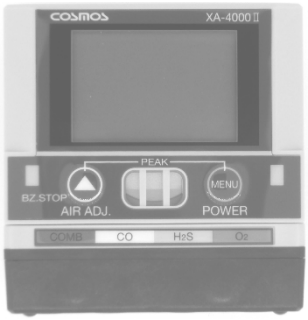
- **XA-4400II**
- **XA-4300IIKHC**
- **XA-4300IIKCS**
- **XA-4300IIKHS**
- **XA-4300IIHCS**
- **XA-4200IIKC**
- **XA-4200IIKH**
- **XA-4200IIKS**
- **XA-4200IICH**
- **XA-4200IICS**
- **XA-4200IIHS**

Multi-gas Detector
Instruction Manual

This instruction manual is for the eleven models listed to the left.

- Keep this manual for easy reference.
- Carefully read this manual prior to use.



Model Variations	
Model	Target Gas
XA-4400II	Combustible gas, H_2S, CO, O_2
XA-4300IIKHC	Combustible gas, H_2S, CO
XA-4300IIKCS	Combustible gas, CO, O_2
XA-4300IIKHS	Combustible gas, H_2S, O_2
XA-4300IIHCS	H_2S, CO, O_2
XA-4200IIKC	Combustible gas, CO
XA-4200IIKH	Combustible gas, H_2S
XA-4200IIKS	Combustible gas, O_2
XA-4200IICH	H_2S, CO
XA-4200IICS	O_2, CO
XA-4200IIHS	O_2, H_2S

NEW COSMOS ELECTRIC CO.,LTD.

Document No.: XA-4400IIT

Table of Contents

Package Contents

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

Item	Model	Quantity
Multi-gas detector		1
Battery unit for housing alkaline battery (pre-installed)	BP-4000IIAL	Either one
Battery unit for housing rechargeable battery (pre-installed)	BP-4000IIMH	
Battery cover Page 28 “Battery Replacement”		1
Safety pin strap, with 4 mounting screws Page 8 “Safety Pin Strap Installation”	C-25	1
Replacement filter elements Page 30 “Filter Element Replacement”	FE-128	8
Replacement sensor filter for combustible gas sensor Page 32 “COMB/CO Sensor Filter Replacement“	FE-140	1
Replacement sensor filter for carbon monoxide sensor Page 32 “COMB/CO Sensor Filter Replacement”	FE-130	1
Panasonic AAA alkaline battery	LR03	Either one
GP rechargeable battery	GP75AAAHC	
Inspection certificate		1
Instruction manual (this document)		1

Optional (sold separately)

Item	Model	Description
Leather case	C-23	Protects the detector from dirt and scratches. Use with a safety pin strap
Data logger kit	XA-4000IIL	Software to collect and transfer logged data to PC
Battery unit for housing alkaline battery	BP-4000IIAL	Replacement battery case. Battery not included.
Battery unit for housing rechargeable battery	BP-4000IIMH	Replacement battery case. Battery not included.
Battery charger	BC-9	
AC adapter	AD-100	For BC-9 battery charger

1. Introduction

Thank you for purchasing the New Cosmos XA-4000II series multi-gas detector. Prior to use, please read this instruction manual to ensure safe and reliable operation.

This detector can measures from 2 to 4 gases, such as oxygen (O_2), combustible gas (COMB), hydrogen sulfide (H_2S) and carbon monoxide (CO) and simultaneously displays all gas concentrations. If gas concentrations reach a preset level, the detector alerts the user via audible, visual and vibrating alarms, thus helping prevent incidents such as low oxygen, gas poisoning and explosion.

Carefully read this manual, regardless of your experience with gas detectors. Do not use the detector for any purposes other than those intended or described in this manual.

⚠ WARNING Waterproof

Keep the gas detection ports dry.

This detector employs a waterproof structure which meets the New Cosmos-specified submersion test* compliant with EN60529 ingress protection code IPX7 in new condition to prevent malfunctions due to water entry during normal usage. However, if the filter elements are wet, proper gas detection is not possible. Gaskets or sealing deteriorated by age, or adhesion of foreign materials, will impair the waterproof function, thus exposure to water should be avoided as much as possible.

*Submersion test procedure:
Submerge a brand new detector into room temperature tap water to a depth of 1 meter for 30 minutes. Verify that water is not present inside the detector.

Explosion-proof Requirements

Follow the conditions below to comply with the explosion-proof requirements.

⚠ WARNING

Explosion-proof:	Class I, Zone 0 AEx ia IIC T3 Ga
	Class I, Division 1, Groups A, B, C, D
Standard:	UL 60079-0:ED6
	UL 60079-11:ED6
	UL 913:ED8
Rating:	1.5_VDC (LR03 manufactured by Panasonic x 1)
	1.5_VDC (LR03 manufactured by Duracell x 1)
	1.5_VDC (LR03 manufactured by Energizer x 1)
	1.5_VDC (LR03 manufactured by Varta x 1)
	1.3_VDC (GP75AAAHC manufactured by GP x 1)

Ambient temperature: -20°C to 50°C

Special conditions of use :

- Replace the battery in a non-hazardous area.
- Charge the battery in a non-hazardous area.
- Charge the battery with a specified battery charger (BC-9).(Um=8.1V)
- Don't separate XA-4400II and BP-4000IIAL or BP-4000IIMH when an explosive gas atmosphere may be present.
- For preventing accidents due to electrostatic charges, wear anti-static working clothes and conductive footwear (antistatic working shoes), and the floor should be a conductive work floor (leak current: 10M ohm or less).
- In the measurement of the oxygen density, do not measure gas other than the mixture of air and combustible gas or steam or toxic gas.
- When the Energizer Type E92 AAA LR03 is used, the ambient temperature range is -18 to +50 degrees C.
- The enclosure of this gas detector uses ABS resin. Avoid exposure to organic solvents, strong acids, strong alkalis and mineral oils. Exposure may compromise the explosion-proof structure of the detector.
- Do not replace the battery when an explosive gas atmosphere may be present.
- Do not recharge the battery when an explosive gas atmosphere may be present.
- Do not separate XA-4400II and BP-4000II when an explosive gas atmosphere may be present.
- Do not take off the "Sensor Cover" when an explosive gas atmosphere may be present.

Symbols Used in this Manual

This manual uses Danger, Warning, Caution and Note symbols to draw attention to procedures, materials, methods, and processes, which 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.
NOTE	Provides information on product handling.

Safety Precautions

To ensure safe operation, follow the precautions below.

⚠ **DANGER** When a gas alarm activates, immediately take all the measures necessary to prevent an explosion.

⚠ **WARNING**

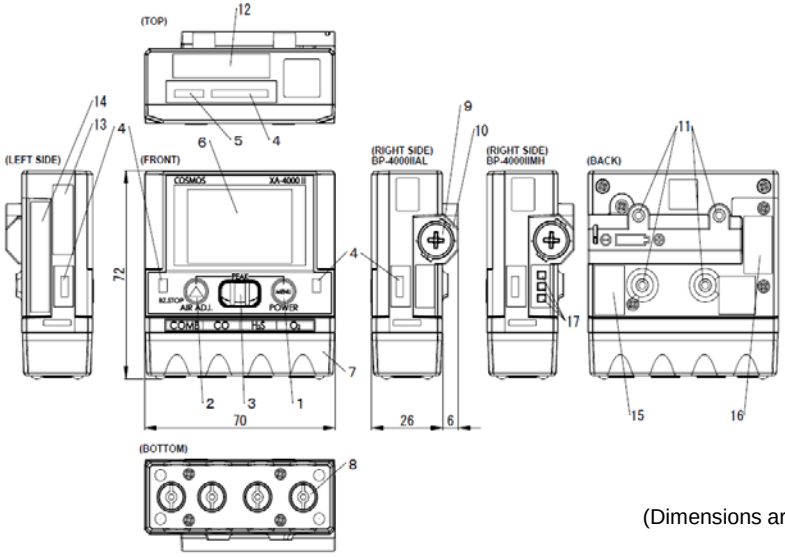
- Air adjustment (zeroing) starts automatically when the detector is turned on. Make sure to turn on the detector in clean air. Failure to do so may cause incorrect air adjustment, which will then lead to inaccurate measurements being displayed.
- This product is safety equipment. Perform a routine check before use (page 35 “Routine Check”).
- Do not cover any gas detection ports with any fabric, etc. If blocked, correct detection is not possible.
- Do not block the speaker opening. If blocked, the audible alarm will be muffled.
- Keep the filter elements at the gas detection ports clean and dry. If the filter elements are dirty or wet, proper gas detection is not possible.
- The recommended replacement cycle for sensors is three years, which is applicable only when a periodic inspection is performed at least once a year. The replacement cycle changes depending on the use of the detector and the environmental conditions. If the detector is being used under conditions different from those specified such as where temperature and/or humidity is/are high, or if the detector has suffered an impact by falling from a height, or if it was exposed to water, a high concentration gas, or gas poisoning, then make sure to carry out a periodic inspection before use to ensure the normal operation of the detector.
- Only use specified batteries. Using batteries other than those specified may impair the product’s explosion-proof performance.

⚠ CAUTION

- If this product is to be unused or stored for an extended period of time, the battery must be removed. Leaving the battery inside while the product is unused or stored for an extended period of time will drain the battery and cause it to leak, which will lead to product failure.
- This product is explosion-proof. Do not disassemble, modify, or alter the structure of this unit or its electrical circuits. Doing so may impair the performance of the explosion-proof characteristics.
- Do not leave the product in high temperature and/or high humidity conditions for a long period of time. Doing so may impair the performance of the product.
- Avoid using the product outside the specified operating temperature/humidity/pressure range. Also avoid exposing the product to abrupt temperature/humidity/pressure changes. Failure to do so may impair the performance of the product.
- Avoid rapid changes in pressure. Failure to do so may impair the sensor performance or damage the sensors.
- Avoid strong mechanical shock, impact or vibration to the product by dropping or bumping. Failure to do so may impair the performance of the product.
- If you drop or bump the product by mistake then the reading fluctuates, allow enough time for the reading to stabilize before use.
- If condensation is present on the product, remove it and make sure the unit is completely dry and has been checked for abnormalities before use.
- This detector may detect gases or solvent vapors that are not target gases. Take the usage environment into consideration.
- Do not use the product in a place or near a place where silicone sealant/vapor may be present. Doing so may compromise the performance of the product.
- Detecting a high concentration of sulfur dioxide or chlorine may shorten the sensor life or increase errors.
- Detecting hydrogen sulfide for an extended period of time may shorten the sensor life and impair the sensor sensitivity.
- The oxygen sensor has pressure dependence. Therefore, make necessary pressure adjustments when using the product at a place other than at sea-level, such as at high altitudes.
- The gas sensors contain harmful substances. For disposal, return the used sensors to New Cosmos or treat them as industrial waste according to the applicable laws and regulations.
- Due to battery's characteristics, the battery life will be shorter than when used at low temperatures than when used at room temperature.
- Keep the product away from wireless devices while in use. Failure to do so may cause fluctuations in the reading or a fault alarm due to radio wave interference.
- The vibrating alarm may be difficult to feel depending on the location where it is worn.

2. Unit Dimensions and Components

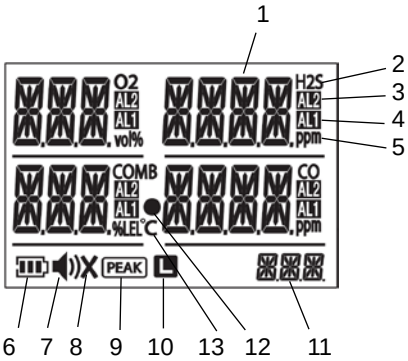
Multi-gas Detector



(Dimensions are in mm)

Item	Component		Description/Function
1	MENU	POWER button	Used for turning on/off the unit or setting
2	▲	AIR ADJ. button	Used for starting automatic air adjustment, muting audio alarm, or making settings
3	Speaker opening		Opening for audio
4	Alarm LED (5 places)		Blinks red when a gas alarm or device error is detected
5	Infrared port		Used for data logging
6	LCD		Displays gas concentrations, error message, and settings. See next page for more information
7	Sensor cover		Secures the sensors and filter elements to the unit
8	Gas detection port (4 places) (with filter elements)		Gas inlet to the sensor. A filter element is installed for preventing the entry of dust/water through the inlet
9	Battery cover		Open/close this cover for battery replacement
10	Battery unit		Battery case to house a battery
11	Mounting screw (4 places)		Used to attach the safety pin strap to the unit
12	Manufacturing number label		Indicates model, serial number and manufacturing date of the gas detector
13	Explosion-proof label		Indicates type of protection, certification number and temperature requirement
14	Battery case manufacturing number label		Indicates model, serial number, and manufacturing date of the battery unit.
15	UL classification mark label		Indicates UL classification mark and UL file number
16	Battery case warning label		Indicates warning for battery replacing/charging
17	Charging terminal		Connects an optional battery charger

LCD Indication



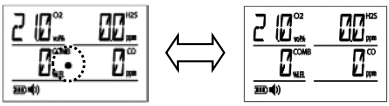
Item	Icon/Display	Ref. Page
1	Concentration values and information	-
2	Gas type	11
3	2nd stage alarm icon	12
4	1st stage alarm icon	
5	Unit of measurement for gas concentration (vol%, %LEL, or ppm)	-
6	Battery level indicator	28-29
7	Alarm volume indicator	21
8	Audio mute icon	20
9	Peak hold icon	14
10	Battery saving mode icon	23
11	Set contents	See NOTE below
12	On/off operation of combustible gas sensor	
13	Unit of measurement for temperature (°C)	15

NOTE

Set contents

Indication	Description	Reference
GAS	Target gases are shown on screen	Page 9
FS	Full scale values are shown on screen	
AL1	1st stage alarm set values are shown on screen	
AL2	2nd stage alarm set values are shown on screen	
TW	TWA alarm set values are shown on screen	Pages 9 and 15
ST	STEL alarm set values are shown on screen	
T-C	TWA alarm set value for CO	Page 13
T-H	TWA alarm set value for H_2S	
TCH	TWA alarm set values for CO and H_2S	
S-C	STEL alarm set value for CO	
S-H	STEL alarm set value for H_2S	
SCH	STEL alarm set values for CO and H_2S	
	Display sequence (upward)	Pages 18 and 26
	Display sequence (downward)	
LOG	Appears when data logging is in progress	Page 24
E-b	Appears when the internal clock battery is empty	Page 27

On/off operation of combustible gas sensor
The combustible gas sensor operates intermittently. When the sensor is in operation, ● will appear on the screen.



Sensor is on　　Sensor is off

3. Operation

3-1. Preparation

3-1-1. Battery Installation

Install the supplied battery. (Page 28 “Battery Replacement”) The battery cover is not pre-installed in the detector but included in the packing box during shipment.

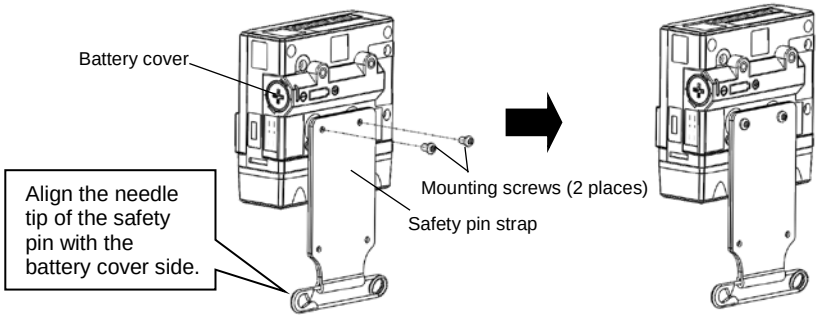
3-1-2. Safety Pin Strap Installation

⚠ CAUTION

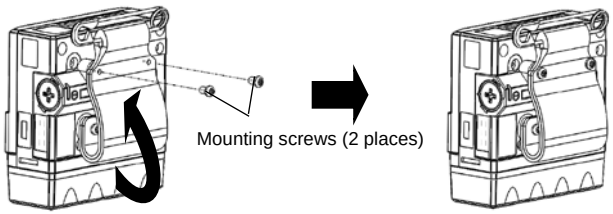
- Only use the supplied screws (M2.6 x 4, truss head).
- Use a screwdriver with point size 1 (see page 33 for the shape).
- Be careful not to prick your finger with the safety pin.

NOTE The safety pin may leave a tiny hole in clothes.

1) Attach the bottom edge of the safety pin strap to the back of the unit by installing the two supplied mounting screws. Note the direction of the safety pin clasp.



2) Roll up the safety pin strap and attach it to the upper part of the unit by installing the two supplied mounting screws as shown below.



⚠ WARNING Do not cover any gas detection ports with any fabric, etc. If blocked, correct detection is not possible.

3-2. Operating Procedure

> **WARNING** Always perform a routine check (page 35) before use.

STEPS: **1.** Power on ▶ Warm-up ▶ Gas concentrations screen ▶ **2.** Detection ▶ **3.** Power off

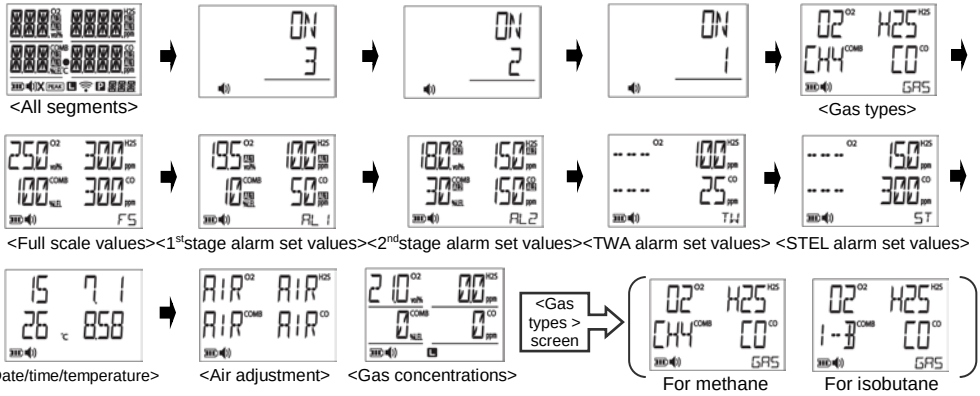
* This manual explains an operating procedure by using a typical 4-gas model (O_2, methane (or isobutane), H_2S and CO) as a sample.

---

1. Power on -> Warm-up -> Gas concentrations screen

> **WARNING** Air adjustment (zeroing) automatically starts when the detector is turned on. Make sure to turn on the detector in clean air. Failure to do so may cause incorrect air adjustment which will then lead to inaccurate measurement being displayed.

Press and hold the [MENU POWER] button until the <gas types> screen is displayed on the LCD.
--> After the unit beeps once, all segments (all letters and icons) will be displayed on the LCD, then “ON” will be displayed. A countdown will start with; “3”, “2” and “1” being displayed in sequence along with a beep for each. When the unit gives off a long beep, release the button. The <gas types>, <full scale values>, <1st stage alarm set values>, <2nd stage alarm set values>, <TWA alarm set values>, <STEL alarm set values> and <date/time/temperature> screens will be displayed in sequence. Air adjustment followed by warm-up cycle will start. When the warm-up cycle is completed, the unit will beep 3 times and the <gas concentrations> screen will be displayed.



<All segments> <Gas types>

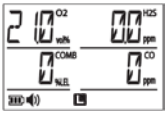
<Full scale values><1st stage alarm set values><2nd stage alarm set values><TWA alarm set values> <STEL alarm set values>

<Date/time/temperature> <Air adjustment> <Gas concentrations> <Gas types > screen For methane For isobutane

> **NOTE**
> - Warm-up cycle takes a maximum of 2 minutes.
> - Only the power off button function is enabled during warm-up cycle.
> - If an error message is displayed, see page 27 “Error Messages”.

2. Detection

When the <gas concentrations> screen is displayed, it means that the detector is ready for use.



<Gas concentrations>

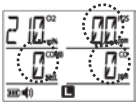
--> See page 7 “LCD Indication”.
--> See page 11 “Gas Concentrations Screen”.
--> See page 12 “Gas Alarm Operation”.

⚠ WARNING

- Do not cover any gas detection ports with any fabric, etc. If blocked, correct detection is not possible.
- Keep the filter elements at the gas detection ports clean and dry. If the filter elements are dirty or wet, proper gas detection is not possible.
- When wearing the detector, adjust its orientation to protect the gas detection ports from rain or splashing water.
- If a reading exceeds the full scale value, move the detector to clean air area immediately. If not moved to clean air and continued to be used, improper gas detection will result, and it may take time for the reading to return to the zero point.
- Do not block the speaker opening. If blocked, the audible alarm will become muffled.

⚠ CAUTION

- A significant change in work environment (e.g., temperature or humidity change) may cause a zero drift (0%LEL, 0 ppm or 21.0vol%). In this case, press and hold the [▲ AIR ADJ.] button to perform air adjustment (zeroing) (page 14) in clean air.
- Blinking “0” or “0.0” for the gas concentration value indicates that the reading has fallen negative. It indicates the possibility that either a high concentration gas was detected or air adjustment was performed in a gas atmosphere. To solve this issue, perform air adjustment (page 14) in clean air. If the error message [E-S] is displayed (page 27), turn off the unit then turn it on in clean air.


Blinking

- The vibrating alarm may be difficult to feel depending on the location where it is worn.

NOTE

During button operation, “press” means to press the button for less than one second, and “press and hold” means to keep pressing the button for more than 3 seconds.

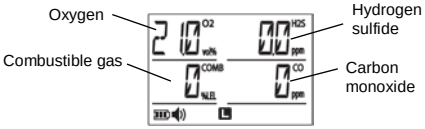
3. Power off

Press and hold the [MENU POWER] button until the LCD turns off.
--> After the unit beeps once, “OFF” will be displayed, then a countdown will start with “3”, “2” and “1” being displayed in sequence. After the unit beeps 3 times, the LCD will turn off then the unit will turn off.

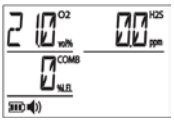
<Gas concentrations> <Power off>

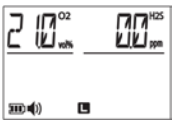
Gas Concentrations Screen

This detector can simultaneously display up to four gas concentrations on its LCD.
Most diagrams used in this manual use a typical 4-gas model as a sample. For 2-gas or 3-gas models, the gas names and concentrations of the corresponding target gases are displayed on the LCD.



4-gas model (Example)


3-gas model (Example)

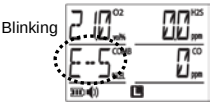

2-gas model (Example)

- When a target gas concentration exceeds the service range (page 39 "Specifications"), "OL" (over range) will blink on the LCD instead of the concentration value.

NOTE See the table on page 12 for the over range conditions.

Service range of combustible gas sensor exceeded (Example)

- If gas detection becomes impossible due to a sensor failure, etc., the error message “E-S” will replace the corresponding gas concentration value. (page 27 “Error Messages”)



Sensor failure for combustible gas (Example)

Gas Alarm Operation

When the gas concentration exceeds the gas alarm set value, the corresponding gas concentration will start blinking, the unit will start beeping, the alarm LEDs will start blinking red, the AL1 and/or AL2 icons will appear on the LCD, the backlight will turn on, and the detector will start to vibrate intermittently.
When the gas concentration falls below the gas alarm set value, the gas alarm will automatically deactivate (automatic resetting).


1st stage alarm for combustible gas (Example)

NOTE

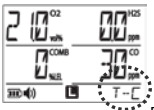
Press the [AIR ADJ.] button to silence the beeping during an active alarm. However, if a new alarm arises, the unit will start beeping.


2nd stage alarm for combustible gas (Example)

Alarm output		1st stage alarm	2nd stage alarm	Over-range alarm	TWA alarm	STEL alarm
Gas Type	Combustible gas	10 %LEL	30 %LEL	111 %LEL	—	—
	Oxygen	19.5 vol%	18.0 vol%	50.1 vol%	—	—
	Hydrogen sulfide	10.0 ppm	15.0 ppm	150.1 ppm	10.0 ppm	15.0 ppm
	Carbon monoxide	50 ppm	150 ppm	2001 ppm	25 ppm	300 ppm
Audio alarm		Slow beeping	Rapid beeping	Same as 2nd stage alarm	Same as 1st stage alarm	Same as 1st stage alarm
Alarm LEDs (5 places in 3 directions)		Blink in sequence in 3 different directions, at 1.5 sec intervals	Blink in sequence in 3 different directions, at 0.8 sec intervals	Same as 2nd stage alarm	Same as 1st stage alarm	Same as 1st stage alarm
Icons on LCD		AL1 appears for corresponding gas	AL1 and AL2 appear for corresponding gas	OL blinks for corresponding gas	[Txx] blinks at the bottom right corner (see next page for sample)	[Sxx] blinks at the bottom right corner (see next page for sample)
Vibration		1 vibration per 2.5 sec	2 vibrations per 2.1 sec	Same as 2nd stage alarm	Same as 1st stage alarm	Same as 1st stage alarm

TWA Alarm

For hydrogen sulfide (H_2S) and carbon monoxide (CO), the gas concentration average is calculated every minute. These averages are integrated and updated every minute while the detector is on. If the integrated value exceeds the integrated alarm set value (see below for how to obtain the integrated alarm set values), a TWA alarm will activate and the blinking alert will be shown at the bottom right corner of the LCD.



(CO) Blinking

(H_2S) Blinking

(CO and H_2S) Blinking

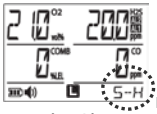
NOTE TWA alarm will not be cancelled until the detector is turned off.

[Integrated alarm set values]
Hydrogen sulfide: 10 ppm x 8 hours x 60 times (60 times/hour) = 4,800 ppm
Carbon monoxide: 25 ppm x 8 hours x 60 times (60 times/hour) = 12,000 ppm

STEL Alarm

For hydrogen sulfide (H_2S) and carbon monoxide (CO), the gas concentration average is calculated every minute. If the average during the last 15 minutes (15 samplings) exceeds the STEL alarm set value (15 ppm for H_2S and 300 ppm for CO), a STEL alarm will activate and the blinking alert will be shown at the bottom right corner of the LCD.

(CO) Blinking



Blinking
(H_2S)

Blinking
(CO and H_2S)

NOTE STEL alarm will not be cancelled unless the average during the last 15 minutes falls below the STEL alarm set value or the detector is turned off.

⚠ DANGER When a gas alarm activates, immediately take all the necessary measures to prevent an explosion.

3-3. Functions in Normal Operation

This section describes functions which are available during normal operation thru button operation. “Normal operation” is a status in which the detector is capable of gas monitoring/detection after powering-up, and normally the <gas concentrations> screen is displayed on the LCD.

NOTE

During normal operation, the unit keeps monitoring the gas concentrations even when the <gas concentrations> screen is not displayed on the LCD and an alarm will activate when any one of the gas concentrations reaches the alarm set value.

3-3-1. Air Adjustment (Zeroing) (21.0vol% adjustment for Oxygen)

⚠ WARNING

Perform air adjustment (zeroing) in clean air. Inaccurate gas concentrations will be indicated if air adjustment has been done in a gas atmosphere.

During normal operation, press and hold the [AIR ADJ.] button for 3 seconds to start air adjustment.

--> The unit will beep 3 times and [ADJ] will be displayed for each target gas for 3 seconds. When the air adjustment is completed, [21.0vol%], [0%LEL] or [0ppm] will be displayed for each corresponding gas.

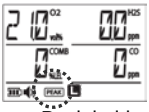
O_2 drifts to 21.2% | Air adjustment in progress | Air adjustment completed

NOTE

When proper air adjustment is not available (e.g., when the actual concentration exceeds the alarm set value), “ADJ” will not be displayed and the concentration value will remain displayed for this gas, even after the [AIR ADJ.] button is pressed for 3 seconds.

3-3-2. Peak Hold On/Off

1) During normal operation, press the [POWER] and [AIR ADJ.] buttons simultaneously to activate the peak hold function.
   --> The unit will beep once, the PEAK icon will appear at the bottom of the LCD. If a highest concentration (lowest for oxygen) is detected, it will replace the current peak value. The new peak value will be maintained on the LCD until exceeded.



Peak hold

2) To deactivate the peak hold function, press the [POWER] and [AIR ADJ.] buttons simultaneously.
   --> The unit will beep once, the PEAK icon will disappear, the peak value will be reset, the LCD will then return to the <gas concentrations> screen.

NOTE

- The peak hold function will be canceled each time the unit is turned off.
- Once the peak hold function is activated, the new peak value will be updated and maintained on the LCD even if the actual gas concentration falls below that value (or above that value for oxygen).

3-3-3. Backlight

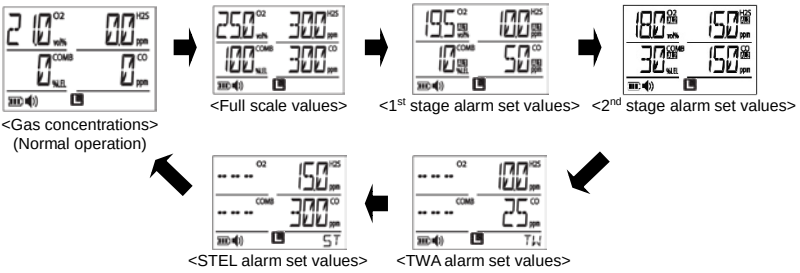
The LCD backlight will automatically turn on when a gas alarm goes off, then it will automatically turn off when the gas alarm is cleared.
Pressing the [MENU POWER] or [AIR ADJ.] button also turns on the backlight, which will automatically turn off 5 seconds later.

3-3-4. Mute Audio (Buzzer Stop)

Pressing the [AIR ADJ.] (BZ.STOP) button while a gas alarm/error alarm/empty battery alarm is active, will mute the audio alarm.

3-3-5. Display Alarm Set Values

During normal operation, press the [AIR ADJ.] button to display the alarm set values.
--> <Full scale values>, <1st stage alarm set values>, <2nd stage alarm set values>, <TWA alarm set values>, and <STEL alarm set values> screens will be displayed on the LCD in sequence for 2 seconds each, then the LCD will return to the <gas concentrations> screen.



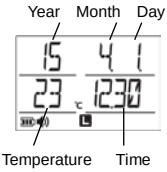
NOTE Contact your New Cosmos representative for changing the alarm set values.

3-3-6. Display Date/Time/Temperature

During normal operation, press and hold the [MENU POWER] and [AIR ADJ.] buttons simultaneously for 3 seconds.
--> Date, time and temperature will be displayed on the LCD for 5 seconds, the LCD will then return to the <gas concentrations> screen automatically.

NOTE

- For the year, the last two digits of the year are displayed on the LCD, e.g., “15” is displayed for the year 2015.
- A temperature sensor is built in the detector, use the displayed temperature for reference.



<Date/time/temperature>

3-4. User Mode

User mode is used to perform an alarm test, make settings (audio on/off, audio volume control, clock adjustment, and battery saving mode on/off) and perform data logging.

⚠ WARNING

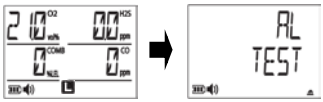
- Gas detection is not possible during user mode.
- The set details in the user mode will be saved even after the unit is turned off or the battery is removed.

NOTE

The LCD will automatically return to the <gas concentrations> screen, if the unit is left idle during user mode for one minute.

3-4-1. Enter User Mode

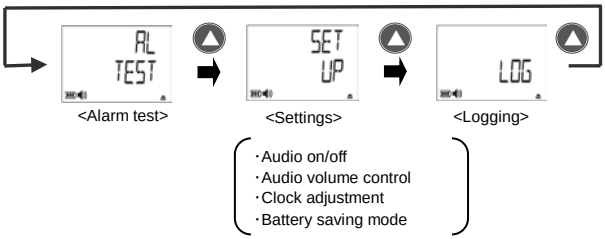
During normal operation, press the [MENU POWER] button.
--> After the unit beeps once, the user mode will start with “AL TEST” (alarm test) displayed on the LCD.



<Gas concentrations>

3-4-2. Change Mode

During user mode, press the [AIR ADJ.] button once.
--> Continue pressing the button to cycle through the following modes:
[AL TEST] (alarm test), [SET UP] (settings), and [LOG] (logging).



<Alarm test> <Settings> <Logging>

・Audio on/off
・Audio volume control
・Clock adjustment
・Battery saving mode

While the desired mode name is displayed, press the [MENU POWER] and [AIR ADJ.] buttons simultaneously to select that mode.
--> After the unit beeps once, the selected mode will start.
(See the next page for the functions and setting of each mode.)

User Mode

Mode	Function and setting		Reference
Alarm test [AL TEST]	Checks an alarm operation (1st/ 2nd stage alarm LEDs, sound, and vibration). Additionally, the alarm volume can be adjusted.		Page 18
Setting [SET UP]	Audio on/off	Sets the audio to on/off for alarm sound and button tone.	Page 20
	Audio volume control	Adjusts the volume level for alarm sound and button tone.	Page 21
	Clock adjustment	Adjusts the current date and time.	Page 22
	Battery saving mode *1	Sets the battery saving mode to on/off by switching the detection interval of combustible gas sensor.	Page 23
Logging [LOG]	Logs (records) the time, gas concentration and temperature at a preset interval. This mode allows the following operations: • To start/stop data logging • To delete log data • To set the logging interval rate • To read out log data *2		Pages 24 to 26

*1. The battery saving mode is set to “ON” by default when shipped out. If the battery saving mode is set to “OFF”, the detection cycle of the combustible gas sensor and the response time will be shortened, resulting in halving the battery life.

*2. A personal computer and a data logger kit (sold separately) are required to read out log data. See the data logger kit’s instruction manual for the read-out procedure.

3-4-3. Exit User Mode

While navigating in the user mode, each of the press the [MENU POWER] button returns to the previous step.

To exit the user mode, press the [MENU POWER] button repeatedly until the LCD returns to the <gas concentrations> screen.

<Gas concentrations>

Return from AL1 test screen to gas concentrations screen

3-4-4. Operating Procedure

Operating procedure for each button is described below.

- Select the option: Press the [AIR ADJ.] button.
  (Press the button to cycle through the options)
- Confirm your selection/setting:
  Press the [AIR ADJ.] and [POWER] buttons simultaneously.
- Return to the previous step:
  Press the [POWER] button.
  (Each press of the button will return to the previous step.)
- Reverse the sequence: Press and hold the [AIR ADJ.] and [POWER] buttons simultaneously for 3 seconds.

NOTE

How to reverse the display sequence:

Press and hold the [AIR ADJ.] and [POWER] buttons simultaneously to reverse the display sequence. After one beep, the arrow icon at the bottom right corner of the LCD will flip vertical.
The same operation reverses the display sequence again.
The sequence returns to the default (upward arrow) if the unit is turned off.

Downward arrow

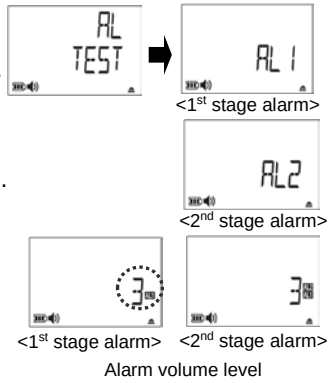
(A) Alarm Test

Enter the user mode (page 16), and take the following steps.

1) While [AL TEST] is displayed, press the [AIR ADJ.] and [POWER] buttons simultaneously.
   --> [AL1] (1st stage alarm) will be displayed (selected).

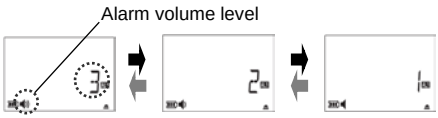
2) To select [AL2] (2nd stage alarm), press the [AIR ADJ.] button.
   --> [AL2] (2nd stage alarm) will be displayed (selected).

3) To confirm the selection, [AL1] or [AL2], press the [AIR ADJ.] and [POWER] buttons simultaneously.
   --> The selected alarm test will be started and the current alarm volume will be displayed.



<1st stage alarm>
<2nd stage alarm>
<1st stage alarm> <2nd stage alarm>
Alarm volume level

4) To change the alarm volume, press the [AIR ADJ.] button.
--> The volume level can be changed in three steps.



WARNING

- The factory default for alarm volume level is 3.
- The change of audio alarm level should be performed by the safety supervisor. When the level is changed, perform an alarm test to check the audio level.

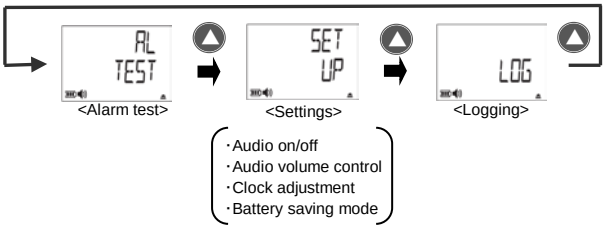
5) To confirm the change, press the [POWER] button.

6) To continue the alarm test, repeat the steps from 2) to 5).

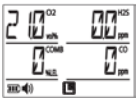
(Returns to AL1 for 1st stage alarm)

7) Press the [POWER] button.
--> The LCD will return to the [AL TEST] display.

8) To go to a different mode, press the [AIR ADJ.] button for mode selection.
--> Press the button to cycle through the following modes: [AL TEST] (alarm test), [SET UP] (settings), and [LOG] (logging).



9) To exit the user mode, press the [POWER] button repeatedly until the LCD returns to the <gas concentrations> screen.



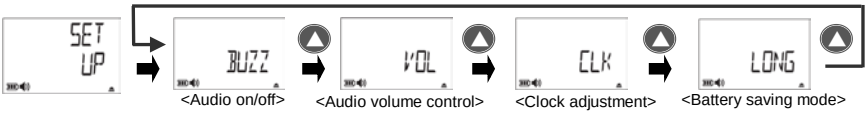
<Gas concentrations>

(B) Setting

Enter the user mode (page 16), and take the following steps.

1) While [SET UP] is displayed, press the [AIR ADJ.] and [POWER] buttons simultaneously.

2) Press the [AIR ADJ.] button to cycle through the following options: [BUZZ] (audio on/off), [VOL] (audio volume control), [CLK] (clock adjustment), and [LONG] (battery saving mode).



<Audio on/off> <Audio volume control> <Clock adjustment> <Battery saving mode>

3) See below for the setting procedure for each option.

(B-1) Audio on/off

1) While [BUZZ] is displayed, press the [AIR ADJ.] and [POWER] buttons simultaneously.
--> The current status (ON or OFF) will be displayed.

(Audio is on)

2) Press the [AIR ADJ.] button to switch between the ON and OFF options. Select ON or OFF.
--> The selected option (ON or OFF) will be displayed.

<OFF is selected>

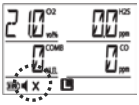
3) To confirm the selection, press the [AIR ADJ.] and [POWER] buttons simultaneously.
--> "SAVE OK?" will be displayed.

4) To save the selection. press the [AIR ADJ.] and [POWER] buttons simultaneously
--> When ON is selected, the unit will beep twice and the audio mute icon will be hidden; when OFF is selected, the unit will not beep and the audio mute icon will be displayed. The LCD will then return to the [BUZZ] display.

(Audio mute icon displayed when audio is off)

5) To continue adjusting settings, press the [AIR ADJ.] button and select the next item. (page 20 "(B) Setting")

6) To exit the user mode, press the [POWER] button repeatedly until the LCD returns to the <gas concentrations> screen.
--> When the audio is set to OFF, the audio mute icon is displayed on the <gas concentrations> screen.


(Audio mute icon when audio is off)

WARNING Audio on/off setting will be saved even after the unit is turned off or the battery is removed.

(B-2) Audio Volume Control

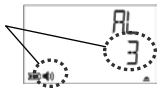
1) While [VOL] is displayed, press the [AIR ADJ.] and [POWER] buttons simultaneously.
"BEEP" will be displayed.

<Button tone>

2) Press the [AIR ADJ.] button to switch between [BEEP] (button tone) and [AL] (alarm sound).
--> The selected item [AL] or [BEEP] will be displayed.

<Button tone> <Alarm sound>

3) To confirm the seletion, press the [AIR ADJ.] and [POWER] buttons simultaneously.
--> The current volume level (3, 2 or 1) will be displayed.



(Alarm volume 3)

4) Press the [AIR ADJ.] button to select the volume level.
--> Each time you press the button, the unit will beep twice then the volume level will change.

(Alarm volume 2)

(Alarm volume 1)

NOTE

- Alarm volume indicator (icon) will change only when the [AL] (alarm sound) level is changed.
- The factory default is 3 for alarm sound and 1 for button tone.


3: Loud 2: Medium 1: Small

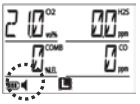
5) To confirm the selection, press the [AIR ADJ.] and [POWER] buttons simultaneously.
--> "SAVE OK?" will be displayed.

6) To save the selection, press the [AIR ADJ.] and [POWER] buttons simultaneously.
--> The unit will beep twice and the adjustment will be completed. The LCD will return to the [VOL] display.
The alarm volume indicator will change only when the alarm volume is changed. It will not change when the button tone is changed.

(Alarm volume 1)

7) To continue adjusting settings, press the [AIR ADJ.] button and select the desired option. (page 20 "(B) Setting")

8) To exit the user mode, press the [POWER] button repeatedly until the LCD returns to the <gas concentrations> screen.
--> The alarm volume indicator shown at the bottom of the screen will change, only when the [AL] level is changed.


(Alarm volume 1)

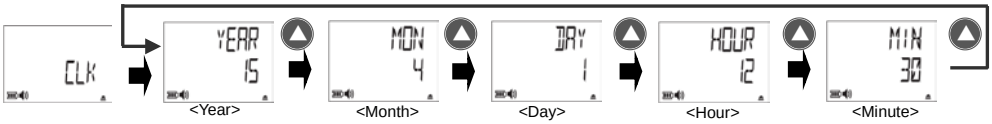
WARNING

- Audio volume setting will be saved even after the unit is turned off or the battery is removed.
- It is not possible to check the volume level while the audio is set to OFF.

(B-3) Clock Adjustment

1) While [CLK] is displayed, press the [AIR ADJ.] and [POWER] buttons simultaneously.
--> [YEAR] (year) will be displayed.

2) To cycle through the following items: [YEAR] (year), [MON] (month), [DAY] (day), [HOUR] (hour) and [MIN] (minute), press the [AIR ADJ.] button.
--> The current setting value of each item will be displayed.



<Year> <Month> <Day> <Hour> <Minute>

3) To select the item, press the [AIR ADJ.] and [POWER] buttons simultaneously.
--> Selected item name and its setting value (blinking) will be displayed.

Blinking
(To change day 1)

4) Press the [AIR ADJ.] button to increase the value incrementally, or press and hold the button to increase the value quickly.

5) To confirm the setting, press the [AIR ADJ.] and [POWER] buttons simultaneously.
--> "SAVE OK?" will be displayed.

6) To save the setting, press the [AIR ADJ.] and [POWER] buttons simultaneously.
--> The unit will beep twice and the LCD will return to the item screen.

(Day is changed to 5)

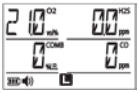
7) To set other items, repeat the steps from 2) to 6) for each item.

WARNING
- Do not set a date which does not exist on the calendar. Such date will contradict the log data.
- Do not adjust the clock while data logging. Doing so may cause error in the log data.

8) Press the [POWER] button to complete the clock adjustment.
--> The LCD will return to the [CLK] display.

9) To continue adjusting settings, press the [AIR ADJ.] button and select the next item.

10) To exit the user mode, press the [POWER] button repeatedly until the LCD returns to the <gas concentrations> screen.



<Gas concentrations>

(B-4) Battery Saving Mode

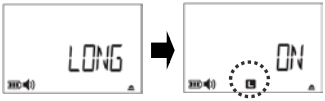
The battery saving mode is available only on models that use a combustible gas sensor. This mode is set to ON by default when shipped out. When the mode is set to OFF, the detection cycle of the combustible gas sensor will become shorter and the response time will become faster, as a result, the battery life will become halved.

Battery saving mode	Continuous operation time
ON	Approx. 40 hours
OFF	Approx. 20 hours

* The battery life may vary depending on several factors including environment, usage conditions, and storage period. When used at low temperature, the battery life will be shorter than when used at room temperature due to battery's characteristics.

NOTE The battery saving mode of/off setting will be saved even after the unit is turned off or the battery is removed.

1) While [LONG] is displayed, press the [AIR ADJ.] and [POWER] buttons simultaneously.
   --> The current status (ON or OFF) will be displayed. When the setting is ON, L will appear in the center bottom of the LCD.



(Battery saving mode is on)

NOTE For models without a combustible gas sensor, the unit will emit a steady tone and [LONG] will remain on the LCD.

2) Press the [AIR ADJ.] button.
   --> ON/OFF will be switched.
   When OFF is selected, L will go off.
   When ON is selected, L will appear in the center bottom of the LCD.

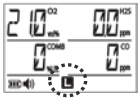
(OFF is selected)

3) To confirm the selection, press the [AIR ADJ.] and [POWER] buttons simultaneously.
   --> "SAVE OK?" will be displayed.

4) To save the selection, press the [AIR ADJ.] and [POWER] buttons simultaneously.
   -->The unit will beep twice and the LCD will return to the [LONG] display.

5) To continue adjusting settings, press the [AIR ADJ.] button and select the next item. (page 20 "(B) Setting")

6) To exit the user mode, press the [POWER] button repeatedly until the LCD returns to the <gas concentrations> screen.
   --> When the battery saving mode is on, the battery saving mode icon L will appear on the <gas concentrations> screen.


(Battery saving mode is on)

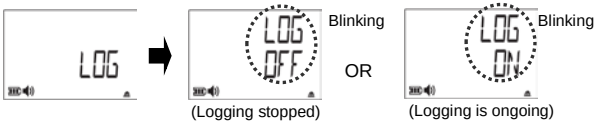
(C) Data Logging

Enter the user mode (page 16), and take the following steps.

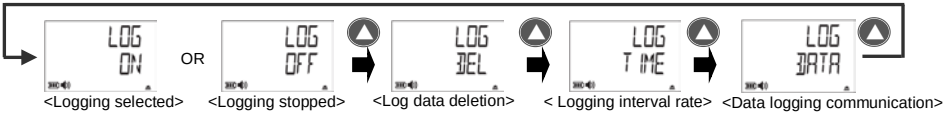
NOTE

- Ensure that the clock has been set before starting data logging.
- To read out the log data, a personal computer and a data logger kit (sold separately) are required. See the data logger kit's instruction manual for the read-out procedure.

1) While [LOG] is displayed, press the [AIR ADJ.] and [POWER] buttons simultaneously.
   --> The current status "LOG OFF" (logging is off)" or "LOG ON" (logging is ongoing) will be displayed.



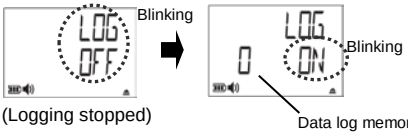
2) To select [LOG DEL] (log data deletion) or [LOG TIME] (logging interval rate), press the [AIR ADJ.] button while [LOG DEL] or [LOG TIME] is displayed.



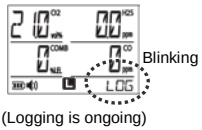
3) See the followings for each setting.

(C-1) Start Logging

1) While [LOG OFF] is displayed, press the [AIR ADJ.] and [POWER] buttons simultaneously.
   --> [LOG ON] will be displayed. The number shown at the bottom left of the LCD is the data log memory usage, represented as a percentage.



2) To start logging, press the [AIR ADJ.] and [POWER] buttons simultaneously.
   --> The unit will beep twice and the LCD will return to the <gas concentrations> screen, and "LOG" (logging is ongoing) will blink at the bottom right of the LCD.



NOTE

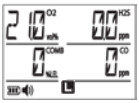
If the unit is turned off while data logging is ongoing, the data will be automatically saved then the logging will be stopped.

(C-2) Stop Logging

1) While [LOG ON] is displayed, press the [AIR ADJ.] and [POWER] buttons simultaneously.
--> [LOG OFF] will be displayed (selected).

(Logging selected)

2) To stop logging, press the [AIR ADJ.] and [POWER] buttons simultaneously.
--> Data logging will stop. The unit will beep twice and the LCD will return to the <gas concentrations> screen. The blinking “LOG” (logging is ongoing) at the bottom right of the LCD will go off.



<Gas concentrations>
(Logging stopped)

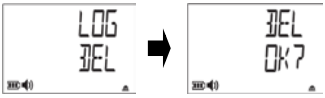
To stay in the logging mode, press the [AIR ADJ.] button and select the next item.

To exit the user mode, press the [POWER] button repeatedly until the LCD returns to the <gas concentrations> screen.

(C-3) Delete Log Data

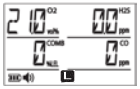
NOTE
- All data will be erased if the log data deletion is excuted.
- Log deletion is not enabled while data logging is running.

1) While [LOG DEL] is displayed, press the [AIR ADJ.] and [POWER] buttons simultaneously.
--> “DEL OK?” will be displayed.



2) To execute log data deletion, press the [AIR ADJ.] and [POWER] buttons simultaneously.
--> The unit will beep twice and the log data will be deleted. The LCD will return to the [LOG DEL] display.

To stay in the logging mode, press the [AIR ADJ.] button and select the next item.

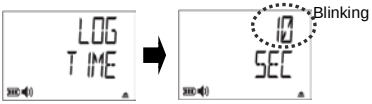


<Gas concentrations>

To exit the user mode, press the [POWER] button repeatedly until the LCD returns to the <gas concentrations> screen.

(C-4) Adjust Logging Interval Rate

1) While [LOG TIME] is displayed, press the [AIR ADJ.] and [POWER] buttons simultaneously.
   --> The current logging interval rate "_ _ SEC (seconds)" will be displayed.



(Current logging interval rate is 10 sec)

Press the [AIR ADJ.] button to adjust the interval rate.
--> Each press of the button will change the value (seconds).

(Logging interval rate is set to 60 sec)

Configurable logging interval rate (in seconds)
0.5
1, 2, 3, 4, 5, 6, 7, 8, 9, 10
20, 30, 40, 50, 60(1min)
120, 180, 240, 300, 360, 420, 480, 540, 600 (10 min.)
1200, 1800, 2400, 3000, 3600 (60 min.)

NOTE

How to reverse the display sequence:

Press and hold the [AIR ADJ.] and [POWER] buttons simultaneously to reverse the display sequence for logging interval rate options. After one beep, the arrow icon at the bottom right corner of the LCD will flip vertical.
The same operation reverses the display sequence again.
The sequence returns to the default (upward arrow) if the unit is turned off.

(Downward arrow)

NOTE

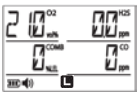
- The factory default of the logging interval rate is 10 seconds.
- The logging period is approx. 40 hours when the logging interval rate is set to 10 seconds.
- If data log memory is full, logging will automatically stop.

2) To confirm the selection, press the [AIR ADJ.] and [POWER] buttons simultaneously.
   --> "SAVE OK?" will be displayed.

3) To save the selection, press the [AIR ADJ.] and [POWER] buttons simultaneously.
   -->The unit will beep twice then the LCD will return to the [LOG TIME] display.

4) To continue adjusting settings, press the [AIR ADJ.] button and select the next item.

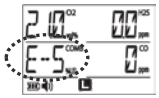
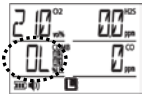
5) To exit the user mode, press the [POWER] button repeatedly until the LCD returns to the <gas concentrations> screen.



<Gas concentrations>

4. Error Messages

If an abnormality occurs in the detector, the corresponding error message will be displayed on the LCD, the unit will beep, and the alarm LEDs will blink red. Note that the audio alarm for a sensor error will be activated when any one of the mounted sensors fails.
To silence the audio alarm, press the [▲ AIR ADJ.] button. The blinking LEDs will turn off when the power is turned off.
The table below lists major error messages. If an error occurs, check the cause of the error and take necessary actions. When no error message is displayed but the button or display does not function, remove the battery, reinstall it, and turn the unit on again. If the unit does not reset to normal, contact New Cosmos or your New Cosmos representative for repair.

Error message	Error condition	Cause	Action
 (Error in combustible gas sensor)	Sensor error “E-S” blinks for the corresponding gas.	Sensor malfunction Gas was present when the detector was turned on	If the error occurs at powering-up, turn the unit off then on in clean air. If the unit does not reset to normal after that, call us for repair.
	Adjustment error of oxygen sensor “E-A” blinks for oxygen.	Oxygen sensor malfunction	Call us for repair.
	Battery empty “E-B” is shown.	Low battery voltage	This is not a failure. Replace/charge the battery (pages 28 and 29).
	Internal clock battery empty “E-b” is shown.	Low battery voltage	Call us for repair.
	Detector error “E-T” is shown.	Detector malfunction	Call us for repair.
	Over-range condition “OL” blinks for the corresponding gas.	The upper limit of the service range is exceeded	This is not a failure. The display will return to normal (gas concentrations screen, page 11), if the gas concentration falls below the upper limit.
	Sensor error “E-U” is shown.	Sensor output does not fall in the normal range within a time frame, and the detector times out as a result.	Turn the unit off then on in clean air. If the unit does not reset to normal after that, call us for repair.

5. Consumable Replacement

5-1. Battery Replacement (BP-4000IIAL)

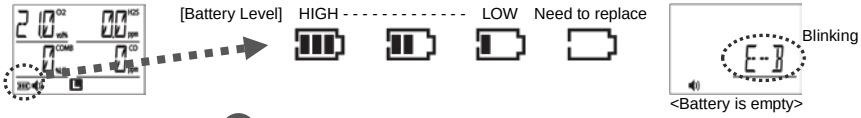
⚠ WARNING

- Replace the battery only in non-hazardous locations.
- Make sure to use a Panasonic (or Duracell or Energizer or Varta) alkaline battery (LR03/AAA). We cannot guarantee the intrinsically safe performance if an unspecified battery is used.
- Make sure to remove dust from O-ring of battery cover and sealing between the Multi -gas Detector and battery cover, as dust may be a of cause water ingress into the Multi-gas Detector.
- Always remove water and dust before opening the battery cover. Entry of water or dust inside the Multi-gas Detector may cause trouble.
- If battery cover O-ring is damaged, be sure to replace entire battery cover, as it may lead to water ingress into the Multi-gas Detector.
- Do not replace the batteries when an explosive gas atmosphere may be present.

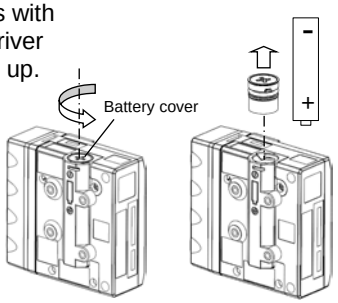
NOTE

- If  is displayed, it is recommended to replace the battery before it becomes empty.
- Only use a new battery for replacement.
- When used at low temperature, the battery life will be shorter than when used at room temperature due to battery's characteristics. If the battery level is low, it is recommended to replace the battery before it becomes empty.

The user can estimate the timing of battery replacement by checking the battery level indicator on the LCD. When the battery is drained, "E-B" will be displayed on the LCD and the unit will beep, and the unit will not detect gases any longer. The LCD will then turn off when the battery is completely drained.



1) Press and hold the [MENU POWER] button for 3 seconds to turn off the power.
2) Rotate the battery cover counterclockwise 45 degrees with a Phillips screwdriver (point size: 2) or slotted screwdriver (6 mm) to unlock. Continue turning until the cover lifts up. Turn it once or twice to free the cover.



NOTE

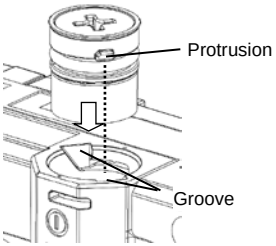
- Use a Phillips screwdriver (point size: 2) or slotted screwdriver (6 mm) (see page 33 for the shape). If the screwdriver is too small, it may damage or deform the battery cover.
- Slowly turn the screwdriver. The battery cover will be damaged or deformed if too much force is used.

3) Remove the battery cover using fingers.

4) Remove the drained battery. Insert a new battery by referring to the marking.

5) Align the protrusion of the battery cover along the groove.

6) Push and rotate the battery cover clockwise until it is tight with a Phillips or slotted screwdriver.



NOTE

If the battery level is still low even after battery replacement, remove the battery, and reinstall it.

5-2. Charge Battery (BP-4000IIMH)

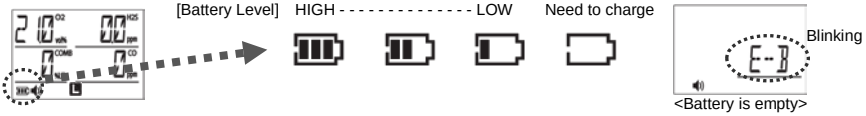
⚠ WARNING

- Charge and insert the battery only in non-hazardous locations.
- Charge the battery with a specified battery charger (BC-9).
- Make sure to use a specified battery (GP75AAAHC). We cannot guarantee the intrinsically safe performance if an unspecified battery is used.
- Make sure to remove dust from O-ring of battery cover and sealing between the multi -gas detector and battery cover, as dust may cause water ingress into the multi-gas detector.

NOTE

- If is displayed, it is recommended to charge the battery before it becomes empty.
- When used at low temperature, the battery life will be shorter than when used at room temperature due to battery's characteristics. If the battery level is low, it is recommended to charge the battery before it becomes empty.
- Rechargeable batteries deteriorate after repeated charge/discharge cycles, which reduces the battery life. Replace the battery if continuous operation time becomes extremely short, indicating the end of the battery life.

The user can estimate the timing of battery replacement by checking the battery level indicator on the LCD. When the battery is drained, "E-B" will be displayed on the LCD and the unit will beep, the detector will not detect gases any longer. The LCD will then turn off when the battery is completely drained.



5-3. Filter Element Replacement

Replace the filter elements with new ones if they are dirty or wet.

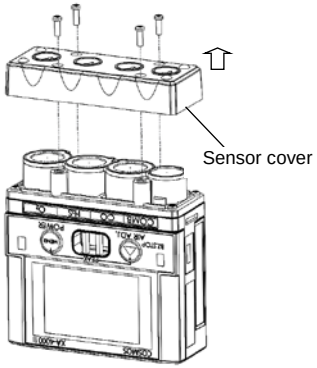
⚠ WARNING

- Ensure that the filter elements and sensor cover are installed correctly. Misalignment may compromise gas detection and waterproof performance.
- Firmly tighten the screws. Loose screws may cause water ingress into the detector.
- Call us for repair if the water is observed inside the detector. Proper gas detection is not possible if water is present inside the gas detector.
- Do not switch the sensor locations. Doing so may cause a failure or error, which will then compromise proper gas detection
- Do not take off the sensor cover when an explosive gas atmosphere may be present.

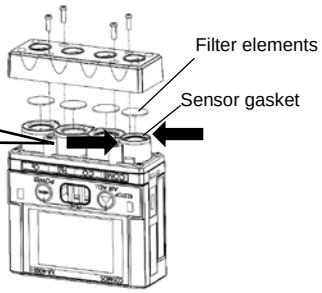
NOTE Do not push or poke the filter elements with a finger etc. Deformation or breakage of the filter elements may compromise their waterproof function.

1) Remove the sensor cover by untightening the four scre

NOTE Use a screwdriver with point size 1 (see page 33 for the shape).



2) Remove the filter elements from the openings of the sensor gasket (black rubber seal).



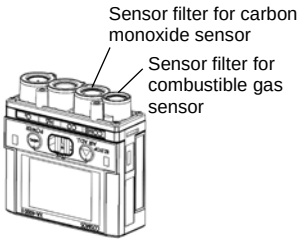
For easy removal, lightly pinch the sensor gasket from sides so that the filter element will come out.

3) Attach new filter elements to the openings of the sensor gasket.

⚠ CAUTION Ensure that the filter elements are correctly seated in the openings of the sensor gasket. Misalignment may compromise the waterproof performance of the product.

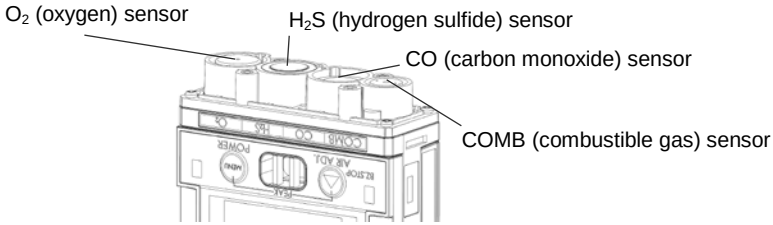
NOTE

- For combustible gas and carbon monoxide sensors, a sensor filter (for interference gas removal) is placed under each filter element. Ensure that the sensor filter and filter element are properly aligned.
- Replace the sensor filters as required (page 32).



4) Install the sensor cover by tightening the four screws.
(Recommended tightening torque: 19 cN·m)

⚠ WARNING If the sensors come off from the detector, put them back in their correct locations by referring to the gas names printed on the front of the detector.



NOTE Tighten the four screws evenly in an “X” pattern. Uneven tightening may compromise the waterproof performance of the product.

5-4. COMB/CO Sensor Filter Replacement

Replace the sensor filters for combustible gas and carbon monoxide sensors with new ones at least once every 6 months regardless of the frequency of use.

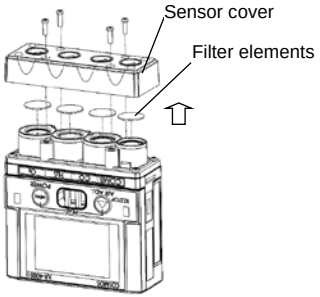
⚠ WARNING

- Ensure that the sensor filters, filter elements and sensor cover are installed correctly. Misalignment may compromise the detection and waterproof performance of the product.
- Do not push or poke the filter elements with a finger etc. Deformation or breakage of the filter elements may compromise their waterproof function.
- Firmly tighten the screws. Loose screws may cause water ingress into the detector.
- Proper gas detection is not possible if water is present inside the gas detector. Call us for repair.

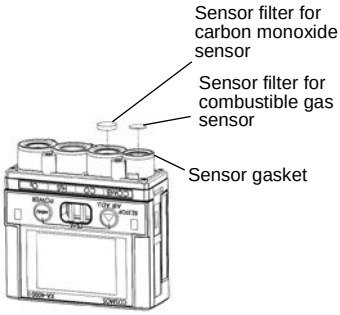
1) Remove the four screws. Remove the sensor cover and filter elements.

NOTE

Use a screwdriver with point size 1 (see page 33 for the shape).

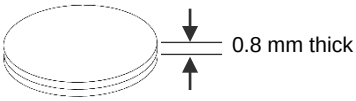


2) Remove the sensor filters.

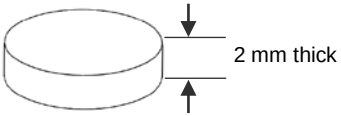


NOTE

- Sensor filter for combustible gas sensor



- Sensor filter for carbon monoxide sensor



3) Install new sensor filters in the openings of the sensor gasket.

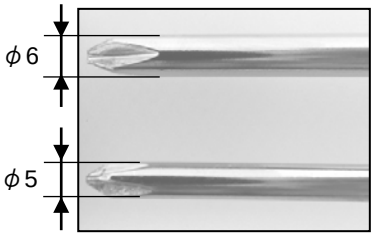
> **⚠ CAUTION** Ensure that the filter elements are correctly seated in the openings of the sensor gasket. Misalignment may compromise the waterproof performance of the product.

4) Install the sensor cover by tightening the four screws.
(Recommended tightening torque: 19 cN·m)

NOTE Tighten the four screws evenly in an “X” pattern. Uneven tightening may compromise the waterproof performance of the product.

NOTE Screwdriver Size and Shape

Phillips screwdriver



Point size: No. 2
(ISO/DIS 8764-1, ISO 8764-2)

Point size: No. 1
(ISO/DIS 8764-1, ISO 8764-2)

Slotted screwdriver

Size: 6 mm

5-5. Battery Unit Replacement

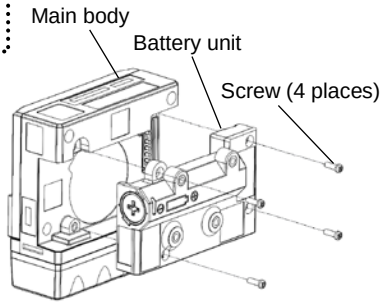
⚠ WARNING

- Replace the battery unit only in non-hazardous area.
- Firmly tighten the screws. Loose screws may cause water ingress into the detector.
- Call us for repair if the water is observed to be inside. Proper gas detection is not possible if water is present inside the gas detector.
- Do not replace the battery unit when an explosive gas atmosphere may be present.

1) Press and hold the [MENU POWER] button for three seconds to turn off the power.

2) Remove the four screws. Pull and remove the battery unit from the main body.

NOTE Use a screwdriver with point size 1 (see page 33 for the shape).



3) Attach a new battery unit to the main body.

4) Tighten the four screws.
(Recommended tightening torque: 14 cN·m)

NOTE Tighten the four screws evenly in an “X” pattern. Uneven tightening may compromise the waterproof performance of the product.

6. Maintenance

This product is a precision instrument. Please perform the periodical checks and inspections below to maintain the detector's performance and ensure safety. In the event of a failure to follow the safety precautions (pages 4 and 5), such as impact shock from dropping or water ingress inside the detector, or use in conditions outside the specifications (pages 39 and 40), such as usage in temperature/humidity exceeding the specified range, please contact New Cosmos or your New Cosmos representative for inspection (fees may apply). Providing a description of the current situation would be appreciated when you contact.

6-1. Routine Check

Check item	Description
LCD indications	Check that all the segments (all letters and icons) are displayed on LCD. (See page 9 "Power on")
Alarm function	Check that the alarm LEDs, audio alarm and vibration work properly. (See page 18 "Alarm Test" for the procedure)
Filter elements	Check that the filter elements are clean and dry. Replace the filter elements with new ones if they are dirty or wet. (See page 30 "Filter Element Replacement")
Battery level	Check the battery level indicator at the bottom left corner of the LCD. If the battery level is low, replace the battery with a new one (page 28 "Battery Replacement") or charge the battery (page 29 "Charge Battery"). [Battery Level] HIGH . . . . . LOW Need to replace Need to charge   Blinking (Battery is empty) NOTE ・ When used at low temperature, the battery life will be shorter than when used at room temperature due to battery's characteristics. It is recommended to replace/charge the battery earlier, or have spare batteries. ・ It is recommended to replace/charge the battery earlier when  is displayed at the bottom left corner of the LCD.

6-2. Annual/Semiannual Inspection

- It is recommended to contact New Cosmos or your New Cosmos representative to perform a gas inspection at least once every six months.
- Contact New Cosmos or your New Cosmos representative to perform a periodic inspection at least once a year, including sensor calibration and filter replacement.

> ⚠ **WARNING** The recommended replacement cycle for sensors is three years, which is applicable only when a periodic inspection is performed at least once a year. The replacement cycle changes depending on the use of the detector and the environmental conditions. If the detector is being used under conditions different from those specified such as where temperature and/or humidity is/are high, or if the detector has suffered an impact by falling from a height, or if it was exposed to water, a high concentration gas, or gas poisoning, then make sure to carry out a periodic inspection before use to ensure the normal operation of the detector.

6-3. Cleaning

If the detector is dirty, wipe it off with a soft dry cloth or with a moist cloth, or a cloth fully wrung out of water (dry enough not to leave the product surface wet). Do not use any alcohol or detergent.

6-4. Consumable Parts

Part Name	Model	Description/Reference
Filter element	FE-128	Replace at least once a year or when dirty or wet. (Page 30 “Filter Element Replacement”)
Battery cover (with O-ring)		Replace when the battery cover is deformed. (Page 28 “Battery Replacement”)
Sensor filter for combustible gas sensor	FE-140	Replace every six months. (Page 32 “COMB/CO Sensor Filter Replacement”)
Sensor filter for carbon monoxide sensor	FE-130	
Sensor gasket		Replace when damaged or deformed.
GP rechargeable battery	GP75AAAHC	Nickel-metal hydride battery Replace the rechargeable battery when continuous operation time becomes extremely short or at least once every two years.

* The warranty period for consumable parts is one year from the date of purchase. The warranty terms and conditions are the same as the one for the gas detector.

7. Troubleshooting

Before contacting us for service repair, perform basic troubleshooting using the table below. If the detector locks up (cannot be turned off), remove the battery. After a few minutes, put it back in and turn on the detector.

Problem	Cause	Steps	Reference
Pressing the [MENU POWER] button does not turn on the power	Battery orientation incorrect	Remove the battery and reinstall it in the correct orientation.	“Battery Replacement” on page 28
	Battery depleted	Replace/charge the battery.	“Charge Battery” on page 29
No audio sound	Audio is set to the OFF position (mute).	Set the audio to the ON position.	“Audio on/off” on page 20
Error message is displayed	See “Error Messages” on page 27		
“0” or “0.0” blinks for gas concentration	The reading shifts in the negative area. It indicates there is a possibility that either a high concentration gas was detected or air adjustment was performed in a gas atmosphere.	Perform air adjustment in clean air.	“Air Adjustment (Zeroing)” on page 14

8. 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 proper use in accordance with the instruction manual and specifications, we will provide a free replacement and repair service. This warranty covers the New Cosmos product/parts only and not third party product/parts.

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

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

9. Specifications

Multi-gas Detector

Model	XA-4400II			
Target gas	Methane or isobutane (Combustible gas)	Oxygen	Hydrogen sulfide	Carbon monoxide
Detection principle	Catalytic	Galvanic cell	Electrochemical	Electrochemical
Gas sampling method	Diffusion			
Measuring range (Service range*1)	0-100%LEL (101-110%LEL)	0-25.0vol% (25.1-50.0vol%)	0-30.0ppm (30.1-150.0ppm)	0-300ppm (301-2000ppm)
Accuracy*2 (excluding service range)	Within ±10%LEL	Within ±0.5vol%	Within ±1.5ppm	Less than 150ppm: Within ±15ppm 151-300ppm: Within ±30ppm
Display resolution	1%LEL	0.1vol%	0-35ppm: 0.1ppm 35-150ppm: 0.5ppm	0-350ppm: 1ppm 350-2000ppm:5ppm
Alarm set values	1st stage alarm: 10%LEL 2nd stage alarm: 30%LEL	1st stage alarm: 19.5vol% (Lower limit) 2nd stage alarm: 18.0vol% (Lower limit)	1st stage alarm: 10.0ppm 2nd stage alarm: 15.0ppm TWA: 10.0ppm STEL: 15.0ppm	1st stage alarm: 50ppm 2nd stage alarm: 150ppm TWA: 25ppm STEL: 300ppm *3
Response time*4	Within 30 seconds	Within 20 seconds	Within 30 seconds	Within 30 seconds
Gas alarm method	Beeping with blinking red LEDs, vibration, and “AL1”/“AL2” icon on the LCD (automatic resetting)			
Power source	For BP-4000IIAL battery unit: Panasonic (or Duracell or Energizer or Varta) AAA alkaline battery (LR03) x 1 For BP-4000IIMH battery unit: GP rechargeable nickel-metal hydride battery (GP75AAAHC) x 1			
Continuous operation time*5	Approx. 40 hours when the battery saving mode is active / Approx. 20 hours when the battery saving mode is inactive / Approx. 1200 hours without combustible gas sensor			
Operating temperature/humidity	-20 to 50°C, 30 to 85%RH (No condensation)			
Operating pressure range	Atmospheric pressure (800 to 1100 hPa)			
Explosion-proof compliance	Class I, Zone 0 AEx ia llC T3 Ga Class I, Division 1 Groups A, B, C, D			
Ingress protection	Equivalent to IP67 *6			
Main features	Self-diagnosis (sensor error), automatic air adjustment, battery level indication, peak-hold, LCD backlight, audio alarm muting during gas alarm, time/temperature indication, alarm test, alarm volume change, audio muting, battery saving mode, data logging			
Dimensions	70 (W) x 73 (H) x 26 (D) mm (excluding protrusions)			
Mass	Approx. 130g (excluding battery)			

Specifications may be subject to change without notice.

*1: Reference indication beyond the measuring range.

*2: Under an identical measurement condition.

*3: STEL alarm set value of carbon monoxide is not defined by ACGIH, but the manufacturer’s standard value.

*4: Time for 90% response (at 20 ± 2°C in ambient temperature).

*5: At 25°C, with no alarm, backlight and data logging off. The time varies according to the circumstances, condition of use, storage period, etc.

*6: Dust-proof and water-proof structure which meets the New Cosmos test complying with IEC60529 ingress protection code IP67 in the condition of brand-new detector. However, this ingress protection code IP67 does not guarantee any gas detection.
IP67 refers a combined structural rating (IP6X) in which a unit is tested using a dust test where the unit is depressurized by a maximum of 2 kPa from ambient air pressure and placed in a chamber containing a quantity of dust to verify that there is no accumulation of dust inside the unit, and a structural rating (IPX7) in with which a unit is slowly immersed in a stationary water bath filled with normal tap water with the bottom of the unit at 1m from the water surface for 30 minutes to verify that there is no water entry and damage from exposure.

Explosion-proof Specifications

Multi-gas detector

Model		XA-4400II
Type of protection		Class I, Zone 0 AEx ia IIC T3 Ga Class I, Division 1 Groups A, B, C, D
Ingress protection code		IP20 (with BP-4000IIAL or BP-4000IIMH)
Rating	Ambient temperature	-20≦Ta≦+50°C

Battery unit (for alkaline battery)

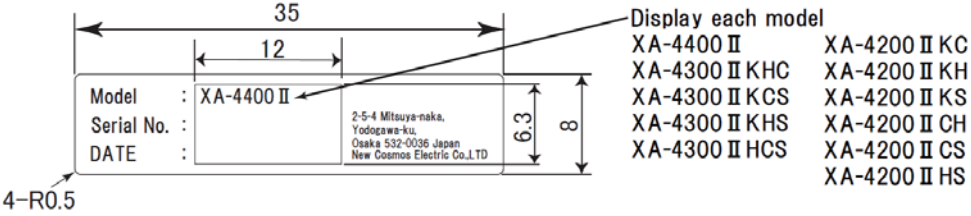
Model		BP-4000IIAL
Type of protection		Class I, Zone 0 AEx ia IIC T3 Ga Class I, Division 1 Groups A, B, C, D
Ingress protection code		IP20 (with XA-4400II)
Rating	Ambient temperature	-20≦Ta≦+50°C

Battery unit (for rechargeable battery)

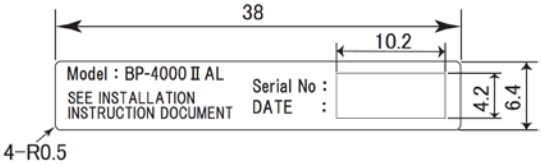
Model		BP-4000IIMH
Type of protection		Class I, Zone 0 AEx ia IIC T3 Ga Class I, Division 1 Groups A, B, C, D
Ingress protection code		IP20 (with XA-4400II)
Rating	Ambient temperature	-20≦Ta≦+50°C

Explosion-proof Markings

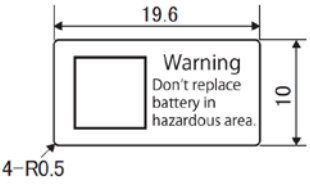
1. Manufacturing number label



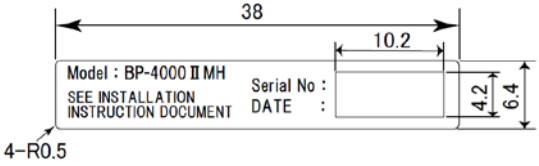
2. Battery case manufacturing number label
(For BP-4000IIAL)



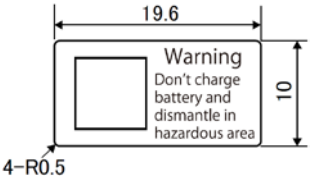
3. Battery case warning label
(For BP-4000IIAL)



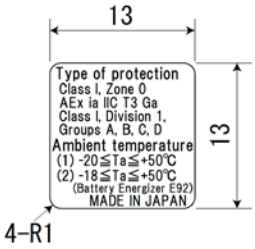
(For BP-4000IIMH)



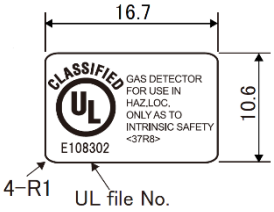
(For BP-4000IIMH)



4. Explosion-proof label



5. UL classification mark label



(Dimensions are in mm)

10. Disposal

When disposing of the used detector, treat it as industrial waste in accordance with the applicable laws and regulations.

Battery disposal

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

11. Detection Principle

Galvanic cell sensor (oxygen)

The sensor consists of two electrodes, a membrane and an electrolyte. To accelerate reactions of gas in the atmosphere on the electrodes, the membrane is designed to adhere tightly to the electrodes.

The electrodes are two different metals, noble metal and base metal. The noble metal electrode has contact with air via a Teflon membrane. Connecting load resistance to both electrodes generates a potential difference, which speeds up 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.

Electrochemical sensor (hydrogen sulfide and carbon monoxide)

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 H_2S is as follows:

Working electrode: $H_2S + 4H_2O \rightarrow H_2SO_4 + 8H^+ + 8e^-$

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

Catalytic sensor (combustible gas)

Catalytic combustion occurs on the catalytic layer applied on a platinum coil even if the gas concentration is well below the lower combustion limit. This causes a rise in temperature of the platinum coil and increases its electrical resistance. This change is read as a differential voltage using a bridge circuit. This process enables detection of combustible gases in air up to the lower explosive limit (LEL).

12. Glossary

Term	Definition
O_2	Oxygen
H_2S	Hydrogen sulfide
COMB	Combustible gas
CO	Carbon monoxide
Air adjustment (zeroing)	To adjust the zero point (or 21.0% 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 value by using span gas.
Explosion-proof structure	Structure of electrical equipment which will not become an ignition source to ignite an ambient explosive atmosphere.
Intrinsically safe structure	Structure tested (e.g., spark test) to not become an ignition source in a flammable atmosphere due to an electrical spark or hot surface during normal operation and fault conditions.
Hazardous area	An area in which an explosive atmosphere is present, or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of electrical apparatus.
Non-hazardous area	An area in which an explosive atmosphere is not expected to be present in quantities such as to require special precautions for the construction, installation and use of electrical apparatus.
%LEL	Concentrations of combustible gas given in terms of percent of the lower explosion limit.
vol%	Gas concentrations given in terms of percent of cubic volume.
ppm	Gas concentrations given in terms of millionth part of cubic volume.
LEL	Lower Explosive Limit. Lowest concentration (percentage) of a gas or vapor in air capable of producing a flash fire, or explosion in the presence of an ignition source like arc, flame or heat.

Term	Definition
TLV-TWA	Threshold Limit Value – Time Weighted Average Acceptable average exposure of the concentration of a harmful substance on the basis of an 8h/day, 40h/week work schedule without adverse effects on the workers' health.
TLV-STEL	Threshold Limit Value – Short Term Exposure Limit Acceptable limit of the concentration of a harmful substance which will not adversely affect the health of a worker by its spot exposure for a duration of 15 minutes, that cannot be repeated more than 4 times per day with at least 60 minutes between exposure periods.

Additional copies of this instruction manual may be purchased.
Contact New Cosmos or its authorized representative for ordering.
The contents of this manual are subject to change without notice.

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