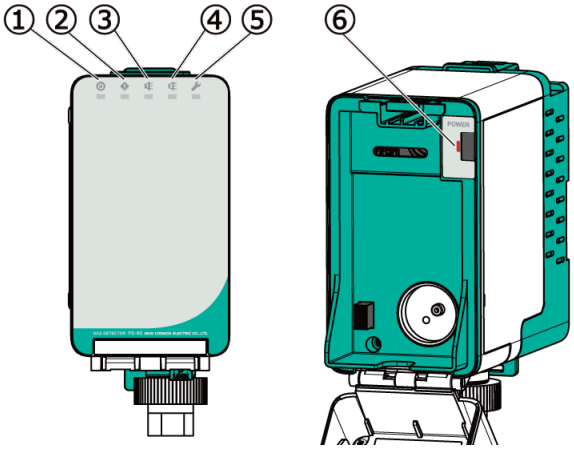
4.2.1 Exterior Appearance



(Dimension unit : mm)

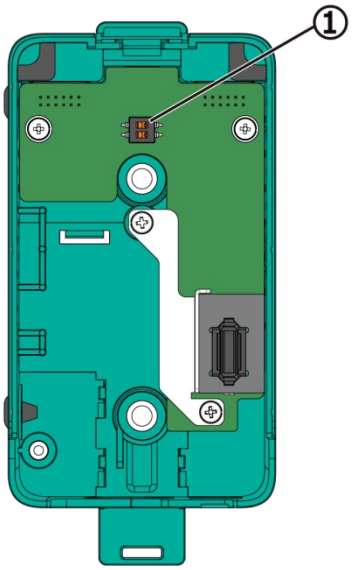
Item	Component	Description
①	Front case	A combination of a front case and a front cover is called “front module”.
②	Rear case	
③	Front cover	
④	Case fixing latch	Secures the rear case to the front case.
⑤	Case fixing lever	
⑥	Front cover open/close latch	Press to open the front cover for sensor unit/sampling module replacement.
⑦	Connector (2 places)	Connects with other unit.
⑧	DIN rail release lever	Pull down this lever to remove the unit from the DIN rail.
⑨	Sampling module	Pumps the gas in and out.
⑩	Fan	Fan for cooling. Provided with a sampling module.
⑪	Gas inlet	Gas intake port. A filter unit (MF-50) is attached to the gas inlet.
⑫	Gas outlet	Gas exhaust port

4.2.2 LEDs



Item	Component		Description
①		Power LED (Green)	Indicates the operational status. The LED status will take precedence in Blinking rapidly > Blinking > Lit. Not lit: when the unit is off. Blinking: when the warm-up is in progress. Blinking rapidly: when the sensor is off. Lit: when the unit operates normally.
②		Fault LED (Yellow)	Indicates a fault condition. Not lit: when the unit operates normally. Blinking: when a fault is detected.
③		AL1 LED (Red)	Indicates the 1st stage gas alarm status. Not lit: when the warm-up is in progress or unit operates normally. Blinking: when a 1st stage gas alarm is activated.
④		AL2 LED (Red)	Indicates the 2nd stage gas alarm status. Not lit: when the warm-up is in progress or unit operates normally. Blinking: when a 2nd stage gas alarm is activated.
⑤		Maintenance LED (Blue)	Indicates the maintenance mode status. The LED status will take precedence in Lit > Blinking rapidly > Blinking. Not lit: when the unit is in normal operation and not in maintenance mode. Blinking: when the unit is in maintenance mode 1. Blinking rapidly: when the unit is in maintenance mode 2. Lit: when the unit is in aging mode.
⑥	Sensor power LED (Red)		Indicates the sensor operational status. Not lit: when the sensor is off. Blinking: when the sensor is on.

4.2.3 Address Switches on Rear Case

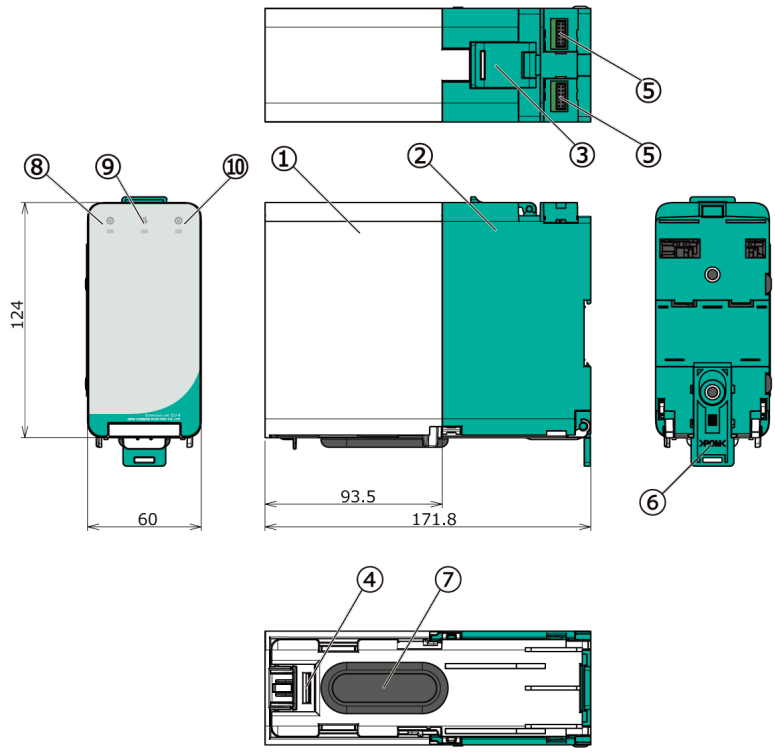


Item	Component	Description
①	Adress switches	DIP switches for setting the address of the subunit.

Ref. Refer to 7.3.1 “Subunit Address Setting” in the PS-8 Series Instruction Manual for Installation for how to set the address.

4.3 Expansion Unit (EU)

4.3.1 Exterior Appearance

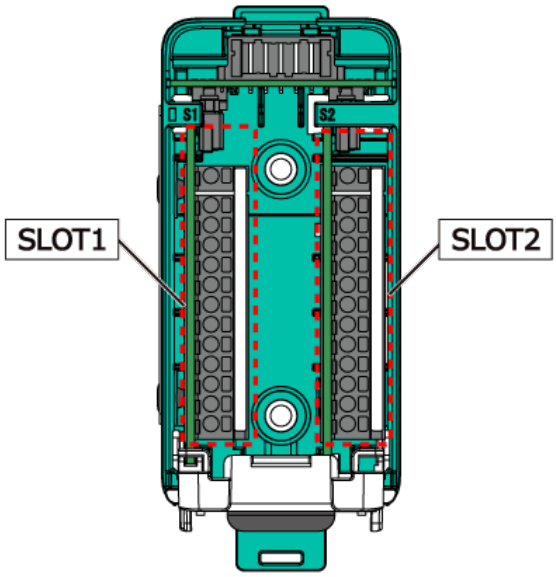


(Dimension unit : mm)

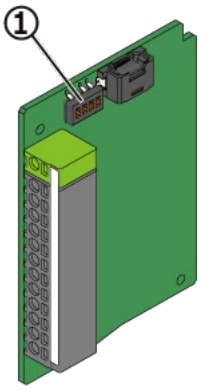
Item	Component		Description
①	Front case		—
②	Rear case		—
③	Case fixing latch		Secures the rear case to the front case.
④	Case release lever		Releases the front case from the rear case.
⑤	Connector (2 places)		Connects with other unit.
⑥	DIN rail release lever		Pull down this lever to remove the unit from the DIN rail.
⑦	Grommet		Cable entry
⑧		Slot 1 Power LED (Green)	Indicates the operational status of Slot 1. Not lit: when the unit is off. Lit: when the unit operates normally. Blinking: when the unit cannot communicate with the main unit, or when the channel allocation (unit/analog output/relay output allocations) is not set*
⑨		Communication LED (Orange)	(Not in use)
⑩		Slot 2 Power LED (Green)	Indicates the operational status of Slot 2. Not lit: when the unit is off. Lit: when the unit operates normally.

* Blinking only on the expansion unit with the AO or DO module(s) installed.

4.3.2 External Wiring Terminals



AO Module (Analog Output) (AO1–AO4)



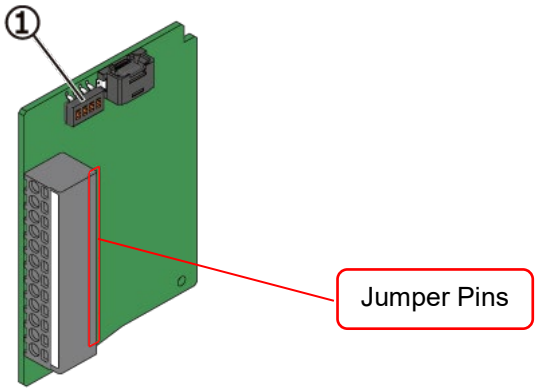
Item	Component	Description
①	Address switches	DIP switches for setting the address of AO module

*Used when adding an AO module.

Terminal No.	Identifier		Terminal Name	Description
–	E	E	Earth	Earth
1	1G+	1G 1H 1E	Analog output ①	Analog output + (4-20 mA)
	1H–			Analog output –
	1E			Earth
2	2G+	2G 2H 2E	Analog output ②	Analog output + (4-20 mA)
	2H–			Analog output –
	2E			Earth
3	3G+	3G 3H 3E	Analog output ③	Analog output + (4-20 mA)
	3H–			Analog output –
	3E			Earth
4	4G+	4G 4H 4E	Analog output ④	Analog output + (4-20 mA)
	4H–			Analog output –
	4E			Earth

*Labels that are not specified above are for control by New Cosmos.

DO Module (Contact Output) (DO1–DO8)



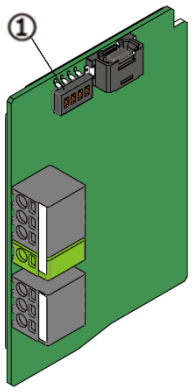
Item	Component	Description
①	Address switches	DIP switches for setting the address of DO module

*Used when adding a DO module.
*Do not touch the jumper pins inside. They are for device setting.

Terminal No.	Identifier		Terminal Name	Description
1	1A1	ZA1 ZC1 ZA2 ZC2 TA TC	Gas alarm output (AL1)	1st stage gas alarm contact output
	1C1			Common with AL1
	1A2		Gas alarm output (AL2)	2nd stage gas alarm contact output
	1C2			Common with AL2
	1FA		Fault alarm output	Fault alarm contact output
	1C3			Common with FA
2	2A1	ZA1 ZC1 ZA2 ZC2 TA TC	Gas alarm output (AL1)	1st stage gas alarm contact output
	2C1			Common with AL1
	2A2		Gas alarm output (AL2)	2nd stage gas alarm contact output
	2C2			Common with AL2
	2FA		Fault alarm output	Fault alarm contact output
	2C3			Common with FA

*Labels that are not specified above are for control by New Cosmos.

AI Module (Analog Input) (AI1–AI4)



Item	Component	Description
①	Address switch	DIP switches for setting the address of AI module

*Used when adding an AI module.

Terminal No.	Identifier		Terminal name	Description
1	1S+	1S+ 1S– 1E	Analog input 1	Analog input + (4-20 mA)
	1S–			Analog input –
	1E			Earth
–	E	E	Earth	Earth
2	2S+	2S+ 2S– 2E	Analog input 2	Analog input + (4-20 mA)
	2S–			Analog input –
	2E			Earth

*Labels that are not specified above are for control by New Cosmos.

Ref.

Refer to 5 "External Outputs" for the functions of the terminals.

For address setting, refer to 7.3.2 “Expansion Module Address Setting” of the PS-8 Series Instruction Manual for Installation.

5 External Outputs

When shipped, the relay contacts (gas and fault alarm contacts) have been set as per the delivery specifications specified at the time of ordering.

A. **When the relay contacts are set to the "normally de-energized" option**
The relay contacts are not energized during normal operation, and they are energized when an alarm is activated.
- Normally open (N.O.) relay contacts: They are open during normal operation, while they are closed when an alarm is activated. They are open when the unit is off.
- Normally closed (N.C.) relay contacts: They are closed during normal operation, while they are opened when an alarm is activated. They are closed when the unit is off.

B. **When the relay contacts are set to the "normally energized" option**
The relay contacts are energized during normal operation, and they are de-energized when an alarm is activated.
- Normally open (N.O.) relay contacts: They are closed during normal operation, while they are opened when an alarm is activated. They are open when the unit is off.
- Normally closed (N.C.) relay contacts: They are open during normal operation, while they are closed when an alarm is activated. They are closed when the unit is off.

Typical operations of the relay contacts and analog outputs are presented in the tables below with the assumption that the 1st stage and 2nd stage gas alarm contacts are set to the "normally de-energized" option while the fault alarm contacts are set to the "normally energized" option.

Main Unit

Function	Terminal	Description	Operation		
			Normal	Gas Alarm	Fault Alarm
Collective 1st stage gas alarm contact output	AL1 COM1	Contact will activate in response to a 1st stage gas alarm that occurs in any cannel in the connected gas detectors including main unit and subunits	N.O.: Open N.C.: Closed	N.O.: Closed N.C.: Open	—
Collective 2nd stage gas alarm contact output	AL2 COM2	Contact will activate in response to a 2nd stage gas alarm that occurs in any cannel in the connected gas detectors including main unit and subunits	N.O.: Open N.C.: Closed	N.O.: Closed N.C.: Open	—
Collective fault alarm contact output	FAULT COM3	Contact will activate in response to a fault alarm that occurs in any cannel in the connected gas detectors including main unit and subunits	N.O.: Closed N.C.: Open	—	N.O.: Open N.C.: Closed

Function	Terminal	Description	Operation		
			Gas Concentration	Low Flow Rate Alarm	Fault Alarm
Analog output	G+, H–	Output corresponding to the gas concentration of the relevant channel will be output	4-20 mA*1	Fixed at 0.5mA (or 1.5 mA)*2	Fixed at 0.5 mA

*1: Output accuracy: within ±0.5% of full scale

*2: Fixed at 1.5 mA for the models for which the analog output in the event of a low flow rate alarm is specified to be 1.5 mA at the time of ordering. Fixed at 0.5 mA if not specified at the time of ordering.

N.O.: Normally Open

N.C.: Normally Closed

⚠ CAUTION

Analog Output Allocation (Allocating the AO module's output or the main unit's output to the channel)

- If an AO module, not the main unit, is allocated to the channel, the analog output from the main unit will be fixed at 0.5 mA.
- If the analog output allocation target is switched from the main unit to the AO module, the analog output from the main unit will remain unchanged and fixed at the same value as before switching.

Expansion Unit (with DO Module)

Function	Terminal	Description	Operation		
			Normal	Gas Alarm	Fault Alarm
1st stage gas alarm contact output	1A1,1C1 2A1,2C1	Contact will activate in response to a gas alarm that occurs in the relevant channel	N.O.: Open N.C.: Closed	N.O.: Closed N.C.: Open	—
2nd stage gas alarm contact output	1A2,1C2 2A2,2C2	Contact will activate in response to a gas alarm that occurs in the relevant channel	N.O.: Open N.C.: Closed	N.O.: Closed N.C.: Open	—
Fault alarm contact output	1FA,1C3 2FA,2C3	Contact will activate in response to a fault alarm that occurs in the relevant channel	N.O.: Closed N.C.: Open	—	N.O.: Open N.C.: Closed

Expansion Unit (with AO Module)

Function	Terminal	Description	Operation		
			Gas Concentration	Low Flow Rate Alarm	Fault Alarm
Analog output	1G+,1H– 2G+,2H– 3G+,3H– 4G+,4H–	Output corresponding to the gas concentration of the relevant channel will be output	4-20 mA*1	Fixed at 0.5mA (or 1.5 mA)*2	Fixed at 0.5 mA

*1: Output accuracy: within ±0.5% of full scale

*2: Fixed at 1.5 mA for the models for which the analog output in the event of a low flow rate alarm is specified to be 1.5 mA at the time of ordering. Fixed at 0.5 mA if not specified at the time of ordering.

N.O.: Normally Open

N.C.: Normally Closed

⚠ CAUTION

- The contacts use mechanical relays, which may falsely activate if exposed to excessive impacts or vibration, or magnetic force. Install the product in a place free from impacts, vibration, and magnetic force.
- Avoid using the relay contacts with PLC digital inputs or other low-current loads. Doing so may result in poor contact between the relay contacts.

⚠ CAUTION

- If the relay contacts are set to the "normally energized" option, these relay contacts and analog output are inoperable during the warm-up cycle. Release the interlocks of the external devices as needed to prevent their unintended operation.

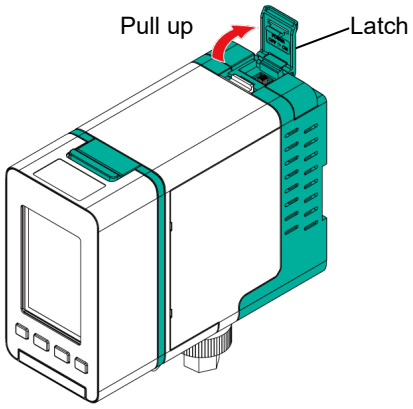
6 Power On/Off

6.1 Power-on and Operation Flow

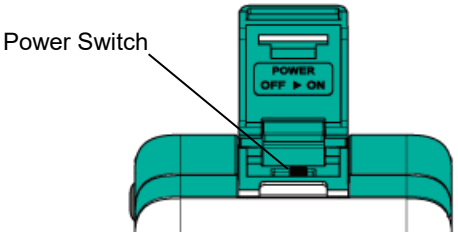
After the installation, turn the product on and check that it starts up normally. Take the following steps to turn on the product.

⚠ CAUTION	
	• Turn on the product while no gas is present around the gas sampling inlet. • Check that all wiring is correct before turning on the external devices (e.g., signal towers, alarm horns, etc.) connected to this product. • If the sensor is not stable, the external relay contacts (1st and 2nd gas alarm contacts) may be activated upon the completion of a warm-up cycle. Release the interlocks of the external devices as needed to prevent their possible activation. • If the sensor output is not stable during the warm-up cycle, the product operation may also become unstable. To prevent any unintended operation, set the product to maintenance mode 2. • During the warm-up cycle, the 1st stage and 2nd stage gas alarm contacts are disabled. However, the fault alarm contact is enabled. • Ensure that the latch is in the lock position after closing it. If the latch is not in the lock position, the case will loosen or open, which may cause injury or product damage such as a broken LCD.

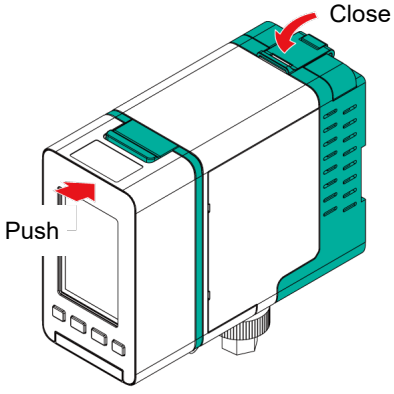
1. Pull the latch open.



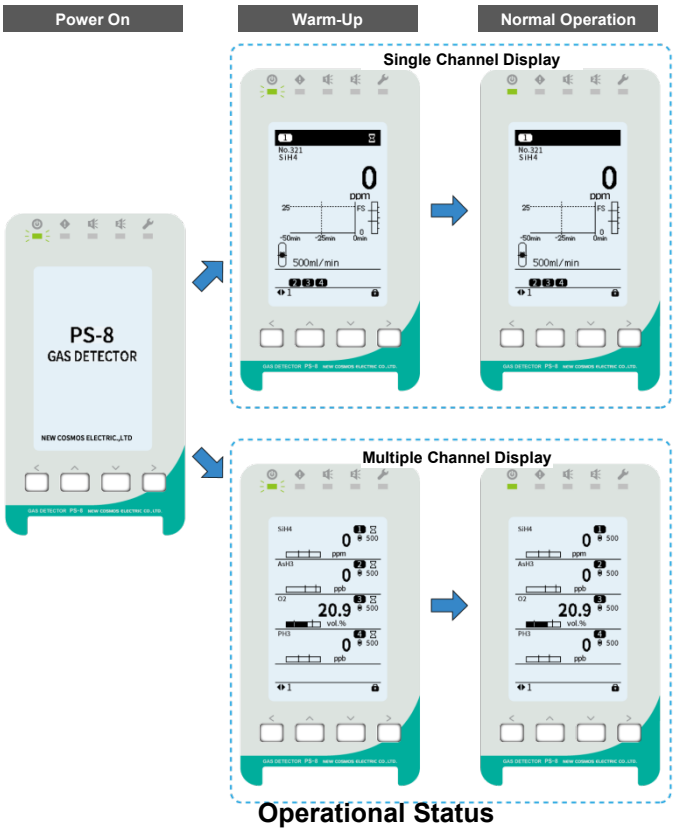
2. Set the power switch to the on position to turn on the unit.



3. While pushing the front case, close the latch.



4. The operation flow after powering-up is shown below.



Operational Status

Indication/Output		Warm-up	Normal Operation with No Alarm (Gas-monitoring Mode)
Warm-up Icon		Displayed	Not displayed
Power LED (Green)*1		Blinking	Lit
Fault LED (Yellow)*1		Not lit (Blinking in the event of a fault alarm)	
AL1 LED (Red)*1		Not lit	
AL2 LED (Red)*1			
Maintenance LED (Blue)*1			
Analog Output	Oxygen (25 vol% F.S.)	Fixed at 17.4 mA*2	4-20mA (Value corresponding to gas concentration)
	Oxygen (50 vol% F.S.)	Fixed at 10.7 mA*2	
	Other than Oxygen*5	Fixed at 4 mA*2	
Collective Gas Alarm Contact		Not activated	Not activated (Activated in the event of a gas alarm)*3
Collective Fault Alarm Contact		Not activated (Activated in the event of a fault alarm)*4	

*1: The LEDs on the main unit operate in response to any sensor channel status in the connected gas detectors. For example, if the sensor channel in one of the subunits enters 1st stage gas alarm mode, the AL1 LEDs on both the main unit and the subunit will start blinking.
*2: Fixed at 2.5 mA for the models for which the analog output in the warm-up cycle is specified to be 2.5 mA at the time of ordering.
*3: If the gas concentration exceeding the gas alarm set value is detected during gas-monitoring mode, a gas alarm will be activated.
*4: If an error or fault is detected within the product itself, a fault alarm will be activated.
*5: Oxygen sensors of 5 vol% F.S. and 10 vol% F.S. are categorized into the “Other than Oxygen” group.

6.2 Power-off

Set the power switch to the off position to turn off the product.

⚠ CAUTION	
	If the relay contacts are set to the “normally energized” option, these relay contacts and analog output will be activated at power-off. Release the interlocks of the external devices as needed to prevent their possible activation.

7 Alarm Operation

This product performs two kinds of alarm operations, gas alarm and fault alarm operations.

7.1 Gas Alarm Operation

If the gas concentration or test value exceeds the gas alarm set value, a gas alarm will be activated. The main unit and subunits perform alarm operation in the following manner.

Alarm Mode

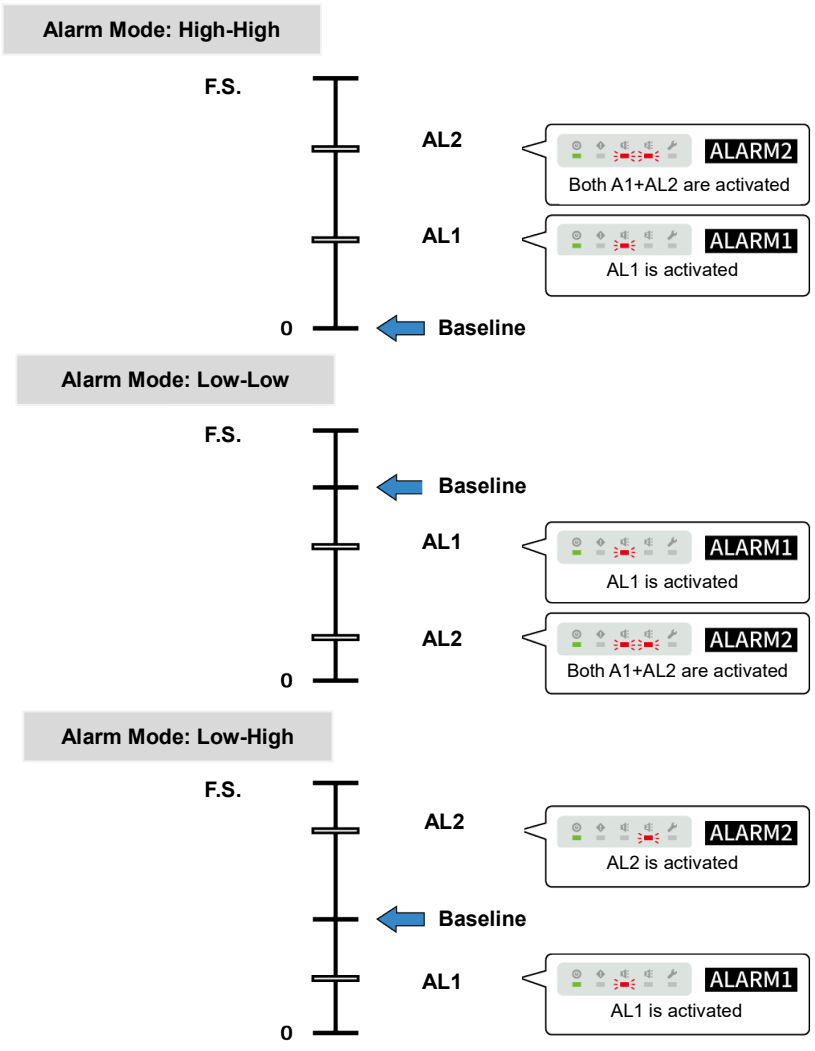
The gas alarm operation per alarm mode (High-High, Low-Low or Low-High) is shown below. The alarm mode can be set from: “Individual CH Info.” –> “Alarm mode” (refer to 10.6).

CAUTION

The relay contacts may be activated when the alarm mode is changed. Release the interlocks of the external devices as needed to prevent their possible activation.

NOTICE

The alarm mode is set to “High-High” for all types of sensors except the COS-7 sensor (oxygen).

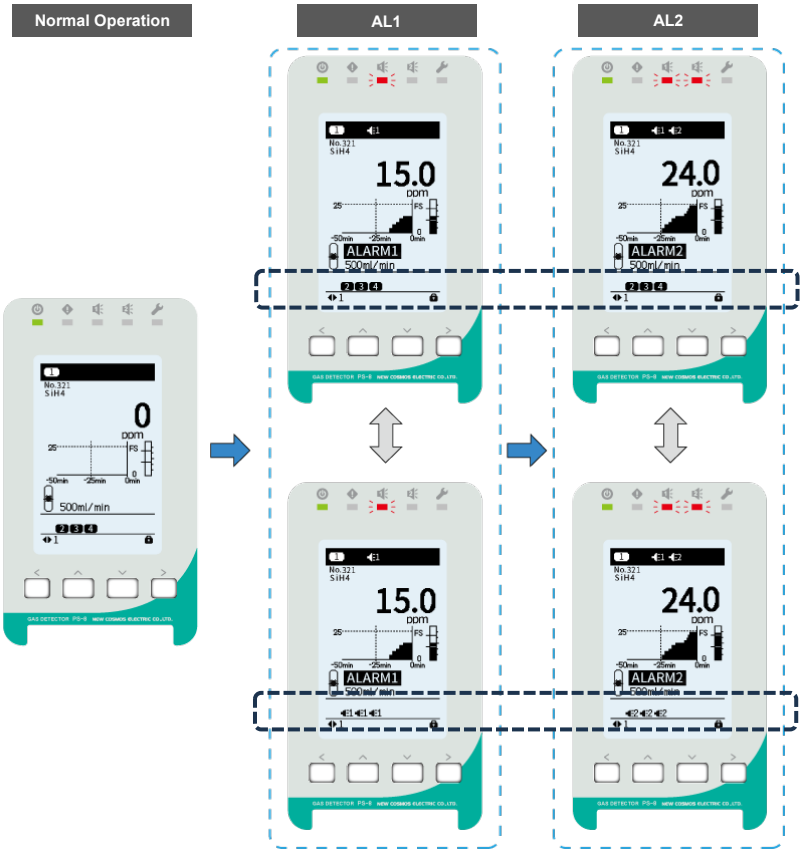


Alarm Mode

Gas Alarm Operation (High-Hight)

Single Channel Display

If a gas alarm is activated, the corresponding channel's status will be displayed in the main status pane. Moreover, if a gas alarm is activated on more than one channel, the channel status of the last gas alarm will be displayed for 10 minutes, after which channel auto cycle will resume. The figure below depicts a typical gas alarm operation when a gas alarm is activated on Channels 1–4 simultaneously (alarm mode: High-High, channel auto cycle function is on).



Sensor channels and gas alarm icons are alternately displayed in the sensor channel status pane.

Gas Alarm Operation (Single Channel Display)

Indication/Output		Warm-up[*1]	Normal Operation	
		Gas Alarm	1st Stage Gas Alarm	2nd Stage Gas Alarm
Power LED (Green)[*2]		Blinking	Lit	
Fault LED (Yellow)[*2]		Not lit		
AL1 LED (Red)[*2]		Not lit	Blinking	Blinking
AL2 LED (Red)[*2]		Not lit	Not lit	Blinking
Maintenance LED (Blue)[*2]		Not lit		
LCD	Main Status Pane[*3]	Gas concentration		
		Not lit	E1	E1 E2
		Not lit	ALARM1	ALARM2
	Sensor Channel Status Pane[*4]	Channel numbers	Channel numbers ⇕ E1	Channel numbers ⇕ E2
Analog Output	Oxygen (25 vol% F.S.)	Fixed at 17.4 mA[*5]	Value corresponding to gas concentration	
	Oxygen (50 vol% F.S.)	Fixed at 10.7 mA[*5]		
	Other than Oxygen[*7]	Fixed at 4 mA[*5]		
Collective Gas Alarm Contact[*6]		Not activated	Activated	
Collective Fault Alarm Contact		Not activated (Activated in the event of a fault alarm)		

*1: Gas alarm is disabled during the warm-up cycle.
*2: The LEDs on the main unit operate in response to any sensor channel status in the connected gas detectors. For example, if the sensor channel in one of the subunits enters 1st stage gas alarm mode, the AL1 LEDs on both the main unit and the subunit will start blinking.
*3: Main status pane shows the selected channel's status.
*4: Sensor channel status pane shows the channels' statuses other than the one shown in the main status pane. Refer to 4.1.4 "LCD" for details.
*5: Fixed at 2.5 mA for the models for which the analog output in the warm-up cycle is specified to be 2.5 mA at the time of ordering.
*6: If at least one of the sensor channels generates a gas alarm, a collective gas alarm contact output is generated by the main unit. If a dedicated gas alarm contact output is required for each sensor channel, an expansion unit with a DO module (sold separately) is required.
*7: Oxygen sensors of 5 vol% F.S. and 10 vol% F.S. are categorized into the "Other than Oxygen" group.

Gas Alarm Clearance Method

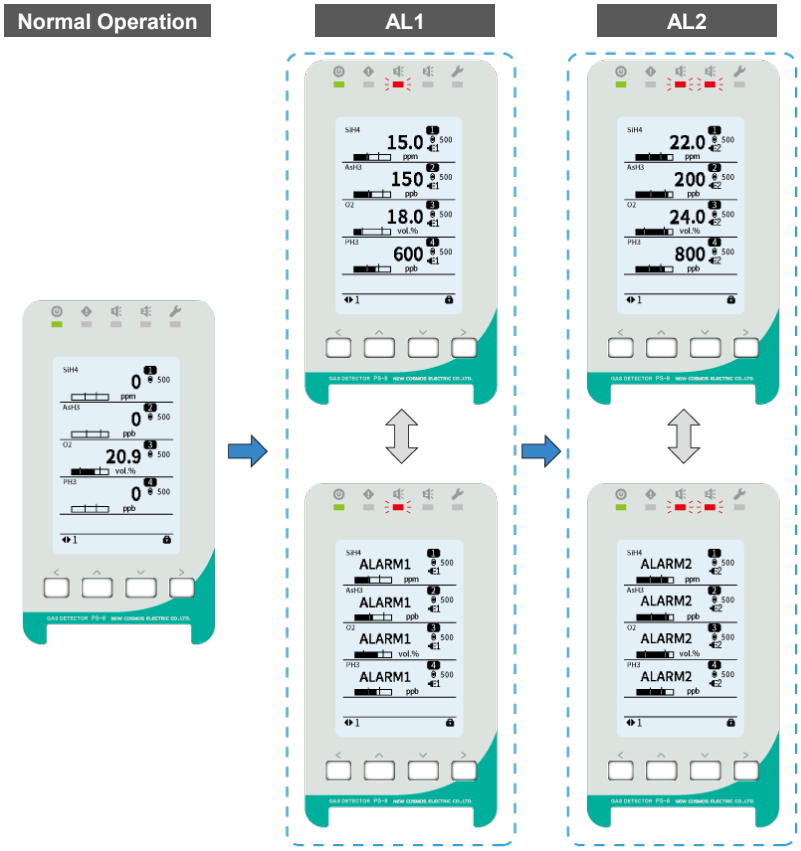
There are two options for clearing a gas alarm, manual-resetting and auto-resetting.

Auto-Resetting	When the gas concentration falls below the gas alarm hysteresis (or above the gas alarm hysteresis in case the alarm mode is set to Low) after an alarm has been triggered, the alarm LEDs, relevant gas alarm icon, and gas alarm contacts will automatically return to their normal statuses.
Manual-Resetting	Even if the gas concentration falls below the gas alarm hysteresis (or above the gas alarm hysteresis in case the alarm mode is set to Low) after a gas alarm has been triggered, the alarm LEDs, relevant gas alarm icon and gas alarm contacts will not automatically return to their normal statuses. The ongoing gas alarm can be manually reset by pressing and holding [>]. However, this manual operation is only possible when the gas concentration is below the gas alarm hysteresis (or above the gas alarm hysteresis in case the alarm mode is Low), or when a fault alarm activates and replaces the gas alarm.

*Gas alarm hysteresis = Gas alarm set value – 2% of full scale (or gas alarm set value + 2% of full scale in case the alarm mode is set to Low).

Multiple Channel Display

If a gas alarm is activated, the channel status page including the channel status of the activated gas alarm will be displayed. Moreover, if a gas alarm is activated on more than one channel, the channel status page including the channel status of the last gas alarm will be displayed for 10 minutes. The figure below depicts a typical gas alarm operation when a gas alarm is activated on Channels 1–4 simultaneously (alarm mode: High-High, channel auto cycle function is on).



Gas Alarm Operation (Multiple Channel Display)

Indication/Output		Warm-up[*1]	Normal Operation	
		Gas Alarm	1st Stage Gas Alarm	2nd Stage Gas Alarm
Power LED (Green)[*2]		Blinking	Lit	
Fault LED (Yellow)[*2]		Not lit		
AL1 LED (Red)[*2]		Not lit	Blinking	Blinking
AL2 LED (Red)[*2]		Not lit	Not lit	Blinking
Maintenance LED (Blue)[*2]		Not lit		
LCD	Main Status Pane[*3]	Gas concentrations	Gas concentrations ⇕ ALARM1	Gas concentrations ⇕ ALARM2
		Not lit	🔈1	🔈2
	Sensor Channel Status Pane[*4]	Channel numbers	Channel numbers ⇕ 🔈1	Channel numbers ⇕ 🔈2
Analog Output	Oxygen (25 vol% F.S.)	Fixed at 17.4 mA[*5]	Value corresponding to gas concentration	
	Oxygen (50 vol% F.S.)	Fixed at 10.7 mA[*5]		
	Other than Oxygen[*7]	Fixed at 4 mA[*5]		
Collective Gas Alarm Contact[*6]		Not activated	Activated	
Collective Fault Alarm Contact		Not activated (Activated in the event of a fault alarm)		

*1: Gas alarm is disabled during the warm-up cycle.

*2: The LEDs on the main unit operate in response to any sensor channel status in the connected gas detectors. For example, if the sensor channel in one of the subunits enters 1st stage gas alarm mode, the AL1 LEDs on both the main unit and the subunit will start blinking.

*3: Main status pane shows the selected channels' statuses.

*4: Sensor channel status pane shows the channels' statuses other than those shown in the main status pane. Refer to 4.1.4 "LCD" for details.

*5: Fixed at 2.5 mA for the models for which the analog output in the warm-up cycle is specified to be 2.5 mA at the time of ordering.

*6: If at least one of the sensor channels generates a gas alarm, a collective gas alarm contact output is generated by the main unit. If a dedicated gas alarm contact output is required for each sensor channel, an expansion unit with a DO module (sold separately) is required.

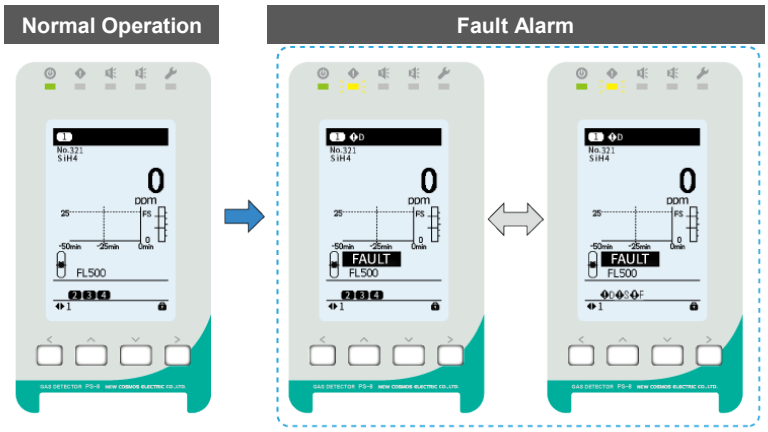
*7: Oxygen sensors of 5 vol% F.S. and 10 vol% F.S. are categorized into the "Other than Oxygen" group.

7.2 Fault Alarm Operation

This product can detect an internal failure, and, depending on the nature of the failure, the yellow fault LED, LCD, and fault alarm contact will be activated. Further, the corresponding event icons will be displayed on the screen. The operation of the main unit and subunit is described below.

Single Channel Display

If a fault alarm (except a fault alarm due to a device error) is activated, the corresponding channel's status will be displayed in the main status pane. Moreover, if a fault alarm is activated on more than one channel, the channel status of the last fault alarm will be displayed for 10 minutes. Furthermore, if another failure occurs while a low flow rate alarm is present, the low flow rate alarm will be replaced by the other failure alarm on the screen. The figure below depicts a typical fault alarm operation when a fault alarm is activated on Channels 1–4 simultaneously and the channel auto cycle function is on.



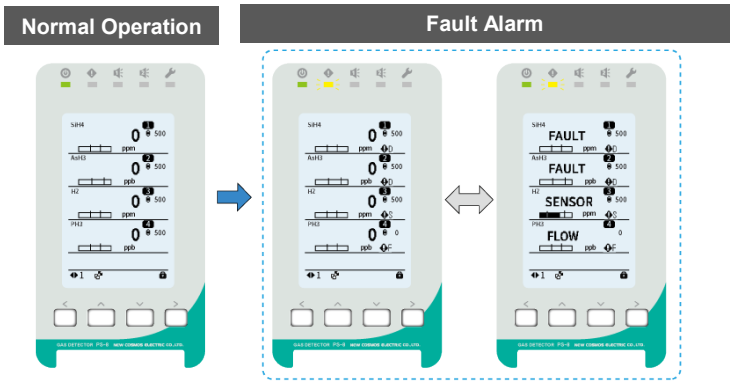
Fault Alarm Operation (Single Channel Display)

Indication/Output		Low Flow Rate		Other Failure	
		Warm-up	Normal Operation	Warm-up	Normal Operation
Power LED (Green)*1		Blinking	Lit	Blinking	Lit
Fault LED (Yellow)*1		Not lit	Blinking	Blinking*8	
AL1 LED (Red)*1		Not lit (Blinking in the event of a gas alarm)			
AL2 LED (Red)*1					
Maintenance LED (Blue)*1		Not lit			
LCD	Main Status Pane*2	Gas concentration			
		Not lit	F	Event icon A*5*8	
		Not lit	FLOW	Event icon B*5*8	
	Sensor Channel Status Pane*3	Channel numbers	Channel numbers ⇕ F	Channel numbers ⇕ Fault alarm icons*5*8	
Analog output	Oxygen (25 vol% F.S.)	Fixed at 17.4 mA*6	Fixed at 0.5 mA*7	Fixed at 0.5 mA*8	
	Oxygen (50 vol% F.S.)	Fixed at 10.7 mA*6			
	Other than Oxygen*9	Fixed at 4 mA*6			
Collective Gas Alarm Contact		Not activated	Not activated (Activated in the event of a gas alarm)	Not activated	Not activated (Activated in the event of a gas alarm)
Collective Fault Alarm Contact*4		Not activated	Activated	Activated*8	

*1: The LEDs on the main unit operate in response to any sensor channel status in the connected gas detectors. For example, if the sensor channel in one of the subunits enters 1st stage gas alarm mode, the AL1 LEDs on both the main unit and the subunit will start blinking.
*2: Main status pane shows the selected channel's status.
*3: Sensor channel status pane shows the channels' statuses other than the one shown in the main status pane. Refer to 4.1.4 "LCD" for details.
*4: If at least one of the sensor channels generates a fault alarm, a collective fault alarm contact output is generated by the main unit. If a dedicated fault alarm contact output is required for each sensor channel, an expansion unit with a DO module (sold separately) is required.
*5: Refer to 4.1.4 "LCD" for details on event and fault alarm icons.
*6: Fixed at 2.5 mA for the models for which the analog output in the warm-up cycle is specified to be 2.5 mA at the time of ordering.
*7: Fixed at 1.5 mA for the models for which the analog output in the event of a low flow rate alarm is specified to be 1.5 mA at the time of ordering. Furthermore, if another failure occurs while a low flow rate alarm is present, the analog output will become 0.5 mA.
*8: May be activated after the warm-up cycle is completed, depending on the nature of the failure.
*9: Oxygen sensors of 5 vol% F.S. and 10 vol% F.S. are categorized into the "Other than Oxygen" group.

Multiple Channel Display

If a fault alarm (except a fault alarm due to a device error) is activated, the channel status page including the channel status of the activated fault alarm will be displayed. Moreover, if a fault alarm is activated on more than one channel, the channel status page including the channel status of the last fault alarm will be displayed for 10 minutes. The figure below depicts a typical fault alarm operation when a fault alarm is activated on Channels 1–4 simultaneously and the channel auto cycle function is on.



Fault Alarm Operation (Multiple Channel Display)

Indication/Output		Low Flow Rate		Other Failure	
		Warm-up	Normal Operation	Warm-up	Normal Operation
Power LED (Green)*1		Blinking	Lit	Blinking	Lit
Fault LED (Yellow)*1		Not lit	Blinking	Blinking*8	
AL1 LED (Red)*1		Not lit (Blinking in the event of a gas alarm)			
AL2 LED (Red)*1					
Maintenance LED (Blue)*1		Not lit			
LCD	Main Status Pane*2	Gas concns.	Gas concns. ⇕ FLOW	Gas concns. ⇕ Event icon D*5*8	Gas concns. ⇕ Event icon D*5
		Not lit	◆F	Event icons C*5*8	Event icons C*5
	Sensor Channel Status Pane*3	Channel numbers	Channel numbers ⇕ ◆F	Channel numbers ⇕ Fault alarm icons*5*8	
Analog Output	Oxygen (25 vol% F.S.)	Fixed at 17.4 mA*6	Fixed at 0.5 mA*7	Fixed at 0.5 mA*8	
	Oxygen (50 vol% F.S.)	Fixed at 10.7 mA*6			
	Other than Oxygen*9	Fixed at 4 mA*6			
Collective Gas Alarm Contact		Not activated	Not activated (Activated in the event of a gas alarm)	Not activated	Not activated (Activated in the event of a gas alarm)
Collective Fault Alarm Contact*4		Not activated	Activated	Activated*8	

*1: The LEDs on the main unit operate in response to any sensor channel status in the connected gas detectors. For example, if the sensor channel in one of the subunits enters 1st stage gas alarm mode, the AL1 LEDs on both the main unit and the subunit will start blinking.

*2: Main status pane shows the selected channels' statuses.

*3: Sensor channel status pane shows the channels' statuses other than those shown in the main status pane. Refer to 4.1.4 "LCD" for details.

*4: If at least one of the sensor channels generates a fault alarm, a collective fault alarm contact output is generated by the main unit. If a dedicated fault alarm contact output is required for each sensor channel, an expansion unit with a DO module (sold separately) is required.

*5: Refer to 4.1.4 "LCD" for details on event and fault alarm icons.

*6: Fixed at 2.5 mA for the models for which the analog output in the warm-up cycle is specified to be 2.5 mA at the time of ordering.

*7: Fixed at 1.5 mA for the models for which the analog output in the event of a low flow rate alarm is specified to be 1.5 mA at the time of ordering. Furthermore, if another failure occurs while a low flow rate alarm is present, the analog output will become 0.5 mA.

*8: May be activated after the warm-up cycle is completed, depending on the nature of the failure.

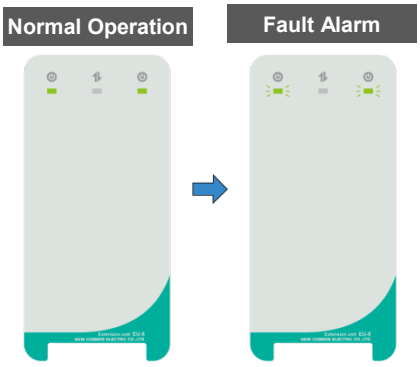
*9: Oxygen sensors of 5 vol% F.S. and 10 vol% F.S. are categorized into the "Other than Oxygen" group.

NOTE When you contact New Cosmos or its authorized representative for assistance for clearing a failure, please provide them with the details on the failure and displayed fault alarm icons/error message.

Ref. Refer to 13 "Troubleshooting" for steps to take in the event of a failure.

Expansion Unit‘s Fault Alarm Operation

If the expansion unit cannot communicate with the main unit or if the channel allocation (unit/analog output/relay output allocations) is not set. the expansion unit’s analog output and relay outputs operate in the manner shown in the table below to indicate that there is a fault.



Expansion Unit’s Fault Alarm Operation

Indication/Output		Normal Operation	Fault Alarm
Power LED (Green)*1		Lit	Blinking
Analog output	Oxygen (25 vol% F.S.)	Value corresponding to the gas concentration*2	Fixed at 0.5 mA
	Oxygen (50 vol% F.S.)		
	Other than Oxygen*3		
Gas Alarm Contact		Not activated (Activated in the event of a gas alarm)	Not activated
Fault Alarm Contact		Not activated	Activated

*1: The expansion unit’s power LED is blinking when it cannot communicate with the main unit.
*2: During the warm-up cycle or maintenance mode 2, the value corresponding to that mode is output.
*3: Oxygen sensors of 5 vol% F.S. and 10 vol% F.S. are categorized into the “Other than Oxygen” group.

8 Maintenance Mode

Maintenance mode is used to deactivate all the alarm contacts and analog outputs during maintenance or inspection. From Menu, select “Maint mode” and then set the channels to maintenance mode 1 or 2 depending on your purpose.

⚠ CAUTION

- Exit maintenance mode immediately after the maintenance work is completed.

⚠ CAUTION

- Gas alarm (alarm contact and 4-20mA output) is disabled when in maintenance mode 1, however, the gas alarm status will be displayed in case of a gas alarm.
- Both gas and fault alarms are disabled when in maintenance mode 2, however, the gas or fault alarm status will be displayed in case of a gas or fault alarm.
- Both collective gas and fault alarm contact outputs (of the main unit) are disabled when either one of the channels is in maintenance mode.

NOTICE

- Maintenance mode will be automatically cleared after approximately 12 hours.
- When maintenance mode is reset, a 12-hour auto clearance will be reset.
- Maintenance mode will be retained after the unit is turned off and then on; however, a 12-hour auto clearance will be reset.

Maintenance Mode Operation

Mode		Icon	Maintenance LED	Alarm Contact	Analog Output
Maintenance Mode Off		–	Not lit	Activated depending on the condition	4-20mA (Value corresponding to gas concentration)
Maintenance Mode 1[*1]		1	Blinking	Disabled	
Maintenance Mode 1[*2]		1	Blinking	Disabled	
Maintenance Mode 2[*1]	Oxygen (25 vol% F.S.)	2	Blinking rapidly	Disabled	Fixed at 17.4 mA[*3]
	Oxygen (50 vol% F.S.)				Fixed at 10.7 mA[*3]
	Other than Oxygen[*4]				Fixed at 4 mA[*3]
Maintenance Mode 2[*2]	Oxygen (25 vol% F.S.)	2	Blinking rapidly	Disabled	Fixed at 17.4 mA[*3]
	Oxygen (50 vol% F.S.)				Fixed at 10.7 mA[*3]
	Other than Oxygen[*4]				Fixed at 4 mA[*3]

*1: Maintenance mode has been set through a communication channel such as Web Server, smartphone app, or Modbus, and can be cancelled through a communication channel, not by the PS-8 unit.

*2: Maintenance mode has been set by the PS-8 unit and can be cancelled by the PS-8 unit only. The icon is slightly different depending on whether maintenance mode is set through the PS-8 unit or other communication channel.

*3: Fixed at 2.5 mA for the models for which the analog output in maintenance mode 2 is specified to be 2.5 mA at the time of ordering.

*4: Oxygen sensors of 5 vol% F.S. and 10 vol% F.S. are categorized into the “Other than Oxygen” group.

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

Ref. Refer to 10.2 “Maintenance Mode” for how to set the maintenance mode.

8.1 Gas Alarm Operation during Maintenance Mode

This section describes the operation when a gas alarm is activated when in maintenance mode 1 or 2. If a gas concentration or test value exceeds the alarm set value, a gas alarm will be activated. The main unit and subunits operate in the manner as shown in table below.

Gas Alarm Operation during Maintenance Mode (Single Channel Display, High-High)

Indication/Output		Maintenance Mode 1		Maintenance Mode 2	
		1st Stage Gas Alarm	2nd Stage Gas Alarm	1st Stage Gas Alarm	2nd Stage Gas Alarm
Power LED (Green)*1		Lit			
Fault LED (Yellow)*1		Not lit			
AL1 LED (Red)*1		Blinking			
AL2 LED (Red)*1		Not lit	Blinking	Not lit	Blinking
Maintenance LED (Blue)*1		Blinking		Blinking rapidly	
LCD	Main Status Pane*2	[Gas concentration] or [Test value] ⇔ [— — — — —]			
		1 or 1		2 or 2	
		MAINTE1 ⇔ [Remaining time]		MAINTE2 ⇔ [Remaining time]	
	Sensor Channel Status Pane*3	Channel numbers ⇕ 1 or 1		Channel numbers ⇕ 2 or 2	
Analog Output	Oxygen (25 vol% F.S.)	Value corresponding to gas concentration		Fixed at 17.4 mA*4	
	Oxygen (50 vol% F.S.)			Fixed at 10.7 mA*4	
	Other than Oxygen*5			Fixed at 4 mA*4	
Gas and Fault Alarm Contacts		Disabled			

Gas Alarm Operation during Maintenance Mode (Multiple Channel Display, High-High)

Indication/Output		Maintenance Mode 1		Maintenance Mode 2	
		1st Stage Gas Alarm	2nd Stage Gas Alarm	1st Stage Gas Alarm	2nd Stage Gas Alarm
Power LED (Green)*1		Lit			
Fault LED (Yellow)*1		Not lit			
AL1 LED (Red)*1		Blinking			
AL2 LED (Red)*1		Not lit	Blinking	Not lit	Blinking
Maintenance LED (Blue)*1		Blinking		Blinking rapidly	
LCD	Main Status Pane*2	[Gas concentrations] or [Test values] ⇔ [— — — — —]			
		1 or 1		2 or 2	
	Sensor Channel Status Pane*3	Channel numbers ⇕ 1 or 1		Channel numbers ⇕ 2 or 2	
Analog Output	Oxygen (25 vol% F.S.)	Value corresponding to gas concentration		Fixed at 17.4 mA*4	
	Oxygen (50 vol% F.S.)			Fixed at 10.7 mA*4	
	Other than Oxygen*5			Fixed at 4 mA*4	
Gas and Fault Alarm Contacts		Disabled			

*1: The LEDs on the main unit operate in response to any sensor channel status in the connected gas detectors. For example, if the sensor channel in one of the subunits enters 1st stage gas alarm mode, the AL1 LEDs on both the main unit and the subunit will start blinking.
*2: Main status pane shows the selected channel(s)' status(es).
*3: Sensor channel status pane shows the channels' statuses other than those shown in the main status pane. Refer to 4.1.4 “LCD” for details.
*4: Fixed at 2.5 mA for the models for which the analog output in maintenance mode 2 is specified to be 2.5 mA at the time of ordering.
*5: Oxygen sensors of 5 vol% F.S. and 10 vol% F.S. are categorized into the “Other than Oxygen” group.

NOTICE	
	If maintenance mode is cleared while a gas or fault alarm is activated, the gas or fault alarm contacts will get activated, and the analog output will change to the value corresponding to the gas concentration.

9 Operation

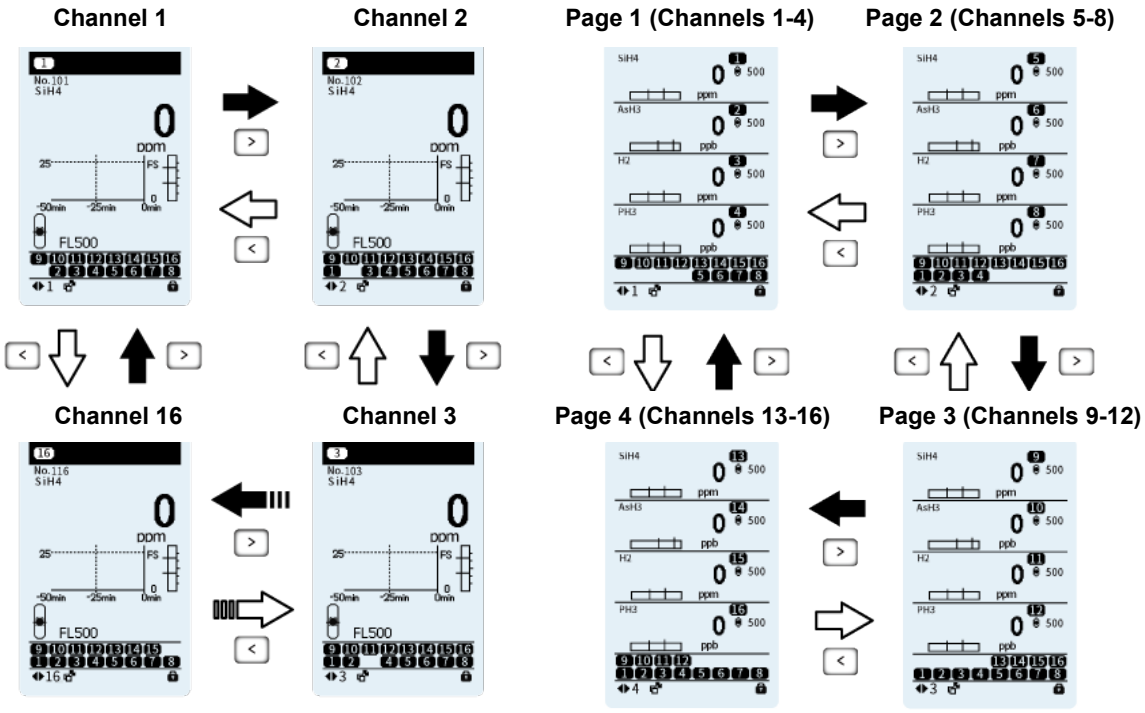
9.1 Gas Concentration Screen (Home)

- This product can display gas concentrations and setting information for up to 16 different sensor channels.
- When the sensor channel is invalid, "– – – – – " is displayed for its gas concentration.
- Channel Auto Cycle:

  - Single Channel Display: During normal operation, the gas concentration screen automatically cycles through the channels in the order of [Channel 1] → [Channel 2] → ... → [Channel 16] → [Channel 1] every 5 seconds.

  - Multiple Channel Display: During normal operation, the gas concentration screen automatically cycles through the pages in the order of [Page 1] → [Page 2] → [Page 3] → [Page 4] → [Page 1] every 5 seconds.

  This channel auto cycle displays valid channels only.
  To cancel the channel auto cycle, refer to 10.13. B "Channel Auto Cycle On/Off".
- To manually navigate through the channels or pages, press [<] or [>].

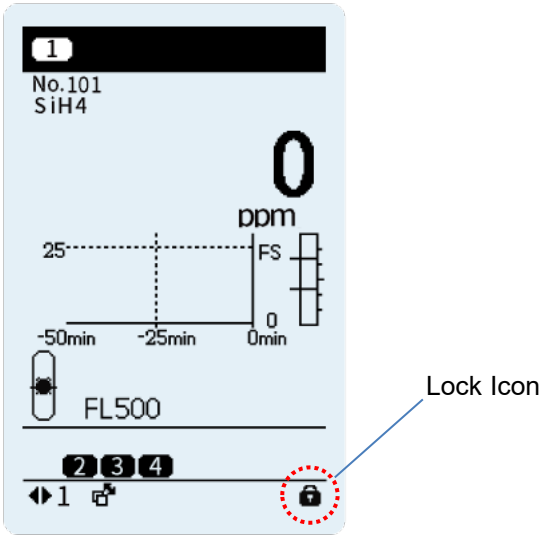


9.2 Deactivate Safety Lock

The safety lock disables key operations to prevent unintended operation.
The lock icon appears in the bottom right corner of the screen when the lock is activated (locked).
Even while the lock is activated (locked), it is possible to navigate through the channels by pressing [<] or [>].

To deactivate the safety lock, press and hold [^] until the lock icon disappears.

NOTE The safety lock will be automatically activated after three minutes if the unit is left idle while on the gas concentration screen.



10 Operation Menu

10.1 Menu Items

This product features menu items corresponding to the operations. It offers three levels of access privileges: supervisor and operator. The accessible menu items vary depending on the privilege level. To access supervisor mode, a password is required. The following table lists menu items and associated access privileges.

Menu List

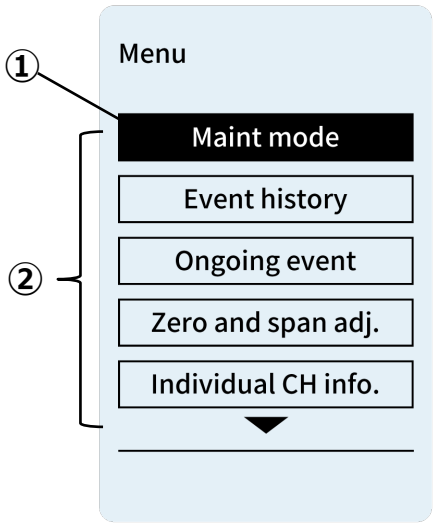
Menu Item	Access Privilege		Description
	S	O	
Maint mode	●	●	Sets the maintenance mode.
Event history	●	●	Checks the history of the gas alarm, fault alarm, etc.
Ongoing events	●	●	Checks ongoing events such as gas or fault alarms.
Zero and span adj.	●	●	Performs zero adjustment. Zero adjustment can be performed only when in maintenance mode.
	×	×	(For use by service personnel) Span adjustment can be performed by only service personnel.
Individual CH info.	○	△	Checks and sets channel data.
Password entry	●	●	Enter the password to gain access to supervisor mode.
Gas alarm test	●	●	Checks the gas alarm operation by increasing/decreasing the simulated gas concentration value to create a gas alarm condition.
Fault alarm test	●	●	Checks the fault alarm operation by simulating a device failure.
Clock & Language	●	●	Sets the clock and language.
Device information	○	○	Views and changes the device information.
Software Ver.	△	△	Views the software version of the main unit.

S: Supervisor O: Operator
●: Permitted. ○: Partially permitted. △: Cannot be changed. ×: Not permitted.

Access to Menu

To go to Menu, press and hold [>] while on the gas concentration screen (Home).
If the lock icon appears in the bottom right corner of the screen, the safety lock must be deactivated to access Menu. To deactivate the safety lock, press and hold [^] until the lock icon disappears.

Ref. Refer to 9.2 “Deactivate Safety Lock” for how to deactivate the safety lock.



① : Item currently selected
② : Menu items

Select Item in Menu

1. To select the desired menu item in Menu, press [^] or [v]. The selected item will be highlighted in black. To return to Home, press [<].
2. To access the selected item, press [>]. To return to Menu, press and hold [<].

10.2 Maintenance Mode

Maintenance mode is used to deactivate all the alarm contacts and analog outputs during maintenance or inspection. From Menu, select “Maint mode” and then set the channels to Maintenance mode 1 or 2 depending on your purpose. Refer to 8 “Maintenance Mode” for the operation while in maintenance mode operation.

⚠ CAUTION

- Exit maintenance mode immediately after the maintenance work is completed.

⚠ CAUTION

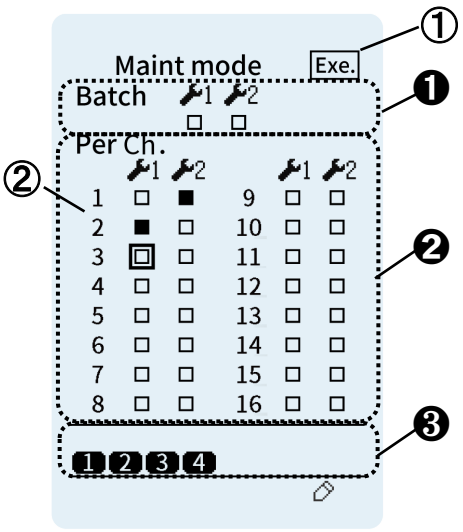
- Gas alarm (alarm contact and 4-20mA output) is disabled when in maintenance mode 1, however, the gas alarm status will be displayed in case of a gas alarm.
- Both gas and fault alarms are disabled when in maintenance mode 2, however, the gas or fault alarm status will be displayed in case of a gas or fault alarm.
- Both collective gas and fault alarm contact outputs (of the main unit) are disabled when either one of the channels is in maintenance mode.

NOTICE

- Maintenance mode will be automatically cleared after approximately 12 hours.
- When maintenance mode is reset, a 12-hour auto clearance will be reset.
- Maintenance mode will be retained after the unit is turned off and then on; however, a 12-hour auto clearance will be reset.

Go to the Maintenance Mode Screen

Deactivate the safety lock ⇒ Go to Menu ⇒ Select “Maint mode” ⇒ Maintenance Mode screen



1: Maintenance mode 1

2: Maintenance mode 2

■: Checked (selected)

□: Unchecked (not selected)

or : Cursor location

❶ Batch: Select/deselects all the channels simultaneously

❷ Per Ch.: Select/deselects each individual channel

❸ sensor channel status pane

① Exe.: Execute

② Channel number (1 to 16)

Enter the Maintenance Mode

1. Select the channels and maintenance mode 1 or 2 by checking the corresponding boxes.
   * Press [<], [^], [v], or [>] to move the cursor to the desired box, then press and hold [>] to check the box. (□=>■). To select all the channels at one time, check the box for Batch.
   * The setting will not be executed until the Exe. is activated in line with Steps 2 and 3 below.
2. Move the cursor to Exe., which will then be highlighted in black: Exe.
3. Press and hold [>] for execution. The checked channels (■) will enter maintenance mode.

Exit the Maintenance Mode

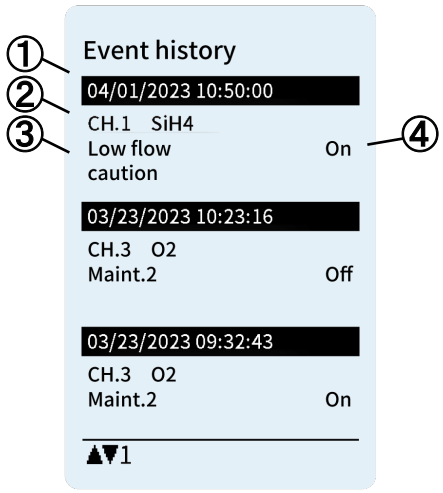
1. Select the channels to be exited by unchecking the corresponding boxes.
   * Press [<], [^], [v], or [>] to move the cursor to the desired box, then press and hold [>] to uncheck the box. (■=>□). To deselect all the channels at one time, check the box for Batch.
2. Move the cursor to Exe., which will then be highlighted in black: Exe.
3. Press and hold [>] for execution. The unchecked channels (□) will exit maintenance mode.

10.3 Event History

Past events (such as gas alarms, fault alarms, and maintenance modes) can be viewed from this menu.

Go to the Event History Screen

Deactivate the safety lock ⇒ Go to Menu ⇒ Select “Event history” ⇒ Event History screen



① Date and time of event
② Channel number and gas name
③ Event description
④ On: Start of the event
Off: End of the event

How to View the Events

Press [^] or [v] to navigate through the pages.

For example, if you perform a gas alarm test, a series of events will be logged in chronological order (see below) and can be viewed from the event history screen. The same applied to when performing a fault alarm test.

Gas alarm test	Off
Alarm 1	Off
Alarm 2	Off
Alarm 1	On
Alarm 2	On
Gas alarm test	On

NOTE

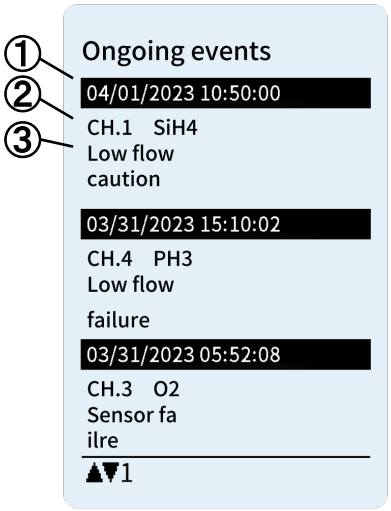
- A maximum of 50 events can be displayed in the event history. If the number of events exceeds 50, older events will be overwritten in chronological order.
- When the clock of the product is set to an earlier date and time than those of the events logged in the event history, new events may not be logged.
- Events recovered by powering off will not be logged in the event history.

10.4 Ongoing Events

Ongoing events (such as gas alarms, fault alarms, and maintenance modes) can be viewed from this menu.

Go to the Ongoing Events Screen

Deactivate the safety lock ⇒ Go to Menu ⇒ Select “Ongoing events” ⇒ Ongoing Events screen



① **Date and time of event**
② **Channel number and gas name**
③ **Event description**

How to View the Ongoing Events

Press [∧] or [∨] to navigate through the pages.

When manual-resetting is selected for gas alarm clearance method, the ongoing gas alarms can be manually reset by pressing and holding [>]. However, this manual operation is only possible when the gas concentration is below the gas alarm hysteresis (or above the gas alarm hysteresis when the alarm mode is Low), or when a fault alarm activates and replaces the gas alarm.

Event on screen	Description
Alarm1	1st stage gas alarm is activated.
Alarm2	2nd stage gas alarm is activated.
Maint.1(C)	The unit is in maintenance mode 1 that has been set via a communication channel such as Web Server, smartphone app, and Modbus.
Maint.1(M)	The unit is in maintenance mode 1 that has been set by the PS-8 unit
Maint.2(C)	The unit is in maintenance mode 2 that has been set via a communication channel such as Web Server, smartphone app, and Modbus.
Maint.2(M)	The unit is in maintenance mode 2 that has been set by the PS-8 unit
Gas alarm test	Gas alarm test is in progress.
Fault alarm test	Fault alarm test is in progress.

*Refer to 13 “Troubleshooting” for information on the fault-related events.

10.5 Zero and Span Adjustments

This menu is used to adjust the sensor reading to zero (or 20.9% for oxygen). Only service personnel are allowed to perform span adjustment.
No on-site span adjustment is required at sensor unit replacement because each sensor unit has been span-adjusted when shipped.
The channel allocated to AI module cannot be zero-/span-adjusted. If allocated to AI module, perform zero/span adjustment on the external gas detector which is connected to the AI module.

⚠ CAUTION

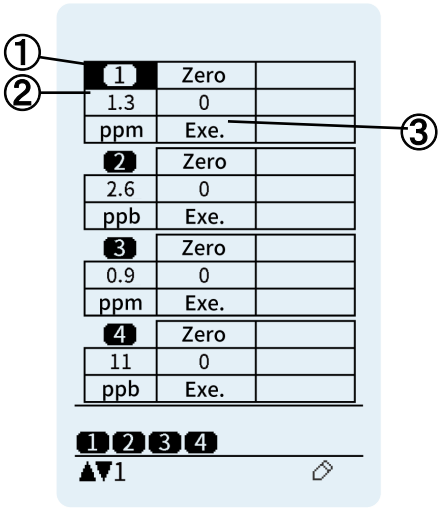
- Perform zero adjustment while no gas is present around the gas sampling inlet. Proper gas detection is not possible if the zero adjustment is performed in a gas atmosphere.
- Perform zero adjustment at the initial power-up or sensor unit replacement.
- Set the unit to maintenance mode before starting a zero or span adjustment. The zero and span adjustments are not possible when the unit is not in maintenance mode.
- Zero and span adjustments are not possible during the warm-up cycle. Perform zero or span adjustment after the warm-up cycle is completed and the reading becomes stable.

NOTICE

- If the connected sensor unit has not been powered for an extended period of time (e.g., the period from factory shipment to initial power-up), the gas concentration reading (sensor output) may take some time to stabilize.

Go to the Zero and Span Adjustment Screen

Deactivate the safety lock ⇒ Go to Menu ⇒ Select “Zero and span adj.” ⇒ Zero and Span Adjustment screen



① Channel number
② Current gas concentration
③ Exe. : Execute

Zero Adjustment Procedure

⚠ CAUTION

For accuracy, perform zero adjustment twice after the unit is turned on. The timing differs based on the sensor type as shown in the table below.

Sensor Type	1st Zero Adjustment	2nd Zero Adjustment
CDS-7	30 minutes after turning power on	24 hours after turning power on
CHS-7		
COS-7	One day after turning power on	7 days after turning power on

*The interval between the 1st and the 2nd adjustments may be longer depending on the installation environment.

Zero adjustment and 20.9 vol% adjustment for oxygen are performed in the same manner below.

1. Set the target channel to maintenance mode (10.2 “Maintenance Mode”).
2. Select the channel to be zero-adjusted.
   * Pressing [^] or [v] moves the cursor. (Example: 1: Not selected, 1: Selected)
3. Press [>] or [<]. to move the cursor to Exe., which will then be highlighted in black: Exe..
4. Press and hold [>] to execute a zero adjustment.
   If “Error (Warm-up time)” appears:
   ⇒Solution: Wait until the warm-up cycle is completed, then perform zero adjustment again.
   If “Error (Out of adjustable range)” appears:
   ⇒Solution: Ensure that no gas is present around the gas sampling inlet, then perform zero adjustment again.
   If “Error (During mode shift lock)” appears:
   ⇒Solution: Set the target channel to maintenance mode, then perform zero adjustment again.
   If “Error (During a fault)” appears:
   ⇒ Solution: Zero adjustment is not possible when a fault alarm is activated. Refer to 13 “Troubleshooting” for the solution.
   If “Error (Unit-to-unit comm.)” appears:
   ⇒Solution: Ensure that the connection between the units as well as between the front and rear cases is firm and secure. Refer to 13 “Troubleshooting”.
   * To hide an error message, press [>].
5. Check that the reading is zero (or 20.9vol% for oxygen).

NOTE

- Zero and span adjustments are not possible during the warm-up cycle or when a gas or fault alarm is activated.
- If the entered span value exceeds the adjustable range, it will lead to an error message “Error (Out of adjustable range)”.

Ref. If an error message appears on the screen, refer to 13 “Troubleshooting” for information on the necessary action to be taken.

10.6 Individual CH Information

Setup details for each channel can be viewed and changed from this menu.

Go to the Individual CH Info Screen

Deactivate the safety lock ⇒ Go to Menu ⇒ Select “Individual CH Info.” ⇒ Individual CH Info screen

The table below lists items to be set and their associated access privileges. A password is required to access supervisor mode.

Item List

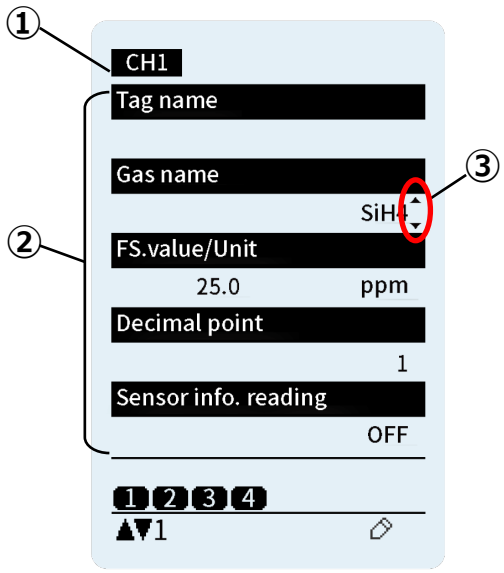
Item	Access Privilege		Description
	S	O	
Tag name	●	△	Sets the tag name for the channel.
Gas name	●	△	Sets the gas name for the channel.
FS. value/Unit	△	△	Sets and displays the full scale value and measurement unit.*1
Decimal point	△	△	Sets and displays the decimal point position. *1
Sensor info. reading	●	△	Renews the sensor data at the initial power-up, when replacing the sensor with a different type/full-scale of sensor. If an error message (e.g., “Sensor type mismatch”) appears, set this item to “ON” to renew the sensor data.
Alarm settings (AL1/AL2)	●	△	Sets the 1st and 2nd stage gas alarm set values.
Alarm mode	●	△	Sets the gas alarm mode to: “High-High”, “Low-Low” or “Low-High”. The relay contacts may be activated when the alarm mode is changed. Release the interlocks of the external devices as needed to prevent their possible activation.
Zero suppr.Unit(+/-)	●	△	Sets the zero suppression value (or 20.9 suppression value for oxygen).
AL delay (AL1/AL2) Sec.	●	△	Sets the delay time in seconds for 1st and 2nd stage gas alarms to: 0–255 seconds. If only the delay time for 1st stage gas alarm is set and the gas concentration exceeds the 2nd stage gas alarm set value, 2nd stage gas alarm will activate before 1st stage gas alarm.
Analog output allocation	●	△	Allocates the channel to main unit’s analog output. None: Unallocated M: Main unit’s terminals * Can be set to the main unit “M” only. Note that other option than “M” can be viewed (even selected) but it cannot be set here. * When the channel has been allocated to the expansion unit (AO module), the AO module address appears, and it cannot be reallocated to the main unit from here. For the procedure to reallocate the channel to the expansion unit (AO module), refer to 7.7 “Power-on Check” in the PS-8 Series Instruction Manual for Installation.

Item		Access Privilege		Description
		S	O	
Relay output allocation		△	△	Displays the relay contact output module (DO module address and terminal No.) allocated to the channel.
Relay (Alarm1)		●	△	Sets the expansion unit's 1st stage gas alarm contact to: "Normally energized" or "Normally de-energized".
Relay (Alarm2)		●	△	Sets the expansion unit's 2nd stage gas alarm contact to: "Normally energized" or "Normally de-energized".
Relay (Fault)		●	△	Sets the expansion unit's fault alarm contact to: "Normally energized" or "Normally de-energized".
Sensor information	P value	△	△	Displays the sensor input current value multiplied by 100. E.g., P203 represents 2.03 mA

S: Supervisor O: Operator

●: Permitted. △: Cannot be changed.

*1: Applied to the expansion unit with AI module(s) installed.



① **Channel number**
② **Item**
③ ▲▼ **: Cursor location**

How to View the Channel Information

Press [<] or [>] to navigate through the channels.

Press [∧] or [∨] to navigate through the pages.

How to Set the Channel Information

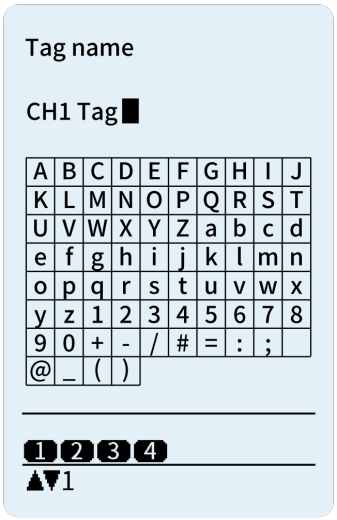
Some items are password protected. To set them up, enter the password to gain access to supervisor mode (refer to 10.7 “Password Entry”).

1. Select the channel and page where the target item is located.
   * Pressing [<] or [>] navigates through the channels.
   * Pressing [∧] or [∨] navigates through the pages.
2. Press and hold [>] to display ▲▼ .
3. Move ▲▼ to the item you want to modify.
   * Pressing [∧] or [∨] moves ▲▼ through the items.
   * Pressing [<] or [>] navigates through the channels.
4. Press and hold [>].
   (a) The item will start blinking, indicating that it is settable, or
   (b) The screen will switch to a text entry screen.
5. Change the setting.
   (a) For the blinking item, select the desired option or change the parameter by pressing [∧] or [∨].
   * To cancel the change, press [<].
   (b) For the text entry screen, press [∧] or [∨] to move the cursor and press [>] to enter a character. To delete a character, press [<].
   * To cancel the change, press and hold [<].
6. Save the setting.
   (a) For the blinking item, press [>] to save the setting.
   (b) For the text entry screen, press and hold [>] to save the setting.

⚠ CAUTION	
❗	Before saving the setting, ensure that the selected channel is correct. Incorrect selection may cause the product not to operate correctly.

A. Tag Name and Gas Name Entry

1. Enter the password to gain access to supervisor mode.
2. Select the channel and page where the target item is located.
   * Pressing [<] or [>] navigates through the channels.
   * Pressing [∧] or [∨] navigates through the pages.
3. Press and hold [>] to display ▲▼ .
4. Move ▲▼ to “Tag name” or “Gas name”.
   * Pressing [∧] or [∨] moves ▲▼ through the items.
   * Pressing [<] or [>] navigates through the channels.
5. Press and hold [>].
   The screen will switch to a text entry screen.
6. Change the setting.
   Press [∧] or [∨] to move the cursor and press [>] to enter a character. To delete a character, press [<].
   * To cancel the change, press and hold [<].
7. Save the setting.
   Press and hold [>] to save the setting.



Text Entry Screen

CAUTION

The following alphanumeric characters and symbols can be entered for tag and gas names. The maximum number of characters displayed is 16. However, since the font width varies depending on the character, when the tag name exceeds 12 characters (11 characters for gas name), some characters may get hidden depending on the character combination. Please contact New Cosmos or its authorized representative for possible displayed tag and gas names.

Tag Name

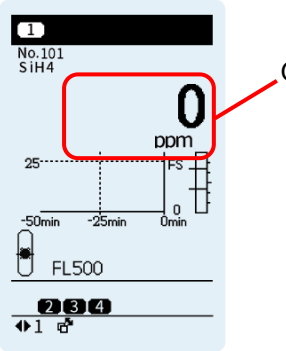
A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	a	b	c	d
e	f	g	h	i	j	k	l	m	n
o	p	q	r	s	t	u	v	w	x
y	z	0	1	2	3	4	5	6	7
8	9	+	-	/	#	=	:	;	(space)
@	_	(	)	,					

Gas Name

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	a	b	c	d
e	f	g	h	i	j	k	l	m	n
o	p	q	r	s	t	u	v	w	x
y	z	0	1	2	3	4	5	6	7
8	9	+	-	/	#	=	:	;	(space)
@	_	(	)	,	α				

B. Sensor Info Reading

1. Enter the password to gain access to the supervisor mode.
2. Select the channel and page where the target item is located.
   * Pressing [<] or [>] navigates through the channels.
   * Pressing [∧] or [∨] navigates through the pages.
3. Press and hold [>] to display ↕ .
4. Move ↕ to “Sensor info reading”.
   * Pressing [∧] or [∨] moves ↕ through the items.
   * Pressing [<] or [>] navigates through the channels.
5. Press and hold [>]. The item will start blinking, indicating that it is settable.
6. Change the setting.
   Select “ON” or “OFF” by pressing [∧] or [∨].
   * To cancel the change, press [<].
7. Press [>] to save the setting. The item will stop blinking.
   If “Error (Excluded sensors)” appears:
   ⇒Solution: Sensor info reading was already completed, and no further reading is required.
8. If the setting is saved successfully, the unit will enter the warm-up cycle, and the power LED will start blinking. When the warm-up cycle is complete, the unit will enter normal operation mode, the power LED will turn on, and the gas concentration will appear on the screen.



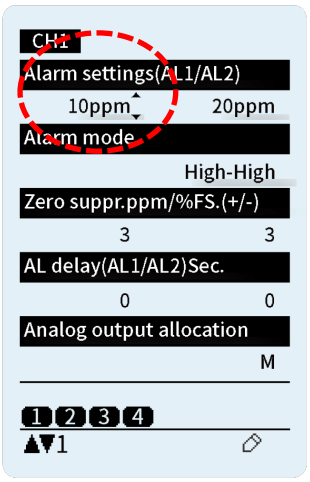
⚠ CAUTION

The alarm mode will not be automatically changed when the sensor info reading is performed.

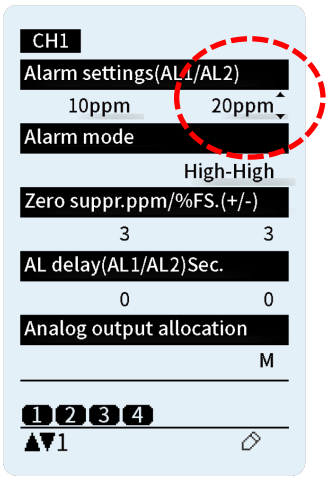
The relay contacts may be activated when the alarm mode is changed. When replacing the oxygen sensor with a non-oxygen sensor, or vice versa, which will then require an alarm mode change, release the interlocks of the external devices as needed to prevent their possible activation.

C. Alarm Settings (AL1/AL2)

1. Enter the password to gain access to the supervisor mode.
2. Select the channel and page where the target item is located.
   * Pressing [<] or [>] navigates through the channels.
   * Pressing [∧] or [∨] navigates through the pages.
3. Press and hold [>] to display ⇕ .
4. Move ⇕ to “Alarm settings (AL1/AL2)”.
   * Pressing [∧] or [∨] moves ⇕ through the items.
   * Pressing [<] or [>] navigates through the channels.
5. Press and hold [>]. The AL1/AL2 value will start blinking, indicating that it is settable.



AL1 Setting



AL2 Setting

6. Change the AL1/AL2 value.
   * Pressing [∧] or [∨] increases or decreases the value.
   * To cancel the change, press [<].
7. Press [>] to save the setting. The value will stop blinking.

D. Zero Suppr / %FS. (+/-)

The sensors used in this product are influenced by environmental factors such as temperature, humidity, and interfering gases, which may cause readings to fluctuate even under normal conditions.
The zero suppression function renders fluctuations in readings below the preset value invisible, making the effects of environmental changes and interfering gases less noticeable under normal conditions. The fluctuations in readings are effectively masked with respect to zero (or 20.9 vol% for oxygen).

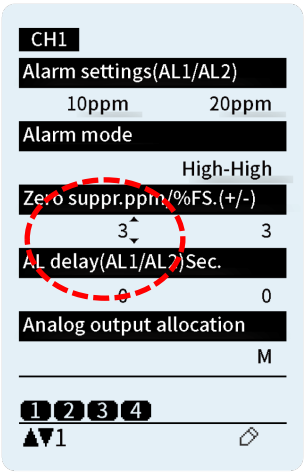
⚠ WARNING

- The adjustable range for the zero suppression value is –9% to 109% of the full-scale value.
- Do not set the zero suppression value higher than the gas alarm set points (AL1/AL2). If it is set above the gas alarm set points, the gas alarm will not activate until the zero suppression value is exceeded. Additionally, when the gas concentration reaches the zero suppression value, the gas alarm may cycle repeatedly, and the display may toggle between zero and the actual reading.

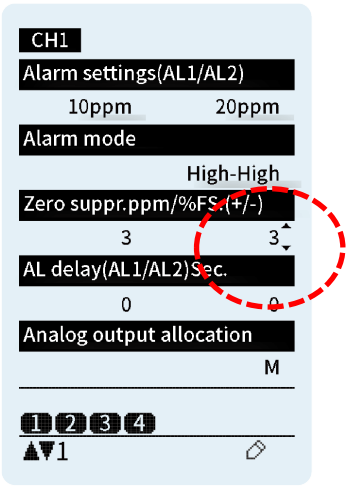
⚠ CAUTION

- When using an AI module, the zero suppression value may be configured on the external gas detector connected to the AI module.
- If there is a discrepancy in the zero suppression values between the external gas detector and the channel used by the AI module, the higher value will take precedence.

1. Enter the password to gain access to supervisor mode.
2. Select the channel and page where the target item is located.
   * Pressing [<] or [>] navigates through the channels.
   * Pressing [^] or [v] navigates through the pages.
3. Press and hold [>] to display ▲▼ .
4. Move ▲▼ to “Zero Suppr / %FS. (+/-)”.
   * Pressing [^] or [v] moves ▲▼ through the items.
   * Pressing [<] or [>] navigates through the channels.
5. Press and hold [>]. The item will start blinking, indicating that it is settable.



Zero Suppr. Value in Positive Area



Zero Suppr. Value in Negative Area

6. Change the zero suppression value in the positive/negative area.
   * Pressing [∧] or [∨] increases or decreases the value.
   * To cancel the change, press [<].
7. Press [>] to save the setting. The value will stop blinking.
   If “Error (Set value error)” appears:
   ⇒Solution: Check your set value is within the adjustable range for the zero suppression.

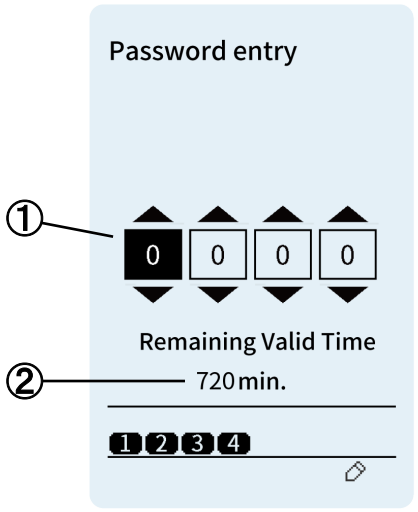
NOTE The adjustable range for the zero suppression value is –9% to 109% of the full-scale value.

10.7 Password Entry

A password must be entered to access supervisor mode.

Go to the Password Entry Screen

Deactivate the safety lock ⇒ Go to Menu ⇒ Select "Password entry” ⇒ Password Entry screen



① 4-digit password
② Remaining time until the password expires.

Password Entry Procedure

1. Enter the password.
   * Press [∧] or [∨] to enter each digit.
   * Pressing [>] moves the cursor to the next digit.
   * Pressing [<] returns the cursor to the previous digit.
2. Press and hold [>] to confirm the password.
   * If “Error (Password mismatch)” appears:
   ⇒ Solution: The password entered is invalid. Enter a valid password.

NOTE
- The default password for supervisor mode is “0 0 0 0”.
- The password will expire after 720 minutes.

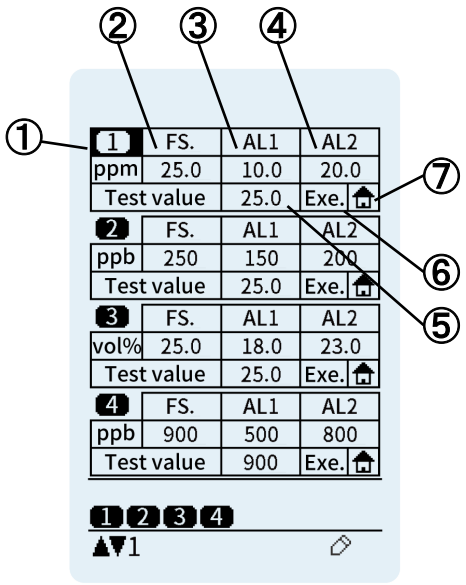
10.8 Gas Alarm Test

This test mode is used to increase or decrease a simulated gas concentration value to activate a gas alarm for maintenance or testing purposes per channel.

⚠ CAUTION
• Gas alarm test cannot be performed on the channel which is in the warm-up cycle. • During a gas alarm test, the external relay contacts will get activated. Before performing a gas alarm test, set the unit to maintenance mode or release the interlocks of external devices as needed to prevent their possible activation. • The unit will automatically exit gas alarm test mode and return to gas-monitoring mode (gas concentration screen) after 10 minutes if left idle. • Gas alarm test is not possible when a gas or fault alarm is activated in any of the channels. • Gas alarm test will be automatically canceled if a fault alarm occurs in the channel under the test. • Gas alarm test will not be automatically canceled, even If a gas alarm occurs during the test. • Gas alarm test mode will not be retained after the unit is turned off and then on.

Go to the Gas Alarm Test Screen

Deactivate the safety lock ⇒ Go to Menu ⇒ Select “Gas alarm test” ⇒ Gas Alarm Test screen



① **Channel number**
② **Full scale value**
③ **1st stage gas alarm set value**
④ **2nd stage gas alarm set value**
⑤ **Test value**
⑥ **Exe./CXL: Executes/Cancels the test**
⑦ **Displays Home screen**

Test Procedure

1. Select the channel to be tested.
   * Pressing [∧] or [∨] moves the cursor up or down.
2. If the test value needs to be changed, move the cursor to the test value cell. If no change is needed, go to Step 6.
   * Pressing [>] moves the cursor forward.
   * Pressing [<] moves the cursor back.
3. Press and hold [>]. The test value will start blinking, indicating that it is settable.
4. Press [∧] or [∨] to increase or decrease the value.
   * To cancel the entered value, press [<].

5. Press [>] to save the set value. The value will stop blinking.
6. Press [>] to move the cursor to Exe. The display will change to Exe.
7. Press and hold [>] to execute the test.
   * To view the gas concentrations when in the gas alarm test, move the cursor to , and then press and hold [>]. The gas concentration screen will be displayed while [>] is being held down.
8. Check that the relevant AL1/AL2 LEDs are blinking and the relevant alarm operations (alarm contacts, analog output, etc.) are activated according to the test value.

How to End the Test

You can end the gas alarm test with or without saving the test value.

* Moving the cursor to CXL and then holding down [>] will exit the test mode and save the test value.
* Holding down [<] will exit the test mode and return the screen to Menu without saving the test value.

NOTE When the alarm clearance method is set to “Manual-resetting”, a gas alarm simulated by the alarm test will be maintained until the alarm test is ended.

10.9 Fault Alarm Test

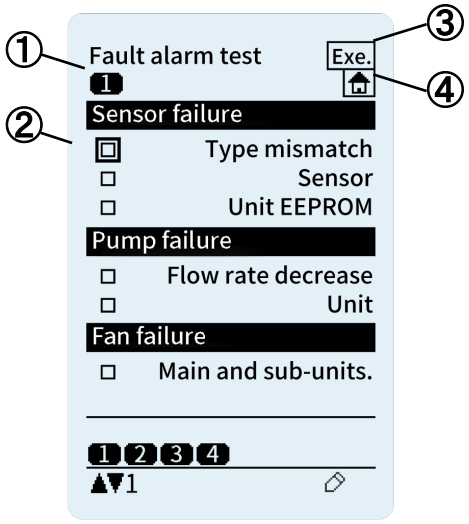
This test mode is used to simulate a device fault (e.g., sensor failure, low flow rate, and communication error) to activate a fault alarm for maintenance or testing purposes per channel.

⚠ CAUTION

- Fault alarm test cannot be performed on the channel which is in the warm-up cycle.
- Fault alarm test is not possible when aging mode is activated in any of the channels.
- During a fault alarm test, the external relay contacts will get activated. Before performing a fault alarm test, set the unit to maintenance mode or release the interlocks of external devices as needed to prevent their possible activation.
- The unit will automatically exit fault alarm test mode and return to gas-monitoring mode (gas concentration screen) after 10 minutes if left idle.
- Fault alarm test is not possible when a gas or fault alarm is activated in any of the channels.
- Fault alarm test will not be automatically canceled, even if a fault alarm of the same kind occurs in the channel under the test.
- Fault alarm test will not be automatically canceled if a gas alarm occurs during the test.
- Fault alarm test mode will not be retained after the unit is turned off and then on.
- The purpose of the fault alarm test is to check the external outputs, and the unit will behave accordingly. Onscreen indications during the test may not match those displayed during an actual fault alarm.

Go to the Fault Alarm Test Screen

Deactivate the safety lock ⇒Go to Menu ⇒ Select “Fault alarm test” ⇒ Fault Alarm Test screen



■: Checked (selected)

□: Unchecked (not selected)

□ or ■: Cursor location

① Channel number
② Test items
③ Exe./CXL: Executes/Cancels the test
④ Displays Home screen

Test Procedure

1. Select the channel to be tested and the test items.
   * Pressing [<] or [>] navigates through the channels.
   * Press [∧] or [∨] to move the cursor to the box for a desired test item, then press and hold [>] to check the box. (□ => ■).
   * The test will not be executed until the Exe. is activated in line with Steps 2 and 3 below.
2. Move the cursor to Exe. which will then change to Exe.
3. Press and hold [>] to execute the test.
   * To view the gas concentrations when in the fault alarm test, move the cursor to 🏠, and then press and hold [>]. The gas concentration screen will be displayed while [>] is being held down.
4. Check that the relevant fault LEDs are blinking and the relevant alarm operations (alarm contacts, analog output, etc.) are activated.

How to End the Test

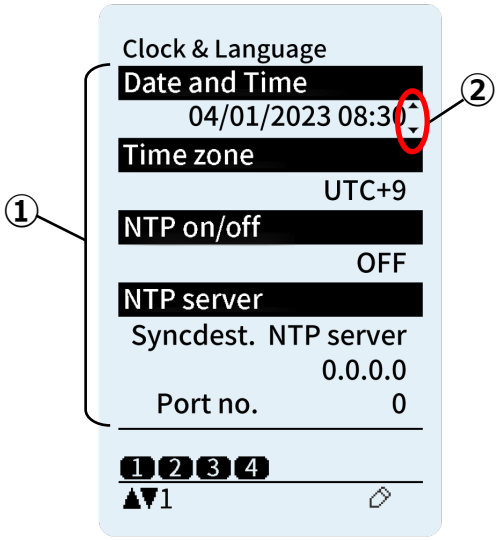
1. Move the cursor to CXL and then press and hold [>], or press and hold [<] to return to Menu. The test will be ended.

10.10 Clock and Language

The clock and display language can be set from this menu.

Go to the Clock and Language Screen

Deactivate the safety lock ⇒ Go to Menu ⇒ Select “Clock & Language⇒ Clock and Language screen



① Item
② ▲▼ : Cursor location

Item List

Item	Description
Date and Time	Sets the date and time.
Time zone	Sets the time zone.
NTP on/off	Sets NTP to ON or OFF.
NTP server	Sets the time synchronization source to “NTP server” or “Tablet PC” and sets the server name and port number.
Language	Sets the display language.

How to View the Settings

Press [∧] or [∨] to navigate through the pages.

Setup Procedure

1. Press and hold [>] to display ▲▼ .
2. Press [∧] or [∨] to move ▲▼ to the item you want to modify.
3. Press and hold [>].
   (a) The item will start blinking, indicating that it is settable,
   (b) The screen will switch to a date entry screen, or
   (c) The screen will switch to a text entry screen (e.g., server name entry screen).
4. Change the setting.
   (a) For the blinking item, select the desired option by pressing [∧] or [∨].
   * To cancel the change, press [<].
   (b) For the date entry screen, press [<] or [>] to move the cursor and press [∧] or [∨] to enter the date and time.
   * To cancel the change, press and hold [<].
   (c) For the text entry screen, press [∧] or [∨] to move the cursor and press [>] to enter a character. To delete a character, press [<].
   * To cancel the change, press and hold [<].

5. Save the setting.
   (a) For the blinking item, press [>] to save the setting.
   (b) For the date entry screen, press and hold [>] to save the setting.
   (c) For the text entry screen, press and hold [>] to save the setting.

NOTE

- The date and time are for the event history purposes only, and their accuracy is not guaranteed.
- The product is set as per Japan time by default. Hence, you may adjust the date and time as per your local time.
- To designate the NTP server as the time synchronization source, turn the Ethernet on. Refer to 10.11 “Device Information” for how to turn the Ethernet on.
- You can select the display language from: Japanese, English, Chinese (simplified), Chinese (traditional), and Korean.

10.11 Device Information

Setup details of the product can be viewed and changed from this menu.

Go to the Device Information Screen

Deactivate the safety lock ⇒ Go to Menu ⇒ Select “Device information” ⇒ Device Information screen

The table below lists items to be set and their access privileges. A password is required to access supervisor mode.

Item List

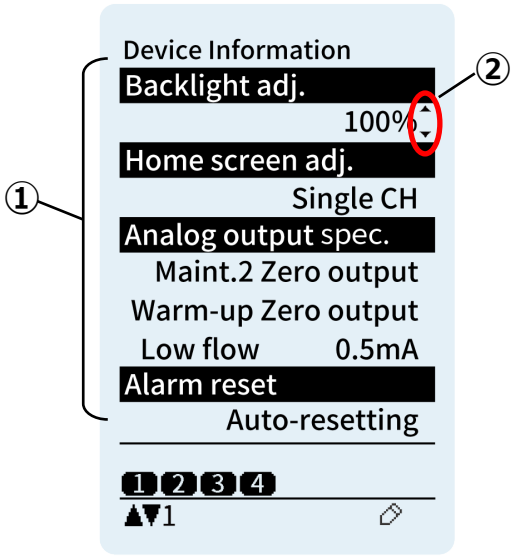
Item		Access Privilege		Description
		S	O	
Backlight adj.		●	●	Sets the brightness of the backlight to: “OFF”, “25%”, “50%”, “75%” or “100%”.
Home screen adj.		●	●	Sets the display format of the gas concentration screen to: “Single CH” or “Multiple CH”.
Analog output spec.	Maint. 2	●	●	Sets the analog output value for maintenance mode 2 to: “Zero output” or “2.5 mA”.
	Warm-up	●	●	Sets the analog output value during the warm-up cycle to: “Zero output” or “2.5 mA”.
	Low flow	●	●	Sets the analog output value during low flow rate alarm to: “1.5 mA” or “0.5 mA”.
Alarm reset		●	●	Sets the alarm clearance method to: “Auto-resetting” or “Manual-resetting”.
Collective contact AL1		●	●	Sets the collective 1st stage gas alarm contact (in main unit) to: “Normally energized” or “Normally de-energized”.
Collective contact AL2		●	●	Sets the collective 2nd stage gas alarm contact (in main unit) to: “Normally energized” or “Normally de-energized”.
Collective contact Fault		●	●	Sets the collective fault alarm contact (in main unit) to: “Normally energized” or “Normally de-energized”.
Trend graph display		●	●	Selects whether to display a trend graph in the main status pane (single CH display) to: “ON” or “OFF”.
Ethernet*1		●	●	Sets the Ethernet to: “ON” or “OFF”.

Item	Access Privilege		Description
	S	O	
IP address*1	●	●	Sets the IP address for Ethernet to: “xxx.xxx.xxx.xxx”. Default: 192.168.0.101
Subnet mask*1	●	●	Sets the subnet mask for Ethernet to: “xxx.xxx.xxx.xxx”. Default: 255.255.255.0
Default gateway*1	●	●	Sets the default gateway for Ethernet to: “xxx.xxx.xxx.xxx”. Default: 0.0.0.0
MAC Address*1	△	△	Displays the MAC address for Ethernet: “xxxxxxxxxxxx”.
DHCP*1	●	●	Sets the DHCP for Ethernet to: “ON” or “OFF”.
Modbus	●	●	Sets the Modbus mode and baud rate to: Mode: “TCP/IP” Baud rate speed: (Not in use)
Modbus/RTU address	●	●	(Not in use)
Password setting	●	△	Sets the 4-digit password to: “xxxx”. Password can be changed when in supervisor mode. Default: 0000
Auto 20.9vol%*2	●	●	Sets the auto 20.9vol% adjustment to: “ON” or “OFF”.
Main unit tag name	●	●	Sets the main unit’s tag name to: “xxxxxxxx”.
Email address (For Web Server only)	●	△	Registers a maximum of ten email addresses for email alert. Email addresses can be registered only from the Web Server.
SMTP settings (For Web Server only)	●	△	Sets SMTP address, port No., encryption method, username, and password, which can be set only from the Web Server.
Connection unit (Sub)	△	△	Displays the connected subunits.
Connection unit (AO)	△	△	Displays the connected AO modules.
Connection unit (DO)	△	△	Displays the connected DO modules.
Connection unit (AI)	△	△	Displays the connected AI modules.
Connection unit (MR)	△	△	(Not in use)
Power-on time	△	△	Displays the time when the product turns on.

S: Supervisor O: Operator ●: Permitted. △: Cannot be changed.

*1: For PS-8M only. If “ON” is set for PS-8N, the Ethernet icon will appear in the device status pane.

*2: For unit with COS-7 sensor (oxygen) only.



① **Item**
② **: Cursor location**

How to View the Device Information

Press [∧] or [∨] to navigate through the pages.

How to Set the Device Information

1. Go to the page where the target item is located.
   * Pressing [∧] or [] ∨ navigates through the pages.
2. Press and hold [>] to display ⇕ .
3. Move ⇕ to the item you want to modify.
   * Pressing [∧] or [∨] moves ⇕ up or down.
4. Press and hold [>].
   (a) The item will start blinking, indicating that it is settable, or
   (b) The screen will switch to a number entry screen.
5. Change the setting.
   (a) For the blinking item, select the desired option by pressing [∧] or [∨].
   * To cancel the change, press [<].
   (b) For the number entry screen, press [<] or [>] to move the cursor and press [∧] or [∨] to enter the number.
   * To cancel the change, press and hold [<].
6. Save the setting.
   (a) For the blinking item, press [>] to save the setting.
   (b) For the number entry screen, press and hold [>] to save the setting.

How to Switch the Display Format of HOME screen: “Single CH” or “Multiple CH”.

1. Go to the page where the target item “Home screen adj.” is located.
   * Pressing [∧] or [∨] navigates through the pages.
2. Press and hold [>] to display ⇕ .
3. Move ⇕ to “Home screen adj.”
   * Pressing [∧] or [∨] moves ⇕ up or down.
4. Press and hold [>].
   The item will start blinking, indicating that it is settable.
5. Change the setting.
   Select the desired option “Single CH” or “Multiple CH” by pressing [∧] or [∨].
   * To cancel the change, press [<].
6. Press [>] to save the setting. The item, “Single CH” (or “Multiple CH”) will stop blinking.

Auto 20.9vol Adjustment

The oxygen sensor output decreases over time, due to the characteristics of the sensor. This function corrects the sensor output, which will then regularly correct the indicated value.

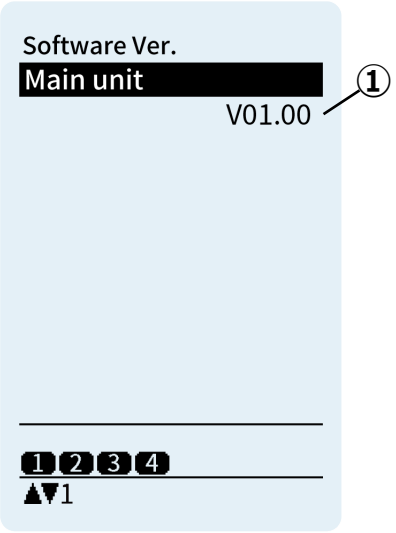
⚠ WARNING	
	The auto 20.9vol adjustment cannot be used under the following environments. Set “Auto 20.9vol” to OFF. ・ Area where hypoxia is constantly present, such as in a nitrogen purge chamber ・ Area where oxygen level slowly decreases in an enclosed space, such as in a storage silo.

10.12 Software Version

The software version can be viewed from this menu.

Go to the Software Version Screen

Deactivate the safety lock ⇒ Go to Menu ⇒ Select “Software Ver.”⇒ Software Version screen



No.	Item	Description
①	Software version	Displays the software version of the main unit.

10.13 Other Useful Functions (Shortcuts)

This product has the following key operations in addition to the operations to be performed through Menu.

⚠ CAUTION	
	When more than one key needs to be pressed or pressed down simultaneously, ensure that they are pressed or pressed down at the same time. Otherwise, that may result in a different setting from the intended one.

A. All Channel Maintenance Mode 2

1. Press and hold [<] and [∨] simultaneously while on the gas concentration screen to set all the channels to maintenance mode 2 at the same time.
   Refer to 10.2 “Maintenance Mode” for how to exit maintenance mode 2.

B. Channel Auto Cycle On/Off

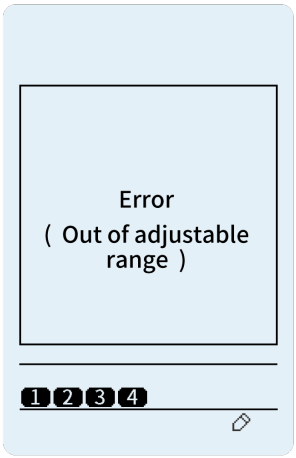
1. Press and hold [∧] while on the gas concentration screen to turn on/off the channel auto cycle display.
   - The channel auto cycle is on when  is present at the bottom of the screen.
   - The gas concentration screen automatically cycles every 5 seconds.
   - In the event of a gas or fault alarm, the screen switches to the one indicating the channel where the gas or fault alarm is activated, and the channel auto cycle is paused for 10 minutes.
   - Navigating through the channels by pressing [<] or [>] while the channel auto cycle is paused will cancel the 10-minute pause.

NOTE If a gas or fault alarm occurs during the 10-minute pause, the screen switches to the one indicating the channel where the gas or fault alarm is present.

C. All Sensor Zero Adjustment

1. Enter maintenance mode.
2. Press and hold [∨] while on the gas concentration screen to perform zero adjustment on all the sensors at the same time.
   *This function is enabled only when the product is in maintenance mode.
   If “Error (Warm-up time)” appears:
   ⇒Solution: Wait until the warm-up cycle is completed, then perform zero adjustment again.
   If “Error (Out of adjustable range)” appears:
   ⇒Solution: Ensure that no gas is present around the gas sampling inlet, then perform zero adjustment again.
   If “Error (Excluded sensors)” appears:
   ⇒Solution: Sensor info reading was already completed, and no further reading is required.
   If “Error (During a fault)” appears:
   ⇒Solution: Zero adjustment is not possible on AI module. If zero adjustment on AI module is needed, perform 4mA adjustment on the connected detector.
   If “Error (Unit-to-unit comm.)” appears:
   ⇒Solution: Ensure that the connection between the units as well as between the front and rear cases is firm and secure. Refer to 13 “Troubleshooting”.
   Check that the reading is zero (or 20.9vol% for oxygen).

3. If the adjustment fails, the failed channels will be displayed in the sensor channel status pane.



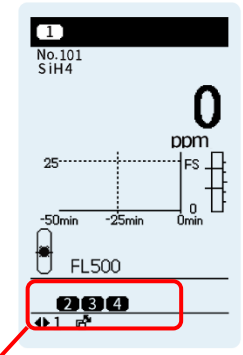
NOTE Zero adjustment is not possible on AI module.

⚠ CAUTION

Refer to 10.5 “Zero and Span Adjustments” before performing zero or span adjustment.

D. Auto Channel Allocation *For supervisor use only

1. Enter supervisor mode. A password is required to access supervisor mode.
2. Press and hold [<] and [>] simultaneously while on the gas concentration screen to automatically allocate all the connected units and modules (from the main unit, the subunits, to the AI modules) to the channels (from the youngest number to the oldest).
   For example, when a main unit (M) is connected to two subunits (S1 and S2), and three extension units (AI module (AI1), AO module (AO1), and three DO modules (DO1-DO3)), the auto channel allocation will be made as shown in the table below.
   If one more subunit (S3) is added, it will be allocated to Channel 6 and the allocation to Channels 1-5 will remain unchanged.



Channel numbers for the connected sensor units

Channel	Auto Channel Allocation		
	Unit Allocation	Analog Output Allocation	Relay Output Allocation
1	M	M	DO1-1
2	S1	AO1-1	DO1-2
3	S2	AO1-2	DO2-1
4	AI1-1	AO1-3	DO2-2
5	AI1-2	AO1-4	DO3-1
6 (if subunit is newly added)	S3	None	DO3-2

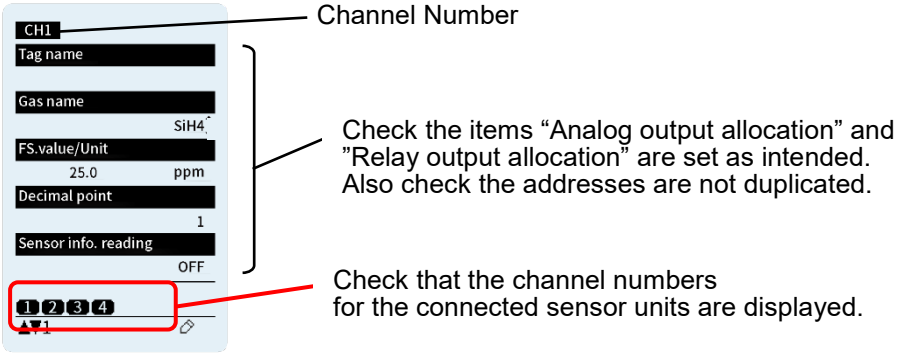
M: Main unit S: Subunit AI: AI module AO: AO module DO: DO module
*See the Allocation table below for details.

Allocation Table

Item	Description
Unit allocation	M: Sensor unit in main unit S1–S3: Sensor unit in subunit AI(1)– AI(2): AI module's terminals in expansion unit
Analog output allocation	M: Main unit's terminals None: Unallocated AO(1)– AO(2): AO module's terminals in expansion unit
Relay output allocation	None: Unallocated DO(1)– DO(2): DO module's terminals in expansion unit

(1): Address (2): Terminal number

3. Check the auto channel allocation result.
   (1) Press and hold [>] to go to Menu.
   (2) Select "Individual CH Info." to go to the Individual CH Info screen.
   To return to Menu, press and hold [<].



   (3) Pressing [<] or [>] navigates through the channels. Go to the channel you want to check.
   (4) Pressing [∧] or [∨] navigates through the pages. Go to the page where the target items, "Analog output allocation" and "Relay output allocation", are present.

Item	Description
Analog output allocation	Indicates the analog output allocated to the channel. M: Main unit's terminals None: Unallocated AO(1)– AO(2): AO module's terminals in expansion unit
Relay output allocation	Indicates the relay output allocated to the channel. None: Unallocated DO(1)– DO(2): DO module's terminals in expansion unit

(1): Address (2): Terminal number

If the channel numbers for the connected sensor units are not displayed or the allocation settings displayed for the Items "Analog output allocation" and "Relay output allocation" are not as intended, it indicates that the auto channel allocation has failed.
Also check that the addresses of the subunits and modules are not duplicated. If duplicated, change their addresses. For the address setting procedure, refer to "7.3.1 Subunit Address Setting" and "7.3.2 Expansion Module Address Setting" in the PS-8 series Instruction Manual for Installation.
If the auto channel allocation fails, the allocation settings need to be cleared once. To clear the allocation settings, take the following steps or contact New Cosmos service personnel.

How to clear the allocation settings

(1) Turn off the product by setting the power switch to the off position.
(2) Remove the joints which connect between the main unit and other units (subunit/expansion unit). For how to remove joints, refer to " 7.2.3. Joint Removal" in the PS-8 series Instruction Manual for Installation.
(3) Turn on the product by setting the power switch to the on position.
(4) Deactivate the safety lock and go to Menu. Select "Password entry" to go to the Password Entry screen. Enter supervisor mode. A password is required to access supervisor mode.
(5) Press and hold [<] and [>] simultaneously while on the gas concentration screen to clear the allocation settings.
(6) Turn off the product. Iinstall the joints which connect between the main unit and other units (subunit/expansion unit).
(7) Turn on the product. Perform auto channel allocation again.

⚠ CAUTION	
	• Analog outputs and external relay contact outputs may change when the channel allocation (unit/analog output/relay output allocations) is changed. When changing the channel allocation while connected to a host monitoring system, take action to prevent any unintended operation triggered by a gas or fault alarm. Before starting allocation settings, release the interlocks of external devices as needed to prevent their possible activation. • When allocating an AI module to the channel, set the tag and gas names for the channel as needed (refer to 10.6.A "Tag Name and Gas Name entry" for the setting procedure). A gas name will not be automatically set for the AI module. Without tag and gas names assigned to the channel, it may be unclear which channel the AAI module is allocated to.

E. All Sensor Info Reading

1. Enter maintenance mode.
2. Press and hold [<] and [^] simultaneously while on the gas concentration screen to collectively renew all the sensors' data.
   *This function is enabled only when the product is in maintenance mode.
   *Make use of this function to renew the sensors' data at the initial power-up, or when replacing the sensors with a different type of sensors.

⚠ CAUTION	
	When replacing the oxygen sensor with a non-oxygen sensor, check that the gas alarm set values (AL1 and AL2) are correct after using this function (renewing the sensor data).

11 Web Server

This product employs the TCP/IP protocol (Ethernet) and can function as a web page server (“Web Server” in this manual). These web pages (product status, settings, and logs) can be viewed on external computer equipment (e.g., PC) through a web browser such as Microsoft Edge and Google Chrome. The settings can also be altered from the web pages. Three operational modes can be used to access the web pages: operator and supervisor modes. The accessible menu items vary between each of these modes. To enter supervisor mode, a password is required. For detailed information on menu items and access privileges, refer to 10.1 “Menu Items”.

⚠ CAUTION

- Do not access the Web Server from more than one PC.
- To make settings, do not use the Web Server and the PS-8 main unit’s operation keys at the same time.

11.1 Setup Procedure

11.1.1 Applicable Browsers

It has been verified that the Web Server operates properly on Microsoft Edge and Google Chrome. The Web Server may or may not operate properly on other browsers.
For a PC, OS Windows 10 or higher is recommended.

NOTE

- The display indications may differ depending on your browser settings and version.
- If your browser does not respond for a long time, close it, and start it again.

11.1.2 IP Address Settings

Communications require the IP addresses and subnet masks of both the PS-8 unit and an external PC. When the PS-8 unit connects to a DHCP server, the IP addresses will be automatically set. To form a connection with a DHCP server, select “Device Information” on Menu and then set “DHCP” to “ON”. If the PS-8 unit is not connected to a DHCP server (“DHCP” is set to “OFF”), the IP addresses and subnet masks must be set manually.

The most significant three bytes of the IP address must be identical for both PS-8 unit and the PC, while the least significant byte must be unique.

⚠ CAUTION

Addresses can be freely set within the settable range and should not overlap with those of other devices.

PS-8 Settings

Set the IP address, subnet mask and default gateway on your PS-8 unit, as needed.
On Menu, select “Device Information” > “IP address” and “Subnet mask”. Refer to 10.11 “Device Information” for the setup procedure.

Example.....IP address: 192.168.0.101
Subnet mask: 255.255.255.0
Default gateway: 0.0.0.0

PC Settings

Set the IP address, subnet mask, and default gateway on your PC, as needed.

Example.....IP address: 192.168.0.102
Subnet mask: 255.255.255.0
Default gateway: 0.0.0.0

11.1.3 Network Environment Setting

The PS-8 unit cannot be operated via a proxy server. Turn off the proxy server on your PC.

11.1.4 Communication Check

Check that communication has been established between your PC and the PS-8 unit.

PC

Open a web browser (e.g., Microsoft Edge, Google Chrome), and enter the PS-8's IP address (e.g., http://192.168.0.101) in the address bar. When accessed successfully, the gas information per channel (Home screen) will appear on the page.

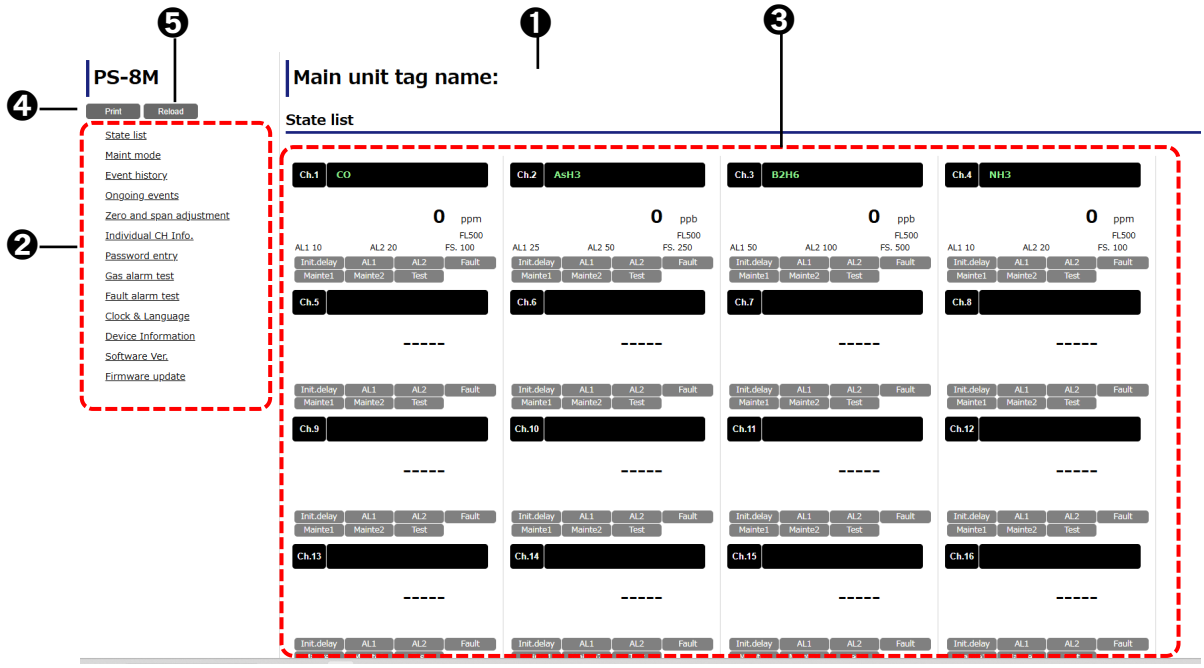
NOTICE

If communication cannot be established, check the followings:

- Ensure that the Ethernet of the PS-8 unit is set to "ON".
  ⇒ Check the Ethernet on/off status: Menu > "Device Information" > "Ethernet" (Refer to 10.11 "Device Information")
- Ensure that the Modbus mode of the PS-8 unit is set to "TCP/IP", not "RS485".
  ⇒ Check the Modbus mode: Menu > "Device Information" > "Modbus" (Refer to 10.11 "Device Information")
- Ensure that the wiring between the PS-8 unit and your PC is correct.
- Ensure that the settings (e.g., IP address, subnet mask) are correct.

11.2 Home Screen on Web Server

This product features menu items corresponding to the operations.
The Home screen displayed on the PC when the PC is connected to the PS-8 unit is depicted below.



No.	Item*	Description
❶	Main unit tag name	Displays the tag name of the main unit.
❷	(Menu)	Lists of menu items. Click on each menu item to display the relevant information.
❸	(Selected menu item)	Displays information relevant to the selected menu item.
❹	Print button	Prints out the currently displayed page.
❺	Reload button	Refreshes the page.

*All above items always appear on Web Server screen.

The list of menu items appears on the left. Click on the desired menu item to navigate to the relevant page.

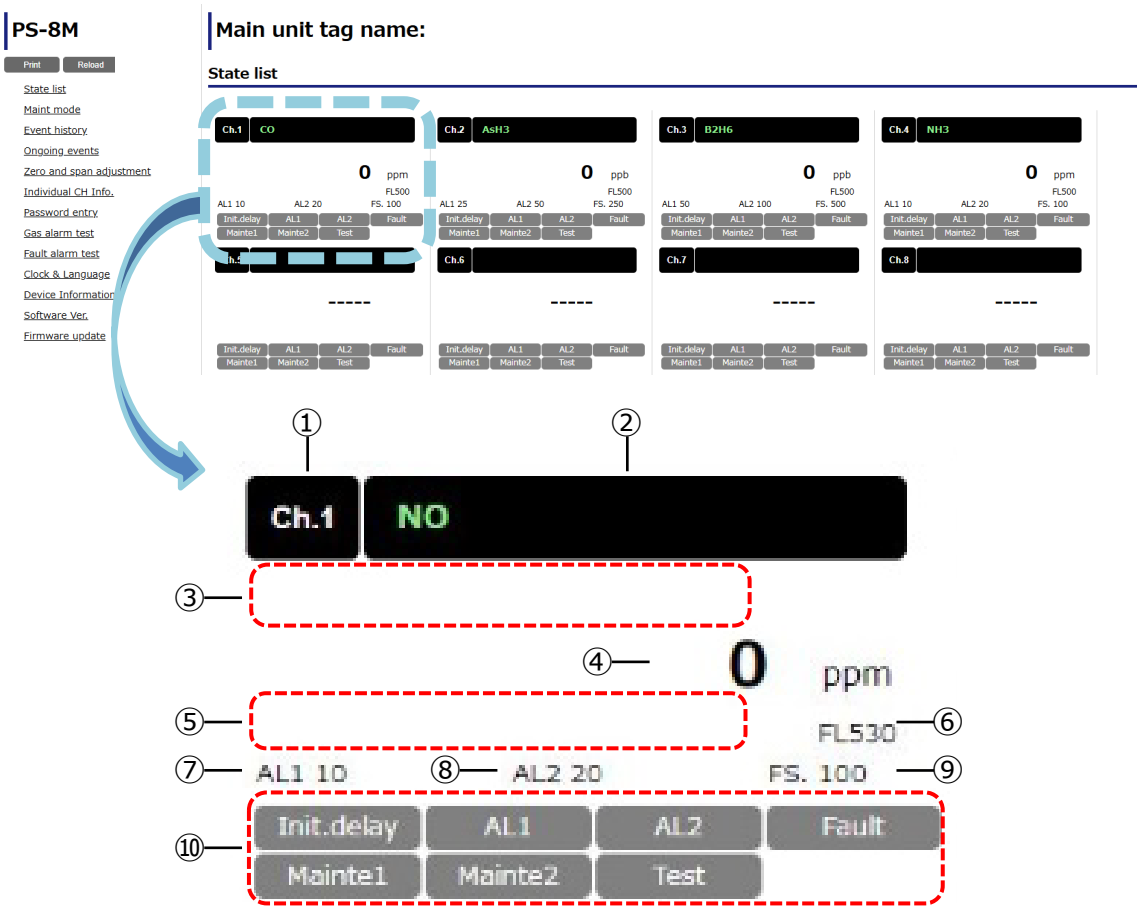
To change the settings from the Web Server, a password is required. Refer to 11.9 “Password Entry” for the password entry procedure.

CAUTION	
	The settings made on the unit are not automatically reflected on the web server screen. To check the latest status, click Reload button.

11.3 State List

This screen shows statuses per channel, such as gas concentration, alarm status and device mode. For invalid channels (i.e., a channel with no gas sensor installed), their gas concentrations will be replaced by "– – – – –".

Screen Description



No.	Item		Description
①	Ch.		Displays the sensor channel number.
②	Gas name		Displays the gas name.
③	Tag name		Displays the tag name.
④	Gas concentration		Displays the numeric measurement of gas concentration. The baseline value (e.g., 0 or 20.9 for oxygen) appears during maintenance mode 2.
⑤	Device fault or aging mode indicator		Indicates a device failure, device error, and/or aging mode.
⑥	FL value		Displays the current FL value. The flow rate is normal when the FL value is 500 ± 10%. However, the FL value is just an estimate, and no guarantee is provided.
⑦	AL1 value		Displays the 1st stage gas alarm set value.
⑧	AL2 value		Displays the 2nd stage gas alarm set value.
⑨	F.S. value		Displays the full scale value.
⑩	Device status icon	Init.delay	Highlighted in light blue during the warm-up cycle.
		AL1	Highlighted in yellow when a 1st stage gas alarm is activated.
		AL2	Highlighted in red when a 2nd stage gas alarm is activated.
		Fault	Highlighted in orange when a device failure or device error is detected.
		Mainte1	Highlighted in light blue when in maintenance mode 1.
		Mainte2	Highlighted in light blue when in maintenance mode 2.
		Test	Highlighted in light blue during gas or fault alarm test.

NOTE To refresh the screen, press the **Reload** button on the left of the screen.

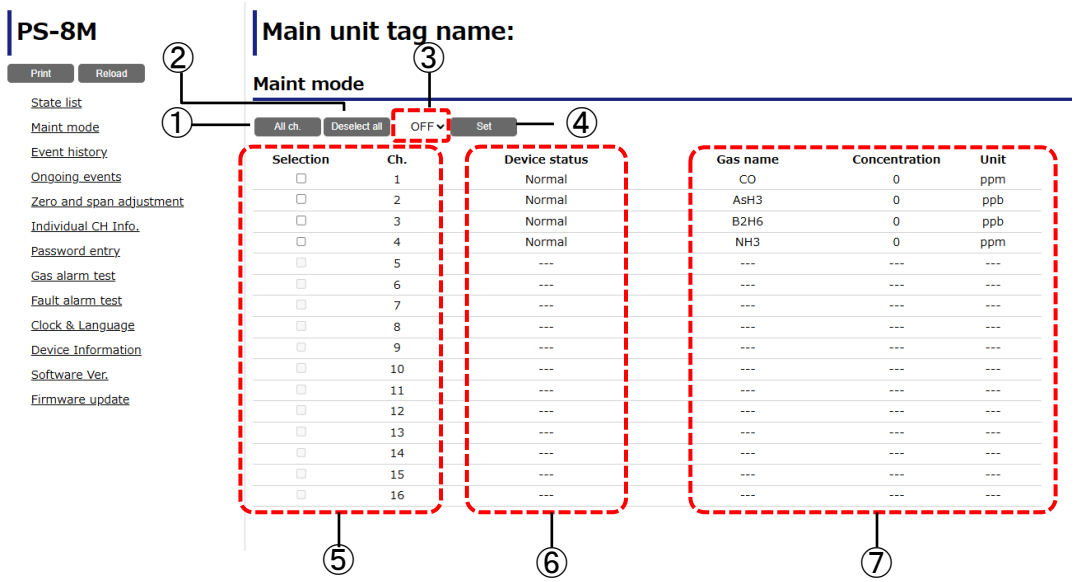
11.4 Maintenance Mode

Maintenance mode can be set from this menu.

⚠ CAUTION

- Before setting maintenance mode, refer to 10.2 “Maintenance Mode” for correct operation.
- To make settings, do not use the Web Server and the PS-8 main unit’s operation keys at the same time.

Screen Description



No.	Item		Description
①	All ch. button		Selects all valid channels at once.
②	Deselect all button		Deselects all valid channels at once.
③	Maintenance mode selection		Selects the mode from OFF, Maint.1 or Maint.2 in the pulldown menu.
④	Set button		Sets the selected channels to the mode selected in ③.
⑤	Channel selection		Check checkboxes to select channels.
⑥	Device status	Normal	Appears during normal operation.
		Warm-up	Highlighted in light blue during the warm-up cycle.
		Alarm1	Highlighted in yellow when a 1st stage gas alarm is activated.
		Alarm2	Highlighted in red when a 2nd stage gas alarm is activated.
		Fault	Highlighted in orange when a device failure is detected.
		Maint.1	Highlighted in light blue when in maintenance mode 1.
		Maint.2	Highlighted in light blue when in maintenance mode 2.
		Aging mode	Highlighted in light blue when in aging mode.
		Test	Highlighted in light blue during gas or fault alarm test (no actual gas or fault alarm is present)
⑦	Gas name/ Concentration/Unit		Displays the sensor information for each channel.

Setup Procedure

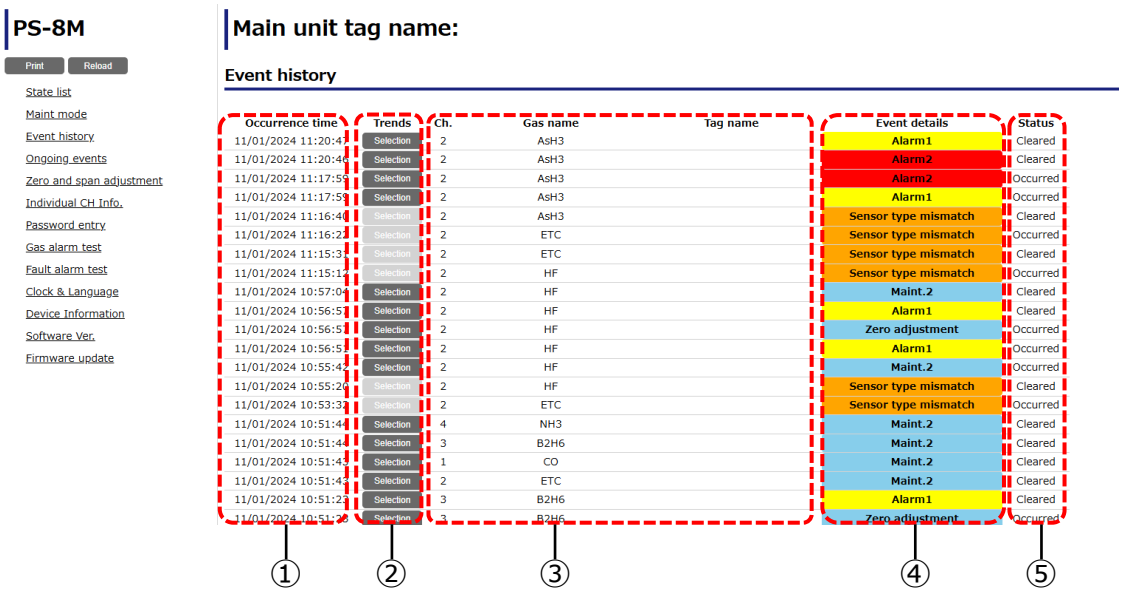
1. Select the channels you want to set to maintenance mode by checking their corresponding boxes.
   * Clicking **All ch**. selects all channels at once.
   * Clicking **Deselect all** deselects all channels at once.
2. Select the mode from **OFF**, **Maint.1** or **Maint.2** in the pulldown menu.
3. Click **Set**.
   A dialog box appears asking, “Do you want to run it?”
4. Click **Yes** in the dialog box.
   * Clicking **Yes** saves the settings. A “Good” popup window will appear if the settings have been set successfully.
   * Clicking **No** returns to the previous screen without saving the settings.
5. Click **OK** in the popup window to close the popup window.
   * The popup window will automatically close after three seconds even if **OK** is not clicked.

   If “Error (Writing to others)” appears:
   ⇒Solution: Setting change is being performed by the PS-8 unit. Check the PS-8 unit operation.

11.5 Event History

Past events (such as fault alarms, gas alarms, and maintenance modes) can be viewed from this menu.

Screen Description



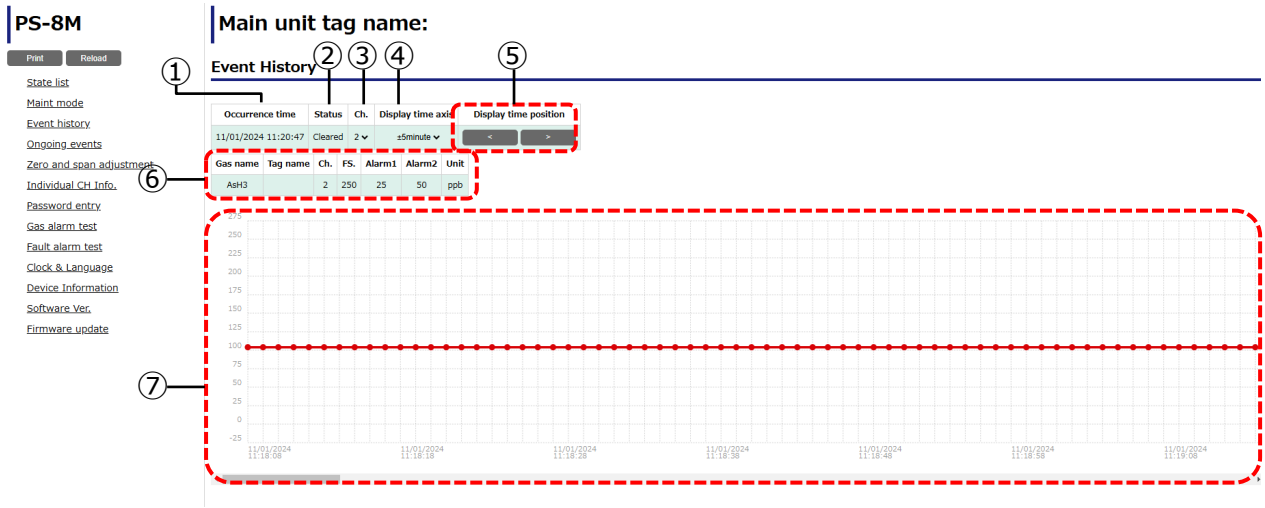
No.	Item		Description
①	Occurrence time		Displays the date and time when the event occurred or was cleared.
②	Selection button		Shows a trend graph of the event. Refer to the next page for details on the trend graph.
③	Ch./Gas name/Tag name		Displays the information on the sensor where the event occurred.
④	Event details	Alarm1	Highlighted in yellow when a 1st stage gas alarm is activated.
		Alarm2	Highlighted in red when a 2nd stage gas alarm is activated.
		Fault	Highlighted in orange when a device failure or device error is detected.
		Maint.1	Highlighted in light blue when in maintenance mode 1.
		Maint.2	Highlighted in light blue when in maintenance mode 2.
		Aging mode	Highlighted in light blue when in aging mode.
		Gas alarm test	Highlighted in light blue during gas alarm test.
		Fault alarm test	Highlighted in light blue during fault alarm test.
		Zero adjustment	Highlighted in light blue during zero adjustment.
		Span adjustment	Highlighted in light blue during span adjustment.
⑤	Status		Occurred: Start of the event Cleared: End of the event

NOTE

- A maximum of 50 events can be displayed in the event history. If the number of events exceeds 50, older events will be overwritten in chronological order.
- Fault event in the form of a trend graph is not available and not displayed.

Trend Graph Display

To view each event in the form of a trend graph, click on the corresponding **Selection** button on the event history screen.



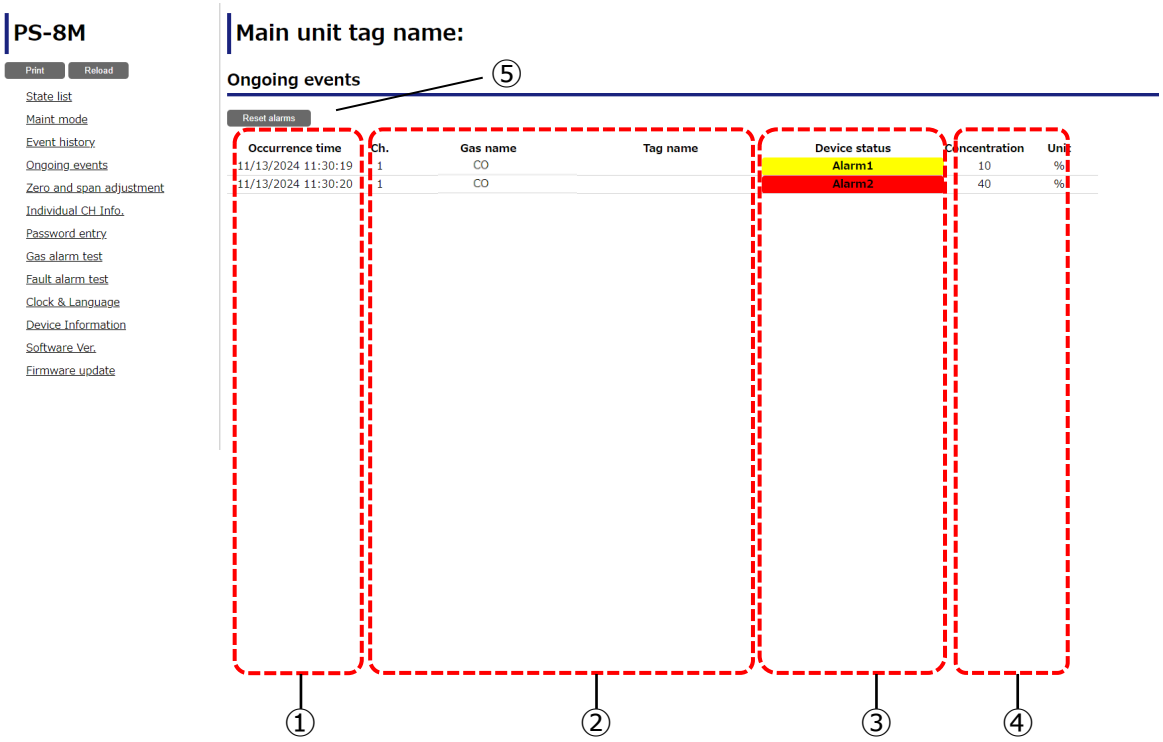
No.	Item	Description
①	Occurrence time	Displays the date and time when the event occurred.
②	Status	Occurred: Start of the event Cleared: End of the event
③	Ch.	Selects the channel to display its trend graph.
④	Display time axis	Selects the time shift unit (e.g., ±5 min, ±10 min).
⑤	Display time position < and > buttons	Time shift button. Click < or > to shift the graph backward or forward in time by the unit set in ④.
⑥	Gas name/Tag name/Ch./ FS/Alarm1/Alarm2/Unit	Displays the information on the sensor where the event occurred.
⑦	(Trend graph)	A vertical dotted line appears in the center of the graph.

NOTE A trend graph expands over a period of ±2.5 hours from the dotted center line (i.e., a total of up to 5 hours).

11.6 Ongoing Events

Ongoing events (such as fault alarms, gas alarms, and maintenance modes) can be viewed from this menu.

Screen Description



No.	Item		Description
①	Occurrence time		Displays the date and time when the event occurred.
②	Ch./Gas name/Tag name		Displays the information on the sensor where the event is ongoing.
③	Device status	Alarm1	Highlighted in yellow when a 1st stage gas alarm is activated.
		Alarm2	Highlighted in red when a 2nd stage gas alarm is activated.
		Fault	Highlighted in orange when a device failure is detected.
		Device error	Highlighted in light brown when a device error is detected.
		Maint.1(C)	Highlighted in light blue when in maintenance mode 1 that has been set via a communication channel such as Web Server, smartphone app, and Modbus.
		Maint.1(M)	Highlighted in light blue when in maintenance mode 1 that has been set by the PS-8 unit
		Maint.2(C)	Highlighted in light blue when in maintenance mode 2 that has been set via a communication channel such as Web Server, smartphone app, and Modbus.
		Maint.2(M)	Highlighted in light blue when in maintenance mode 2
		Aging mode	Highlighted in light blue when in aging mode.
		Test	Highlighted in light blue during gas or fault alarm test.
④	Concentration/Unit		Displays the gas concentration value/unit.
⑤	Reset alarms button		Appears when the alarm clearance method is set to “Manual-resetting”. Pressing this button clears an ongoing gas alarm only when the gas concentration is below the gas alarm hysteresis (or above the gas alarm hysteresis when the alarm mode is Low), or when a fault alarm activates and replaces the gas alarm.
NOTE	A maximum of 100 events can be displayed in the event history. If the number of events exceeds 100, older events will be overwritten in chronological order.		

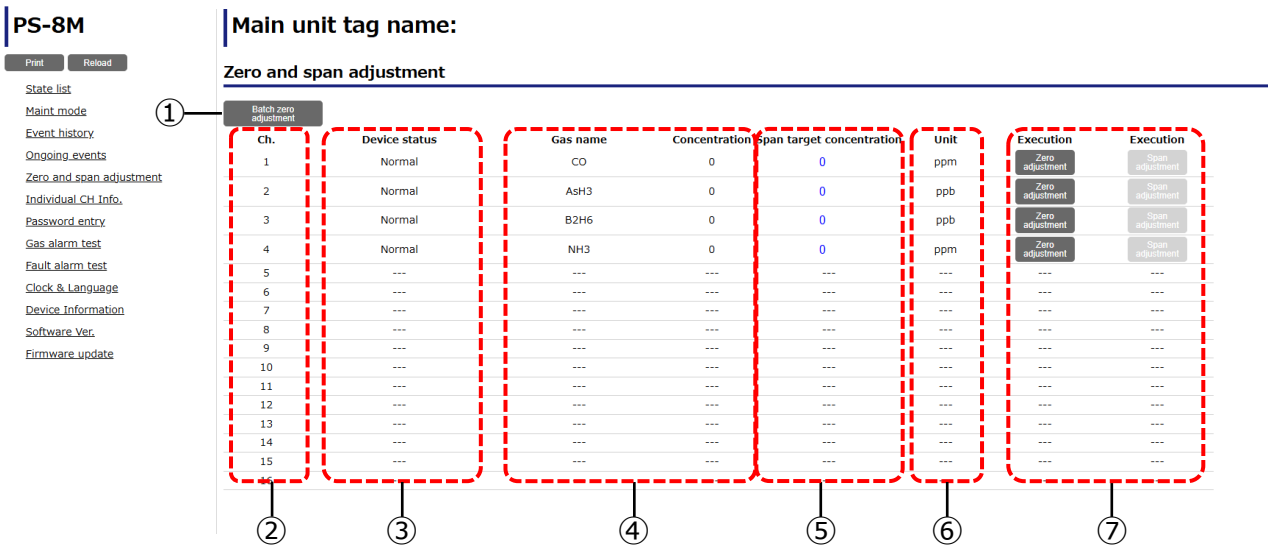
11.7 Zero and Span Adjustments

This menu is used to adjust the sensor reading to zero (or 20.9% for oxygen). Only service personnel are allowed to perform span adjustment. No on-site span adjustment is required at sensor unit replacement because each sensor unit has been span-adjusted when shipped.

CAUTION

Before performing zero or span adjustment, refer to 10.5 “Zero and Span Adjustments”.

Screen Description



No.	Item		Description
①	Batch zero adjustment button		Performs zero adjustment on all valid channels at once.
②	Ch.		Displays the sensor channel number.
③	Device status	Normal	Appears during normal operation.
		Warm-up	Highlighted in light blue during the warm-up cycle.
		Alarm1	Highlighted in yellow when a 1st stage gas alarm is activated.
		Alarm2	Highlighted in red when a 2nd stage gas alarm is activated.
		Fault	Highlighted in orange when a device failure is detected
		Maint.1	Highlighted in light blue when in maintenance mode 1.
		Maint.2	Highlighted in light blue when in maintenance mode 2.
		Aging mode	Highlighted in light blue when in aging mode.
		Test	Highlighted in light blue during gas or fault alarm test (no actual gas or fault alarm is present).
④	Gas name/Concentration		Displays the sensor information for each channel. Displays the gas concentration, which will not be fixed at the baseline value even in maintenance mode 2
⑤	Span target concentration		Displays the target span value for each channel.
⑥	Unit		Displays the unit of gas concentration value for each channel.
⑦	Execution	Zero adjustment button	Performs zero adjustment on each channel.
		Span adjustment button	Performs span adjustment on each channel.

Zero Adjustment Procedure

1. Set the target channel to maintenance mode (11.4 “Maintenance Mode”).
2. Click **Zero adjustment** button for the target channel.
   *Clicking **Batch zero adjustment** button selects all valid channels at once.
   A dialog box appears asking, “Do you want to run it?”
3. Click **Yes** in the dialog box.
   * Clicking **Yes** performs zero adjustment. A “Good” popup window will appear if the zero adjustment has been successfully completed.
   * Clicking **No** returns to the previous screen without performing zero adjustment.
4. Click **OK** in the popup window to close the popup window.
   * The popup window will automatically close after three seconds even if **OK** is not clicked.
   * If “Error (Warm-up time)” appears:
   ⇒Solution: Wait until the warm-up cycle is completed, then perform zero adjustment again.
   * If “Error (Out of adjustable range)” appears:
   ⇒Solution: Ensure that no gas is present around the gas sampling inlet, then perform zero adjustment again.
   * If “Error (During mode shift lock)” appears:
   ⇒Solution: Set the target channel to maintenance mode, then perform zero adjustment again.
   * If “Error (During a fault)” appears:
   ⇒Solution: Zero adjustment is not possible when a fault alarm is activated. Refer to 13 “Troubleshooting” for the solution.
   * If “Error (Unit-to-unit comm.)” appears:
   ⇒Solution: Ensure that the connections between the units as well as between the front and rear cases are firm and secure. Refer to 13 “Troubleshooting”.
5. Check that the reading is zero (or 20.9vol% for oxygen).

NOTE

- Zero and span adjustments are not possible during the warm-up cycle or when a gas or fault alarm is activated.
- If the entered span value exceeds the adjustable range, it will lead to an error message “Error (Out of adjustable range)”.

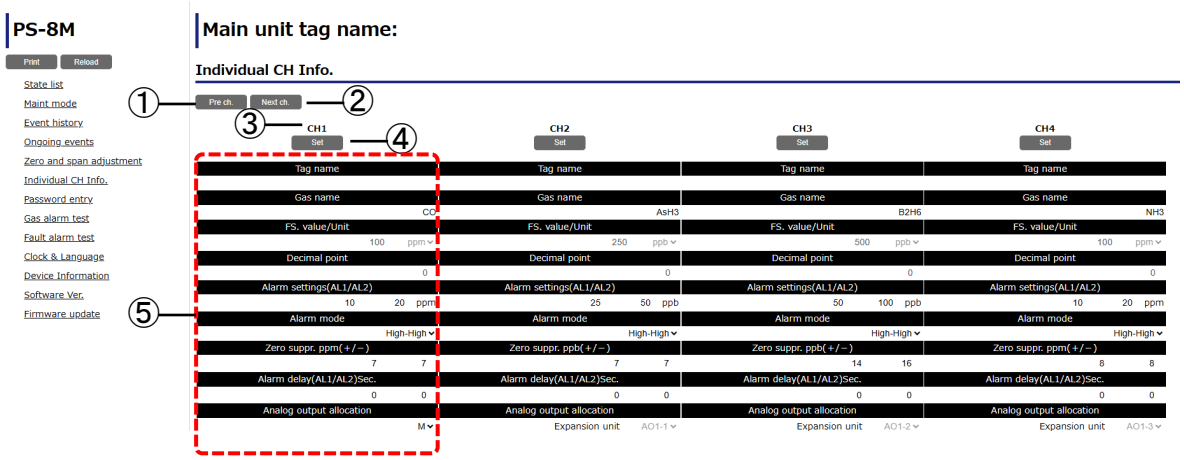
Ref.

If an error message appears on the screen, refer to 13 “Troubleshooting” for information on the necessary action to be taken.

11.8 Individual CH Information

Setup details for each channel can be viewed and changed from this menu. Four channels are simultaneously displayed on the screen. Refer to 10.6 “Individual CH Information” for further details.

Screen Description



No.	Item	Description
①	Pre ch. button	Displays the previous four channels.
②	Next ch. button	Displays the next four channels.
③	Channel number	Displays the channel number.
④	Set button	Saves the displayed settings.
⑤	Setup details	Displays the settings for each channel.

Setup Procedure

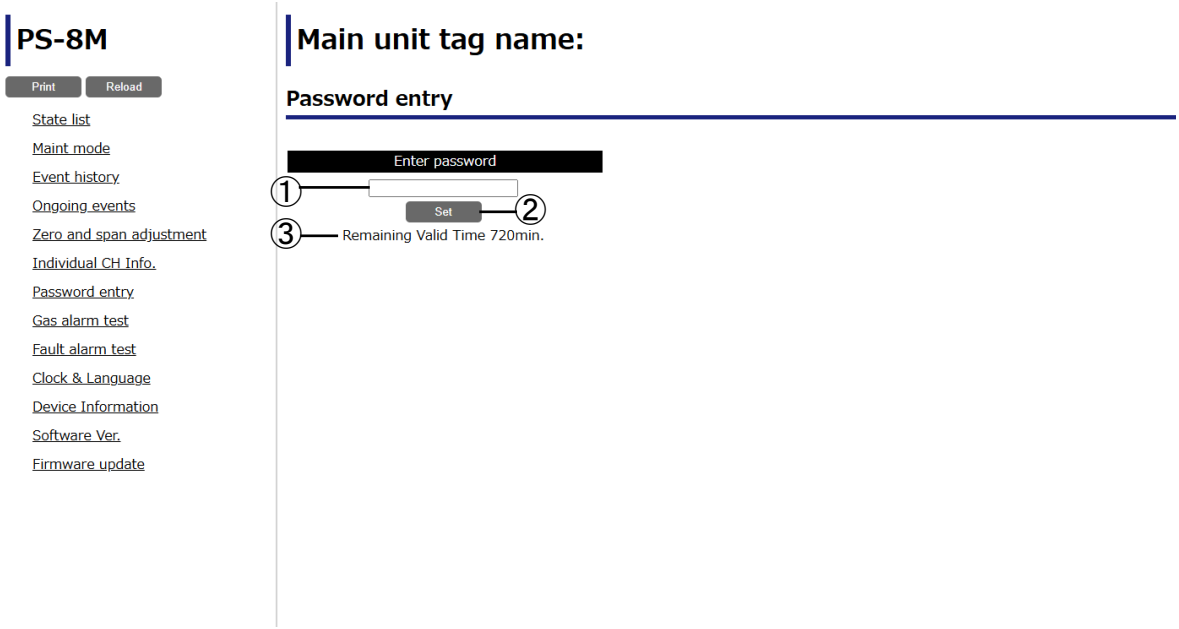
1. Click on the item you want to modify and change its parameters/settings.
2. Click **Set**.
   A dialog box appears asking, “Do you want to run it?”
3. Click **Yes** in the dialog box.
   * Clicking **Yes** saves the settings. A “Good” popup window will appear if the settings have been saved successfully.
   * Clicking **No** returns to the previous screen without saving the settings.
4. Click **OK** in the popup window to close the popup window.
   * The popup window will automatically close after three seconds even if **OK** is not clicked.
   If “Error (Writing to others)” appears:
   ⇒Solution: Setting change is being performed by the PS-8 unit. Check the PS-8 unit operation.

NOTE To refresh the screen, press the **Reload** button on the left of the screen.

11.9 Password Entry

A password must be entered to access supervisor mode.

Screen Description



No.	Item	Description
①	Password entry box	For entering the 4-digit password.
②	Set button	Saves the password entered in ①.
③	Remaining Valid Time – min.	Displays the remaining time until the password expires.

Password Entry Procedure

1. Click on the password entry box and enter the password.
2. Click **Set**.
   A dialog box appears asking, “Do you want to run it?”
3. Click **Yes** in the dialog box.
   * Clicking **Yes** confirms the password. A “Good” popup window will appear if the password is correct.
   * Clicking **No** returns to the previous screen.
4. Click **OK** in the popup window to close the popup window.
   * The popup window will automatically close after three seconds even if **OK** is not clicked.
   * If “Error (Password mismatch)” appears:
   ⇒ Solution: The password entered is invalid. Enter a valid password.

NOTE

- The default password for supervisor mode is “0 0 0 0”.
- The password will expire after 720 minutes.
- Passwords differ between the Web Server and the PS-8 unit. Even if you have already entered supervisor mode from the Web Server, you need to enter a different password on the PS-8 unit to access supervisor mode from the PS-8 unit. Refer to “10.7 Password Entry” for password entry procedure.

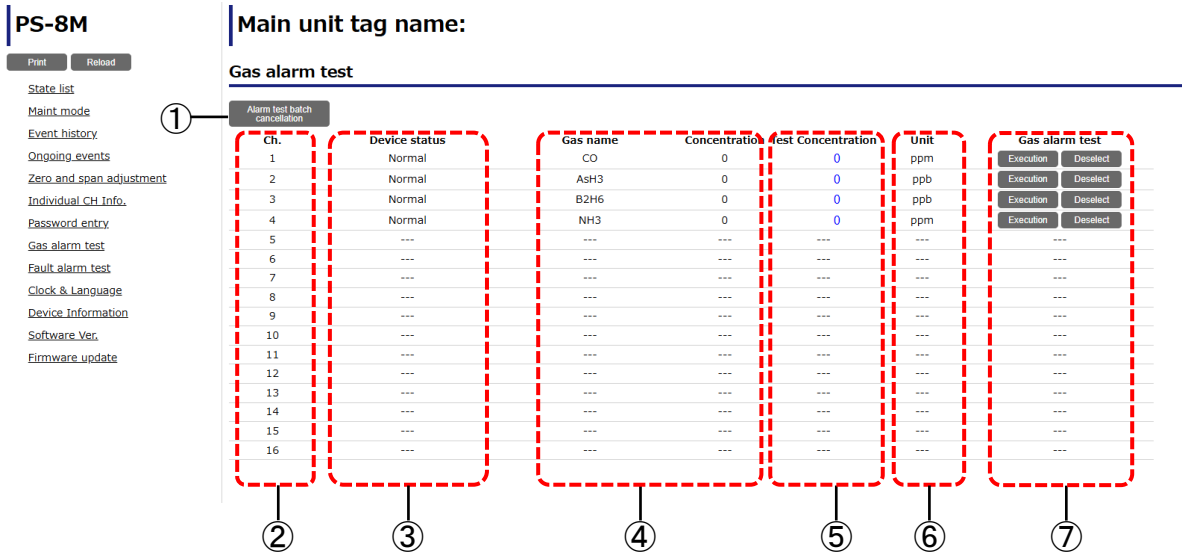
11.10 Gas Alarm Test

This test mode is used to increase or decrease a simulated gas concentration value to activate a gas alarm for maintenance or testing purposes per channel.

⚠ CAUTION

- Before performing a gas alarm test, refer to 10.8 “Gas Alarm Test” for correct operation.
- Gas alarm test cannot be performed on the channel which is in the warm-up cycle.
- During a gas alarm test, the external relay contacts will get activated. Before performing a gas alarm test, set the unit to maintenance mode or release the interlocks of external devices as needed to prevent their possible activation.
- The unit will automatically exit gas alarm test mode and return to gas-monitoring mode (gas concentration screen) after 10 minutes if left idle.
- Gas alarm test is not possible when a gas or fault alarm is activated in any of the channels.
- Gas alarm test will be automatically canceled if a fault alarm occurs in the channel under the test.
- Gas alarm test will not be automatically canceled, even If a gas alarm occurs during the test.
- Gas alarm test mode will not be retained after the unit is turned off and then on.
- When a gas alarm test is started using the Web Server, the main unit’s gas concentration screen will switch to the one showing Channel 1 status.
- It is possible to cancel an ongoing gas alarm test using the main unit’s operation keys, even if the test was initiated by the Web Server. Do not use the Web Server and the main unit’s operation keys simultaneously to change settings.

Screen Description



No.	Item		Description
①	Alarm test batch cancellation button		Cancels the gas alarm test on all valid channels at once.
②	Ch.		Displays the sensor channel number.
③	Device status	Normal	Appears during normal operation.
		Warm-up	Highlighted in light blue during the warm-up cycle.
		Alarm1	Highlighted in yellow when a 1st stage gas alarm is activated.
		Alarm2	Highlighted in red when a 2nd stage gas alarm is activated.
		Fault	Highlighted in orange when a device failure is detected.
		Maint.1	Highlighted in light blue when in maintenance mode 1.
		Maint.2	Highlighted in light blue when in maintenance mode 2.
		Aging mode	Highlighted in light blue when in aging mode.
		Test	Highlighted in light blue during gas or fault alarm test (no actual gas or fault alarm is present).
④	Gas name/Concentration		Displays the sensor information for each channel.
⑤	Test concentration		Sets the test value for each channel. The value can be set when displayed in blue.
⑥	Unit		Displays the unit of gas concentration for each channel.
⑦	Gas alarm test	Execution button	Performs a gas alarm test on each channel.
		Deselect button	Clears a gas alarm test on each channel.

Test Procedure

1. Click on the test concentration for the target channel and enter the test value.
2. Click the **Execution** button for the target channel.
   A dialog box appears asking, “Do you want to run it?”
3. Click **Yes** in the dialog box.
   * Clicking **Yes** starts the test. A “Good” popup window will appear if the test has been started successfully.
   * Clicking **No** returns to the previous screen without starting the test.
4. Click **OK** in the popup window to close the popup window.
   * The popup window will automatically close after three seconds even if **OK** is not clicked.
   If “Error (Writing to others)” appears:
   ⇒Solution: Setting change is being performed by the PS-8 unit. Check the PS-8 unit operation.
5. Check that the relevant AL1/AL2 LEDs are blinking and the relevant alarm operations (alarm contacts, analog output, etc.) are activated according to the test value.

How to End the Test

1. Click the **Deselect** button for the channel you want to end the test.
   * Clicking **Alarm test batch cancellation** button will deselect all channels at once.
   A dialog box appears asking, “Do you want to run it?”
2. Click **Yes** in the dialog box.
   * Clicking **Yes** ends the test. A “Good” popup window will appear if the test has been ended successfully.
   * Clicking **No** returns to the previous screen and the test will continue.
3. Click **OK** in the popup window to close the popup window.
   * The popup window will automatically close after three seconds even if **OK** is not clicked.

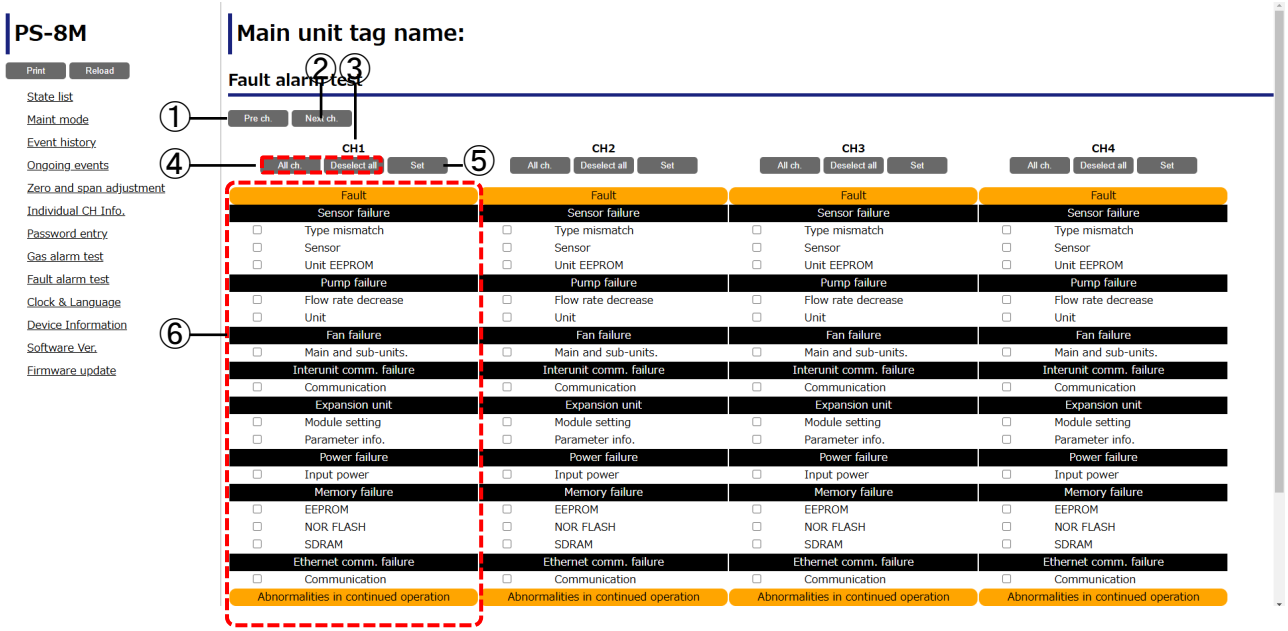
11.11 Fault Alarm Test

This test mode is used to simulate a device fault (e.g., sensor failure, low flow rate, and communication error) to activate a fault alarm for maintenance or testing purposes per channel. Four channels are simultaneously displayed on the screen.

⚠ CAUTION

- Before performing a fault alarm test, refer to 10.9 “Fault Alarm Test” for correct operation.
- Fault alarm test cannot be performed on the channel which is in the warm-up cycle.
- Fault alarm test is not possible when aging mode is activated in any of the channels.
- During a fault alarm test, the external relay contacts will get activated. Before performing a fault alarm test, set the unit to maintenance mode or release the interlocks of external devices as needed to prevent their possible activation.
- The unit will automatically exit fault alarm test mode and return to gas-monitoring mode (gas concentration screen) after 10 minutes if left idle.
- Fault alarm test is not possible when a gas or fault alarm is activated in any of the channels.
- Fault alarm test will not be automatically canceled if a fault alarm of the same kind occurs in the channel under the test.
- Fault alarm test will not be automatically canceled, even If a gas alarm occurs during the test.
- Fault alarm test mode will not be retained after the unit is turned off and then on.
- When a fault alarm test is started using the Web Server, the main unit’s gas concentration screen will switch to the one showing Channel 1 status.
- It is possible to cancel an ongoing fault alarm test using the main unit’s operation keys, even if the test was initiated by the Web Server. Do not use the Web Server and the main unit’s operation keys simultaneously to change settings.
- Zero and span adjustments are not possible while performing a fault alarm test from the Web Server.

Screen Description



No.	Item	Description
①	Pre ch. button	Displays the previous four channels.
②	Next ch. button	Displays the next four channels.
③	Channel number	Displays the sensor channel number.
④	All ch. button	Selects all test items at once for each channel.
	Deselect all button	Deselects all test items at once for each channel.
⑤	Set button	Executes the selected test items for each channel.
⑥	Test items	Selects/deselects test items by checking/unchecking their corresponding boxes.

Test Procedure

1. Select the test items for the target channel by checking their corresponding boxes.
   * Clicking **All ch.** selects all the test items at once for each channel.
2. Click **Set**.
   A dialog box appears asking, “Do you want to run it?”
3. Click **Yes** in the dialog box.
   * Clicking **Yes** starts the test. A “Good” popup window will appear if the test has been started successfully.
   * Clicking **No** returns to the previous screen without starting the test.
4. Click **OK** in the popup window to close the popup window.
   * The popup window will automatically close after three seconds even if **OK** is not clicked.

   If “Error (Writing to others)” appears:
   ⇒Solution: Setting change is being performed by the PS-8 unit. Check the PS-8 unit operation.
5. Check that the relevant fault LEDs are blinking and the relevant alarm operations (alarm contacts, analog output, etc.) are activated.

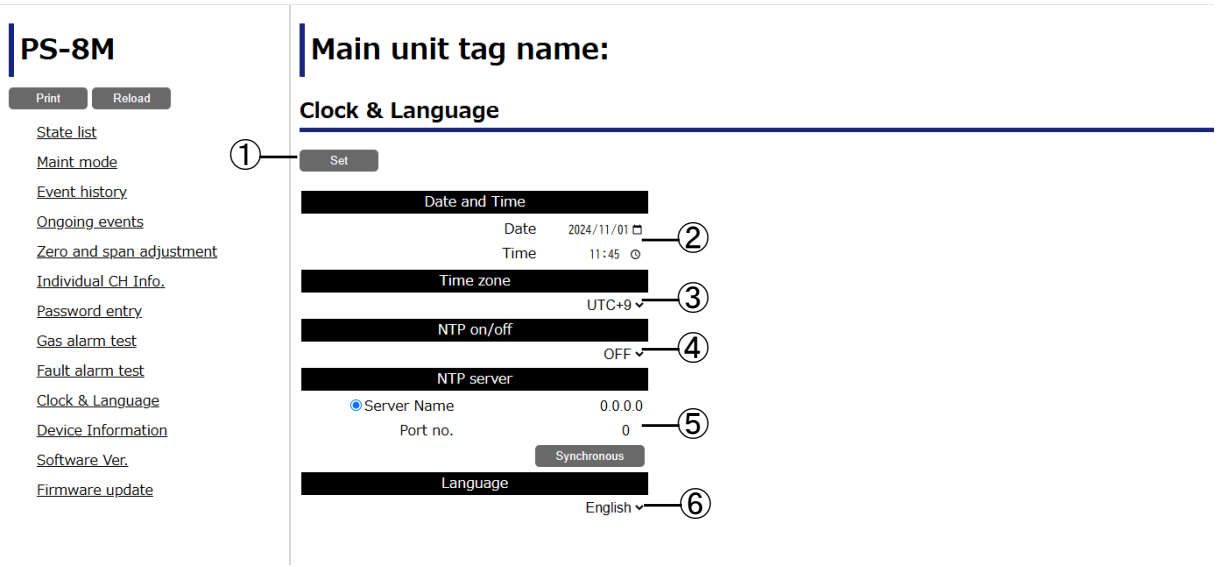
How to Clear the Test Items

1. Deselect the test items you want to clear by unchecking their corresponding boxes.
   * Clicking **Deselect all** deselects all test items at once for each channel.
2. Click **Set**.
   A dialog box appears asking, “Do you want to run it?”
3. Click **Yes** in the dialog box.
   * Clicking **Yes** clears the unchecked test items. A “Good” popup window will appear if the test items have been cleared successfully.
   * Clicking **No** returns to the previous screen without clearing the selected test items.
4. Click **OK** in the popup window to close the popup window.
   * The popup window will automatically close after three seconds even if **OK** is not clicked.

11.12 Clock and Language

The clock and display language can be set from this menu.

Screen Description



No.	Item			Description
①	Set button			Saves the displayed settings.
②	Date and Time			Sets the date and time.
③	Time zone			Sets the time zone.
④	NTP on/off			Turns the time synchronization function on/off.
⑤	NTP server	Server	Name	Sets the NTP server name.
			Port No.	Sets the NTP server port number.
		Synchronous button		Starts synchronization under the conditions set above.
⑥	Language			Selects the display language.

Setup Procedure

1. Click on the item you want to modify and change its parameters/settings.
2. Click **Set**.
   A dialog box appears asking, “Do you want to run it?”
3. Click **Yes** in the dialog box.
   * Clicking **Yes** saves the settings. A “Good” popup window will appear if the settings have been saved successfully.
   * Clicking **No** returns to the previous screen without saving the settings.
4. Click **OK** in the popup window to close the popup window.
   * The popup window will automatically close after three seconds even if **OK** is not clicked.
   If “Error (Writing to others)” appears:
   ⇒Solution: Setting change is being performed by the PS-8 unit. Check the PS-8 unit operation.

NOTE

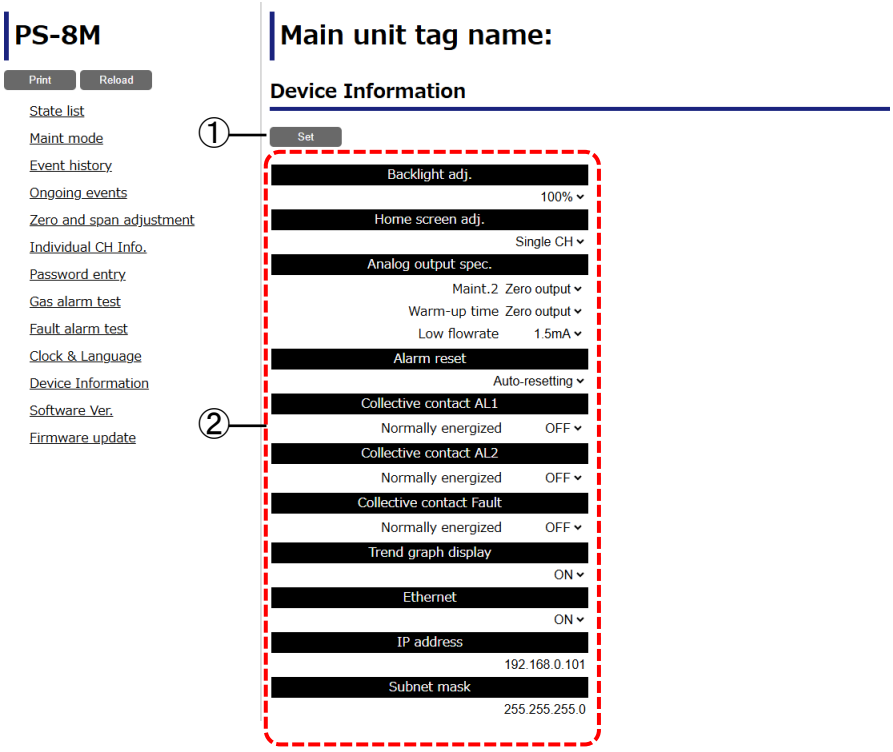
- The date and time are for the event history purposes only, and their accuracy is not guaranteed.
- The product is set as per Japan time by default. Hence, you may adjust the date and time as per your local time.
- You can select the display language from: Japanese, English, Chinese (simplified), Chinese (traditional), and Korean.

11.13 Device Information

Set details of the product can be viewed and changed from this menu.

CAUTION
Before setting the device information, refer to 10.11 “Device Information” for correct operation.

Screen Description



No.	Item	Description
①	Set button	Saves the displayed settings.
②	Setup details	Lists items to be set for the product.

Setup Procedure

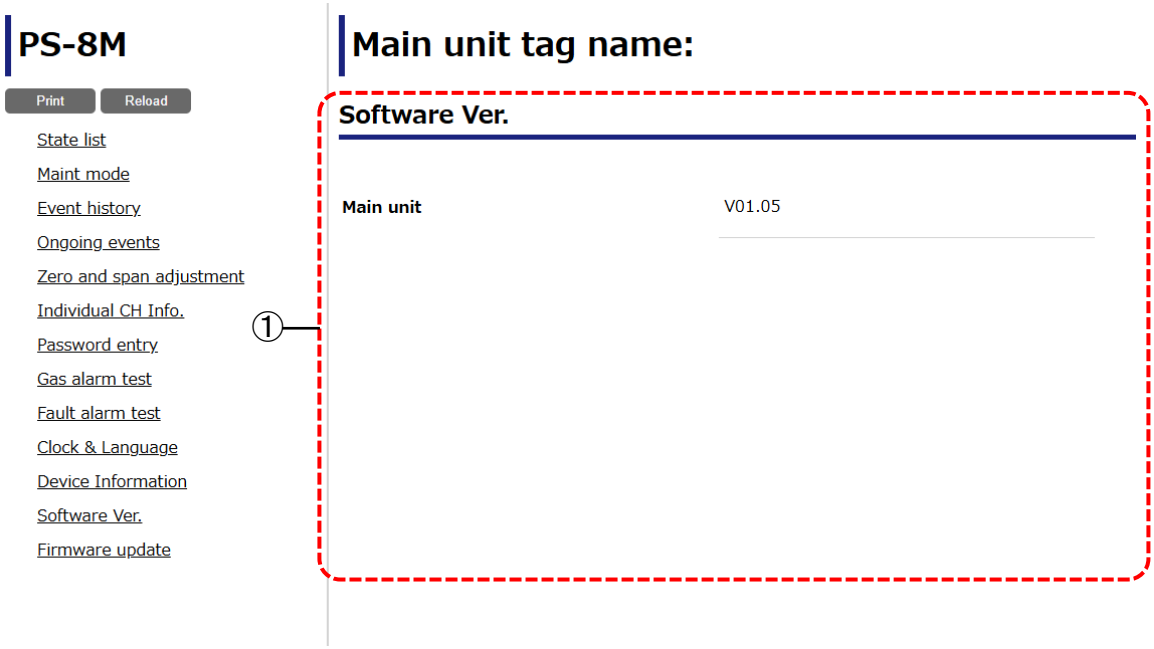
1. Click on the item you want to modify and change its parameters/settings.
2. Click **Set**.
   A dialog box appears asking, “Do you want to run it?”
3. Click **Yes** in the dialog box.
   * Clicking **Yes** saves the settings. A “Good” popup window will appear if the settings have been saved successfully.
   * Clicking **No** returns to the previous screen without saving the settings.
4. Click **OK** in the popup window to close the popup window.
   * The popup window will automatically close after three seconds even if **OK** is not clicked.

   If “Error (Writing to others)” appears:
   ⇒Solution: Setting change is being performed by the PS-8 unit. Check the PS-8 unit operation.

11.14 Software Version

The software version can be viewed from this menu.

Screen Description



No.	Item	Description
①	Software Ver.	Displays the software version of the main unit.

11.15 Firmware Update

The firmware can be updated from this menu.

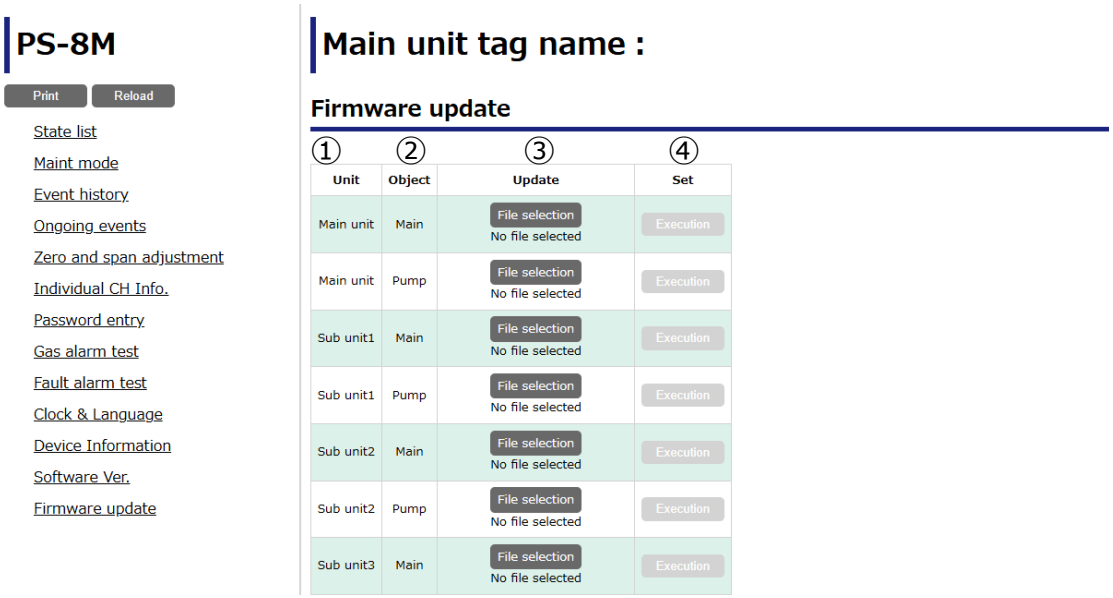
⚠ WARNING

- Do not turn off the product while a firmware update is in progress. Doing so may result in a device failure.
- Do not select an update file that is not intended for the target unit. Doing so may cause the product not to start up normally.

⚠ CAUTION

- Gas detection is not possible during firmware update.
- Analog outputs and external relay contact outputs may change when a firmware update is in progress. When performing a firmware update while connected to a host monitoring system, take action to prevent any unintended operation triggered by a gas or fault alarm. Before starting a firmware update, release the interlocks of external devices as needed to prevent their possible activation.

Screen Description



No.	Item		Description
①	Unit		Displays the name of the unit to be updated.
②	Object		Displays the name of the module to be updated.
③	Update	File selection button	Selects the update file.
④	Set	Execution button	Updates the file.

Setup Procedure

1. Click on **File selection** to open the file folder.
2. Select the update file from it.
3. Click **Execution**.
   A dialog box appears asking, “Do you want to run it?”
4. Click **Yes** in the dialog box.
   * Clicking **Yes** executes the firmware update. A “Good” popup window will appear if the firmware has been updated successfully.
   * Clicking **No** returns to the previous screen without firmware update.
5. Click **OK** in the popup window to close the popup window.
   * The popup window will automatically close after three seconds even if **OK** is not clicked.
6. Check that the firmware version has been updated by checking the software version (refer to 11.14 “Software Version”).

12 Maintenance

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

12.1 Routine Check, Periodical Inspection and Replacement Parts

Routine checks are carried out by the user(Supervisor or Operator), while periodical inspections and part replacements are performed by New Cosmos or its authorized representative. Please refer to 12.2 for check/inspection procedures, and 12.3 for part replacement procedures.

Check Items

Check Item	Routine Check		Periodical Inspection
	Daily	Monthly	Every 6 months
1. Power LED	✔	✔	✔
2. LCD Indication	✔	✔	✔
3. Exterior Appearance	✔	✔	✔
4. Filter Element	✔	✔	✔
5. Alarm Test Operation		✔	✔
6. Pump Flow Rate and Airtightness			✔
7. Tubing			✔

Replacement Parts

Part Type	Part Name	Check Frequency	Replacement Cycle*1	
		Every 6 months	Every 6 months	Every 3 years
Consumable	Filter Element	✔	✔	
	Activated Carbon Filter	✔	✔	
	Sensor Unit	✔	✔	
Periodical Replacement	Sampling Module	✔		✔
	Fan*2	✔		✔

*1: The replacement cycle is only an estimate and not guaranteed. The replacement cycle varies depending on environmental and usage conditions. Please perform part replacement accordingly.
*2: Replace the fan with a new one when it fails. The fan itself generally does not require replacement because it is included in the sampling module, which is periodically replaced.

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 (flammable 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

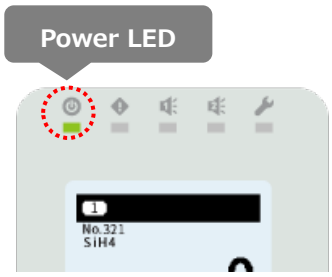
- When in the gas alarm test mode, the external relay contact outputs will be activated. (The external relay contacts are disabled when in maintenance mode.) If the external relay contact outputs are used to interlock external devices, release the interlocks as needed, before checking the alarm operation using the test mode.
- Notify those concerned before starting the gas alarm inspection.

12.2 Check/Inspection Procedure

This section explains how to perform a routine check or periodical inspection.

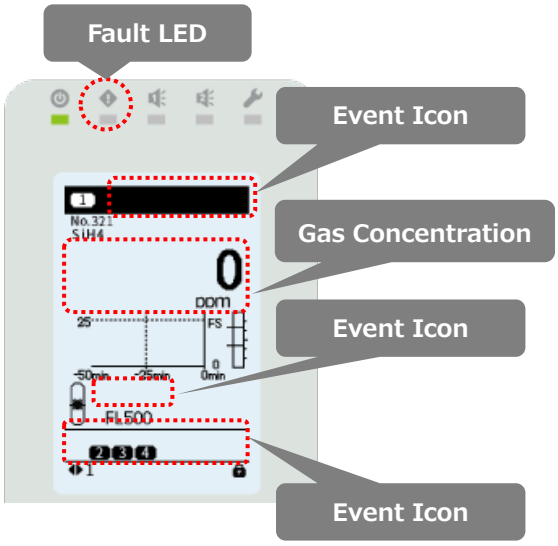
1. Power LED Check

Check that the power LED is lit.

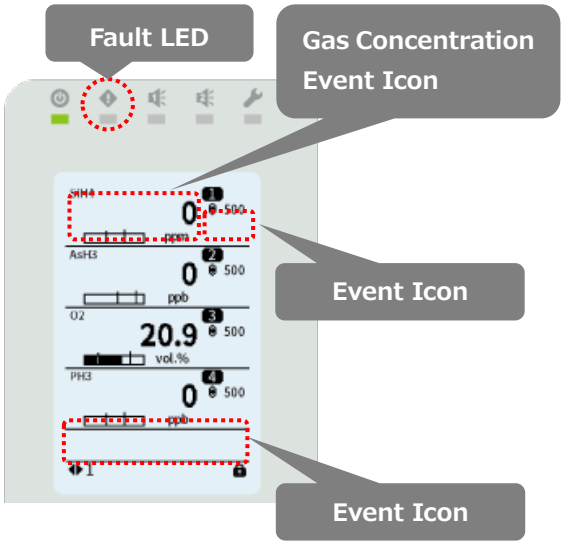


2. LCD Indication Check

Check that the gas concentrations are displayed on the LCD and that the product is in operation.
In case of a zero drift, perform zero adjustment. Refer to 10.5 “Zero and Span Adjustments” for how to perform zero adjustment.
Additionally, check for any unusual event icons or indications.
If an error message appears on the screen or the fault LED is blinking, refer to 13 “Troubleshooting” for the solution.



Single Channel Display



Multiple Channel Display

3. Exterior Appearance Check

Visually check the unit for cracks, damage, and screw corrosion.

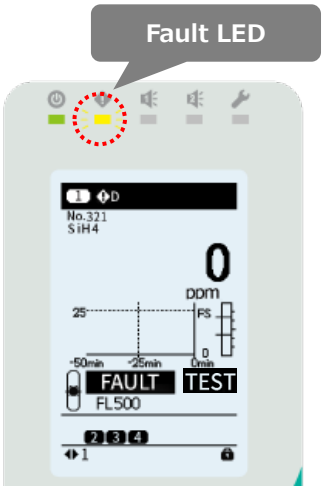
4. Filter Element Check

Check the filter element for dirt and clogging.
Depending on the environment conditions, the filter element may be easily contaminated. Replace the filter element if it is dirty or clogged. Refer to 12.3.1 “Filter Element Replacement” for how to replace the filter element.

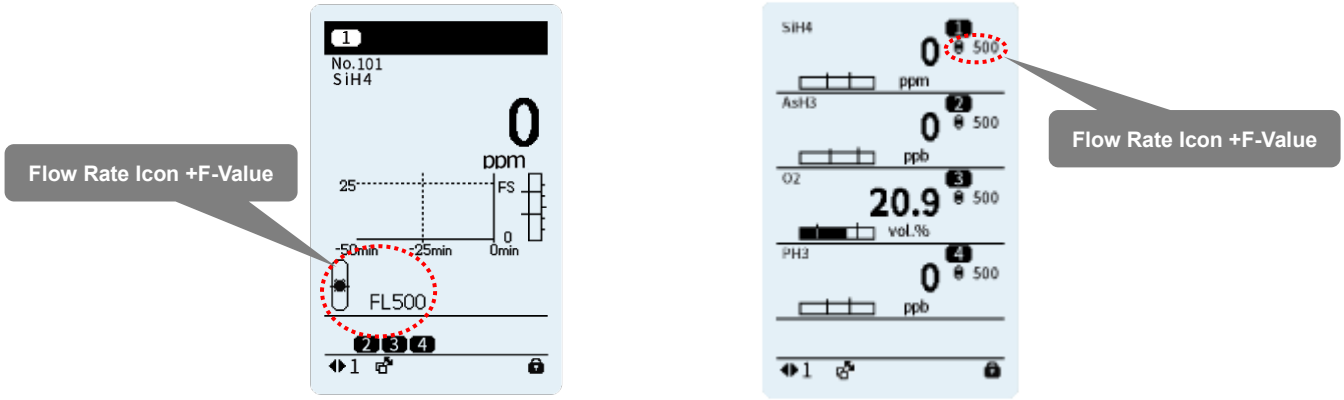
5. Alarm Test Operation Check

(1) Use gas alarm test mode to check the gas alarm operation.
Check that the AL1 LED and AL2 LED are blinking when in gas alarm test mode. Refer to 10.8 “Gas Alarm Test” for the gas alarm test procedure.

(2) Use fault alarm test mode to check the fault alarm operation.
Check that the fault LED is blinking when in fault alarm test mode. Refer to 10.9 “Fault Alarm Test” for the fault alarm test procedure.



6. Pump Flow Rate and Airtightness Check



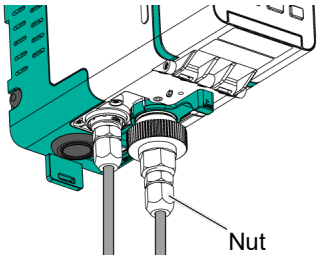
Single Channel Display **Multiple Channel Display**

Flow Rate Icon		Event Icon	Flow Rate	Function and Possible Cause
Single Channel Display	Multiple Channel Display			
Lit	Lit	–	Normal	Pump's flow rate is normal.
Blinking	Blinking	–	High	Pump's flow rate is too high. Gas detection is possible. Find the cause and take action accordingly. Possible cause: Excessive pressure, etc.
Blinking		–	Insufficient	Pump's flow rate is insufficient. Gas detection is possible. Find the cause and take action accordingly. Possible cause: Clogged filter element, clogged tubing, excessive negative pressure, etc.
Slowly blinking		FLOW FLOW	Low	Pump's flow rate is too low. The fault LED is also blinking. Gas detection is not possible. Find the cause and take action accordingly. Possible cause: Clogged filter element, clogged tubing, excessive negative pressure, excessive backpressure, sampling module failure, loosely installed sensor unit, etc.

Ensure that the flow rate and airtightness are checked after sensor or pump replacement.

(1) Flow Rate Check
Check that the normal flow rate icon appears on the screen.

(2) Airtightness Check
Rotate and loosen the nut. Disconnect the tube from the gas inlet, and completely block the inlet with a finger. The normal flow rate icon will change to the insufficient flow rate icon.



Keep blocking it until the insufficient flow rate icon changes to the low flow rate icon and check that the fault LED will start blinking and the FL value will become “0”. (The delay time for the low flow rate alarm is set to 10 seconds). The low flow rate event icon will also appear.

Connect the tube back to the gas inlet and tighten the nut, then check that the flow rate icon will return to the normal flow rate icon.

7. Tubing Check

Check that the tubing is correct. If it is not, proper pump flow rate cannot be maintained, and gas cannot be sampled from the intended detection point.

12.3 Part Replacement

This product has been designed such that its consumable and replacement parts can be easily accessed by the user. To order parts, please contact New Cosmos or its authorized representative.

12.3.1 Filter Element Replacement

If the filter element is dirty, replace it with a new one by using the following steps.

⚠ WARNING
A low flow rate alarm may be activated when replacing the filter element. Before filter element replacement, set the unit to maintenance mode or release the interlocks of external devices as needed to prevent their possible activation.

Replacement Procedure

1. Set the power switch to the off position to turn off the product.
   Note: Regardless of being in maintenance mode 2, the analog output will become 0 mA if the product is turned off.

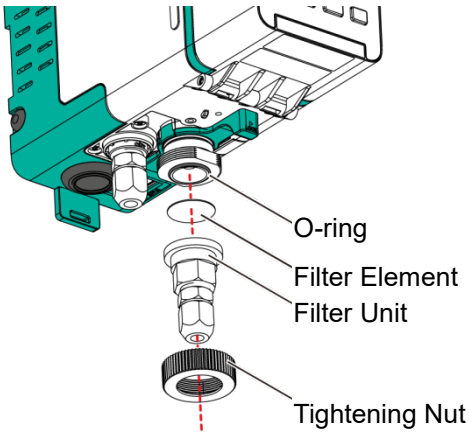
2. Check that the power LED is off.

3. Loosen the tightening nut of the filter unit (MF-50) and remove the tube.

4. Replace the filter element (FE-1) with a new one.

5. Place the filter unit back in place and tighten the tightening nut to secure the tube.
   Ensure the O-ring is back in place.

6. Set the power switch to the off position to turn on the product. Check that the flow rate and airtightness are normal.
   Refer to 12.2 “Check/Inspection Procedure”.



12.3.2 Activated Carbon Filter Replacement

WARNING

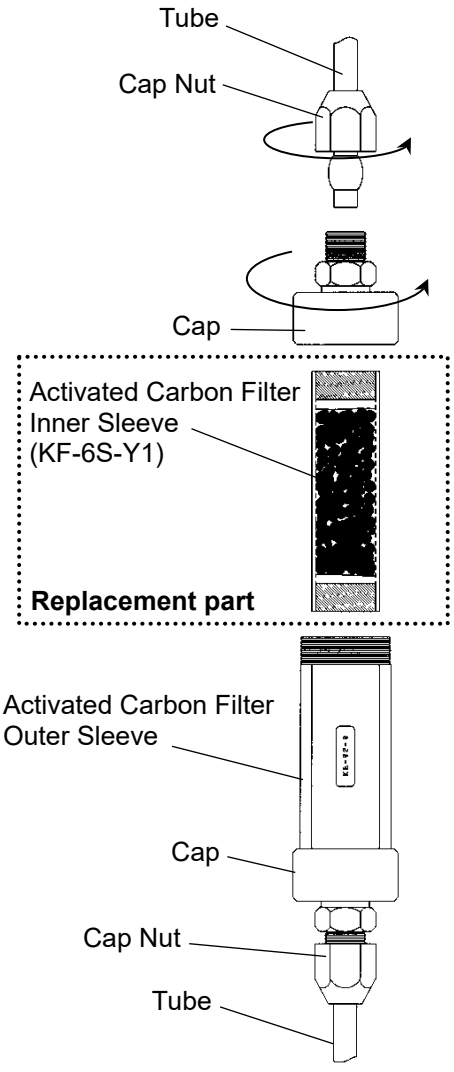
- Install the activated carbon filter only when the target gas is NF_3.
- Before activated carbon filter replacement, release the interlocks of external devices as needed to prevent their possible activation.

CAUTION

- Replace the activated carbon filter inner sleeve (KF-6S-Y1) when replacing the sensor unit.

Replacement Procedure

1. Set the power switch to the off position to turn off the product.
   Note: Regardless of being in maintenance mode 2, the analog output will become 0 mA if the product is turned off.
2. Check that the power LED is off.
3. Loosen the cap nut (on either end, top or bottom). Disconnect the tube from the activated carbon filter.
4. Rotate the cap to remove it while holding the outer sleeve with the other hand.
5. Take the inner sleeve (KF-6S-Y1) out of the outer sleeve.
6. Place a new inner sleeve (KF-6S-Y1) in the outer sleeve.
7. To install the cap to the outer sleeve, rotate it until firmly tightened to ensure that no movement is possible. Check that the cap on the other end is also firmly tightened.
8. Tighten the cap nut to connect the tube to the filter.
9. Set the power switch to the off position to turn on the product. Check that the flow rate and airtightness are normal.
   Refer to 12.2 “Check/Inspection Procedure”.



NOTE Used activated carbon filters must be disposed of as hazardous waste in accordance with the applicable local laws and regulations.

12.3.3 Sensor Unit Replacement

WARNING

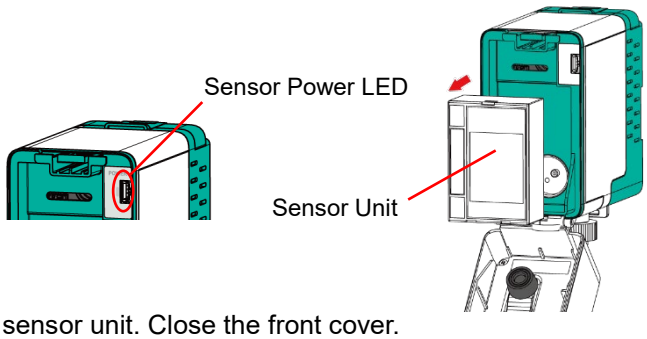
- Check that the target gas and full scale value are correct before using a sensor unit. Also, check that the sensor expiration year/month has not been reached.
  Note: The target gas name, full scale value and expiration year/month are indicated on the sensor unit. However, the expiration year/month is not indicated on a flammable gas sensor unit (CHS-7).
- Fully insert the sensor unit. If the sensor unit is not completely inserted, an airtight seal will not be created, and correct gas detection will not be possible.
- Before sensor unit replacement, turn off the product. Replacing the sensor unit while the product is on may cause device or sensor failure.
- Before sensor unit replacement, release the interlocks of external devices as needed to prevent their possible activation.

CAUTION

- Replace the sensor unit with a new one every 6 months, except for flammable gas sensor units (CHS-7). Replace the expired sensor unit with a new one.
- Replace the sensor unit with a new one before the expiration year/month. The expiration year/month is written on each sensor unit's individual package.
- Perform zero adjustment after sensor unit replacement. Refer to 10.5 "Zero and Span Adjustments".
- Check the flow rate and airtightness after sensor unit replacement. Refer to 12.2 "Check/Inspection Procedure".

Replacement Procedure

1. Set the power switch to the off position to turn off the product.
   Note: Regardless of being in maintenance mode 2, the analog output will become 0 mA if the product is turned off.
2. Check that the power LED is off.
3. Open the front cover.
4. Check that the sensor power LED is off. Pull out the sensor unit to remove it from the case.



5. Insert a new sensor unit. Close the front cover.
6. Set the power switch to the off position to turn on the product. Check that the flow rate and airtightness are normal.
   Refer to 12.2 "Check/Inspection Procedure".

NOTE

- Used sensor units must be disposed of as hazardous waste in accordance with the applicable local laws and regulations.
- If an error message appears on the screen, refer to 13 "Troubleshooting" for information on the necessary action to be taken.

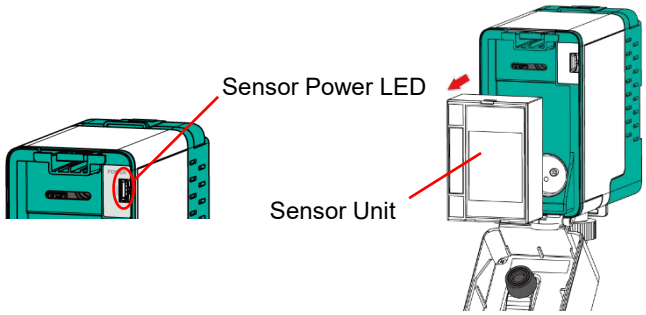
12.3.4 Sampling Module Replacement

WARNING

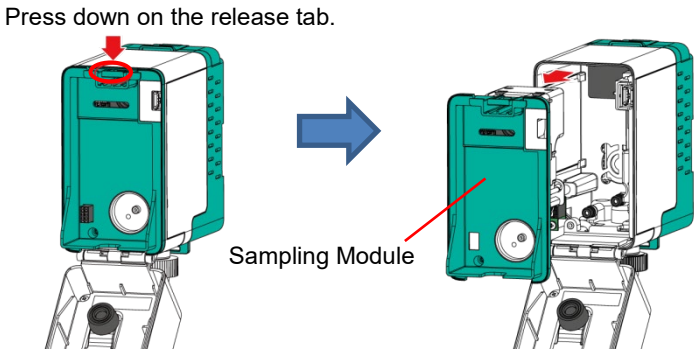
- Before sampling module replacement, turn off the product or sensor unit.
- Fully insert the sensor unit. If the sensor unit is not completely inserted, an airtight seal will not be created, and correct gas detection will not be possible.
- Check the flow rate and airtightness after sampling module replacement. Refer to 12.2 “Check/Inspection Procedure”.

Replacement Procedure

1. Set the power switch to the off position to turn off the product.
   Note: Regardless of being in maintenance mode 2, the analog output will become 0 mA if the product is turned off.
2. Check that the power LED is off.
3. Open the front cover.
4. Check that the sensor power LED is off. Pull out the sensor unit to remove it from the case.



5. While pressing down on the release tab on the top of the sampling module, hold the bottom of the sampling module and pull it forward to separate it from the case.



6. Insert a new sampling module into the case while pressing on its center until it is completely inserted.
7. Insert the sensor unit back and close the front cover.
8. Set the power switch to the off position to turn on the product. Check that the flow rate and airtightness are normal. Refer to 12.2 “Check/Inspection Procedure”.

NOTE Used sampling modules must be disposed of as hazardous waste in accordance with the applicable local laws and regulations.

12.3.5 Fan Replacement

Replace the fan with a new one when it fails. The fan itself generally does not require replacement because it is included in the sampling module, which is periodically replaced.

⚠ WARNING

- Before fan replacement, turn off the product or sensor unit.
- Fully insert the sensor unit. If the sensor unit is not completely inserted, an airtight seal will not be created, and correct gas detection will not be possible.

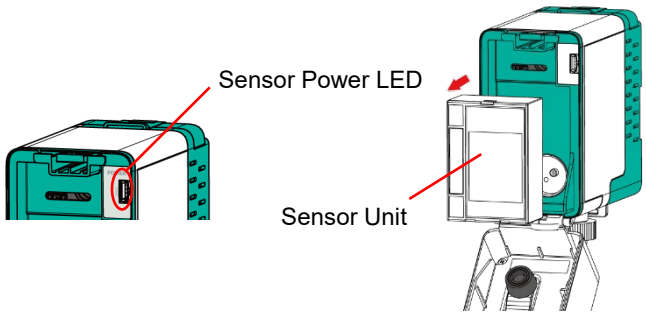
Replacement Procedure

1. Set the power switch to the off position to turn off the product.
   Note: Regardless of being in maintenance mode 2, the analog output will become 0 mA if the product is turned off.

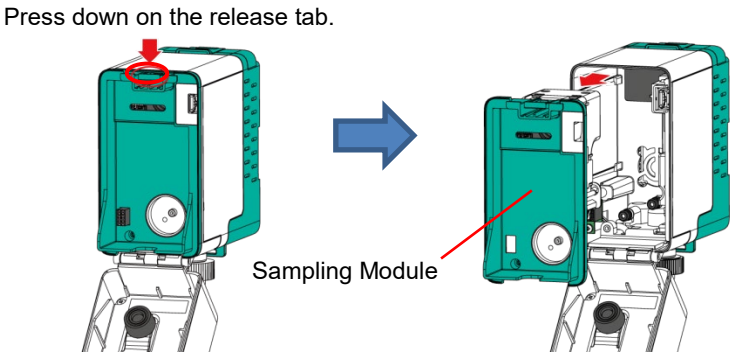
2. Check that the power LED is off.

3. Open the front cover.

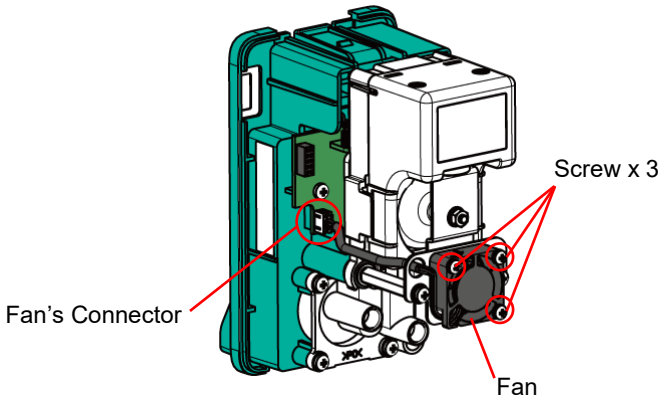
4. Check that the sensor power LED is off. Pull out the sensor unit to remove it from the case.



5. While pressing down on the release tab on the top of the sampling module, hold the bottom of the sampling module and pull it forward to separate it from the case.

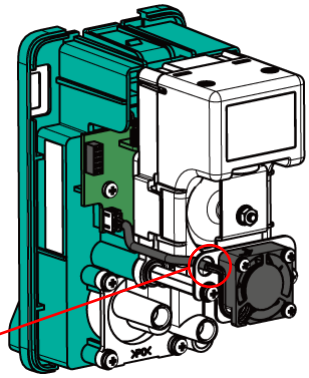


6. Disconnect the fan’s connector from the sampling module. Remove the three screws to detach the fan from the module.



7. Install a new fan into the sampling module.

8. Connect the fan’s connector back.
   - Tightening torque: 35 cN·m
   - Ensure proper cable routing.



9. Insert the sampling module back into the case while pressing on its center until it is completely inserted.

10. Insert the sensor unit back and close the front cover.

11. Turn on the product and check that the fan failure icon has disappeared. Check that the flow rate and airtightness are normal. Refer to 12.2 “Check/Inspection Procedure”.

13 Troubleshooting

Before requesting a repair, please refer to the table below. If the product does not return to normal operation after performing the corresponding steps in the table or if your issue is not found in the table, consult New Cosmos or its authorized representative.
If the product goes into any unintended mode during adjustment or setting, cease the use of the product and consult with your supervisor.

Powering-up and Operation

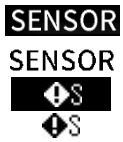
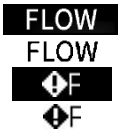
Problem/Error Message	Probable Cause	Solution/Reference
Setting the power switch to the on position does not turn on the power LED (green)	Incorrect or loose wiring	Check and rewire. Refer to 7.4 “Wiring Connection” of Instruction Manual for Installation.
	Loose connection between front case and rear case	Check and reconnect. Refer to 7.4.5 “Front Module Installation” of Instruction Manual for Installation.
Setting the power switch to the on position does not turn on the screen	Connection failure in internal wiring	Contact us for repair.
Maintenance LED (blue) blinking	Product is in maintenance mode	Exit maintenance mode. Refer to 10.2 “Maintenance Mode”.
No contact output	Product is in maintenance mode	Exit maintenance mode. Refer to 10.2 “Maintenance Mode”.
	Incorrect or loose wiring	Check and rewire. Refer to 7.4 “Wiring Connection” of Instruction Manual for Installation.
	Incorrect relay contact setting or incorrect relay output allocation	(a)Check the relay contact settings are as intended (“Normally energized” or “Normally de-energized”). -When using collective gas/fault alarm contact output from the main unit, refer to 10.11 “Device Information” -> “Collective Contact (AL1, AL2, Fault)” for resetting. - When using dedicated gas/fault alarm contact output from the DO module(s), refer to 10.6 “Individual CH Information” -> “Relay (Alarm1, Alarm2, Fault)” for resetting. (b)To check the relay output allocation settings, refer to 10.6 “Individual CH Information” -> “Relay output allocation”. To correct the relay output allocation, refer to 7.7 “Power-on Check” of Instruction Manual for Installation, or contact us.
“Error (Warm-up time)” appears on the screen during zero/span adjustment	Product is in warm-up cycle	Wait until the warm-up cycle is completed, then perform zero/span adjustment. Refer to 6.1 “Power-on and Operation Flow”.

Problem/Error Message	Probable Cause	Solution/Reference
“Error (During mode shift lock)” appears on the screen during zero/span adjustment	Product is not in maintenance mode	Ener maintenance mode, then perform zero/span adjustment. Refer to 10.2 “Maintenance Mode”.
“Error (During a fault)” appears on the screen during zero/span adjustment	Fault alarm is activated	Remove the fault by referring to the event icons table below for the solution.
“Error (Unit-to-unit comm.)” appears on the screen during zero/span adjustment	Sub unit loosely connected	Check and reconnect. Refer to 7.2.2 “Wall-Mounting” and 7.4.4 “Connection to External Devices” of Instruction Manual for Installation.
“Error (Out of adjustable range)” appears on the screen during zero adjustment	Gas is present around the gas sampling inlet	Ensure that no gas is present around the gas sampling inlet, then perform zero adjustment.
Cannot operate	Safety lock is activated (locked)	Deactivate the safety lock. Refer to 9.2 “Deactivate Safety Lock”.
Flow rate indication is not stable	Flow sensor output is unstable immediately after powering-up	Energize the product for about 30 minutes to stabilize the flow sensor output.
Cannot communicate with Web Server	Incorrect or loose LAN cable connection	Check and reconnect LAN cable.
	Incorrect settings	Check and reset IP address, subnet mask, and default gateway. Refer to 11.1.2 “IP Address Settings”
		Turn off the proxy server on your PC. Refer to 11.1.3 “Network Environment Setting”.

Event Icons

In the event of a fault, the yellow fault LED starts blinking, and the relevant event icon(s) and error message appear on the screen. The fault details can be viewed from the Ongoing Events screen (10.4 “Ongoing Events”).

Gas Detection	Event Icon	Possible Cause	Solution/Reference
Disabled	FAULT FAULT	“Memory failure” Internal device failure	Contact us for repair.
		“Module setting failure” Expansion unit not connected or installed incorrectly	Turn off and then on the product. Check that the expansion unit is installed correctly. Refer to 7.2 “Installation Procedure” of Instruction Manual for Installation. If your issue remains unsolved even after the unit is installed correctly, contact us for repair.
		“Power failure”	Check that the power voltage is steadily supplied.
		“Ethernet comm. failure”	Check the Ethernet connection. If your issue remains unsolved, contact us for repair.

Gas Detection	Event Icon	Possible Cause	Solution/Reference
Disabled		“Unit-to-unit comm. failure” No communication between units	Check and reconnect the units. Communication between units is not working. Check that the subunits and expansion units are correctly connected. Refer to 7.2 “Installation Procedure” of Instruction Manual for Installation.
		“Sensor unit EEPROM failure” No sensor unit installed, or sensor unit loosely connected	Turn off and then on the product. Check that the sensor unit is installed correctly. Refer to 12.3.3 “Sensor Unit Replacement”.
		“Sensor failure” Sensor output is low	Perform zero adjustment. If your issue remains unsolved, replace the sensor unit. Refer to 10.5 “Zero and Span Adjustments” and 12.3.3 “Sensor Unit Replacement”.
		“Sensor unit EEPROM failure” Sensor’s internal failure	Turn off and then on the product. Replace the sensor unit. Refer to 12.3.3 “Sensor Unit Replacement”.
		“Sensor type mismatch” Incorrect type of sensor installed (newly installed sensor’s data does not match the last installed sensor’s data)	Install a correct type of sensor. Refer to 12.3.3 “Sensor Unit Replacement” To use a different type of sensor, the sensor data should be renewed by setting “Sensor info. reading” to “ON”. Refer to 10.6 “Individual CH Information” -> “Sensor info. reading”.
		“Low flow failure” Flow rate is too low due to clogged filter element	Replace the filter element. Refer to 12.3.1 “Filter Element Replacement”.
		“Low flow failure” Flow rate is too low due to clogged tubing	Remove clog from tubing.
		Sampling module failure Flow rate is too low due to sampling module failure	Replace the sampling module. Refer to 12.3.4 “Sampling Module Replacement”.
		“Fan failure” Internal temperature rise may have shortened the service life of the fan.	Replace the fan. Refer to 12.3.5 “Fan Replacement”.
Enabled		“Time synchronization error”	Change the clock settings. Refer to 10.10 “Clock and Language”.
		“Date/time setting error” Battery for clock may be out.	Contact us for replacement.
		“NAND FLASH abnormal” Some internal functions may not work correctly,	Check that the power voltage is steadily supplied. If your issue remains unsolved, contact us for repair.

Low Flow Rate Icons

The low flow rate details can be viewed from the Ongoing Events screen (10.4 “Ongoing Events”).

Gas Detection	Icon	Possible Cause	Solution/Reference
Enabled	 Blinking  Blinking	“Low flow caution” Flow rate is too low due to clogged filter element	Replace the filter element. Refer to 12.3.1 “Filter Element Replacement”.
		“Low flow caution” Flow rate is too low due to clogged tubing	Remove clog from tubing.
		“Low flow caution” Flow rate is too low due to sampling module degradation	Replace the sampling module. Refer to 12.3.4 “Sampling module Replacement”.

14 Specifications

14.1 Main Unit

Model	PS-8M, PS-8N			
Detection Principle	Electrochemical, Hotwire semiconductor, Galvanic cell			
Gas Sampling Method	Extractive type (0.5L/min) Flow rate automatically controlled			
Sampling Tubing	PTFE with OD 6mm ID 4mm or OD 1/4 inch ID 11/64 inch*1 Tube length to be at least 1 m but not more than 20 m*2			
Target Gas	(As per the delivery specifications)			
Detection Range	(As per the delivery specifications)			
Display	Monochrome full dot LCD display Gas concentration value: 5-digit with measurement unit Displays gas name, flow rate status, 1st and 2nd stage gas alarms, fault alarm, etc.			
Power Indicator	Power LED (green) is lit when the unit is on			
Gas Alarm Set Value	(As per the delivery specifications)			
Alarm Accuracy	• Flammable gas: ±25% of the gas alarm set value under the identical conditions • Toxic gas: ±30% of the gas alarm set value under the identical conditions • Low oxygen: ±1 vol% under the identical conditions			
Response Time	Flammable gas: ≤ 30 seconds with a gas concentration that is 1.6 times higher than the gas alarm set value Toxic gas: ≤ 60 seconds with a gas concentration that is 1.6 times higher than the gas alarm set value Low oxygen: ≤ 5 seconds until the reading reaches 18 vol% with a 10 vol% concentration at 20±2°C *Excludes delay time caused by tube length and communication time.			
Gas Alarm	1st stage gas alarm	AL1 LED (red) is blinking		
		“ALARM1” appears on the screen		
	2nd stage gas alarm	AL2 LED (red) is blinking		
		“ALARM2” appears on the screen		
Fault Diagnosis	Internal failure, sensor error, low flow rate, abnormal power supply voltage, communication error between units, sensor incorrectly inserted			
Fault Alarm	Fault LED (yellow) is blinking, and the corresponding event icons appear on the screen			
Maintenance Mode	Maintenance mode 1	Maintenance LED (blue) is blinking, and the corresponding event icons appear on the screen		
	Maintenance mode 2	Maintenance LED (blue) is blinking rapidly, and the corresponding event icons appear on the screen		
External Output	Model		PS-8N	PS-8M
	Digital signal		-	Ethernet 10BASE-T/100base-Tx (Modbus/TCP) (Max. number of connectable units changes depending on system configuration) Communication mode: RTU Transmission distance up to hub: 100 m or less
	Gas concentration analog signal		4-20 mADC (common negative with power supply) (Output accuracy: within ±0.5% of full scale) *0.6 mA or less in the event of a fault alarm *300 Ω or less including a wiring resistance	
	· Collective 1st and 2nd stage gas alarm contacts · Collective fault alarm contact		Normally open dry contact, auto-resetting *Max. load: 125 VAC 0.5 A or 30 VDC 1.0 A (resistive load) *For dedicated contact output, refer to 14.3 “Expansion Unit” (DO module’s external output) on page 107.	
Explosion-proof	This product is not explosion-proof			
Compliance	CE (EMC:2014/30/EU and RoHS:2011/65/EU)			

<table>
<tr><td rowspan="4">Applicable Cable for External Terminals</td><td>Model</td><td>PS-8N</td><td colspan="2">PS-8M</td></tr>
<tr><td colspan="4">Terminal: Terminal blocks (3-pin x 1 and 6-pin x 1)
Applicable cable: CVV 1.25mm²
Target signal: Power, gas alarm contact (1st and 2nd stages), and fault alarm contact signals</td></tr>
<tr><td>Terminal: RJ-45 jack 8P8C</td><td>None</td><td colspan="2">Applicable cable: STP Ethernet cable, Category 5e or higher
Target signal: Digital signal Ethernet 10BASE-T /100base-Tx and PoE</td></tr>
<tr><td colspan="4">Terminal: Terminal block (3-pin x 1)
Applicable cable: CVV-S 1.25mm²
Target signal: Gas concentration analog signal</td></tr>
<tr><td>Operating Temperature/Humidity</td><td colspan="4">0°C to 40°C No sudden temperature change
30 to 85%RH No condensation</td></tr>
<tr><td rowspan="2">Power Supply</td><td>Model</td><td>PS-8N</td><td colspan="2">PS-8M</td></tr>
<tr><td>Power Supply</td><td>24 VDC ±10%</td><td colspan="2">24 VDC ±10% or Power over Ethernet (PoE), IEEE 802.3at)</td></tr>
<tr><td rowspan="5">Power Consumption*3</td><td>Sensor Unit</td><td colspan="2">Typical</td><td>Max.</td></tr>
<tr><td>CDS-7</td><td colspan="2">3.5 W</td><td>5.2 W</td></tr>
<tr><td>CDS-7 (with pyrolyzer)</td><td colspan="2">4.0 W</td><td>5.9 W</td></tr>
<tr><td>COS-7</td><td colspan="2">3.5 W</td><td>5.2 W</td></tr>
<tr><td>CHS-7</td><td colspan="2">4.0 W</td><td>5.9 W</td></tr>
<tr><td>Dimensions</td><td colspan="4">W 70 mm × H 124 mm × D 172 mm (excluding protrusions)</td></tr>
<tr><td>Mass</td><td colspan="4">Approx. 850 g (without sensor units)</td></tr>
<tr><td>Mounting Method</td><td colspan="4">Wall-mounting or DIN rail-mounting*4</td></tr>
</table>

* Specifications above may be subject to change without notice.

*1: Inch size tubing must be specified at the time of ordering.

*2: For detection of highly adsorptive gases including halogen-based gases, the tube length of 5 m or less is recommended. When used in an environment exposed to dust, the tube length should be shorter than the recommended one and periodic tube replacement may be required.

*3: Power consumption will increase when using analog and digital outputs simultaneously.

*4: Do not install the product in an area directly exposed to persistent vibration or excessive impact. Persistent vibration or excessive impact may cause device failure. Wall mounting is recommended if the product needs to be installed in a location exposed to vibration or impact.
Specified DIN rail: TH35-7.5

14.2 Subunit

Model	PS-8S		
Detection Principle	Electrochemical, Hotwire semiconductor, Galvanic cell		
Gas Sampling Method	Extractive type (0.5L/min) *Flow rate automatically controlled		
Sampling Tubing	PTFE with OD 6mm ID 4mm or OD 1/4 inch ID 11/64 inch*1 Tube length to be at least 1 m but not more than 20 m*2		
Target Gas	(As per the delivery specifications)		
Detection Range	(As per the delivery specifications)		
Display	No display (displayed on main unit's LCD)		
Power Indicator	Power LED (green) is lit when the unit is on		
Gas Alarm Set Value	(As per the delivery specifications)		
Alarm Accuracy	• Flammable gas: ±25% of the gas alarm set value under the identical conditions • Toxic gas: ±30% of the gas alarm set value under the identical conditions • Low oxygen: ±1 vol% under the identical conditions		
Response Time	Flammable gas: ≤ 30 seconds with a gas concentration that is 1.6 times higher than the gas alarm set value Toxic gas: ≤ 60 seconds with a gas concentration that is 1.6 times higher than the gas alarm set value Low oxygen: ≤ 5 seconds until the reading reaches 18 vol% with a 10 vol% concentration at 20±2°C *Excludes delay time caused by tube length and communication time.		
Gas Alarm	1st stage gas alarm	AL1 LED (red) is blinking	
	2nd stage gas alarm	AL2 LED (red) is blinking	
Fault Diagnosis	Internal failure, sensor error, low flow rate, abnormal power supply voltage, sensor incorrectly inserted		
Fault Alarm	Fault LED (yellow) is blinking		
Maintenance Mode	Maintenance mode 1	Maintenance LED (blue) is blinking	
	Maintenance mode 2	Maintenance LED (blue) is blinking rapidly	
External Output	None (external output is generated from expansion unit)		
Explosion-proof	This product is not explosion-proof		
Compliance	CE (EMC:2014/30/EU and RoHS:2011/65/EU)		
Applicable Cable for External Terminals	No cable connected		
Operating Temperature/Humidity	0°C to 40°C No sudden temperature change 30 to 85%RH No condensation		
Power Supply	Supplied by main unit		
Power Consumption	Sensor Unit	Typical	Max.
	CDS-7	2.7 W	3.5 W
	CDS-7 (with pyrolyzer)	3.0 W	3.8 W
	COS-7	2.7 W	3.5 W
	CHS-7	3.2 W	4.2 W
Dimensions	W 70 mm × H 124 mm × D 172 mm (excluding protrusions)		
Mass	Approx. 770 g (without sensor units)		
Mounting Method	Wall-mounting or DIN rail-mounting*3		

* Specifications above may be subject to change without notice.

*1: Inch size tubing must be specified at the time of ordering.

*2: For detection of highly adsorptive gases including halogen-based gases, the tube length of 5 m or less is recommended. When used in an environment exposed to dust, the tube length should be shorter than the recommended one and periodic tube replacement may be required.

*3: Do not install the product in an area directly exposed to persistent vibration or excessive impact. Persistent vibration or excessive impact may cause device failure. Wall mounting is recommended if the product needs to be installed in a location exposed to vibration or impact.
Specified DIN rail: TH35-7.5

14.3 Expansion Unit

Model		PS-8EU				
Module Type		AO Module (Analog output)		DO Module (Contact output)		AI Module (Analog input)
External Output	Signal	Gas concentration analog signal		Gas alarm contacts (1st and 2nd stages) and Fault alarm contact		None
	Number of Outputs	4		2		
	Output	4-20 mADC (common negative with power supply) (Output accuracy: within ±0.5% of full scale) *0.6 mA or less in the event of a fault alarm *300 Ω or less including a wiring resistance		Normally open dry contact, auto-resetting *Max. load: 125 VAC 0.5 A or 30 VDC 1.0 A (resistive load)		
External Input	Signal	None		None		4-20 mA analog input
	Number of Inputs					2
	Input					0-21.6 mA
Power Indicator		Power LED (green) is lit when the unit is on				
Communication Indicator		None				
Explosion-proof		This product is not explosion-proof				
Compliance		CE (EMC:2014/30/EU and RoHS:2011/65/EU)				
Applicable Cable for External Terminals		Terminals: Terminal blocks (1-pin × 1 and 12-pin×1) Applicable cable: CVV-S 1.25 mm²		Terminals: Terminal blocks (12-pin×1) Applicable cable: CVV 1.25 mm²		Terminals: Terminal block (1-pin × 1, 3-pin × 2) Applicable cable: CVV-S 1.25 mm²
Operating Temperature/Humidity		0°C to 40°C No sudden temperature change 30 to 85%RH No condensation				
Power Supply		Supplied by main unit				
Power Consumption*1		Typical	Max.	Typical	Max.	Typical	Max.
		1.1 W	2.2 W	0.8 W	1.6 W	0.8 W	1.1 W
Dimensions		W 60 mm × H 124 mm × D 172 mm (excluding protrusions)				
Mass		Approx. 410 g (including two modules)				
Mounting Method		Wall-mounting or DIN rail-mounting*2				

* Specifications above may be subject to change without notice.

*1: Power consumption when the maximum number of channels are used.

*2: Do not install the product in an area directly exposed to persistent vibration or excessive impact. Persistent vibration or excessive impact may cause device failure. Wall mounting is recommended if the product needs to be installed in a location exposed to vibration or impact.
Specified DIN rail: TH35-7.5

15 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 or 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.

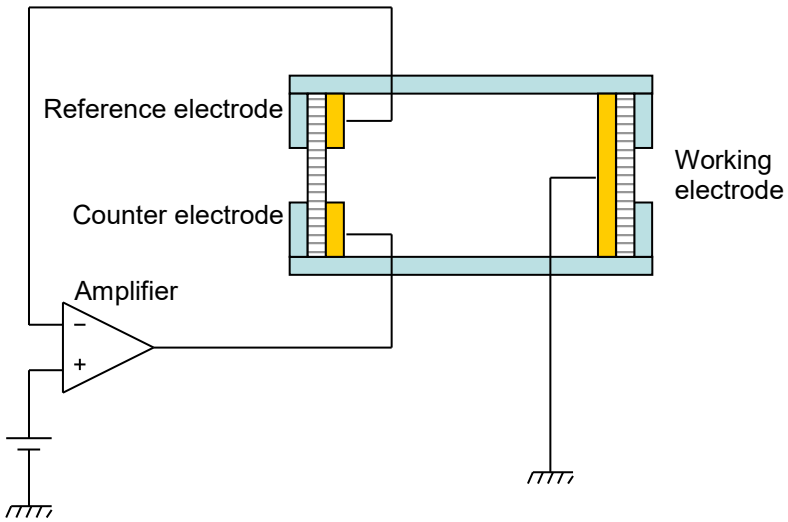
(1) Failures and damages incurred by incorrect use, deliberate acts, or negligence of the user.
(2) Failures and damages caused by disaster, earthquake, storm and flood, lightning, extreme climate, abnormal power supply voltage, excessive electromagnetic interferences, or other acts of God.
(3) Failures 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.

16 Detection Principle

16.1 Electrochemical Sensor (Catalytic Conversion)

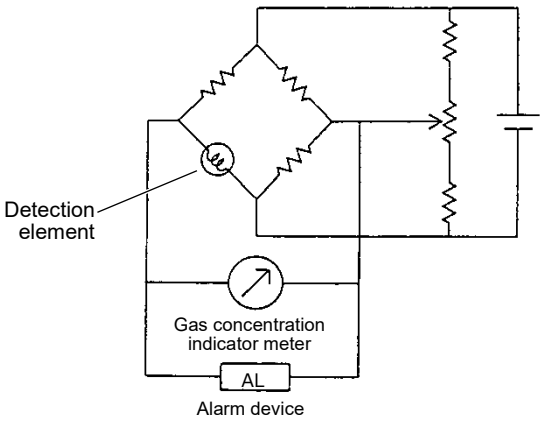
This sensor consists of three electrodes and an electrolyte, and the method adopted here is to produce electrolytic oxidation with a potentiostat circuit while keeping the working electrode at a constant potential against the reference electrode. Measuring the current generated here allows determining the concentration of the gas (e.g., H_2S, CO).
The electrolytic reaction of silane (SiH_4) is as follows:

Working electrode: $SiH_4+4H_2O \rightarrow H_4SiO_4+8H^++8e^-$
Counter electrode: $2O_2+8H^++8E^- \rightarrow 4H_2O$



16.2 Hotwire Semiconductor Sensor

A small amount of metal oxide semiconductor is deposited on a platinum coil, then the platinum coil is heated to a high temperature. When reducing (electron donating) gases react with the surface of the metal oxide, electrons will be donated to the semiconductor in the course of the reaction. Consequentially, the resistance of the semiconductor decreases as more charge carriers (electrons) are available. The sensor element (semiconductor on the platinum coil) can be understood as two resistances in parallel, being part of a bridge circuit. The resistance change of the semiconductor is read as differential voltage using a bridge circuit. This type of sensor is very sensitive and can detect flammable or toxic gases at a low ppm or even a ppb level.



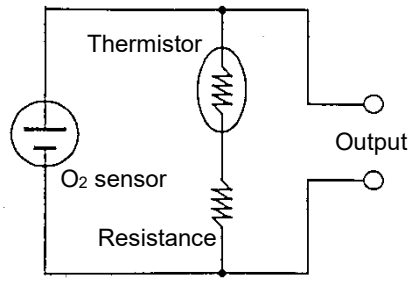
16.3 Galvanic Cell Sensor for Oxygen Detection

The sensor consists of two electrodes, a membrane, and an electrolyte.
The electrodes are two different metals, noble metal (Pt, Ag) and base metal (Pb). The noble metal electrode has contact with air via a Teflon membrane. Connecting load resistance to both electrodes generates a potential difference, which promotes the following reactions:

Noble metal electrode: $O_2 + 2H_2O + 4e^- \rightarrow 4OH^-$

Base metal electrode: $2Pb \rightarrow 2Pb_2+ + 4e^-$

As a result, the current proportional to the oxygen concentration in the air flows from the noble metal electrode to the base metal electrode via the external circuit. Since the electromotive force changes depending on the temperature, a thermistor is added to compensate for the ambient temperature variations.



17 Glossary

Term	Definition
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.
Target gas	Specific gas to be detected, concentration displayed, and used to trigger alarms.
Detection range	A range of target gas concentrations that can be displayed and trigger alarms.
Alarm accuracy	Difference between the gas alarm set value and the detected gas concentration that activates the alarms. It may also be expressed as a % with respect to the gas alarm set value.
Zero adjustment (zeroing)	To adjusting the zero point (or 20.9% for oxygen) in clean air. Clean air: air free from target or interfering gases and composed of 20.9-21.0vol% oxygen in dry conditions. Gas atmosphere: air containing target or interfering gases.
Span adjustment	To adjust the indicated values by using span gas.
Zero suppression (or 20.9 suppression for oxygen detection)	A function with which the display or bar graph display will continue to indicate “0” (or 20.9 vol%) until the target gas concentration detected by the detector exceeds the preset value. The preset value is stated in the delivery specifications.
Explosion-proof structure	Structure of an electrical apparatus in order not to become an ignition source in a flammable atmosphere
Span gas	Gas specifically prepared to calibrate/adjust the gas detection and alarm system.
Maintenance and inspection	Tasks performed to ensure that equipment operates normally and correctly.
Aging mode	For use by service personnel. This mode is used to energize the sensor inside to stabilize the sensor output.

Revision History

Document No.	Date	Revision
GAE-179-00	December 2024	00 (Initial issue)

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

Authorized representative:

Manufacturer:

NEW COSMOS ELECTRIC CO., LTD.

2-5-4 Mitsuya-naka, Yodogawa-ku,

Osaka 532-0036, Japan

www.newcosmos-global.com

NEW COSMOS ELECTRIC CO.,LTD.