

Portable Toxic Gas Monitor

SC-8000

User Maintenance Manual

Need of Maintenance and Servicing

This gas monitor must be maintained in a normal state at all times to prevent accidents due to gas leaks.

Daily and regular maintenance is required to keep the gas monitor in a normal state. Neglecting maintenance will result in failures and false alarms.

The specified maintenance procedures must be performed for the sake of maintenance of a normal state.

Also, maintenance by the manufacturer (comprehensive maintenance) should be performed in addition to the maintenance specified in this manual.

This manual complements the Operating Manual (main manual). Be sure to read and understand thoroughly both this manual and the Operating Manual including precautions to ensure proper use of this gas monitor.

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Maintenance Intervals and Items

- Daily maintenance: Perform maintenance before beginning to work.
- Monthly maintenance: Perform alarm test once a month.
- Regular maintenance: Perform maintenance once or more every six months to maintain the performance as a safety unit.

Maintenance item	Maintenance content	Daily maintenance	Monthly maintenance	Regular maintenance
Battery Level Check	Check that the battery level is sufficient.	○	○	○
Concentration Display Check	Make the gas monitor draw in fresh air and check that the concentration display value is zero. When the reading is incorrect, perform the zero adjustment after ensuring that no other gases exist around it.	○	○	○
Flow Rate Check	See the flow rate indicator to check for abnormalities.	○	○	○
Filter Check	Check the dust filter for dust or clogging.	○	○	○
Alarm Test	Check the alarm lamp and buzzer for normal operation using the alarm test function.		○	○
Span Adjustment	Perform the span adjustment by using the calibration gas.			○
Gas Alarm Check	Check the gas alarm by using the calibration gas.			○

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Maintenance Mode

Maintenance mode is an operation (adjustment) mode in which span adjustment and setup such as change of alarm setpoints can be performed.



WARNING

After the adjustment is completed, never fail to return to the measuring mode.
(If the gas monitor remains in the maintenance mode, it does not automatically return to the measuring mode.)

To enter the maintenance mode, press the POWER switch with the ▲ and ▼ switches pressed at power-on and release them when the buzzer sounds. The maintenance mode is password-protected. The input of a password is needed in the beginning.

The maintenance mode provides the following menu.

Mode	Item	LCD display	Details
Maintenance Mode	Date/time setting	DATE	Set the date and time.
	Zero adjustment	AIR CAL	Perform the zero adjustment. *
	Automatic span adjustment	AUTO CAL	Perform the span adjustment automatically to a set concentration value.
	Manual span adjustment	ONE CAL	Perform the span adjustment manually.
	Bump test	BUMP	Perform the bump test.
	Alarm setting	ALARM-P	Change the alarm setpoint value.
	Bump test settings	BUMP-SET	Set the bump test.
	Beep setting	BEEP SET	Set the running check operation.
	K No. display	K No.	----- **
	Exit maintenance mode	START	Enter the measuring mode.

* This mark indicates the item that can be operated (adjusted) in the measuring mode. The operation can be performed in either mode.

** This is not required for normal maintenance.

NOTE

If any mode that is not described in this manual or the Operating Manual (main manual) (any mode other than the maintenance mode) is entered by mistake, turn off the power once and then try again.

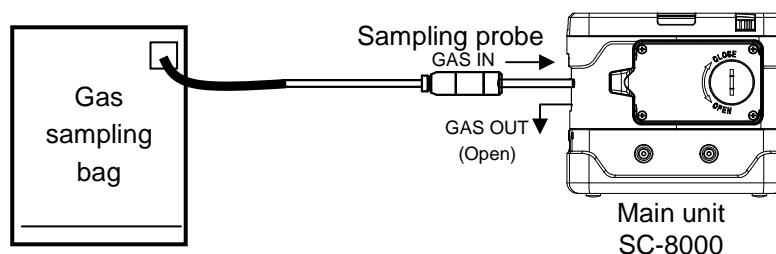
<Bump Test "BUMP">

Required equipment/material

- Bump test gas (collected in a gas sampling bag)

Connection

Connect the equipment as shown below to perform the bump test.



WARNING

About the bump test gas

The bump test gas is a hazardous gas (toxic, oxygen deficient, etc.) therefore handle the gas and related jigs and tools with due care. (Inhaling the gas must be avoided, the gas sampling bag must be free of holes, etc.)

About the place for span adjustment

- Perform span adjustment where no silicon, organic solvent, spray can gases, etc. is used.
- Perform span adjustment indoors at normal temperatures without remarkable fluctuation (within $\pm 5^{\circ}\text{C}$).
- Perform span adjustment in an exhaust booth.



CAUTION

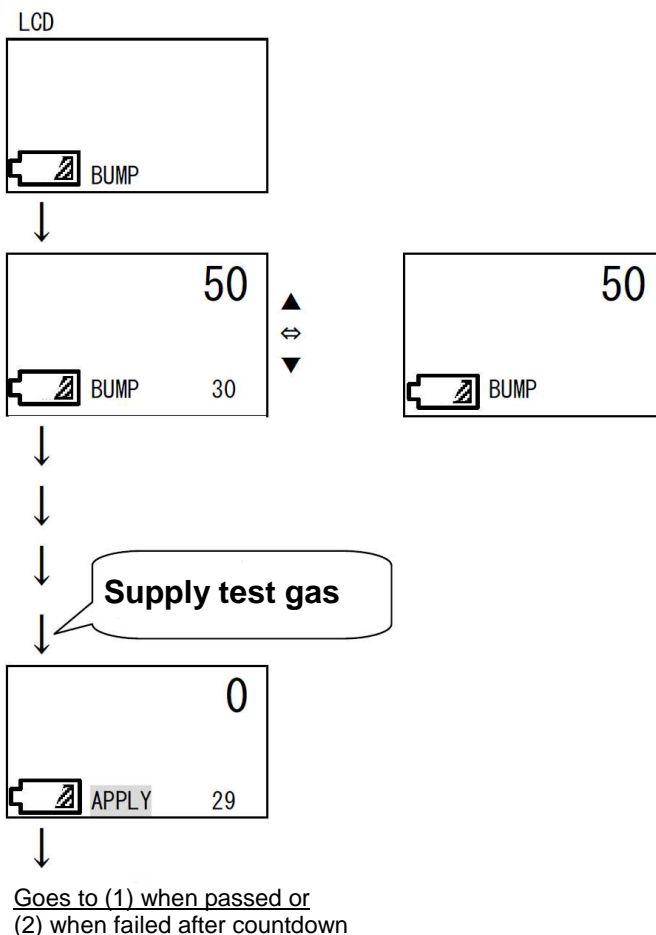
The GAS OUT side of the pipe must be left open without any pipe connected. A supplied gas must be discharged to a safe place.

BUMP

Press the ENTER switch.

The bump test gas concentration is displayed.
The concentration of the prepared test gas must be consistent with the displayed test gas concentration.
To change the test gas concentration value, change the value in span adjustment menu. The test gas concentration is set to the same value as the span gas concentration. Automatic span adjustment => P15

Supply the test gas and press ENTER.
BUMP and APPLY are displayed alternately, and the countdown is started.

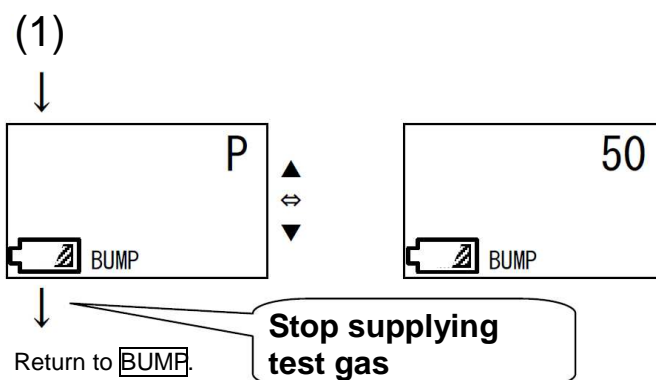


<When passing the test>

The result is displayed after the countdown finishes.
Stop supplying the test gas. The results and values are displayed alternately every time the ▲ or ▼ switch is pressed.

P: Pass, F: Fail

After checking the result, press ENTER. The gas monitor returns to the maintenance mode menu.



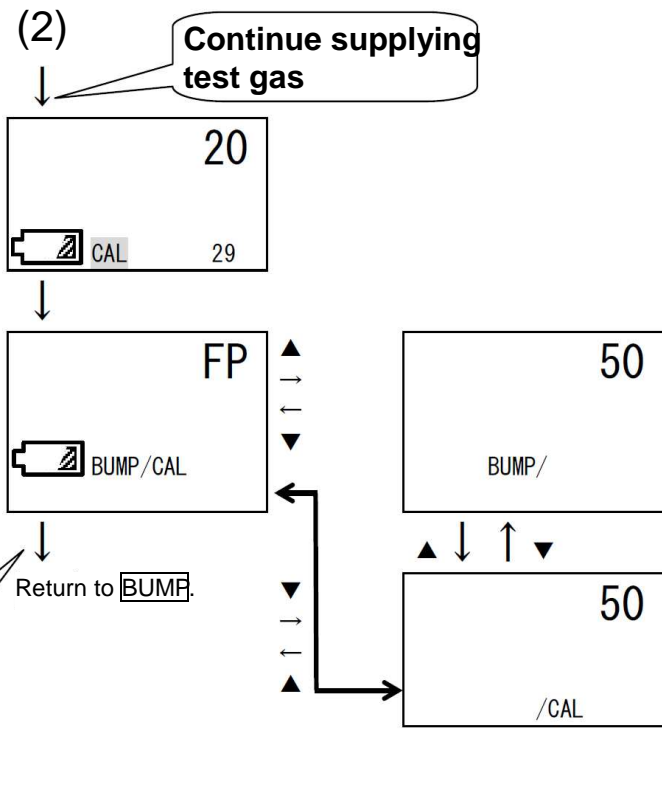
<When failing the test>

Continue supplying the gas. The result is not displayed, and the span adjustment is automatically started. CAL and APPLY are displayed alternately, and the countdown is started.

The span adjustment is started after the countdown finishes, and the result is displayed. Left: Test result, Right: Adjustment result (P: Pass, F: Fail)
The results (P or F) <-> bump test result values <-> span adjustment result values are displayed alternately every time the ▲ or ▼ switch is pressed. Stop supplying the gas.

After checking the result, press ENTER.
The gas monitor returns to the calibration mode menu.

Stop supplying test gas



NOTE

If "F" (Fail) is displayed after the span adjustment, replace the sensor with a new one.

<<Maintenance Mode>>

The maintenance mode includes setting menus which are usually not used. Be careful not to change these settings by mistake. It is recommended that the set values be recorded before changing them.

Keep the ▲ and ▼ switches pressed and press the POWER switch. When the buzzer beeps, release the switches.

The input field blinks. Press the ▲ or ▼ switch to select a number and press ENTER to confirm it. Enter four digits from the left.

Password: 0008

Maintenance Mode

DATE

Set the date and time.

AIR CAL

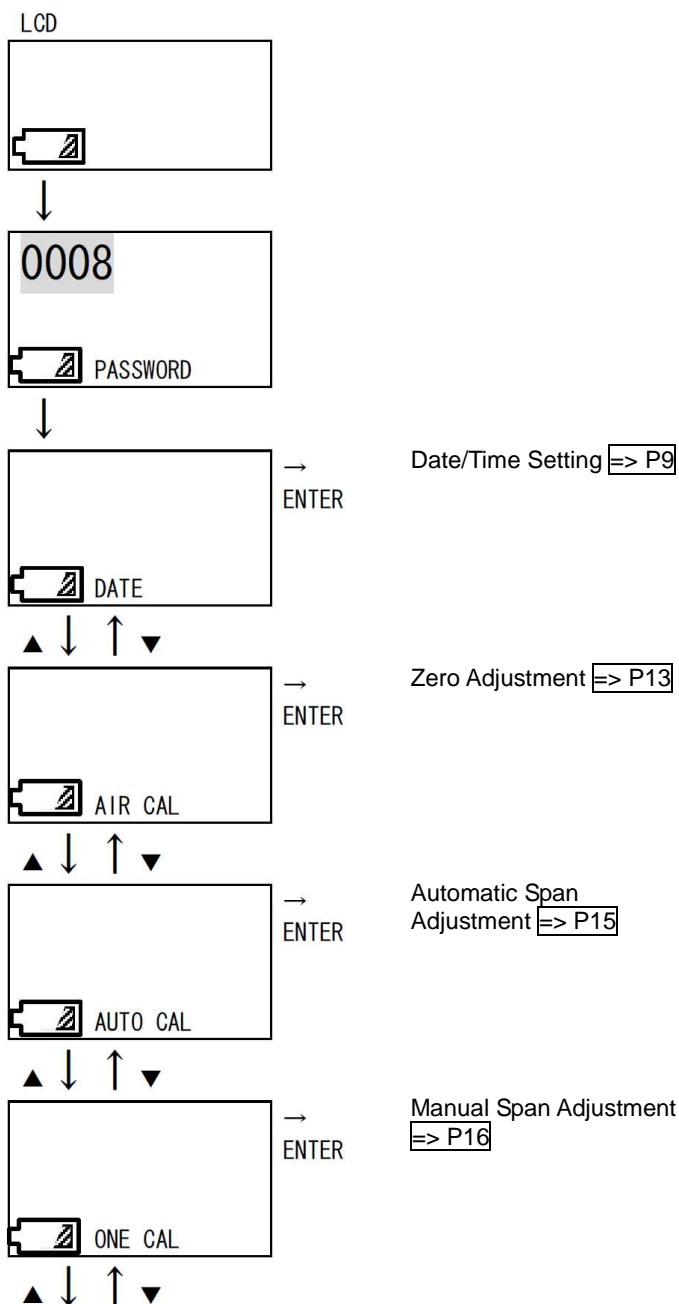
Perform the zero adjustment.

AUTO CAL

Perform the span adjustment automatically.
(Set the span gas concentration in advance and make adjustment.)

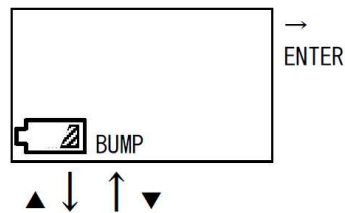
ONE CAL

Perform the span adjustment manually.
(While gas is supplied, perform the span adjustment using UP/DOWN.)



BUMP

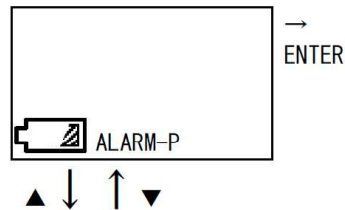
Perform the bump test.



Bump Test => P4

ALARM-P

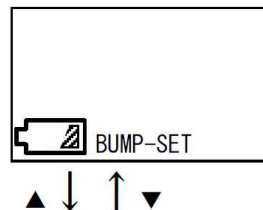
Set the alarm setpoint.



Alarm Setpoint Setting
=> P10

BUMP-SET

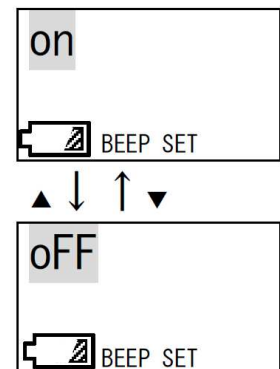
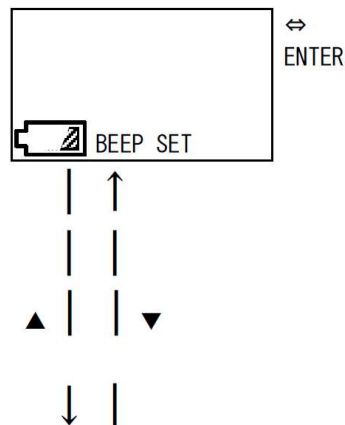
Check or set the bump test conditions.



Bump Test Setting
=> P11

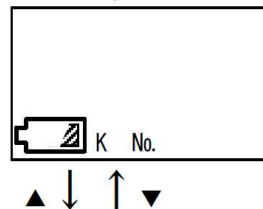
BEEP SET

Set whether or not to perform the confirmation beep operation.
Press the ▲ or ▼ switch to select ON or OFF and press the ENTER switch to confirm it.



K No.

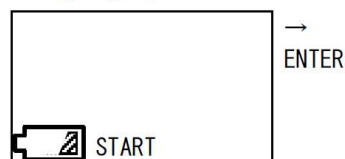
Display K No. of the sensor.



*** No change is required for normal maintenance.**

START

Exit the maintenance mode.



Press ENTER to enter the measuring mode.

<Date/Time Setting "DATE">

Set the date/time.

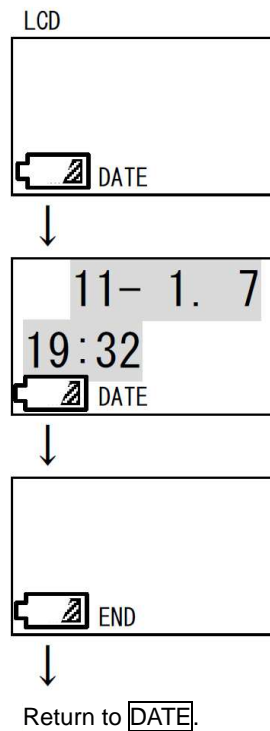
DATE

Press the ENTER switch.

The input field blinks. Enter the year, month, day, hour, and minute in this order. Press the ▲ or ▼ switch to adjust the date and time and press the ENTER switch to enter it.

(The figure on the right shows an example of input for 2011/01/07 19:32.)

Once the last part (minute) is entered, the date/time setting is confirmed. After END is displayed, the gas monitor automatically returns to the maintenance mode menu.



<Alarm Setpoint Setting "ALARM-P">

Set the alarm setpoint.

ALARM-P

Press the ENTER switch.

The alarm setpoint setting selection menu is displayed.

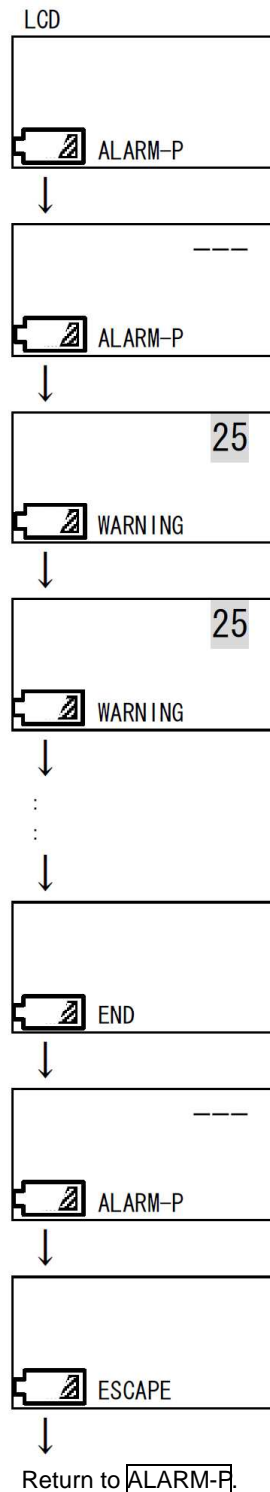
Press the ENTER switch. The alarm setpoint display blinks, prompting for input.

Press the ▲ or ▼ switch to change an alarm setpoint value. Next, press the ENTER switch to enter it.

Set WARNING and then ALARM.

Change the last item and press the ENTER switch. After the changed settings are confirmed and END is displayed, the gas monitor automatically returns to the alarm setpoint setting selection menu.

When the alarm setpoint setting is completed, press the ▲ or ▼ switch until ESCAPE is displayed. Press the ENTER switch to return to the maintenance mode menu.



<Bump Test Setting "BUMP-SET">

Check and set the setting items related to the bump test.

BUMP-SET

Press the ENTER switch.

Press the ▲ or ▼ switch to display a target setting item to be checked or set.

The test time is displayed.

Press the ENTER switch. The numeric display blinks, prompting for input. Press the ▲ or ▼ switch to enter introduction time. Press the ENTER switch to confirm it. The figure on the right shows an example of 30 seconds.

(Test time: 30, 45, 60, or 90 seconds)

The test pass tolerance range is displayed.

Press the ENTER switch. The numeric display blinks, prompting for input. Press the ▲ or ▼ switch to enter a range. Press the ENTER switch to confirm it. The figure on the right shows an example of range within $\pm 30\%$.

(Pass range: Within $\pm 10\%$, $\pm 20\%$, $\pm 30\%$, $\pm 40\%$, or $\pm 50\%$)

The adjustment time after test fail is displayed.

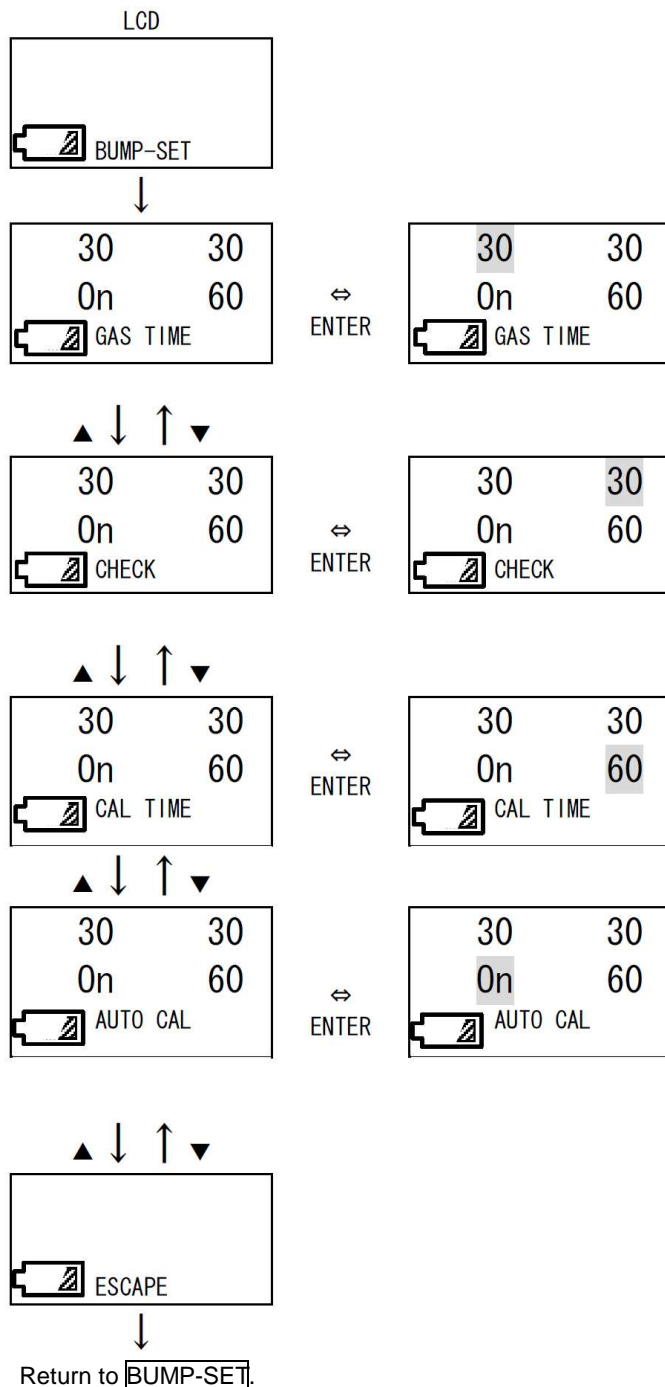
Press the ENTER switch. The numeric display blinks, prompting for input. Press the ▲ or ▼ switch to enter adjustment time. Press the ENTER switch to confirm it. The figure on the right shows an example of 60 seconds.

Whether or not to enable automatic adjustment after test fail is displayed.

Press the ENTER switch. The ON (OFF) display blinks, prompting for input. Press the ▲ or ▼ switch to select ON or OFF. Next, press the ENTER switch to confirm it. ON: Automatic adjustment enabled OFF: Automatic adjustment disabled.

The figure on the right shows an example of ON setting.

When the setting is completed, press the ▲ or ▼ switch until ESCAPE is displayed. Press the ENTER switch to return to the maintenance mode menu.



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Span Adjustment

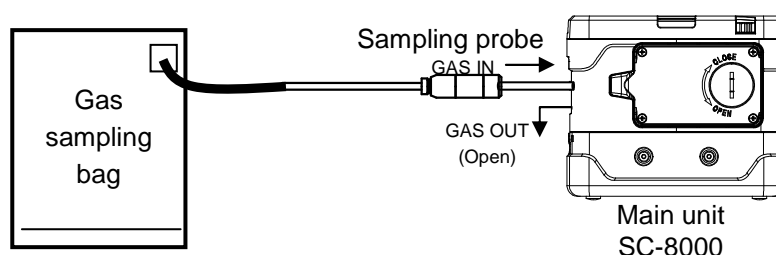
3-1. Preparation for span adjustment

Required equipment/material

- Span gas (collected in a gas sampling bag)
- Stopwatch

Connection

Connect the equipment as shown below to perform the span adjustment.



WARNING

About the span gas

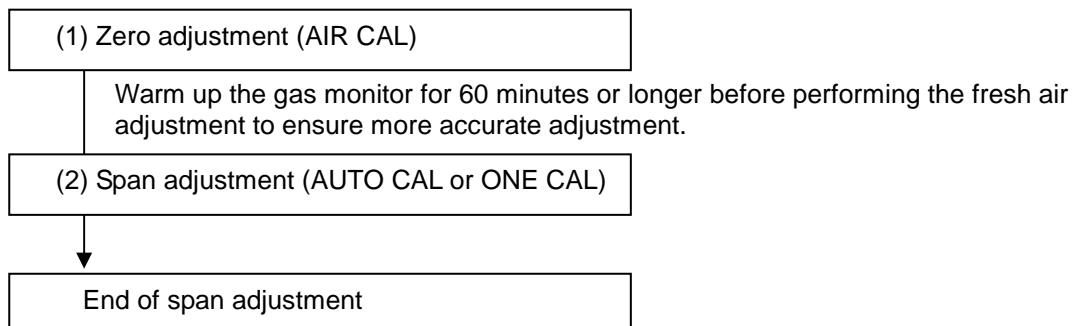
The span gas is a hazardous gas (toxic, oxygen deficient, etc.) therefore handle the gas and related jigs and tools with due care. (Inhaling the gas must be avoided, the gas sampling bag must be free of holes, etc.)

About the place for span adjustment

- Perform span adjustment where no silicon, organic solvent, spray can gases, etc. is used.
- Perform span adjustment indoors at normal temperatures without remarkable fluctuation (within $\pm 5^{\circ}\text{C}$).
- For span adjustment, the GAS OUT side of the pipe must be left open without any pipe connected. Make sure to supply a gas in an exhaust booth and discharge the gas to a safe place.

<Adjustment Procedure>

Perform adjustment using the procedure shown below.



WARNING

When the zero adjustment is performed in the atmosphere, check the atmosphere for freshness before beginning the adjustment. If other gases exist, the adjustment cannot be performed properly, thus leading to dangers when the gas leaks.

NOTE

Before starting the span adjustment, let the gas monitor draw the gas and wait until the readings are stabilized.

3-2. Zero Adjustment



WARNING

When the zero adjustment is performed in the atmosphere, check the atmosphere for freshness before beginning the adjustment. If other gases exist, the adjustment cannot be performed properly, thus leading to dangers when the gas leaks.

NOTE

If the existence of other gases is suspected in the atmosphere before performing the zero adjustment, collect fresh air in a gas sampling bag separately and perform the adjustment supplying fresh air in the same way as for the span adjustment.

AIR CAL

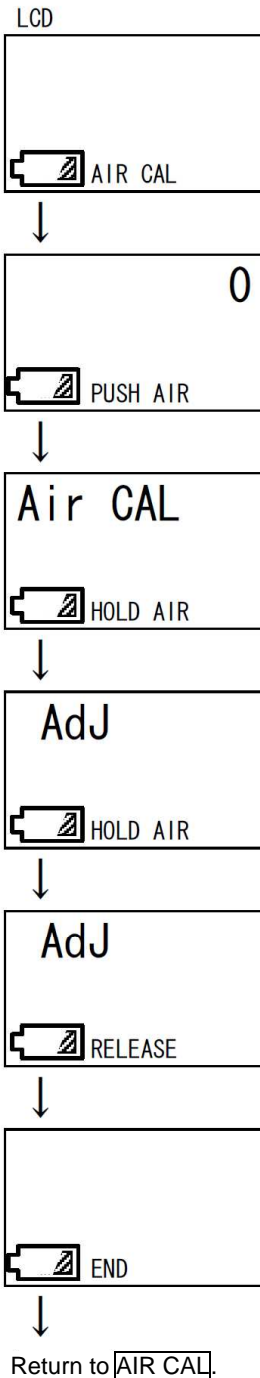
Press the ENTER switch.

The current concentration readings of the gases are displayed. Press the AIR switch when they are stabilized.

When the AIR switch is pressed, HOLD AIR is displayed. Keep pressing the switch until RELEASE is displayed.

Release the AIR switch.

After the fresh air adjustment is successfully completed and END is displayed, the gas monitor automatically returns to the menu.



3-3. Span Adjustment

<Automatic Span Adjustment (AUTO CAL)>

AUTO CAL

Press the ENTER switch.

The test gas concentration is displayed. It needs to be consistent with the concentration of the prepared test gas. To change the value, press the ▼ and DISPLAY switches simultaneously. The span adjustment concentration setting menu is displayed.

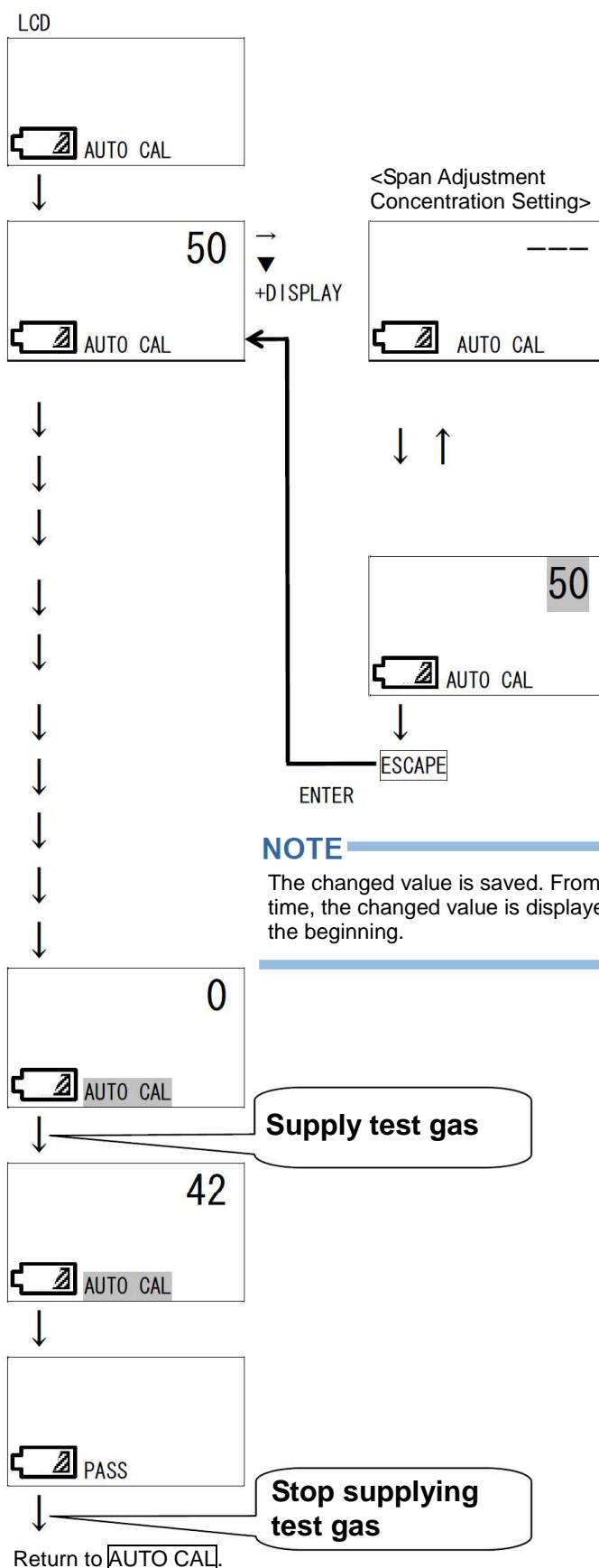
Press the ENTER switch. The span adjustment concentration display blinks, prompting for input. Press the ▲ or ▼ switch to change the span adjustment concentration setting.

After the ENTER switch is pressed to confirm the changed setting and END is displayed, the gas monitor automatically returns to the span adjustment concentration setting menu. When the span adjustment concentration setting is completed, press the ▲ or ▼ switch until ESCAPE is displayed. Press ENTER to return to the original screen.

While the span adjustment concentration is displayed, press the MODE switch to cause AUTO CAL display to blink and display the current concentration readings (prompting for supply). Prepare and supply the test gas.

When the readings are stabilized 120 seconds after supplying the test gas, press the ENTER switch to perform adjustment.

After the adjustment is successfully completed and PASS is displayed, the gas monitor automatically returns to the menu. Stop supplying the gas.



NOTE

The changed value is saved. From next time, the changed value is displayed in the beginning.

<Manual Span Adjustment (ONE CAL)>

ONE CAL

Press the ENTER switch.

The span adjustment selection menu is displayed.

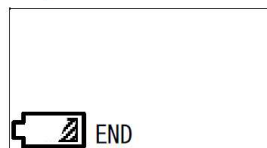
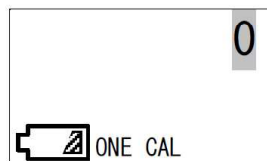
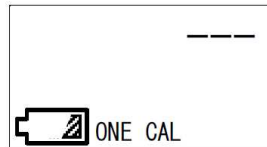
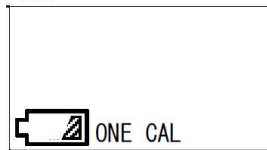
Press the ENTER switch to cause the concentration display to blink and display the current concentration readings (prompting for supply). Prepare and supply the test gas.

When the readings are stabilized 120 seconds after supplying the test gas, press the ▲ or ▼ switch to adjust to the gas concentration.

Press the ENTER switch to adjust it. After END is displayed, the gas monitor automatically returns to the manual span adjustment menu. Stop supplying the test gas.

When the span adjustment is completed, press the ▲ or ▼ switch until ESCAPE is displayed. Press the ENTER switch to return to the menu.

LCD



Return to **ONE CAL**.

Supply test gas

Stop supplying test gas

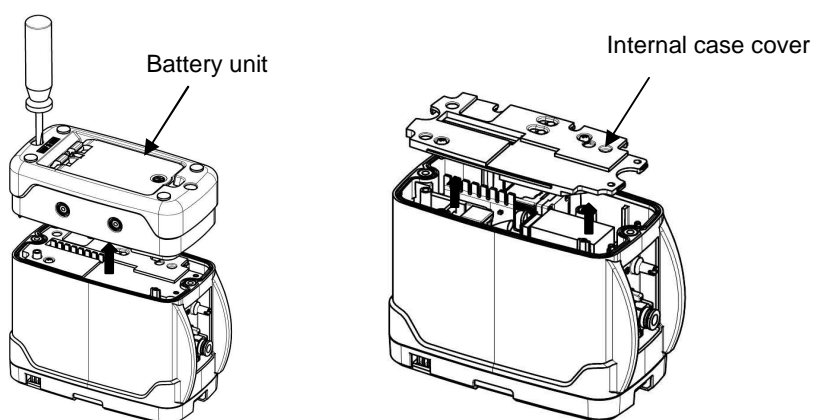
4

Replacement of Consumable Parts

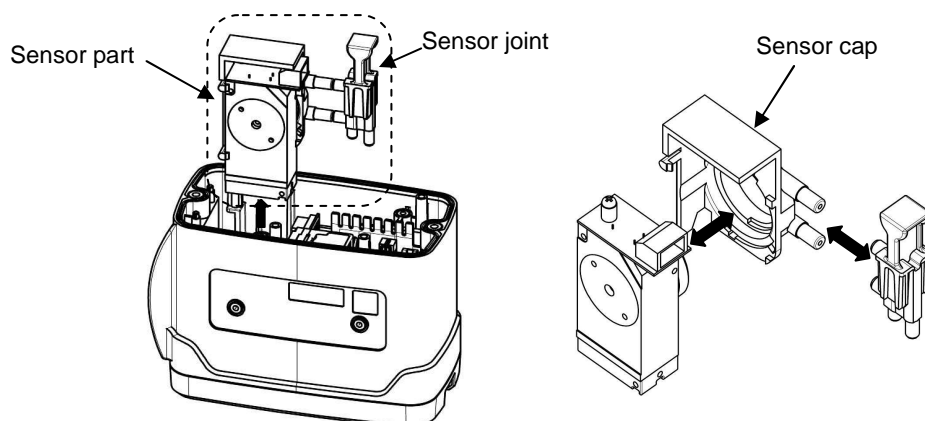
<Sensor Replacement Procedure>

Note: Do not turn the main unit upside down for a long time. (At most one minute as a guide)
After a sensor is replaced, energize the sensor for at least two hours before performing calibration.
Check that a replacement has the same type of gas, the same model and measurement range as the sensor currently used.
Attaching an inappropriate sensor causes malfunction.

- (1) Loosen the two screws at the bottom of the lower case and remove the battery unit.
- (2) Loosen the two screws of the internal case cover and remove the cover.



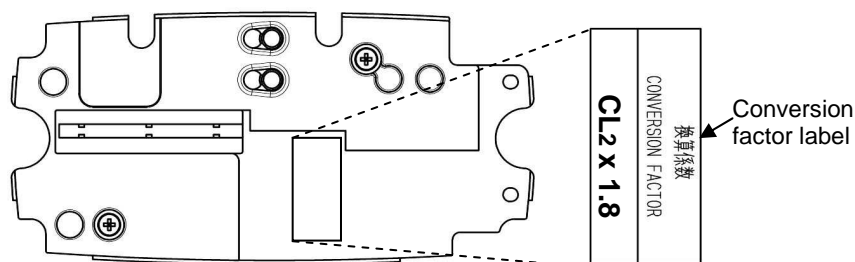
- (3) Remove the sensor connector and then pull out the sensor part by holding the knob of the sensor joint.
- (4) Remove the sensor and sensor joint from the sensor cap.



- (5) Attach the sensor joint and a new sensor to the sensor cap in reverse order of sensor removal. Insert the connector of the sensor cable to a new sensor and attach the sensor to the main unit. At this time, be careful not to let the sensor cable be caught by the amplifier board. For the sensor with a conversion factor label attached, tear off the product side of the label beforehand.



- (6) Put the internal case cover and battery unit back in place. For the sensor with a conversion factor label attached, peel off the conversion factor label (product side) removed from the new sensor from release paper and then attach the label in place of the one on the internal case cover.



- (7) Turn the power ON. When "SENSOR CHANGE" is displayed, press the POWER ENTER switch to see if the measuring mode is entered. (If the display does not appear, reattach the sensor.)
- (8) Turn the power OFF and then start up in the maintenance mode again. Perform a zero adjustment and then a span calibration.

<Replacement Procedure for Other Consumable Parts>

For the stable operation of the gas monitor and safety, a qualified service engineer is required to take care of the replacement of the parts that requires high expertise. Please contact RIKEN KEIKI.