ODORSENSOR

KAGUROBO

POLFA

MANUAL

Ver.1.1

KALMOR®

Thank you for your purchasing the odor sensor KAGUROBO-POLFA.
In order to use this equipment safely and correctly, please read this manual carefully before starting using it.
And please keep this document not to be damaged or lost so that you can check it anytime.

Table of Contents

1 In the Beginning

■ Caution for Safety Please be sure to follow these cautions.

In order to use the odor sensor POLFA safely and correctly, the items for safety are described in here.
An incorrect operation may cause an unexpected accident, injury or malfunction. In order to prevent an accident, please keep this manual carefully and use the product after reading and understanding this manual.

WARNING	This may cause the significant malfunction, firing of the product, or user' s serious injury, if user operates the product incorrectly.
CAUTION	This may cause the breakdown of the product or the user' s injury, if user operates the product incorrectly.

The meanings of the symbols used in this manual are as following.

Must NOT do this.

Recommended to follow this.

Please pay attention to this.

WARNING

[Do NOT disassemble or modify] Do not disassemble or modify the product. There is a risk of fire, electric shock, user' s injury or the product malfunction.

[Not explosion-proof] Do not use the product in a place with flammable gas or explosive gas, because it is not the explosion-proof specification. It may cause fire or explosion.

[MUST NOT get wet] Do not expose to water or rain, because it is not waterproof specification. It may cause the product malfunction or user' s injury.

[Cautions for falling] Since this product is a precision equipment, please do not drop it or give it a shock. It may cause the product malfunction or breakdown.

[Suction prohibition of oil and liquid] This product is a device for measuring gas, so do not suction oil or liquid. It may cause the product malfunction or user' s injury.

[MUST Use specified power supply] Please do not use except alkaline dry cell battery (AA) or attached AC adapter. Otherwise, it may cause product malfunction.

CAUTION

Do not wipe the product with organic solvents such as gasoline, alcohol, benzine or thinner. Otherwise, the product may be damaged.

When cleaning dirt, do not use synthetic fibers that are prone to static electricity. Otherwise, the product may breakdown.

If you do not use it for a long time, do not leave the dry cell battery inserted.
Leaving a dry cell battery in the product may cause a liquid leakage that causes product malfunction.

Please use this product in an environment where there is oxygen as same level in the normal atmosphere. This product does not work normally in an environment where the oxygen density is zero or low.

Please note that the characteristics of the sensor will change if it is exposed for several hours to several months in the following environment.

- Exposed to VOC (Volatile Organic Compound) gas such as toluene with a concentration of 1 ppm or more, or exposed to fragrance used in an aromatic for 1 month or more.
- Exposed to ozone over 100 ppm for 2 hours.

Please note that it may cause product malfunction or affect the life and characteristics of the sensor by usage, installation, or storage in the following places and environments.

- Usage in an environment where the relative humidity exceeds 90% in the temperature range 0 to 40℃ .
- An environment temperature not in the range -10 to 50℃ .
- An environment where temperature changes rapidly and condensation occurs easily.
- An environment that is vibrating.
- A place easily get wet, or highly humid with moisture or steam.
- A place exposed to direct sunlight, or place with large temperature differences.
- An environment with corrosive gas or flammable gas.
- An environment with dust.
- In a room with automatic solder tank, or place where silicon material is stored and used.
- In a room with high concentration of organic solvent by painting, or near from such place.
- An environment with cigarette smoke or smell, like in a smoking room.

Please be careful not to ingest or lose the parts, or not to injure yourself from the protrusion part of this product. In order to prevent accidents, please use and store out of the reach of children and pets.

2 Included Items List

When you receive this product, firstly please check the product and included items for any problems or abnormalities before using.
If you find any damage or defects, please contact the retailer you bought.
In addition, if there is a malfunction or damage during usage, or if you lose any accessories, etc., a repair with charge can be carried out. In this case, please check the warranty and contact the retailer or KARUMOA.

POLFA.....	x 1
microSD/SDcard adapter.....	x 1 set
AC adapter.....	x 1
Suction Nozzle.....	x 1
Alkaline dry cell batteries (AA)....	x 4
Activated carbon filter.....	x 1 0
Dust filter.....	x 1 0
lithium coin battery（CR2032）...	x 1
Strap.....	x 1
Manual(This document).....	x 1
Warranty.....	x 1

* Some accessories are not re-sold. For details, please refer to page 25.

3 Outline and Features of Odor Sensor POLFA

Product Outline

The odor sensor POLFA is a handy-type monitor that detects odorous substances in gas by a semiconductor of gas sensor and displays the reaction value as our unique value. The higher the odor, the higher the value. And the lower the odor, the lower the value. Therefore, it is possible to compare odor intensity relatively, and it can be used to control the change of odor intensity and environmental management as well.

Features of this product

★ Excellent performance of the response

A performance of the response is superior compared to conventional products, and high reproducible measurement is available.

★ Real-time graph display

Displayed graph measurement data in real-time makes you to check the change of odor visually.

★ Peak hold function

By using the peak hold function, it is possible to keep displaying the peak value during measurement on the screen. This function is useful to avoid missing the measurement values.

★ Data collection function

Measurement data can be recorded by using the data collection function. No need to write down the measurement values by hand.

★ Recording measurement data into microSD card

Measurement data can be recorded in the microSD card that is inserted into the body, so no special software is required to download the data. In addition to PC that can read microSD, since SD card conversion adapter is included, data editing is easily possible with many PC regardless of the OS type.

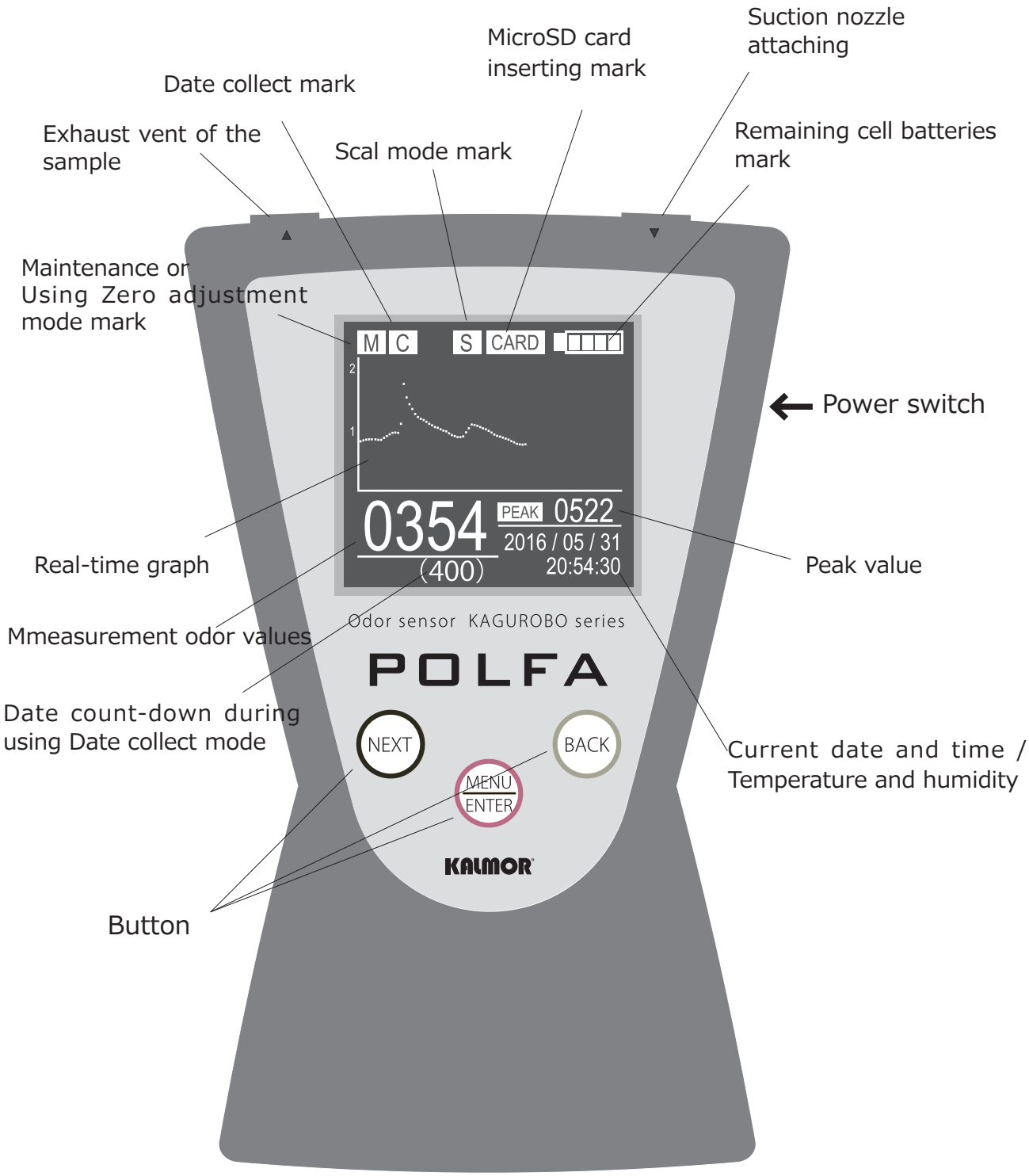
★ Simple temperature and humidity display function

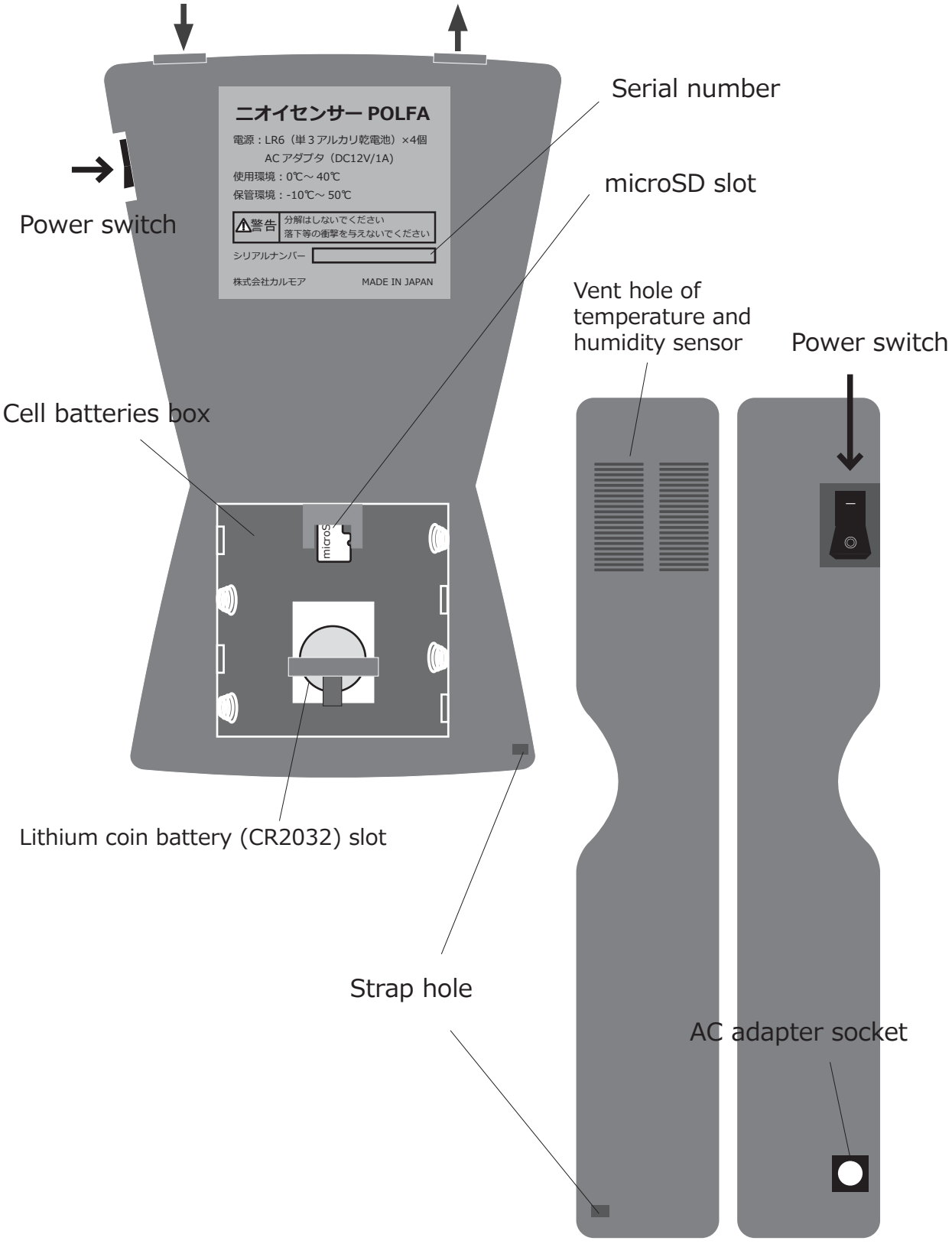
A simple temperature and humidity sensor is built-in to assist measurement. Since the odor sensor is affected by temperature and humidity, it can be used to evaluate the measured value with measuring the temperature and humidity simultaneously in the odor measurement.

★ Scale function

A scale function is provided to make it easier to see the change in odor. Odors with little change can be easily checked using this scale function.

4 Name of Each Part




ニオイセンサー POLFA
電源：LR6（単３アルカリ乾電池）×4個
AC アダプタ（DC12V/1A）
使用環境：0℃～ 40℃
保管環境：-10℃～ 50℃
警告
分解はしないでください
落下等の衝撃を与えないでください
シリアルナンバー
株式会社カルモア
MADE IN JAPAN
Power switch
Serial number
microSD slot
Vent hole of temperature and humidity sensor
Power switch
Cell batteries box
Lithium coin battery (CR2032) slot
Strap hole
AC adapter socket

Name of Each Part and function

Display

Maintenance mark

Blink :
The cumulative usage time has exceeded 3500 hours. It will need maintenance soon.
Lights up :
The cumulative usage time has exceeded 4000 hours. Maintenance is required.
Lights up +C001 :
The cumulative usage time has exceeded 4500 hours. No more measurement possible. An immediate maintenance is required.
Lights up +200 (Blink) :
This is displayed in zero adjustment mode. (→ P.21)
Lights up + C002 / 200 (Alternate blink) :
This is displayed in zero adjustment mode. (→ P.21) The suctioned air is dirty or the sensor is moderately degraded. Although measurement is possible, maintenance is recommended.
Lights up +C002 :
This is displayed in zero adjustment mode. (→ P.21) The suctioned air is dirty or the sensor is severely degraded. Please try to replace the activated carbon cartridge to recover. If still not recover, maintenance is required.

Date collect mark

Lights up only during data collection

Scale mode mark

Lights up only during scale mode

MicroSD card inserting mark

Lights up : During microSD card recognition
Blink : During writing data into microSD card. If it continues blinking, it is a reading error.

Remaining cell batteries mark

During using dry cell batteries. It can operate for about 8 hours by the full batteries with display light.

About 80% remaining

About 60% remaining

About 25% remaining

0% (It will turn off the power soon as it starts blinking. Please replace the battery or connect the AC adapter as soon as possible.)

It is shown during using AC power. If you connect the AC adapter with the battery inserted, AC power will take a first precedence.

Real-time graph

This is a real-time graph that plots the measured value every 2 seconds. It is possible to change the scale range of the vertical axis from MENU.

Odor value

This is the measured value. It will blink when the value exceeds the measurable range (more than 2,000). In this case, please stop measurement immediately as it may lead to malfunction.

(400) : Date count-down during using Date collect mode	This is displayed during data collection. It does count-down to start writing data into the internal recording file. When it becomes 0, it starts writing.Although the measurement is continued during writing, the operation will become temporarily slow. So please be careful not to miss the measurement value, for example, by interrupting the measurement when it approaches 0.
Peak value	This is displayed only during peak measurement mode. Display / cancel can be selected from the MENU or holding MENU button for 2 seconds.
Date and Time	This shows the current date and time. If the date and time are not correct, you can adjust it from the calendar function of MENU.
Simple temperature and humidity display	This is displayed only during temperature and humidity mode. T: Temperature, H: Humidity

Body

Power switch	[—] Power ON [◎] Power OFF
Exhaust vent of the sample	This is an exhaust vent of the sample. It is possible to connect a tube with an outer diameter of 6mm (* Teflon tube is recommended).
Suction nozzle attaching	This is inlet of attachment suction nozzle. This suction nozzle can be connected to a tube with an inner diameter of 4 mm. (※ Teflon tube is recommended)
Button	 **NEXT Button :** This is used to move to the next item / value in the MENU screen.
	 **MENU/ENTER Button :** This makes moving to the MENU screen. It is used as an enter button in the MENU screen. Peak value can be displayed by 2 seconds press of this button.
	 **BACK Button :** This is used to return back to the previous item / value in the MENU screen.
Serial number	This is the unique serial number of this product. You may be asked for this number when making an inquiry. So please have it ready when you contact us.
microSD card slot	This is a microSD card slot. Please insert the SD card deeply and firmly. Although measurement is possible without the SD card, the data collection function cannot be used. Only 2GB or less capacity of microSD card can be used. If the capacity is more than that, it may cause a reading error or a malfunction.
Lithium coin battery (CR2032) slot	This is Lithium coin battery (CR2032) slot. Please insert it deeply and firmly.
AC adapter socket	This is a socket for AC adapter. When using the AC adapter, please be sure to use the included adapter.
Cell batteries box	Four alkaline dry cell batteries (AA) are inserted in here. By using dry cell batteries, measurement is possible without the AC power.
Strap	This is a hole to attach the included strap. Please use the strap to prevent falling. Other straps that is commercially available can also be attached.

5 Before Using

5 – 1 Caution on Measurement

Some items to be noted before measurement are described when using the odor sensor POLFA.Please be sure to check before using this product since some measurement methods may contaminate the sensor of the product.

1 Substances that affect the measured values

The odor that contains the following substances cannot be measured correctly.

Oxidizing substances (Chlorine, Ozone, Freon, NOx, SOx etc.), Low oxygen concentration environment

2 Substances that contaminate the sensor

The following substances temporarily contaminate the sensor. After measurement, frequent sensor cleaning (idling operation under clean air) can prevent deterioration of the sensor.After measuring the odor including follows, please turn off the power after idling until the measured value becomes below a certain level.

Cigarette smoke, high concentration odor

3 Substances that change sensor characteristics by long-time exposure

Please do not use the product under following environment as these substances will change the sensor characteristics by measuring for several hours continuously.

Organic solvent more than 1ppm, perfume, 100ppm ozone gas

4 Substances that significantly contaminate the sensor

Please do not use the product under following environment as these substances will change the sensor characteristics by measuring for several hours continuously.

Hydrogen chloride, acetone, sulfur dioxide, tar, silicon, chlorine, freon, sulfuric acid mist, hydrochloric acid mist, oil mist

5 Limit odor concentration of the measurement (indication)

The lower limit value and the upper limit value of measurement with the odor sensor POLFA are as follows approximately.

Lower limit of measurement /
Odor concentration 50 to 100 (odor index 17 to 20)
(The level on the human sense of smell " clearly understandable what the smell is ")

Upper limit of measurement/
Odor concentration 100,000 or more (odor index 50 or more)
(The level that cannot be smelled directly on the human sense of smell)

※ "Odor concentration" and "Odor index" are words decided in Japanese law (Offensive Odor Control Law)
※ The above is just an indication and not all odors can be applied.
※ As the odor exceeding the measurable range (more than 2,000) may cause malfunction, please stop the measurement immediately in this case.

6 The affection of temperature and humidity

The measured value of this product is affected and fluctuated by the gas or the temperature / humidity of the measurement environment. In either case, the measured value increases as the temperature / humidity gets higher, and the measured value tends to decrease as the temperature / humidity gets lower. Therefore, please use data that is measured under the same conditions and in the same environment as much as possible to compare the measured data.

7 Prohibition of liquid, oil, powder and dust suction

This product is a measuring equipment for digitizing the intensity of odor gas or odor in the air. Never aspirate liquid, oil, powder, or dust for measurement. If liquid, water, oil, powder, dust, etc. is accidentally aspirated into the product, it may dangerously cause product malfunction or heat generation. In this case, please turn off the power immediately and contact KARUMOA by email.

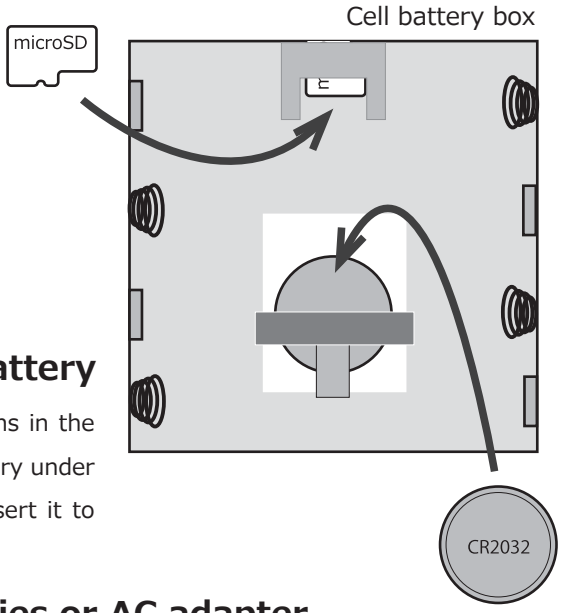
KARUMOA Co.,Ltd.
Address : 2-9-5 Shinkawa Chuo-ku Tokyo Japan 1040033
TEL : +81-3-5540-5851
MAIL : odorsensor@kalmor.jp

5 – 2 Preparation for Measurement

Please install the necessary parts to execute the measurement.

1 Please insert the SD card

The microSD card is required for data collection.
There is an insertion slot of the microSD card under the battery box on the back side of the body. Please insert it deeply and firmly.
(The capacity of the MicroSD card should not be larger than 2GB.)
When taking out the microSD card, please push it once and take it out after popping out.

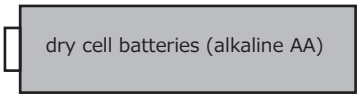


2 Please insert a lithium coin battery

Lithium coin battery is required for various operations in the product.There is an insertion slot of lithium coin battery under the battery box on the back of the body. Please insert it to the specified position.

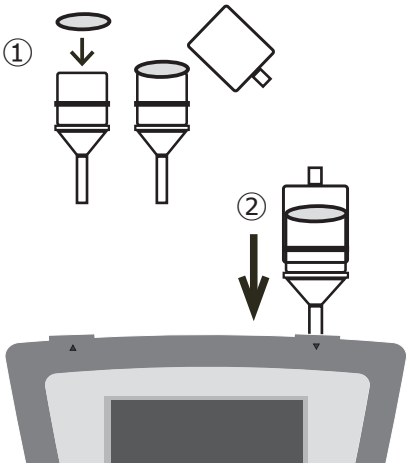
3 Please prepare dry cell batteries or AC adapter

Please install dry cell batteries (alkaline AA) or connect AC adapter, according to the measurement location and usage conditions.Please note that about 8 hours can be operated continuously with the 4 alkaline dry batteries (when the back light on).
※ It may change according to the usage condition.



4 Please attach the suction nozzle.

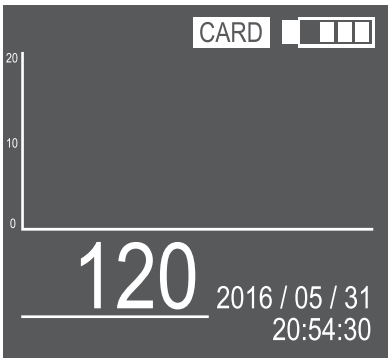
① Then, please remove the top cover of the suction nozzle and stick a dust removal filter.
(The seal side is on the bottom.)
② After setting a dust removal filter, tighten the top cover firmly, and insert it into the suction port of the body.
※ Depending on the suction gas, the dust filter may absorb the gas, and the measured value may not smoothly react.
※ The suction nozzle is designed to be enough hard to removal. Forcibly pulling out from the body may cause damage.
(How to take off the nozzle → P.15)



6 Starting Measurement

6 – 1 Turning on the Power

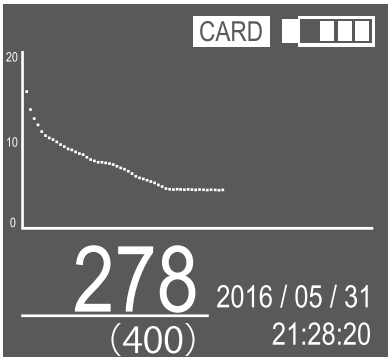
① Please turn on the power.
② The display lights up and a 120-second countdown is started.



⚠ ※ Do not turn off the power during this time.
It willbe the cause of the malfunction.

6 – 2 Idling Operation (About 10 minutes under clean air environment)

① The measurement will start 120 seconds after power on, but firstly please execute the idling operation in the room without odor, or in outdoor.
② After about 10 minutes passing, the value will slowly level off as shown on the right.
③ When this value becomes less than 300 under clean air environment, idling is completed.



※ “Under clean air environment” means “outdoors where the air is clean” or “the air that has filtered through the activated carbon filter” , etc.
※ If the measured value does not become below 300 after idling under clean air, there may exist some substances that are difficult to detect in the human sense of smell, or sensor deterioration may have started.
In the case of sensor deterioration, please adjust the zero point. → P.21
※ An activated carbon filter is a consumable that degrades by absorbing odor. So please replace it regularly.An activated carbon filter is also sold separately as an optional item. → P.25

6 – 3 Confirming the Settings

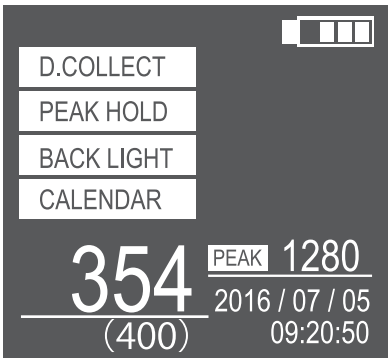
Please check the various settings according to the purpose of measurement.

MENU ENTER Moving to the MENU screen. And ENTER function in MENU.

NEXT Moving to the item on the MENU screen. And forwarding the value / cursor in the advanced setting.

BACK Back to the measurement screen from the MENU screen. And back the value / cursor in advanced settings

Please refer to the page for MENU setting



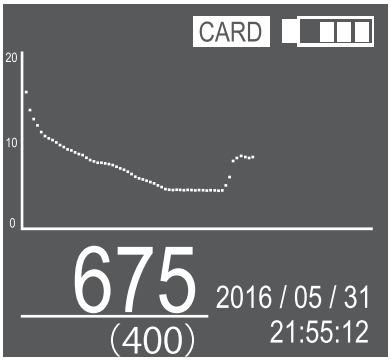
【D.COLLECT】	Setting of data recording ON / OFF, and recording interval
【PEAK HOLD】	Peak hold ON / OFF
【BACK LIGHT】	Setting the display backlight off time
【CALENDAR】	Setting date and time
【CAL/TEMP】	Switching a display for calendar / temperature and humidity
【INDICATE】	Changing the range of vertical axis of real-time graph
【DELETE】	Erasing all data in SD card
【SCALE】	Scale function ON / OFF

6 – 4 Reading the Measured Value

① Please execute measurement with the suction port (suction nozzle) closing to the object.

② Depending on the odor, the value may peak immediately or may rise gradually.

③ Read the peak value as soon incase if the peak is reached immediately.
Or read the flat keeping value in case if the value is rising gradually.



※ (400) shown below the measured value is used during data collection mode.
In the data collection mode, writing to the SD card is executed at specified time intervals (minimum 400 seconds). And this (400) is the countdown to the next writing. When (400) becomes (0), data writing to the SD card starts, and CARD blinks. In this operation, the operability is a little slow. So please be careful not to write data at the timing of important measurement.

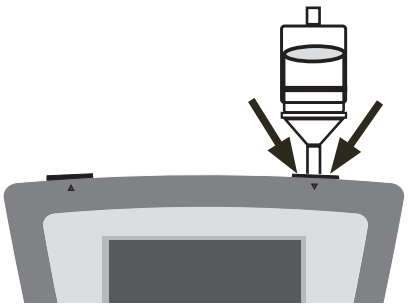
6 – 5 Finishing Measurement

When all measurements are completed, remove the suction nozzle, and turn off the power switch.For details on daily maintenance and storage, please refer page 23 "Daily Maintenance and Storage".

※ When using the data collection function, please turn off the data collection before turning off the power. If the power is turned off without turning off the data collection, the data within the last (400) counts will be lost without stored.

※ If you had measured a strong odor like exceeding 1,000 that causes deterioration of the sensor (refer to page 10), please execute an idling operation under clean air environment before turning off the power. And turn off the power after the measured value becomes stable at 300 or less.Turning the power off while the sensor is contaminated may accelerate the deterioration of the sensor.

※ In the case of the measured value exceeding 2,000, the measurement is not recommended since it may lead to equipment failure or sensor sensitivity characteristics change.
Please stop the measurement immediately in this case.



Please note that the suction nozzle is designed to be enough hard to be pulled out.

When removing the suction nozzle, push two points of the black insertion port (open ring) and pull out the nozzle.
It may not be pulled out if you push only one point.
Also, it may not be pulled out if you push it with pulling the nozzle.

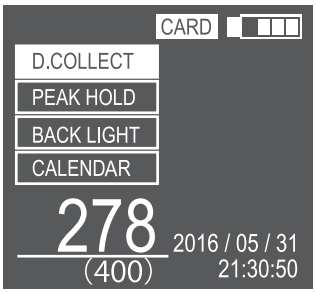
If the nozzle is difficult to be pulled out, it can be pulled out relatively smoothly if you push two points of insertion part of the nozzle once and then pull out.

Please be careful not to pull out by force, as it may cause damage to the body and suction nozzle.

7 MENU Screen / Function Setting

7 – 1 MENU mode

Moving to MENU screen by pressing the MENU button.
In the MENU screen, detailed settings for each function can be set.



MENU ENTER — Moving to the MENU screen. Also it works as ENTER function in MENU screen.

NEXT — Moving up the item on the MENU screen, or forwarding the value / cursor in the advanced settings

BACK — Return to the measurement screen from the MENU screen. Or returning back the value / cursor in advanced settings

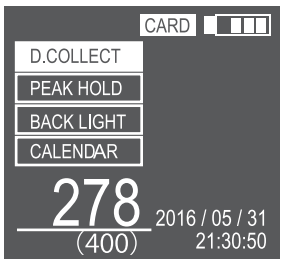
7 – 2 D.COLLECT

A function to record the measured values. (Please check if the SD card is surely inserted before using.)
The data recording interval can be set at any time between 1 and 59 seconds and between 1 and 30 minutes.

【Notes】

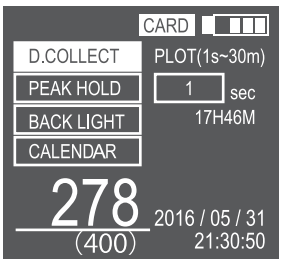
- Continuous recording is possible as far as START / STOP is not executed, but it will be forcibly stopped when the cumulative use time reaches 4,500 hours from the point of durability of the pump. Also, please note that the maximum continuous recording time varies depending on the capacity of the SD card.
- The measured data is written to the SD card in every 400 seconds for 1 second interval PLOT, in every 400 minutes for 1 minute interval PLOT, or each time when data collection is stopped.
- Please note that the latest 400 PLOT data will be lost without stored, if the power is turned off without stopping Data Collection properly.

MENU mode



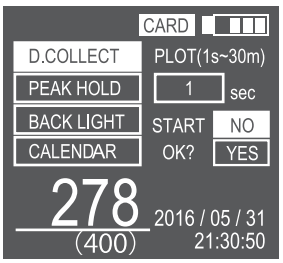
Selecting the cursor and press by NEXT, then moving to the detailed settings by MENU ENTER

Detailed settings 1



Setting any numerical value by NEXT BACK, and entering by MENU ENTER

Detailed settings 2



Switching NO/YES by NEXT BACK and entering by MENU ENTER

※ If NO is selected, it returns to the measurement screen without any setting.

When stopping the data collection, please select follows.
MENU screen → D. COLLECT → STOP OK? → YES

During writing, CARD blinks and the operability is a little slow temporarily. Therefore, please check carefully the counter of countdown (400).

※ If the SD card is not inserted (in this case CARD is not displayed), YES cannot be selected.

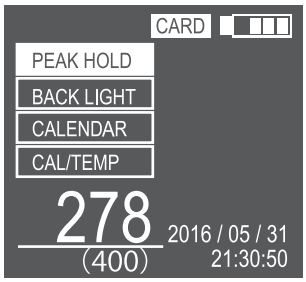
※ Calendar settings, scale changes, and zero point adjustments cannot be executed during collecting data

※ Each CSV file is created every time after START / STOP is selected, or each 64,004 plots (about 17 hours and 46 minutes in case of 1 second interval recording).

7 – 3 PEAK HOLD

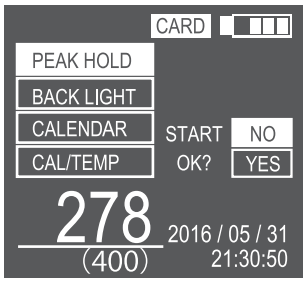
The peak value is displayed on the measurement screen. The peak value is maintained unless turned off.

MENU mode



Selecting the cursor and press by NEXT, then moving to the detailed settings by MENU ENTER

Detailed settings 1



Switching NO/YES by NEXT BACK and entering by MENU ENTER

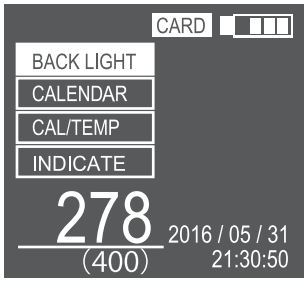
※ If NO is selected, it will return to the measurement screen.

You can also switch ON / OFF by pressing and holding MENU ENTER for 2 seconds in the measurement screen.

7 – 4 BACK LIGHT

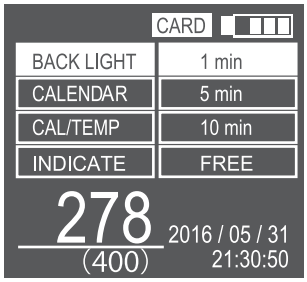
The backlight off time can be set. The default setting is FREE.
Turning off the backlight reduces power consumption and improves battery life.

MENU mode



Selecting the cursor and press by NEXT, then moving to the detailed settings by MENU ENTER

Detailed settings 1



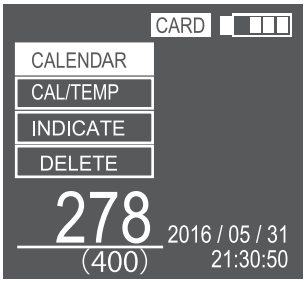
If it is set to FREE, backlight does not turn off.

Switching off time by NEXT BACK and entering by MENU ENTER

7 – 5 CALENDAR

Setting the date and time. The year, month, day, hour, minute and second at the bottom right of the screen can be set by selecting CALENDAR.

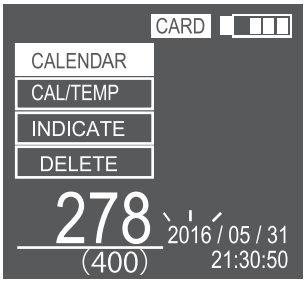
MENU mode



Selecting the cursor and press by (NEXT), then moving to the detailed settings by (MENU ENTER)

It starts to blink from the year.

Detailed setting 1



Setting any numerical value by (NEXT) (BACK), and entering by (MENU ENTER)

It starts to blink from the year.

⚠ ※ The calendar cannot be changed during collecting data

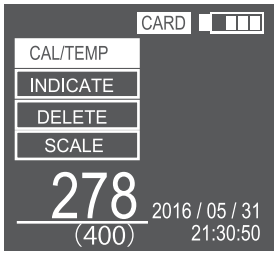
7 – 6 CAL/TEMP

A simple temperature / humidity sensor has been implemented in the odor sensor POLFA for the assistance to record the measurement environment.The measured value of the odor sensor may be affected by temperature and humidity.By knowing the environment at the time of measurement, it can be used as a consideration of fluctuations of the measured values.

⚠ ※ The built-in temperature / humidity sensor is only an assistant function of this product, and it is not aimed the function as an observation equipment. In order to prevent misunderstanding, the unit (℃ , %) is not displayed with the temperature / humidity value.

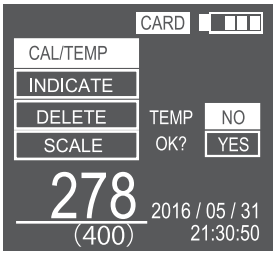
※ The displayed temperature and humidity is the one detected around the sensor, which is different from the temperature and humidity of the measurement gas itself.

MENU mode



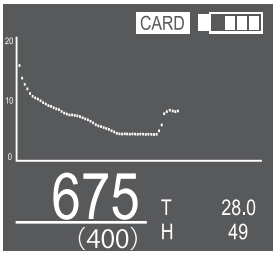
Selecting the cursor and press by (NEXT), then moving to the detailed settings by (MENU ENTER)

Detailed setting 1



Switching NO/YES by (NEXT) (BACK) and entering by (MENU ENTER)

Measuring display



Selecting YES, it returns to the measurement screen, and T (temperature) and H (humidity) will be displayed.To return to the calendar again, please select follows.

MENU screen → CAL / TEMP → CAL OK? → YES

7 – 7 INDICATE

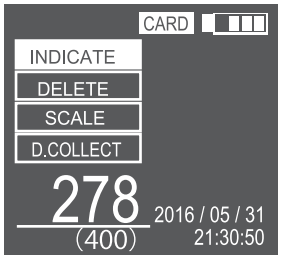
By using the INDICATE function, it is possible to expand the range of the vertical axis of the graph.By using the INDICATE function, even when the default settings (the memory on the vertical axis is 0 to 2,000) are difficult to see, using the INDICATE function makes it visually clearer.

※ The difference between MAX and MIN is required at least 400.

※ In the actual range expression, the lower two digits are not shown.

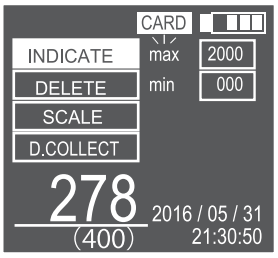
Example : 1,000 → 10, 2,000 → 20

MENU mode



Selecting the cursor and press by NEXT , then moving to the detailed settings by MENU ENTER

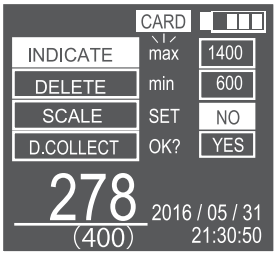
Detailed setting 1



Setting any numerical value by NEXT BACK , and entering by MENU ENTER

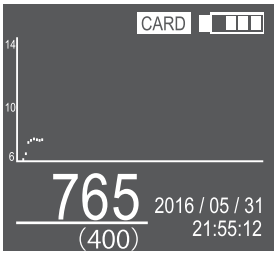
By pressing and holding the button for a while, the change of the value becomes faster.

Detailed setting 2



Switching NO/YES by NEXT BACK and entering by MENU ENTER

Measuring display



By selecting YES, it returns to the measurement screen, and the vertical axis is changed. To change back the setting, please retry from the beginning.

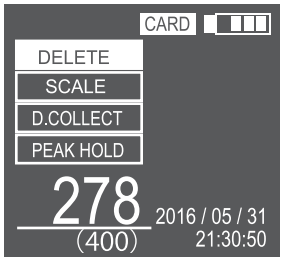
7 – 8 DELETE

Erasing all the data in the SD card recorded by Data Collection all at once.

※ Please note that the deleted data cannot be restored again.

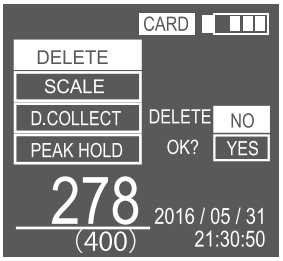
※ If the SD card is not inserted, YES cannot be selected.

MENU mode



Selecting the cursor and press by NEXT , then moving to the detailed settings by MENU ENTER

Detailed setting 1



Switching NO/YES by NEXT BACK and entering by MENU ENTER

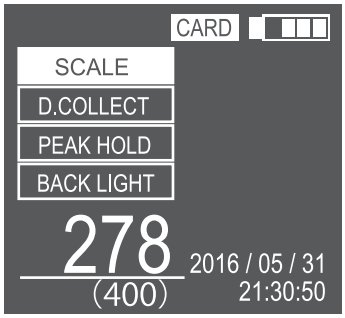
If you select YES, all data will be erased at once.Please select NO if you do not want to delete.

7 – 9 SCALE

The SCALE function is used to make it easy to recognize fluctuations by scaling the true measured value, when the fluctuations in the measured value is small and difficult to read.

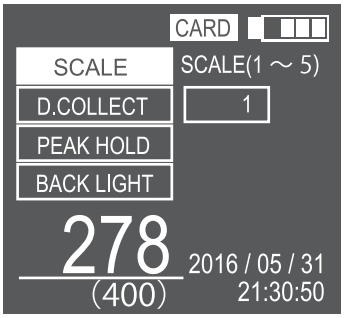
While using the scale function, the mark [S] appears on the measurement screen.

MENU mode



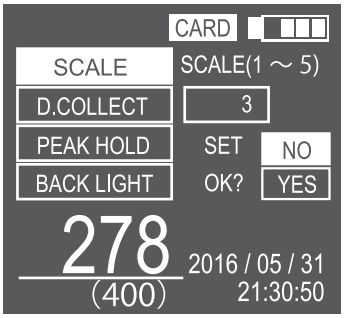
Selecting the cursor and press by NEXT, then moving to the detailed settings by MENU ENTER

Detailed setting 1



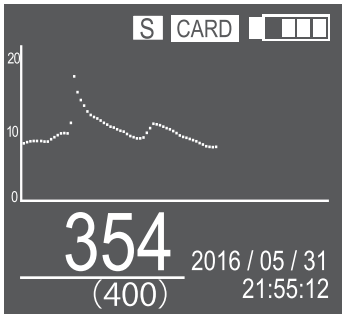
Setting any numerical value by NEXT BACK, and entering by MENU ENTER

Detailed setting 2



Switching NO/YES by NEXT BACK and entering by MENU ENTER

Measuring display



It returns to the measurement screen, and [S] will be displayed.

⚠ The measurable range of this product is 0 to 2,000 in normal mode.

By using the scale function,

Scale 2 → 0 to 4,000

Scale 3 → 0 to 6,000

Scale 4 → 0 to 8,000

Scale 5 → 0 to 9,999

The range is changed like this.

In case of obtaining the measurement value with using scale function, you need to remember the scale number you have set. (In case of recording the measurement value by Data Correct function, the scale number will be recorded in the data.)

The SCALE function is aimed to make it easy to recognize the fluctuation that is small measured values and difficult to read, such when the odor is weak to be reflected in the measured values or to detect odorous substances such as ammonia, etc.

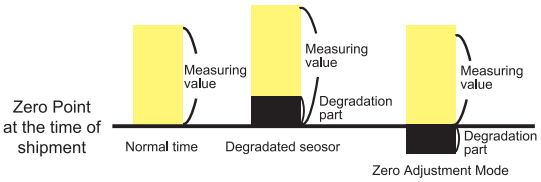
When exiting the SCALE function, please return to the SCALE function setting and set the SCALE function to 1.

⚠ ※ The SCALE function is also reset when the power is turned off.

※ The measurable range of this product is 0 to 2000. If it exceeds 2000, the measured value will blink. Theoretically, a value of 2000 or more may be displayed, but please stop the measurement immediately as it is too strong odor that may cause sensor malfunction.

7 – 1 0 Zero Adjustment Mode

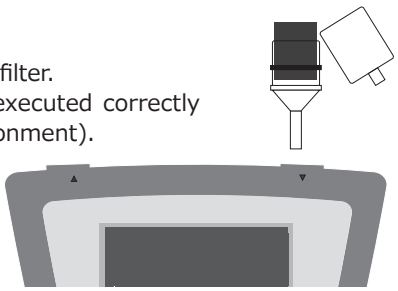
Zero adjustment mode is a function to temporarily adjust the sensor zero point when sensor deterioration is observed. Please use this function when it does not become less than 300 even if you executed the idling operation under clean air environment.



Zero Adjustment Image

Zero adjustment is only a temporary correction.
It cannot be used if sensor deterioration is significant.
In this case, please contact to repair / maintenance service.

① Set the activated carbon filter to the suction nozzle.
The activated carbon filter is preserved in a silver pouch.
When using this function, please use a brand new activated carbon filter.
Although repeated use is possible, zero adjustment may not be executed correctly because performance decreases with each use (or by storage environment).



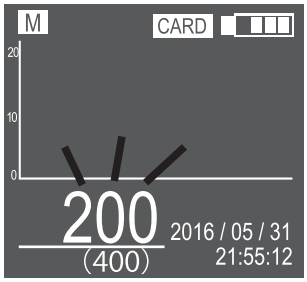
② Insert the suction nozzle.

③ Turn on the power with pushing NEXT and MENU ENTER button.

④ M is displayed on the screen, and then 120-second countdown is started.

⑤ The operation after 120 seconds will be one of following 3 patterns depending on the degree of deterioration of the sensor.

The case of no or slight deterioration of the sensor



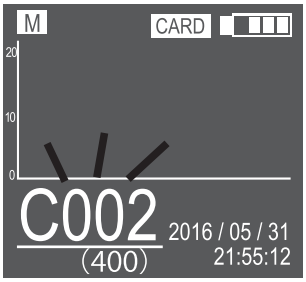
(1) In case of no sensor deterioration or slight deterioration, 200 blinks.

(2) Normally it is OK as 200, but to adjust to any value, please change the value by NEXT and BACK

(3) Press MENU ENTER to confirm.
The value displayed for a moment after the confirmation is the actual measured values.

(4) Please take out the activated carbon filter, and replace it with the dust filter, and start measurement.

The case of moderate deterioration the sensor or the sucked air is dirty



(1) In case of moderate deterioration, C002 and 200 blink alternately.

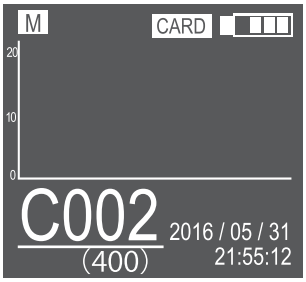
(2) Normally it is OK as 200, but to adjust to any value, please change the value by NEXT and BACK

(3) Press MENU ENTER to confirm.
The value displayed for a moment after the confirmation is the actual measured values.

(4) Please take out the activated carbon filter, and replace it with the dust filter, and start measurement.

※ The case of maintenance recommendation

The case of moderate deterioration the sensor or the sucked air is dirty



In case of severe deterioration, C002 lights up.

If this condition is appeared even a brand new activated carbon filter is used, the zero point adjustment cannot be executed because the zero point adjustment range is exceeded.

※ Maintenance required

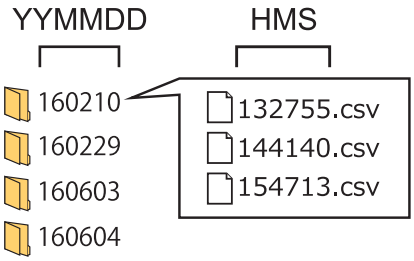
※ Zero adjustment will be reset when the power is turned off.

8 Recorded Data

Data recorded by data collection will be saved as csv format file in microSD card.
Data in the microSD card can be read by a PC.

※ A microSD / SD card slot is required on your PC to read an SD card. If there is only an SD card slot, please use the accessory (also commercially available) microSD card adapter to use the microSD card as an SD card.

※ You need spreadsheet software such as MS Excel to check and edit the data in csv file.



In the SD card, a folder is created with the name of date at the measurement started, and a csv file is created in the folder with the name of the hour, minute, and second at the measurement started.

※ The extension (csv) may not be displayed depending on the setting of your PC.

The following information is stored in the csv file.
File Name (Hour, Min, Sec at the measurement started)
Scale (1 to 5)
Date (YYYY/MM/DD)
Time... HourMinSec　Odor...Measuring value　Temp...Temperature　Humi...Humidity

File Name :	144140.csv		
Scale:	1		
Date:	2016/02/10		
Time	Odor	Temp	Humi
14:41:41	324	28	50
14:41:42	324	28	50
14:41:43	324	28	50
14:41:44	323	28	50
14:41:44	324	28	50
14:41:45	324	28	50

When using the scale mode (scale: 2 to 5), the measured value is multiplied with corresponding scale.To compare with other measurement data, it is necessary to consider the value being used in scale mode.

※ During data collection, data recording is executed once for 400 plots. (Time varies depending on the recording interval setting, like every 400 seconds if the recording interval is set as 1 second, and every 800 seconds if the recording interval is set as 2 seconds.)

※ Please note that the data of the last 400 plots will be lost if you turn off the power without properly stopping the data collection mode.

※ The number of plots stored in one csv file is approximately 64,000 plots (about 17 hours and 46 minutes in case of 1 second interval recording).

9 Daily Maintenance and Storage

Daily Maintenance

★ After the measurement is completed, please execute idling operation under clean air environment before turning off the power

By executing idling operation under clean air environment before turning off the power, the sensor will last longer by removing the odor that is absorbed to the sensor.If the measured value 300 or less is shown under clean air environment, this is an indication of the completion of idling operation.

★ Wiping dirty body with a dry cloth

If the main unit becomes dirty, please wipe the body with a dry cloth. However, please do not wipe with synthetic fibers that generates static electricity, or with organic solvents such as alcohol or thinner, etc.

Storage

★ Storing the product with removing dry cell batteries

Leaving the batteries in the product may cause liquid leakage of battery that cause product malfunction.

★ Do not store this product in the following places / environment

- An environment temperature not in the range -10 to 50℃ .
- An environment where temperature changes rapidly and condensation occurs easily.
- An environment that is vibrating.
- A place easily get wet, or highly humid with moisture or steam.
- A place exposed to direct sunlight, or place with large temperature differences.
- An environment with corrosive gas or flammable gas.
- An environment with dust.
- In a room with automatic solder tank, or place where silicon material is stored and used.
- In a room with high concentration of organic solvent by painting, or near from such place.
- An environment with cigarette smoke or smell, like in a smoking room.

10 Error Indication

The errors displayed on the screen are as follows.

M

Blink :
The cumulative usage time has exceeded 3500 hours. It will need maintenance soon.

Lights up :
The cumulative usage time has exceeded 4000 hours. Maintenance is required.

Lights up +C001 :
The cumulative usage time has exceeded 4500 hours. No more measurement possible. An immediate maintenance is required.

Lights up +200 (Blink) :
This is displayed in zero adjustment mode. (→ P.21)

Lights up + C002 / 200 (Alternate blink) :
This is displayed in zero adjustment mode.The suctioned air is dirty or the sensor is moderately degraded. Although measurement is possible, maintenance is recommended.

Lights up +C002 :
This is displayed in zero adjustment mode.The suctioned air is dirty or the sensor is severely degraded. Please try to replace the activated carbon cartridge to recover. If still not recover, maintenance is required.

E001 Sensor error. If the error cannot be resolved even after turning the power off and on, maintenance is required.

E002 Pump error. If the error cannot be resolved even after turning the power off and on, maintenance is required.

CARD

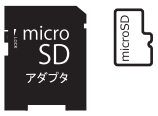
Blink :
Reading microSD. Normally, it flashes when writing data, but if it continues to blink, a card read error may have occurred. Please stop measurement and reinsert the microSD card.

Measuring value Blink Over range. The measured value exceeds the measurable range (more than 2,000).
In the case of strong odor with a measured value of 2,000 or more, we do not recommend measurement since it may lead to product malfunction. Please stop the measurement immediately.

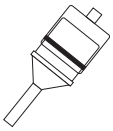
11 After Service

Optional consumables and accessories

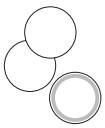
The following optional consumables and accessories are sold separately. Please feel free to contact us.



microSD card (2GB) + Adapter set



Suction nozzle



Dust removal filter (10 sheet)

Activated carbon filter（10 ea ）

AC adapter

Repair and maintenance service

This product is recommended the maintenance every 4000 hours of cumulative use time. (If the cumulative use time exceeds 4,500, the product will stop the function for safety reasons.)

Also, we offer repair or replacement of failure product or sensor, etc. in all time.

All of above services will be performed at KARUMOA, so please contact us by email in advance, and then send the product to below address.

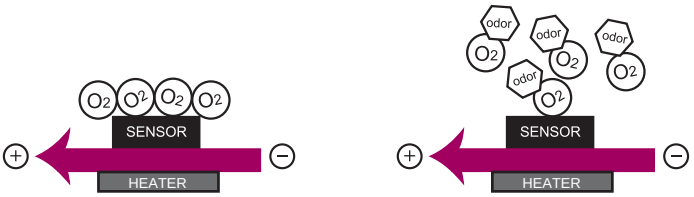
Any service of checks, parts replacements, calibrations, etc. which are performed before repair will be charged (warranty items are not included). Please note that there is no alternative product available.

<CONTACT>
Karumoa Co.,Ltd.
Address : 2-9-5 Shinkawa Chuo-ku Tokyo Japan 1040033
TEL : +81-3-5540-5851
MAIL : odorsensor@kalmor.jp

12 FAQ

The frequently asked questions are listed below. Please read here before contacting us.

Q.1 What is the reaction principle of the sensor ?



The sensor element has the characteristic of absorbing oxygen when it becomes warm at high temperature.
Under the clean air, a large amount of oxygen is absorbed on the surface of sensor element, and the electric current in the sensor to flow has been low (= high resistance). When odor (reducing gas) comes in this condition, oxygen is pulled out and the resistance of the sensor is reduced. It makes the flow of electric current through the sensor (= low resistance).
By reading this resistance value, this product is expressing the odor as the measured value calculated by our original calculation.

Q.2 Is there any unit of measurement value?

There is no unit. The measured value of the odor sensor POLFA is the value of KARUMOA original.

Q.3 The value is high even there is no odor.

The factor of the cause of the high measured value even no odor is mainly that the sensor is deteriorated, an organic solvent such as toluene is nearby, an alcohol is nearby, or measured in the space with many people, etc.Especially, an alcohol is widely used in cosmetics and stationeries.
Because POLFA sensitively reacts these substances, the measured values may unexpectedly be high in case of these substances.
In this case, please try the measurement in clean air environment such as outdoors and check again if the measured value drops or not.
If the measured value is still high even in outdoors, the sensor may be degraded, and maintenance is required.

Q.4 The value is low even there is an odor.

Because of the principle of the odor sensor, the measured value becomes low if the oxidizing substance (chlorine, ozone, freon, NOx, Sox, etc.) is included. Please check if it contains such substances or not.
Also, even the latest science cannot exceed a human odor sense. Even if you feel some odor in your odor sense, the odor may not be measured as a value depending on the strength and components.

Q.5 The time cannot be set.

Please make sure that the lithium coin battery is properly inserted. 長 If you have not used it for a long time, please replace the lithium coin battery with a new one. If the problem is still not solved, please contact to KARUMOA. → Refer to page 25 " Repair and maintenance service "

13 Product Specifications

Product Name	Odor Measuring device KAGUROBO series　POLFA
Sensor	METAL OXIDE SEMICONDUCTOR GAS SENSOR × 1
Target gus	General Odor gus （ex : hydrogen sulfide, methyl mercaptan, acetaldehyde, and so on）
Accessory	microSD(2GB), AC adapter, Suction nozzle, Alkaline dry cell battery (AA), Dust removal filter, Straps, Activated carbon filter, Lithium coin battery(CR2032）
Display	Measured value, Real-time graph, Peak, Date and Time, Simple temperature and humidity display function
Function	data collection function、Peak hold function、Scale function、
Measuring Range	0 ～ 2,000 (When using scale mode, 0~max9,999)
Power	Alkaline dry cell (AA x 4) or AC adapter
AC adapter	AC100-240V （DC12V/1A）
Power consumption	[When using alkaline dry cell] Backlight lighting 0.9W [When using AC adapter] Backlight lighting 1.8W
Operating time	[When using alkaline dry cell] Backlight lighting : about 8 hours Backlight off : about 16 hours Up to 4,500 hours, depending on cumulative hours [When using alkaline dry cell] Up to 4,500 hours, depending on cumulative hours
Gus suction quantity	about 350ml/min
Usage environment	0℃～ 40℃（No condensation）
Strage environment	-10℃～ 50℃
Dimention	about W127.7 × H209.5 × D40 mm（without black inserting port）
Weight	about 375g（without suction nozzle, dry cell, and so on）
Warranty	Please check the warranty sheet separately.

MEMO

MEMO

KAGUROBO

POLFA

KALMOR®