



PT0E-1491

# **Portable Combustible Gas Detector NP-1000**

**Operating Manual  
(PT0-149)**

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# Contents

1. Outline of the Product.....	4
Preface.....	4
Purpose of use.....	4
Definition of DANGER, WARNING, CAUTION and NOTE .....	4
2. Important Notices on Safety.....	5
2-1. Danger cases .....	5
2-2. Warning cases .....	5
2-3. Precautions.....	6
2-4. Safety information.....	8
3. Product Components.....	9
3-1. Main unit and standard accessories.....	9
3-2. Names and functions for each part .....	11
4. How to Use .....	14
4-1. Before using the gas detector .....	14
4-2. Preparation for start-up .....	14
4-3. How to start the gas detector .....	17
4-4. Basic operating procedures.....	20
4-5. Performing air calibration .....	21
4-6. How to detect.....	23
4-7. Switching range mode .....	25
4-8. Snap logger .....	26
4-9. Power-off .....	27
5. How to Set Display Mode.....	28
5-1. Entering the display mode.....	28
5-2. Concentration displayed gas reading setting (base).....	31
5-3. Alarm setpoint display .....	34
5-4. Pump suction volume setting .....	36
5-5. Log data display .....	38
6. How to Set User Mode .....	40
6-1. Entering the user mode .....	40
6-2. Peak bar display setting .....	43
6-3. Date/time setting.....	45
6-4. Alarm setpoint setting .....	46
7. Calibration .....	48
7-1. Preparation for air and N <sub>2</sub> /CO <sub>2</sub> calibrations.....	48
7-2. Entering calibration mode.....	50
7-3. Bump test (base gas: N <sub>2</sub> ).....	53
7-4. Air calibration .....	55
7-5. N <sub>2</sub> calibration.....	56
7-6. CO <sub>2</sub> calibration .....	57
7-7. AUTO CAL (base gas: N <sub>2</sub> ) .....	58
7-8. ONE CAL .....	60
7-9. Bump test condition setting .....	62
7-10. Password setting .....	64
8. Alarm Function.....	66
8-1. Gas alarm activation.....	66
8-2. Fault alarm activation .....	68
9. Maintenance .....	69
9-1. Maintenance intervals and items.....	69
9-2. How to clean.....	71
9-3. Parts replacement .....	72

10. Storage and Disposal .....	73
10-1. Procedures to store the gas detector or leave it for a long time .....	73
10-2. Procedures to use the gas detector again .....	73
10-3. Disposal of products .....	73
11. Troubleshooting .....	75
11-1. Abnormalities on unit .....	75
11-2. Abnormalities of readings .....	76
12. Product Specifications .....	77
12-1. List of product specifications .....	77
12-2. List of optional parts .....	78
Appendix .....	79
13-1. Definition of terms .....	79

## 1

# Outline of the Product

## Preface

Thank you for choosing our portable combustible gas detector NP-1000 (hereinafter referred to as the gas detector). Please check that the model number of the product you purchased is included in the specifications on this manual.

This manual explains how to use the gas detector and its specifications. It contains information required for using the gas detector properly. Not only the first-time users but also the users who have already used the product must read and understand the operating manual to enhance the knowledge and experience before using the gas detector.

Note that the contents of this manual are subject to change without notice for product improvement. It is also prohibited to copy or reproduce this manual, in whole or in part, without permission.

Regardless of warranty period, we shall not make any indemnification for accidents and damage caused by using the gas detector.




Make sure to read the warranty policy specified on the warranty.

## Purpose of use

This product is used to detect combustible gases (vol%).  
It detects combustible gases for a gas storage tank or pipeline.  
Detection results are not intended to guarantee life or safety in any way.

## Definition of DANGER, WARNING, CAUTION and NOTE

Throughout this manual, the following indications are used to ensure safe and effective work.

 <b>DANGER</b>	This message indicates that improper handling may cause serious damage on life, health or assets.
 <b>WARNING</b>	This message indicates that improper handling may cause serious damage on health or assets.
 <b>CAUTION</b>	This message indicates that improper handling may cause minor damage on health or assets.
<b>NOTE</b>	This message indicates advice on handling.

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## 2

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# Important Notices on Safety

To maintain the performance and use the gas detector safely, observe the following instructions of DANGER, WARNING and CAUTION.

## 2-1. Danger cases



### DANGER

#### About use

- While conducting measurement in a confined space such as inside of the gas storage tank and pipeline, do not lean over or look into the gas storage tank or pipeline. It may lead to dangers because oxygen-deficient air or other gases may blow out.
- Oxygen-deficient air or other gases may be discharged from the gas exhausting outlet (GAS OUT). Never inhale the air or gases.

## 2-2. Warning cases



### WARNING

#### Sampling point pressure

- The gas detector is designed to draw gases under the atmospheric pressure. If excessive pressure is applied to the gas inlet (GAS IN) and outlet (GAS OUT) of the gas detector, measured gases may leak out from its inside and may cause dangerous conditions. Be sure that excessive pressure is not applied to them while used.
- Do not connect the gas sampling hose directly to a location with a pressure higher than the atmospheric pressure. The internal piping system may be damaged.

#### Air calibration in atmosphere

- When air calibration is performed in the atmosphere, check the atmosphere for freshness before beginning it. If interference gases exist, the adjustment cannot be performed properly, thus leading to dangers when the gas leaks.

#### Battery level check

- Before use, check that there remains sufficient battery power. When the gas detector is not used for a long period, the batteries may be exhausted. Never fail to replace them with new ones before use.
- If a low battery voltage alarm is triggered, gas detection cannot be conducted. If the alarm is triggered during use, turn off the power and promptly replace the batteries in a safe area.



## WARNING

### Others

- Do not throw the gas detector into fire.
- Do not wash the gas detector in a washing machine or ultrasonic cleaner.
- Do not block the buzzer sound opening. No alarm sound can be heard.
- Do not remove the battery while the power is on.
- Be sure to connect the gas sampling probe to the gas detector and check that the surrounding air is fresh before turning on the power.
- If the main unit is dropped or given a shock, the reading may rise and it may remain so. In such a case, perform air calibration in a place where the surrounding air is fresh.

## 2-3. Precautions



## CAUTION

**Do not use the gas detector where it is exposed to oil, chemicals, etc. Do not submerge the gas detector under water on purpose.**

- Do not use in a place where the gas detector is exposed to liquids such as oil and chemicals.
- The gas detector, being compliant to IP67, is not water-pressure-resistant. Do not use the gas detector where a high water pressure is applied to it (under a faucet, shower, etc.) or submerge it under water for a long time. The gas detector is water-proof only in fresh water and running water, and not in hot water, salt water, detergent, chemicals, human sweat, etc.
- The gas inlet and outlet are not water-proof. Be careful not to let water such as rainwater, etc. get into these parts. Because this may cause trouble and gas cannot be detected.
- Do not place the gas detector where water or dirt gets accumulated. The gas detector placed at such a location may cause malfunction due to water or dirt that gets into the buzzer opening, etc.
- Note that drawing in dirty water, dust, metallic powder, etc. will significantly deteriorate the sensor sensitivities. Be careful when the gas detector is used in an environment where these elements exist.

**Do not use the gas detector in a place where the temperature drops below -20°C or rises over 50°C.**

- The operating temperature of the gas detector is -20 to +50°C. Do not use the gas detector at higher temperatures, humidities and pressures or at lower temperatures than the operating range.
- Avoid long-term use of the gas detector in a place where it is exposed to direct sunlight.
- Do not store the gas detector in a sun-heated car.

**Observe the operating restrictions to prevent condensation inside the gas detector or gas sampling hose.**

- Condensation formed inside the gas detector or gas sampling hose causes clogging or gas adsorption, which may disturb accurate gas measurement. Thus, condensation must be avoided. In addition to the operating environment, carefully monitor the temperature/humidity of the sampling point to prevent condensation inside the gas detector or gas sampling hose. Please observe the operating restrictions.

**Do not use a transceiver near the gas detector.**

- Radio wave from a transceiver near the gas detector may disturb readings. If a transceiver or other radio wave transmitting device is used, it must be used in a place where it disturbs nothing.
- Do not use the gas detector near a device that emits strong electromagnetic waves (high-frequency or high-voltage devices).

**Verify that the pump driving indicator is rotating before using the gas detector**

- If the flow check display is not rotating, gas detection cannot be performed properly. Check whether the flow rate is lost.



## CAUTION

### Never fail to perform a regular maintenance.

- Since this is a safety unit, a regular maintenance must be performed to ensure safety. Continuing to use the gas detector without performing maintenance will compromise the sensitivity of the sensor, thus resulting in inaccurate gas detection.

### Others

- Pressing buttons unnecessarily may change the settings, preventing alarms from activating correctly. Operate the gas detector using only the procedures described in this operating manual.
- Do not drop or give shock to the gas detector. The accuracy of the gas detector may be deteriorated.
- Do not jab the buzzer opening with a sharp-pointed item. Doing so may cause a failure or damage.
- Do not remove the panel sheet on the display. The water-proof and dust-proof performances will be deteriorated.
- Do not affix a label or the like on the infrared port. Infrared communications can no longer be conducted.
- The operating environment may include gases that have harmful effects on the sensor of the gas detector. The gas detector cannot be used in the presence of the following gases:
  - (1) High-concentration sulfides that exist continuously (such as H<sub>2</sub>S, SO<sub>2</sub>, etc.)
  - (2) Halogen gases (such as chloride compounds, fluorocarbons, etc.)
  - (3) Silicone (Si compounds)

Do not use the gas detector in the presence of the above gases (such as high-concentration sulfides, halogen gases, silicone, etc.), which may shorten the sensor life significantly or cause malfunctions such as inaccurate readings.

In case the gas detector is used for detection in the presence of silicone, etc., be sure to check the gas sensitivities before using it again.

### About battery replacement

- Never fail to turn off the power of the gas detector before replacing the batteries.
- Replace the batteries in a safe place.
- Replace all of the four batteries with new ones at one time.
- The conditions for the explosion-proof standard of the gas detector include the use of TOSHIBA batteries. To use the unit as an explosion-proof product, use four AA alkaline batteries (LR6) manufactured by TOSHIBA Corporation.
- Pay attention to the polarities of the batteries.

### Usage

- In a low-temperature environment, the operating time is shortened due to the battery performance property.
- At low temperatures, the responses of the LCD display may slow down.
- Note the following points for air calibration according to the operating environment.
  - (1) Before performing air calibration in the atmosphere, check that the surrounding air is fresh.
  - (2) Before checking air purge, be sure to perform air calibration with the purge air of the gas storage tank or pipeline to use. Measurement should be performed in the purge air environment to obtain correct results.
- Perform air calibration after the reading is stabilized.
- If there is a sudden temperature change of 15°C or more between the storage and operational locations, turn on the power of the gas detector, let it stand for about 10 minutes in a similar environment to the operational location, and perform air calibration in fresh air before using it.
- When cleaning the gas detector, do not splash water over it or use organic solvents such as alcohol and benzene on it. The surface of the gas detector may be discolored or damaged.
- If the gas detector is not used for a long time, turn on the power at least once every six months and check that the pump draws in air (about three minutes). The gas detector, when not activated for a long time, may cease to work because of hardening of the grease in the pump motor.
- If the gas detector is not used for a long time, store it after removing the batteries. Battery leaks may result in fire, injury, etc.

When the gas detector is used again after a long-period storage, never fail to perform air calibration. For information on readjustment including air calibration, please contact RIKEN KEIKI.

## 2-4. Safety information

### Outline of the unit

The combustible gas detector model NP-1000 is designed to monitor combustible gases in a hazardous area.

The detection range of NP-1000 is 0 to 100 vol%.

A sample gas is drawn by the built-in small pump.

The power is supplied by AA alkaline batteries (LR6, manufactured by TOSHIBA, four pieces) only.

Replacing batteries in a hazardous area is prohibited.

### Technical data

Explosion-proof specifications	Explosion-proof class	ExialICT4Ga II1GExiall CT4Ga
	Ambient temperature range	-20 - +50°C
Electrical specifications		Driven by four AA alkaline batteries (LR6, manufactured by TOSHIBA).
Certificate number	IECEX	IECEX DEK13.0090
	ATEX	DEKRA 13 TEX0227
Applied standards		IEC60079-0:2011    EN60079-0:2012 IEC60079-11:2011    EN60079-11:2012 IEC60079-26:2006    EN60079-26:2007
Precautions		<ul style="list-style-type: none"> <li>· Do not replace the batteries in a hazardous area.</li> <li>· Do not disassemble/modify the gas detector.</li> <li>· Use only AA alkaline batteries (LR6, manufactured by TOSHIBA) as power supply.</li> <li>· Use only CR1220 (manufactured by Hitachi Maxell) as backup power supply.</li> </ul>
How to read instruction number		INST.No. <u>0</u> <u>0</u> <u>000</u> <u>0000</u> <u>00</u> A B C D E A: Manufacturing year (0-9) B: Manufacturing month (1-9, XYZ for Oct.-Dec.) C: Manufacturing lot D: Serial number E: Factory code

### Manufacturer

**RIKEN KEIKI CO., LTD.**

2-7-6 Azusawa, Itabashi-ku, Tokyo, 174-8744 Japan

Web site: <http://www.rikenkeiki.co.jp/>

## 3

# Product Components

## 3-1. Main unit and standard accessories

After opening the carton box, check the gas detector and accessories.  
If there is anything missing, contact RIKEN KEIKI.

### Main unit

For names and functions of individual parts of the gas detector and LCD display, see "Names and functions for each part" (P. 11).

#### <Main Unit>

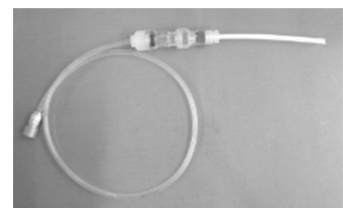


### Accessories

AA alkaline battery  
: 4 pcs  
(installed)



Gas sampling  
probe +  
gas sampling hose  
(1 m): 1 pc



Hand strap (1 pc)



Product warranty (1 pc)  
Operating manual: 1 copy

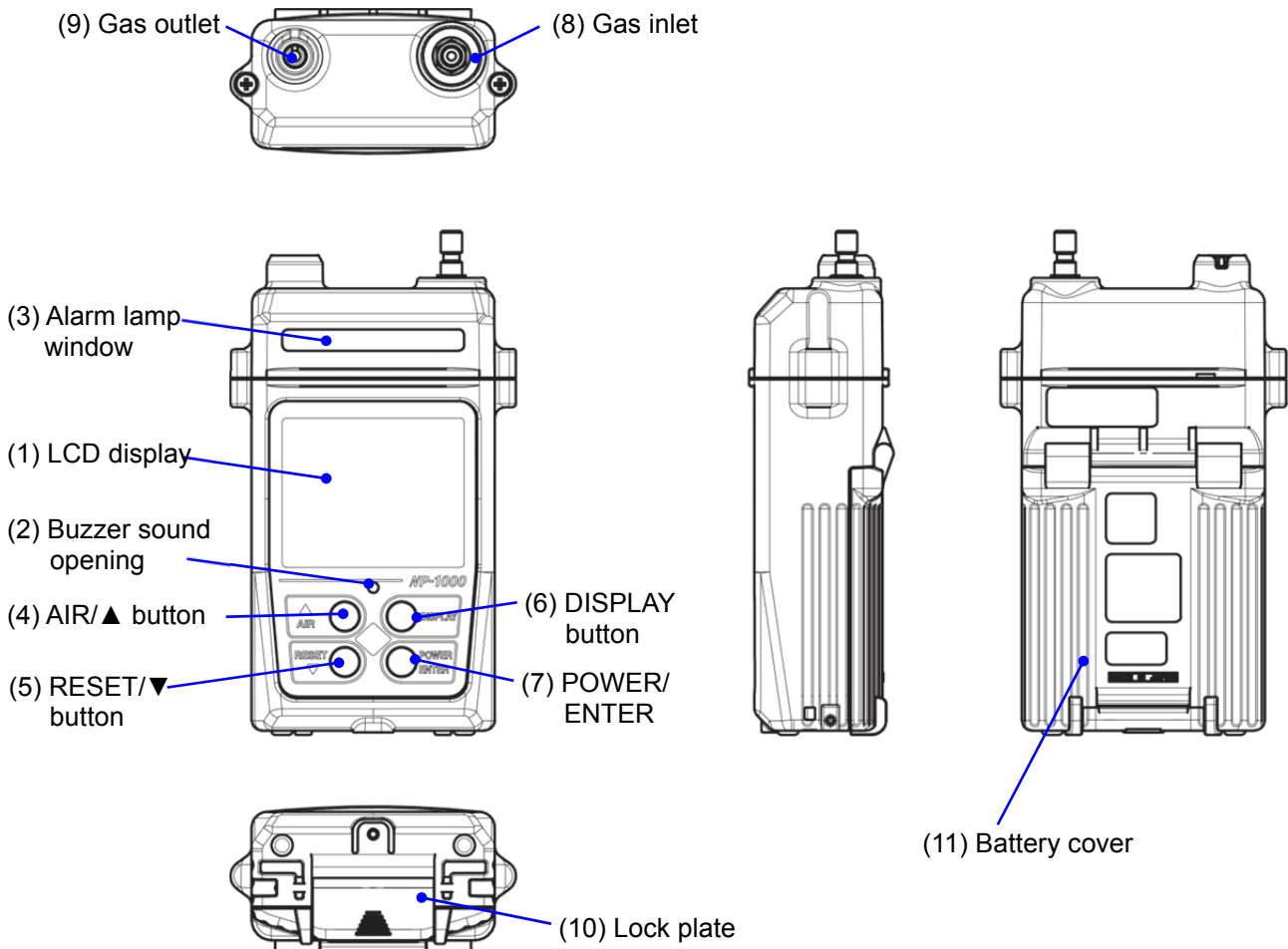
**DANGER****About explosion-proof**

- Do not modify or change the circuit, structure, etc.
- When using the gas detector in a hazardous area, take the following countermeasures for preventing dangers resulting from electrostatic charges.
  - (1) Wear anti-static clothes and conductive shoes (anti-static work shoes).
  - (2) For indoor use, use the gas detector while standing on a conductive work floor (with a leakage resistance of 10 MΩ or less).
- Replace the batteries in a non-hazardous area.
- The specifications of the gas detector are as follows:  
Power supply: 6.0 VDC (LR6, manufactured by TOSHIBA, 4 pcs)  
Ambient temperature: -20 - +50°C
- The explosion-proof class of the gas detector is as follows:  
ExiallCT4 (TIIS explosion-proof certification)  
II1GExiallCT4Ga (ATEX explosion-proof directive)
- The protective class of the case to be explosion-proof is IP20.  
IP20 is a protection class to be explosion-proof. The IP protection class is compliant to IP67 level by factory default.

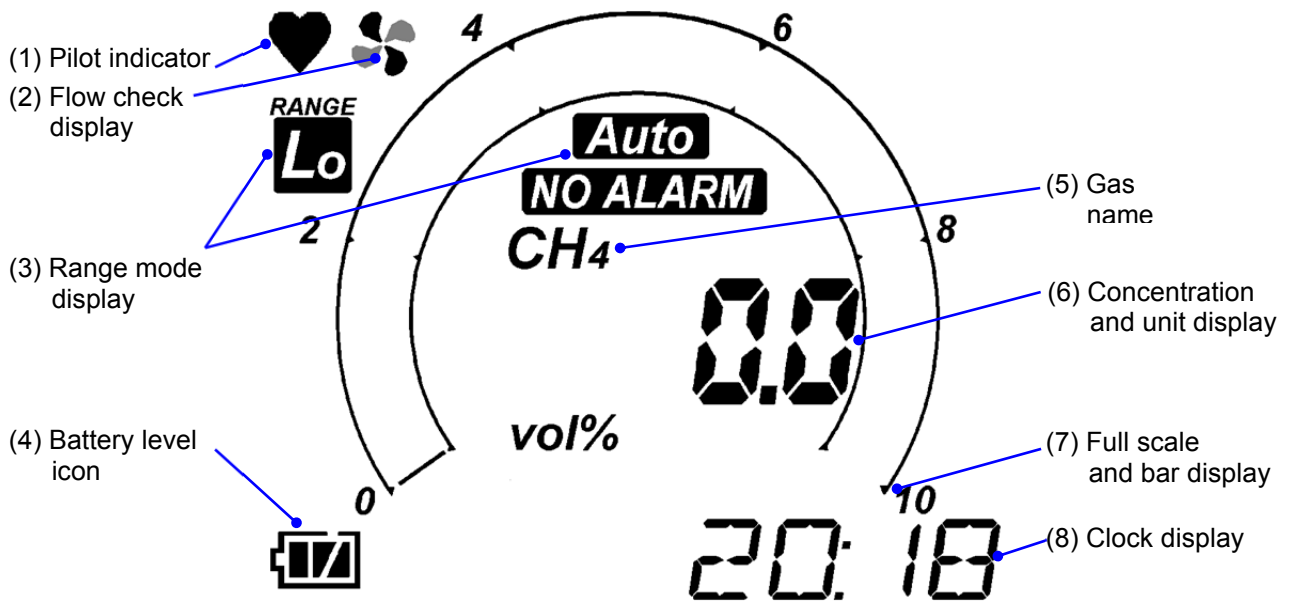
## 3-2. Names and functions for each part

This section describes names and functions of main unit and battery unit parts and LCD display.

### <Exterior of Main Unit>



No.	Name	Function
(1)	LCD display	Displays gas concentrations, measured gas name, alarms, etc.
(2)	Buzzer sound opening	Emits operation and alarm sounds. (Do not block it.)
(3)	Alarm lamp window	Blinks (in red) in response to an alarm state.
(4)	AIR/▲ button	Keep this switch pressed to perform air calibration.
(5)	RESET/▼ button	When an alarm occurs, press this switch to reset the alarm.
(6)	DISPLAY button	Press this switch to change between display modes.
(7)	POWER/ENTER button	Turns the power ON or OFF.
(8)	Gas inlet	Connect a gas sampling hose to this port.
(9)	Gas outlet	Exhausts the gas drawn into the gas detector. (Do not block it.)
(10)	Lock plate	Retains the battery cover.
(11)	Battery cover	Protects the battery.

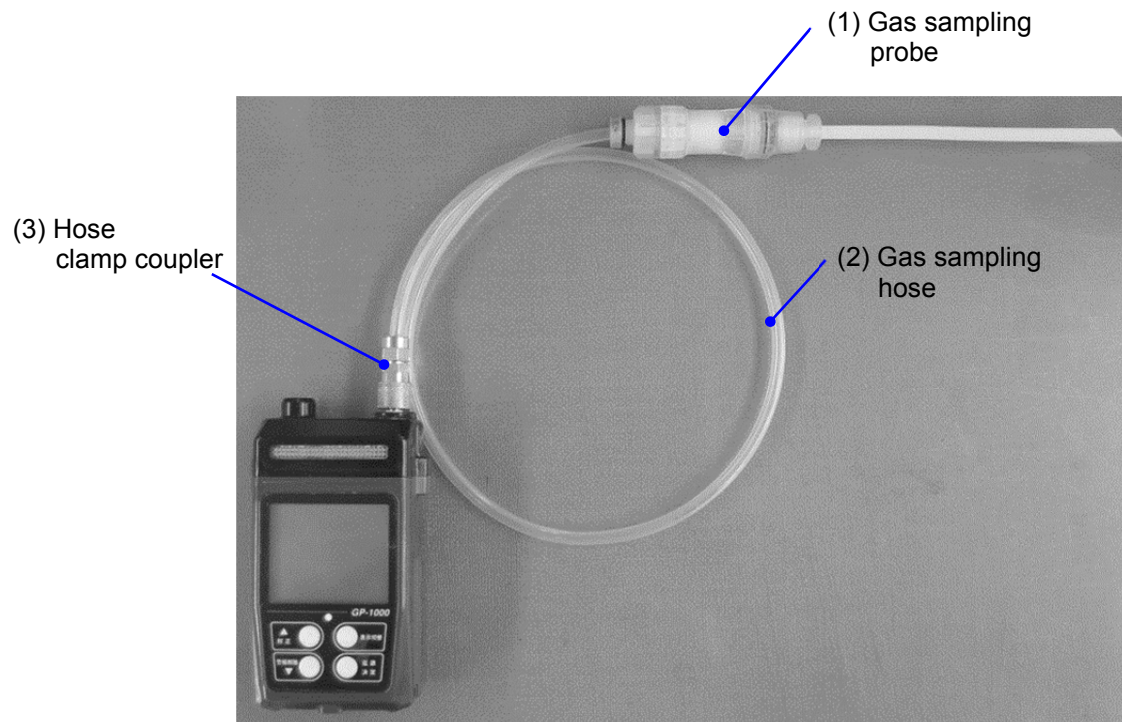
**<LCD Display>**

No.	Name	Function
(1)	Pilot indicator	Displays the operating status in the detection mode. Normal: Blinking
(2)	Flow check display	Displays the drawing status. Normal: Rotating
(3)	Range mode display	Displays the Lo/Auto range with an icon. No icon is displayed in the Hi range mode.
(4)	Battery level icon	Displays a reference of the battery level.
(5)	Gas name display	Displays detected gases name.
(6)	Concentration and unit display	Displays gas concentration and unit.
(7)	Full scale and bar display	Displays the level of gas concentration with the bar meter as well as the full scale value.
(8)	Clock display	Displays the current time.

**NOTE**

- The meanings of battery level icons are as follows:
  - : Sufficient / : Low / : Needs charging
  - If the battery level further drops, the inside of the battery icon starts to blink ( ).
- Range mode display
  - Lo: Fixed to the low range (0 - 10.0 vol%)
  - Auto: Automatic range switching that switches between the low and high ranges automatically
  - Hi: Fixed to the high range (0 - 100 vol%)

## Gas sampling probe and gas sampling hose



No.	Name	Function
(1)	Gas sampling probe	Placed in a detection area to collect a gas. The probe includes a dust filter.
(2)	Gas sampling hose	A resin hose through which the sampled gas goes.
(3)	Hose clamp coupler	A joint that connects with the main unit.

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# 4

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## How to Use

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### 4-1. Before using the gas detector

Not only the first-time users but also the users who have already used the gas detector must follow the operating precautions.

Ignoring the precautions may damage the unit, resulting in inaccurate gas measurement.

### 4-2. Preparation for start-up



#### CAUTION

- The display is covered by the protective film to prevent scratches from shipping.
- Be sure to remove this film before use.
- Gas monitor with this film will not satisfy the explosion-proof performance.

Before starting gas detection, check the followings

- Check that the protective film attached on the display from shipping is removed.
- The batteries are installed (with sufficient battery level).
- The dust filter is not contaminated.
- The gas sampling probe is not loose.
- The hose clamp coupler is connected securely.

#### 4-2-1. How to replace the batteries

When the gas detector is used for the first time, or when the battery level is low, attach new AA alkaline batteries according to the following procedures.

**1 Check that the power of the gas detector is turned off.**

Turn off the power if it is turned on.

**2 Release the lock and open the battery cover.**



Lock plate

- 3 Remove old batteries and then put new batteries while observing the correct polarity.**



- 4 Close the battery cover and lock it.**

The lock clicks.



### DANGER

- The conditions for the explosion-proof standard of the gas detector include the use of TOSHIBA batteries. To use the unit as an explosion-proof product, use four AA alkaline batteries (LR6) manufactured by TOSHIBA Corporation.



### CAUTION

- Never fail to turn off the power of the gas detector before replacing the batteries.
- Replace the batteries in a safe place.
- Replace all of the four batteries with new ones at one time.
- Pay attention to the polarities during replacement.
- If the battery cover is not completely locked, the dry batteries may drop off or water may get in through the clearance. Water may also get in if a minute foreign substance is caught between the gas detector and battery cover.

## 4-2-2. Gas sampling probe maintenance

Check the dust filter inside the gas sampling probe visually.

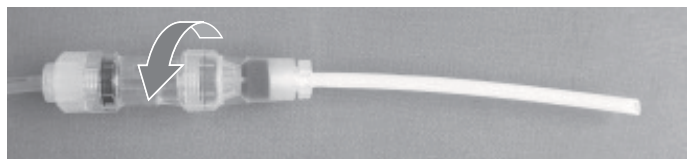
- Check that the dust filter is not contaminated.

### <Dust Filter Replacement Procedure>

Check that the dust filter inside the gas sampling probe is not contaminated visually.

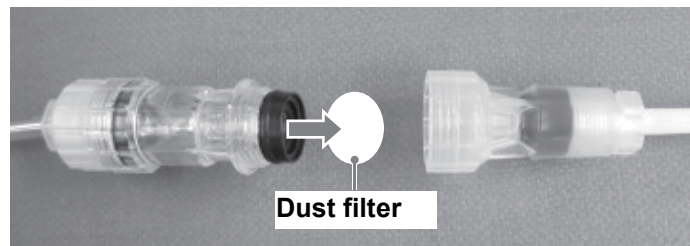
If the dust filter is contaminated, replace it following the procedure below.

- 1 Hold the middle section (filter case) of the gas sampling probe and remove the tip section by turning it counterclockwise.**



- 2 Remove the contaminated dust filter from the middle section (filter case) and then put a new filter in the case.**

There are no differences between the front and back sides of the dust filter.

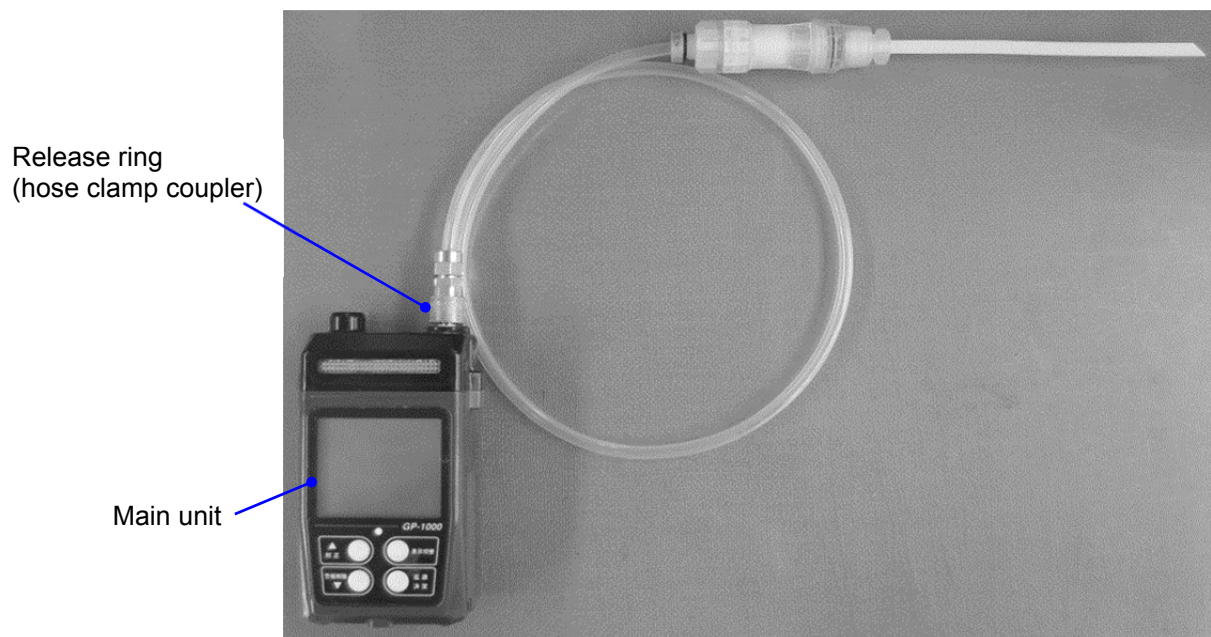


- 3 Connect the tip section by turning it clockwise.**

Tighten it securely. Loose connection may cause a leak.  
Tighten it by hand.

### <Installation>

Connect the gas sampling probe to the main unit as shown in the following figure. Insert the hose clamp coupler into the gas inlet of the main unit while pulling the release ring, and then release the release ring.



### CAUTION

- Use only a gas sampling hose specified by RIKEN KEIKI.
- Use the gas detector with the gas sampling probe connected to the gas sampling hose so that no foreign substance is drawn into it.
- Be sure to connect the gas sampling probe and gas sampling hose by hand. If they are fastened too tight using a tool, the plastic part of the gas sampling probe may be broken.

### NOTE

- Insert the hose releasing coupler to the gas inlet (GAS IN) side securely until it clicks.

## 4-3. How to start the gas detector

When the power is turned on, a self-diagnostic starts, and then the gas detector enters the detection mode.

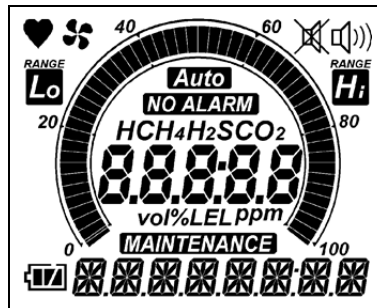
### Power-on

Press and hold the POWER button until the buzzer blips (three seconds or longer) to turn on the power. When the power is turned on, the LCD display changes automatically as shown below, and the gas detector enters the detection mode.

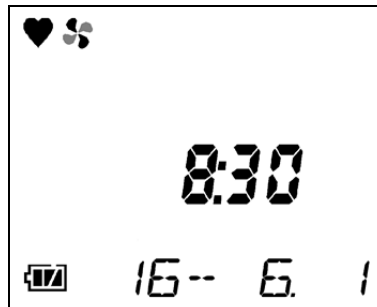
#### 1 Press and hold the POWER button for three seconds or longer.

Hold it down until all the LCDs and alarm lamp light up and the buzzer blips.

All LCDs light up

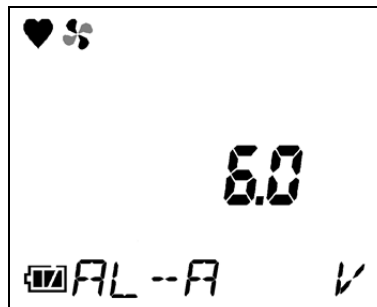


Date/time display



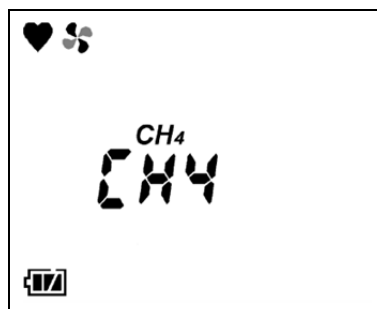
Display example:  
Wednesday, June 1, 2016  
8:30

Battery voltage display  
Alarm type display



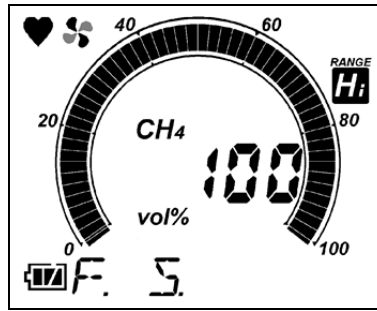
Display example:  
Battery voltage 6.0 V  
Non latching (auto-reset): AL-A  
(Alarm-Auto)  
\* Alarm type  
Self-latching: AL-H  
(Alarm-Hold)  
Non latching (auto-reset):  
AL-A (Alarm-Auto)

Gas name display



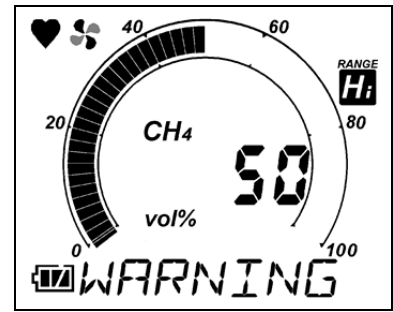
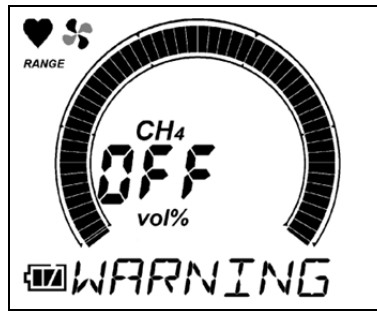
Display example:  
CH4

Full scale  
Display



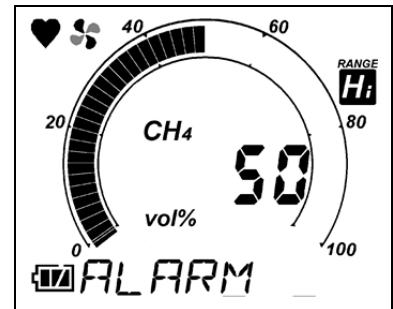
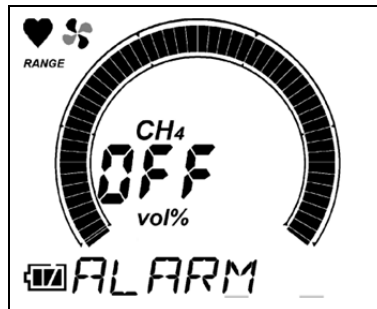
Display example:  
100 vol%

WARNING  
Setting  
display



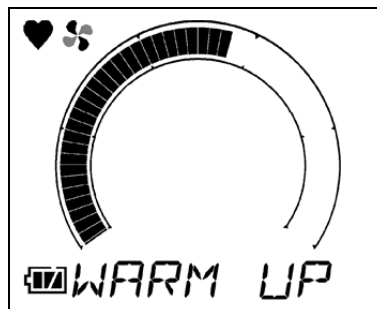
Display in setting alarm (P. 34)  
Display example: 50 vol%

ALARM  
Setting  
display



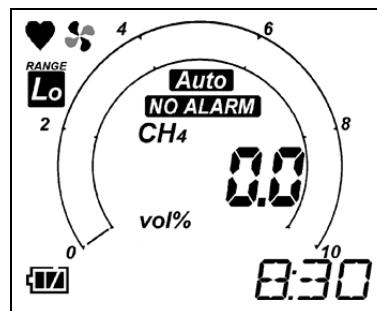
Display in setting alarm (P. 34)  
Display example: 50 vol%

Warm-up  
display



The buzzer blips twice and the detection mode is displayed.

Detection mode



## WARNING

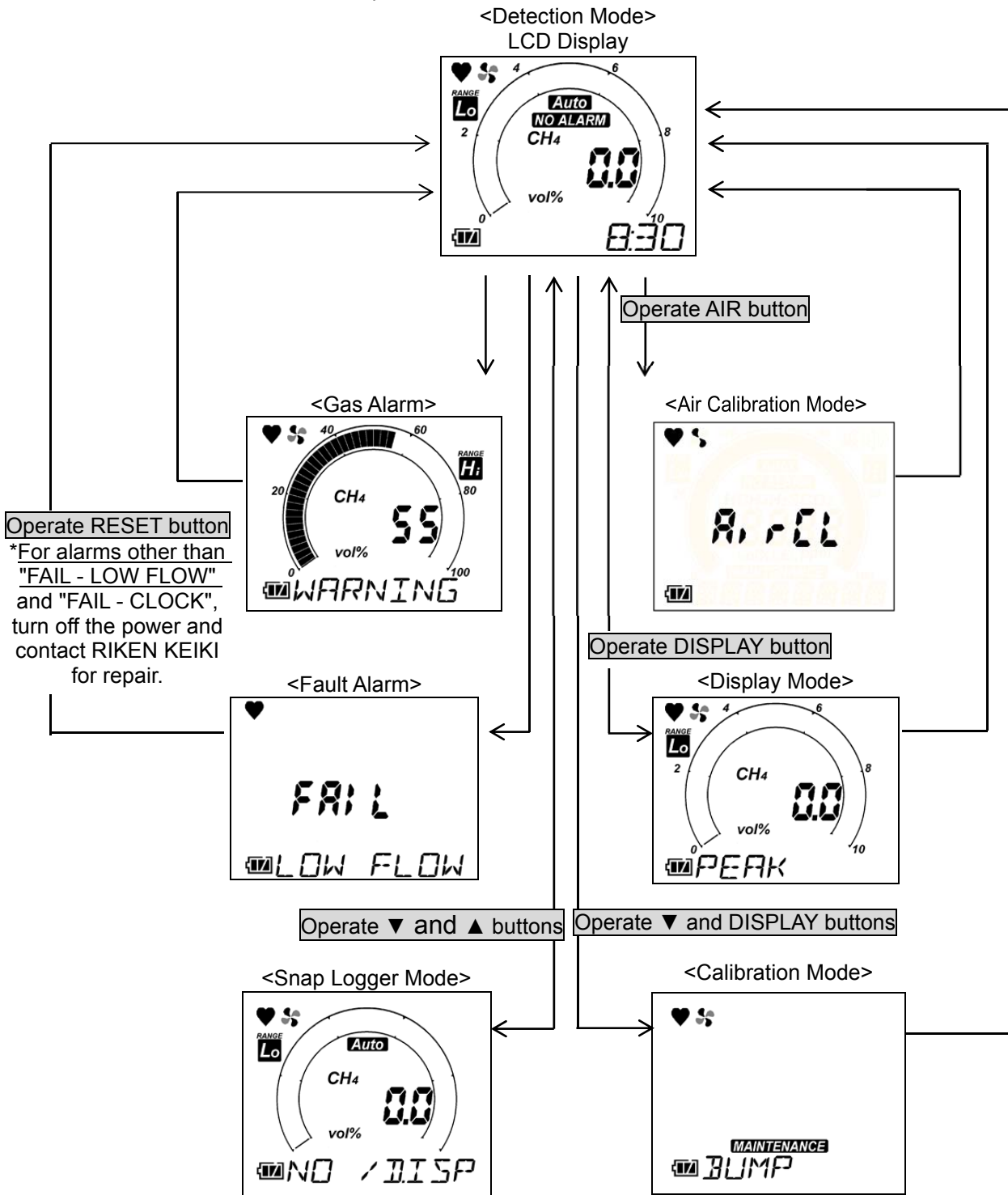
- If the main unit is dropped or given a shock, the reading may rise and it may remain so. In such a case, perform air calibration in a place where the surrounding air is fresh.

## NOTE

- The range mode used at the last power off is retained.
- If there is an abnormality in the built-in clock, a fault alarm FAIL CLOCK may be triggered. In this case, contact RIKEN KEIKI immediately.

## 4-4. Basic operating procedures

The detection mode is used after power-on.



### NOTE

- Of the fault alarms, only the low flow rate alarm "FAIL - LOW FLOW" can be reset by pressing the RESET button after removing the cause of low flow rate. For other fault alarms, turn off the power and then promptly contact RIKEN KEIKI.
- The backlight goes off after 30 seconds or so of no operation. It lights up continuously while an alarm is activated.

## 4-5. Performing air calibration

Perform air calibration after checking the following points at maintenance before starting work or if the zero point deviates even though fresh air is drawn.

### <Performing Air Calibration in Surrounding Atmosphere>

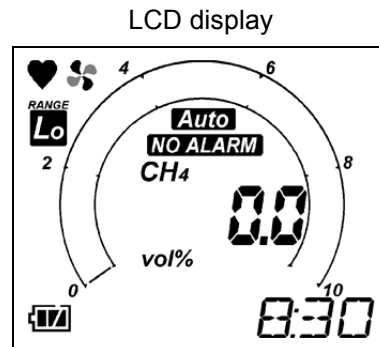
Check that the surrounding air is fresh.

### <Purge Air Environment>

Air calibration cannot be performed when a base gas is set to "N2" or "CO2".

To perform air calibration, set a base gas to "AIR" beforehand. For details about the base gas setting, see "5-2. Concentration displayed gas reading setting (base)" (P. 31).

- 1 In the detection mode, hold down the AIR button.**

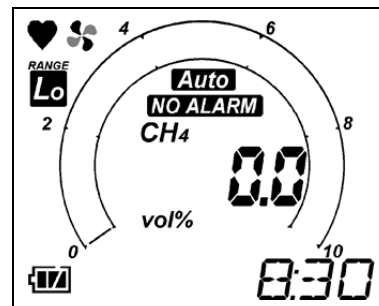


- 2 Release the AIR button when the display changes from "AirCL - HOLD AIR" to "AdJ - RELEASE".**

(Buzzer sound: Three times <blip, blip, blip>)



The zero adjustment is done and the gas detector returns to detection mode.  
(Buzzer sound: Once <blip>)



If air calibration fails, "FAIL - AIR CAL" is displayed. Press the RESET button to reset the alarm. The gas detector returns to the detection mode (before adjustment).

**NOTE**

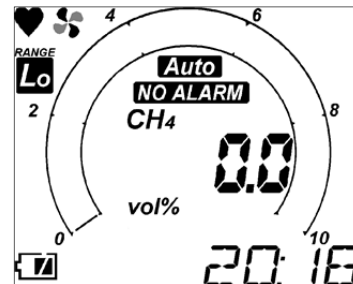
- Perform air calibration under the pressure and temperature/humidity conditions close to those in the operating environment or in the fresh air.
  - Perform air calibration after the reading is stabilized.
  - If there is a sudden temperature change of 15°C or more between the storage and operational locations, leave the gas detector in the operating environment (in the fresh air or place filled with purge air) for ten minutes or so to make it adapt to the environment before performing air calibration.
-

## 4-6. How to detect

When the preparation for start-up and air calibration have been completed, put the probe close to the detection area in the detection mode and perform gas detection.

### Reading display (example)

- CH4 concentration: 0.0 vol%
- Detection range: 0 - 10.0 vol% (Low RANGE)
- Range mode: Automatic switching (Auto)
- Battery level: Low
- Time: 20:18



### DANGER

- While conducting measurement in a confined space such as inside of the gas storage tank and pipeline, do not lean over or look into the gas storage tank or pipeline. It may lead to dangers because oxygen-deficient air or other gases may blow out.
- Oxygen-deficient air or other gases may be discharged from the gas exhausting outlet. Never inhale the air or gases.
- High-concentration combustible gases may be discharged. Never use fire near it.



### WARNING

- The gas detector is designed to draw gases under the atmospheric pressure. If excessive pressure is applied to the gas inlet and outlet (GAS IN, GAS OUT) of the gas detector, detected gases may leak out from its inside and may cause dangerous conditions. Be sure that excessive pressure is not applied to the gas detector while used.
- Do not connect the sampling hose directly to a location with a pressure higher than the atmospheric pressure. The internal piping system may be damaged.
- When the fresh air adjustment is performed in the atmosphere, check the atmosphere for freshness before beginning the adjustment. If interference gases exist, the adjustment cannot be performed properly, thus leading to dangers when the gas leaks.
- When the gas detector triggers a gas alarm while "Alarm setpoint setting" (P. 46) is configured, it may indicate an extreme danger. In this case, take proper actions based on your judgment.
- Issuance of a gas alarm while the gas detector is used for the purposes such as explosion prevention indicates that there are extreme dangers. Take proper actions based on your judgment.
- Before use, check that there remains sufficient battery power. When the gas detector is not used for a long period, the batteries may be exhausted. Never fail to replace them with new ones before use.
- If a low battery alarm is triggered, gas detection cannot be conducted. If the alarm is triggered during use, turn off the power and promptly replace the batteries in a safe area.
- Do not block the buzzer sound opening. No alarm sound can be heard.
- If the main unit is dropped or given a shock, the reading may rise and it may remain so. In such a case, perform air calibration in a place where the surrounding air is fresh.



### CAUTION

- Before performing gas detection, attach the gas sampling probe provided with the gas detector to prevent disturbances by air dust.

**NOTE**

- Use only a gas sampling hose specified by RIKEN KEIKI.
- Use the gas detector with the gas sampling probe connected so that no foreign substance is drawn into it.
- In a low-temperature environment, the operating time is shortened due to the battery performance property.
- At a low temperature, the response of the LCD display may get slow down.
- If a combustible gas with high concentration such as 100 vol% is drawn, some gas may remain in the gas sampling hose due to adsorption in the hose, gas sampling probe, etc. After drawing a high-concentration combustible gas, clean the gas detector to remove the adsorbed gas (draw fresh air and check that the reading becomes zero).

Performing fresh air adjustment before cleaning it completely will result in inaccurate adjustment, giving adverse influence on measurement. In such a case, remove the gas sampling hose before performing fresh air adjustment to avoid inaccurate adjustment.

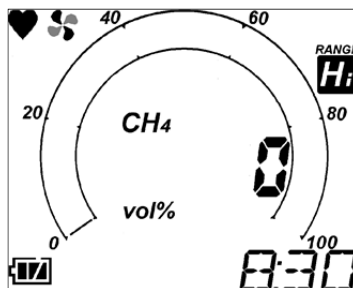
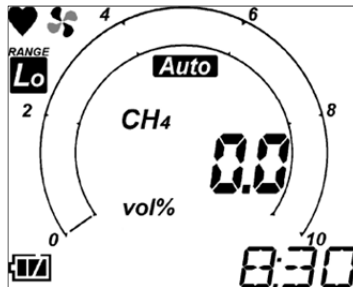
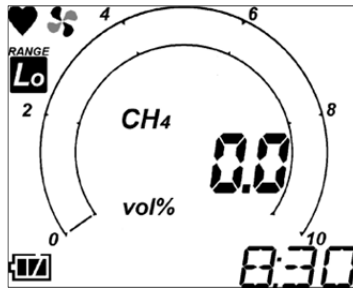
---

## 4-7. Switching range mode

The range mode can be switched between “Lo” (low range, fixed to 0 - 10.0 vol%), “Auto” (automatic range switching) and “Hi” (high range, fixed to 0 - 100 vol%) to use the gas detector. With “Auto” selected, the mode is switched between the low and high ranges.

**Press the POWER button.**

The buzzer blips once and the range switches to another every time the button is pressed.



“Lo” low range  
(0.0 - 10.0 vol%) fixed

“Auto”  
Automatic range  
switching

\* With “Auto” selected,  
the icon of the  
selected range (Lo or  
Hi) lights up.

“Hi” high range  
(0 - 100 vol%) fixed

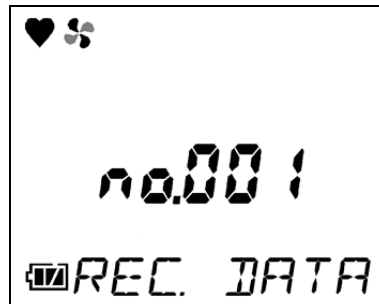
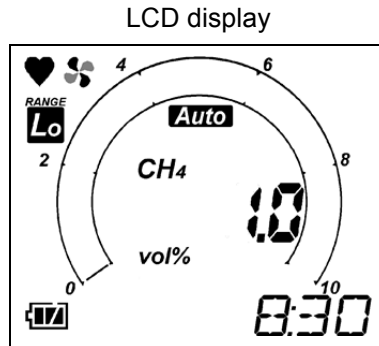
**NOTE**

- The range mode used at the last power off is retained.

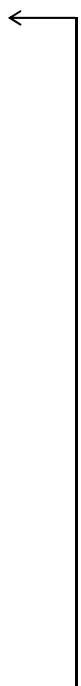
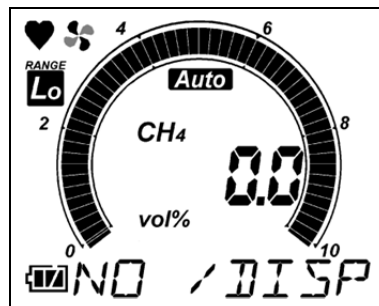
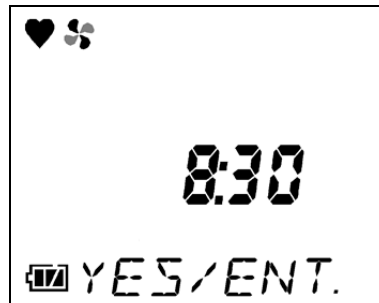
## 4-8. Snap logger

Any instantaneous value during measurement can be recorded.  
 Up to 256 points of data can be recorded. When the number of recorded data points reaches the maximum, recorded data will be overwritten, starting from the oldest data.

- 1 Press the ▼ and ▲ buttons.**  
 The gas detector enters the snap logger mode.



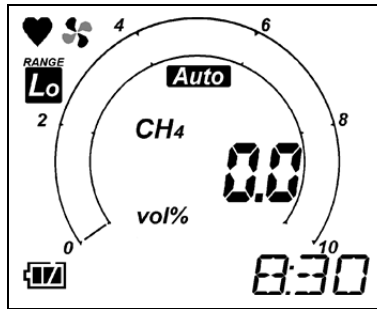
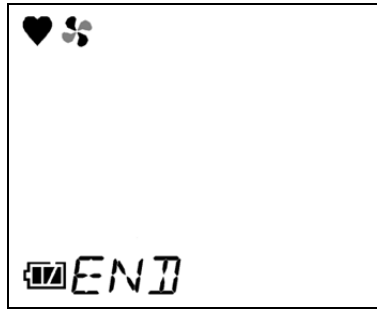
- 2 Press the ENTER button.**  
 The recording screen is displayed.



\* Press the DISPLAY button to stop recording.

**3 Press the ENTER button.**

The record is saved and the detection mode returns.



## 4-9. Power-off

Press and hold the POWER button (at least three seconds) until the buzzer blips four times ("TURN OFF" disappears) to turn off the power.



### CAUTION

- Do not turn off the power while the gas concentration display indicates a high value. A high-concentration gas that remains in the gas detector may adversely affect the sensor.

## 5

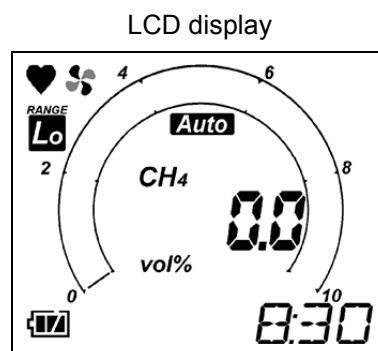
# How to Set Display Mode

## 5-1. Entering the display mode

This mode allows users to view and change various display settings and perform other operation.

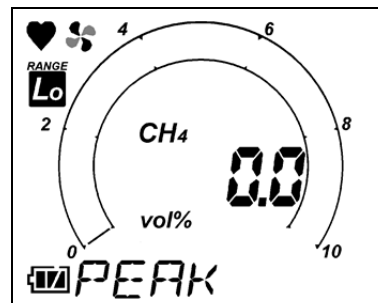
- 1 In the detection mode, press the DISPLAY button.**

The gas detector enters the peak value display in the display mode.



- 2 Press the DISPLAY button again to display the desired menu.**

The setting screen for the display mode is switched every time the button is pressed.



\* Press the ▲/▼ button to select the menu and press the ENTER button to perform the setting.



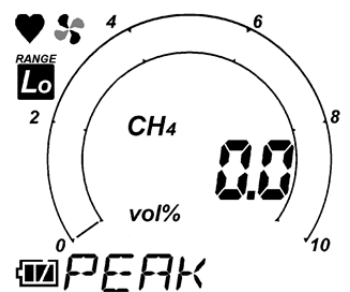


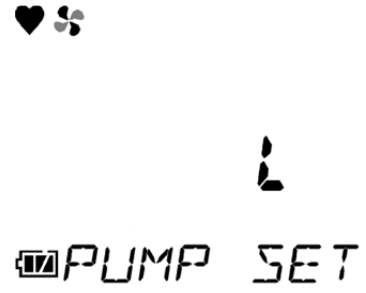

### CAUTION


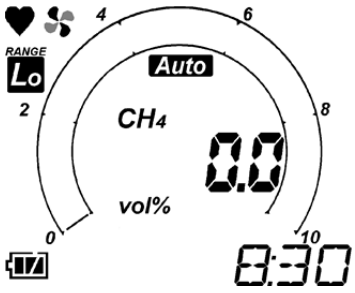
- With a base gas set to N<sub>2</sub> or CO<sub>2</sub>, drawing of air causes the reading to increase by several vol%, but this does not indicate an abnormal situation. Drawing of N<sub>2</sub> or CO<sub>2</sub> in this case makes the reading indicate 0 vol%.
- While a base gas is set to N<sub>2</sub>, if drawing of pure N<sub>2</sub> does not make the reading indicate 0 vol%, perform calibration of the base gas N<sub>2</sub> in the calibration mode.
- While a base gas is set to CO<sub>2</sub>, if drawing of pure CO<sub>2</sub> does not make the reading indicate 0 vol%, perform calibration of the base gas CO<sub>2</sub> in the calibration mode.

### NOTE

- Air calibration cannot be performed with the gas detector when a base gas is set to N<sub>2</sub> or CO<sub>2</sub>.
- When non-operation time lasts 20 seconds, the gas detector returns to the detection mode automatically.
- The backlight goes off after 30 seconds or so of no operation.
- Gas detection is continued in the display mode and an alarm can be activated.

## Display mode overview

Item	LCD display	Details
Peak display		<p>Displays the maximum concentration detected during the period from power-on to the point of checking.</p> <p>* To clear the peak display, hold down the RESET button until "CLEAR - RELEASE" is displayed.</p>
Concentration displayed gas reading setting		<p>By changing the setting to the pre-registered gas in the gas detector, the converted concentration from the detection target gas (CH4) will be displayed.</p> <p>(P. 31)</p>
Alarm setpoint display		<p>Displays the alarm setpoint of the gas detector.</p> <p>* Press the ENTER button while the alarm setpoint is displayed to perform alarm test for the setting.</p> <p>(P. 34)</p>
Pump suction volume setting		<p>Changes (in small measure) the pump suction volume.</p> <p>(P. 36)</p> <p>* L: Low (suction volume &lt;low&gt;) H: High (suction volume &lt;high&gt;)</p>
Log data display		<p>Displays the data recorded by the snap logger.</p> <p>(P. 38)</p>

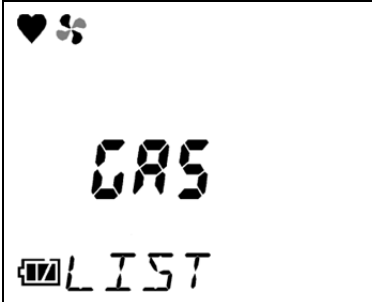
<p><b>Entering user mode</b></p>		<p>Enters the user mode. (P. 40)</p>
<p><b>Detection mode</b></p>		<p>Returns to the detection mode.</p>

## 5-2. Concentration displayed gas reading setting (base)

Normally, the concentration display of the gas detector is "methane (CH4)" by the specification; however, a pre-registered gas can be read instead to display its concentration.


LCD display

**1 Press the ENTER button.**  
The gas detector enters the base gas setting mode.



The LCD display shows a heart icon and a fan icon in the top left corner. The word "GAS" is displayed in large characters in the center. Below it, the word "LIST" is displayed in smaller characters, preceded by a small square icon with a diagonal line.

**2 Select a base gas name with the ▼/▲ button and then press the ENTER button.**  
The gas detector enters the gas reading setting mode. The currently set base gas (N2) is displayed first.



The LCD display shows a heart icon and a fan icon in the top left corner. The word "BASE" is displayed in large characters in the center. Below it, the chemical formula "N2" is displayed in smaller characters, preceded by a small square icon with a diagonal line.

\* For the calibration gases that cannot be read, the gas reading setting mode will not be entered.



The LCD display shows a heart icon and a fan icon in the top left corner. The word "BASE" is displayed in large characters in the center. Below it, the chemical formula "CO2" is displayed in smaller characters, preceded by a small square icon with a diagonal line.

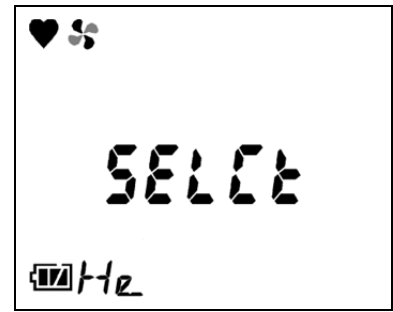
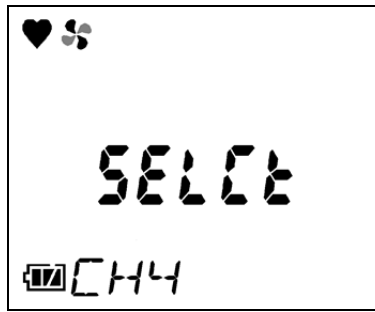


The LCD display shows a heart icon and a fan icon in the top left corner. The word "BASE" is displayed in large characters in the center. Below it, the word "AIR" is displayed in smaller characters, preceded by a small square icon with a diagonal line.



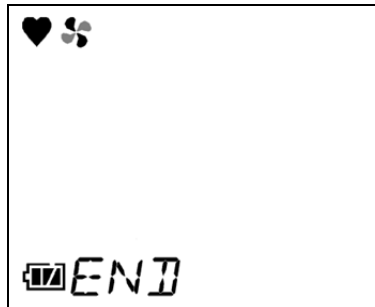
\* Press the DISPLAY button to cancel the operation.

- 3 Select a gas name to read with the ▼/▲ button and then press the ENTER button.**



\* The gas reading setting will be cleared at power-off.

After "END" is displayed, the gas detector returns to the display mode menu.



## CAUTION

- To perform the concentration displayed gas reading setting, see "NP-1000 gas list" in the following page.

## NOTE

- The reading accuracy on the list of specifications is applied to the calibration gas (CH4) only.
- The concentration displayed for a converted reading is a reference value. To display an accurate concentration, calibration using the gas to be measured is required. Therefore, request RIKEN KEIKI for span adjustment using the gas to be measured.
- For a list of the gases that can be read, see "NP-1000 gas list" in the following page.

**NP-1000 gas list**

No.	Gas	Symbol	Reading
1	Methane	CH <sub>4</sub>	○
2	Propane	C <sub>3</sub> H <sub>8</sub>	○
3	Isobutane	i-C <sub>4</sub> H <sub>10</sub>	○
4	Argon	Ar	○
5	Helium	He	○
6	Hydrogen	H <sub>2</sub>	×

**NOTE**

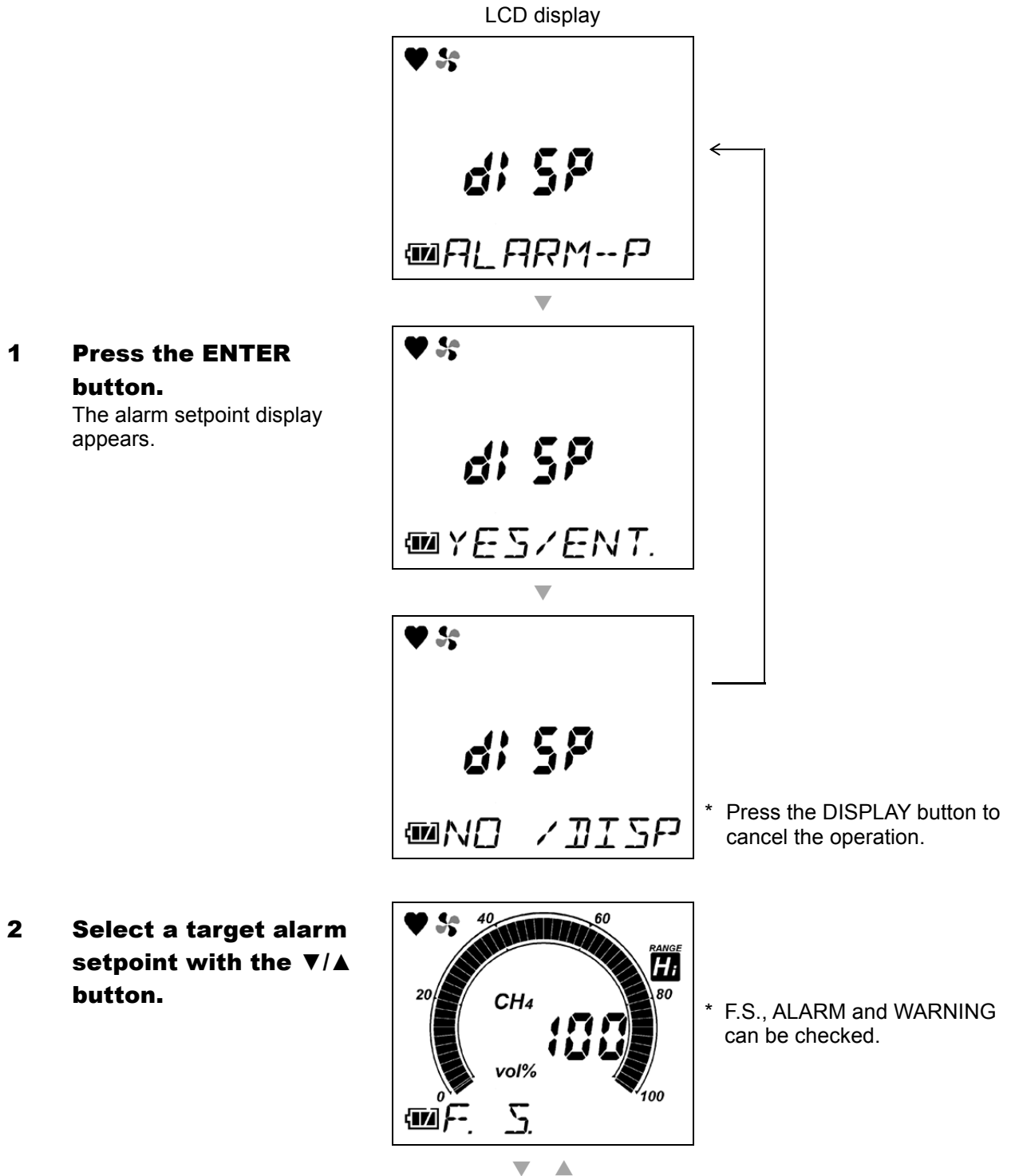
- Argon (Ar) and Helium (He) in the above list are not categorized as combustible gas generally; however, they are handled by a combustible gas detector in explosion-proof certification.

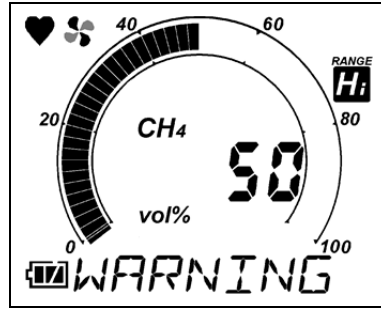
**NOTE**

- To measure H<sub>2</sub>, specify H<sub>2</sub> type when ordering.
- H<sub>2</sub> cannot be read for a converted reading.

## 5-3. Alarm setpoint display

An alarm setpoint can be displayed and activation test can be performed.

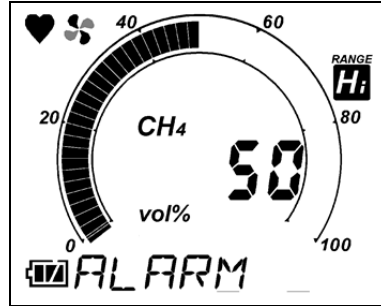




\* Press the ENTER button to test the selected alarm activation. Press any button to reset the alarm.

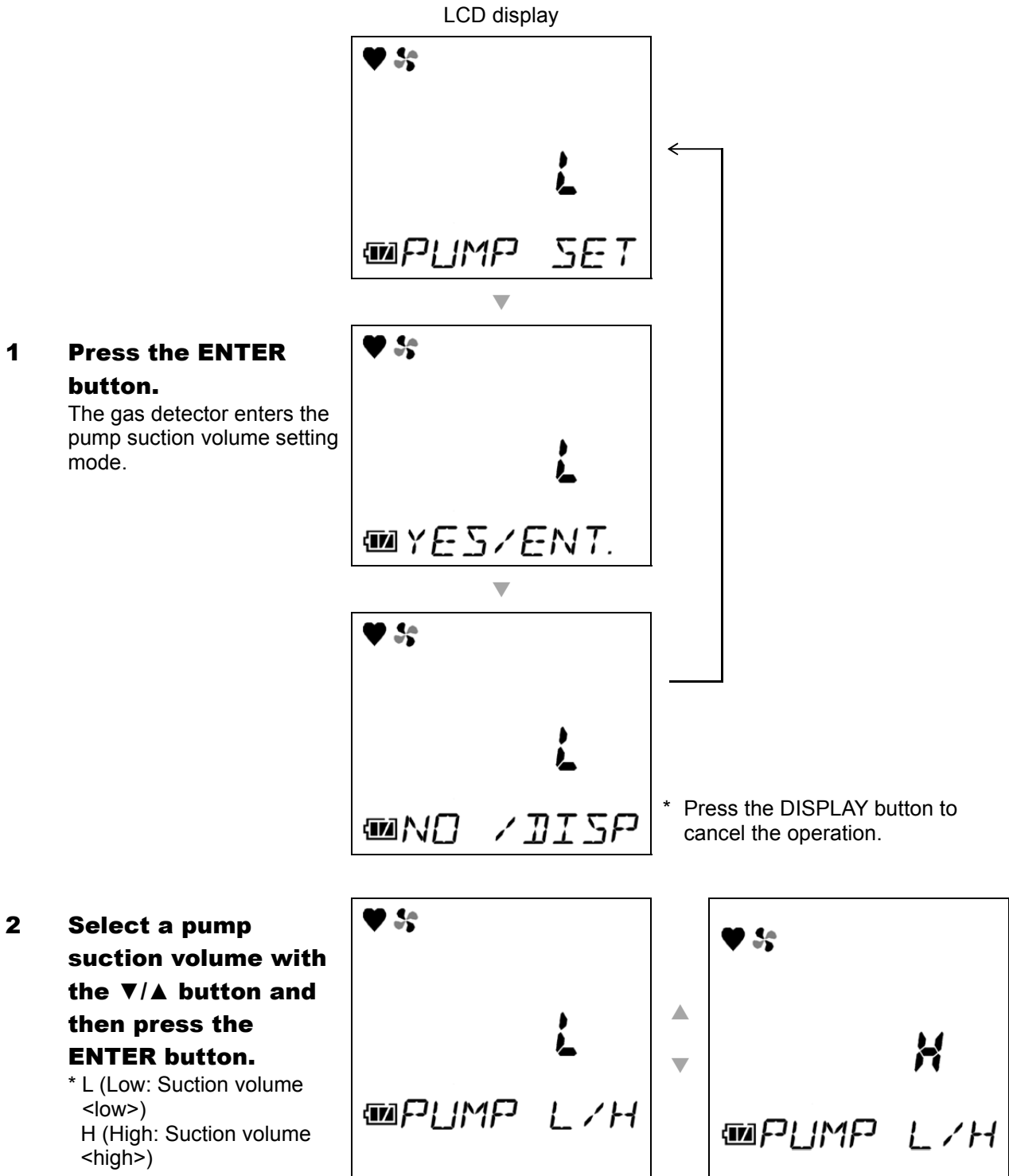
**3 Press the DISPLAY button.**

The gas detector returns to the display mode menu.



## 5-4. Pump suction volume setting

The pump suction volume can be set to L (Low: Suction volume <low>) or H (High: Suction volume <high>).



After "END" is displayed, the gas detector returns to the display mode menu.



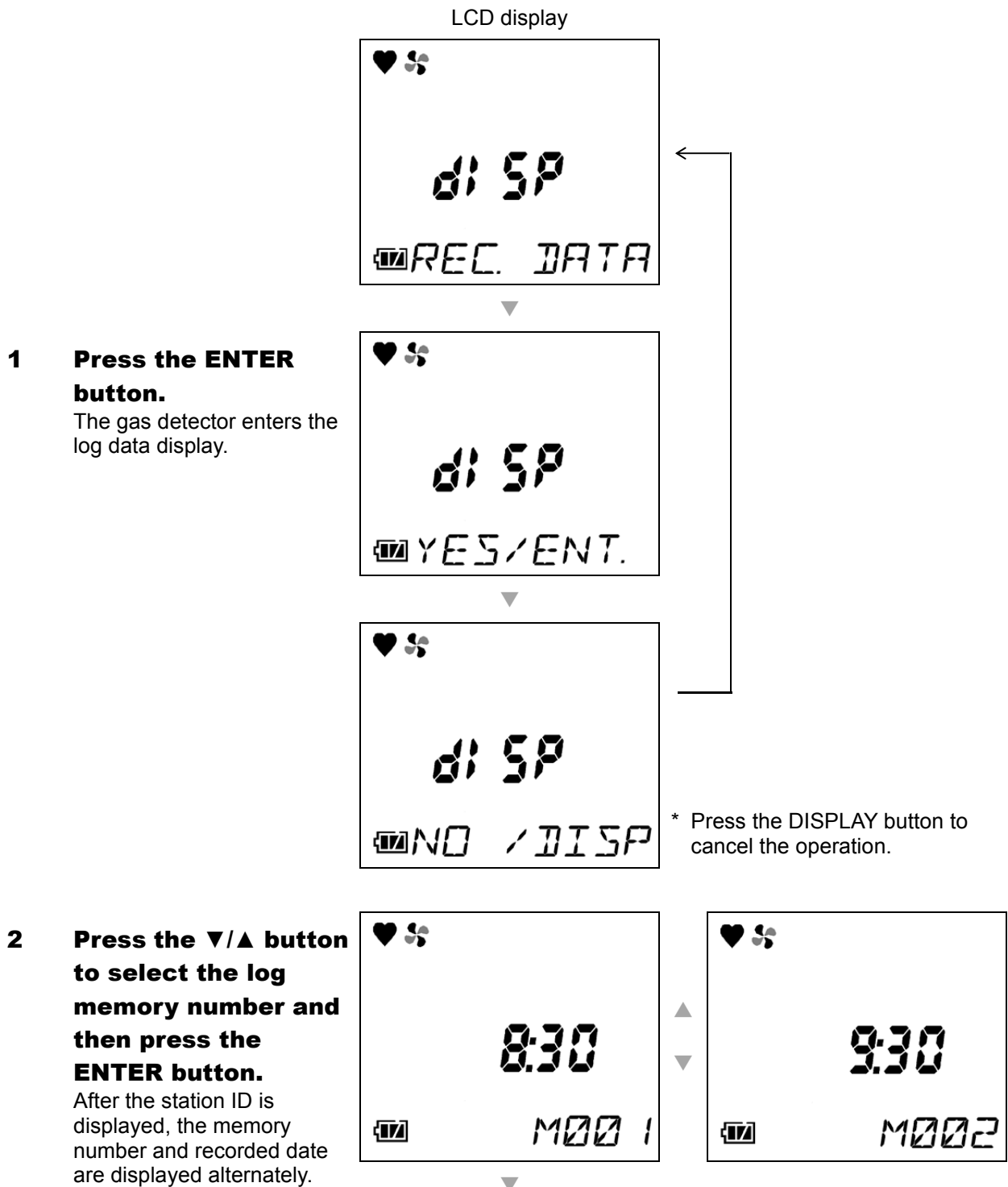
---

**NOTE**

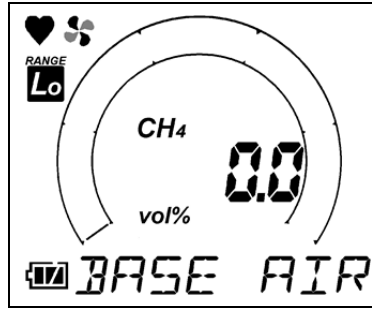
- When the gas detector is restarted, the pump suction volume is set to L (suction volume <low>).
-

## 5-5. Log data display

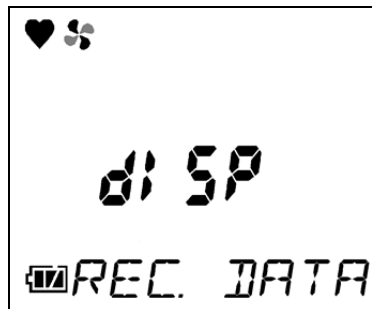
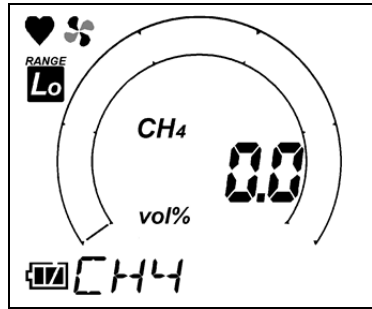
The data recorded by the snap logger can be viewed.



The contents of the selected log (gas name and base record) are displayed in order.  
When a log is not recorded, "NO DATA" is displayed.



**3 Press the DISPLAY button to exit.**  
The gas detector returns to the display mode menu.



6

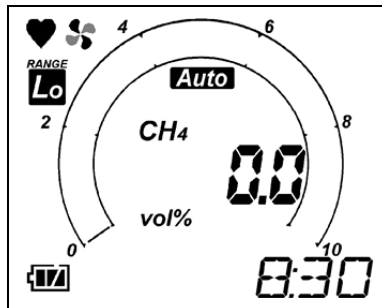
# How to Set User Mode

## 6-1. Entering the user mode

The maintenance including internal clock correction, etc. can be performed.

- 1 In the detection mode, press the DISPLAY button six times to display the user mode entry.**

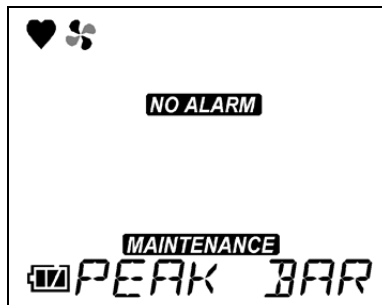
LCD display



- 2 Press the ENTER button.**



The peak bar display setting screen is displayed.



\* Press the ▲/▼ button to select the menu and press the ENTER button to perform the setting.








### CAUTION

- Return to the detection mode after use. (“User mode overview” (P.42))
- Neither gas detection nor alarm activation occurs in the user mode.

**NOTE**

- The backlight goes off after 30 seconds or so of no operation.
-

## User mode overview

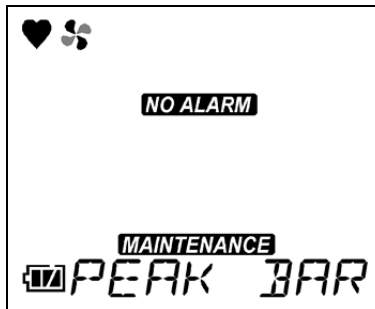
Item	LCD display	Details
Peak bar display setting		Turns on/off the display of blinking bar graph for the maximum concentration detected during the period from power-on to the point of checking on the bar graph. (P. 43)
Date/time setting		Set the date/time of the internal clock. (P. 45)
Alarm setpoint setting		Set the alarm function to ON/OFF. (P. 46)
ROM/SUM display		Displays the program number and SUM value of the gas detector. * This is not typically used by the user.
Entering detection mode		To exit, press the ENTER button to enter the detection mode.

## 6-2. Peak bar display setting

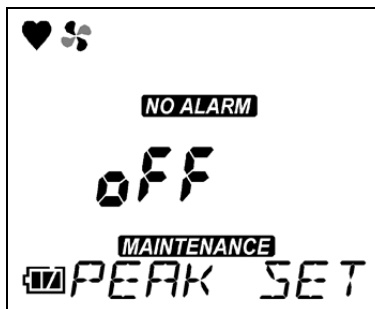
A peak of the detected gas concentration can be displayed on the bar.

LCD display

- 1 Press the ENTER button.**  
The gas detector enters the peak bar display setting mode.

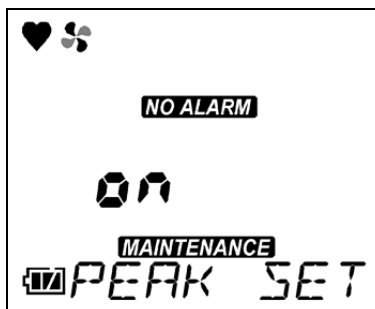


- 2 Enable <on> or disable <off> the peak bar display with the ▼/▲ button.**

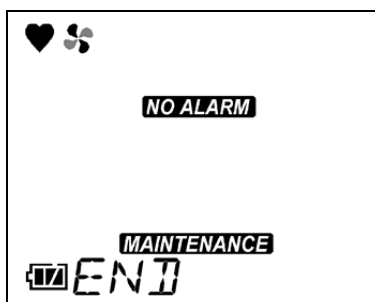


\* This is disabled <off> by default.

- 3 Press the ENTER button to confirm the selection.**



After "END" is displayed, the gas detector returns to the user mode menu.





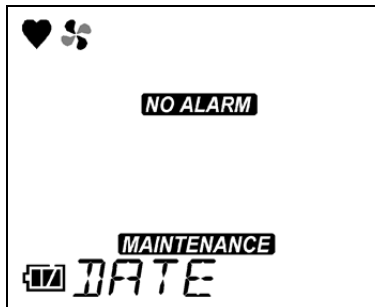
## 6-3. Date/time setting

Set the date/time of the internal clock.

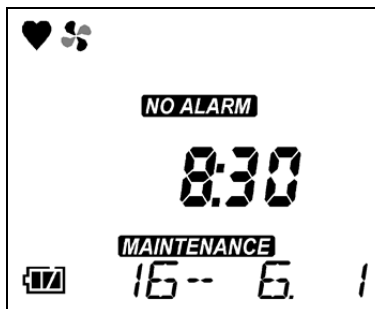
LCD Display

**1 Press the ENTER button.**

The gas detector enters the date/time setting.

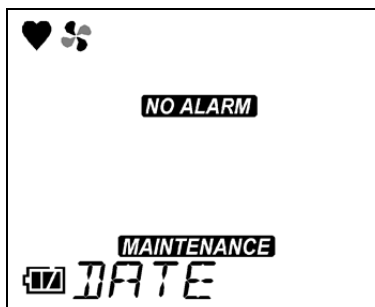
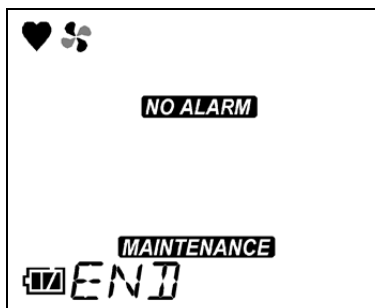


**2 Adjust the date/time with the ▲/▼ button and press the ENTER button.**



**3 Set year -> month -> day -> hour -> minute in this order.**

When the "minute" value is confirmed, "END" is displayed and then the gas detector returns to the user mode menu.

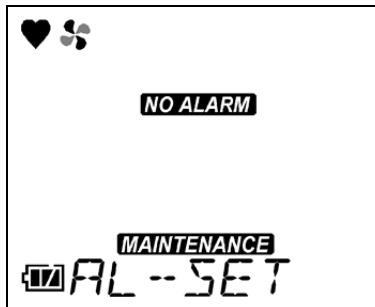


## 6-4. Alarm setpoint setting

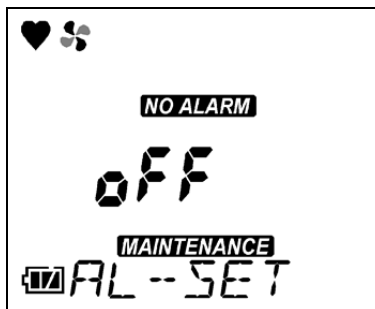
Set the alarm function to ON/OFF and specify an alarm setpoint.

LCD display

- 1 Press the ENTER button.**  
The gas detector enters the alarm setpoint setting mode.



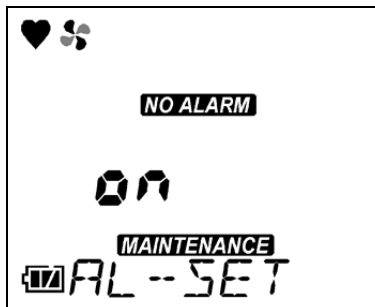
- 2 Enable <on> or disable <off> the alarm function with the ▼/▲ button.**



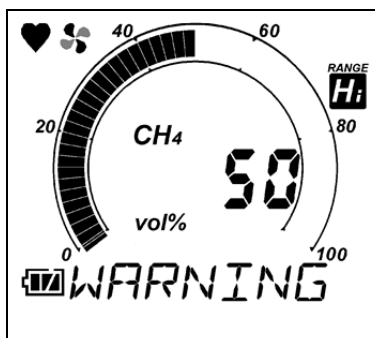
\* This is disabled <off> by default.



- 3 Press the ENTER button to confirm the selection.**  
The first alarm setting screen is displayed.

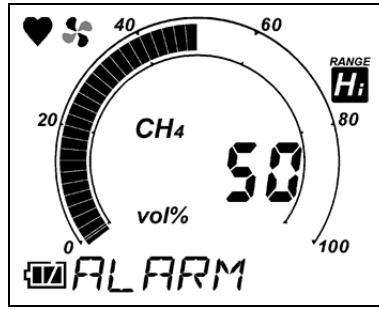


- 4 Set the first alarm setpoint with the ▼/▲ button and then press the ENTER button.**  
The second alarm setting screen is displayed.



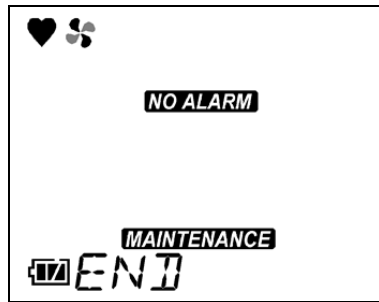
\* Set the first alarm setpoint within the following range.  
Lo: 0.0 - 10.0  
Hi: 11 up to the second alarm setpoint

- 5 **Set the second alarm setpoint with the ▼/▲ button and then press the ENTER button.**



\* Set the second alarm setpoint within the following range.  
Hi: First alarm setpoint to 100

After "END" is displayed, the gas detector returns to the user mode menu.



## 7

# Calibration

## 7-1. Preparation for air and N<sub>2</sub>/CO<sub>2</sub> calibrations

Prepare the following before performing maintenance such as a bump test and air calibration.

### Preparation for air calibration

Perform air calibration at maintenance before starting work or if the zero point deviates even though fresh air is drawn. Before performing air calibration, check that the surrounding air is fresh.

- Air calibration (P. 21, P. 55)

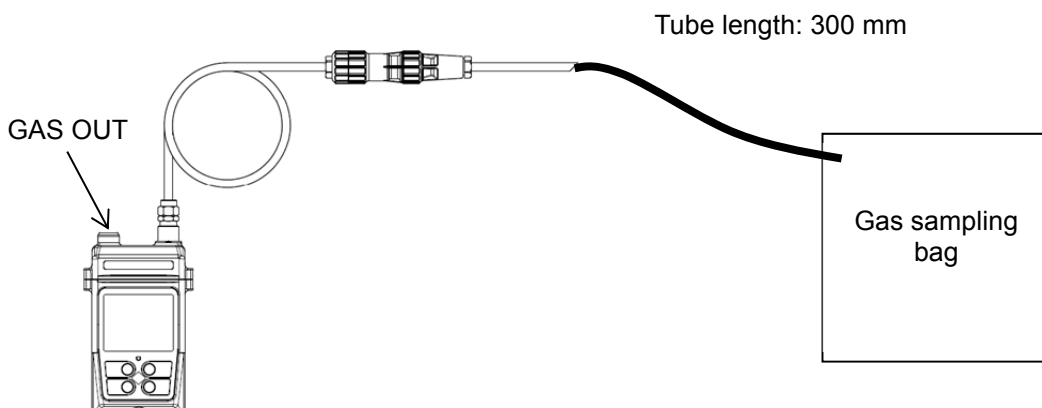
### Preparation for N<sub>2</sub>/CO<sub>2</sub> calibration

#### <Items to Prepare>

- Calibration gas: N<sub>2</sub> or CO<sub>2</sub> of 100 vol% (recommended)
  - Gas sampling bag (\*1)
  - Stopwatch
- \*1 Optional part

#### <Connection>

Connect the gas detector as shown in the figure below.  
Connect a gas sampling bag at an appropriate timing.



Perform calibration in a single step using the concentration of the prepared calibration gas preliminarily set to the gas detector, or perform it manually by adjusting to the concentration of the prepared calibration gas.

- AUTO CAL (P. 58)
- ONE CAL (P. 60)



**CAUTION**

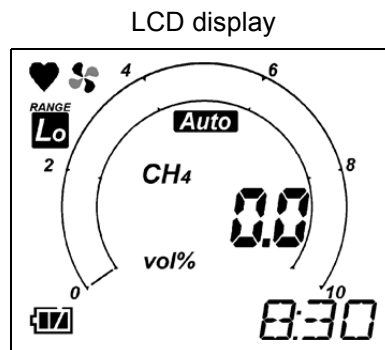
- Do not use a lighter gas to check the sensitivity of the gas detector. A constituent of the lighter gas may deteriorate the sensor performances.

## 7-2. Entering calibration mode

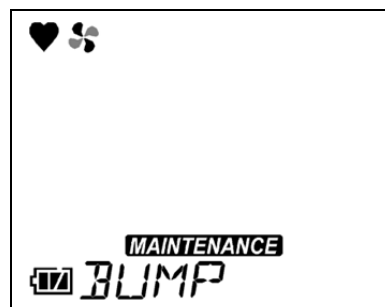
The maintenance including bump test and air calibration can be performed.

- 1 In the detection mode, hold down the ▼ and DISPLAY buttons.**

The bump test screen in the calibration mode is displayed.



- 2 Press the ▼/▲ button to display the desired menu.**



- \* Press the ▲/▼ button to select the menu and press the ENTER button to perform the setting.
- \* When a password has been set for the calibration mode, the password entry screen will be displayed.








### CAUTION









- To perform base gas calibration of N2 and CO2, perform N2 calibration first and then perform CO2 calibration.  
It may be impossible to perform CO2 calibration if N2 calibration is not performed first.
- Return to the detection mode after use.
- Neither gas detection nor alarm activation occurs in the calibration mode.

### NOTE

- The backlight goes off after 30 seconds or so of no operation.

## Calibration mode overview

Item	LCD display	Details
Bump test		<p>The function is tested using a test gas. (P. 53)</p>
Air calibration		<p>Perform air calibration (zero adjustment). (P. 55)</p>
N2 calibration		
CO2 calibration		
Auto calibration		<p>Preset the concentration value of the prepared calibration gas in the gas detector to enable automatic adjustment in a single step. (P. 58)</p>

<p><b>One calibration</b></p>	  	<p>Perform manual adjustment to the concentration value of the prepared calibration gas. (P. 60)</p>
<p><b>Bump test condition setting</b></p>	  	<p>Set the bump test operating conditions. (P. 62)</p>
<p><b>Password setting</b></p>	  	<p>Set a password used to protect the entry to the calibration mode. (P. 64)</p>
<p><b>Return to detection mode</b></p>	  	<p>To exit, press the ENTER button to enter the detection mode. When non-operation time lasts 15 minutes, the gas detector returns to the detection mode.</p>

## 7-3. Bump test (base gas: N2)

The function is tested using a test gas. The result will be displayed as "P" (PASS) or "F" (Failure). If the function is diagnosed as "F" (Failure), perform span calibration, etc.

The bump test may not be displayed depending on the factory default setting.

Set a base gas to "N2". For details about the setting, see "5-2. Concentration displayed gas reading setting (base)" (P. 31).

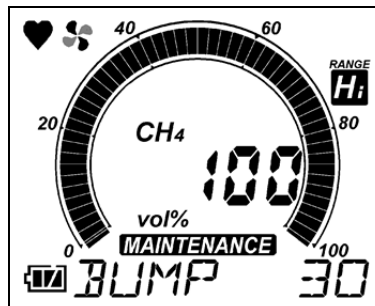
LCD display

**1 Press the ENTER button.**

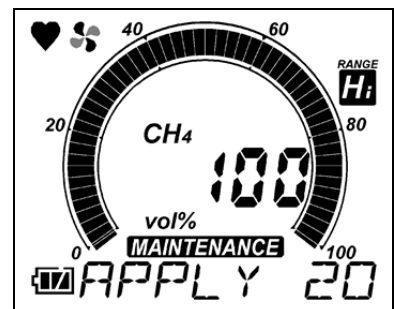
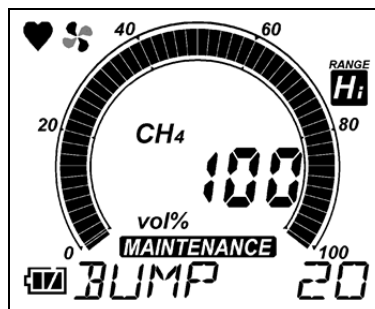
The gas detector enters the bump test mode.



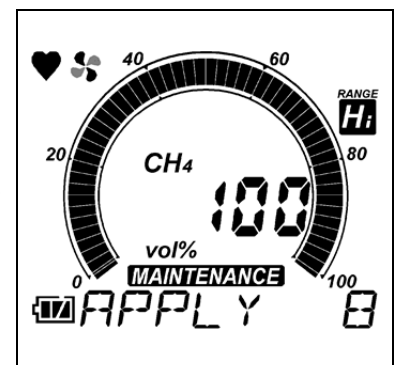
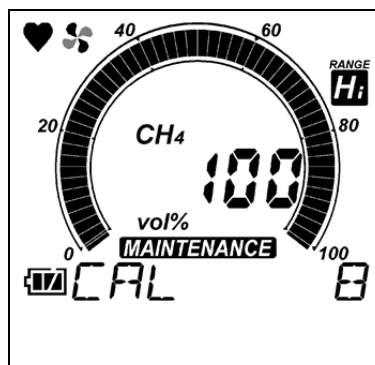
**2 Supply a test gas and press the ENTER button.**



"BUMP" and "APPLY" are displayed alternately and the countdown is started. When the count reaches zero, diagnosis is performed.

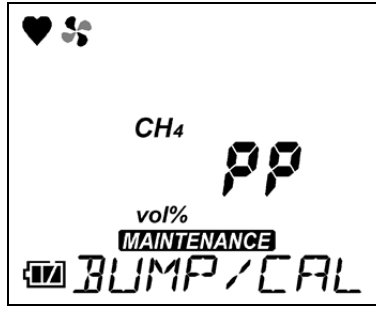


When a bump test fails while CAL is set to ON, "CAL" and "APPLY" are displayed alternately and the countdown is started. When the count reaches zero, calibration will be performed. After the calibration is completed, the diagnosis result is displayed.



**3 Press the ENTER button.**

After the result of the bump test is displayed, the gas detector returns to the calibration mode menu.



\* FF: Fail

# 7-4. Air calibration

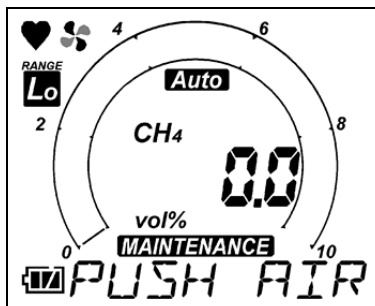
Perform the air calibration.

LCD display

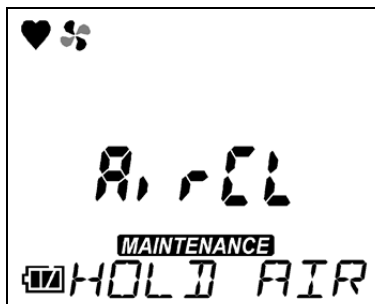
- 1 Press the ENTER button.**  
The gas detector enters the air calibration mode.



- 2 Hold down the AIR button.**



- 3 Release the AIR button when the display changes from "AirCL - HOLD AIR" to "AdJ - RELEASE".**  
(Buzzer sound: Three times <blip, blip, blip>)



After zero adjustment, "END" is displayed and then the gas detector returns to the calibration mode menu.  
(Buzzer sound: Once <blip>)



\* If air calibration fails, "FAIL" is displayed. Press the RESET button to reset the alarm.

# 7-5. N2 calibration

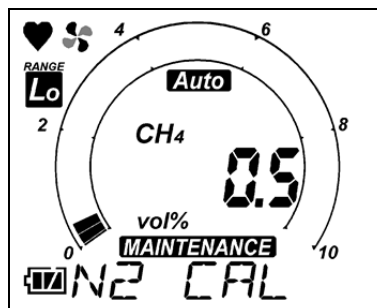
Perform nitrogen (N2) calibration. The function is tested using a test gas.

LCD display

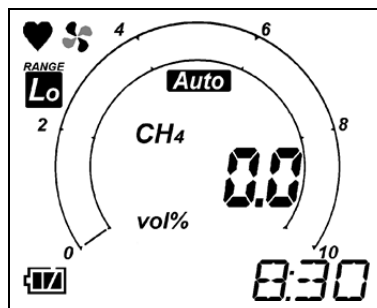
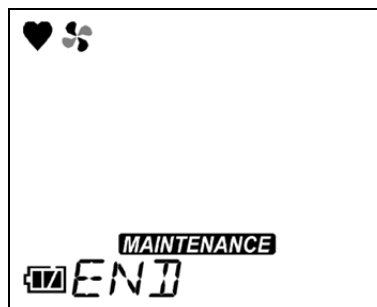
- 1 Press the ENTER button.**  
The gas detector enters the N2 calibration mode.



- 2 Supply a test gas and press the ENTER button.**



After "END" is displayed, the gas detector displays the calibration result and then returns to the calibration mode menu.  
(Buzzer sound: Once <blip>)

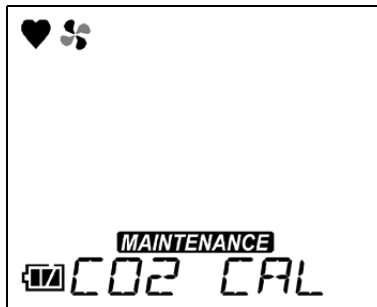


# 7-6. CO2 calibration

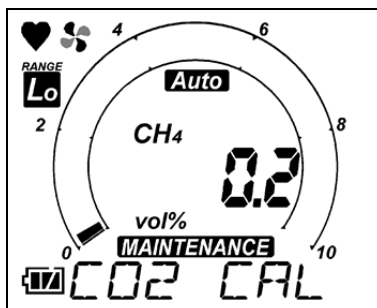
Perform carbon dioxide (CO2) calibration. The function is tested using a test gas.

LCD display

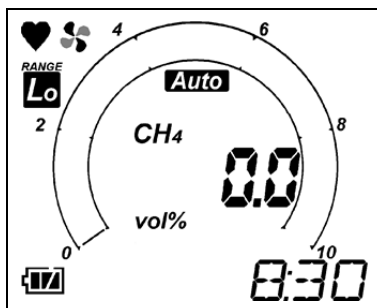
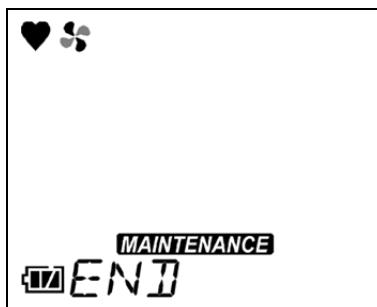
- 1 Press the ENTER button.**  
The gas detector enters the CO2 calibration mode.



- 2 Supply a test gas and press the ENTER button.**



After "END" is displayed, the gas detector displays the calibration result and then returns to the calibration mode menu.  
(Buzzer sound: Once <blip>)



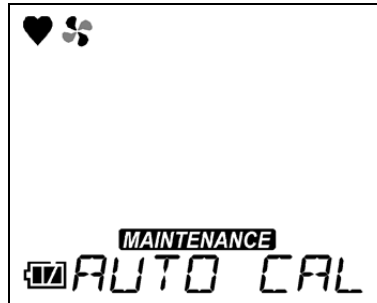
## 7-7. AUTO CAL (base gas: N2)

This is how to preset the concentration value of the prepared calibration gas in the gas detector and perform calibration in a single step.

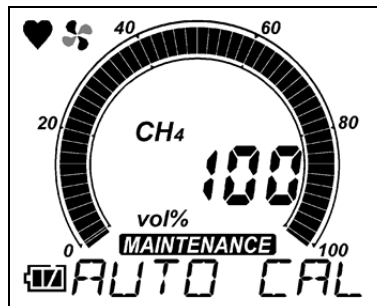
AUTO CAL may not be displayed depending on the factory default setting.

LCD display

- 1 Press the ENTER button.**  
The gas detector enters the AUTO CAL mode.

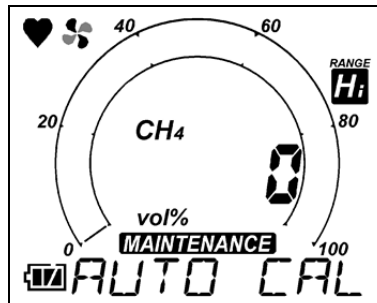


- 2 When the preset adjustment value is displayed, press the ENTER button.**

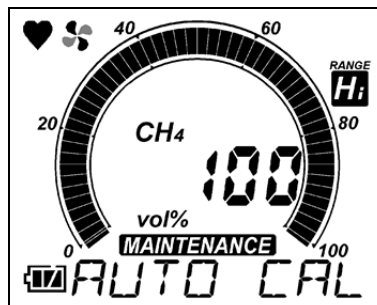


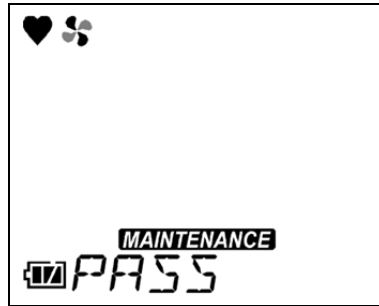
The value of AUTO CAL can be changed by using the ▼ and DISPLAY buttons.

"AUTO CAL" and concentration display blink and the system waits for the calibration gas to be introduced.



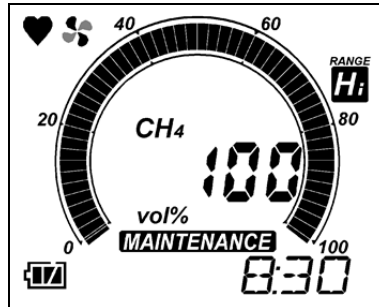
- 3 Press the ENTER button one minute after starting the supply of the calibration gas.**



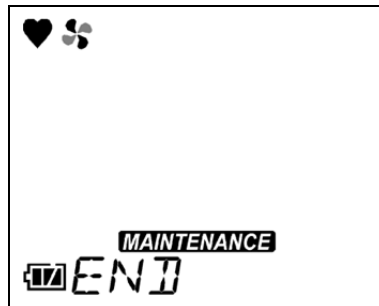


\* If span calibration fails, "FAIL" is displayed. Press the RESET button to reset the alarm.

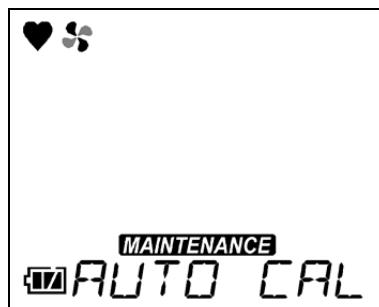
After span adjustment, the gas detector returns to the gas concentration display.



After "END" is displayed, the gas detector returns to the calibration mode menu. (Buzzer sound: Once <blip>)



**4 Stop supplying the calibration gas.**



## 7-8. ONE CAL

This is how to perform calibration with manually set to the concentration value of the prepared calibration gas.

ONE CAL may not be displayed depending on the factory default setting.

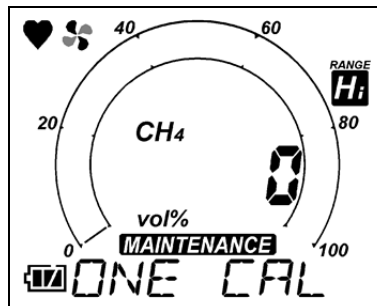
LCD display

**1 Press the ENTER button.**

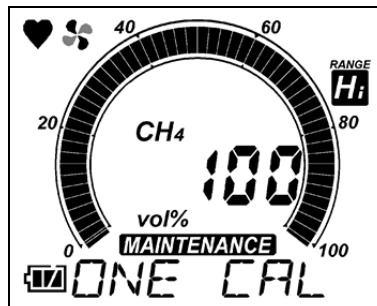
The gas detector enters the ONE CAL mode.



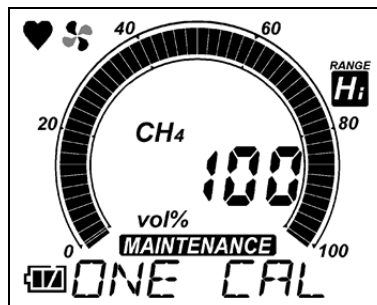
The concentration display blinks and the system waits for the calibration gas to be introduced.



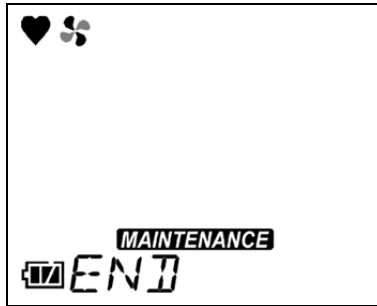
**2 Start supplying the calibration gas.**



**3 After one minute, adjust the concentration with the ▲/▼ button and press the ENTER button.**



After span adjustment, "END" is displayed and then the gas detector returns to the calibration mode menu. (Buzzer sound: Once <blip>)



**4 Stop supplying the calibration gas.**



## 7-9. Bump test condition setting

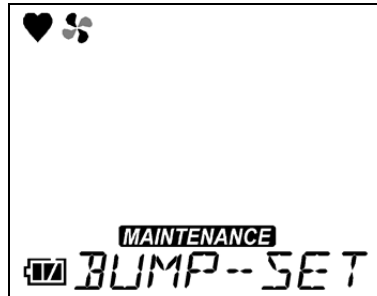
Various conditions for conducting a bump test can be set.

The bump test condition setting may not be displayed depending on the factory default setting.

LCD display

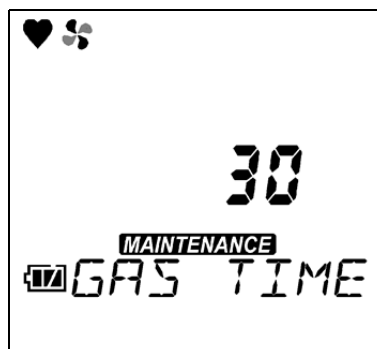
**1 Press the ENTER button.**

The gas detector enters the bump test condition setting mode.



**2 Set the time for introducing a test gas.**

Press the ENTER button. When the display starts blinking, select a value with the ▲/▼ button. When the ENTER button is pressed, "END" is displayed and the setting is confirmed.

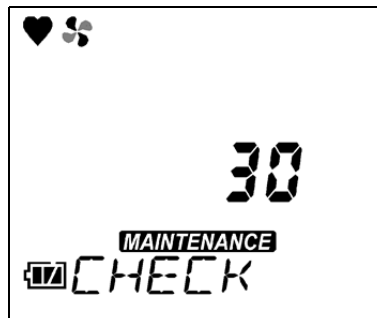


\* Set range  
30/45/60/90 seconds  
Diagnosis is performed automatically when the set time has passed.

**3 Press the ▲ button.**

**4 Set a threshold for checking a test gas.**

Press the ENTER button. When the display starts blinking, select a value with the ▲/▼ button. When the ENTER button is pressed, "END" is displayed and the setting is confirmed.

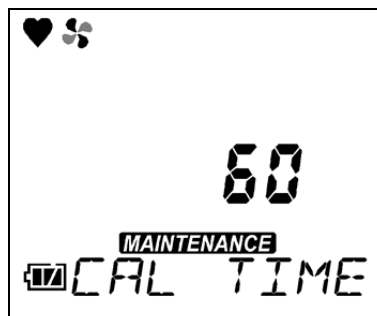


\* Set range  
±10/20/30/40/50%  
Diagnosis is performed automatically when the set time has passed.

**5 Press the ▲ button.**

**6 Set the calibration time.**

Press the ENTER button. When the display starts blinking, select a value with the ▲/▼ button. When the ENTER button is pressed, "END" is displayed and the setting is confirmed.

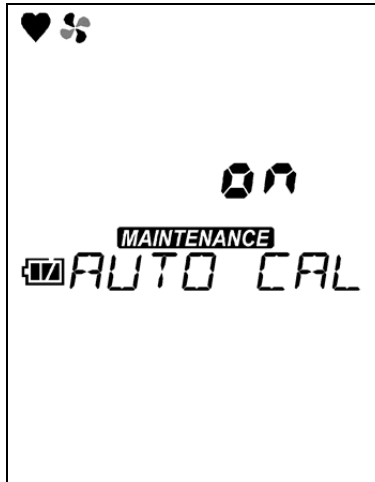


\* Set range  
60/90/120 seconds  
Span calibration is performed automatically when the set time has passed.

**7 Press the ▲ button.**

**8 Set whether or not to perform span calibration after "F" (Failure) is displayed as a result of diagnosis.**

Press the ENTER button.  
When the display starts blinking, select a value with the ▲/▼ button.  
When the ENTER button is pressed, "END" is displayed and the setting is confirmed.



\* Set range  
on: Span calibration performed  
off: Span calibration not performed

**9 Press the ▲ button.**

**10 Press the ENTER button with "ESCAPE" displayed.**

The gas detector returns to the calibration mode menu.  
(Buzzer sound: Once <blip>)



# 7-10. Password setting

A password can be used to protect the entry to the calibration mode.

LCD display

**1 Press the ENTER button.**

The gas detector enters the password setting mode.



**2 Select whether or not to set a password with the ▲/▼ button.**

The state of <on> or <off> for the current password protection setting is displayed.



\* This is disabled <off> by default.

**3 Press the ENTER button.**

When <off> is confirmed, the gas detector returns to the calibration mode menu.

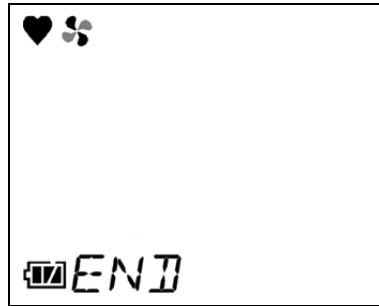


**4 When <on> is selected, use the ▲/▼ button to select a value and press the ENTER button.**

The password is a four-digit number. Set one digit at a time.



After "END" is displayed, the gas detector returns to the calibration mode menu.  
(Buzzer sound: Once <blip>)



8

# Alarm Function

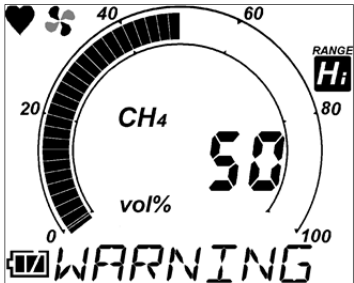
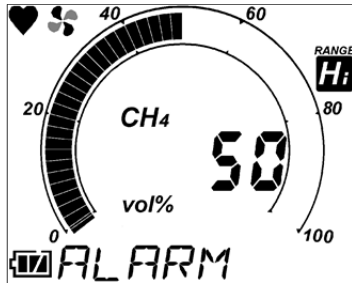
## 8-1. Gas alarm activation

"Gas alarm" is triggered in the gas detector with a blinking alarm lamp, buzzer sound and blinking gas concentration display when the concentration of detected gas reaches or exceeds the alarm setpoint values. (Auto-reset operation)

When the gas concentration falls below the alarm setpoint, the alarm activation will be reset automatically.



There are two types of gas alarm: first alarm (WARNING) and second alarm (ALARM).

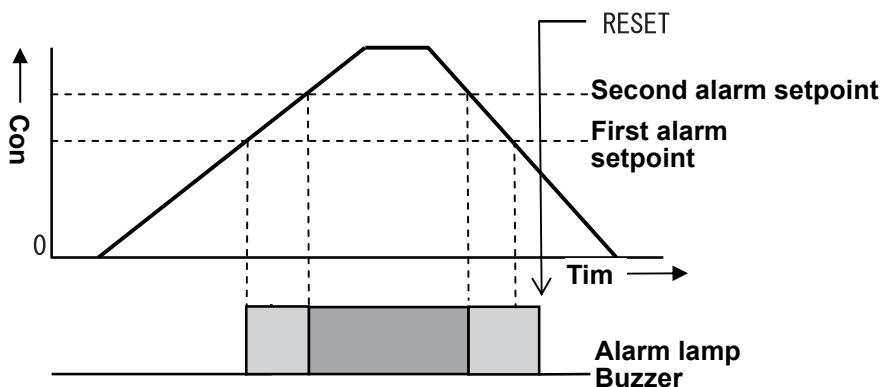
To enable gas alarm, set it to ON and specify an alarm setpoint using "Alarm setpoint setting" (P. 46) in the user mode.

Alarm type	First alarm	Second alarm
Alarm lamp	Repeatedly blinks at about one-second intervals.	Repeatedly blinks at about 0.5-second intervals.
Buzzer	Repeatedly sounds strong and weak beeps at about one-second intervals.	Repeatedly sounds strong and weak beeps at about 0.5-second intervals.
LCD display	Gas concentration and WARNING blink 	Gas concentration and ALARM blink 

### <Alarm Pattern of Lamp and Buzzer>

A slow or quick intermittent operation is performed depending on the alarm type.

-  : 1-second interval
-  : 0.5-second interval



**<How to Reset Alarm>**

The gas detector resets a gas alarm automatically when the concentration of detected gas falls below the alarm setpoint value. (Non latching (auto-reset))

**NOTE** 

---

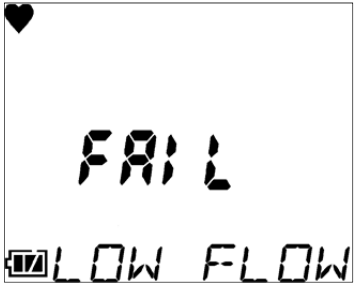
- When the concentration of detected gas falls below the alarm setpoint value, the operations of buzzer, alarm lamp and vibration will be reset automatically (non latching (auto-reset)).
  - When the detection range is exceeded while the range is fixed to "Lo" (0 - 10.0 vol%), "■■■■■■" (over scale) blinks on the LCD display.
-

## 8-2. Fault alarm activation

"Fault alarm" is triggered using a buzzer sound and blinking alarm lamp when an abnormality is detected in the gas detector. (Self-latching)

When an alarm is triggered, one of the following fault details is displayed on the LCD.

- System abnormalities:      SYS□□□
- Sensor abnormalities:      SENSOR
- Calibration abnormalities: AIR CAL
- Battery voltage low:        BATTERY
- Low flow rate:               LOW FLOW
- Clock abnormalities:        CLOCK

Alarm lamp	Repeatedly blinks at about one-second intervals.
Buzzer	Repeatedly sounds intermittent beeps at about one-second intervals.
LCD display	Display example of low flow rate (LOW FLOW) 

If a fault alarm is triggered, determine the cause and take appropriate action.

If the gas detector has problems and is repeatedly malfunctioning, contact RIKEN KEIKI immediately.

### NOTE

- A low flow rate alarm (FAIL LOW FLOW) can be reset by pressing the RESET button. For other fault alarms, turn off the power and then promptly contact RIKEN KEIKI.  
Note that a clock abnormality alarm (FAIL CLOCK) can be reset by pressing the RESET button, but the internal clock is not operating normally and thus the data logger cannot be recorded normally.
- For details about malfunctions (error messages), see "Troubleshooting" (P. 75).

## 9

# Maintenance

The gas detector is an important instrument for the purpose of safety. To maintain the performance of the gas detector and improve the reliability of safety, perform a regular maintenance.

## 9-1. Maintenance intervals and items

Perform the following maintenance regularly before use.

- Daily maintenance: Perform maintenance before commencing each work.
- Regular maintenance: Perform maintenance once or more every six months to maintain the performance as a safety unit.

Maintenance item	Maintenance content	Daily maintenance	Regular maintenance
Battery level	Check that the battery level is sufficient.	○	○
Tube	Check for cracks and holes.	○	○
Filter	Check the dust filter for dust or clogging.	○	○
Operation of main unit	Check the LCD display for a fault indication.	○	○
Concentration display check	Make the gas detector draw in fresh air and check that the concentration display value is zero. When the value is other than zero, perform zero adjustment by air calibration after ensuring that no interference gases exist around.	○	○
Span adjustment	Perform span adjustment using a calibration gas.	-	○
Gas alarm calibration	Check the gas alarm using a calibration gas.	-	○



### WARNING

- If an abnormality is found in the gas detector, contact RIKEN KEIKI immediately.

### NOTE

- Perform span adjustment using a calibration gas at least once every six months.
- The span adjustment requires dedicated equipment and creation of calibration gas. Therefore, contact RIKEN KEIKI for span adjustment.
- The built-in sensor of the gas detector has a validity period and must be replaced regularly.
- The sensor life has expired if, for example, the sensor cannot be calibrated in span adjustment, the reading does not come back after fresh air adjustment, or the reading fluctuates. In this case, contact RIKEN KEIKI. Note that the warranty period is one year.

## About maintenance services

We provide services on regular maintenance including span adjustment, other adjustments and maintenance.

To make the calibration gas, dedicated tools, such as a gas cylinder of the specified concentration, gas sampling bag, etc., must be used.

Our qualified service engineers have expertise, knowledge and other information on the dedicated tools used for services, along with other products. To maintain the safety operation of the gas detector, please use our maintenance service.

The followings are typical maintenance services. For details, contact RIKEN KEIKI.

### <Main Services>

Item	Details
<b>Battery level check</b>	Checks the battery level.
<b>Concentration display check</b>	Verifies that the concentration display value is zero by using the zero gas. Performs the air calibration if the reading is incorrect.
<b>Flow rate check</b>	Checks the flow rate indicator to find abnormalities. Checks the flow rate by using an external flow meter to verify the correctness of the flow rate indicator on the gas detector. If the flow rate is incorrect, performs the flow rate adjustment.
<b>Filter check</b>	Checks the dust filter for dust or clogging. Replaces a dirty or clogged dust filter.
<b>Span adjustment</b>	Performs span adjustment using a calibration gas.
<b>Cleaning and repair of the unit (visual diagnosis)</b>	Checks dust or damage on the surface of the unit, cleans and repairs such parts. Replaces parts which are cracked or damaged.
<b>Unit operation check</b>	Operates the buttons to check the operation of functions and parameters, etc.
<b>Replacement of consumable parts</b>	Replaces consumable parts, such as a sensor, filter, pump, etc.

## 9-2. How to clean

Clean the gas detector if it becomes extremely dirty. The gas detector must be turned off while cleaning it. Use a waste cloth or the like to remove dust. Do not use water or organic solvent for cleaning because they may cause malfunctions.



### CAUTION

- When cleaning the gas detector, do not splash water over it or use organic solvents such as alcohol, benzene, etc. on it. Otherwise, it may cause discoloration or damage to the surface of the gas detector or a sensor failure.

### NOTE

- When the gas detector gets wet, water may remain in the buzzer sound opening or grooves. Drain water as follows:
  - (1) Wipe away moisture on the gas detector thoroughly using a dry towel, cloth, etc.
  - (2) While holding the gas detector firmly, shake it about ten times with the buzzer sound opening facing downward.
  - (3) Wipe away moisture coming out from the inside thoroughly using a towel, cloth, etc.
  - (4) Place the gas detector on a dry towel, cloth, etc. and let it stand at normal temperatures.

## 9-3. Parts replacement

### <Replacement of Regular Replacement Parts>

Replace the regular replacement parts of the gas detector at recommended maintenance intervals.

#### List of recommended regular replacement parts

Name	Maintenance intervals	Replacement intervals	Quantity (pieces per unit)	Remarks
Pump unit (RP-12)	6 months	1 - 2 years	1	*
Gas sensor (TE-7515W)	6 months	3 years	1	*
Rubber seal (sensor)	-	3 - 6 years	1	
Rubber seal (main case)	-	3 - 6 years	1	
Rubber seal (battery cover)	-	3 - 6 years	1	
Alkaline manganese battery	-	-	4	
Filter set (10 pcs)	3 months	0.5 years	1	

\* The operation must be checked after replacement by a qualified service engineer. For the stable operation of the gas detector and safety, ask a qualified service engineer to take care of replacement of the parts. Request RIKEN KEIKI for operation check.

#### NOTE

- The above replacement intervals are recommendation only. The intervals may change depending on the operating conditions. These intervals do not mean the warranty periods either. The result of the regular maintenance may determine when to replace the parts.

### <Battery Replacement>

For battery replacement, see "How to replace the batteries" (P. 14).

### <Filter Replacement>

For dust filter replacement, see "Dust Filter Replacement Procedure" (P. 15).

#### NOTE

- Never fail to turn off the power of the gas detector before replacing the dust filter.
- Be sure to use the dedicated dust filter for the gas detector. The use of similar products may cause inaccurate gas detection.

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**10**

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**Storage and Disposal****10-1. Procedures to store the gas detector or leave it for a long time**

The gas detector must be stored under the following environmental conditions.

- In a dark place under the normal temperature and humidity away from direct sunlight
- In a place where gases, solvents, vapors, etc. are not present

Store the gas detector in a shipping carton, if any, in which the product was delivered.  
Store the gas detector away from dust, etc. if the shipping carton is not available.

**CAUTION**

- If the gas detector is not used for a long time, store it after removing the batteries. Leaks from dry batteries may result in fire or injury.
- If the gas detector is not used for a long time, turn on the power at least once every six months and check that the pump draws in air (about three minutes). The gas detector, when not activated for a long time, may cease to work because of hardening of the grease in the pump motor.

**10-2. Procedures to use the gas detector again****CAUTION**

- When the gas detector is used again after a long-period storage, never fail to perform a calibration.
- Contact RIKEN KEIKI for information on readjustment including calibration.

**10-3. Disposal of products**

When the gas detector is disposed of, it must be treated properly as an industrial waste in accordance with the local regulations, etc.

**WARNING**

- Dispose of dry batteries in accordance with procedure specified by the local authority.

**<Disposal in EU Member States>**

When disposing of the gas detector in EU member states, sort the batteries as specified. Handle the removed batteries according to the classified refuse collection system and recycling system based on the regulations of EU member states.

**NOTE**

Crossed-out recycle dustbin mark

- This symbol mark is indicated on the products which contain the batteries which fall under EU Battery Directive 2006/66/EC. Such batteries need to be disposed of as specified by the latest Directive. This symbol mark indicates that the batteries need to be separated from the ordinary waste and disposed of appropriately.



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# 11

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## Troubleshooting

The Troubleshooting does not explain the causes of all the malfunctions which occur on the gas detector. This simply helps to find the causes of malfunctions which may frequently occur.

If the gas detector shows a symptom which is not explained in this manual, or still has malfunctions even though remedial actions are taken, please contact RIKEN KEIKI.

### 11-1. Abnormalities on unit

Symptoms	Causes	Actions
<b>The power cannot be turned on.</b>	The battery level is too low.	Replace all the four batteries with new ones.
	The POWER button was released quickly.	For power-on, keep the POWER button pressed until a blip is heard.
	Improper installation of the battery unit	Check that the batteries are properly installed to the main unit.
<b>Abnormal operations</b>	Disturbances by sudden static electricity noise, etc.	Turn off the power once and then turn it on again (restart).
<b>Cannot operate the gas detector.</b>	Disturbances by sudden static electricity noise, etc.	Remove the batteries in a safe place. Then reinstall them and turn on the power to perform operations.
<b>System abnormalities</b> FAIL SYS□□□	A circuit abnormality occurred.	Record the display content "FAIL SYS□□□" and then contact RIKEN KEIKI for repair.
<b>A low battery voltage alarm is displayed.</b> FAIL BATTERY	The battery level is low.	Turn off the power and replace the dry batteries with new ones in a safe area.
<b>Air calibration impossible</b> FAIL AIR CAL	Fresh air is not supplied around the gas detector.	Press the RESET button to reset the alarm. Supply fresh air and then perform air calibration again.
<b>Sensor abnormalities</b> FAIL SENSOR	A sensor has failed.	Request RIKEN KEIKI for sensor replacement.

Symptoms	Causes	Actions
<b>A low flow rate alarm is displayed.</b> <b>FAIL LOW FLOW</b>	The flow rate has decreased due to clogs at the sampling part, bent hose, etc.	After eliminating the cause for clogging, bending, etc., press the RESET button to reset the alarm.
	The pump has failed.	Request the dealer or Riken Keiki local representative to replace the pump.
	The gas detector is left unused for a long time (six months or longer).	Cycle the power a few times. The pump may start operating. If the problem still persists, request RIKEN KEIKI to replace the pump.
<b>Clock abnormalities</b> <b>FAIL CLOCK</b>	Abnormalities of the internal clock	Request RIKEN KEIKI for repair.

## 11-2. Abnormalities of readings

Symptoms	Causes	Actions
<b>The reading rises (drops) and it remains so.</b>	Drifting of sensor output	Perform air calibration (zero adjustment). (P. 21)
	A high-concentration combustible gas has been drawn.	Supply fresh air and leave the unit for a while.

# 12

## Product Specifications

### 12-1. List of product specifications

<b>Model</b>	NP-1000
<b>Gas to be detected</b>	CH <sub>4</sub> , and C <sub>3</sub> H <sub>8</sub> , i-C <sub>4</sub> H <sub>10</sub> , H <sub>2</sub> , He and Ar as optional specification
<b>Detection principle</b>	Thermal conductivity
<b>Measurement range</b>	0-100 vol%
<b>Alarm type</b>	Gas Alarm: ON/OFF setting available (default: OFF), arbitrary alarm setpoint setting available, non-latching (auto-reset) Fault alarm: Flow rate low, poor sensor connection, battery voltage low, circuit abnormality, and calibration range abnormality
<b>Alarm operation</b>	Gas Alarm: Continuous buzzer sound, blinking of red lamp and gas concentration display (with alarm set to ON) Fault alarm: Intermittent buzzer sound, blinking of red lamp, fault detail display
<b>Accuracy of the reading</b>	±5 vol% (under the same conditions)
<b>Response time</b>	90% response: Within 30 seconds
<b>Detection method</b>	Pump suction type with a flow rate of 0.3 L/min or more (pump L mode)
<b>Display</b>	LCD seven-segment numeric display, bar meter display (50 divisions) and status information display Seven-segment digital display: 0 - 100 vol% Digital bar meter display: Auto range switching L range: 0 - 10.0 vol% H range: 0 - 100 vol%
<b>Power supply</b>	AA alkaline battery x 4
<b>Continuous operating time</b>	About 30 hours (new batteries, without alarms or lighting, at 25°C )
<b>Operating environment</b>	Operating temperature range: -20 - +50°C Operating humidity range: 95%RH or less (non-condensing) Storage temperature range: -25 - +60°C Storage humidity range: 95%RH or less (non-condensing)
<b>External dimensions</b>	External dimensions: 80.1 (W) x 124 (H) x 36 (D) mm (projection portions excluded)
<b>Weight</b>	Weight: Approx. 260 g (without batteries)
<b>Drip-proof and dust-proof performances</b>	Equivalent to IP-67
<b>Explosion-proof performance</b>	Intrinsically safe explosion-proof structure ExialICT4
<b>Certification,</b>	Explosion-proof certification: IECEx, ATEX, TIIS

<b>etc.</b>	Others: CE marking
<b>Functions</b>	LCD backlight, data logger, log data display, peak display, switching pump performance between strong and weak, changing a reading target gas, balance gas selection
<b>Accessories</b>	Power supply: 4 AA alkaline batteries Storage: Hand strap Sampling: Gas sampling hose (1 m) and gas sampling probe

\* To meet explosion-proof performance requirements, use the batteries specified in the certification of explosion-proof electrical equipment.

## 12-2. List of optional parts

- 30 m hose
- Dedicated leather case
- Filter
- 2 L gas sampling bag
- Data logger management program

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**13**

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**Appendix**

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**13-1. Definition of terms**

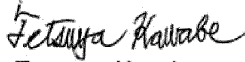
<b>vol%</b>	Gas concentration indicated in the unit of one-hundredth of the volume
<b>ppm</b>	Gas concentration indicated in the unit of one-millionth of the volume
<b>LEL</b>	The acronym of Lower Explosive Limit. Lower explosive limit (LEL) refers to the lowest concentration of a combustible gas in air capable of causing explosion when ignited.

## Declaration of Conformity

We, **RIKEN KEIKI CO., LTD.**

2-7-6, Azusawa, Itabashi-ku,  
Tokyo 174-8744 Japan

declare in our sole responsibility that the following product conforms to all the relevant provisions.

Product Name	:	Combustible Gas Monitor
Model Name	:	NP-1000
Council Directives	:	EMC : 2014/30/EU
		ATEX : 2014/34/EU
Applicable Standards	:	RoHS : 2011/65/EU
	:	EMC : EN50270(2015)
	:	ATEX : EN60079-0(2012):A11(2013)
		EN60079-11(2012)
		EN60079-26(2007)
	:	RoHS : EN50581(2012)
Name and address of the ATEX Notified Body	:	DEKRA Certification B.V Meander 1051, 6825 MJ Arnhem P.O.Box 5185,6802 ED Arnhem The Netherlands
Number of the EC type examination certificate	:	DEKRA13ATEX0227 June 26, 2015
Name and address of the ATEX Auditing Organization	:	Baseefa Ltd. Rockhead Business Park, staden Lane, Buxton, Derbyshire, SK17 9RZ
The Marking of the equipment or protective system shall include the following	:	II 1G Ex ia II C T4 Ga
Year to begin affixing CE Marking	:	2016
Place:	TOKYO, Japan	Signature: 
		Full name: Tetsuya Kawabe
Date:	June 14, 2016	Title: Director, Quality control center