COSMOS

■ **XA-4400**
■ **XA-4300H**
■ **XA-4300C**
■ **XA-4200KS**
■ **XA-4200KH**
■ **XA-4200KC**
■ **XA-4300H-n**
■ **XA-4300C-n**

Multi-gas Detector
Instruction Manual

This instruction manual explains the use of eight models listed in the left.

- Keep this instruction manual available for quick reference when needed.
- Read this instruction manual and understand the information before using the product.

Model	Target Gas
XA-4400	Combustible gas, H_2S, CO, O_2
XA-4300H	Combustible gas, H_2S, O_2
XA-4300C	Combustible gas, CO, O_2
XA-4200KS	Combustible gas, O_2
XA-4200KH	Combustible gas, H_2S
XA-4200KC	Combustible gas, CO
XA-4300H-n	O_2, H_2S
XA-4300C-n	O_2, CO

NEW COSMOS ELECTRIC CO., LTD.

Document No.: XA-4400T

Table of Contents

Included in this Package

The following items are enclosed in the package. Carefully check all items listed below before use. Contact your New Cosmos representative if any items are broken or missing.

Multi-gas Detector	1
Belt clip (with three screws)	1
Two spare filter elements	1
Size AA alkaline dry cell battery (LR6) made by PANASONIC	2
Inspection report	1

● Options (sold separately)

Name	Remarks
Calibration jig (EG-111)	For inspection of the alarm function and indication accuracy for combustible gas, H_2S, CO and O_2 gases in daily inspection.
Inspection set for hydrogen sulfide (EG-112)	For inspection of the alarm function and indication accuracy for H_2S gas in daily inspection. * Inspection requires calibration jig (EG-111) in addition to this set.
Data logging kit*	For collecting logged data to PC

*PC is necessary to meet the following system requirements.
・OS: MS Windows®2000 or MS Windows® XP
 (Gas Detector operation has not been confirmed with other OS versions.)
・Hard disk: Free space of 6 MB or more
・CD-ROM drive: A CD-ROM drive capable of reading CD-R data
 (The software is provided on a CD-R disc.)
・USB port: A USB1.1 or higher grade port for Windows, which allows connection to a connector type A.

1. Introduction

Thank you for purchasing the Multi-gas Detector. Be sure to read this instruction manual and use the product properly to prevent gas accidents and for inspection and maintenance.

This Multi-gas Detector detects up to four types of gases, oxygen (O2), combustible gas (COMB), hydrogen sulfide (H2S) and carbon monoxide (CO), and displays all gas concentration values at the same time. The Multi-gas Detector also prevents accidents from lack of oxygen, gas explosion, or gas poisoning.

Read and understand thoroughly this manual regardless of your experience with using gas detector. Do not use this Multi-gas Detector for improper purposes. Do not use the Multi-gas Detector in undocumented way in this manual.

⚠ **WARNING**   **Waterproof**

Be sure to keep the gas sampling port dry. This Multi-gas Detector employs a water proof structure which meets our tests* complying with JIS C 0920-2003 Ingress Protection code IPX7 at brand-new condition to prevent malfunctions due to water from unavoidable circumstances in use. However, if the filter element is wet, the gas cannot be detected properly. Since the age-related deterioration of packing or label, or adhesion of foreign materials degrade the performance of water proof structure, exposure to water should be avoided as much as possible.

 * Immerse the new Multi-gas Detector gently from the bottom into the depth of 1m from the surface of standing tap water at room temperature and verify that there is no damage from ingress of water after 30 minutes.

• **Explosion-Proof Requirements**

Confirm the following explosion-proof requirements.

Explosion-proof structure: Ex iad II BT3 X (Japan)
Power rating: 3.0V DC (LR6 made by PANASONIC x 2)
Ambient temperature: -20 to 50 degrees C
Use conditions:
・ Replace batteries in a safe place.
・ For comprehensive measures for preventing accidents due to electrostatic charges, the user should desirably wear anti-static working clothes and conductive footwear (antistatic working shoes), and the floor should desirably be a conductive work floor (leak current: 10M ohm or less).
・ The cap may catch fire if it is impacted or rubbed. Do not drop, hit, or rub the equipment.

- **Explanation of Symbols**

The following symbols are used for safety purposes:

⚠ **DANGER**	Indicates a hazardous situation that may result in serious injury or death, if not avoided.
⚠ **WARNING**	Indicates a potentially hazardous situation that may result in serious injury or death, if not avoided.
⚠ **CAUTION**	Indicates a potentially hazardous situation that may result in minor injury or physical damage, if not avoided.
NOTE	Indicates an operational advice.

- **Safe Operation**

Be sure to observe the following to use the product safely and properly.

⚠ **DANGER**   If the gas alarm is activated, take all necessary precautions immediately to prevent explosion or gas poisoning accidents.

⚠ **WARNING**
- Be sure to turn ON the Multi-gas Detector in clean air. Since zero adjustment starts automatically, the proper gas concentration will not be displayed if turning on the Multi-gas Detector in gas atmosphere.
- Do not close the sampling port or exhaust port. The gas cannot be detected properly.
- Do not block the buzzer port or the alarm will be hard to hear.
- Use clean filter elements. If the filter element is dirty or wet, the gas cannot be detected properly.
- The sensor unit is guaranteed for one year from the date of purchase. It is highly recommended to replace a sensor after one year for proper gas detection.
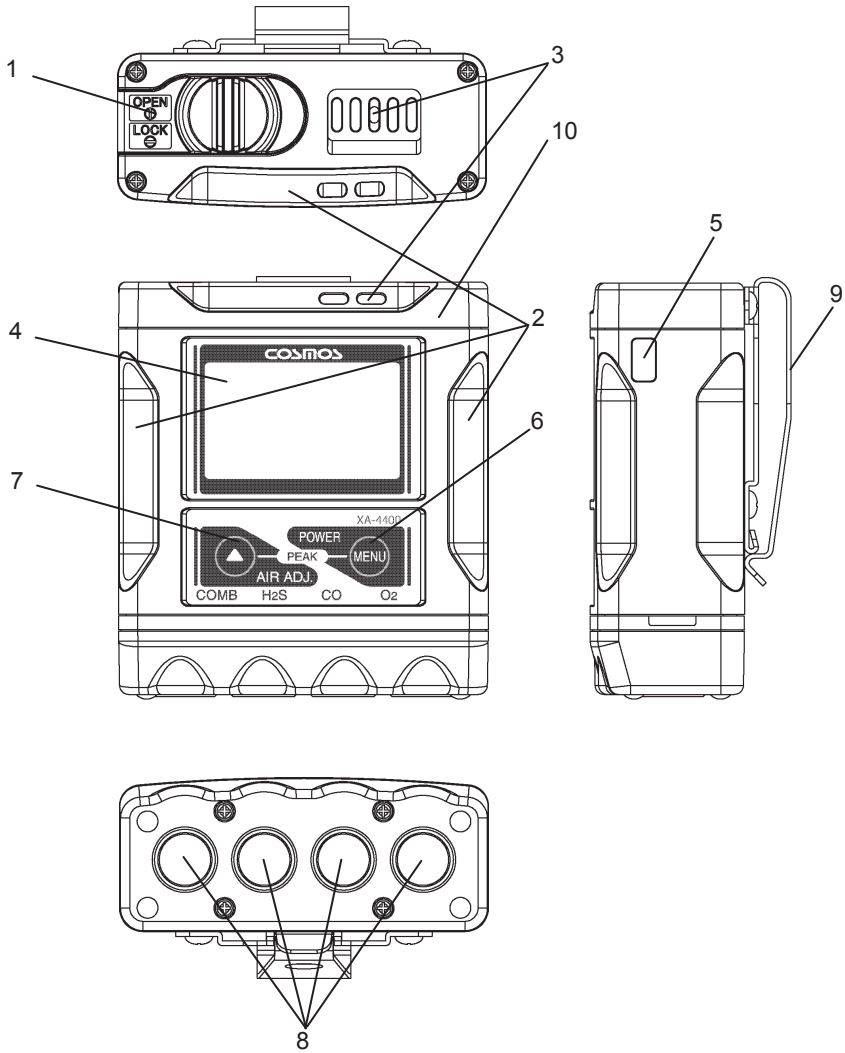
• Safe Operation

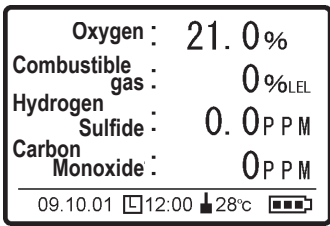Be sure to observe the following to use the product safely and properly.

⚠ **CAUTION**

- Check the battery status, about once a month, even if the Multi-gas Detector remains unused for a long time. Replace batteries as the leakage of electrode may occur when the battery level is low.
- This is an explosion-proof multi-gas detector. To avoid damaging the explosion-proof structure, never attempt to disassemble, remodeling, modifying of structure or circuit, etc.
- Keep the Multi-gas Detector away from heat and humidity. Otherwise, it may affect the performance.
- Do not store or use the Multi-gas Detector in places where the temperature or humidity fluctuates greatly. Otherwise, it may affect the performance.
- Keep the Multi-gas Detector away from significant changes in atmospheric pressure. Otherwise, it may affect the performance of sensor.
- Avoid high mechanical impacts, dropping and throwing the Multi-gas Detector, Otherwise, it may affect the performance.
- In case of dew condensation, conduct an inspection after drying the Multi-gas Detector completely before use.
- Use the Multi-gas Detector in suitable environment to avoid detection of other interference gas or solvent vapor.
- Do not use the Multi-gas Detector in an atmosphere containing silicone gas or silicone products to avoid affecting the performance.
- Detecting high concentration of SO_2 or Cl_2 may decrease the sensor life or increase errors.
- Using the Multi-gas Detector for long periods of time for detecting H2S may decrease the sensor life and increase errors.
- Gas detection at places where the atmospheric pressure is different from the standard, such as high altitude, will not detect correct concentration due to the pressure dependence of oxygen sensor.
- The gas sensor contains harmful substances. When disposing of the sensor, return to New Cosmos Electric or dispose as industrial waste.
- The battery life will be shorter when using the Multi-gas Detector at low temperature than using at normal temperature due to the battery characteristics.
- Keep walkie-talkie away from the Multi-gas Detector while in use. It may cause the indicator shakes or alarm errors due to radio wave.

2. Product Layout and Functions

No.	Name	Function
1	Battery cover	Cover for the battery compartment.
2	Alarm lamp	Flickers when a gas alarm is activated.
3	Buzzer port	Buzzer sounds.
4	LCD Display Oxygen : 21.0% Combustible gas : 0%LEL Hydrogen Sulfide : 0.0PPM Carbon Monoxide : 0PPM 09.10.01 □12:00 ▮28℃ ▮▮▮▯ d　c　b　a	Displays the gas concentration value and other messages. a. Remaining battery level: High · · · · · · · · · Low　Replace ▮▮▮▯ ▮▮▯ ▮▯ ▮▯ ▯ (Flicker)　(Flicker) b. Temperature inside the Multi-gas Detector c. Time d. Year, month, and day
5	Infrared data communication	Used to collect log data.
6	POWER/MENU Switch (Set)	Turns the power on and off. Changes to the MENU screen.
7	[AIR ADJ./▲ switch] (Select) BZ.STOP	Adjusts the air. Selects the menu. Stops the alarm.
8	Gas detection port	Detects the gases.
9	Belt clip	Clips to belt using three screws on back of Multi-gas Detector.
10	Brightness sensor	Detects the current lighting condition, and lights up LCD backlight automatically.

• Installation Procedure of Belt Clip

Install the belt clip to wear the Multi-gas Detector on the belt.
Please follow the instructions below.

⚠ **CAUTION**
- Use only the provided screws (M2.6 x 4, truss head) to attach the belt clip.
- Use the proper screwdriver to avoid damaging the screw head.
- Tighten the screws firmly. When the screws are loosened, it may cause the detector to fall from the belt clip.
- Do not lift the edge of belt clip too high. It may cause the deformation of the belt clip.

1) Attach the belt clip to the back of Multi-gas Detector with provided three screws (M2.6 x 4, truss head).

Provided 3 screws
(M2.6 x 4, truss head))
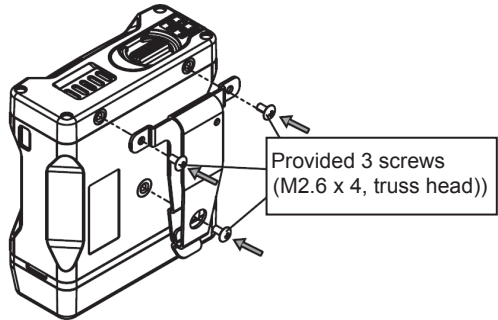
2) Hold both sides of the detector and lift the edge of belt clip, to wear or remove.

1. Hold both sides of the detector tightly.

2. Lift the edge of belt clip up to wear on or remove.
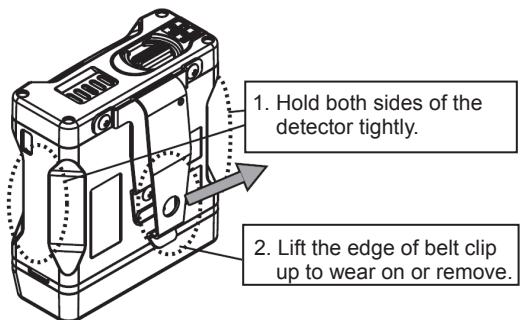
3. Operating Procedure

- **Operating Procedure**

⚠ **WARNING**   Be sure to perform Maintenance Check (on page 34) before use.

STEPS	**1.** Turn ON ▶ Warm-up ▶ Displays <Gas Concentration screen>	**2.** Detection	**3.** Turn OFF

1. Turn on the power → Warm-up → Displays <Gas Concentration screen>

⚠ **WARNING**
- When using for the first time, when the batteries has been removed for a long period of time, or if "Delete Memory" is displayed, it is necessary to lea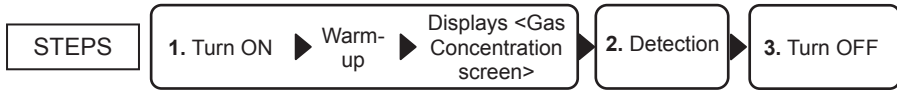ve the Multi-gas Detector in clean air at operating condition for approximately 10 minutes before use. Then press the [AIR ADJ./▲ switch] for approximately two seconds to perform the air adjustment.
- Be sure to turn ON the Multi-gas Detector in clean air. Since zero adjustment starts automatically, the proper gas concentration will not be displayed if turning on the Multi-gas Detector in gas atmosphere.

<Delete Memory>

| [Delete memory] |
| Memory has been deleted |
| Set the clock. |
| _ _ _ _ _ _ _ _ _ _ |
| [MENU] : Return   ▭▭ |

1) Press the POWER switch for approximately three seconds. The alarm lamp will flicker once, and the buzzer will sound (pip). The power will be turned on.

2) "Please wait a moment" message (warm-up) will be displayed for a maximum of two minutes on LCD display.

3) The buzzer will sound (peep) within one minute, and <Gas Concentration screen> will be displayed.

NOTE
- When the error message is displayed on LCD, see on page 31.
- When <Delete Memory screen> is displayed, press the [POWER/MENU switch] to return to <Gas Concentration screen> and adjust the clock (see on page 22).
- "Delete Memory" will be displayed when it has not been used for several days or after the batteries are replaced.

2. Detection

When <Gas Concentration screen> is displayed, it is ready for detection.

Oxygen :	21. 0 %
Combustible gas :	0 %LEL
Hydrogen Sulfide :	0. 0 P P M
Carbon Monoxide :	0 P P M
09.10.01 ⊡12:00 ⬛28℃ ▮▮▮▯	

- See "How to Read the Gas Concentration" on page 10.
- See "Gas Alarms" on page 11.

⚠ **WARNING**
- When the indicator value is beyond Full Scale, leave the Multi-gas Detector in pure air, otherwise it may cause performance deterioration.
- Do not close the suction port or exhaust port, or no gas detection will be possible
- Do not block the buzzer port, or the alarm volume will be hard to hear.
- Use clean filter elements. If the filter element is dirty or wet, gases will not be detected correctly.
- Be sure to set the Multi-gas Detector in the correct direction to avoid exposure to rain and water.

⚠ **CAUTION** The adjustment value may vary with changes in working environment, such as temperature, humidity. In that case, press and hold the [AIR ADJ./▲ switch] to execute automatic air adjustment.

NOTE Change the battery before fully discharged.
The data will remain about one week when the batteries run out.
The data will be deleted after 24 hours when the batteries are removed. (It depends on the conditions and temperature.)
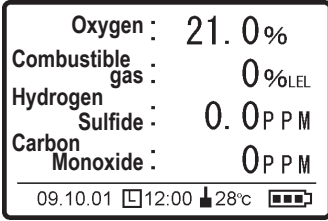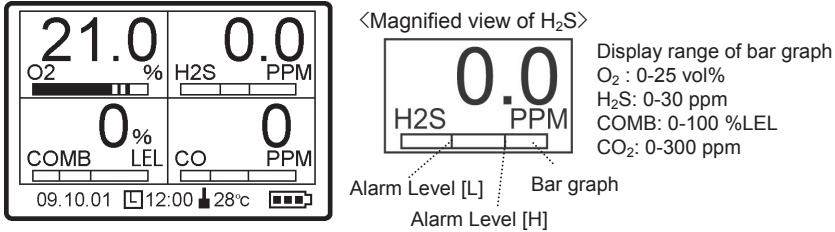
---

3. Turn off the power.

1) Press and hold the [POWER/MENU switch].
2) The buzzer (pip) will sound and start the countdown for power-off on the LCD display. Release the switch when the countdown is 0, then the buzzer will sound (Peep) and the power will turn off.

• How to Read Gas Concentration

Four gas concentration values are displayed at the same time. Two different types of display are available. (See on page 27 for display setting).
However, the name and concentration of the corresponding gases will be displayed when the monitoring gas is two or three types. (The following explanatory diagrams indicate the four types of the corresponding gases.)
In the case of malfunction due to the sensor trouble, the names and concentration of the corresponding gases will be displayed blank.

Standard Display	The names of the target gases and gas concentration values are displayed at the same time. Oxygen : 21.0% Combustible gas : 0%LEL Hydrogen Sulfide : 0.0 PPM Carbon Monoxide : 0 PPM 09.10.01 ⊡12:00 ▌28℃ ▪▪▪▫
Four Split Screen	Four gas concentration values and bar graphs are displayed. 21.0 0.0 O2 % H2S PPM 0% 0 COMB LEL CO PPM 09.10.01 ⊡12:00 ▌28℃ ▪▪▪▫ ⟨Magnified view of H₂S⟩ 0.0 H2S PPM Alarm Level [L] Bar graph Alarm Level [H] Display range of bar graph O_2 : 0-25 vol% H_2S: 0-30 ppm COMB: 0-100 %LEL CO_2: 0-300 ppm

* If gas concentration value exceeds its full scale, "---," will indicate.
* If the Multi-gas Detector is unable to detect gases for reasons including sensor malfunction, only the display of the sensor will be blacked out.

• Auto Backlight and Setting

▪ Auto backlight
The brightness sensor detects the current lighting condition, and lights up LCD backlight automatically.

▪ Backlight setting
LCD backlight can be set the timeout at a certain period of time. (See on page 27 for setting.)

Setting time	Description
[- - -] minutes	Keep backlight on until its surrounding is bright enough.
Up to 10 min at 5 min intervals.	The backlight turns off after the elapse of set time.
10 to 60 min at 10 min intervals	
60 to 600 min at 30 min intervals	

- Condition of auto backlight after timeout
    1) Turns on when it becomes dark again.
    2) Turns on by tapping the switch in the dark place.
    3) Turns on when it detects gas in the dark place.

Gas Alarm

When the gas concentration reaches its alarm set value, the Multi-gas Detector activates gas alarm. The following table is the alarm action.
When the gas concentration value falls below the alarm set value, the gas alarm automatically turns off.
Press and hold the BZ.STOP switch to stop the buzzer and vibration. However, when it detects further gas alarm, the buzzer will sound again.

NOTE   When the oxygen alarm mode is set to "High, Low" (see on page 23), the buzzer and alarm lamp action will be the same as the 2nd stage in the table.

Example: Oxygen concentration display (1st stage: 19.5%, 2nd stage: 18.0%)

		LCD display	Buzzer	Alarm lamp
1st stage	Standard Display	AL1 flickers Oxygen : 19.4% AL1	Sounds continuously at long intervals	Blinks alternately in the same period of buzzer.
	Four Split Screen	AL1 flickers 19.4% O2 AL1		
2nd stage	Standard Display	AL2 and value flicker Oxygen : 17.8% AL2	Sounds continuously at very short intervals	
	Four Split Screen	AL2 and value flicker 17.8% O2 AL2		

• TWA Alarm

The Multi-gas Detector integrates the concentration of gas every minute from power ON to OFF and activates the alarm when the integrated value exceeds the following value. The TWA alarm will not go off until the power is turned OFF. Press and hold the BZ. STOP switch to stop the buzzer and vibration.

Integrated value
   H2S: 10 ppm x 8 hours x 60 times (60 times per 1 hour) = 4,800 ppm
   CO: 25 ppm x 8 hours x 60 times (60 times per 1 hour) = 12,000 ppm

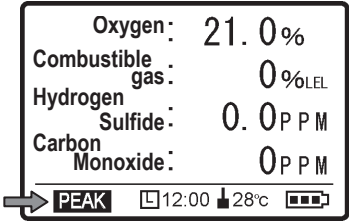|		LCD display	Buzzer	Alarm lamp
Standard Display		TWA flickers **TWA** Hydrogen Sulfide : 10.0 P P M	Sound continuously at long intervals	Blinks alternately in the same period of buzzer.
Four Split Screen		TWA flickers 10.0 **TWA** H2S PPM		

• STEL Alarm

The Multi-gas Detector activates the alarm when the average gas concentration per minute in the past 15 minutes exceeds its set value. The STEL alarm will not go off until either the average value drops below the set value or the power is turned OFF. Press and hold the BZ. STOP switch to stop the buzzer and vibration.

		LCD display	Buzzer	Alarm lamp
Standard Display		STEL flickers **STEL** Hydrogen Sulfide : 15.0 P P M	Sound continuously at long intervals	Blinks alternately in the same period of buzzer.
Four Split Screen		STEL flickers 15.0 **STEL** H2S PPM		

- **Peak-hold Function**

The peak hold function displays the peak value of detected gas concentration after setting. The highest concentration values of combustible gas (COMB), hydrogen sulfide (H_2S), and carbon monoxide (CO), and the lowest concentration value (default) of oxygen (O_2) are kept and displayed.
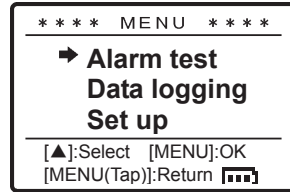
Setting	Press both [POWER/MENU switch] and [AIR ADJ./▲ switch] at the same time.	PEAK will flicker in the date section of the <Gas Concentration screen>, and the peak value is displayed. <Gas Concentration screen> Oxygen : 21.0% Combustible gas : 0 %LEL Hydrogen Sulfide : 0.0 PPM Carbon Monoxide : 0 PPM ⇨ PEAK 🖫12:00 🌡28℃ 🔋
Reset	Press both [POWER/MENU switch] and [AIR ADJ./▲ switch] at the same time.	Back to the standard <Gas Concentration screen> and the peak values will be reset.

NOTE	The peak hold function setting will be reset when the power is turned off.

• Functions and Setting

Press the [POWER/MENU switch] for one second to display <MENU screen>. From this screen, perform and configure each function.
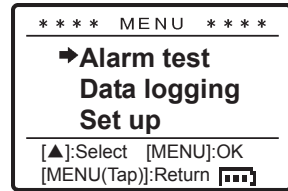
<MENU screen>

```
* * * *   M E N U   * * * *
➡ Alarm test
   Data logging
   Set up
```
[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return

Item	Functions and settings	Reference page
Alarm test	Operation test for alarm lamps and buzzer. Adjust the volume of gas alarms.	Page 15
Logging	The detection date, time, gas concentration and temperature levels are logged (recorded) in preset cycles. The following operations are available: • Start logging • Stop logging • Delete logging data • Set the logging cycle (Interval)	Page 16 to 20
Setting	Alarm level * — Change alarm levels	Page 21
	Time (Clock adjustment) — Set time and date	Page 22
	O2 mode set * — Select a mode for oxygen (O2) gas alarms and peak-hold function	Page 23
	Gas adjustment * — Conduct gas adjustment	-
	Volume/Silent * — Change buzzer sound volume and activate silent mode	Page 24
	LCD contrast — Adjust display contrast	Page 26
	Display setting — Change display to Japanese, four split screen, and backlight timeout setting	Page 27
	Safety lock — Lock *-marked functions at the left to prevent changes. It needs to disable the safety lock to change functions. Safety lock is a factory default setting.	Page 28

• Functions and Setting: **Alarm Test**

<MENU screen>

1) Press the [POWER/MENU switch] for one second to display <MENU screen>.

```
* * * *  M E N U  * * * *
➡Alarm test
 Data logging
 Set up
[▲]:Select  [MENU]:OK
[MENU(Tap)]:Return 🔋
```
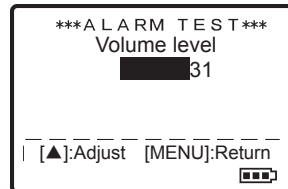
2) "Alarm test" is pre-selected. Press and hold the [POWER/MENU switch]

3) <ALARM TEST screen>is displayed, the alarm lamp flickers, and the buzzer sounds.

<ALARM TEST screen>

```
***A L A R M  T E S T***
  Volume level
        ▉31


_ _ _ _ _ _ _ _ _
[▲]:Adjust   [MENU]:Return
              🔋
```

| NOTE | If the Multi-gas Detector is set on silent mode, the message of "Cancel [SILENT MODE]?" is displayed. If "Cancel" is selected, the Silent mode will be canceled and alarm test starts. |

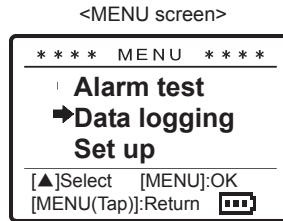4) Press the [AIR ADJ./▲ switch] to adjust the buzzer volume. (Set range 0 to 31)

⚠ **WARNING** The change of buzzer volume on this screen is also applied to the gas alarms.

5) Press and hold the [POWER/MENU switch] to stop the alarm test and return to <Gas Concentration screen>.
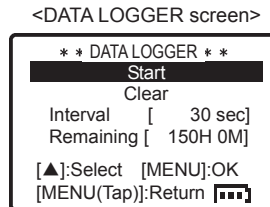
- **Functions and Setting: Logging**

1) Press the [POWER/MENU switch] for approximately one second to display MENU screen.

<MENU screen>

```
* * * *   M E N U   * * * *
  Alarm test
➡Data logging
  Set up
[▲]Select    [MENU]:OK
[MENU(Tap)]:Return  🔋
```

2) Select Data logging with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

3) <DATA LOGGER screen> is displayed. Select the item with the [AIR ADJ./▲ switch] and press and hold the [POWER/MENU switch].

<DATA LOGGER screen>

```
* * DATA LOGGER * *
     Start
     Clear
Interval    [    30 sec]
Remaining [  150H 0M]

[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return 🔋
```

Item	Execution detail
Start	Start logging. See on page 17.
	Stop logging See on page 18.
Clear	Delete logging data. See on page 19.
Interval	Set logging cycle. See on page 20.

■ **To start Logging:**

1) Follow steps 1 to 2 on page 16 to display <DATA LOGGER screen>.

<DATA LOGGER screen>

NOTE   The logging data records instantaneous value in one cycle. "Interval" (logging cycle) and "Remaining" (time left for logging) will be displayed at the bottom of screen. See on page 20 to change the logging cycle.
The logging will stop automatically when the logging time runs out.

```
＊ ＊ DATA LOGGER  ＊ ＊
           Start
           Clear
  Interval    [    30 sec]
  Remaining [   150H 0M]

  [▲]:Select   [MENU]:OK
  [MENU(Tap)]:Return  ▥
```
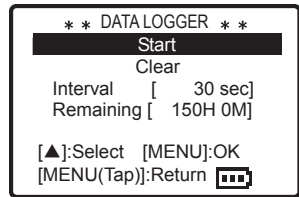
2) "Start" is pre-selected. Press and hold the [POWER/MENU switch].

3) <Logging started screen> is displayed and it starts logging.

<Logging started screen>

```
＊ ＊ ＊ DATA LOGGER  ＊ ＊ ＊
＊          Logging          ＊
＊          started          ＊
＊ ＊ ＊ ＊ ＊ ＊ ＊ ＊ ＊ ＊ ＊
  Interval    [    30 sec]
  Remaining [   150H 0M]
— — — — — — — — — —
  [MENU(Tap)]: Return      ▥
```
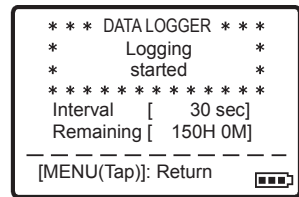
4) Return to <Gas Concentration screen> by pressing the [POWER/MENU switch].
"LOGGING" blinks in the date section of <Gas Concentration screen> while logging.

⟨Gas Concentration screen⟩

```
  Oxygen  :  21.0%
Combustible
      gas :     0%LEL
Hydrogen
    Sulfide :   0.0PPM
Carbon
  Monoxide :     0PPM
▶ LOGGING ▯12:00 ▮28℃ ▥
```

■ To stop Logging:

1) Follows steps 1 to 2 on page 16 to display <Logging screen>.

〈Logging screen〉

```
* * *   Logging   * * *
      Stop logging?

Remaining [   149H42M]

                        _ _
[MENU]: Stop
[MENU(Tap)]: Return    ▥
```
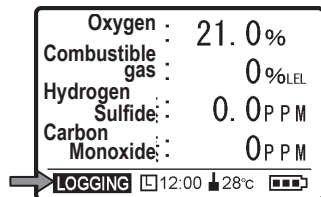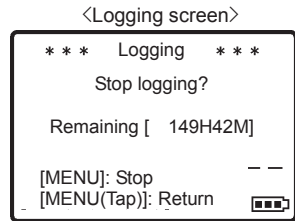
2) Press and hold the [POWER/MENU switch] to stop logging. <Logging stopped screen> will be displayed.

〈Logging stopped screen〉

```
* * * DATA LOGGER * * *
*      Logging        *
*      stopped        *
* * * * * * * * * * * *
Interval    [    30 sec]
Remaining [   149H42M]
_ _ _ _ _ _ _ _ _ _ _
[MENU(Tap)]: Return   ▥
```
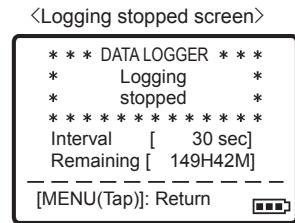
3) Return to <Gas Concentration screen> by pressing the [POWER/MENU switch].

■ To delete Logging Data:

1) Follow steps 1 to 2 on page 16 to display <DATA LOGGER screen>.

<DATA LOGGER screen>

```
* * DATA LOGGER * *
        Start
        Clear
Interval    [     30 sec]
Remaining [   150H 0M]

[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return 
```

2) Select "Clear" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

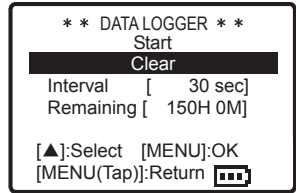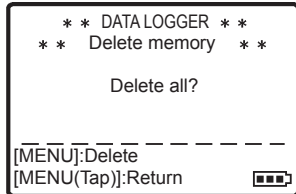3) <Delete memory screen> will be displayed.

| NOTE | The logging data will be deleted completely. Save all the necessary data to PC with log data download software (optional). |

<Delete memoryr screen>

```
* * DATA LOGGER * *
* *   Delete memory    * *

        Delete all?

_ _ _ _ _ _ _ _ _ _ _ _
[MENU]:Delete
[MENU(Tap)]:Return 
```

4) Press and hold the [POWER/MENU switch] to delete logging data. <Complete Deletion screen> will be displayed.

<Complete Deletion screen>

```
* * DATA LOGGER * * *

* * * * * * * * * * *
*  Memory has been   *
*  deleted           *
* * * * * * * * * * *
[MENU(Tap)]: Return 
```

4) Return to <DATA LOGGER screen> by pressing the [POWER/MENU switch].

- 19 -
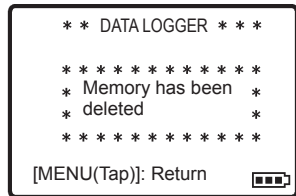
■ Changing the Logging Cycle (Interval):

1) Follow steps 1 to 2 on page 16 to display <DATA LOGGER screen>.

<DATA LOGGER screen>

```
＊＊DATA LOGGER ＊＊
        Start
        Clear
 Interval    [    30 sec]
 Remaining [    150H 0M]

[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return ▥
```

2) Select "Interval" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

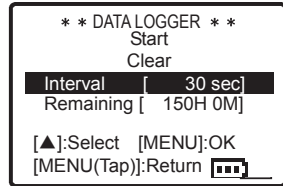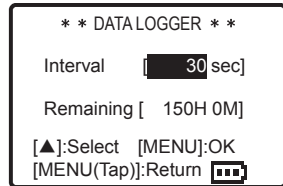3) <Interval Setting screen> will be displayed. Press the [AIR ADJ./▲ switch] to change the value.
"Remaining" indicates the time left for logging.
Example: The maximum remaining time of 30-second cycle is 150 hours; the maximum remaining time of 300-second cycle is 1500 hours.

<Interval Setting screen>

```
＊＊DATA LOGGER ＊＊

 Interval       [    30 sec]

 Remaining [   150H 0M]

[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return ▥
```

Configurable logging interval
0.5-second
1-second cycle from 1 to 10 seconds
10-second cycle from 10 to 60 seconds
60-second cycle from 60 to 600 seconds
600-second from 600 to 3600 seconds.

NOTE	Keep pressing the [AIR ADJ./▲ switch] to move the value up to 3600 seconds automatically. Press the switch again to return to 0.5 seconds.

4) Press and hold the [POWER/MENU switch] to save changes, and return to <DATA LOGGER screen>. (Pressing the [POWER/MENU switch] returns to <DATA LOGGER screen> without saving changes.)

• Functions and Setting: **Alarm Level**

Disable the safety lock to change the Alarm Level. Follow the steps on page 28.

> ⚠ **WARNING** Setting the alarm level is very important. Only the safety manager, or the other authorized personnel, c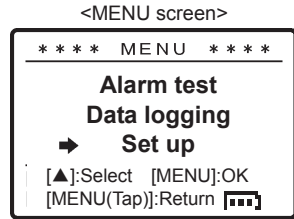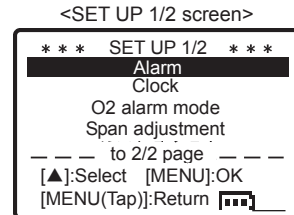an configure the alarm level setting. Make sure all the setting values are correct when the alarm level has been changed.

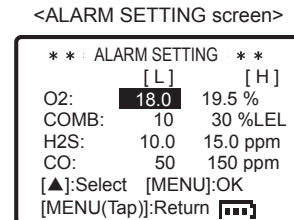1) Press the [POWER/MENU switch] for approximately one second to display <MENU screen>.

<MENU screen>

```
* * * *   M E N U   * * * *

    Alarm test
    Data logging
 ➜    Set up

[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return �юю
```

2) Select "Set up" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

3) <SET UP 1/2 screen> will be displayed. "Alarm" is pre-selected. Press and hold the [POWER/MENU switch].

<SET UP 1/2 screen>

```
* * *    SET UP 1/2   * * *
           Alarm
           Clock
       O2 alarm mode
      Span adjustment
 — — —  to 2/2 page  — — —
[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return ▮▮▮
```

4) <ALARM SETTING screen> will be displayed.
Select the item to change by pressing and holding the [POWER/MENU switch].

<ALARM SETTING screen>

```
* *   ALARM SETTING   * *
           [ L ]       [ H ]
O2:       18.0    19.5 %
COMB:      10     30 %LEL
H2S:      10.0   15.0 ppm
CO:        50    150 ppm
[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return ▮▮▮
```

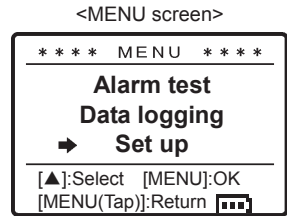5) Press the [AIR ADJ./▲ switch] to change the values. Keep pressing the switch to adjust values automatically.

Configurable setting range.
O$_2$: 18 to 25 vol%, COMB: 5% to 60%LEL
H$_2$S: 1.5 to 30 ppm, CO: 15 to 150 ppm

6) Press and hold the [POWER/MENU switch] to save changes, and select next item to change.

7) Return to <Gas Concentration screen> by pressing the [POWER/MENU switch].
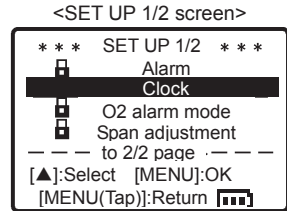
• Functions and Setting: **Clock Adjustment**

<SET THE CLOCK screen>

1) Press and hold the [POWER/MENU switch] for approximately one second to display <MENU screen>.

<MENU screen>

```
* * * *   M E N U   * * * *
        Alarm test
        Data logging
   ➡      Set up
────────────────────────
 [▲]:Select   [MENU]:OK
 [MENU(Tap)]:Return ▭▭
```
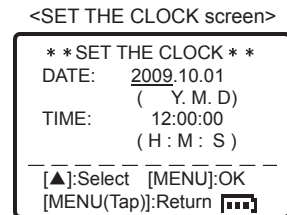
2) Select "Set up" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

3) <SET UP 1/2 screen> will be displayed. Select "CLOCK" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].
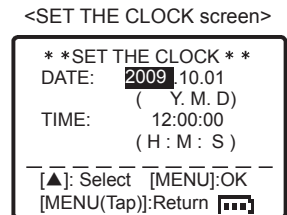
<SET UP 1/2 screen>

```
 * * *    SET UP 1/2    * * *
   ▯         Alarm
             Clock
   ▯      O2 alarm mode
   ▯      Span adjustment
 — — — to 2/2 page ·— — —
 [▲]:Select   [MENU]:OK
 [MENU(Tap)]:Return ▭▭
```

4) <SET THE CLOCK screen> will be displayed. Select the item to change with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

<SET THE CLOCK screen>

```
  * * SET THE CLOCK * *
 DATE:     2009.10.01
          (    Y. M. D )
 TIME:      12:00:00
          ( H : M :  S )
 _ _ _ _ _ _ _ _ _ _ _
  [▲]:Select   [MENU]:OK
  [MENU(Tap)]:Return ▭▭
```

5) Press the [AIR ADJ./▲ switch] to change the date and time.

<SET THE CLOCK screen>

```
  * * SET THE CLOCK * *
 DATE:    ▮2009▮.10.01
          (    Y. M. D )
 TIME:      12:00:00
          ( H : M :  S )
 _ _ _ _ _ _ _ _ _ _ _
  [▲]: Select   [MENU]:OK
  [MENU(Tap)]:Return ▭▭
```

6) Press and hold the [POWER/MENU switch] to save changes.
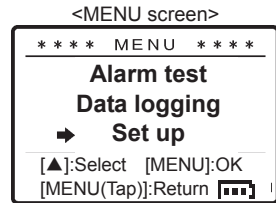
7) Return to <Gas Concentration screen> by pressing the [POWER/MENU switch].

- 22 -

- **Functions and Setting: O_2 Alarm Mode**

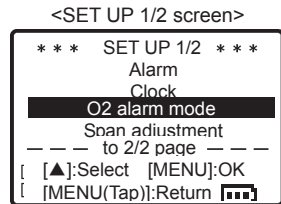Disable the safety lock to change the O_2 Alarm Mode. Follow the steps on page 28.

⚠ **WARNING**   Only the safety manager, or the other authorized personnel, can configure the O2 alarm mode. Set to "Low" (lower-limit alarm) for detecting oxygen deficient. The alarm will not activate when the O2 alarm mode is set to "High" (upper-limit alarm).

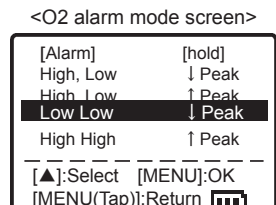1) Press and hold the [POWER/MENU switch] for approximately one second to display <MENU screen>.

<MENU screen>

```
* * * *   M E N U   * * * *
        Alarm test
        Data logging
  ➡     Set up
[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return
```

2) Select "Set up" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

3) <SET UP 1/2 screen> will be displayed. Select "O2 alarm mode" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

<SET UP 1/2 screen>

```
* * *   SET UP 1/2   * * *
          Alarm
          Clock
      O2 alarm mode
       Span adjustment
 — — —  to 2/2 page  — — —
[  [▲]:Select   [MENU]:OK
[  [MENU(Tap)]:Return
```

4) <O2 alarm mode screen> will be displayed. Select the item to change with the [AIR ADJ./▲ switch].

<O2 alarm mode screen>

```
[Alarm]              [hold]
High, Low           ↓ Peak
High, Low           ↑ Peak
Low Low             ↓ Peak
High High           ↑ Peak
— — — — — — — — — —
[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return
```

Mode	Alarm setting	Peak-hold setting
High, Low ↓ Peak	1st stage [H] Upper-limit alarm 1st stage [L] Lower-limit alarm	Lowest value
High, Low ↑ Peak	1st stage [H] Upper-limit alarm 1st stage [L] Lower-limit alarm	Highest value
Low, Low ↓ Peak	1st stage [H] Lower-limit alarm 2nd stage [L] Lower-limit alarm	Lowest value
High, High ↑ Peak	2nd stage [H] Upper-limit alarm 1st stage [L] Upper-limit alarm	Highest value

5) Press and hold the [POWER/MENU switch] to save changes and return to <ALARM SETTING screen>. Set the appropriate alarm level for O_2 (see on page 21). (Pressing the [POWER/MENU switch] returns to <Gas Concentration screen> without saving changes.)
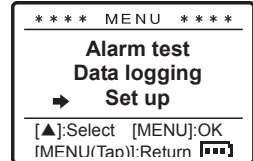
- **Functions and Setting: Volume/Silent**

Disable the safety lock to change the Volume/Silent. Follow the steps on page 28.

⚠ **WARNING** Only the safety manager, or the other authorized personnel, can configure the alarm sound volume.

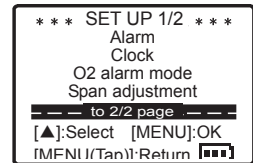1) Press the [POWER/MENU switch] for approximately one second to display <MENU screen>.

<MENU screen>

```
* * * *  M E N U  * * * *
      Alarm test
      Data logging
  →      Set up
[▲]:Select  [MENU]:OK
[MENU(Tap)]:Return  ▥
```

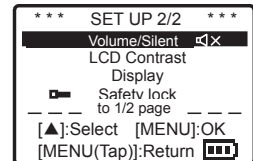2) Select "Set up" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

3) <SET UP 1/2 screen> will be displayed. Select "To 2/2 page" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

<SET UP 1/2 screen>

```
* * *  SET UP 1/2  * * *
         Alarm
         Clock
      O2 alarm mode
      Span adjustment
— — —  to 2/2 page  — — —
[▲]:Select  [MENU]:OK
[MENU(Tap)]:Return  ▥
```

4) <SET UP 2/2 screen> will be displayed. "Volume/Silent" is pre-selected. Press and hold the [POWER/MENU switch].

<SET UP 2/2 screen>

```
* * *    SET UP 2/2    * * *
      Volume/Silent  ◁×
      LCD Contrast
         Display
  ▭     Safety lock
— — —  to 1/2 page  — — —
[▲]:Select  [MENU]:OK
[MENU(Tap)]:Return  ▥
```

5) <VOLUME SETTING screen> will be displayed. Select the item to change with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].
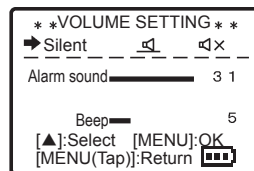
<VOLUME SETTING screen>

```
* *VOLUME SETTING * *
➡Silent _ _  ⊿  _  ⊿✕  _
Alarm sound━━━━━   3 1

      Beep━         5
 [▲]:Select   [MENU]:OK
 [MENU(Tap)]:Return [▥]
```

Item	Content of change
Silent	The silent mode will stop all the buzzers. Silent mode deactivated ⊿ Silent mode activated ⊿✕
Alarm sound	Set the buzzer sound volume of The main unit for the gas alarm.
Beep	Set the beep for operation and the Buzzer sound volume when an error message is displayed.

6) Press the [AIR ADJ./▲ switch] to change the setting.

7) Press and hold the [POWER/MENU switch] to save the changes.

8) Press and release the [POWER/MENU switch] to return to <Gas Concentration screen>.

On silent mode, ⊿✕ blinks in the date section of <Gas Concentration screen>.

<Gas Concentration screen>

```
Oxygen :  21.0%
Combustible
      gas :   0%LEL
Hydrogen
   Sulfide :  0.0PPM
Carbon
  Monoxide :   0PPM
⊿✕ 09.10.01 🕛12:00 🌡28℃ [▥]
```
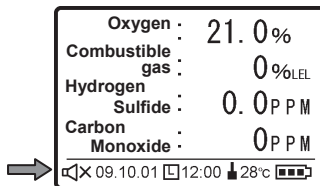
• Functions and Setting: LCD Contrast

<MENU screen>

1) Press the [POWER/MENU switch] for approximately one second to display <MENU screen>.
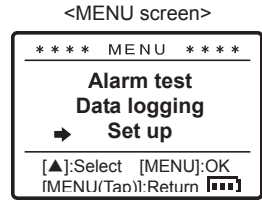
```
* * * *  M E N U  * * * *
─────────────────────────
       Alarm test
       Data logging
  ➡     Set up
─────────────────────────
[▲]:Select  [MENU]:OK
[MENU(Tap)]:Return 📶
```
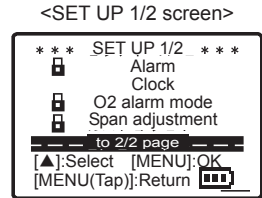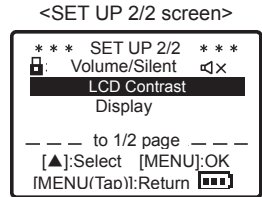
2) Select "Set up" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

<SET UP 1/2 screen>

3) <SET UP 1/2 screen> will be displayed.
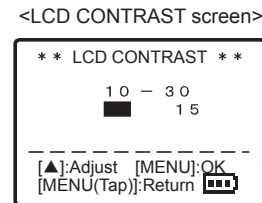Select "to 2/2 page" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

```
* * *  SET UP 1/2  * * *
🔒        Alarm
          Clock
🔒     O2 alarm mode
🔒    Span adjustment
─ ─ ─  to 2/2 page  ─ ─ ─
[▲]:Select  [MENU]:OK
[MENU(Tap)]:Return 📶
```

<SET UP 2/2 screen>

4) <SET UP 2/2 screen> will be displayed.
Select "LCD Contrast" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

```
* * *  SET UP 2/2  * * *
🔒   Volume/Silent  🔇×
     LCD Contrast
        Display
─ ─ ─  to 1/2 page  ─ ─ ─
 [▲]:Select  [MENU]:OK
[MENU(Tap)]:Return 📶
```

<LCD CONTRAST screen>

5) <LCD CONTRAST screen> will be displayed.
Press the [AIR ADJ./▲ switch] to change the parameters.

> NOTE | Too high LCD contrast will be difficult to read the display.

```
* *  LCD CONTRAST  * *

     1 0 ─ 3 0
     ■      1 5

─ ─ ─ ─ ─ ─ ─ ─ ─ ─
 [▲]:Adjust  [MENU]:OK
 [MENU(Tap)]:Return 📶
```
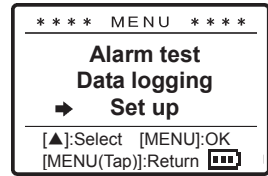
6) Press the [POWER/MENU switch] to save the changes and return to <Gas Concentration screen>.
Press and release the [POWER/MENU switch] to return to <Gas Concentration screen> without changing the parameters.

• **Functions and Setting: Display Setting**

<MENU screen>

1) Press the [POWER/MENU switch] for approximately one second to display <MENU screen>

```
* * * *   M E N U   * * * *
       Alarm test
       Data logging
  ➔      Set up
[▲]:Select  [MENU]:OK
[MENU(Tap)]:Return 🔋
```
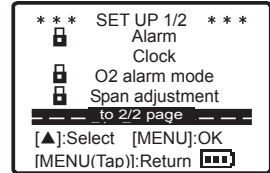
2) Select "Set up" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

<SET UP 1/2 screen>

3) <SET UP 1/2 screen> will be displayed.
Select "To 2/2 page" with the [AIR ADJ./▲ switch] , and press and hold the [POWER/MENU switch].

```
* * *   SET UP 1/2   * * *
  🔒       Alarm
          Clock
  🔒    O2 alarm mode
  🔒    Span adjustment
_ _ _  to 2/2 page  _ _ _
[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return 🔋
```

<SET UP 2/2 screen>

4) <SET UP 2/2 screen> will be displayed.
Select "Display" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

```
* * *   SET UP 2/2   * * *
  🔒   Volume/Silent   ◁×
      LCD Contrast
        Display
— — — 1／2ページへ— — —
[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return 🔋
```
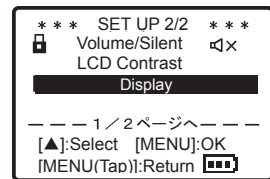
5) <DISPLAY SETTING screen> will be displayed.
Select the item with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

<DISPLAY SETTING screen>

```
****DISPLAY SETTING****
  ➔ [Japanese] [ English]
    [Display1]  [Display2]
     B.lighttimer [---]min
— — to 1/2 page — —
[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return 🔋
```

Item	Changing detail
[Japanese] [English]	Language can be selected
[Display 1] [Display 2]	Display 1…Quadrant display Display 2…Japanese/English
B.light timer	Set the period of time for timeout
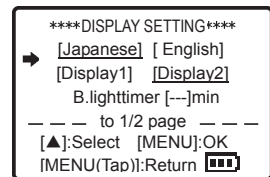
Refer to page 10 for the details on backlight timer.

6) Press the [AIR ADJ./▲ switch] to change the setting.

<DISPLAY SETTING screen>

```
****DISPLAY SETTING****

    [Japanese] [ English]
 ➔  [Display1] [Display2]
— — — to 1/2 page — — —
[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return 🔋
```

7) Press and hold the [POWER/MENU switch] to save the changes and return to <Gas Concentration screen>.

- **Functions and Setting: Safety Lock**

⚠ **WARNING** The safety lock is very important. Only the safety manager, or the other authorized personnel, can disable the safety lock.

Configuring the safety lock will prevent to change the following settings. Disable the safety lock to change the setting.
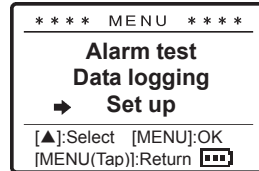* Safety lock is a factory default setting.
   Alarm level, O_2 alarm mode, gas adjustment, volume/silent

■ **Setting of safety lock**

<MENU screen>

1) Press the [POWER/MENU switch] for approximately one second to display <MENU screen>.

```
* * * *  M E N U  * * * *
     Alarm test
     Data logging
  ➡   Set up
[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return 🔋
```
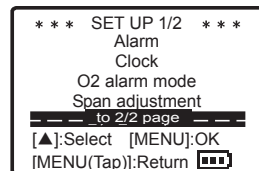
2) Select "Set up" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].
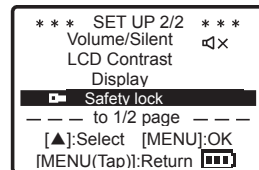
3) <SET UP 1/2 screen> will be displayed. Select "to 2/2 page" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].
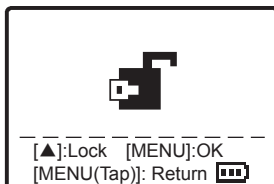
<SET UP 1/2 screen>

```
* * *  SET UP 1/2  * * *
        Alarm
        Clock
     O2 alarm mode
    Span adjustment
— — — to 2/2 page — — —
[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return 🔋
```

4) <SET UP 2/2 screen> will be displayed. Select "Safety lock" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

<SET UP 2/2 screen>

```
* * *  SET UP 2/2  * * *
    Volume/Silent  🔇×
     LCD Contrast
        Display
  🔒   Safety lock
— — —  to 1/2 page  — — —
[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return 🔋
```

5) Pressing the [AIR ADJ./▲ switch] changes the safety lock setting.

<Safety lock is canceled >

```
        🔓
— — — — — — — — — —
[▲]:Lock   [MENU]:OK
[MENU(Tap)]: Return 🔋
```

➡

<Safety lock>

```
        🔒
— — — — — — — — — —
[▲]:Unlock   [MENU]:OK
[MENU(Tap)]: Return 🔋
```

6) Pressing and holding the [POWER/MENU switch] saves the changes. Lock marks are displayed on locked functions.
(Pressing the switch returns to <Gas Concentration screen> without saving the changes.)

<Safety lock>

```
 * * *   SET UP 1/2   * * *
      🔒     Alarm
             Clock
      🔒     O2 alarm mode
      🔒     Span adjustment
 — — —  to 2/2 page  — — —
 [▲]:Select   [MENU]:OK
 [MENU(Tap)]:Return  🔋
```

7) Return to <Gas Concentration screen> by pressing the [POWER/MENU switch].

■ **Disable the safety lock**

1) Press the [POWER/MENU switch] for approximately one second to display <MENU screen>.

<MENU screen>

```
 * * * *   M E N U   * * * *
        Alarm test
        Data logging
   ➡      Set up
 [▲]:Select   [MENU]:OK
 [MENU(Tap)]:Return  🔋
```

2) Select "Set up" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].

3) <SET UP 1/2 screen> will be displayed. Select "to 2/2 page" with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].
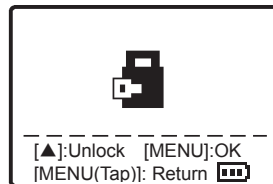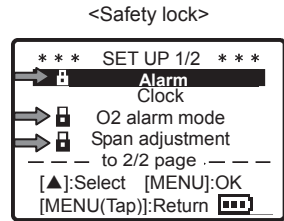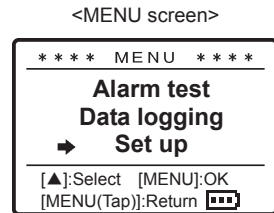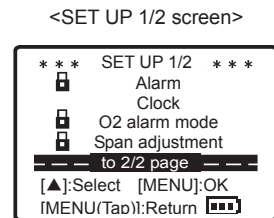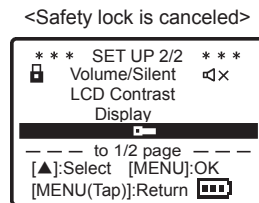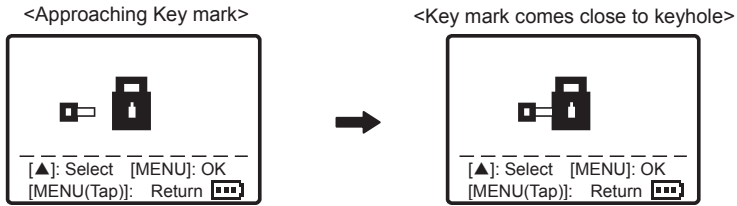
<SET UP 1/2 screen>

```
 * * *   SET UP 1/2   * * *
      🔒     Alarm
             Clock
      🔒     O2 alarm mode
      🔒     Span adjustment
 — — —  to 2/2 page  — — —
 [▲]:Select   [MENU]:OK
 [MENU(Tap)]:Return  🔋
```

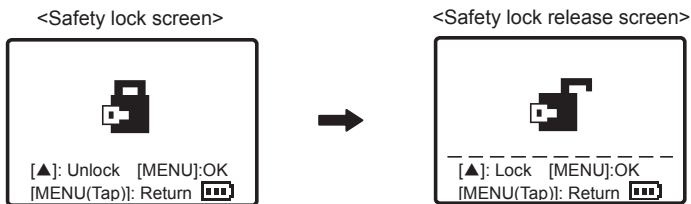4) <SET UP 2/2 screen> will be displayed. Select "key" mark with the [AIR ADJ./▲ switch], and press and hold the [POWER/MENU switch].
 "Key" mark will appear as pressing the [AIR ADJ./▲ switch].

<Safety lock is canceled>

```
 * * *   SET UP 2/2   * * *
      🔒  Volume/Silent  🔇
          LCD Contrast
             Display
 — — —  to 1/2 page  — — —
 [▲]:Select   [MENU]:OK
 [MENU(Tap)]:Return  🔋
```

5) "Key" mark approaches to keyhole by pressing the [AIR ADJ./▲ switch] several times. When "key" mark moves close to keyhole, press and hold the [POWER/MENU switch].
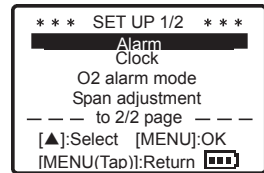
<Approaching Key mark>

[▲]: Select   [MENU]: OK
[MENU(Tap)]:   Return

<Key mark comes close to keyhole>

[▲]: Select   [MENU]: OK
[MENU(Tap)]:   Return

6) Press the [AIR ADJ./▲ switch] to disable the safety lock.

<Safety lock screen>

[▲]: Unlock   [MENU]:OK
[MENU(Tap)]: Return

<Safety lock release screen>

[▲]: Lock   [MENU]:OK
[MENU(Tap)]: Return

7) Press and hold the [POWER/MENU switch] to save the changes. "Key" mark will be off and safety lock will be canceled.
(Pressing the switch returns to <Gas Concentration screen> without saving the changes.)

<Safety lock is canceled>

＊ ＊ ＊   SET UP 1/2   ＊ ＊ ＊
Alarm
Clock
O2 alarm mode
Span adjustment
— — — to 2/2 page — — —
[▲]:Select   [MENU]:OK
[MENU(Tap)]:Return

8) Press and hold the [POWER/MENU switch] to save the changes and return to <Gas Concentration screen>.

4. Notifications and Error Messages

Any abnormality or notice in the Multi-gas Detector will display a message on the LCD screen (buzzer sounds.) Major displayed messages are listed below. Take appropriate measures in accordance with the message displayed.

・ When the switch or display does not function correctly without displaying error message, reset batteries and turn on the power again. If it still does not work properly, consult your New Cosmos representative.

● Notification message

Notification message	Action
O2 sensor out of service life. Replace O2 sensor with new one.	Service life of oxygen sensor is expiring. Request an oxygen sensor replacement immediately before a detection failure.
[LOGGER STOP] Memory becomes full. Detector stopped data logging.	Memory capacity for logging is full. Save data to a PC using the logging data collection set (sold separately) as necessary. Logging can be resumed by erasing data (see on page 19).
Data Logger Can not start Set the clock.	Logging cannot be started due to a stopped clock. Set clock (see on page 22) to resume logging.

● Error message

Message	Action
Unable to zero	Turn on the power for approximately 10 minutes in pure air followed by pressing the [AIR ADJ./▲ switch] for approximately two seconds to execute automatic air adjustment.
** [E10] ** Sensor failure	Turn off the power once then re-start in the event of failure to recover. Request repairs if the recovery is not successful.
** [E01] ** RTC(U11) ERROR	RTC (clock IC) is abnormal. Request repairs.
Sensor failure Should detection continue only with active sensors?	Pressing the [AIR ADJ./▲ switch] for approximately two seconds will execute automatic air adjustment for an abnormal sensor then return to the Gas Concentration screen. At this time, the gas concentration for an abnormal sensor will display blank. Return to the original display before the abnormal condition by pressing the [POWER/MENU switch]. Request repairs in the event that keeping the power on for approximately 10 minutes in pure air and restarting the power source do not achieve normal recovery.
[LOGGER STOP] Memory failure. Detector stopped data logging.	Memory for logging is abnormal. Request repairs in the event that logging cannot be resumed by erasing data (see on page 19). The Multi-gas Detector is possibly abnormal.

5. Replacing Consumables

• Replacing filter element

A tainted or wet filter element needs to be replaced with a new one.

> ⚠ **WARNING**
> • Attach the filter element properly. Otherwise, it may not meet the waterproof structure.
> • Securely tighten screws to prevent water from penetrating into the Multi-gas Detector.
> • If the water penetrates inside the Multi-gas Detector, request a repair. It cannot detect gases properly.
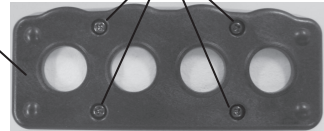
> NOTE   Do not push or poke the filter element. It may damage the waterproof structure.

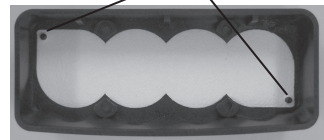1) Remove four screws on the bottom of the Multi-gas Detector and take off the sensor cover.

4-screws

Sensor cover

2) Remove the old filter element and attach the new filter on the sensor cover. Align the holes on the left and right sides of the replacement filter element with the projection of the sensor cover here.

Align to projection

Filter element for combustible gas sensor

Detection port

> ⚠ **CAUTION**   Confirm that white "filter element for combustible gas sensor" is attached inside the detection port of combustible gas sensor.

3) Tighten four screws and attach the sensor cover on the Multi-gas Detector. Four screws need to be gradually tightened alternatively to avoid off-centered tightening.

• **Battery Replacement**

When the battery level drops, the battery low pre-alarm buzzer will sound (pi…pip… and the alarm lamp on top of the Multi-gas Detector will flicker). It is recommended to replace batteries immediately.
Pressing and holding the [AIR ADJ./▲ switch] stops the buzzer.

Low Battery Alarm   Battery Exhausted   <Low battery Screen>

(Flicker)(Flicker)
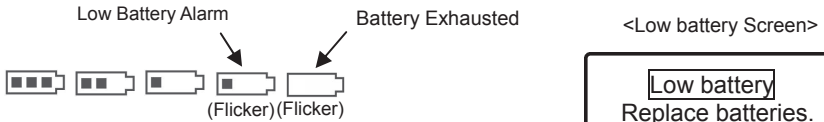
When the battery status shows Battery Exhausted icon, <Low battery screen> will be displayed and the Multi-gas Detector will not work properly.

Low battery
Replace batteries.
(Do not replace Batteries
in potentially
hazardous area.)
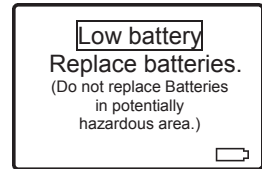
⚠ **WARNING**   • Always remove water and dust before opening the battery lid. Entry of water or dust inside the Multi-gas Detector may cause trouble.
• Remove any dust from the O-ring of the battery lid or seal face of the Multi-gas Detector body and battery lid. Even a slight amount of dust may allow water inside the Multi-gas Detector.
• Replace the battery lid AS if the O-ring has any damage (see on page 35), or it may allow water inside the Multi-gas Detector.
• Replace batteries in a safe place.
• Use two AA alkaline dry cell batteries (LR6) made by PANASONIC. Otherwise, it may damage the explosion-proof structure.

NOTE   • Use the same kind of batteries and always use fresh batteries.
• Replace two batteries at the same time.
• It is recommended to replace batteries early when the level is low even before getting the remaining battery level low alarm.

---

1) Press and hold the [POWER/MENU switch] to turn off the power.
2) Twist the battery lid lock to release (OPEN) and open the lid.
3) Remove old batteries and insert new batteries (two AA alkaline dry cells (LR6) made by PANASONIC) with correct polarity as printed on a label.
4) Attach the battery lid and twist it lock to lock (LOCK).

Battery lid lock

6. Maintenance Check

This Multi-gas Detector is a precision equipment. Maintenance in accordance with the following items is imperative for maintaining performance of the Multi-gas Detector and ensuring safety. In the event of a violation of Safe Operation instructions (see on pages 3-4), such as impact shock from dropping or exposure to water, or improper use as described in Specifications (see on page 37), such as detecting gas concentration exceeding the detection range or use in temperatures and humidity exceeding the use range, it is suggested to request an inspection (with fee) along with a description of the situation.

- **Daily Check**

Items to check	Description
Alarm function	Check that the alarm lamps and buzzer for the gas detector work properly. (See on page 15.)
Alarm indications	Check the alarm indications by having the Multi-gas Detector draw gas at a level that slightly exceeds the alarm level. Check that the gas concentration values change. Then check that the alarm lamp flickers and that the buzzer sounds once the gas concentrations reach the alarm level. In the event of an abnormality in the way the gas concentration values change, such as the alarm lamp does not flicker or the buzzer does not sound, request repairs. (If the Multi-gas Detector is set to the No Sound mode or the volume to zero, the buzzer will not sound.)
Filter element	Tainted or wet filter element needs to be replaced with a new one. (See on page 32.)
Remaining battery level	Check remaining battery level at lower right-hand corner of the LCD display. <LCD display> Oxygen : 21.0 % Combustible gas : 0 %LEL Hydrogen Sulfide : 0.0 PPM Carbon Monoxide : 0 PPM Remaining battery level 09.10.01 □12:00 28℃ ▪▪▪ Remaining level High · · · · · · · · Low Replace (Flicker) (Flicker) If the level is low, replace batteries. (See on page 33.) NOTE Prepare spare batteries or replace earlier due to shorter battery life in cold temperature.
Date and time	Adjust if the year, month, date and time setting is incorrect. (See on page 22.)

- **Periodic Check**

  - To ensure the accuracy of the Multi-gas Detector, contact your New Cosmos representative for inspection more than once every six months.
  - To ensure the accuracy of the Multi-gas Detector, contact your New Cosmos representative for a routine inspection more than once a year.

⚠ **WARNING** The sensor of Multi-gas Detector is warranted for a period of one year from the date of purchase. Proper detection may not be guaranteed after the period of one year. It is recommended to be replaced.

- **Spare Parts**

Item name	Model	Remarks
Filter element	FE-122 (2 pieces)	
XA-4000 battery lid AS (with O-ring)	59519205	

7. Troubleshooting

Before requesting repairs, please check the items in the following table. * When the Multi-gas Detector fails to operate, remove all batteries. After several minutes, install the batteries and try again.

Symptom	Cause	Treatment	Reference
Power does not be turned ON by pressing the POWER switch.	Reverse polarity of batteries	Install batteries again in the correct polarity.	Battery replacement (Page 33)
	Run out of batteries	Replace the batteries.	
The message "Battery low" is displayed.	The battery voltage reaches cutoff voltage.	Replace the batteries.	
The buzzer does not sound.	The Multi-gas Detector is set to Silent mode.	Deactivate the Silent mode.	Volume / Silent (Page 24)
	The sound volume is set to "0".	Set sound volume to "1" or higher.	
A notice or error message is displayed on LCD screen.	See "Notifications and Error Messages" on page 31.		

8. Warranty

New Cosmos Electric Company Limited (hereafter referred to as "New Cosmos") offers the following as the sole and exclusive limited warranty available to the Customer. This warranty is in lieu of, and the Customer waives, all other warranties of any kind or nature, expressed or implied, including without limitation any warranty for merchantability or fitness for a particular purpose. The remedies set forth herein are exclusive.

New Cosmos warrants to the original purchaser (Customer) and no other person or entity that the gas detection product supplied by New Cosmos shall be free from defects in materials and workmanship for a period of one (1) year from the date of purchase. This warranty does not apply to consumables, including but not limited to fuses and filters. Certain other accessories not specifically listed here may have different warranty periods.

If after examination of an allegedly defective product returned to New Cosmos, with freight prepaid, should it be found that the product fails to conform to this warranty, the Customer's only remedy and New Cosmos's only obligation shall be, at New Cosmos's sole discretion, replacement or repair of the non-conforming product or refund of the original purchase price of the non-conforming product. In no event shall New Cosmos be liable for any other special, incidental, or consequential damages or losses of any kind whatsoever, including but not limited to loss of anticipated profits and any other loss caused by reason of non-operation of the product.

This warranty is valid only if the product is maintained and used in accordance with New Cosmos's instructions and recommendations. New Cosmos shall be released from all obligations under this warranty in the event repairs or modifications are made by persons other than its own or authorized service personnel or if the warranty claim results from physical abuse or misuse of the product.

9. Specifications

Model	XA-4400			
Target gas	Combustible gas	Oxygen	Hydrogen sulfide	Carbon monoxide
Detection principle	Catalytic Combustion	Galvanic Cell	Electrochemical cell	Electrochemical cell
Gas sampling method	Diffusion			
Detection range (service range)	0 to 100%LEL (101 to 110%LEL)	0–25.0vol% (25.1–50.0vol%)	0–30.0ppm (30.1–150.0ppm) [*1]	0–300ppm (301–2000ppm) [*2]
Indicated accuracy[*3] (service range)	Within ±10%LEL	Within ±0.5vol%	Within ±1.5ppm	150ppm or less: within ±15ppm 151 to 300ppm: within ±30ppm
Display resolution	1%LEL	0.1 vol%	0.1 ppm	1 ppm
Alarm setting value	1st stage: 10%LEL 2nd stage: 30%LEL	1st stage: 19.5vol% 2nd stage: 18.0vol%	1st stage: 10.0ppm 2nd stage:15.0ppm TWA: 10.0ppm STEL: 15.0ppm	1st stage: 50ppm 2nd stage: 150ppm TWA: 25ppm STEL: 300ppm[*4]
Response time[*5]	Within 60 seconds	Within 20 seconds	Within 30 seconds	Within 30 seconds
Gas alarm method	Buzzer sounds. Red LED flicker. LCD flicker. Vibration (automatic recovery)			
Power source	Two size AA dry batteries (LR6) made by PANASONIC 1.5VDC			
Continuous use[*6]	15 hours. Approximately 60 hours for model without combustible gas. (without alarm, backlight, and data logging, at 25 degrees C)			
Operating temperature and humidity	-10 to 40 degrees C, 30 to 85% RH (No condensation)[*7]			
Ambient Temperature	-20 to 50 degrees C			
Explosion-proof structure	Ex iad II BT3 X (Japan)[*8]			
Protection class	IP67 or equivalent [*9]			
Functions	・Self-diagnosis (Sensor abnormality, Zero adjustment disabled) ・Zero setting (with oxygen adjusted at 21.0%) ・Alarm test ・Automatic back light ・Peak-hold function (Lower limit peak only for oxygen(for default setting)) ・Remaining battery level display, temperature, clock display ・Remaining battery level low pre-alarm ・Buzzer off (when the buzzer sounds) ・TWA/STEL alarm ・Change the alarm volume (when the lock is off) ・Change the alarm setting value(when the lock is off) ・Data logging (need to set for Data logging)			
Dimensions	79 (W) × 89 (H) × 33 (D) mm (excluding projection)			
Weight	Approximately 230 g (including batteries)			

*1 Increments of 0.5 ppm from 35.0 to 150.0 ppm.
*2 Increments of 5 ppm from 350 to 2,000 ppm.
*3 Based on the same conditions.
*4 STEL alarm setting value for CO is not defined in ACGIH and it uses manufacturer's standards.
*5 Response time: To be a time for response of 90%. (Condition is at ambient temperature of 20±2 degrees C)
*6 It may vary according to circumstances, operating condition, storage period, and battery manufacturer.
*7 Operating temperature is subject to change in the range of surrounding temperature.
*8 Hydrogen and Acetylene are not covered by explosion-proof structure.
*9 Dust-proof and waterproof structure which satisfies the test of New Cosmos Electric complying with JIS C 0920-2003 Ingress Protection code IP67 in the condition of brand-new Multi-gas Detector.
   However, this Ingress Protection code IP67 does not guarantee any gas detection.
   The IP67 means a structure (IP6X) with which a Multi-gas Detector for testing is conducted in a dust test on depressurized condition at a maximum 2 kPa to verify that there is no accumulation of dust inside, and a structure (IPX7) with which a Multi-gas Detector for testing is slowly immersed in a stationary water bath filled with tap water at normal temperature with its bottom end at 1 m from the water surface for 30 minutes to verify that there is no water entry and damage from such exposure.

Aforementioned specification is subject to change without notice.

10. Detection Principle

- Diaphragm galvanic cell (oxygen)

The sensor consists of a noble metal electrode, a base metal electrode, and an electrolytic solution. A noble metal electrode has contact with the air through the Teflon membrane.
Due to the electrical potential difference from the load resistance caused by connecting to both terminals, the following reaction takes place.

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

Base metal electrode $2Pb \rightarrow 2Pb^{2+} + 4e^-$

As a result, the electrical current commensurate with the oxygen concentration value in the air flows from the noble metal electrode to the base metal electrode through an external circuit.

- Electrochemical cell (hydrogen sulfide, carbon monoxide)

The sensor consists of three electrodes and an electrolytic solution. This method uses a potentiate circuit for electrolytic oxidation to maintain the working electrode at a certain electrical potential as contrasted with the reference electrode. The gas concentration is obtained by measuring the electrical current generated in this process.
The following explains the electrolytic reaction of hydrogen sulfide:

Working electrode $H2S + 4H_2O \rightarrow H_2SO_4 + 8H^+ + 8e^-$

Counter electrode $2O_2 + 8H^+ + 8e^- \rightarrow 4H_2O$
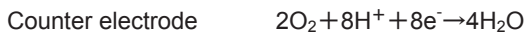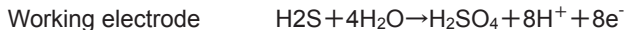
- Catalytic combustion (combustible gas)

A catalyst applied to the surface of a platinum coil causes catalytic combustion on the surface of the catalyst even when the gas concentration value is lower than the lower explosion limit. The temperature rise in this process increases the electrical resistance of platinum coil.
This change is picked up as deviation voltage for the abridged circuit. The combustible gas can be detected up to the lower explosion limit (LEL).

11. Glossary

O$_2$: Oxygen

H$_2$S: Hydrogen sulfide

COMB: Combustible gas

CO: Carbon monoxide

Ambient temperature: Atmospheric temperature around the electric instrument to maintain its explosion-proof structure.

Operating temperature and humidity range: Atmospheric temperature and humidity around the electric instrument to ensure accuracy and proper operation.

Air adjustment: Adjustment of zero point in pure air.

Span adjustment: Adjustment of indication value with span gas.

Explosion-proof: Equipment designed in accordance with existing codes and standards such that it will operate in a specified hazardous environment without causing an explosion.

Intrinsically safety: A protection technique for safe operation of electrical equipment in hazardous areas by limiting the energy available for ignition.

Flameproof enclosure: An enclosure that can withstand the pressure developed during an internal explosion of an explosive mixture and that prevents the transmission of the explosion to the explosive atmosphere surrounding the enclosure and that operates at such an external temperature that a surrounding explosive gas or vapor will not be ignited thereby.

Nonhazardous area: A location in which fire or explosion hazards are not expected to exist specifically due to the presence of flammable gases or vapors, flammable liquids, combustible dusts, or ignitable fibers.

% LEL: Concentrations of combustible gas given in terms of percent of the lower explosive limit.

Vol% : Gas concentrations given in terms of percent of cubic volume

Service range: A range out of the detection range showing the reading as a rough standard.

Lower explosive limit (LEL): The Lower Explosive Limit of a flammable gas or vapor (percentage by volume in air in which explosion can occur upon ignition in a confined area.

TLV-TWA (Threshold Limit Values - Time Weighted Average) : Expressed as TWA in this manual Threshold limit value of time weighted average. A time weighted average concentration of harmful material considered to have no harmful influence on the health of the majority of workers who are exposed during average work time of either eight hours daily or 40 hours weekly.

TLV-STEL (Threshold Limit Values - Short Term Exposure Limit): Expressed as STEL in this manual Threshold limit value of short term exposure limit. A concentration of harmful material that has no harmful influence on the health of workers who are exposed for a continuous 15 minutes as long as daily exposure is TWA or less. (Exposure shall be four times or less per day, and the interval of the exposure shall be at least 60 minutes.)

(Partly cited from Industrial Gas Detectors & Monitors Association, Glossary of the Gas Detector Alarms, and Detection Tube Type Gas Measuring Instrument)

MEMO