

Optical Gas Monitor

Model RK60000

COSA SF6 Purity Pro

Instruction Manual

COSA+XENTAUR CORPORATION LOCATIONS:

**84G Horseblock Rd
Yaphank, NY 11980
(631) 345-3434 Fax: (631) 924-7337
7125 North Loop East
Houston, TX 77028
(713) 947-9591 Fax.: (713) 947-7549**

email: sales@cosaxentaur.com

www.cosaxentaur.com

Introduction

Thank you for purchasing the Model RK60000. This instrument is a portable gas monitor to measure “Helium in N2,” “CH4 in air,” and other gas concentration and calorie (valid only to the measurement mentioned in the attached measuring gas specifications) intermittently.

This instruction manual is a guidebook on how to operate the Model RK60000. Both beginner users and experienced users must read this manual and understand the contents thoroughly prior to operation.

This instrument is to be used solely for the purposes mentioned in this manual and the attached measuring gas specifications.

For your safety, the following marks have been included in this manual.

Danger

The liability or exposure to harm or injury.

Warning

If the instrument is not operated accordingly, it may serve as a serious hazard or health risk.

Caution

If the instrument is not operated accordingly, it may malfunction or serve as a serious hazard.

***Note: Advice on Usage**

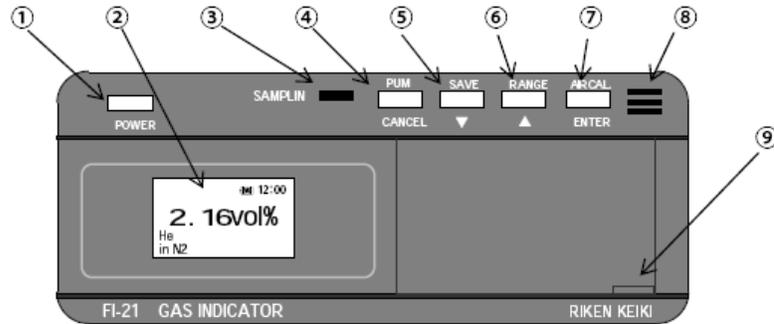
As the kinds of measurable gas and range vary depending on the type of RK60000, refer to the attached measuring gas specification. For standard models, refer to the attached “each TYPE measuring gas specification.”

Index

1. PARTS AND PART FUNCTIONS.....	4
2. MEASURING MODE (POWER KEY).....	6
2-1. Basic Display for Measuring Mode and Explanation.....	6
2-2. Procedures from Power ON to Measurement.....	7
2-3. Saving Data.....	9
2-4. Initial Display (Self-Diagnostic Display).....	9
2-5. ERROR Message Display.....	10
2-6. AIR CAL. CAUTION.....	11
2-7. Affection on Measurement from Pressure.....	12
3. SETTING MODE (ENTER + POWER).....	14
3-1. Changing the Measuring Gas (SELECT GAS).....	14
3-2. Adjusting the Time (SET DATE / TIME).....	15
3-3. Confirming the Saved Data (VIEW SAVED DATA).....	15
3-4. Clearing the Saved Data (CLEAR SAVED DATA).....	15
3-5. Start the Measurement (START MEAS.).....	15
4. MAINTENANCE.....	14
4-1. Replacing Batteries.....	16
4-2. Confirming Sensitivities.....	16
4-3. Daily Check.....	16
4-4. Frequency / Standard for Replacing Parts.....	17
5. DISPOSING OF THE INSTRUMENT.....	17
6. TROUBLE SHOOTING.....	18
7. WARNINGS ON USAGE.....	19
8. DEFINITION OF TERMS.....	20
9. SPECIFICATIONS.....	21
9-1. Specifications.....	21
9-2. Standard Accessories.....	21
10. MEASURING PRINCIPLE.....	22
11. WARRANTY.....	23

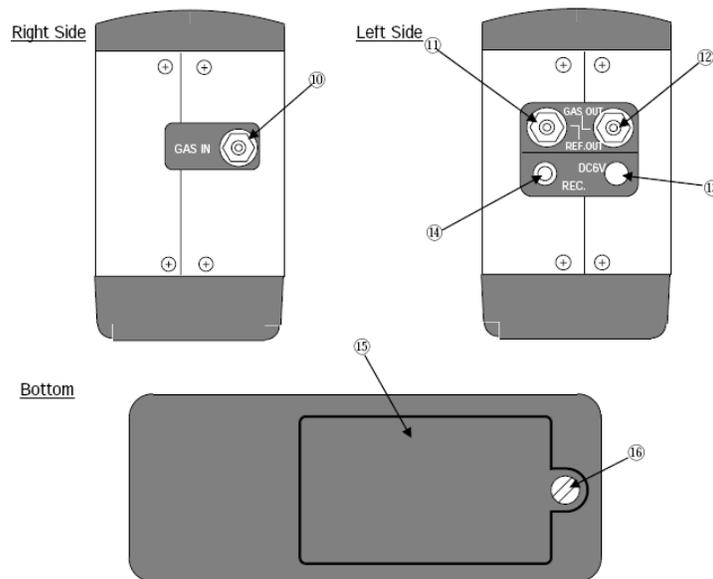
1. PARTS AND PART FUNCTIONS

TOP



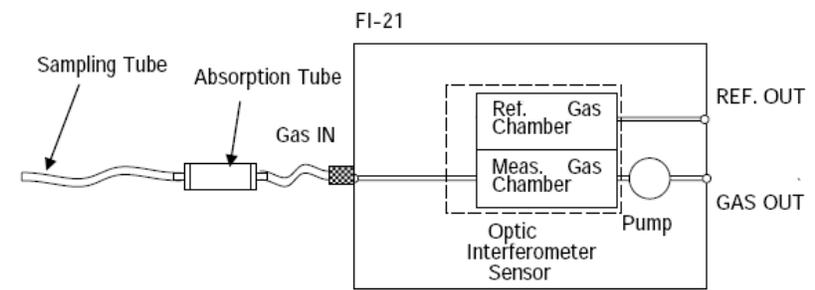
(1)	<p>POWER key: Press this key to turn the power on until the buzzer beeps. Keep pressing the key for approximately three seconds to turn the power off. When pressing the POWER key and (7) ENTER key, you can enter the "SETTING MODE."</p>
(2)	<p>LCD Display: Concentration is displayed. The time, battery remainder, and measures of gas and base gas are displayed as well.</p>
(3)	<p>LED for "SAMPLING": The LED is on while the internal pump is working.</p>
(4)	<p>PUMP key (CANCEL) : When this key is pressed, the internal pump starts to work. When the key is pressed again, the pump stops. (Pump is automatically turned OFF after three minutes of operation to conserve energy.) Contents selected by the keys are cancelled by this key.</p>
(5)	<p>SAVE key (key) : Information about the Time/Date, Measuring Gas, base Gas, and Displayed Concentration is saved by this key. The maximum number of data points is 100. (This key is used to enter numbers or to move the cursor.)</p>
(6)	<p>RANGE key (key): Position of the decimal point on the concentration display can be moved by this key. (This key is used to enter numbers or to move the cursor.)</p>
(7)	<p>AIR CAL. key (ENTER key): When calibration is performed with standard gas, this key is used. Contents selected by the keys are fixed by this key.</p>
(8)	<p>Buzzer Beeps when the power is turned on or off, or when special control or incorrect operation takes place.]</p>
(9)	<p>There is a data logger interface under the cover.</p>

*****Explanations in the () are for use during SETTING MODE.**



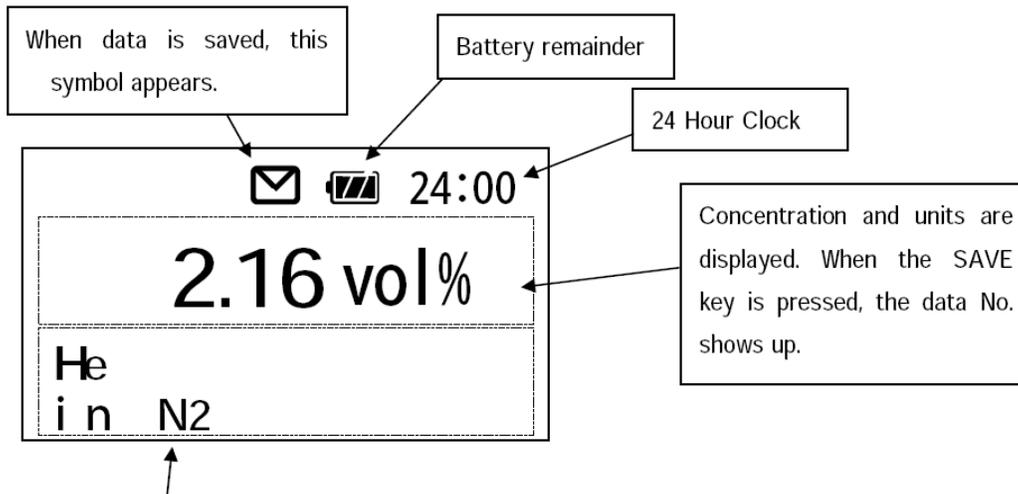
(10) GAS IN	Inlet for measuring gas. A specific absorption tube must be connected to the inlet, or the reading may go wrong.
(11) REF. OUT	Outlet connected to the reference gas chamber. The exhaust from the outlet must be emitted into the fresh air at atmospheric pressure.
(12) GAS OUT	Outlet for measuring gas sucked from the GAS IN.
(13) DC6V	6VDC Interface for the specific AC adaptor.
(14) REC.	A jack for 0-1VDC output. (cable : option)
(15) Battery Cover	Cover for the batter box.
(16) Screw	Fixing screw for the battery cover. It can be opened or closed by a screwdriver or coin.

Tubing Structure



2. MEASURING MODE (POWER KEY)

2-1. Basic Display for Measuring Mode and Explanation



Display Contents	Status
Gas Name and Base Gas	Standard measuring mode.
CAUTION CHECK AIR CAL.	Zero drifting might be occurring. Let the monitor sample fresh air and perform AIR CAL.
CAUTION ABNORMAL TEMP.	Internal thermistor detects an abnormal temperature.
CAUTION LOW BATT.	Battery voltage is low. Replace the batteries.
CAUTION LOW CONTRASUT	The interferometer sensor is getting contaminated. Before measuring, the sensor should be replaced or repaired.
CAUTION LOW BRIGHTNESS	The brightness is getting low. Before measuring, the sensor should be replaced or repaired.

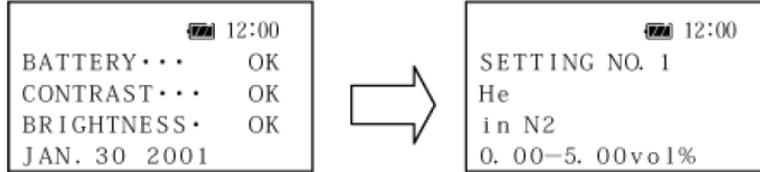


Caution

When the message "CAUTION ~" appears on the LCD, make an appropriate adjustment as soon as possible.

2-2. Procedures from Power ON to Measurement

1) The power is turned on by pressing the POWER key until the buzzer beeps. The initial display (self-diagnostic display) will show up as well. A display that confirms the setting will then appear. After two seconds, it will proceed to the basic display of measuring mode.



Self-Diagnostic Display

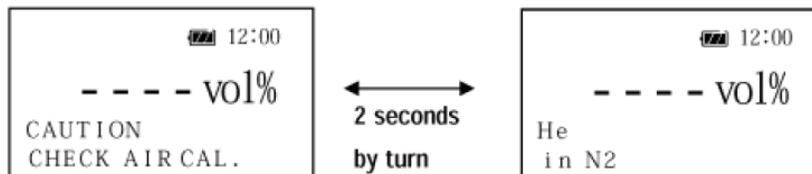
Confirmation Display



Caution

This instrument does not indicate a correct reading if the measuring gas and base gas are not selected properly. Confirm if [Measuring Gas] and [base gas] are the ones selected.

2) Two of the messages, [Meas Gas/Base Gas] and [AIR CAL], are displayed as seen below. (Refer to WARNIN AIR CAL.)



3) Press the PUMP Key and let it sample-draw enough reference gas (fresh air) into the instrument for about two minutes (the color of the display reverses while the pump is operating.)



4) After the indication is stable, press the PUMP key for the pump to stop operating. Press the AIR CAL key until the buzzer beeps. "AIR CAL value" will then be displayed.



5) After the AIR CAL is

completed, press the PUMP key and let the sample gas draw into the instrument. The color of the display will reverse while the pump is operating. *Note that the indication on display under pump operation is not measuring result.

6) After the indication on the reverse display becomes stable, the pump will stop the operation and read out the indication as a measuring result at this pump operation stop. At this pump operation, stop under the gas flow ceasing condition. This is the measuring result.



Caution

Press the AIR CAL key after confirming that there is enough fresh air in the chamber, or else the correct measurement cannot be achieved.

*Note

If the [AIR] is selected as the base gas, the indication will show a zero when the AIR CAL key is pressed. However, if the [N2] or other gases except [AIR] are selected as the base gas, the indication will not show a zero, but rather other values determined based on the combination of the measuring gas and the base gas. This is caused by sampling the gas which is not on target (in this case, the air.) Note that the instrument is not broken. Once it samples the target gas, it shows a correct reading. Depending on the combination of the measuring gas and the base gas, the AIR CAL value may be a negative value. For further information, refer to the measuring gas specification.



Caution

RK60000 performs best when both the Gas Chamber and Reference Chamber are at the atmospheric pressure (101.3 kPa.) While the measuring gas is being sampled, the pressure in the Gas Chamber will become slightly different from the atmospheric pressure, and the analyzer will not show the correct reading. Read the indication after the gas flow stops.

*Note

RK60000 measures the gas best when both the Gas Chamber and Reference Chamber are at 101.3 kPa. If precise measurement is required, perform the pressure correction by the following method:

$$\text{Pressure Correction} = \frac{101.3 \text{ kPa}}{\text{Pressure at measurement [kPa]}} \times (\text{Reading} - \text{Air Cal. Value}) + \text{Air Cal Value}$$

2-3. Saving Data

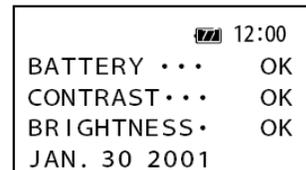
Once the **SAVE** key is pressed, the buzzer will beep and the display shown right will appear. The time, data, and the measurement result are saved chronologically from No. 001 to No. 100. The saved data can be seen at “**VIEW SAVED DATA**” in the **SETTING MODE**. Also, the saved data can be deleted with “**CLEAR SAVED DATA**” in the **SETTING MODE**.



12:00
SAVE DATA .005
He
i n N2

2-4. Initial Display (Self-Diagnostic Display)

After starting with the **MEASURING MODE** by pressing the **POWER** key, the self-diagnostic function will automatically begin to work. If the result is normal, the display shown to the right will appear.



12:00
BATTERY . . . OK
CONTRAST . . . OK
BRIGHTNESS . OK
JAN. 30 2001

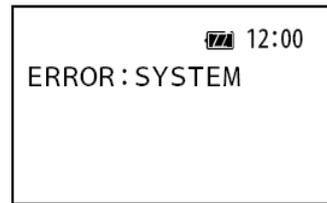
If any problems occur, it will be indicated as shown in the display at right. The display exemplifies a contamination of the interferometer. If the problem becomes serious, the display will not switch to the basic display, but instead the **ERROR** message display.



12:00
BATTERY . . . OK
CONTRAST . . . LOW
BRIGHTNESS . OK
JAN. 30 2001

2-5. ERROR Message Display

If the problem proceeds to affect the measurement, an ERROR message (as shown to the right) will appear.

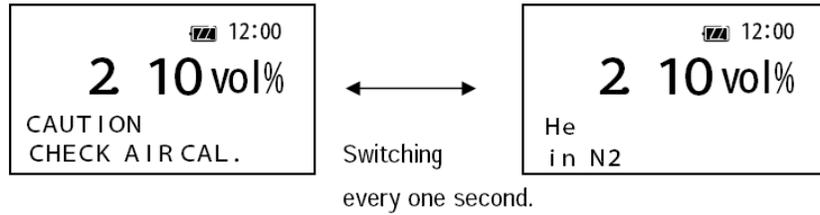


ERROR message and the meanings are as follows:

Contents of Display	The Meanings and Required Solutions
ERROR: LOW BATT.	Battery voltage is too low to perform the measurement. Replace the batteries.
ERROR: CONTRAST	Contamination of the optic interferometer sensor is too severe to perform the measurement. Replace the sensor or have it repaired.
ERROR : BRIGHTNESS	The brightness is too low to perform the measurement. Replace the sensor or have it repaired.
ERROR: SETTING	The setup data saved in the setting mode has an error. Confirm the setup data in the setting mode and set the data again.
ERROR: SYSTEM	A system error has occurred. Repair work is required.
ERROR: PUMP	There is a possibility that the pump is not working. Pump replacement is required.

2-6. AIR CAL CAUTION

If the temperature inside of the sensor has changed over $\pm 10^{\circ}\text{C}$ from the last time the AIR CAL was performed, [CAUTION/CHECK AIR CAL] will be displayed in order to prevent zero drifting. [Measuring Gas/Base Gas] and [AIR CAL] are displayed consecutively.



If the [CAUTION/CHECK AIR CAL] is displayed, perform the AIR CAL based on the procedure below:

AIR CAL Procedure

1. Press the PUMP key and let it sample fresh air.
2. When the indication becomes stable, stop the pump with the PUMP key and press the AIR CAL key



Caution

Before pressing the AIR CAL key, allow the instrument to sample enough fresh air (ideally for two minutes.) Otherwise, the correct measurement cannot be acquired.



Caution

When the measurement starts, confirm if the AIR CAL value is displayed after the fresh air is sampled enough. If the AIR CAL value is not indicated, or if [AIR CAL CAUTION] is not displayed, be sure to perform the AIR CAL procedures correctly.



Caution

The pressure in the Gas Chamber changes from the atmospheric pressure while sampling the gas. As a result, the indication will not be accurate (note that if an instant pressure change occurs in the Gas Chamber or the reference Chamber, the indication might also go wrong.) If these symptoms occur, perform the AIR CAL right away. Also, be sure to note the following points:

- > Do not plug the GAS IN or GAS OUT while the gas is feeding.
- > Do not attach or detach the sampling tube/absorption tube while the gas is feeding.
- > Keep the pressure of GAS IN, GAS OUT, and REF. OUT equal to the atmospheric pressure when the indication is read.
- > Read the indication after the gas flow stops.

2-7. Affection on Measurement from Pressure

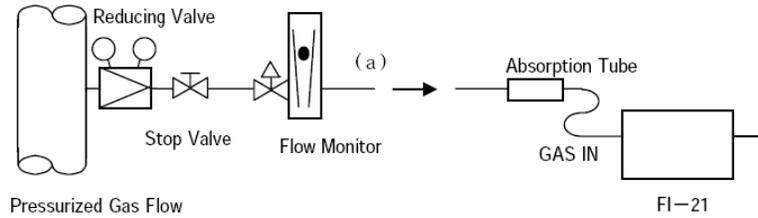


Caution

When a concentration change occurs suddenly on the RK60000, the correct reading cannot be shown. The absorption tube is also used for stabilizing the temperature of the sampling gas. Therefore, be sure to equip an absorption tube on the GAS IN whenever the measurement is taking place.

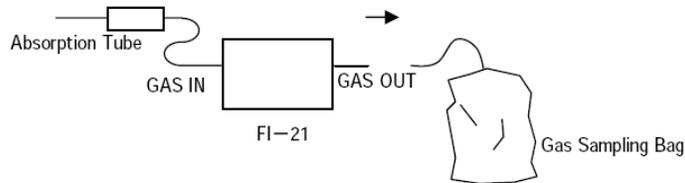
An example of measurement when the pressure of the sampling point is higher than that of the atmospheric pressure:

Make an inlet (a) as drawn below. Open and shut the stop valve to feed the gas to the instrument, rather than turning the pump on and off. Read the indication when the valve is shut off and the gas flow completely stops. Flow rate at inlet (a) should be 300 to 400mL. GAS OUT should be at the atmospheric pressure and the REF. OUT should face fresh air.



An example of measurement when the measured gas is not released into the air:

Connect a gas-sampling bag to the GAS OUT so that exhaust is not emitted into the air. Expose the REF. OUT to the fresh air.



3. SETTING MODE (ENTER + POWER)

The SETTING MODE is for “Change the Measuring Gas,” “Adjusting the time,” and “Confirming the Saved Data.” Enter the SETTING MODE by pressing the POWER key while the ENTER key is also being pressed.

Once you enter the mode, the display shown right will appear. Move the cursor (black bar) with the ▲▼ keys and select the item you wish to set up. Go into the item by [ENTER key].



Initial Display in Setting Mode

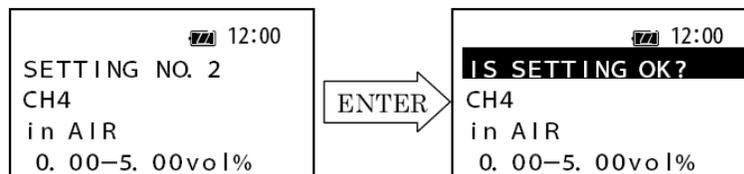
Items to Set Up and the Contents

SELECT GAS	Changing the measuring gas
SET DATE / TIME	Adjusting the clock
VIEW SAVED DATA	Confirming saved data
CLEAR SAVED DATA	Clearing the saved data
START MEAS.	Starting the Measuring Mode

3-1. Changing the Measuring Gas (SELECT GAS)

Choose the measuring gas with the ▲▼ keys and press the ENTER key to submit your choice. On the first line, the phrase “IS SETTING OK?” will appear. Press the [ENTER] key again if it is correct. If you wish to change the setting, press the [CANCEL] key.

The types of selectable measuring gas and range vary depending on the type of RK60000. For more information, refer to the attached measuring gas specification.

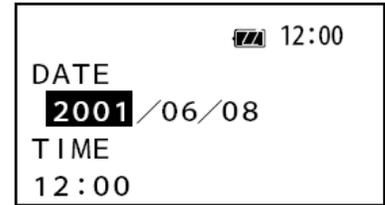


Select by ▼ ▲ keys.

If the setting is what you intend, press the ENTER key to save the setting.

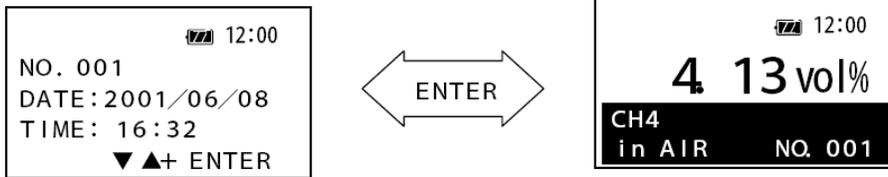
3-2. Adjusting the Time (SET DATE/TME)

The initial position of the cursor is on YEAR. Change this with the ▲▼ keys and fix the setting with the ENTER key. The cursor then moves to DAY. Select the DAY, MONTH, HOUR and MINUTE by the same procedures as YEAR. HOUR is displayed through a 24-hour clock.



3-3. Confirming the Saved Data (VIEW SAVED DATA)

On the first line, the data number is shown. On the second and third lines, the saved data and time are displayed. Select the data with the ▲▼ keys and fix the selection with the [ENTER] key. The saved data will then appear. At displaying the saved data, the measuring gas and the base gas are displayed with white letters on a black background. The CANCEL key leads to the initial display in Setting Mode.



3-4. Clearing the Saved Data (CLEAR SAVED DATA)

Select the "CLEAR SAVED DATA" with the ▲▼ keys and fix the selection with the ENTER key. If you want to cancel the action, select "CANCEL" and press the [ENTER] key.



3-5. Start the Measurement (START MEAS.)

If you would like to start the measurement right after Setting each item, select "START MEAS" with the ▲▼ keys and press the [ENTER] key. The display will then turn to the Measuring Mode.



4. MAINTENANCE

4-1. Replacing the Batteries



Warning

- > All the C-size Alkaline batteries used in the instrument should be the same kind.
- > Replace all four batteries at the same time.

- 1) Confirm that the power is off.
- 2) Remove instrument out of carrying case.
- 3) Remove the old batteries and replace them with the new ones in the correct direction.
- 4) Once you have replaced the batteries, place the battery cover on the bottom.

4-2. Confirming the Sensitivities

It is recommended that the sensitivity of the instrument be assessed periodically (at least once annually) to ensure its correct operation. If any problems are found or if you wish to have it calibrated, please contact any of our agents.

4-3. Daily Check

- 1) Is there any damage on switches, lamps, display, or body?
- 2) Confirmation of battery voltage.
- 3) Do you see “CAUTION...” OR “ERROR...” during the operation?

4-4. Frequency/Standard for Replacing Parts

The frequency of the replacement mentioned below is simply standard. The life of the instrument is dependent on how it is used and stored.

- 1) Internal Pump and Internal Tubing.....2 years
- 2) Absorption Tube (Consumable Part).....2 years
- 3) Rubber Parts in Interferometer.....2 years (optic element should be cleaned if necessary)

- 4) Main PCB.....5 years
- 5) Interferometer Assembly.....5 years (continuously used if no problem exists)

- 6) Others.....5 years

5. DISPOSING THE INSTRUMENT

This instrument does not contain any harmful material as component parts. When disposing the instrument, take an appropriate method based on local regulation.

6. TROUBLE SHOOTING

The trouble shootings mentioned below do not cover all problems, however those that occur most frequently are indicated to help your research for cause and solution.

Symptoms	Causes	Solutions
Power does not turn ON.	<p>No batteries; AC adaptor may not be connected.</p> <p>Polarity of the batteries is wrong.</p> <p>The POWER key has not been pressed long enough.</p>	<p>Insert batteries; connect AC adaptor.</p> <p>Place batteries in the correct direction.</p> <p>Continue to press POWER key until the buzzer beeps.</p>
Reading is not correct.	<p>AIR CAL is not functioning correctly.</p> <p>The incorrect “Measuring Gas” or “Base Gas” has been selected.</p> <p>Interference gas is included in the sample gas.</p> <p>A sudden pressure change occurs at GAS IN, GAS OUT, or REF. OUT.</p> <p>The pressure at GAS IN, GAS OUT or REF. OUT is not at atmospheric pressure.</p>	<p>When the instrument samples enough fresh air, stop the pump. Then press the AIR CAL key.</p> <p>Select the correct “Measuring Gas” and “Base Gas.”</p> <p>The target gas that contains interference gas cannot be measured.</p> <p>Perform AIR CAL again.</p> <p>Set GAS IN, GAS OUT, and REF. OUT under the atmospheric pressure.</p>
After performing AIR CAL, the reading goes up even though no gas has been fed.	Molecular attached to the chamber or tubing inside begins to detach. The concentration in the chamber becomes high.	Let the instrument sample some fresh air and confirm if it shows the AIR CAL value.

7. CAUTION OF USAGE

The following caution items must be followed to maintain the performance and safety of the instrument.



Danger

- > Specification of this instrument is based on a non-explosive structure. Do not use it in a place specified as a hazardous area.
- > Make any solutions for exhaust gas emitted from GAS OUT to avoid harmful gas from emission (e.g. connecting a sampling bag to GAS OUT.)
- > In case of instrument leakage, a mask should be worn at all times.



Warning

- > The instrument shows incorrect indication when it samples a high concentration gas over the full scale.
- > Use the batteries based on the specifications.
- > Use the specified AC adaptor if necessary.



Caution

- > Do not use this instrument close to other apparatus that generates a strong noise. It may affect the wave form of the power source. If the AC adaptor is applied, do not use the same power source as the other apparatus.
- > Use the power source based on the specifications.
- > Do not operate the instrument in a place which has a reaction heat such as infrared emitted from high temperatures. Also, be sure to avoid a place which has a direct sunbeam that makes the instrument over 35°C.
- > Interference Gas: The gases which are neither the target gas nor base gas.
If there is any interference gas in the measuring gas, the reading will be incorrect. Do not measure gas containing interference gas.
- > Expose GAS OUT and REF. OUT to the air in order to match the pressure inside to the atmospheric pressure.
- > When operating this instrument, keep it in a carrying case and connect the absorption tube.

8. Definition of Terms

vol%: The rate of substance occupying in some volume. The unit is indicated by percentage.

ppm: The rate of substance occupying a given volume. The unit is indicated by ppm, or “parts per million.”

%LEL: This is the unit when defining the Lower Explosive Limit of a combustible gas as 100%.

mg/l: This is the unit of the target gas mass that is contained in one liter. The standard is under the condition of 20°C, 101.3 kPa.

MJ/m³ Gross: This is the unit of calorie, and it is indicated by gross calorific value 0°C. Gross calorific value 0°C is a common calorie unit among city gas companies. It is equal to the calorie in case of complete combustion of a gas 1m³ under the standard condition (0°C, 1 pressure.) Gas combustion generates steam. Gross calorific value includes the calorie of the steam (latent heat.)

MJ/m³ Net: This is the unit of calorie, and it is indicated by net calorific value 0°C. net calorific value 0°C is equal to the calorie in case of complete combustion of a gas 1m³ under the standard condition (0°C, 1 pressure.) Gas combustion generates steam. Net calorific value excluded the calorie of the steam (latent heat.)

*Gross calorific value = Net calorific value + Latent heat

Measuring Gas: The target gas to measure in the sample gas.

Base Gas: The balance gas in the sample gas.

Reference Gas: The gas (fresh air) to take the standard reflection ratio.

Gas Chamber: chamber that is filled by sample gas.

Reference Gas Chamber: Chamber that is filled by reference gas.

AIR CAL VALUE: Concentration indicated on the display when AIR CAL key is pressed.

9. SPECIFICATIONS

9-1. Specifications

Model	Model RK60000
Detection Principle	Optical Interferometric Method
Display	Digital Display (Measuring Gas, Base Gas, Concentration, Time, etc.)
Structure	Non-Explosion Proof
Measuring Method	Batch Measurement
Gas-Sampling Method	Suction by Internal Pump (pump stops operation while reading)
Outputs	Data Logger, 0~1VDC Analog Output (output cable: optional)
Data-Logging Function	Concentration Reading, Year/ Month/ Day/ Time (24 hours), Maximum Recording Number: up to 100
Operating Temp. & Humidity	5~35°C, Below 80% RH
Operating Pressure	Atmospheric Pressure (cannot be used under positive/negative pressure.)
Power Source	C-size Alkaline battery (4 ea.), or AC Adaptor (optional)
Battery Life	Approx. 30 hours (when the pump works 50% of the total operating time).
Dimensions	200 (W) x 80 (H) x 145 (D) (mm)
Weight	Approx. 2 kg

- For information of the kinds of measurable gas and range, refer to measuring gas specification.
- For standard type model, refer to the attached "each TYPE measuring gas specification."
- For a special version such as TYPE 99, refer to the measuring gas specification that is attached.

9-2. Standard Accessories

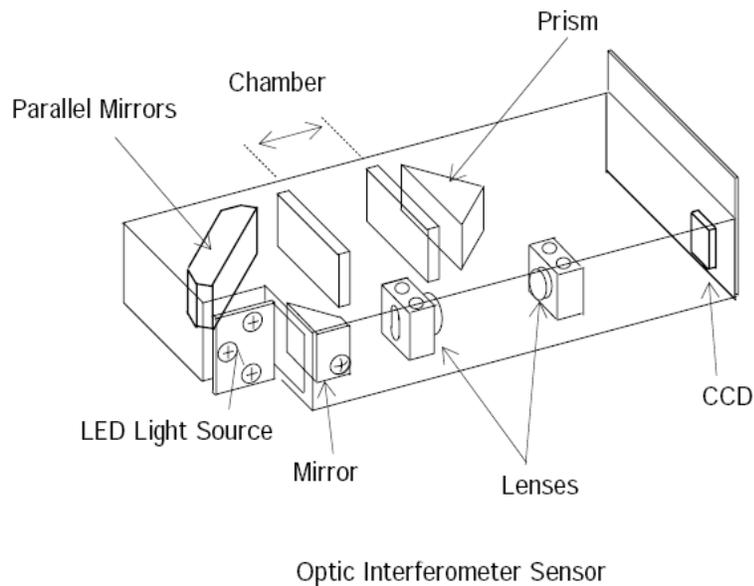
- 1) Carry Case.....1 each
- 2) Absorption Tube.....1 each
- 3) Sampling Probe.....1 each
- 4) C-size Alkaline Batter.....4 each
- 5) Instructional Manual.....1 each

10. MEASURING PRINCIPLE

The Reflection ratio of gas mixture is determined by the kinds of composing gases as well as the mixture ratio. As long as the kinds of composing gases are known, the mixture ratio (concentration) can be determined by measuring the reflection ratio.

The optic interferometer applied in the RK60000 displays “Interference Stripes” on the CCD. The Interference Stripes move proportional to the reflection ratio. The amount of the movement is measured by the solution of the interference stripes on CCD with Fourier analysis, and the result is converted to the reflection ratio.

Concentration can be displayed by adding data like “measuring gas” and “base gas” to the reflection ratio determined by high accuracy. Sensitivity of the optic interferometer depends on the length of the chamber. Since the length of the chamber is physically unchanged by elapsing time, the high accuracy is maintained for awhile.



11. WARRANTY

COSA INSTRUMENT CO. warrants gas alarm equipment manufactured and sold by us to be free from defects in materials and workmanship for a period of one year from the shipment date from COSA INSTRUMENT CO. Any parts found defective within that period will be repaired or replaced at our option, free of charge, FOB factory. This warranty does not apply to those items which by their nature are subject to deterioration or consumption, and which must be cleaned, repaired, or replaced on a routine basis. Such items may include:

- a) Lamp Bulbs and Fuses
- b) Pump Diaphragms
- c) Absorbent Cartridges
- d) Filter Elements
- e) Batteries

Warranty is voided by abuse including rough handling, mechanical damage, operation, alteration, or repair procedures not in accordance with the instruction manual. This warranty indicates the full extent of our liability, and we are not responsible for removal or replacement costs, local repair costs, transportation cost, or contingent expenses incurred without our prior approval.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES AND REPRESENTATIONS, EXPRESSED OR IMPLIED, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF COSA INSTRUMENT CO., INCLUDING BUT NOT LIMITED TO THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL COSA INSTRUMENT CO. BE LIABLE FOR INDIRECT, INCIDENTAL, OR CONSEQUENTIAL LOSS OR DAMAGE OF ANY KIND CONNECTED WITH THE USE OF ITS PRODUCTS OR FAILURE OF ITS PRODUCT TO FUNCTION OR OPERATE PROPERLY.

This warranty covers instruments and parts sold (to users) only by authorized distributors, dealers, and representatives as appointed by COSA INSTRUMENT CO.

We do not assume the indemnification for any accident or damage caused by the operation of gas monitor and our warranty is limited to the replacement of parts or our complete goods.

RK60000
EACH TYPE SPECIFICATIONS
(TYPE- 51 ~55)

TYPE-51 [FOR SOLVENT GASES (vol%)]

Selectable Measuring Gas and Range

	Measuring Gas (Display Indication)	Measuring Range (Minimum Digit)	AIR CAL Value	Drift Amount	Spec. No.
1	Toluene in AIR (C7H8 in AIR)	0~2 vol% (0.002)	0.000 vol%	0.017 vol%	SPE- 1428
2	Methyl ethyl ketone in AIR (MEK in AIR)	0~5 vol% (0.005)	0.000 vol%	0.027 vol%	SPE- 1429
3	Ethyl acetate in AIR (EtAc in AIR)	0~5 vol% (0.2)	0.000 vol%	0.023 vol%	SPE- 1430
4	Xylene in AIR (C8H10 in AIR)	0~1 % (0.002)	0.000 vol%	0.014 vol%	SPE- 1431
5	Isopropyl alcohol in AIR (IPA in AIR)	0~2 vol% (0.005)	0.000 vol%	0.033 vol%	SPE- 1432
6	Methyl isobutyl ketone in AIR (MIBK in AIR)	0~1 vol% (0.002)	0.000 vol%	0.016 vol%	SPE- 1433
7	Methanol in AIR (CH3OH in AIR)	0~6 %LEL (0.02)	0.000 vol%	0.11 vol%	SPE- 1446
8	-----	-----	-----	-----	-----

Interferometer Type: Type120MM

Indication Accuracy: $\pm (\text{Indication Value} - \text{AIR CAL Value}) \times 0.03 \pm \text{Drift Amount}$

AIR CAL Value: Concentration indicated on the display when AIR CAL key is pressed.

Drift Amount: The amount of indication drifting when temperature changes $\pm 10^\circ\text{C}$.

Special Caution:

- 1) This instrument is not explosion proof.
- 2) This instrument measures combustible gas around lower explosive limits in this specification. Take enough sample for the measurement.
- 3) Measuring gases in this specification are not extensively vaporized. The gas concentration may not reach a higher concentration in the measuring range depending on a condition of temperature and pressure.

TYPE-52 [FOR SOLVENT GASES (%LEL)]

Selectable Measuring Gas and Range

	Measuring Gas (Display Indication)	Measuring Range (Minimum Digit)	AIR CAL Value	Drift Amount	Spec. No.
1	Toluene in AIR (C7H8 in AIR)	0~100 %LEL (0.2)	0.0 %LEL	1.4 %LEL	SPE- 1434
2	Methyl ethyl ketone in AIR (MEK in AIR)	0~100 %LEL (0.2)	0.0 %LEL	1.5 %LEL	SPE- 1435
3	Ethyl acetate in AIR (EtAc in AIR)	0~100 %LEL (0.2)	0.0 %LEL	1.1 %LEL	SPE- 1436
4	Xylene in AIR (C8H10 in AIR)	0~100 %LEL (0.2)	0.0 %LEL	1.4 %LEL	SPE- 1437
5	Isopropyl alcohol in AIR (IPA in AIR)	0~100 %LEL (0.2)	0.0 %LEL	1.7 %LEL	SPE- 1438
6	Methyl isobutyl ketone in AIR (MIBK in AIR)	0~100 %LEL (0.2)	0.0 %LEL	1.3 %LEL	SPE- 1439
7	Methanol in AIR (CH3OH in AIR)	0~100 %LEL (0.2)	0.0 %LEL	2.0 %LEL	SPE- 1447
8	-----	-----	-----	-----	-----

Interferometer Type: Type 120MM

Indication Accuracy: $\pm (\text{Indication Value} - \text{AIR CAL Value}) \times 0.03 \pm \text{Drift Amount}$

AIR CAL Value: Concentration indicated on the display when AIR CAL key is pressed.

Drift Amount: The amount of indication drifting when temperature changes $\pm 10^\circ\text{C}$.

Special Caution:

- 4) This instrument is not explosion proof.
- 5) This instrument measures combustible gas around lower explosive limits in this specification. Take enough sample for the measurement.
- 6) Measuring gases in this specification are not extensively vaporized. The gas concentration may not reach a higher concentration in the measuring range depending on a condition of temperature and pressure.

TYPE-53 [FOR FUMIGATION GASES]

Selectable Measuring Gas and Range

	Measuring Gas (Display Indication)	Measuring Range (Minimum Digit)	AIR CAL Value	Drift Amount	Spec. No.
1	Methyl bromide in AIR (CH ₃ Br in AIR)	0~200 mg/l (0.2)	0.0 mg/l	1.7 mg/l	SPE- 1405
2	Phosphine in AIR (PH ₃ in AIR)	0~50 mg/l (0.1)	0.0 mg/l	0.8 mg/l	SPE- 1406
3	Methyl iodide in AIR (CH ₃ I in AIR)	0~200 mg/l (0.2)	0.0 mg/l	1.7 %mg/l	SPE- 1407
4	Methyl bromide in AIR (CH ₃ Br in AIR)	0~5 vol% (0.005)	0.000 vol%	0.044 vol%	SPE- 1408
5	Propylene oxide in AIR (PO in AIR)	0~10 vol% (0.005)	0.000 vol%	0.038 vol%	SPE- 1448
6	Sulfuryl fluoride in AIR (SO ₂ F ₂ in AIR)	0~200 mg/l (0.5)	0.0 mg/l	2.9 mg/l	SPE- 1828
7	-----	-----	-----	-----	-----
8	-----	-----	-----	-----	-----

Interferometer Type: Type120MM

Indication Accuracy: \pm (Indication Value - AIR CAL Value) x 0.03 \pm Drift Amount

AIR CAL Value: Concentration indicated on the display when AIR CAL key is pressed.

Drift Amount: The amount of indication drifting when temperature changes \pm 10°C.

Special Caution:

- 1) Define Methyl bromide 2.53 vol% as 100 mg/l.
- 2) Define Phosphine 7.07 vol% as 100 mg/l.
- 3) Define Methyl iodide 1.69 vol% as 100 mg/l.
- 4) This instrument measures combustible gas around lower explosive limits in this specification. Take enough sample for the measure.
- 5) Define Sulfuryl fluoride 2.35 vol% as 100 mg/l.

TYPE-54 [FOR GAS PURITY]

Selectable Measuring Gas and Range

	Measuring Gas (Display Indication)	Measuring Range (Minimum Digit)	AIR CAL Value	Drift Amount	Spec. No.
1	Helium in AIR (He in AIR)	0~100 vol% (0.05)	0.00 vol%	0.46 vol%	SPE- 1411
2	Neon in AIR (Ne in AIR)	0~100 vol% (0.1)	0.0 vol%	0.5 vol%	SPE- 1442
3	Hydrogen in AIR (H2 in AIR)	0~100 vol% (0.1)	0.0 vol%	0.8 vol%	SPE- 1412
4	Methane in AIR (CH4 in AIR)	0~100 vol% (0.1)	0.0 vol%	0.7 vol%	SPE- 1443
5	Carbon dioxide in AIR (CO2 in AIR)	0~100 vol% (0.1)	0.0 vol%	0.8 vol%	SPE- 1413
6	Ammonia in N2 (NH3 in N2)	0~100 vol% (0.2)	-6.6 vol%	1.4 vol%	SPE- 1418
7	Hydrogen in N2 (H2 in N2)	0~100 vol% (0.1)	3.5 vol%	0.7 vol%	SPE- 1420
8	Hydrogen in CO2 (H2 in CO2)	0~100 vol% (0.05)	50.20 vol%	0.38 vol%	SPE- 1444

Interferometer Type: Type 30MM

Indication Accuracy: \pm (Indication Value - AIR CAL Value) \times 0.03 \pm Drift Amount

AIR CAL Value: Concentration indicated on the display when AIR CAL key is pressed.

Drift Amount: The amount of indication drifting when temperature changes $\pm 10^\circ\text{C}$.

Special Caution:

- 1) This instrument is not explosion proof. This instrument measures combustible gas around lower explosive limits in this specification. Take enough sample for the measurement.
- 2) This instrument measures extremely toxic gases. It exhausts sample gas from GAS OUT, and sample gas may leak from internal piping. Take enough sample for the measurement.

TYPE-55 [FOR ANAESTHETIC GASES]

Selectable Measuring Gas and Range

	Measuring Gas (Display Indication)	Measuring Range (Minimum Digit)	AIR CAL Value	Drift Amount	Spec. No.
1	Halothane in O2 (HALOTHANE in O2)	0~6 vol% (0.01)	1.57 vol%	0.09 vol%	SPE- 1401
2	Isoflurane in O2 (ISOFLURANE in O2)	0~8 vol% (0.01)	1.65 vol%	0.09 vol%	SPE- 1402
3	Sevoflurane in O2 (SEVOFLURANE in O2)	0~10 vol% (0.01)	1.70 vol%	0.09 vol%	SPE- 1403
4	Desflurane in O2 (DESFLURANE in O2)	0~20 vol% (0.02)	2.10 vol%	0.12 vol%	SPE- 1404
5	Halothane in AIR (HALOTHANE in AIR)	0~6 vol% (0.01)	0.00 vol%	0.09 vol%	SPE- 1397
6	Isoflurane in AIR (ISOFLURANE in AIR)	0~8 vol% (0.01)	0.00 vol%	0.09 vol%	SPE- 1398
7	Sevoflurane in AIR (SEVOFLURANE in AIR)	0~10 vol% (0.01)	0.00 vol%	0.10 vol%	SPE- 1399
8	Desflurane in AIR (DESFLURANE in AIR)	0~20 vol% (0.02)	0.00 vol%	0.12 vol%	SPE- 1400

Interferometer Type: Type 30MM

Indication Accuracy: \pm (Indication Value - AIR CAL Value) x 0.03 \pm Drift Amount

AIR CAL Value: Concentration indicated on the display when AIR CAL key is pressed.

Drift Amount: The amount of indication drifting when temperature changes $\pm 10^{\circ}\text{C}$.

Special Caution:

- 1) Measuring gases in this specification are not extensively vaporized. The gas concentration may not reach a higher concentration in the measuring range depending on the conditions of temperature and pressure.

TYPE-56 [FOR CALORIE MEASUREMENT]

Selectable Measuring Gas and Range

	Measuring Gas (Display Indication)	Measuring Range (Minimum Digit)	AIR CAL Value	Drift Amount	Spec. No.
1	Propane in AIR (PROPANE in AIR)	0~100 MJ/m ³ Gross (0.1)	0.0 MJ/m ³	0.6 MJ/m ³	SPE- 1423
2	Propane in AIR (PROPANE in AIR)	0~100 MJ/m ³ Net (0.1)	0.0 MJ/m ³	0.6 MJ/m ³	SPE- 1424
3	Butane in AIR (BUTANE in AIR)	0~100 MJ/m ³ Gross (0.1)	0.0 MJ/m ³	0.6 MJ/m ³	SPE- 1425
4	Butane in AIR (BUTANE in AIR)	0~100MJ/m ³ Net (0.1)	0.0 MJ/M ³	0.6 MJ/m ³	SPE- 1426
5	Propane in AIR (PROPANE in AIR)	0~20000 Gross (20)	0	140	SPE- 1450
6	Propane in AIR (PROPANE in AIR)	0~20000 Net (20)	0	140	SPE- 1451
7	Butane in AIR (BUTANE in AIR)	0~20000 Gross (20)	0	140	SPE- 1452
8	Butane in AIR (BUTANE in AIR)	0~20000 Net (20)	0	140	SPE- 1453

Interferometer Type: Type 30MM

Indication Accuracy: \pm (Indication Value - AIR CAL Value) x 0.03 \pm Drift Amount

AIR CAL Value: Concentration indicated on the display when AIR CAL key is pressed.

Drift Amount: The amount of indication drifting when temperature changes $\pm 10^{\circ}\text{C}$.

Special Caution:

- 1) This instrument is not explosion proof. This instrument measures combustible gas around lower explosive limits in this specification. Take enough sample for the measurement.
- 2) The measuring range 0-20000 is equivalent to old unit (kcal). Please read it as a reference value.
- 3) Calorie amount for pure Propane, pure normal-Butane, and pure iso-Butane for this instrument is defined and indicated as following the table (Ref. JISK2301-1992-9.)

TYPE-58 [FOR SF6 MEASUREMENT]

Selectable Measuring Gas and Range

	Measuring Gas (Display Indication)	Measuring Range (Minimum Digit)	AIR CAL Value	Drift Amount	Spec. No.
1	Sulfur Hexafluoride (SF6)	0~100 vol% (0.1)	0.0 vol%	1.0 vol%	SPE- 1414
2					
3					
4					
5					
6					
7					
8					

Interferometer Type: Type 7.5MM

Indication Accuracy: $\pm (\text{Indication Value} - \text{AIR CAL Value}) \times 0.03 \pm \text{Drift Amount}$

AIR CAL Value: Concentration indicated on the display when AIR CAL key is pressed.

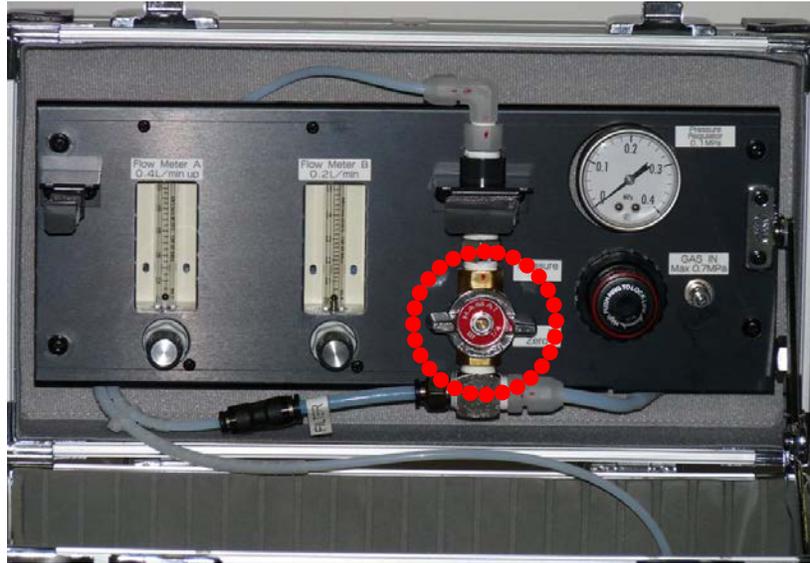
Drift Amount: The amount of indication drifting when temperature changes $\pm 10^\circ\text{C}$.

Special Caution: Nothing

Gas Purity Indicator for SF6 (RK60000-SF6) Simple Instructional Manual

SECTION 1. POWER ON

1-1. Make sure that the change over cock (measuring gas/air) is turned sideways.

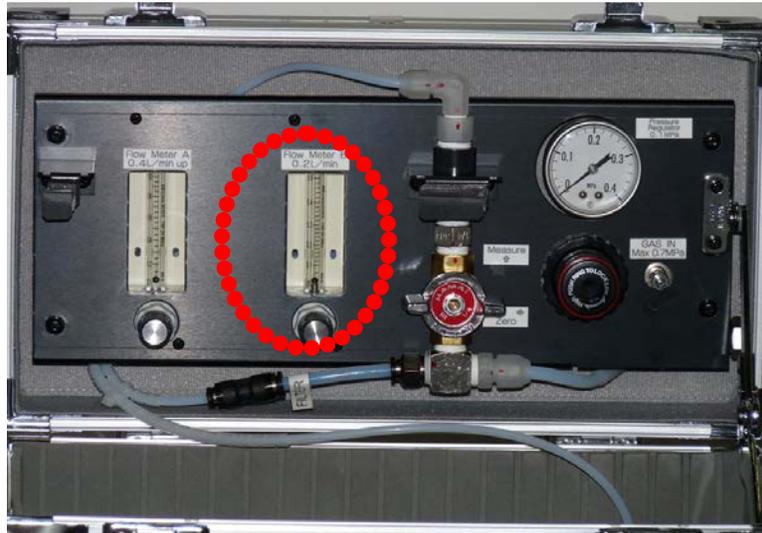


1-2. Press the power button on the Model RK60000 until beeping.



SECTION 2. ZERO ADJUSTMENT

2-1. Adjust the flow rate to be 0.2 ± 0.04 L/min at flow meter “B” (located right on the panel).



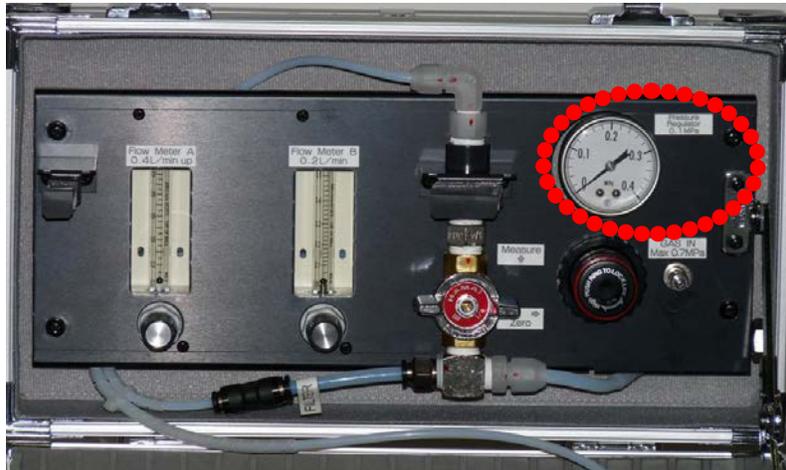
2-2. Verify that the indication value has been stable and press the AIR CAL button until it starts to beep.



SECTION 3. PREPARATIONS FOR GAS SAMPLING AND MEASURING

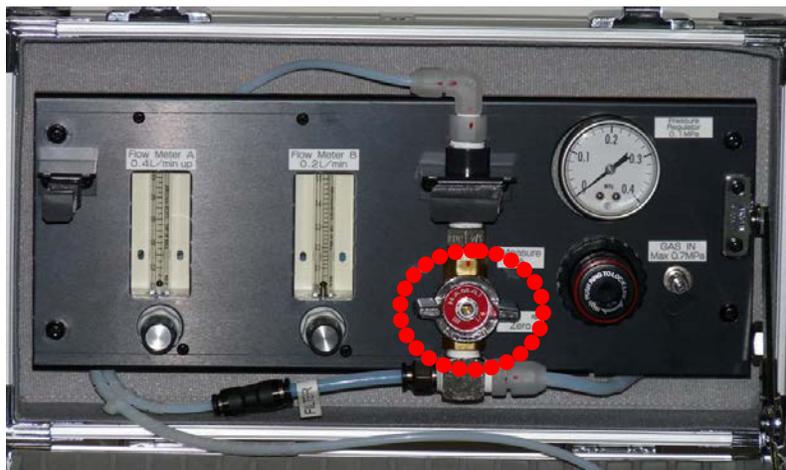
3-1. Connect the sampling tube to the gas inlet “GAS IN” on the panel and apply the sampling gas (SFG) from the sampling point. The sampling gas pressure should then be less than 0.7 MPa.

3-2. Make sure that the pressure regulator on the panel is set 0.1 ± 0.02 MPa. Regulator adjustment must be done at step 4.



SECTION 4. START MEASURING

4-1. Turn the change over cock (measuring gas/air) vertical. The unit will begin to measure. Adjust the flow rate so that it is more than 0.4 L/min at flow meter “A” (left side n the panel).



The higher that the flow rate of meter “A” is set, the sooner its indication will be stable. Also, since the instrument has air in the internal piping, regulator, or sampling tube, we recommend adjusting the flow monitor “A” so that it is more than 0.8 L/min every first turn when measuring.

SECTION 5. OTHER OPERATION

5-1. In case of checking zero or suspending measuring, turn the change over cock (measuring gas/air) sideways.

5-2. It is enough for further measuring to set flow meter “A” 0.5 L/min
*The unit can also accept the flow rate being set still 0.8 L/min.

Quit Measuring and Turn Off Instrument

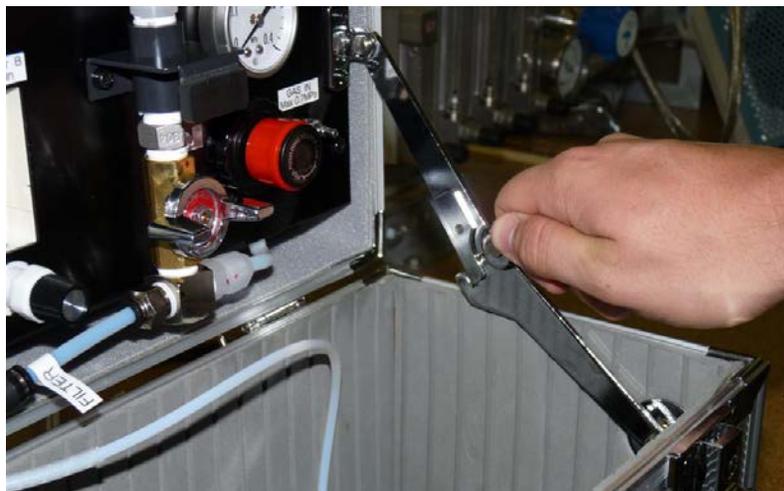
SECTION 1. APPLY FRESH AIR

1-1. It is necessary for the unit to apply fresh air before turning off. Turn the change over the cock (measuring gas/air) sideways to apply fresh air.

1-2. Press the power button until the LCD display goes out. The buzzer will beep three times while pressing the power button.

SECTION 2. CLOSE THE CARRYING CASE

Press the stopper. Then put on the retaining bar once the box is closed.



Operated by AC Adaptor

Connect the plug of the AC adaptor to the connector.

***1:** Exclusive use for the model RK60000, an optional accessory.

***2:** The connector is on the left side of the instrument.



Operated by Dry Cell

Install four alkaline batteries. Take out The model RK60000 from the carrying case. The battery holder is at the bottom of the unit. Unscrew the screw with a coin or screw driver and pull the battery cover from the bottom case.