Ambient O_3 monitor
APOA-370

Maintenance Manual

CODE:GZ0000051256H

Preface

This manual describes the operation of the Ambient O_3 monitor, APOA-370.

Be sure to read this manual before using the product to ensure proper and safe operation of the product. Also safely store the manual so it is readily available whenever necessary.

Product specifications and appearance, as well as the contents of this manual are subject to change without notice.

Warranty and responsibility

HORIBA, Ltd. warrants that the Product shall be free from defects in material and workmanship and agrees to repair or replace free of charge, at option of HORIBA, Ltd., any malfunctioned or damaged Product attributable to responsibility of HORIBA, Ltd. for a period of one (1) year from the delivery unless otherwise agreed with a written agreement. In any one of the following cases, none of the warranties set forth herein shall be extended;

- Any malfunction or damage attributable to improper operation
- Any malfunction attributable to repair or modification by any person not authorized by HORIBA, Ltd.
- Any malfunction or damage attributable to the use in an environment not specified in this manual
- Any malfunction or damage attributable to violation of the instructions in this manual or operations in the manner not specified in this manual
- Any malfunction or damage attributable to any cause or causes beyond the reasonable control of HORIBA, Ltd. such as natural disasters
- Any deterioration in appearance attributable to corrosion, rust, and so on
- Replacement of consumables

HORIBA, LTD. SHALL NOT BE LIABLE FOR ANY DAMAGES RESULTING FROM ANY MALFUNCTIONS OF THE PRODUCT, ANY ERASURE OF DATA, OR ANY OTHER USES OF THE PRODUCT.

Trademarks

Company names and brand names are either registered trademarks or trademarks of the respective companies. (R), (TM) symbols may be omitted in this manual.

Regulations

EU regulations

Conformable standards

This equipment conforms to the following standards:

CE

EMC: EN61326-1
Class B, Industrial electromagnetic environment
Safety: EN61010-1
RoHS: EN50581
9. Industrial monitoring and control instruments

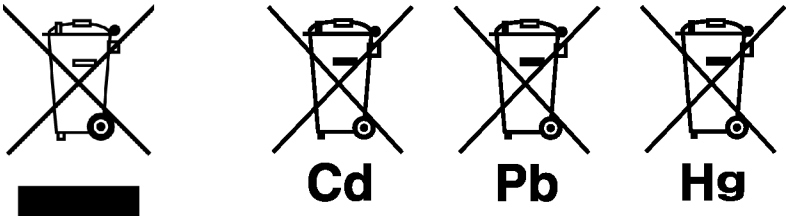
Installation environment

This product is designed for the following environment.

- Overvoltage category II
- Pollution degree 2

Information on disposal of electrical and electronic equipment and disposal of batteries and accumulators

The crossed out wheeled bin symbol with underbar shown on the product or accompanying documents indicates the product requires appropriate treatment, collection and recycle for waste electrical and electronic equipment (WEEE) under the Directive 2012/19/EU, and/or waste batteries and accumulators under the Directive 2006/66/EC in the European Union.
The symbol might be put with one of the chemical symbols below. In this case, it satisfies the requirements of the Directive 2006/66/EC for the object chemical.
This product should not be disposed of as unsorted household waste.
Your correct disposal of WEEE, waste batteries and accumulators will contribute to reducing wasteful consumption of natural resources, and protecting human health and the environment from potential negative effects caused by hazardous substance in products.
Contact your supplier for information on applicable disposal methods.



FCC rules

Any changes or modifications not expressly approved by the party responsible for compliance shall void the user's authority to operate the equipment.

■ Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Korea certification

■ B급 기기 (가정용 방송통신기자재)

이 기기는 가정용(B 급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

For Your Safety

Hazard classification and warning symbols

Warning messages are described in the following manner. Read the messages and follow the instructions carefully.

● **Hazard classification**

⚠DANGER	This indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This is to be limited to the most extreme situations.
⚠WARNING	This indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	This indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

● **Warning symbols**

Description of what should be done, or what should be followed

Description of what should never be done, or what is prohibited

Safety precautions

This section provides precautions for using the product safely and correctly and to prevent injury and damage. The terms of DANGER, WARNING, and CAUTION indicate the degree of imminency and hazardous situation. Read the precautions carefully as it contains important safety messages.

⚠ DANGER

High voltage

Care should be taken when handling the lamp.
The lighting circuit of the lamp is high-voltage. There is a danger of electric shock, or electrocution at worst.

⚠ WARNING

Fire

- For your safety, make sure to unplug the power plug from the electrical outlet when not in use.
- Clear dust on the power plug periodically (a few times a year).

If the power cable is left plugging into the electrical outlet for a long period of time, electrical tracking may occur due to dust and moisture, and it may result in an ignition or a fire.

Fire or electric shock

- Do not bundle the power cable during use.
- Do not damage the power cable nor apply an excessive load to it, such as bending and stretching it repeatedly, putting a heavy thing on it.
- If it can not be plugged into an electrical outlet firmly, stop use of the power cable.

It may result in overheating, a fire, an electrical shock, or breakdown.

DO NOT look directly at lighted lamp.
It may damage your eyes.

Product Handling Information

Operational precautions

Use of the product in a manner not specified by the manufacturer may impair the protection provided by the product. And it may also reduce product performance.
Exercise the following precautions:

- Make sure to use the provided power cable to power this product.
- This instruction manual describes how to replace APOA-370 consumable parts.
  The instrument inside is hot or high-voltage partly. Before opening the cover, make sure to plug off the main power cable and wait 1 hour or longer until the inside cools down.
  For the safety, the works described in this book should be operated only by the service engineers who have the knowledge and skills necessary for APOA-370 maintenance.

Contact for maintenance

Manufacturer: HORIBA, Ltd.
2 Miyanohigashi, Kisshoin Minami-ku, Kyoto 601-8510 Japan

Disposal of the product

The lamp in this product contains 3 mg of mercury.
When disposing of the product, follow the related laws and/or regulations of your country.

Manual Information

Description in this manual

Note

This interprets the necessary points for correct operation and notifies the important points for handling the product.

Reference

This indicates the part where to refer for information.

Tip

This indicates reference information.

Original language

This is the English translation of an original Japanese document.

Contents

1 List of Consumables and Replacement Parts

The following table shows the consumable and replacement parts of APOA-370.

Note

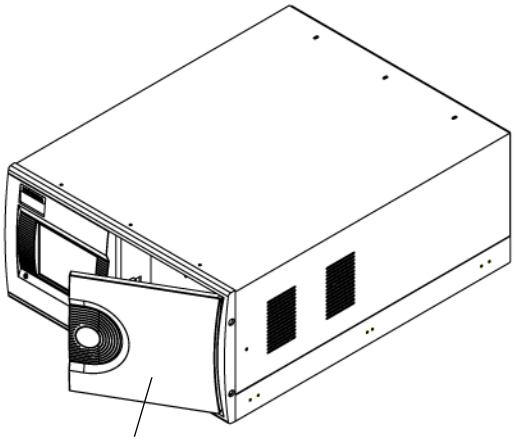
- **The replacement periods shown below are given as recommended and do not assure any performance. The replacement periods of consumables may become shorter depending upon the installation environment and operating conditions.**
- **In order to maintain the accuracy, it is recommended that periodical maintenance and checks be performed when consumables are replaced. For information on maintenance and checks, etc., contact us.**
- **Consumable or replacement parts no longer required should be disposed of as industrial waste.**
- **Perform zero and span calibration after parts replacement.**

No.	Name	Specification	Qty.	Part No.	Replacement period	Refer to...
1	Filter element	PA-10L 54 mm in diameter × (t) 0.5 mm 24 pieces per package	1	3200043947	2 weeks	page 5
2	O-ring	JISB2401 G50	1	3014059499	1 year	page 5
3	Diaphragm assembly	EPDM for GS and GD series	1	3200044033	1 year	page 7
4	Glass tube	For APOA-3X0	1	3014061445	1 year	page 9
5	UV lamp	For APOA-370	1	3014036635	1 year	page 10
6	Pump unit	GS-6EH-100	1	3014059159	2 years	page 12
		GS-6EH-230	1	3014059160	2 years	
7	Solenoid valve unit	WTB-3K-NIF-3	1	3014034340	2 years	page 13
8	LCD unit	For APXX	1	3014035613	3 years	---
9	Battery	CR2032	1	3200043671	3 years	page 14

* Contact us for LCD unit replacement.

2 Preparations

1. **Open the front panel door and turn OFF the power switch.**



When the front panel door is open

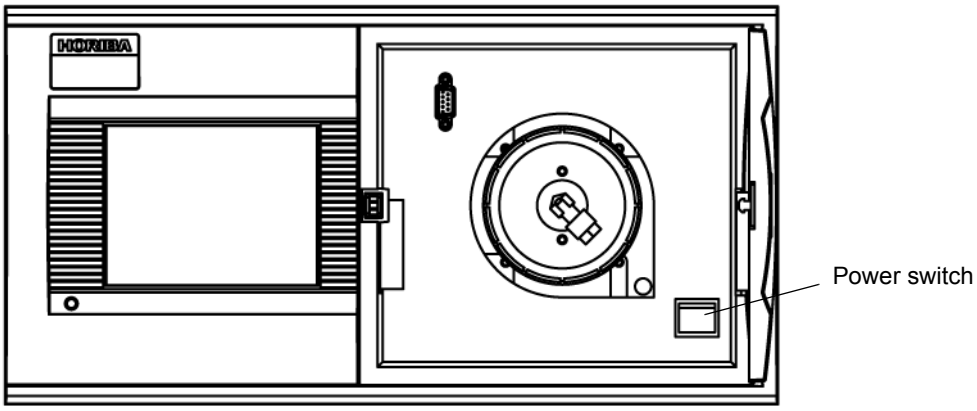


Fig. 1 Front panel

2. **Unplug the power cable from the rear panel.**

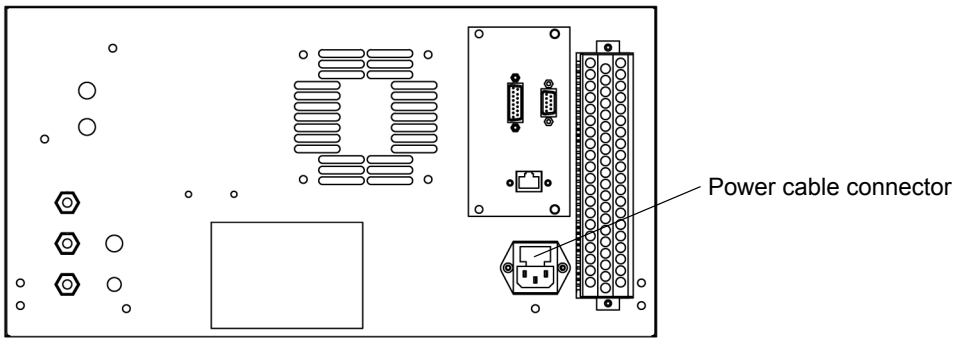


Fig. 2 Rear panel

3. **Wait 1 hour or longer until the instrument cools down.**

4. **Remove the 8 screws (M3) on the cover (shown below) and open the cover.**

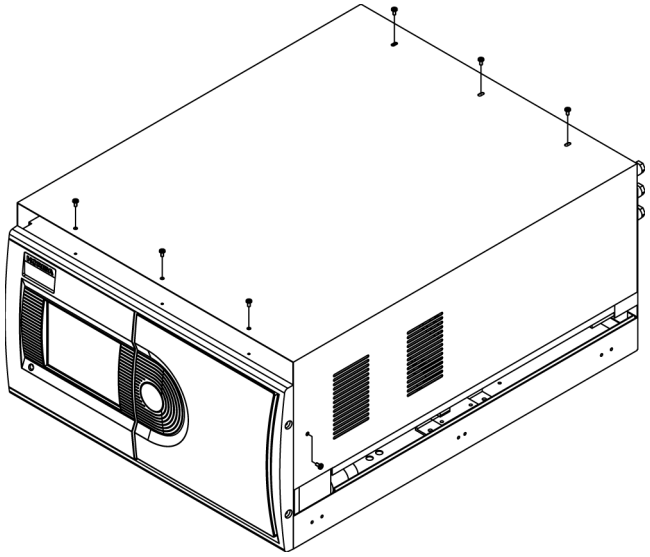


Fig. 3 Removing the cover

3 Component Arrangement

The following figure shows the component arrangement of APOA-370.

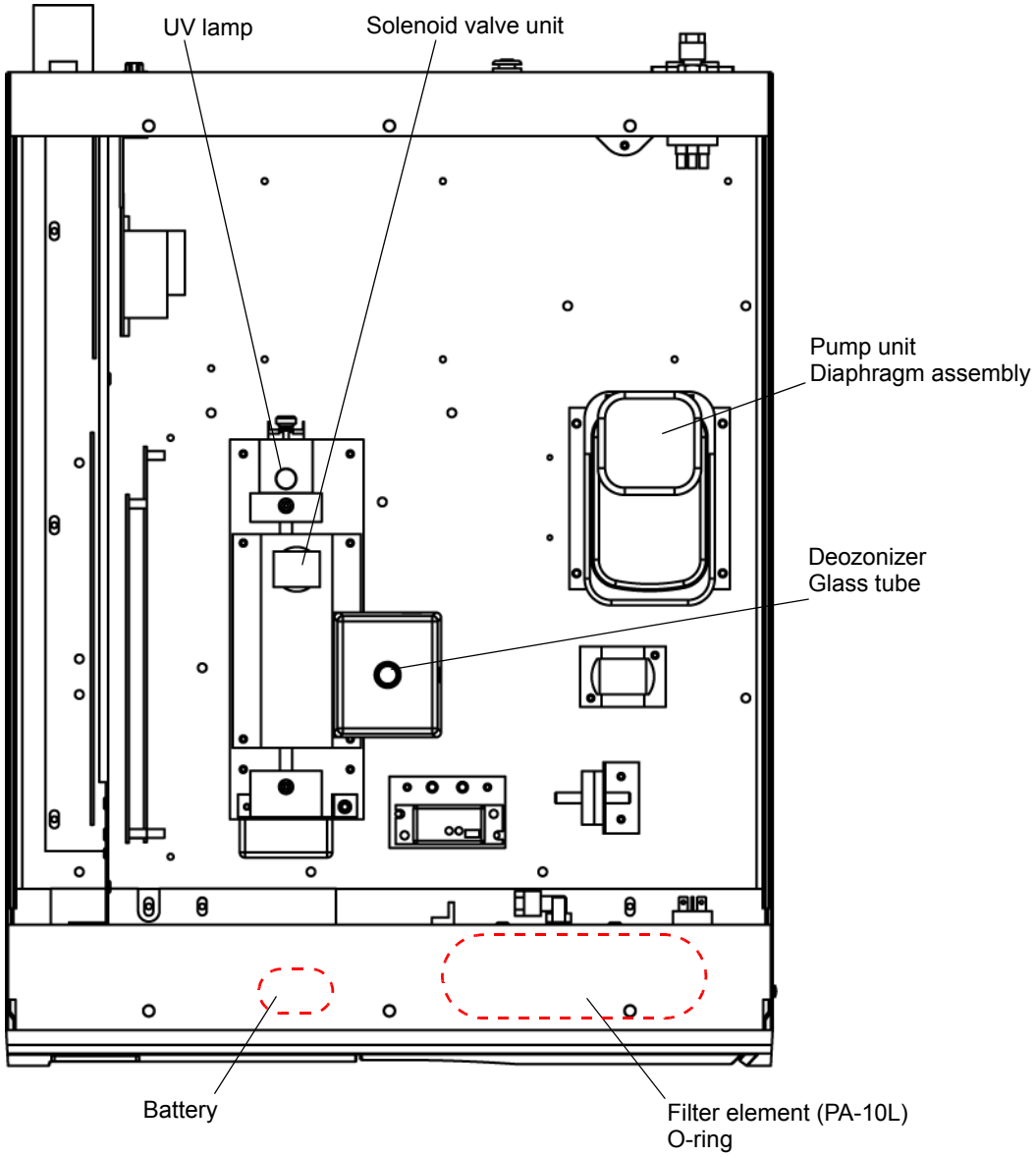


Fig. 4 Component arrangement

4 Parts Replacement

4.1 Filter element (PA-10L), O-ring

The filter element (PA-10L) is used to purify the sample gas and protect the analyzer.
If the filter element is used over a long period, the flow rate of the sample decreases.
And the O-ring will be deteriorated with time, and it may cause troubles, such as insufficient sample flow rates.
We recommend that you replace the filter element (PA-10L) and O-ring periodically. This procedure is the same as mentioned in the APOA-370 operation manual.

Recommended frequency of maintenance

- Filter element:
  Approximately every 2 weeks (depending upon the sample conditions)
- O-ring:
  Approximately every 1 year (depending upon the sample conditions)

Procedure

Note

Before doing the procedure below, make sure to power OFF the instrument referring to "2 Preparations" (page 2).

1. **Push the PUSH-marked area on the front panel door to open the door.**

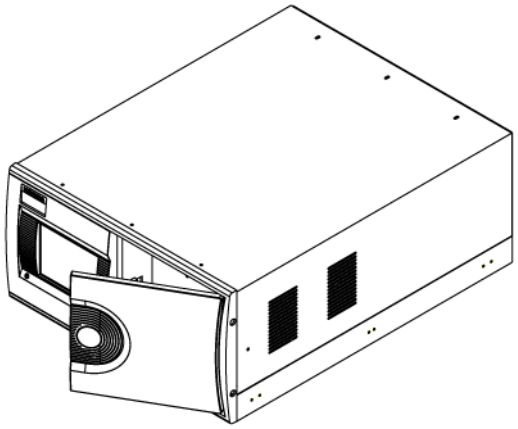


Fig. 5 Front panel door

2. **Turn the sample filter cover leftward.**
The filter element is located behind the sample filter cover.

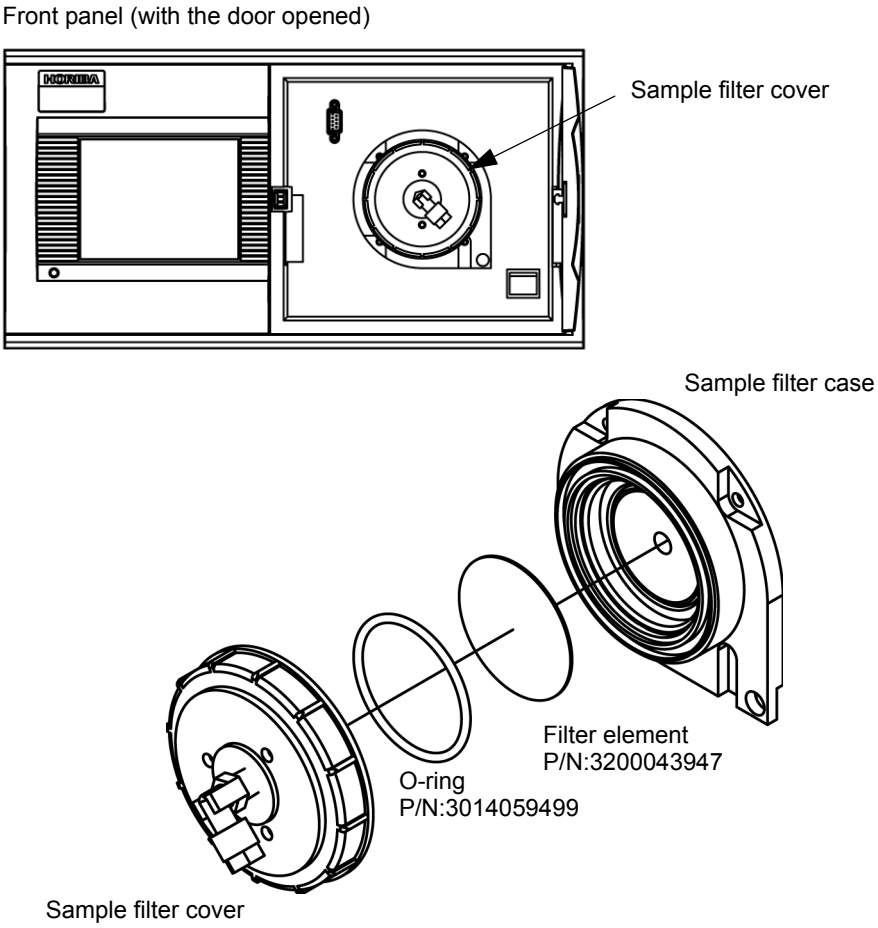


Fig. 6 Filter element, O-ring

3. **Attach a new filter element (or O-ring).**
4. **Close the sample filter case.**
5. **Close the front panel door.**

4.2 Diaphragm assembly

The diaphragm or valve will be deteriorated with time, and it may cause troubles, such as insufficient flow rates.
We recommend that you replace the diaphragm and valve periodically.

Recommended frequency of maintenance

Approximately every 1 year (depending upon the sample conditions)

Procedure

Note

The surface of the pump is very hot.
Before doing the procedure below, make sure to power OFF the instrument referring to "2 Preparations" (page 2) and wait until the pump cools down.

1. **Remove the 4 fixing screws on the pump head.**
2. **Remove the diaphragm with the special wrench provided with the diaphragm assembly.**

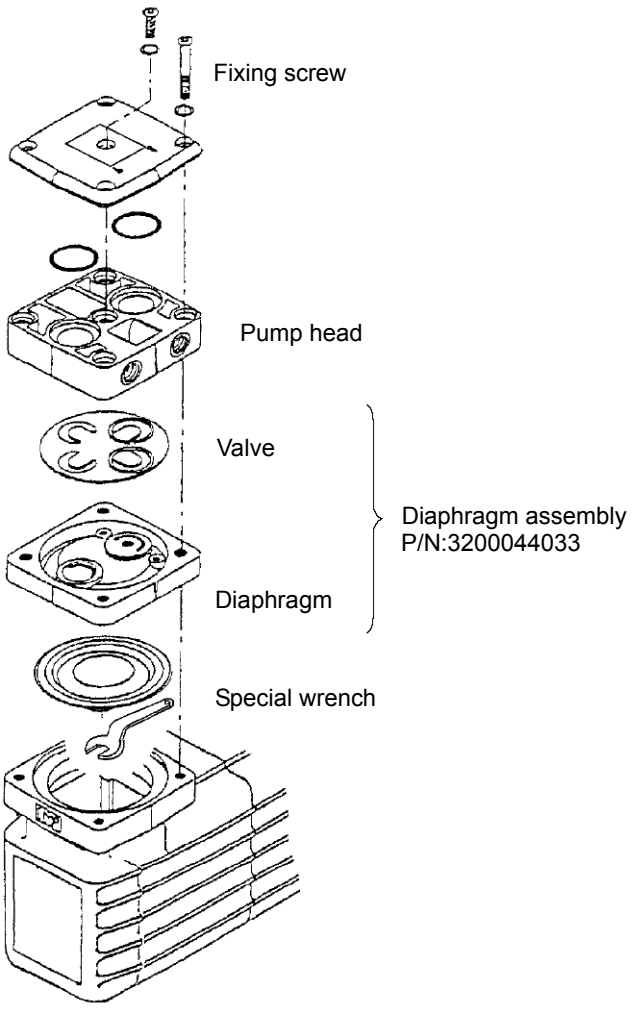


Fig. 7 Diaphragm

3. **Replace the valve with new one.**
4. **Mount a new diaphragm and valve, and use the special wrench to fix it.**

Note

Fix the diaphragm assembly securely, or it may cause the pump to malfunction.

5. **Making sure that the directions of the valve and pump head are correct, put them back together.**

4.3 Glass tube

The performance of the catalyst in the deozonizer (glass tube) will degrade with time, and it may cause the O_3 readings to be lower than actual values.
We recommend that you replace the glass tube periodically.

Recommended frequency of maintenance

Approximately every 1 year (depending upon the sample conditions)

Procedure

Note

The deozonizer is very hot.
Before doing the procedure below, make sure to power OFF the instrument referring to "2 Preparations" (page 2) and wait until the deozonizer cools down.

1. **Disconnect the connector from the deozonizer.**
2. **Remove the fixing screw on the deozonizer.**
3. **Remove the tubes from the deozonizer.**
4. **Remove the upper and lower joints of the glass tube, and replace the glass tube with new one.**

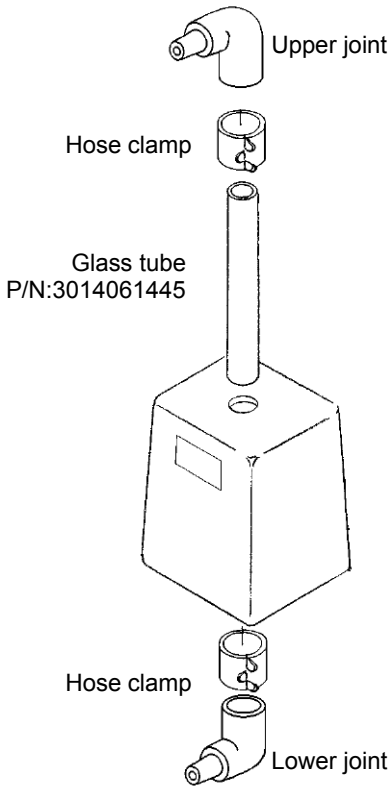


Fig. 8 Deozonizer

5. **Mount the deozonizer in the reverse procedure.**

4.4 UV lamp

The brightness of the UV lamp will decrease with time, and it may cause background noise to increase.
We recommend that you replace the UV lamp periodically.

⚠ DANGER

High voltage
Care should be taken when handling the lamp.
The lighting circuit of the lamp is high-voltage. There is a danger of electric shock, or electrocution at worst.

⚠ WARNING

DO NOT look directly at lighted lamp.
It may damage your eyes.

Recommended frequency of maintenance
Approximately every 1 year (depending upon the sample conditions)

Procedure

Note

Before doing the procedure below, make sure to power OFF the instrument referring to "2 Preparations" (page 2).

1. **Disconnect the connector from the lamp.**
2. **Loosen the 2 knurling screws that fix the lamp, and replace the lamp with new one.**

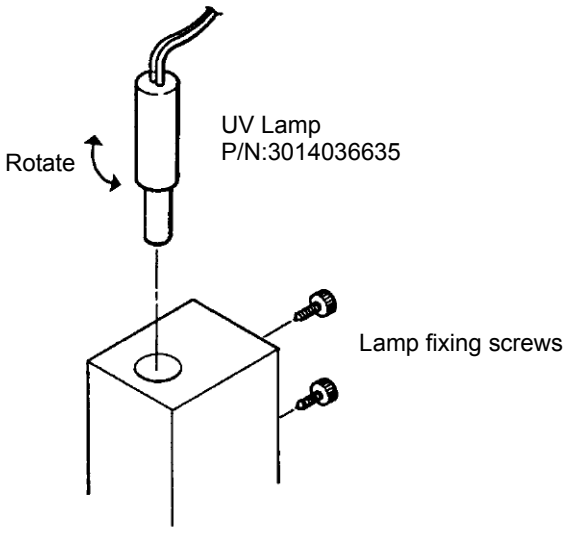


Fig. 9 UV lamp

3. **Fix the new lamp loosely with the knurling screws, and attach the connector.**
4. **Power ON the APOA-370 and warm up it for 30 to 60 minutes.**
5. **Press the [ANALOG INPUT] button on the MENU/MAINTENANCE screen. The ANALOG INPUT screen will be displayed.**

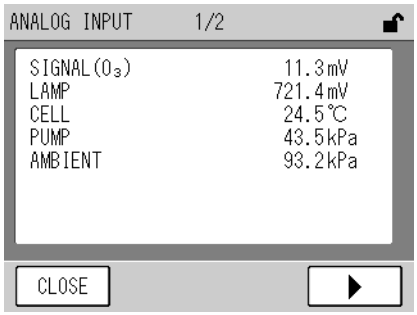


Fig. 10 ANALOG INPUT screen

6. **Rotate the lamp slowly checking LAMP value on the ANALOG INPUT screen, and stop where the value is maximized.**

7. **Fix the lamp at the stop position tightly with the knurling screws .**

4.5 Pump unit

The pump will be deteriorated with time, and it may change sample flow rates.
We recommend that you replace the pump periodically.

Recommended frequency of maintenance

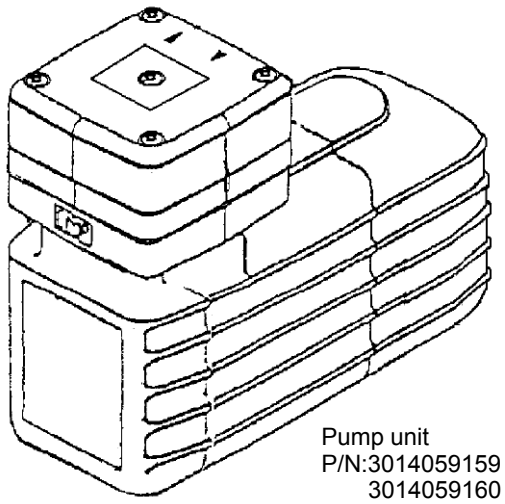
Approximately every 2 years (depending upon the sample conditions)

Procedure

Note

The surface of the pump is very hot.
Before doing the procedure below, make sure to power OFF the instrument referring to "2 Preparations" (page 2) and wait until the pump cools down.

1. **Disconnect the power connector of the pump.**
2. **Remove the joints attached to the pump.**
3. **Unscrew the 4 screws fixing the pump, and remove the pump.**



Pump unit
P/N:3014059159
3014059160

Fig. 11 Pump unit

4. **Mount a new pump unit in the reverse procedure.**

Note

When connecting the joints, make sure to use sealing tapes to wind them.

4.6 Solenoid valve unit

The solenoid valves will be deteriorated with time, and it may cause serious troubles affecting measured values, such as insufficient airtight, or malfunction.
We recommend that you replace the solenoid valves periodically.

Recommended frequency of maintenance

Approximately every 2 years (depending upon the sample conditions)

Procedure

Note

Before doing the procedure below, make sure to power OFF the instrument referring to "2 Preparations" (page 2).

1. **Disconnect the connectors of tubing and wiring from the solenoid valve unit.**
2. **Remove the 2 screws A.**
3. **Remove the 4 screws B on the fixing plate.**
4. **Unscrew the 2 fixing screws C to remove the solenoid valve unit.**

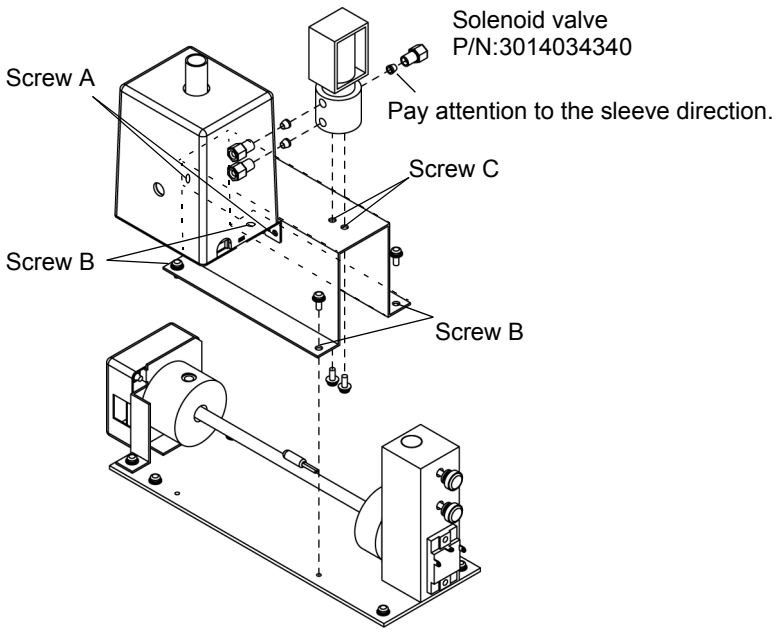


Fig. 12 Solenoid valve unit

5. **Making sure that the positions of sleeve and tubing connection are correct, assemble a new solenoid valve unit in the reverse procedure, and connect the tubing and wiring.**

4.7 Battery

The battery for clock/memory backup will be deteriorated with time, and the voltage will be lowered.

Recommended frequency of maintenance

Approximately every 3 years (depending upon the installation conditions)
or when the BATT alarm occurs

Procedure

Note

Before doing the procedure below, make sure to power OFF the instrument referring to "2 Preparations" (page 2).

1. **The battery is attached on the printed board that is located on the front panel inside (see below). Replace the battery with a new one.**

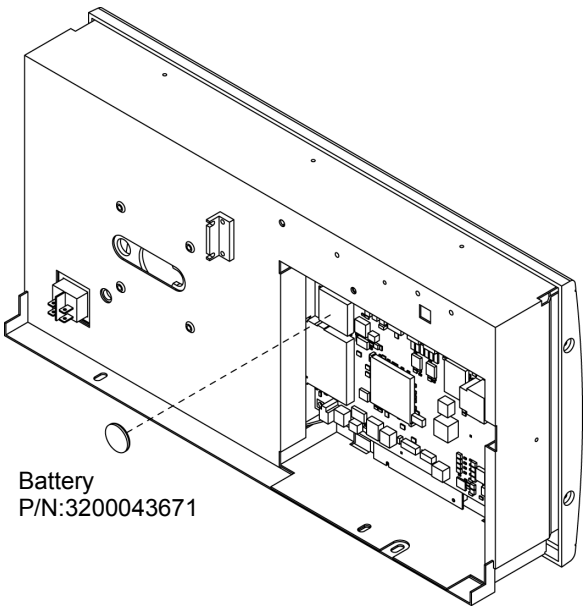


Fig. 13 Battery

2. **After powering ON the instrument, adjust the internal clock (see "5.2 Readjusting the internal clock" (page 16)).**

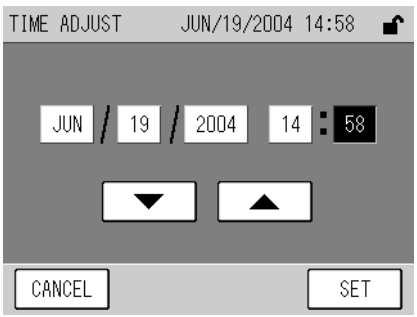


Fig. 14 TIME ADJUST screen

5 Operations after Part Replacement

5.1 Resetting the maintenance status

To use the maintenance status as an indication for the next replacement, reset the operation hours for the replaced parts on the MAINTENANCE STATUS screen.

1. **After powering ON the instrument, press the [MAINTENANCE STATUS] button on the MENU/MAINTENANCE screen. The MAINTENANCE STATUS screen will be displayed.**

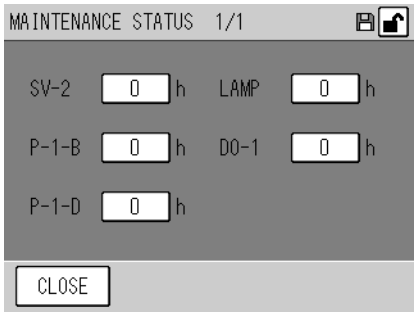


Fig. 15 MAINTENANCE STATUS screen

The operating hours of consumable parts are displayed.
For the symbols, see the flow sheet at the end of this document.
Use P-1-B for the pump itself and P-1-D for the pump diaphragm.

2. **Press the button of the operating hour to be changed (reset).**
The MAINTENENCE STATUS screen for setting will be displayed.

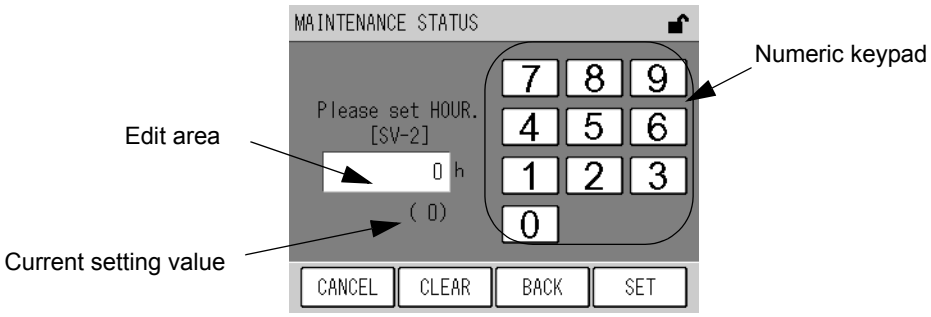


Fig. 16 MAINTENENCE STATUS screen for setting

Enter a value via the numeric keypad.
The keys allow you to perform the following operations.

[CANCEL]:	Returns to the MAINTENANCE STATUS screen without changing the time.
[CLEAR]:	Deletes the value entered in the edit area.
[BACK]:	Deletes the just entered figure (1-digit).
[SET]:	Returns to the MAINTENANCE STATUS screen with the time changed.

3. **Enter a desired value (0 for resetting) via the numeric keypad.**

4. **Press the [SET] key. The operating hours will be changed (reset) and the MAINTENENCE STATUS screen is displayed again.**

5. **Press the [CLOSE] key on the MAINTENANCE STATUS screen. The MENU/MAINTENANCE screen will be displayed again.**

5.2 Readjusting the internal clock

Readjust the internal clock after battery replacement.

1. **After powering ON the instrument, press the [TIME ADJUST] button on the MENU/ SETTING screen. The TIME ADJUST screen will be displayed.**

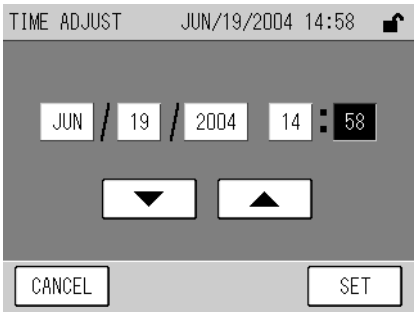


Fig. 17 TIME ADJUST screen

The current time setting is always displayed first, in a format of year, month, day, hour, and minute as respective buttons.
To change a value, press the corresponding button, and then press either of the following buttons to increase or decrease the value.

[▲]: Increases the value.
[▼]: Decreases the value.

The keys allow you to perform the following operations.

[CANCEL]: Returns to the MENU/SETTING screen without changing the settings.
[SET]: Returns to the MENU/SETTING screen with the settings changed.

2. **Press a value button to be changed to select the item, and adjust the current time with the [▲] and [▼] buttons.**

3. **Press the [SET] key. The current time setting will be changed and the MENU/SETTING screen will be displayed again.**

Note

- **If you press the [CANCEL] button before completing the setting, the time prior to the change will apply.**
- **The time cannot be set on a second basis. Pressing the [SET] key will automatically set the time to 00 second.**
- **If you change the time to any unrealistic date or time and press the [SET] key, the realistic date or time nearest to the set value will apply automatically.**
- **Pressing the [SET] key will delete the internal data (e.g., average) having the creation time later than the set time.**

6 Drawings

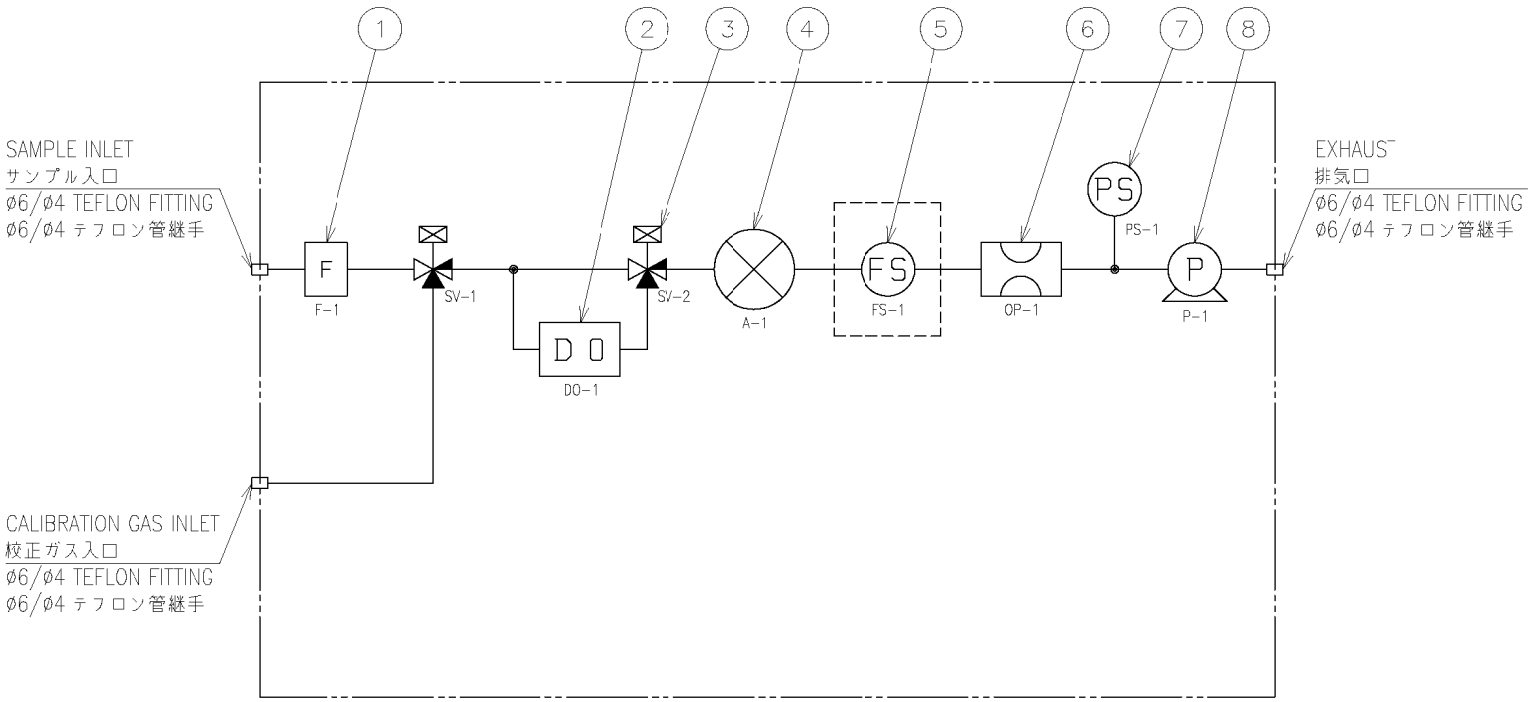
Flow sheet	V1016118A (GZ9100352116A)

CAD DRAWING NO. V1016118A

HORIBA

EXTERIOR DRAWING

NO.	PARTS NAME	NOTES
1	FILTER フィルタ	
2	DEOZONIZER オゾン分解器	
3	SOLENOID VALVE 3方電磁弁	
4	ANALYZER UNIT 分析部	
5	FLOW SENSOR フローセンサ	
6	ORIFICE オリフィス	
7	PRESSURE SENSOR 圧力センサ	
8	PUMP ポンプ	



オプション
OPTION

No.	SPEC.	PARTS.NO.	NOTES

NAME APOA-370
FLOW SCHEMATIC OF AMBIENT O_3 MONITOR
大気汚染監視用O_3測定装置 フローシート

オプション一部削除 OPTION PARTIAL ELIMINATION	A.TANIGUCHI	APR.27,2004
REVISED		

DRAWN	CHECKED	APPROVED
A.TANIGUCHI	A.KAGAWA	A.KAGAWA

SCALE FREE

DATE APR.27,2004

CAD DRAWING NO. V1016118A

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