

# Yamato

## Water Purifier, Auto Still

Model

# WG 250/1000

## Instruction Manual

- Fourth Edition -

- Thank you for purchasing "Auto Still, WG series" of Yamato Scientific Co., Ltd.
- To use this unit properly, read this "Instruction Manual" thoroughly before using this unit. Keep this instruction manual around this unit for referring at anytime.



**WARNING!**

Carefully read and thoroughly understand the important warning items described in this manual before using this unit.

**Yamato Scientific Co. LTD.**

This paper has been printed on recycled paper.



◆ <b>Cautions in Using with Safety</b> .....	<b>1</b>
• Explanation.....	1
• Table of Illustrated Symbols .....	2
• Fundamental Matters of "WARNING!" and "CAUTION!" .....	3
◆ <b>Before Using this unit</b> .....	<b>4</b>
• Requirements for Installation.....	4
◆ <b>Description and Function of Each Part</b> .....	<b>13</b>
• Main Unit .....	13
• Water Sampling Table and Multi-Purpose Distilled Water Sampling Port.....	15
• Piping System View.....	16
• Principle of Operation.....	17
• Control Panel.....	20
◆ <b>Operation Method</b> .....	<b>21</b>
• Setup and Check before Use .....	21
• Operation Procedure.....	22
• Sampling of Pure Water .....	23
• Collection of Measured Amount of Pure Water .....	24
• Collection of Measured Amount of Distilled Water .....	25
• Display of Water Quality.....	27
• Setting/Display of Submenu .....	29
◆ <b>Handling Precautions</b> .....	<b>31</b>
◆ <b>Maintenance Method</b> .....	<b>32</b>
• Daily Inspection and Maintenance .....	32
• Washing of Distiller.....	33
• Replacement of Heater .....	37
• Washing of Water Supply Hose Filter.....	38
• Replacement of Hose.....	38
◆ <b>Long storage and disposal</b> .....	<b>39</b>
• When not using this unit for long term / When disposing .....	39
◆ <b>In the Event of Failure</b> ... ..	<b>42</b>
• Failure indication and Its Contents .....	42
• Remedy for Trouble.....	45
• Trouble Shooting .....	46
• Measures in emergency .....	46
◆ <b>After Service and Warranty</b> .....	<b>47</b>
◆ <b>Specification</b> .....	<b>48</b>
◆ <b>Wiring Diagram</b> .....	<b>49</b>
• WG250 .....	49
• WG1000 .....	50
◆ <b>Reference</b> .....	<b>51</b>
• List of Dangerous Substances .....	51

## Explanation

### MEANING OF ILLUSTRATED SYMBOLS

#### Illustrated Symbols

Various symbols are used in this safety manual in order to use the unit without danger of injury and damage of the unit. A list of problems caused by ignoring the warnings and improper handling is divided as shown below. Be sure that you understand the warnings and cautions in this manual before operating the unit.

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 **WARNING!** If the warning is ignored, there is the danger of a problem that may cause a serious accident or even fatality.

 **CAUTION!** If the caution is ignored, there is the danger of a problem that may cause injury/damage to property or the unit itself.

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#### Meaning of Symbols



This symbol indicates items that urge the warning (including the caution). A detailed warning message is shown adjacent to the symbol.



This symbol indicates items that are strictly prohibited. A detailed message is shown adjacent to the symbol with specific actions not to perform.



This symbol indicates items that should be always performed. A detailed message with instructions is shown adjacent to the symbol.

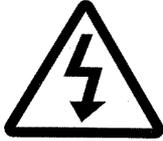
# Cautions in Using with Safety

## Table of Illustrated Symbols

### Warning



Warning,  
generally



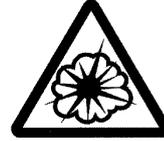
Warning,  
high voltage



Warning,  
high temperature



Warning,  
drive train



Warning,  
explosive

### Caution



Caution,  
generally



Caution,  
electrical shock



Caution,  
scald



Caution,  
no road heating



Caution,  
not to drench



Caution,  
water only



Caution,  
deadly poison

### Prohibit



Prohibit,  
generally



Prohibit,  
inflammable



Prohibit,  
to disassemble



Prohibit,  
to touch

### Compulsion



Compulsion,  
generally



Compulsion,  
connect to the  
grounding  
terminal



Compulsion,  
install on a flat  
surface



Compulsion,  
disconnect the  
power plug



Compulsion,  
periodical  
inspection

## Cautions in Using with Safety

### Fundamental Matters of "WARNING!" and "CAUTION!"

#### **WARNING!**

##### **Do not use this unit in an area where there is flammable or explosive gas**

Never use this unit in an area where there is flammable or explosive gas. This unit is not explosion-proof. An arc may be generated when the power switch is turned on or off, and fire/explosion may result. (Refer to Page 51 "List of Dangerous Substances".)

##### **Be sure to connect grounding wire.**

Connect to grounded plug socket. If no grounded plug socket is available, be sure to connect grounding lead by use of ground adapter attached in nonstandard. Failure to do so could cause electric shock or fire.

##### **If a problem occurs**

If smoke or strange odor should come out of this unit for some reason, turn off the power key right away, and then turn off the circuit breaker and the main power. Immediately contact a service technician for inspection. If this procedure is not followed, fire or electrical shock may result. Never perform repair work yourself, since it is dangerous and not recommended.

##### **Do not use the power cord if it is bundled or tangled**

Do not use the power cord if it is bundled or tangled. If it is used in this manner, it can overheat and fire may be caused.

##### **Do not process, bend, wring, or stretch the power cord forcibly**

Do not process, bend, wring, or stretch the power cord forcibly. Fire or electrical shock may result.

##### **Do not disassemble or modify this unit**

Do not disassemble or modify this unit. Fire or electrical shock or failure may be caused.

##### **Do not touch hot portion**

Boiler may be hot in some portion in operation or immediately after operation. Be aware of burns. When performing maintenance of heater etc., ensure that the boiler is cooled down beforehand.

##### **Close the tap when unit is out of service**

When unit is out of service (at night or on holiday), be sure to close the tap so as to avoid water leakage accident.

#### **CAUTION!**

##### **During a thunder storm**

During a thunderstorm, turn off the power key immediately, then turn off the circuit breaker and the main power. If this procedure is not followed, fire or electrical shock may be caused.

##### **Exercise care in handling washing liquid (Orgazor)**

Principal component of washing liquid (Orgazor) is sulfamic acid, which is acidic almost equal to water solution PH:1. Use protective tool (gloves, mask, and glasses) in handling. When it is touched by human body, immediately wash it away with clean water.

## Requirements for Installation

### **WARNING!**

#### 1. Always ground this unit



- Connect the power plug to a receptacle with grounding connectors.



- Do not forget to ground this unit, to protect you and the unit from electrical shock in case of power surge. Choose a receptacle with grounding connectors as often as possible.
- Do not connect the grounding wire to a gas pipe, or by means of a lightning rod or telephone line. A fire or electrical shock will occur.

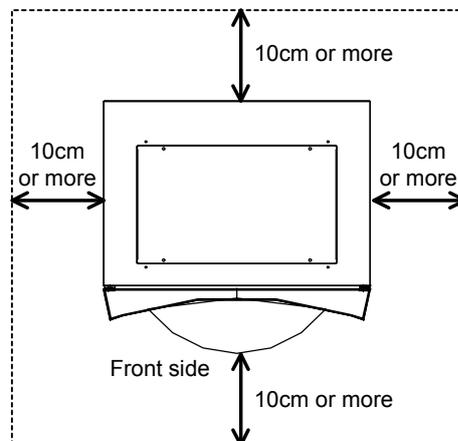
#### 2. Choose a proper place for installation



- Do not install this unit in a place where:
  - ◆ Rough or dirty surface.
  - ◆ Flammable gas or corrosive gas is generated.
  - ◆ Ambient temperature 35°C and above or 5°C and below.
  - ◆ Ambient temperature fluctuates violently.
  - ◆ There is direct sunlight.
  - ◆ There is excessive humidity and dust.
  - ◆ There is a constant vibration.
  - ◆ Not horizontal surface.
  - ◆ The power source is instable.



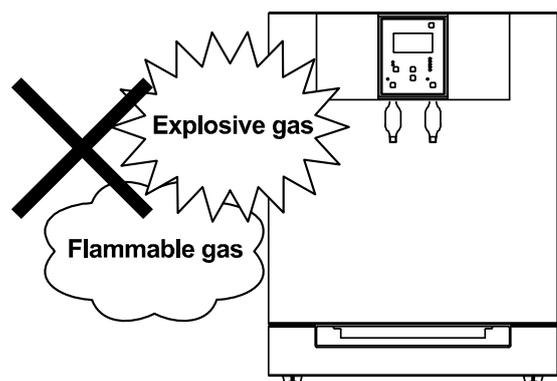
- Keep space around each product above the range shown below. Install units within sink equipment if possible.



#### 3. Do not use this unit in an area where there is flammable or explosive gas



- Never use this unit in an area where there is flammable or explosive gas. This unit is not explosion-proof. An arc may be generated when the power switch is turned ON or OFF, and fire/explosion may result. (To know about flammable or explosive gas, refer to Page 51 "List of Dangerous Substances".)

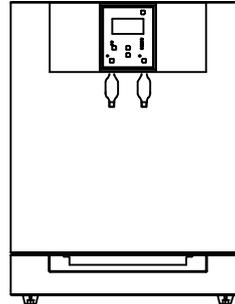


## Requirements for Installation

### 4. Do not modify



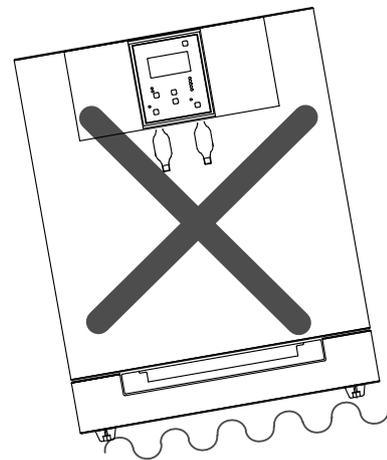
- Never disassemble this unit.
- This unit has high voltage inside in some portion, which may cause electric shock. Contact dealers or Yamato Scientific Co., Ltd. sales office for adjusting or repairing inside.
- In routine maintenance and inspection, follow the procedure described in the instruction manual. Do avoid modification by customer because it may lead to trouble.



### 5. Installation on horizontal surface



- Set this unit to the flattest place. Setting this unit on rough or slope place could cause the unexpected trouble or malfunction.
- The unit WG250 weighs 55kg gross, and the unit WG10000 weighs 105kg gross. Two or more persons are required for carrying or setting these units. Specially be careful for carrying WG1000 because its location of the center of gravity is high.



### 6. Choose a correct power distribution board or receptacle



- Use a plug socket conforming to electric capacity (capacity 15A or greater).
- When power capacity is insufficient, sampling of distilled water goes short, and normal control is disabled by fall of power voltage. Connect to power equipment having sufficient power capacity.

**Electric capacity:** WG250: 100V AC Single phase 15A  
WG1000: 200V AC Single phase 20A

### 7. Handling of power code



- Do not entangle the power cord. This will cause overheating and possibly a fire.
- Do not bend or twist the power cord, or apply excessive tension to it. This may cause a fire and electrical shock.
- Do not lay the power cord under a desk or chair, and do not allow it to be pinched in order to prevent it from being damaged and to avoid a fire or electrical shock.
- Keep the power cord away from any heating equipment such as a room heater. The cord's insulation may melt and cause a fire or electrical shock.
- If the power cord becomes damaged (wiring exposed, breakage, etc.), immediately turn off the power at the rear of this unit and shut off the main supply power. Then contact your nearest dealer for replacement of the power cord. Leaving it may cause a fire or electrical shock.
- Connect the power plug to the receptacle which is supplied appropriate power and voltage.

## Requirements for Installation

### 8. Connection of power cord



- Always ensure that breaker on power unit side is "Off" before connecting power cord. Power plug of WG250 uses 3-core cord including grounding wire, and the plug is grounded type. If your plug socket is not compatible (2P), use a ground adapter attached in nonstandard. In using ground adapter, be sure to ground a grounding lead.



### 9. Connect the water supply hose securely

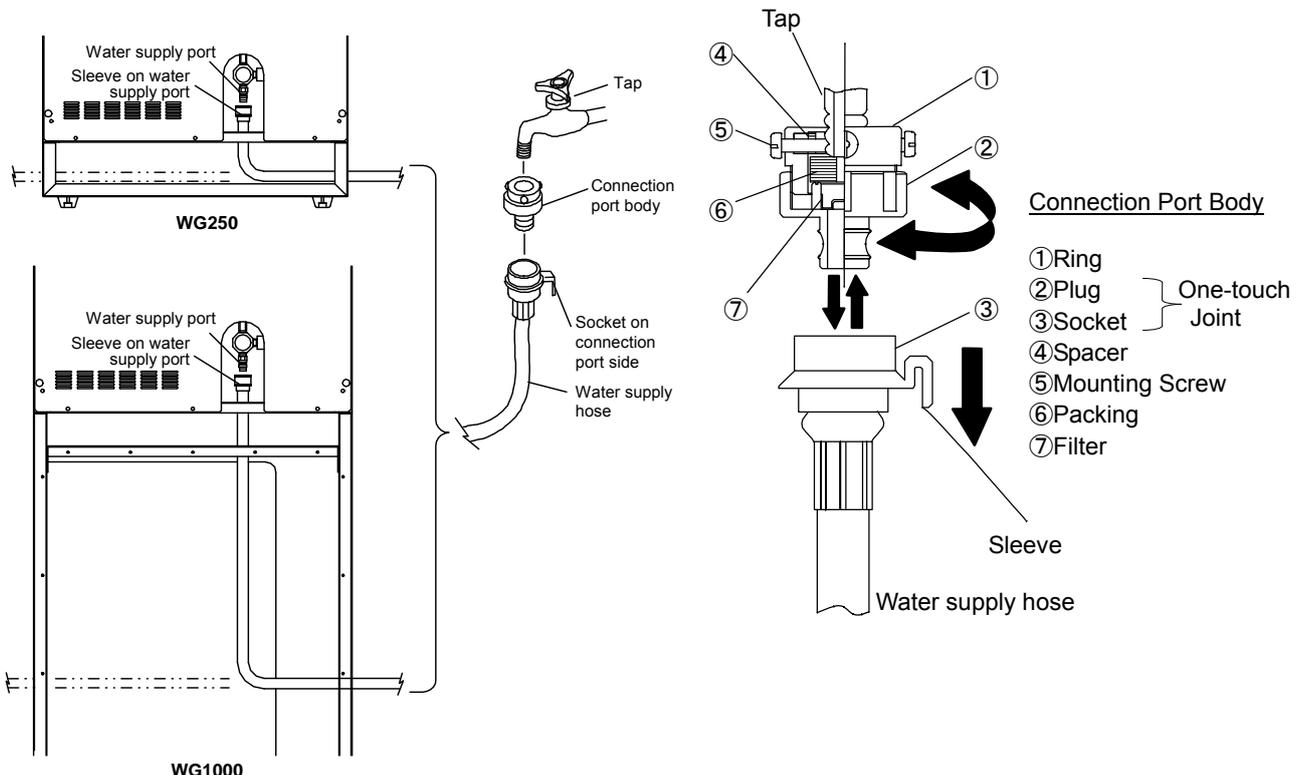


- If not connecting the water supply hose securely, the water supply hose or connection port may be disconnected, resulting in water leakage such as water bursting forth.
- Take the connection port body and supply hose out of attachments to the unit. Install the unit on a horizontal and stable place nearby tap and sink.

### 10. Connect the tap side



1. Slide the sleeve of socket ③ on connection port side in the arrow direction, then connection port body and water supply hose can be separated. There separate the two parts.
  2. Once loosen the plug ② from the ring ①.
  3. Tighten the 4 mounting screws ⑤ uniformly while pressing the ring ① slightly and uniformly to make the packing ⑥ in flat contact with water tap. If the tap is a chemical tap, adjust the position so that the mounting screw is located at the bottom valley of tap nipple as shown.
  4. Turn the plug ② clockwise to tighten securely. This will allow the tap and connection port to be sealed by packing ⑥.
  5. Insert the socket ③ securely to the plug ② with the sleeve slid in the arrow direction. The sleeve returns to the original position when released, and then connection is completed.
- ❖ In case that the socket is removed, the valve attached on the connection side of the main unit stops the flow of water.



## Requirements for Installation

### 11. Observe the specified pressure range of raw water from waterworks

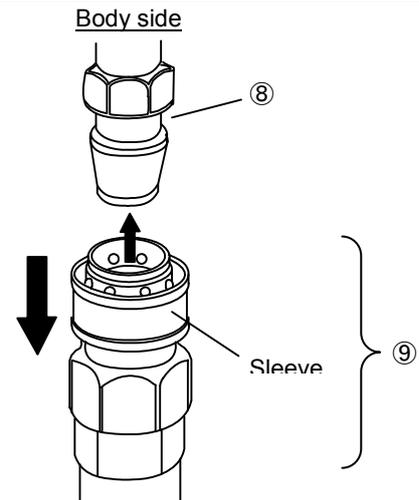


- Apply the range of city water pressure between 0.5 X 100kPa and 5 X 100kPa (0.5 - 5kgf/cm<sup>2</sup>) including nighttime.
- Range of raw water pressure is the same when "Water Supply Port Unit" (optional accessory) is used.

### 12. Connection on body side



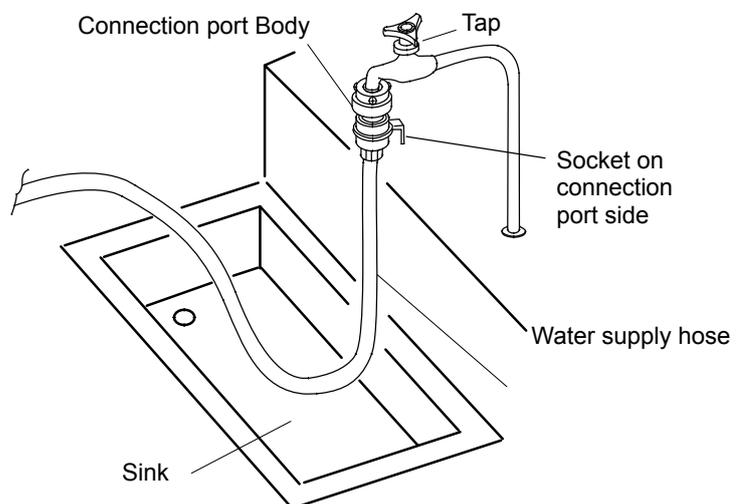
1. Remove the rubber cap from the water supply port plug ⑧.
2. Insert the socket ⑨ securely to the plug ⑧ on body side with the sleeve slid in the arrow direction. The sleeve returns to the original position when released, and then connection is completed. The socket contains a valve inside, which opens only when the socket is connected by plug; otherwise, water is not fed because this valve does not open.



### 13. Connect the water supply hose to the tap provided with sink equipment



- If the water supply hose is connected to a tap without sink equipment, flood damage may be caused when water supply hose is disconnected or damaged; therefore be sure to connect to a tap having sink equipment.



### 14. When the sink equipment is remote from water tap, use "Water Supply Port Unit" (optional accessory)



- "Water Supply Port Unit" is designed to loosen the connection to the tap harder than the set of standard water supply hoses when water pressure fluctuates.

### 15. In case that there is no tap



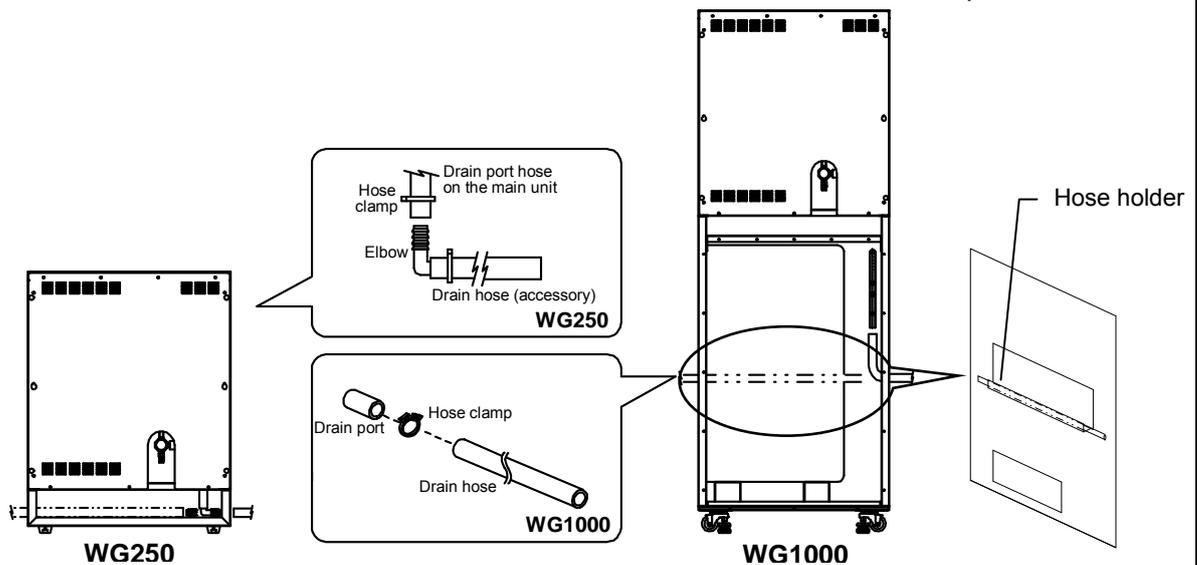
- In case that there is no tap, use appropriate joint shown in the optional "Coupler joints for feed water".

## Requirements for Installation

### 16. Connect the drain hose securely



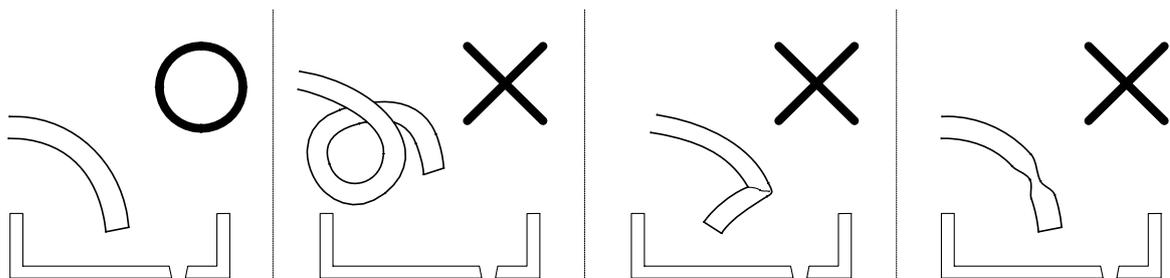
- If the drain hose is not connected securely, it may be disconnected, leaking water in the unit, or leading to trouble of system.
1. Pick up the drain hose (with elbow) and the hose clamp from the main unit accessories.
  2. Always make sure that the earth leakage breaker of the unit is "OFF".
  3. Remove the rubber stopper from the outlet of the drain port hose on the main unit.
  4. Push the hose clamp into the elbow of the drain hose, and next, put the elbow into the drain outlet hose of the main unit, then tighten the hose clamp securely.
  5. Pull the hose out from the drain hose-end outlet at right/left or backside of the main unit.  
For WG1000 unit, be sure to set the hose in the hose holder at the backside plate.



### 17. Use care in routing of drain hose



- Do avoid making bend or projection of drain hose.
- In case that the drain hose is bent and the drain cannot be performed, back-flow or breakage of the cooling hose might occur.
- Place the drain hose lower than the drain port of this unit. Further, avoid piping which allows paddle in the hose or at the hose outlet, because it is a resistance against drain.
- Place the end of drain hose where drain is allowed. When distilled water is being prepared, cooling water is drained approx. 2 liters/min (approx. 2.6 liters/min in WG1000). Also drain further increases when boiler water is drained, and sufficient drain equipment is required.



## Requirements for Installation

### 18. Check the drain temperature of cooling water



- Drain temperature may exceed 60°C in drainage from boiler. Drain to a place remote from working environment not to be touched easily because there is a danger of burns.
- High-temperature cooling water could flow out. If vinyl chloride tube is used for the water drain unit of the sink, such a tube could deteriorate. Water should be drained to a place away from the drain tube of the sink. Even if VP tube (JIS K6741) is used for the vinyl chloride tube, DV-RR joint is used for the joint, and even if insert socket (JIS K6739) is used, the water drain trap in the nonstandard options should be used when the control temp. cannot be lowered (60°C or lower). Even if the drain temperature is 60°C or lower, and if the above-mentioned tubes and joint are not used, the drain trap in the nonstandard options should be used.

### 19. When drain temperature of sink equipment does not fall under 60°C



- Use a drain trap (optional accessory).
- Drain trap makes temperature fall by accumulating cooled drain water temporarily. Further, it mixes city water and cooled-down drain water, makes mixed water temperature fall, then lets drain to sink equipment.
- Contact your dealer or Yamato Scientific sales office for detail of drain trap.

## Requirements for Installation

### 20. Install the ion exchange resin cartridge (CPC-S) securely



- Install the ion exchange resin cartridge (CPC-S) following the procedure shown below.
  - Connect securely because insecure connection may cause water leakage.
1. Make sure that the earth leakage breaker of this unit is "Off" and that the tap is tightened.
  2. Take the ion exchange resin cartridge out of attachments to the unit.
  3. Place the ion exchange resin cartridge taken out on the receiver within the unit. (See Fig.1.)
  4. Fix the ion exchange resin cartridge with the band of receiver. (See Fig.2.)

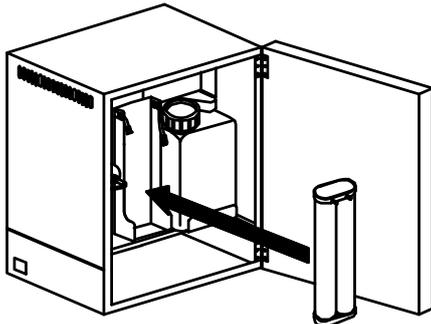


Fig.1

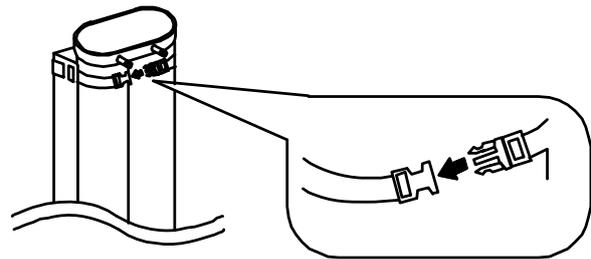


Fig.2

5. Remove the rubber cap attached to the inlet and outlet of ion exchange resin cartridge.
  6. Fit in the coupler marked with (IN) to the inlet of ion exchange resin cartridge (left) until click is heard. (See Fig.3.)
  7. Fit in the coupler marked with (OUT) to the outlet of ion exchange resin cartridge (right) until click is heard. (See Fig.3.)
- ❖ Coupler may be hard at first. When applying force in inserting, do not make it curved because insertion port may be broken.

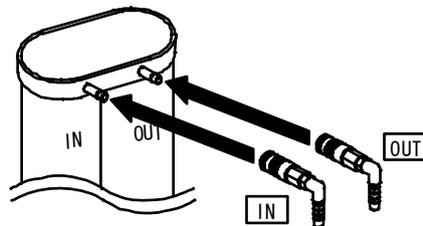


Fig.3

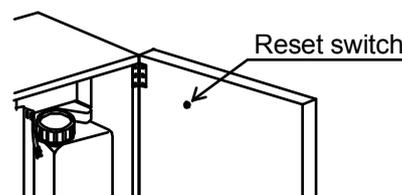


Fig.4

8. Coupler can be removed easily from the ion exchange resin cartridge by pulling it toward yourself while pushing the black part of the coupler to the depth.
9. After changing, turn the breaker on and wait for about ten second, then press and hold the reset switch till a beep is heard. (See Fig.4.)

## Requirements for Installation

### 21. Secure the pre-treatment cartridge securely



- Connect the hose in the body securely following the procedure shown below.
  - Insecure connection may cause disconnection of connection hose, resulting in accident by water leakage.
1. Make sure that the earth leakage breaker of this unit is "OFF" and that the tap is tightened.
  2. Take the pre-treatment cartridge ① out of attachments to the body.
  3. Inlet and outlet of the pre-treatment cartridge ① are provided with a cap, so remove it.
  4. When the front door of this unit is opened, connection hose marked IN and OUT is found in the coupler; there make connection matching them with IN and OUT on pre-treatment cartridge ①.
  5. In connecting, mate the coupler and port of cartridge while sliding the blue portion ③ of coupler toward the hose, push in, then release the blue portion ③.
  6. When connection is finished, place the pre-treatment cartridge at the position shown on the right (near side on the left of distilled water tank) as paying attention to the bend of hose.

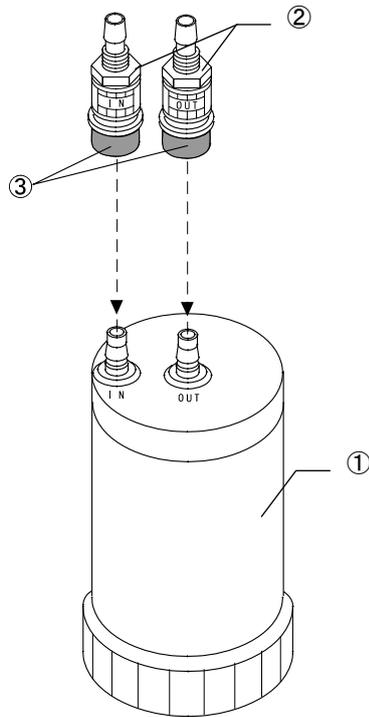


Fig.5

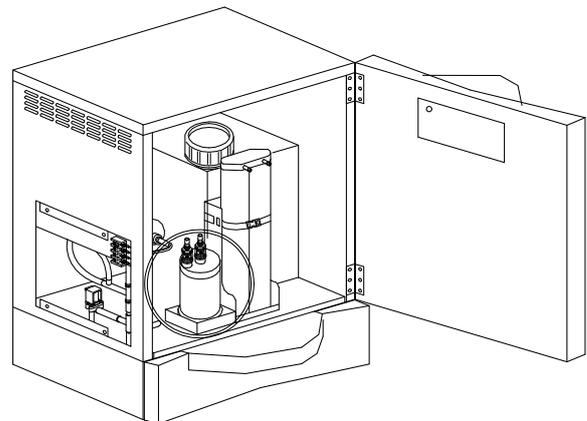


Fig.6

### 22. After installation



- This unit may topple over due to unexpected earthquake or shock causing injury. Take an appropriate measure against toppling for safety.  
(For WG1000, earthquake-resistant fittings are optionally available.)

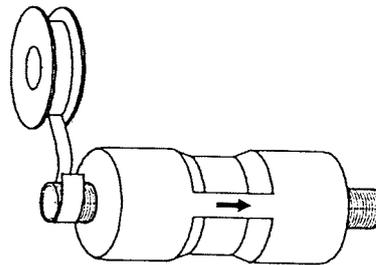


#### 22. Install the membrane filter firmly.

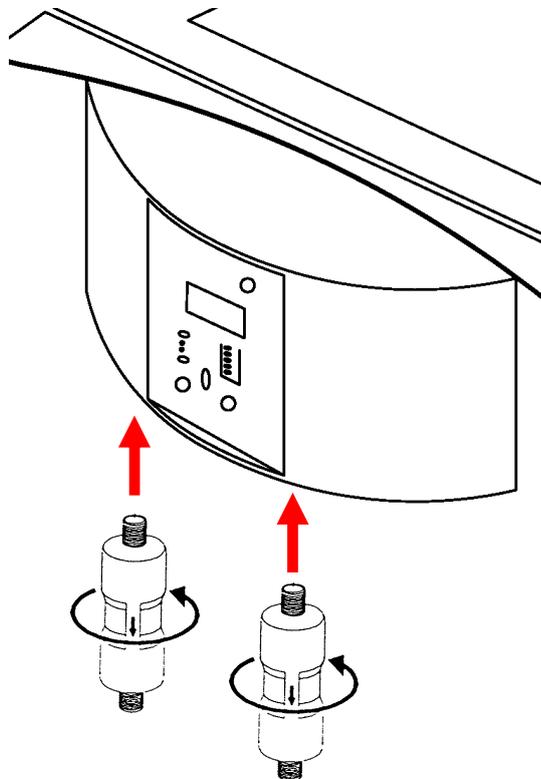


- Install the membrane filter as follows:
- Unless firm connection is made, water may leak from the threaded portion and may be mixed into and contaminate the sampled pure water. Always ensure firm connection.

- (1) Take out two membrane filters and seal tape from among accessories of the main body.
- (2) Pay attention to the direction of arrow mark on the membrane filter. Wind the seal tape clockwise as viewed from the tape windind side two to three turns while pulling the tape slightly. Remaining tape should be cut away.



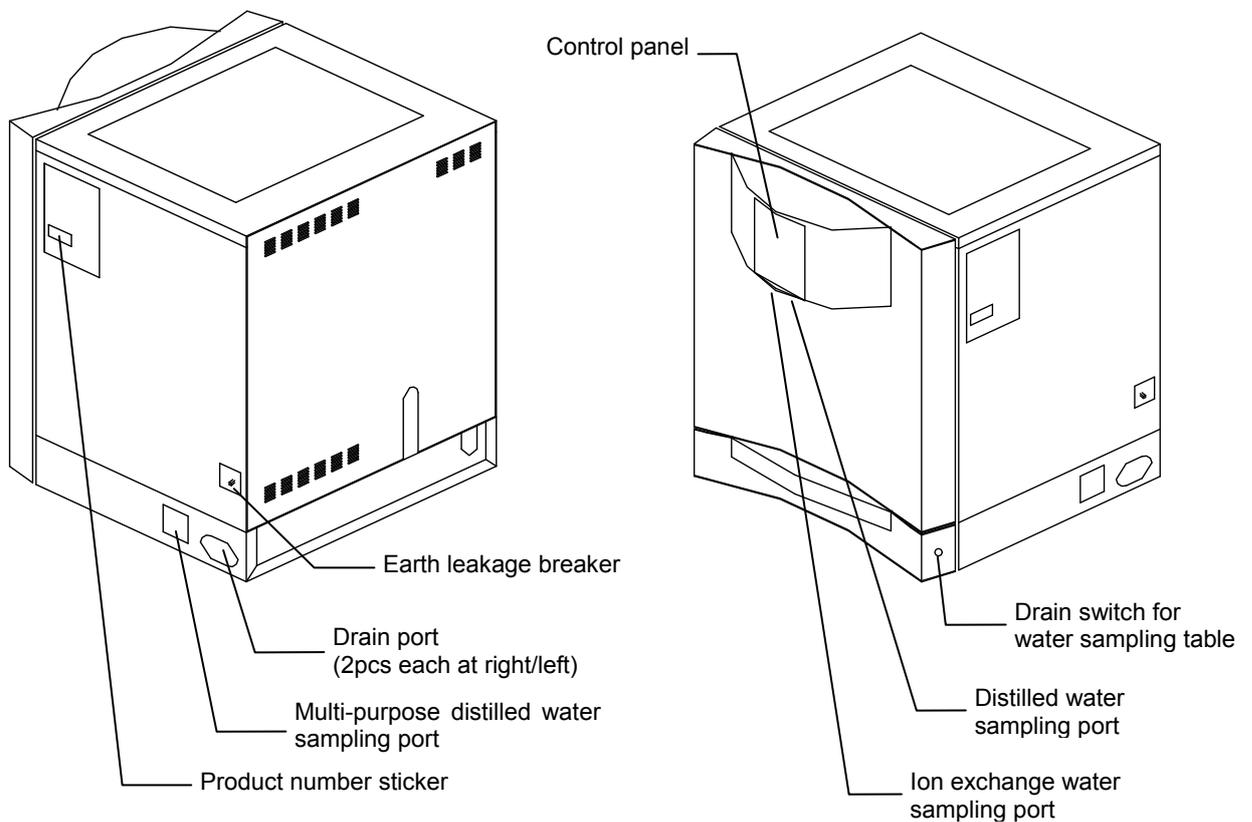
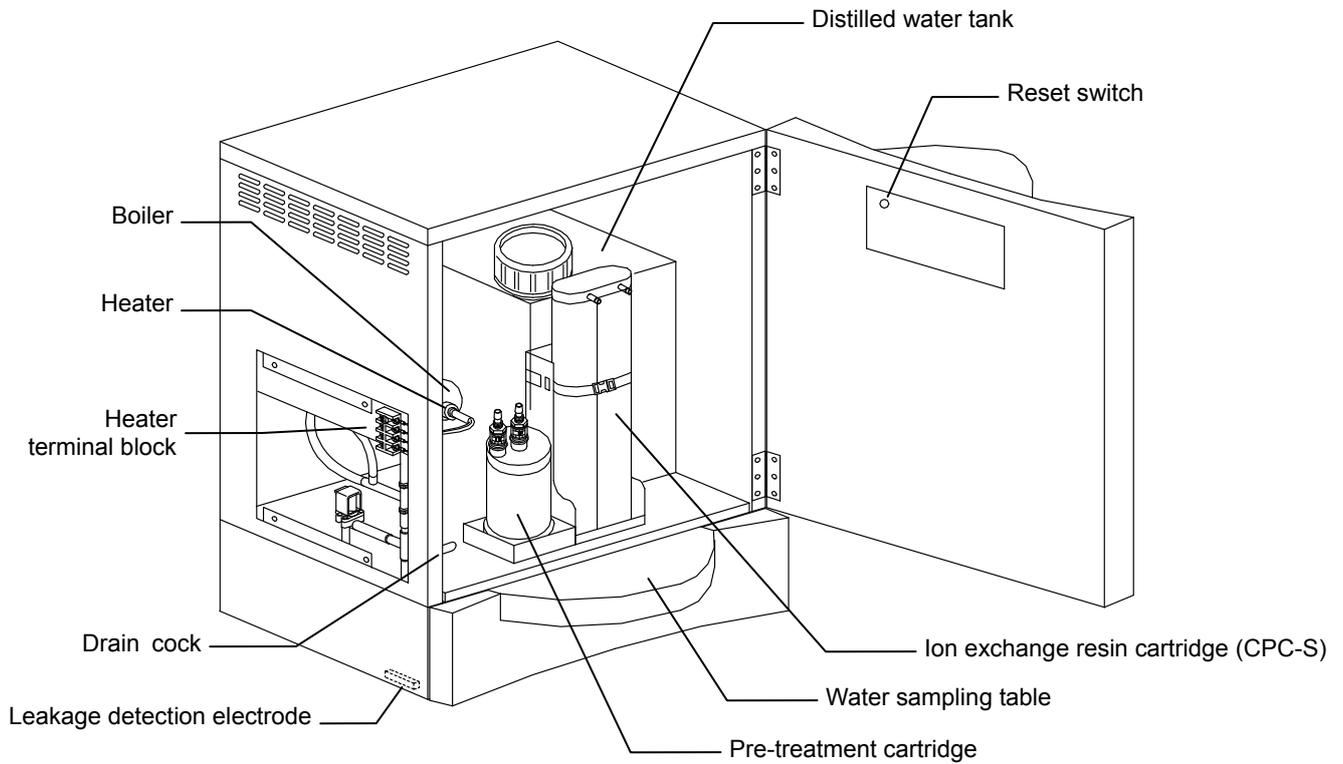
- (3) Screw the membrane filter, with the seal tape applied side on the top side, while taking care not to crush threads. Check for water leak during sampling of pure water. If any, screw the membrane filter further.



# Description and Function of Each Part

## Main Unit

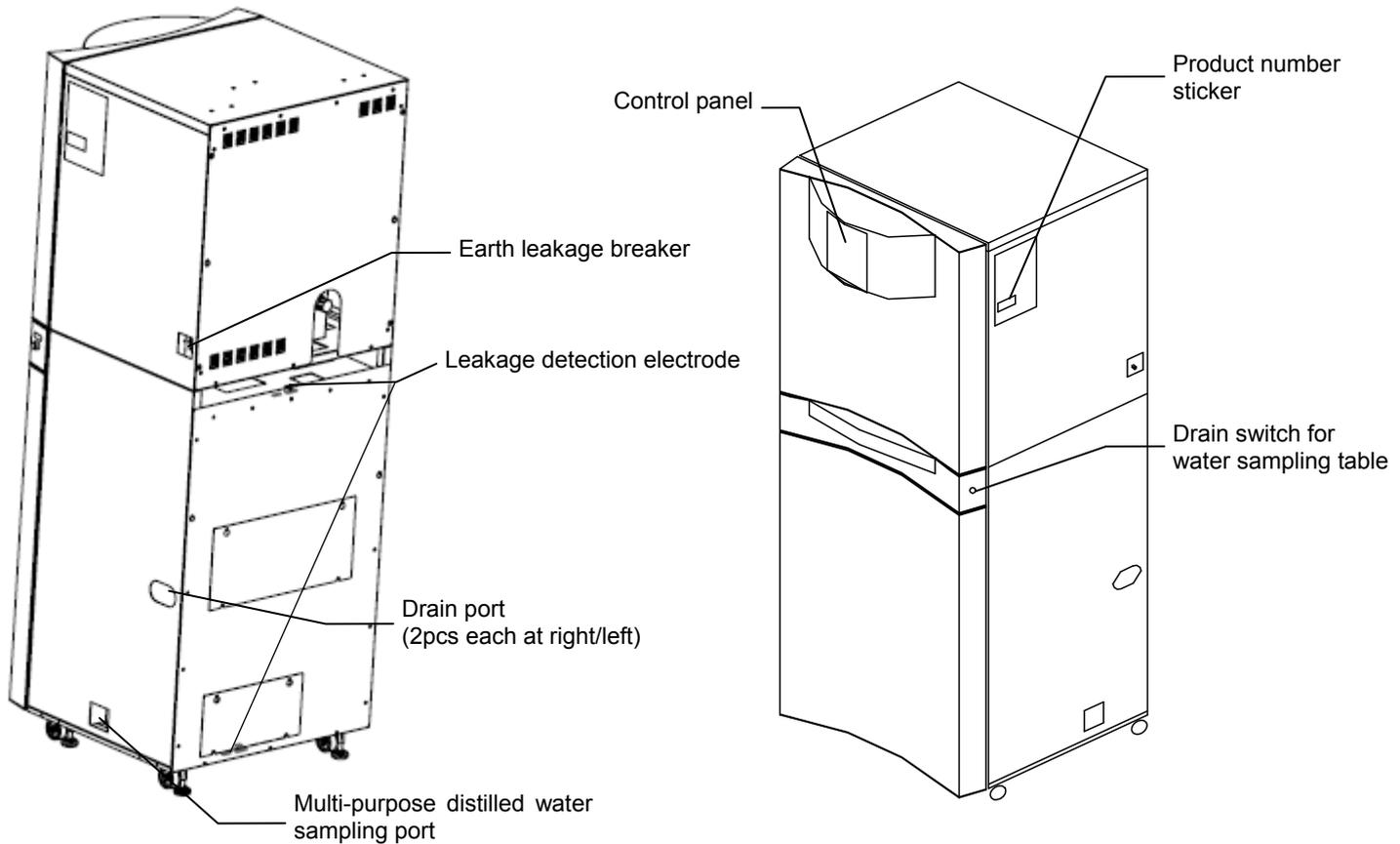
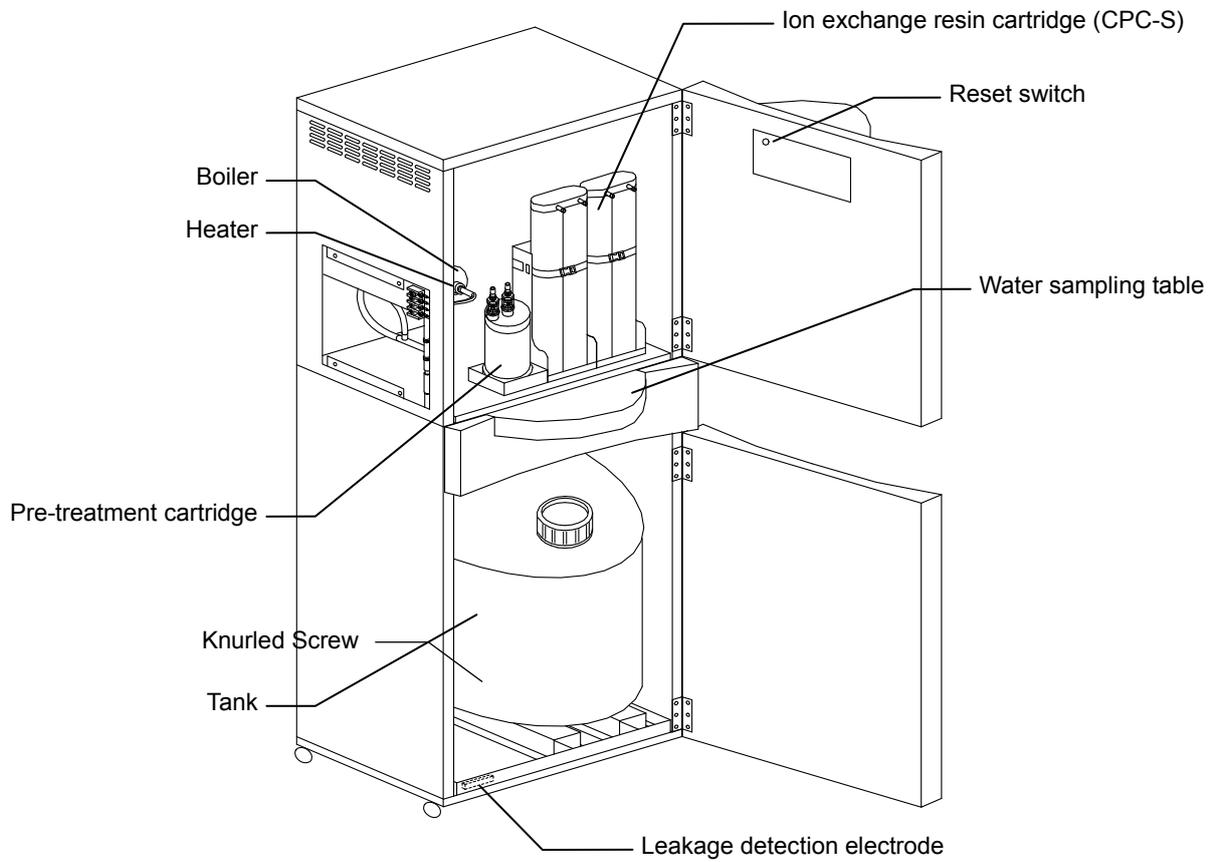
### WG250



# Description and Function of Each Part

## Main Unit

WG1000



# Description and Function of Each Part

## Water Sampling Table and Multi-Purpose Distilled Water Sampling Port

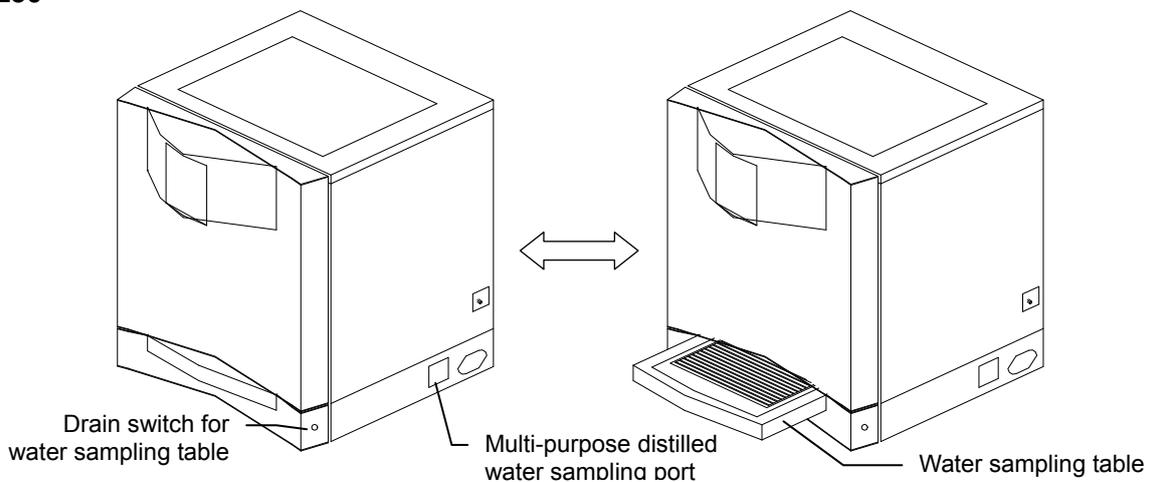
### Water sampling table

Use the water sampling table by pulling it out frontward. Because coolant for condenser is used, so for draining the water in the following cases (and coolant is not flowed), press the drain switch specifically used for the water sampling table at right side of the unit.

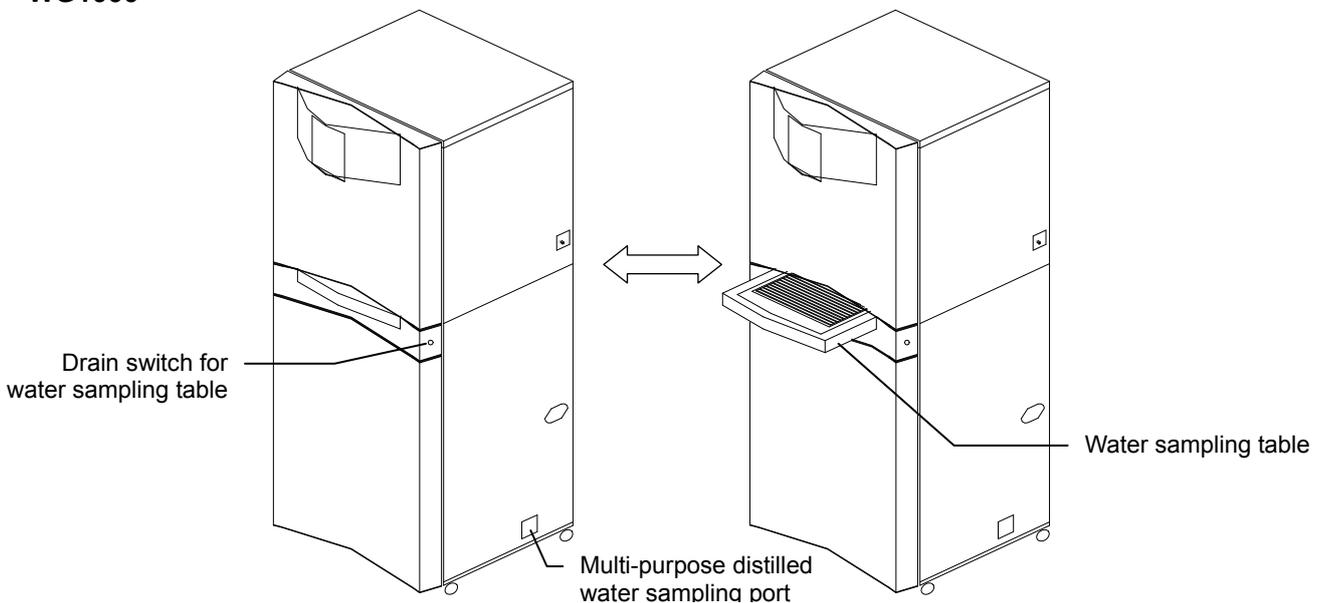
Coolant flows for one minute, and then, the water sampling table is drained. After that, returns to the condition before pressing the switch.

- ① When the tank is filled to capacity (Distillation is not operated.)
- ② When drawing pure water
- ③ While standby time (the breaker is turned on, and POWER key is turned off.)

### WG250



### WG1000



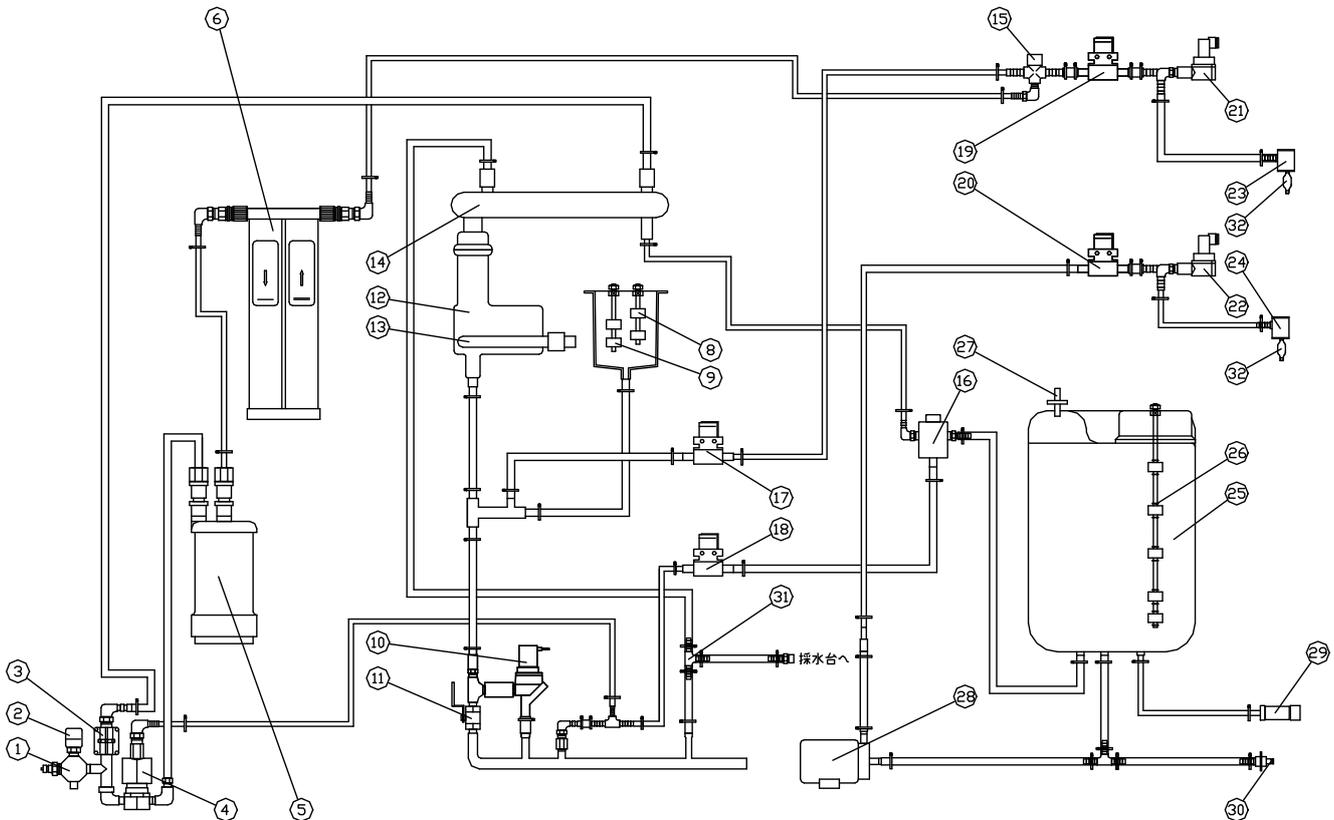
### Multi-purpose distilled water intake opening

The multi-purpose distilled water intake opening is located at right side surface of the unit, and one-touch joint is installed at the opening. Distilled water in the tank can be filled by removing the plug stopper, and connect the hard tube of  $\phi 8$  of outer diameter. Moreover, the one-touch joint is available as connection port for optional goods.

- Notice that distilled water pours when removing the plug stopper because the one-touch joint does not have the check valve.

# Description and Function of Each Part

## Piping System View



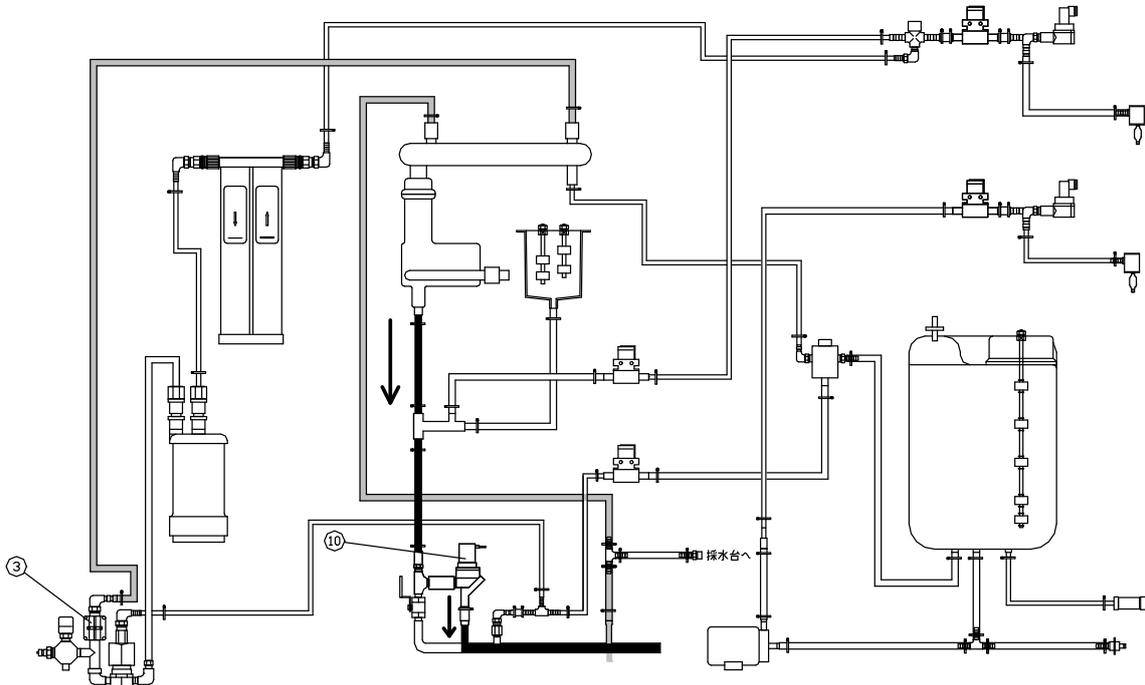
1	Pressure reduction valve	17	Boiler water supply solenoid valve
2	Pressure switch	18	Initial accumulated water drain solenoid valve
3	Cooling water solenoid valve	19	Ion exchange water sampling solenoid valve
4	Raw water supply solenoid valve	20	Distilled water sampling solenoid valve
5	Pre-treatment cartridge	21	Ion exchange water flow sensor
6	Ion exchange resin cartridge (CPC-S) (Two pieces are used for WG1000 type.)	22	Distilled water flow sensor
7	Float cylinder	23	Ion exchange water sampling port
8	Float switch 1	24	Distilled water sampling port
9	Float switch 2	25	Distilled water tank
10	Boiler drain solenoid valve	26	Float switch 3
11	Boiler drain cock	27	Air filter
12	Boiler	28	Distilled water sampling pump
13	Heater	29	Distilled water tank drain port
14	Condenser	30	Multi-purpose distilled water sampling port
15	Ion exchange water quality gauge electrode	31	Aspirator
16	Distilled water quality gauge electrode	32	Membrane filter

# Description and Function of Each Part

## Principle of Operation

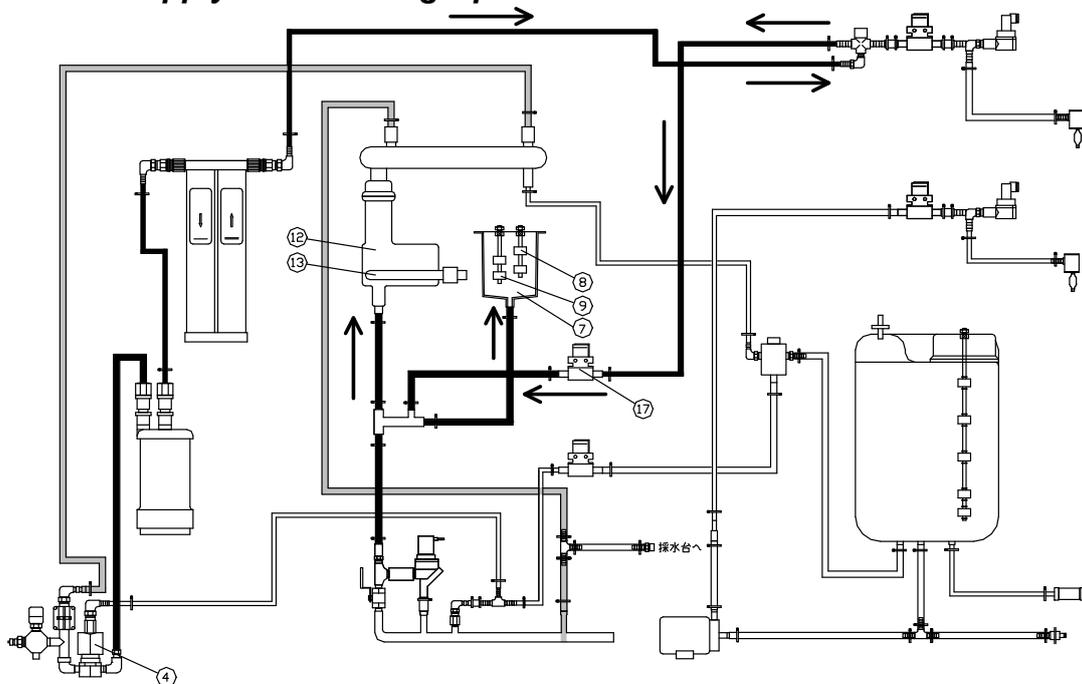
Description of the operation mechanism of WG250/1000 by each step.

### 1. Drain of the boiler



Turn on the earth leakage breaker and press POWER key. And after 15 seconds passed, boiler drain solenoid valve (10) opens for approx. 40 seconds, and cooling water solenoid valve (3) opens for approx. 30 seconds at the same time. Drain of the boiler is performed every 5 hours during distillation.

### 2. Boiler Water Supply and Distilling Operation

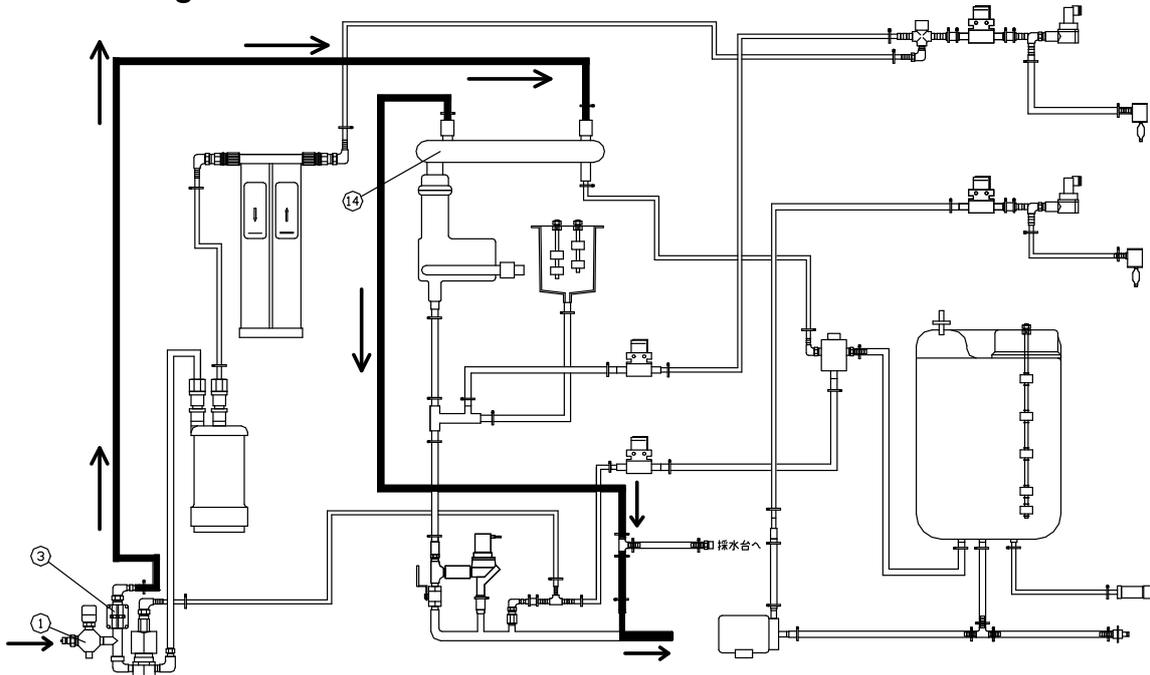


When drain of the boiler is finished, both of raw water supply solenoid valve (4) and boiler water supply solenoid valve (17) open at the same time in order to supply water to boiler (12). When float switch 1 (8) in float cylinder (7) detects water level, heater (13) is turned on and distillation starts. With float switch 2 (9), water supply to the boiler is controlled by opening/closing raw water supply solenoid valve (4) and boiler water supply solenoid valve (17).

# Description and Function of Each Part

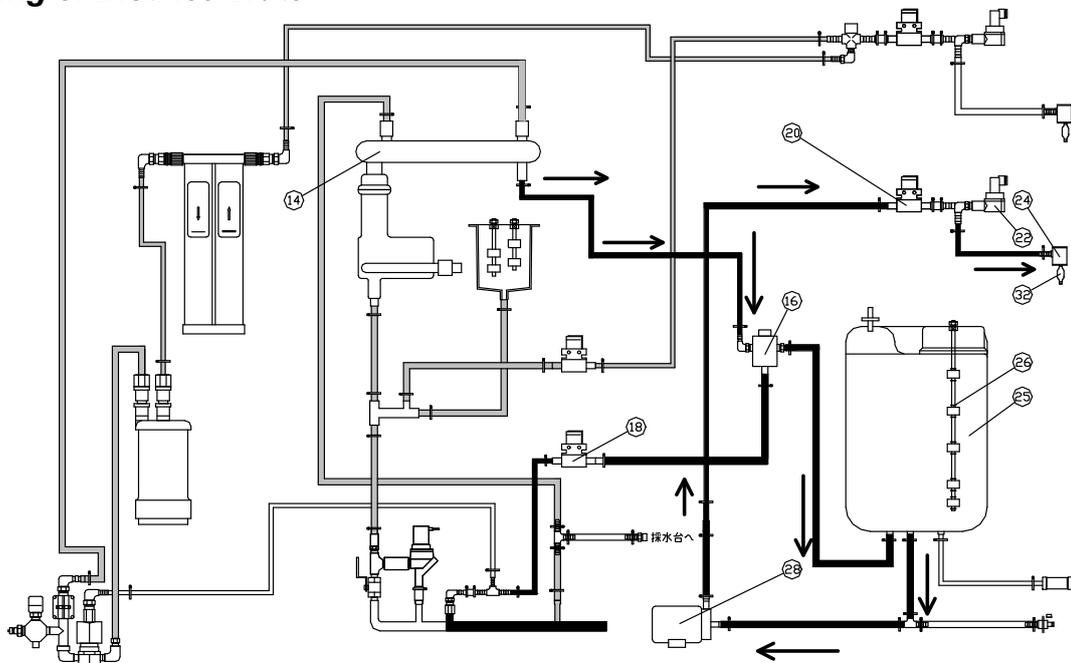
## Principle of Operation

### 3. Flow of Cooling Water



During distillation, water is supplied and discharged in the order: (1) pressure-reducing valve, (3) cooling water solenoid valve and condenser (14). When the distilled water tank is full, or when ion exchanged water is sampled, distillation is stopped, and the cooling water is also stopped automatically.

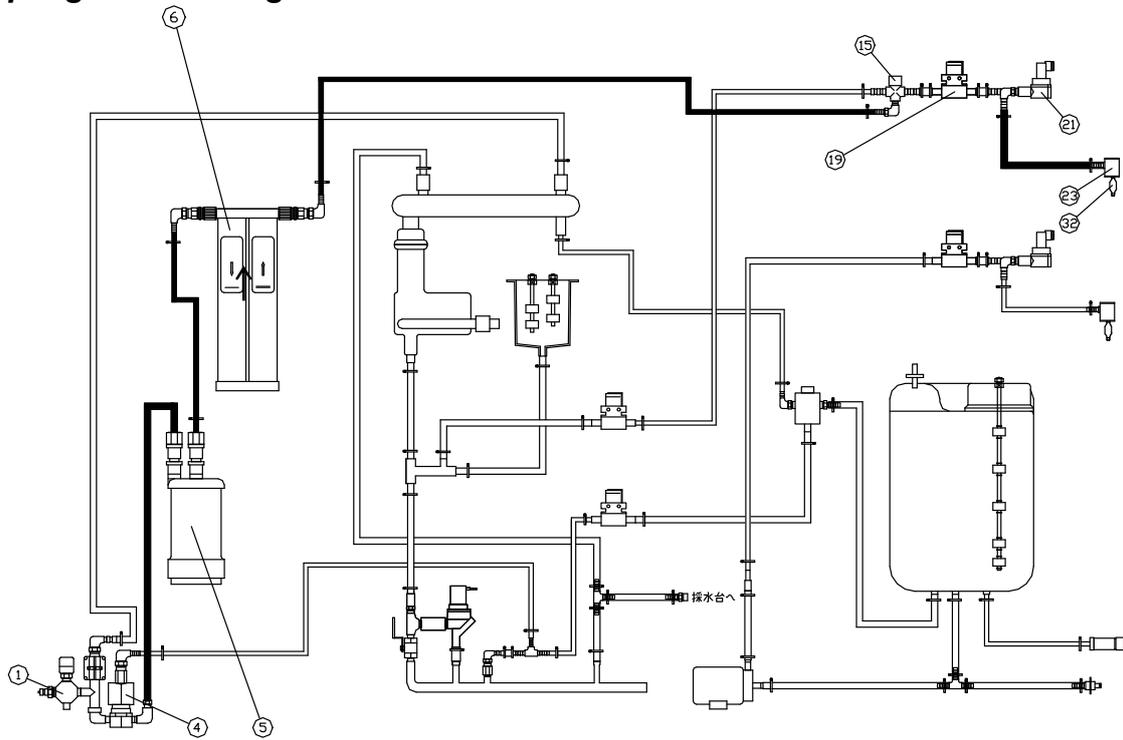
### 4. Sampling of Distilled Water



For 10 minutes after starting distillation, initial distilled water condensed in condenser (14) is drained by opening initial accumulated water drain solenoid valve (18). Then distilled water is stored in distilled water tank (25) by distilled water quality gauge electrode (16). Distillation stops as the tank is full when float switch 3 (26) on the top in the tank operates. The stored water is collected by distilled water sampling pump (28) through distilled water sampling solenoid valve (20), distilled water flow sensor (22), distilled water sampling port (24), and membrane filter (32).

## Principle of Operation

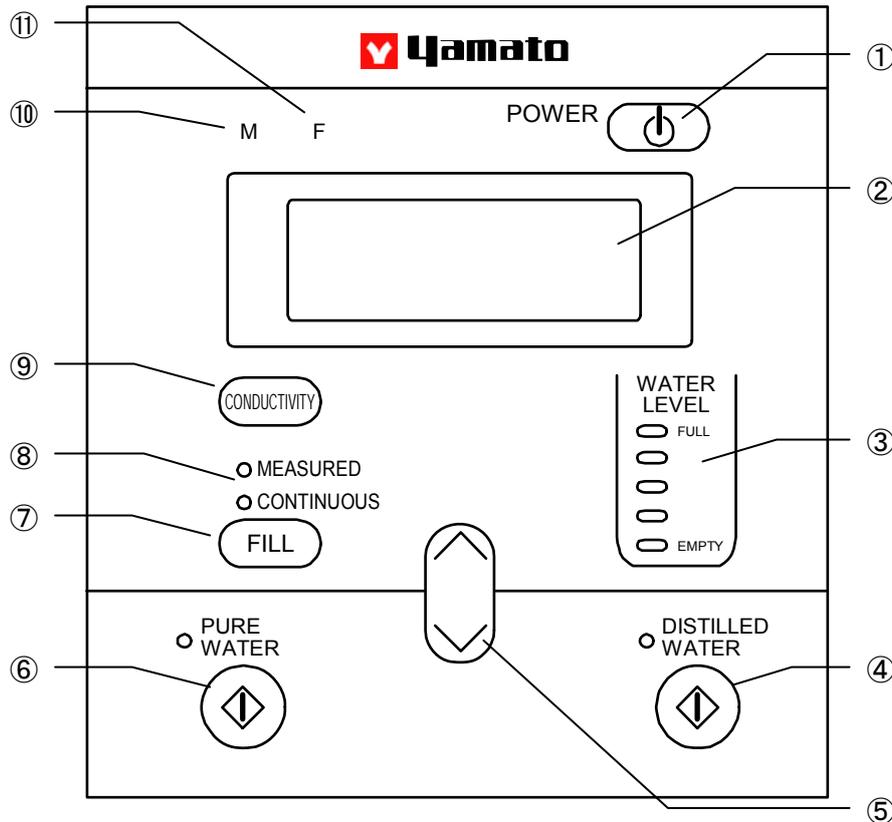
### 5. Sampling Ion Exchanged Water



Ion exchange water is sampled by way of the pressure-reducing valve (1), raw water supply solenoid valve (4), pre-treatment cartridge (5), ion exchange resin cartridge (6), ion exchange water quality electrode (15), ion exchange water sampling solenoid valve (19), ion exchange water flow sensor (21), ion exchange water sampling port (23), and membrane filter (32).

# Description and Function of Each Part

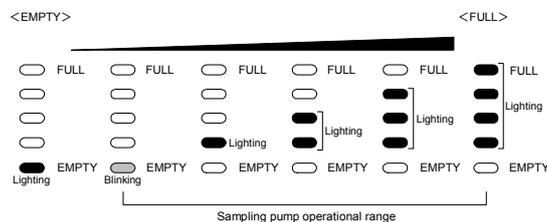
## Control Panel



①	POWER key	Turns on/off the power of the controller.
②	Message indication area	Indicates the measured value and setting value.
③	WATER LEVEL lamp	Indicates water level in the distilled water tank in five levels.
④	DITILLED WATER key	Starts/stops drawing distilled water.
⑤	▲ ▼ key	Selects the value setting item.
⑥	PURE WATER key	Starts/stops drawing pure water.
⑦	FILL key	Switches water collecting method. (Measured filling/Continuous filling)
⑧	FILL lamp	Lights up when either of MEASURED or CONTINUOUS is selected.
⑨	CONDUCTIVITY key	Switches conductivity indication unit. (S/m□Ω·m)
⑩	M key	Used when entering submenu or maintenance mode. Also (confirms the setting) then shifts to the next setting item.
⑪	F key	(Cancels the setting) then returns to the previous setting item.

### Description of ③ WATER LEVEL lamp

This lamp indicates the storage amount of distilled water in the tank in five levels. When this red lamp lights, distilled water cannot be collected for empty drive prevention of the pump. When this red lamp lights, distilled water cannot be collected for empty drive prevention of the pump. When water keeps being stored, and a red lamp in the lower is blinking, distilled water can be gathered. In addition, a red lamp in the lower is turned off when the amount of storing water increases, a green lamp since the second step lamp, and the amount of storing water can be confirmed.



## Setup and Check before Use

---

### **WARNING!**

#### 1. Check of water supply

- Check that the water supply hose is securely connected.
- Open the tap.
- Check that water does not leak from connection of water supply hose.

#### 2. Check of drain

- Check that the drain hose is securely connected.
- Check that the drain hose is free from bend or projection.
- When the drain hose is bent or the like, system does not operate normally, and in addition, it may lead to water leakage accident. Inspect from time to time, and ensure that water is drained properly.

#### 3. Check of power supply

- Check that the power cord is connected to appropriate plug socket.

#### 4. Before operation

- Turn on the earth leakage breaker, then, perform calibration before pressing POWER key. Perform calibration operation at first-time using this unit (refer to page 22) and when changing the heater of the boiler (refer to page 37). Press POWER key while holding down PURE WATER key and DISTILLED WATER key. Perform calibration operation (at the measured values of heater temperature and power-supply voltage) for about five minutes, after then, distillation starts automatically. Key operation becomes disable while calibration operation. In case that power failure occurs while calibration operation, please perform calibration again.

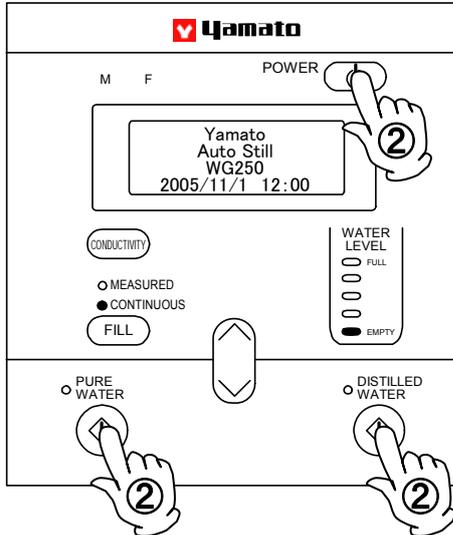
#### 5. Caution at initial operation

- In sampling distilled water in initial energization and drain from distilled water storage tank, air is contained in the pump and piping, and it takes time until sampling is started.
- In sampling ion exchanged water immediately after changing pre-treatment cartridge or ion exchange resin cartridge, it also takes time until sampling is started. Further, when each cartridge is changed, drain about 5 liters in order to remove initial impurities.

## Operation Procedure

When operation is set up, follow the procedure below for operation:

### 1. Turning on power



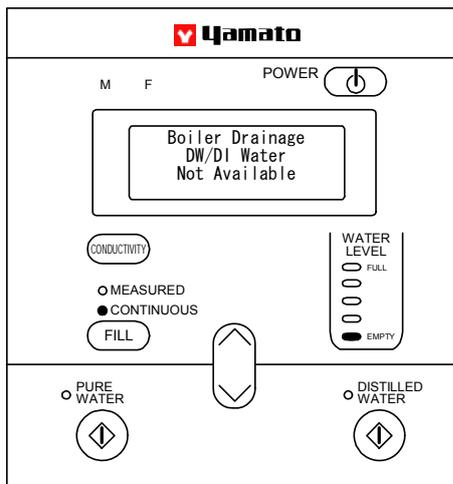
When first-time using the unit, perform calibration operation.

1. Turn on the earth leakage breaker.
2. Press POWER key while holding PURE WATER key and DISTILLED WATER key.
3. After five minutes passed, distillation starts automatically. (Clause 3)

From the second time using:

- ① Turn on the earth leakage breaker.
- ② Press POWER key.

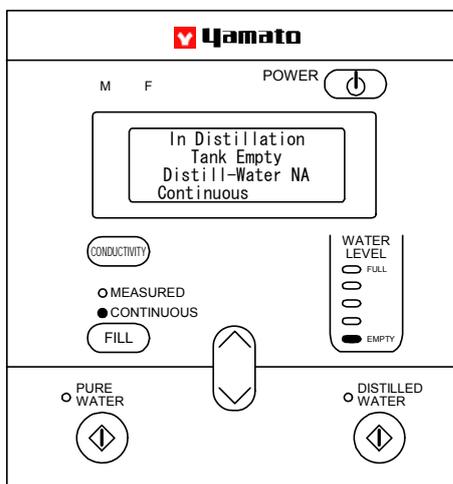
### 2. Drain of the boiler



Drain of the boiler starts.

Drain of the boiler starts when turning on/off the earth leakage breaker, and when five hours passed after distillation starts. (Drain of the boiler does not start if POWER key is not turned on.)

### 3. Distillation operation



Distillation operation starts.

When there is no water in the tank, the left screen display and the below screen display are alternately indicated at 5 seconds interval. The value  $\dots \times 10^{-4} \text{S/m}$  is indicated while initial distilled water is drained (approx. 10 minutes), after that, the below screen is displayed.

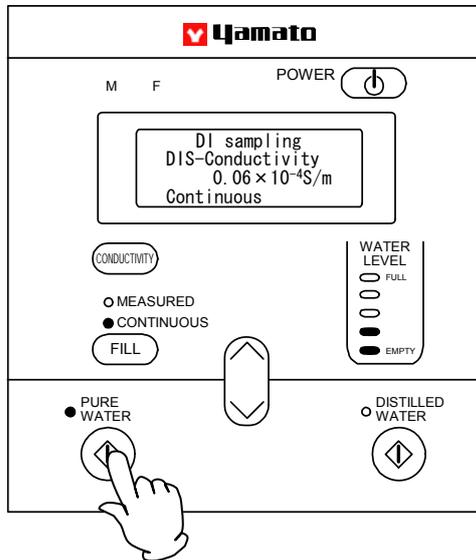
In Distillation  
DW-Conductivity  
 $0.854 \times 10^{-4} \text{S/m}$   
Continuous

It takes approx. 4 hours till the tank is filled at the water collection available level. The above screen appears. When the tank is full, the below screen appears.

DistillationStop  
Tank Full  
Continuous

## Sampling of Pure Water

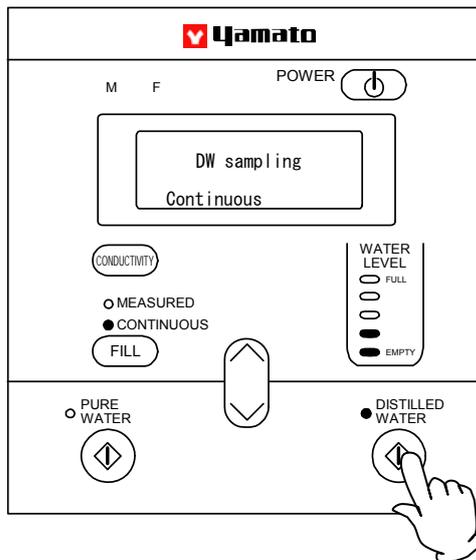
### Continuous collection of pure water



PURE WATER lamp lights up by pressing PURE WATER key while “CONTINUOUS” lamp is ON. Then, pure water can be collected.

Collecting water stops by pressing PURE WATER key again. Then, PURE WATER lamp is turned on. After water collection is finished, it returns to distillation operation.

### Continuous collection of distilled water

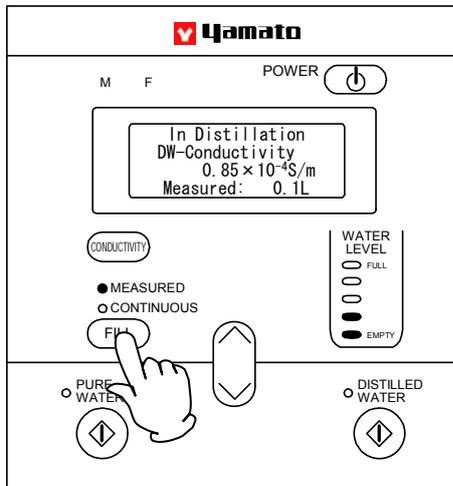


DISTILLED WATER lamp lights up by pressing DISTILLED WATER key while “CONTINUOUS” lamp is ON. Then, distilled water can be collected.

Collecting water stops by pressing DISTILLED WATER key again. Then, DISTILLED WATER lamp is turned on. After water collection is finished, it returns to distillation operation.

## Collection of Measured Amount of Pure Water

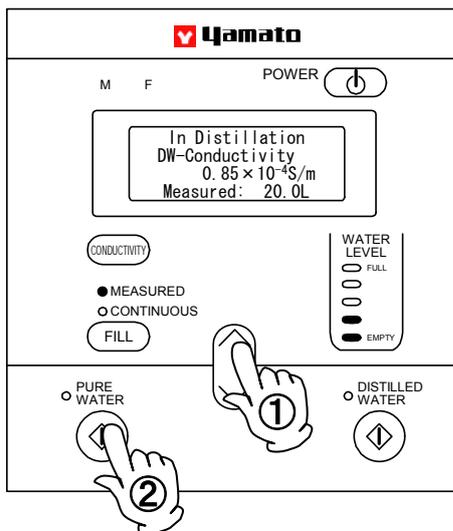
### 1. Switching water collection method



Switch to “MEASURED” amount water collection method.

Switch from “CONTINUOUS” to “MEASURED” by pressing FILL key.

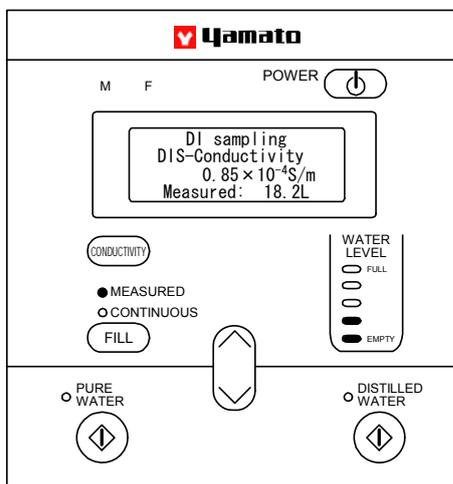
### 2. Amount of collecting water setting



Set the amount of collecting pure water. The same setting screen is used for setting of pure water and distilled water.

1. Set the amount of pure water by pressing ▲▼ key. Set up to 30 liters for WG250, or up to 100 liters for WG1000.
2. After setting, pressing PURE WATER key starts water collection.

### 3. Collecting

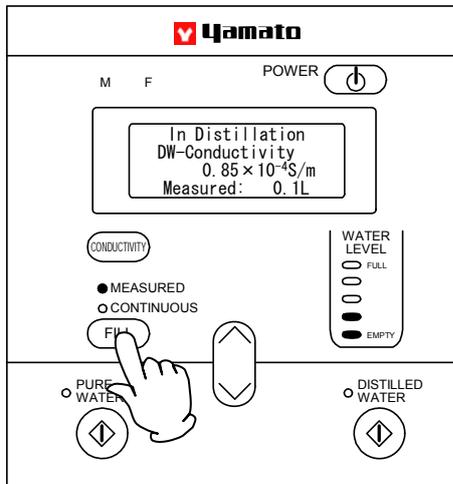


Water collection of measured amount starts.

1. The counter starts decrementing from the setting value.
  2. When collecting water is finished, message “Measured: 0.0L” appears on the window.
  3. Go back to clause 2.
- ❖ If pressing PURE WATER key while collecting water, the operation stops and the setting value is reset.

## Collection of Measured Amount of Distilled Water

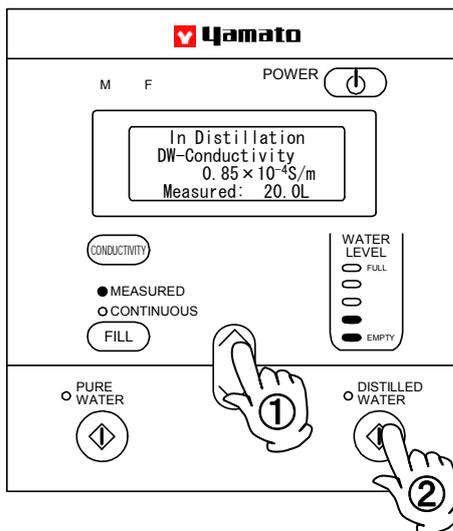
### 1. Switching water collection method



Switch to “MEASURED” amount water collection method.

Switch from “CONTINUOUS” to “MEASURED” by pressing FILL key.

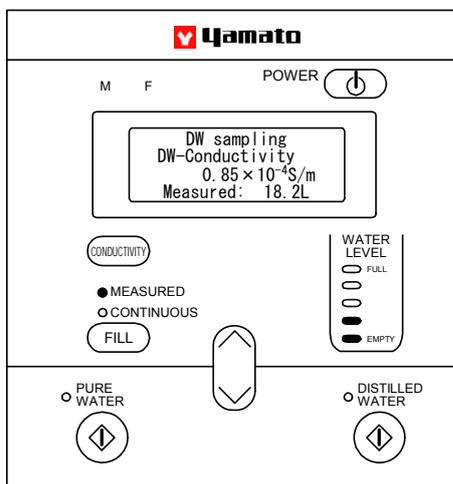
### 2. Amount of collecting water setting



Set the amount of collecting distilled water. The same setting screen is used for setting of pure water and distilled water.

1. Set the amount of distilled water by pressing ▲▼ key.  
Set up to 30 liters for WG250, or up to 100 liters for WG1000.
2. After setting, pressing DISTILLED WATER key starts water collection.

### 3. Collecting

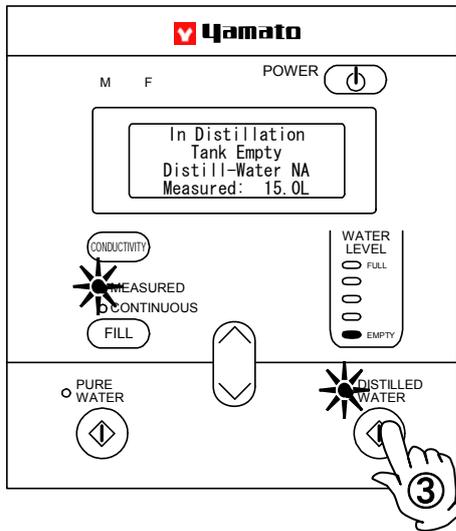


Water collection of measured amount starts.

1. The counter starts decrementing from the setting value.
  2. When collecting water is finished, message “Measured: 0.0L” appears on the window.
  3. Go back to clause 2.
- ❖ If pressing DISTILLED WATER key while collecting water, the operation stops and the setting value is reset.

## Collection of Measured Amount of Distilled Water

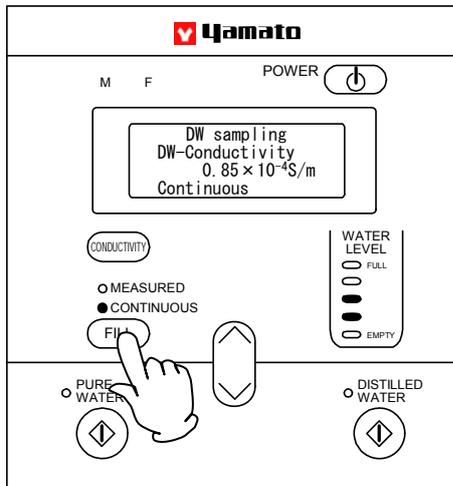
In case that the tank becomes empty while collecting water



1. The left screen is displayed when the tank becomes empty during collecting water, and DISTILLED WATER lamp blinks and operation of water collection is suspended.
2. Distillation starts.
3. In case that "EMPTY" lamp of WATER LEVEL display does not light up, press DISTILLED WATER key again to start collecting water. If PURE WATER key is pressed under this condition, the holding condition is released.
4. After collecting water is finished, "Measured: 0.0L" appears on the window, and return to the screen of Clause 2.

## Display of Water Quality

### Switching conductivity unit

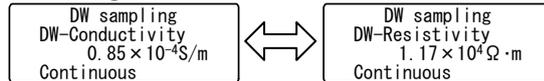


Switch the conductivity unit.

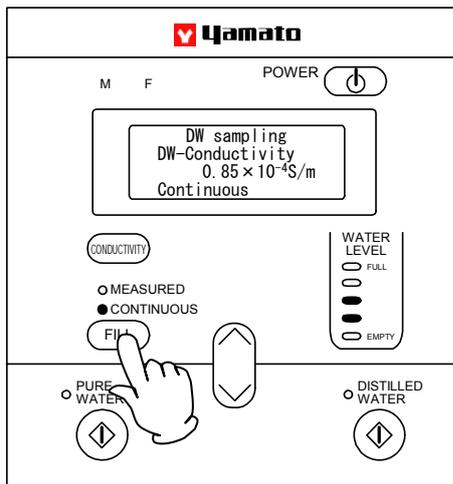
Pressing CONDUCTIVITY key for 2 seconds switches the conductivity unit.

Ex)

In case of switching the conductivity unit during collecting distilled water



### Switching conductivity display

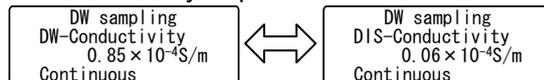


Switch the conductivity display. The conductivity of distilled water is displayed during distillation, and the conductivity of pure water is displayed during collecting pure water.

Pressing CONDUCTIVITY key switches the conductivity display for either of pure water or distilled water.

Ex)

In case that you want to see the conductivity of pure water during collecting distilled water: In case that the conductivity of pure water



If not pressing any keys, the conductivity display is returned.

## Display of Water Quality

### Measurement of Electric Conductivity

The water conductivity meter on the control panel displays the conductivity at the outlets of the ion-exchange resin cartridge and the condenser for distilled water. The displayed value can be used as an index for replacing the ion-exchange resin cartridge. The value of conductivity is valid only when the electrode is fully damped with water, or when pure water is dripped. Correct value is not displayed in the following cases because the electrode is not damped or air bubbles are produced.

1. At beginning of operation and during halts
2. Just after changing pretreatment cartridge or ion-exchange resin cartridge
3. Just after distillation starts

### Electric conductivity

- Electric conductivity is a value indicating easiness of flowing of electricity. In the case of water, electricity flows the more easily when the more electrolyte i.e. impurity is solved, so the value of conductivity is the greater; when the less electrolyte is solved, the smaller is the value.
- When the value of electric conductivity is the smaller, the better is purity of pure water.
- Here, electric conductivity indicates only electrolyte, and does not indicate content of non-electrolyte (such as organic substance, colloid substance, dissolved gas, and microorganism), and it is just an index indicating purity of pure water, and it does not represent all of purity.
- Specific resistivity indicates the same contents as electric conductivity. Specific resistivity is inversely related to electric conductivity, and when the value is the greater, the better is purity.
- When obtaining specific resistivity from electric conductivity, where specific resistivity is  $R$  and electric conductivity  $\rho$ ,

$$R [\Omega \cdot m] = \frac{1}{\rho [S/m]} \quad \text{or} \quad R [\times 10^4 \Omega \cdot m] = \frac{1}{\rho [\times 10^{-4} S/m]}$$

So the theoretical value of pure water is as follows:

$$R = 18.3 \times 10^4 \Omega \cdot m \quad (18.3 M\Omega \cdot cm) \quad 25^\circ C$$

(Take notice that the resistivity is displayed in integer form (not in decimal) in the range 18 to 1 x 10<sup>4</sup>  $\Omega \cdot m$ .)

$$\rho = 0.055 \times 10^{-4} S/m \quad (0.055 \mu S/cm) \quad 25^\circ C$$

### Quality of ion exchange water and distilled water

- Ion exchange water and distilled water have the following features respectively. Distinguish them as necessary in use.

It is ideal to use pure water immediately after sampling; therefore be sure to drain water in distilled water tank if it is out of use for a long time. If water has been stored in distilled water tank for a long time, drain once, then store in distilled water tank newly before use.

#### 1. Ion exchange water

Most of electrolyte in water is removed, and water with the lowest electric conductivity is obtained. However, non-electrolyte cannot be removed. In addition, slight fall of purity is found while resin is new and when water is fed again after halt of system.

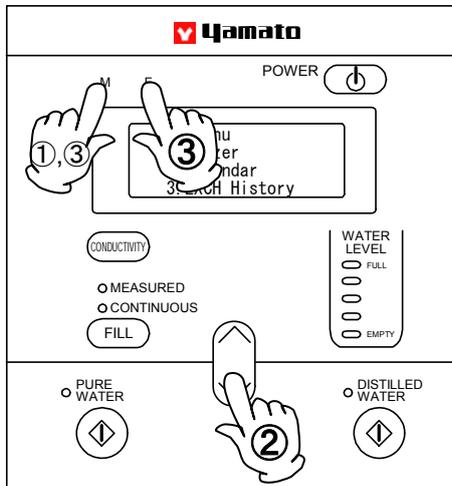
#### 2. Distilled water

Electrolyte and non-electrolyte can be removed in average except for low boiling point substance such as ammonia. However, carbon dioxide gas in the atmosphere is absorbed and carbon oxide is generated in the process of manufacturing (condensing/storing), and so the electric conductivity is worse than ion exchange water, that is 1 to 2.5 X 10<sup>-4</sup> S/m (1 to 2.5  $\mu$  S/cm) at 25C, and represents weak acid (pH5 to 6).

See "2 - Common item (11) Water" of JIS K0102 (Plant drain test procedure) for removal of dissolved gas (oxygen and carbon dioxide) in pure water.

## Setting/Display of Submenu

### 1. Setting/display of submenu



Perform setting/display of submenu.

1. Pressing M key for 2 seconds displays the submenu.
  2. Select the item to be set or displayed by pressing ▲▼ key.
  3. Pressing M key confirms the setting and shifts to the selection screen.
- ❖ Press F key to (cancel the setting and) return the previous setting screen.
  - ❖ If not pressing any keys for 2 minutes, the screen returns to the previous display before setting/display of submenu.

Items of submenu are:

- 1) ON/OFF of buzzer sound
- 2) Calendar setting
- 3) Consumables change history
- 4) Maintenance history
- 5) Error occurrence history
- 6) Power failure occurrence history
- 7) Water cutoff occurrence history
- 8) Language selection
- 9) Power failure recovery function

### 2. Setting/display of each item

#### 2.1. Setting of ON/OFF of buzzer sound

Buzzer  
1. Key Click  
2. Error Buzz

To set a key clicking sound/alarm buzzer sound:

1. Select an item of submenu by pressing ▲▼ key.
  2. Confirm the item by pressing M key. The selection screen appears.
  3. Specify "ON" or "OFF" of each item by pressing ▲▼ key, and confirm the setting by pressing M key.
  4. Pressing F key returns to the submenu screen.
- ❖ "ON" is set to buzzer sound at default setting.

#### 2.2. Calendar setting

Calendar  
2005 year  
9/29 month/day  
12:25 h:min

To set the calendar:

1. Set the items (year/month/day/hour/minute) by pressing ▲▼ key.
2. Confirm the setting by pressing M key.
3. The set items are displayed. Check the set items and confirm your entry by pressing M key to go to the selection screen.
4. Pressing F key returns to the previous submenu screen.

#### 2.3. Consumables change history

Buzzer  
1. Hollow Filter  
2. Ion-Exchange-S  
3. DW M-Filter

4. 6.DI M-Filter

To display the history of changing pretreatment filter, ion-exchange resin (S), M filter for distilled water, and M filter for pure water:

1. Display an item of submenu by pressing ▲▼ key.
  2. Confirm the setting by pressing M key. The history display appears.
  3. Confirm the history by pressing ▲▼ key.
  4. Pressing F key returns to the previous screen.
- ❖ Up to 20 records are displayed for each change history. If it exceeds 20 records, the oldest record is deleted.

## Setting/Display of Submenu

<p>2.4. Maintenance history</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;">           Maintenance History No.1  2005/09/29 12:25         </div>	<p>To display the maintenance history:</p> <ol style="list-style-type: none"> <li>1. Confirm the maintenance history by pressing ▲▼ key.</li> <li>2. Pressing F key returns to the previous screen.</li> </ol> <ul style="list-style-type: none"> <li>❖ Up to 20 records are displayed for each change history. If it exceeds 20 records, the oldest record is deleted.</li> </ul>
<p>2.5. Error occurrence history</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;">           Error History History No.1 Leak error 2005/09/29 12:25         </div>	<p>To display the error occurrence history:</p> <ol style="list-style-type: none"> <li>1. Confirm the maintenance history by pressing ▲▼ key.</li> <li>2. Pressing F key returns to the previous screen.</li> </ol> <ul style="list-style-type: none"> <li>❖ Up to 20 records are displayed for each change history. If it exceeds 20 records, the oldest record is deleted.</li> <li>❖ For details of error alarms, refer to page 42.</li> </ul>
<p>2.6. Power failure occurrence history</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;">           Outage History History No.1 ↓ 05/09/29 12:25 ↑ 05/09/29 12:30         </div>	<p>To display the power failure occurrence history:</p> <ol style="list-style-type: none"> <li>1. Confirm the maintenance history by pressing ▲▼ key.</li> <li>2. Pressing F key returns to the previous screen.</li> </ol> <ul style="list-style-type: none"> <li>❖ Up to 20 records are displayed for each change history. If it exceeds 20 records, the oldest record is deleted.</li> </ul>
<p>2.7. Water cutoff occurrence history</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;">           Water Alarm History No.1 ↓ 05/09/29 12:25 ↑ 05/09/29 12:30         </div>	<p>To display the water cutoff occurrence history:</p> <ol style="list-style-type: none"> <li>1. Confirm the maintenance history by pressing ▲▼ key.</li> <li>2. Pressing F key returns to the previous screen.</li> </ol> <ul style="list-style-type: none"> <li>❖ Up to 20 records are displayed for each change history. If it exceeds 20 records, the oldest record is deleted.</li> </ul>
<p>2.8. Language selection</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;">           Language 1. Japanese 2. English         </div>	<p>To select display language:</p> <ol style="list-style-type: none"> <li>1. Select an item of submenu by pressing ▲▼ key.</li> <li>2. Confirm the item by pressing M key. The submenu screen appears.</li> </ol>
<p>2.9. Power failure recovery function</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;">           Resume Function 1. No 2. Yes         </div>	<p>To set the power failure recovery:</p> <ol style="list-style-type: none"> <li>1. Select an item of submenu by pressing ▲▼ key.</li> <li>2. Confirm the item by pressing M key. The submenu screen appears.</li> </ol> <ul style="list-style-type: none"> <li>❖ This function is set to "invalid" at default setting.</li> </ul>
<p><b>3. Finishing of setting/display</b></p>	
<p>Press M key for 2 seconds. The screen returns to the previous display before setting/display submenu.</p>	

## **WARNING!**

### **If a problem occurs**

-  If smoke or strange odor should come out of this unit for some reason, turn off the power key right away, and then turn off the circuit breaker and the main power. Immediately contact a service technician for inspection. If this procedure is not followed, fire or electrical shock may result. Never perform repair work yourself, since it is dangerous and not recommended.

### **During a thunder storm**

-  During a thunderstorm, turn off the power key immediately, then turn off the circuit breaker and the main power. If this procedure is not followed, fire or electrical shock may be caused.

### **Take enough care in handling detergent (liquid)**

- 
  - In storing detergent (liquid), store in enclosable container avoiding high temperature and humidity.
  - Principal component of detergent (liquid) Orgazor 10 is sulfamic acid (acidic with pH of water solution approx. 1).
  - In handling this detergent (liquid), use protective tools (gloves, mask, and glasses).
  - When it is in contact with human body, wash it away with clean water.
  - Neutralize the liquid with neutralizer (such as sodium hydroxide) after washing.
  - Ensure neutralization with pH test paper, etc.
  - Do not use empty container for beverage.
  - Do not allow detergent to directly flow into agricultural irrigation canal or fields because it causes withering of rice crop.

### **Do not step on this unit**

-  Do not step on this unit. It will cause injury if this unit fall down or break.

### **Do not put anything on this unit**

-  Do not put anything on this unit. It will cause injury if fall.

### **In power failure (In case that the unit does not power failure recovery function)**

-  When system has halted during operation due to power failure etc. and is provided with power again, system is brought to standby status. When restarting operation, start from (Page 22 "1. Turning on power").

## Daily Inspection and Maintenance

**Timing of maintenance and inspection**  
**(Perform daily inspection for stable use of product.)**

Maintenance/check items	Reference for timing	Remarks
Replacement of pre-treatment cartridge	Approx. 6 months Exchange message appears on the indication area.	Throughput: About 5000 liters of city water in Tokyo. If the quality of raw water is not good, perform this maintenance as soon as possible.
Replacement of membrane filter	Approx. 3 months Exchange message appears on the indication area.	Throughput: approx. 500 liters for pure water. Need to exchange if the amount of collection is less than the above value.
Replacement of ion exchange resin cartridge	Exchange message appears on the indication area. (Displayed when the conductivity of pure water is more than $1 \times 10^{-4}$ S/m.)	Throughput: About 700 liters of the raw water of $200 \times 10^{-4}$ S/m. (1400 liter for WG1000 type)
Cleaning of distiller	3 months	If the quality of raw water is not good, start the operation as soon as possible.
Cleaning of water supply hose filter	6 months	
Replacement of hose	2 years	Connections shall be checked monthly.
Drainage of distilled water tank	3 months	If not used for a long time, drain water from the tank.

### Replacement of pre-treatment cartridge

- See Page 11 "21. Secure the pre-treatment cartridge securely" for replacement procedure.
- When the cartridge is put to use without replacement, life span of ion exchange resin cartridge becomes short.
- Please dispose used cartridge as noncombustibles. When it is sent back to our company, fill in the designated invoice attached to a new cartridge, and send it with the used cartridge to us.

### Replacement of ion exchange resin cartridge

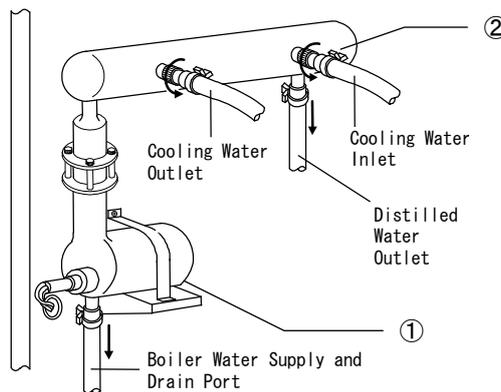
- When a cartridge is stored for a long time, deterioration of water quality and fall of processing capacity are found; therefore prepare a spare cartridge in a planned manner for replacement timing. Standard for storage is about 4 months.
- In replacement, see Page 10 "20. Install the ion exchange resin cartridge (CPC-S) securely".
- When a cartridge is used without replacement, much scale is deposited on boiler and heater, which causes decrease of distilled water sampling and damage to heater.
- Please dispose used cartridge as noncombustibles. When it is sent back to our company, fill in the designated invoice attached to a new cartridge, and send it with the used cartridge to us.
- We promote the reasonable disposal, collection, and recycling of cartridge for environmental protection.

※ After changing the pretreatment cartridge, the membrane filter, or the ion-exchange resin cartridge, press and hold the reset switch at backside of the door for two seconds till a beep is heard. Then the warning indication is reset and the change record is registered in the consumables change history. In case that two or more items are changed at the same time, they are registered in the consumables change history in order of occurrence. However, be sure that the ion-exchange resin cartridge is normally registered at the last. (Warning alarm for the ion-exchange resin cartridge is automatically recovered.)

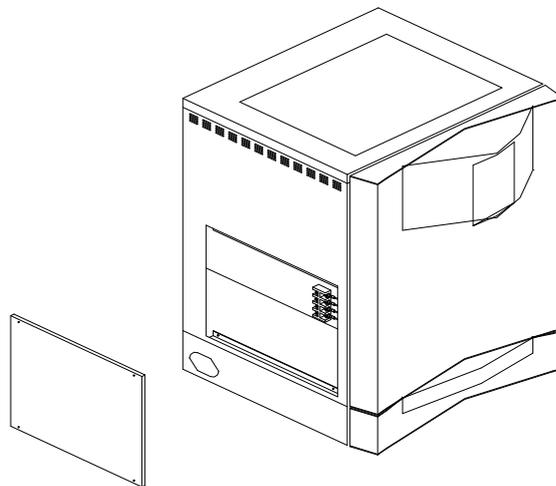
## Washing of Distiller

### Dismounting of Distiller

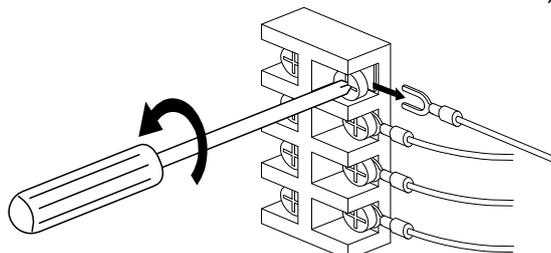
1. Turn "OFF" the earth leakage breaker of the unit.
2. Close the tap.
3. Check that the boiler is not hot (longer than 30 minutes after the breaker is turned "OFF"), then open the front door of the unit, and open the boiler water drain cock.
4. Disconnect the hose connected to the boiler ① and condenser ②. In disconnecting from the distilled water outlet and boiler water supply and drain port, turn the hose band by use of tool and displace the engaged portion (serrated portion). Take care in disconnecting because excessive force applied to glass may cause damage.



5. Disconnect the hole plug at left plate, remove four screws with a screw driver, then remove the left plate.



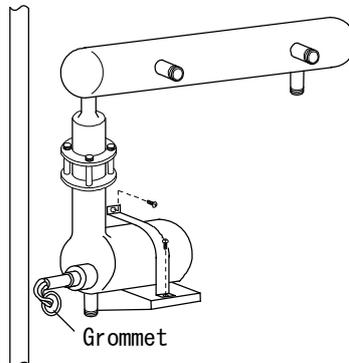
6. Loosen 4 screws on the right of terminal block located at the right top of the body frame with left side plate dismounted by use of Phillips screwdriver, and disconnect the heater lead terminal. (For WG1000, 8 pieces of screw are used because it has two heaters.)



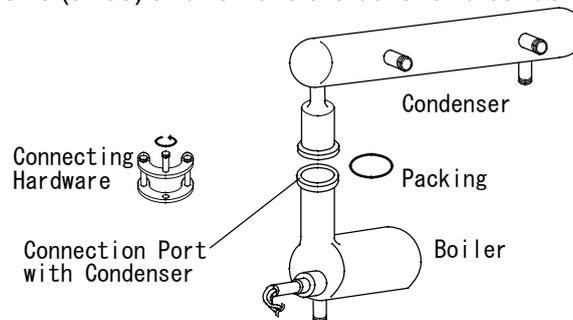
## Washing of Distiller

7.

- 1) Disconnect the heater lead wire from grommet.  
Note that, do not bend or pull the heater lead wire more than necessary.
- 2) Remove the two screws of boiler securing band with a Phillips screwdriver, and take the boiler and condenser out of the body.



- 3) Loosen the knurled screws (three) and remove the boiler and condenser.



### Washing of boiler

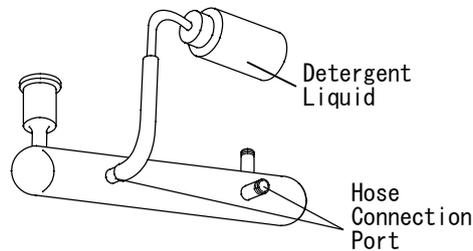
1. Adjust detergent liquid.
  - 1) Prepare approx. 2 liters of hot water at 50 to 60°C.
  - 2) Add attached scale detergent (Orgazor) approx. 200g to hot water prepared in 1) and agitate well.
2. Seal the hose connection port at the bottom of boiler (boiler supply and drain port) by use of rubber stopper, etc.
3. Secure the boiler at a stable position to prevent washing liquid from spilling.
4. Pour in washing liquid through connection port with condenser with heater turned on.  
Most scale is removed in 4 to 5 hours approximately. Drain washing liquid in the boiler. If much scale is distiller deposited, pour in washing liquid newly, and repeat washing
  - 1) When scale-removing work is finished, take the heater out of boiler and wash each of them enough with city water. Here, in washing the heater with water, be sure to fill a larger beaker with water and wash the heater inside so that lead wire and its routing port are not wet by water.  
Avoid washing the heater directly with water from tap.
  - 2) If solid scale distiller remains after washing by washing liquid, follow the remedy below:  
Boiler: Scrub with brush etc. for removing.  
Heater: Scrub with something soft such as wood piece or plastic.

In this connection, remove scale on the heater uniformly in general, never leaving solid scale in part. In an extreme case, only such part has a great heat resistance, causing damage to the heater.

## Washing of Distiller

### Washing of Condenser

1. Pour detergent liquid into the cooling pipe of condenser.  
(See Page 34 "Washing of boiler" for formulating detergent liquid.)



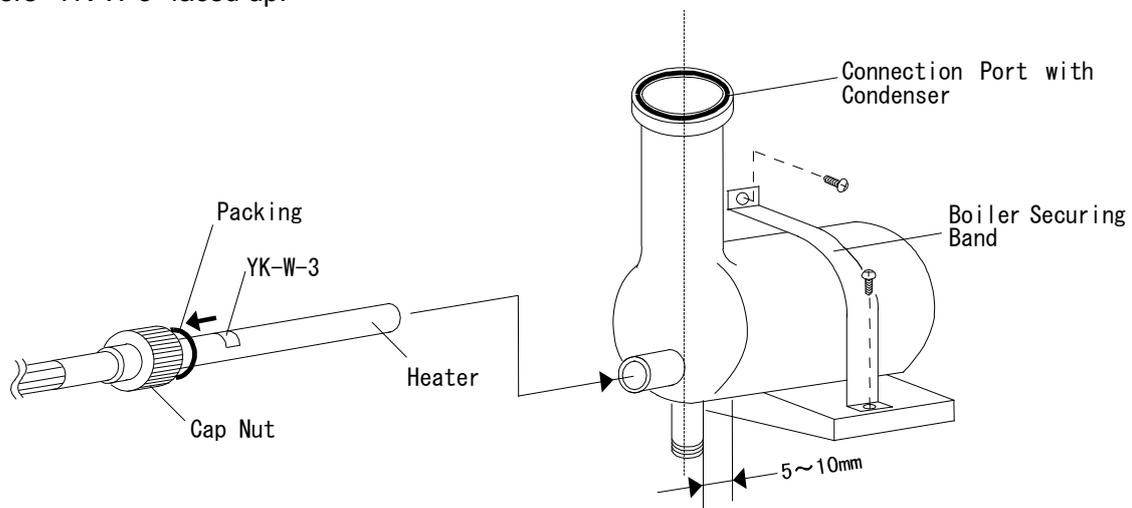
2. If detergent liquid should flow out of hose connection port, seal with rubber stopper. Most fur can be removed in 4 - 5 hours approximately.
3. Drain detergent liquid, and then wash enough with city water.

### Handling of Detergent Liquid (also refer to Page 31 "Handling Precautions")

1. Wash the boiler and heater sooner. If the more scale is deposited, the more difficult is its removal, which may cause decrease of distilled water sampling and damage to heater.
2. When washing is finished, drain detergent liquid out of the unit, and apply neutralization by neutralizer (such as sodium hydroxide). In neutralization, check that it is neutral by use of pH test paper, etc. (Principal component of scale detergent: Sulfamic acid and pH of water solution: Acidic approximately 1)
3. In storing this detergent, seal the agent and store in cold and dark place avoiding high temperature and humidity.
4. In handling this detergent, be sure to use protective tools (gloves, mask, and glasses).
5. When it is in contact with human body, wash it away with clean water.
6. Do not use empty container for beverage.
7. Do not allow detergent to directly flow into agricultural irrigation canal or fields because it causes withering of rice crop.

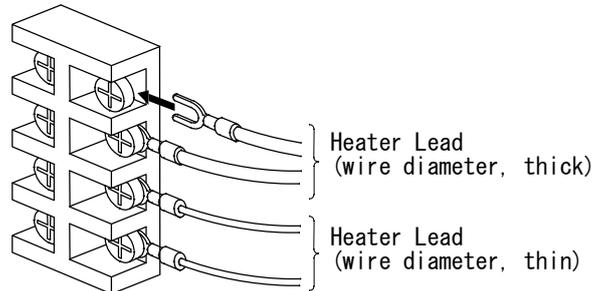
### Installation of boiler

1. Secure the boiler with the boiler securing band so that connection port of condenser is horizontal. Check that the packing is contained in the cap nut, and then install the heater into the boiler with letters "YK-W-3" faced up.



## Washing of Distiller

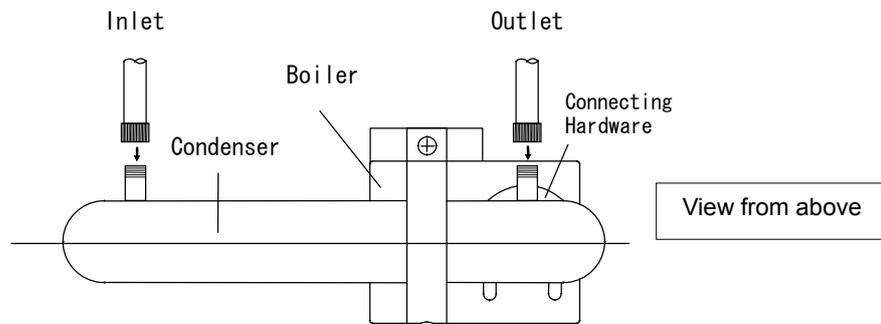
2. Attach 4 heater lead terminals to the terminal block.



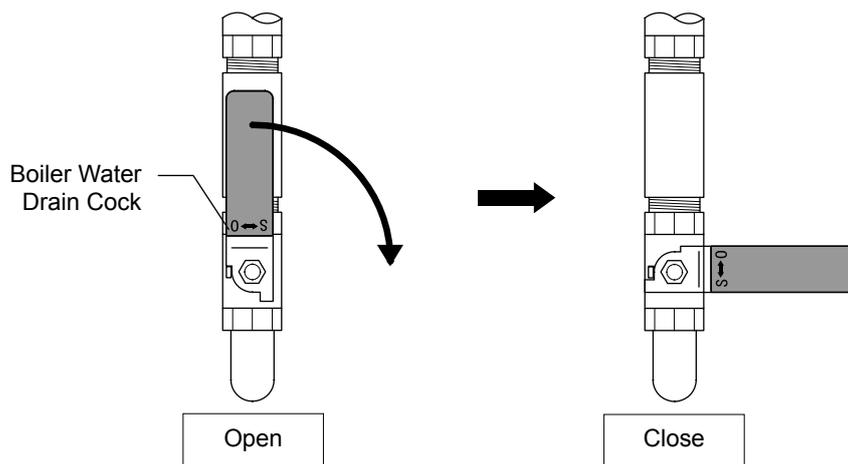
3. Install the left side plate on the body.
4. Insert the hose to the boiler water supply and drain port, and secure with the hose band.

## Installation of condenser

1. Place packing in the connection port of boiler with condenser, and secure with connecting hardware so that the boiler and condenser are placed in the same direction.

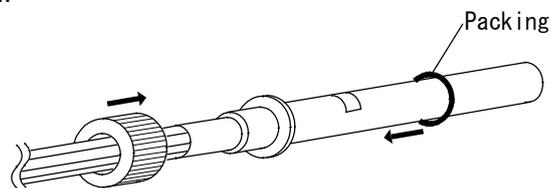


2. Connect the hose respectively to the cooling water inlet, outlet, and distilled water outlet of condenser.
3. Close the boiler water drain cock.



## Replacement of Heater

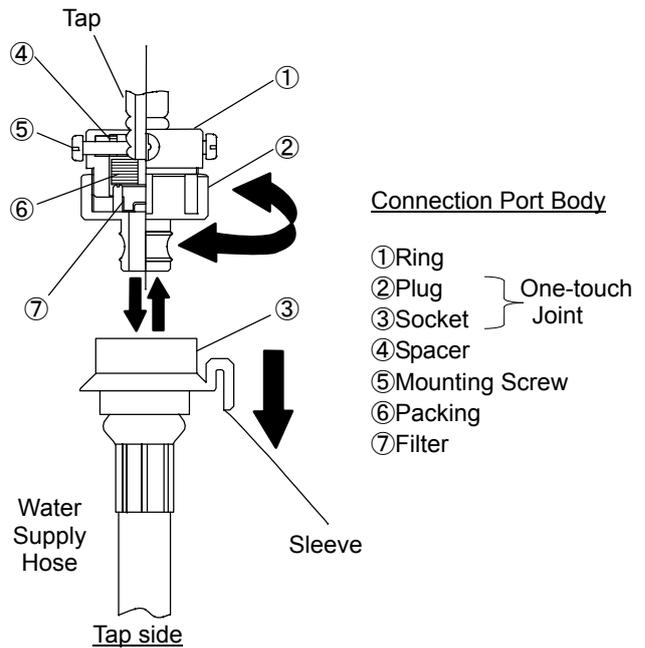
- If the heater should be disconnected or damaged due to deposit of scale, replace it by the procedure below. (Also refer to Page 33 "Washing of Distiller" in working.)
1. Turn "OFF" the earth leakage breaker of this unit.
  2. Close the tap.
  3. Turn "OFF" earth leakage breaker, and when more than 30 minutes has passed, open the front door of this unit, and open the boiler water drain cock.
  4. Open the left side plate of the body, loosen the four screws on the right of the terminal block, and disconnect the heater lead terminal.
  5. Pull the heater lead out of the grommet.
  6. Remove the cap nut of heater, and pull out the heater.
  7. Remove the packing and cap nut from the damaged heater.
  8. Install the packing and cap nut on the new heater. At that time, do not touch with bare hand in order to prevent soiling by hand.



9. Install on the boiler so that "YK-W-3" mark of the heater is faced up.
10. Feed the heater lead wire through the grommet, check the heater lead wire attaching position, and secure to the terminal block.
11. Mount the left side plate.
12. Close the boiler water drain cock.
13. Close the front door, and then open the tap.
14. Turn on the earth leakage breaker.
15. The standby screen appears at the display window of the control panel.
16. Perform calibrations by pressing POWER key while holding down PURE WATER key and DISTILLED WATER key. (Refer to page 21.)  
(Calibration is performed for storing the standard temperature of the sensors in each heater under normal operation in the inner controller. Performing calibration detects errors when the temperature rises higher than the standard temperature + 20°C.)
17. During calibration, a message is displayed at the message window of the control panel.
18. After approx. 5 minutes passed after starting calibration, normal operation starts automatically.

## Washing of Water Supply Hose Filter

1. After turning off the earth leakage breaker on this unit, turn the tap off, slide the sleeve to the direction of the arrow, then, remove the water supply hose from the connection port.
2. Remove the plug ② from ring ① as turning.
3. Cleanse filter ⑦ attached to the packing with water.
4. Wash the filter with spray, etc.
5. Assemble by reversing the procedure.



## Replacement of Hose

- Be sure to use a hose specified by Yamato Scientific for replacement.

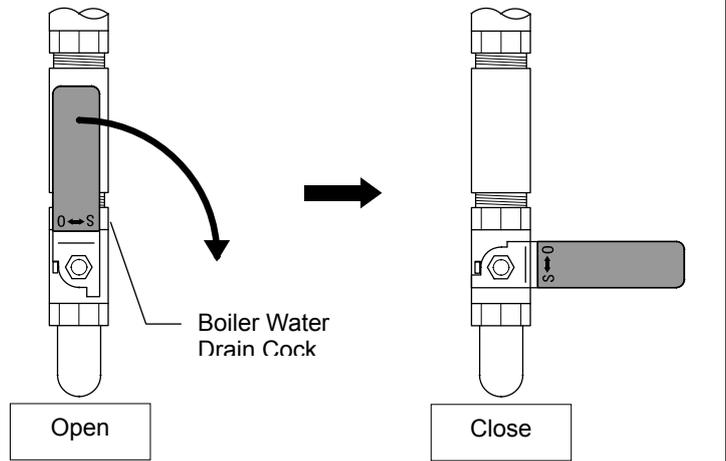
## When not using this unit for long term / When disposing



- If this unit is to be put out of service for a long time, be sure to turn off the earth leakage breaker of this unit for safety, and close the tap. Water in the boiler and distilled water tank, if stored as it is, will deteriorate in quality due to generated bacteria or algae. Drain water by the procedure below:

### Boiler Water Drain

1. In draining boiler water, turn off the earth leakage breaker, ensure that the tap is closed, then wait for 30 minutes or more, and open the front door.
2. Open the boiler water drain cock.
3. Make sure that all water in the boiler and float cylinder is drained.
4. Be sure to close the boiler water drain cock. If boiler water drain cock is opened in next use, water is not fed into the boiler, and distillation is not started.



# Long storage and disposal

## When not using this unit for long term / When disposing

### **WARNING!**

#### When disposing...



- Keep out of reach of children.
- Treat as large trash.

#### When the unit is out of service at night and on holidays



- Turn off the earth leakage breaker.
- Be sure to close the tap.
- Fluctuation of city water pressure may cause unexpected accident such as water leakage.
- In use in winter at a severely cold place, beware of freezing in the tank, boiler, condenser, etc. while system is stopped.

### **Environmental protection should be considered**

We request you to disassemble this unit as possible and recycle the reusable parts considering to the environmental protection. The feature components of this unit and materials used are listed below.

Component Name	Material
<b>Main components of exterior</b>	
Exterior	Made of iron, bonded steel plate, melamine resin baking finish
Exterior rear plate	Made of iron, bonded steel plate, melamine resin baking finish
Door	Made of iron, bonded steel plate, melamine resin baking finish
Door rear plate	Stainless steel plate SUS 304
Mounting plate (painted)	Made of iron, bonded steel plate, melamine resin baking finish
Mounting plate (unpainted)	Stainless steel plate SUS 304
Electric parts mounting plate	Aluminum
Hinge	Stainless steel plate SUS
Rubber foot	Synthetic rubber
Mounting tabs	Stainless steel plate SUS 304
Production plates	Polyester
<b>Main components of water circuit system</b>	
Boiler	Hard glass
Condenser	Hard glass
Float cylinder	Polypropylene
Pure water tank	Polyethylene
Drain port	Polypropylene
Float cylinder branch pipe	Polypropylene
Electrode holder	Polypropylene
Water sampling port	Polypropylene
Control panel	ABS resin
Water sampling table	ABS resin

## Long storage and disposal

### When not using this unit for long term / When disposing

Component Name	Material
<b>Main components of water circuit system</b>	
Resin cylinder case	Polypropylene
Ion exchange resin	Polystyrene Resin
Water quality gauge electrode	Titanium
Heater	Ceramic
Heater mounting nut	Teflon
<b>Main components of piping system</b>	
Water supply hose	Vinyl chloride
Drain hose	Ethylene propyne
Hose (transparent)	Vinyl
Hose (milky transparent)	Silicon
Hose clamp	Polyacetal
Hose nipple (resin black)	Polyamide
Hose nipple (resin white)	Polypropylene
Hose nipple (metal)	Brass
<b>Main components of electric system</b>	
Pump	Casing: Polypropylene Impeller: Polypropylene Magnet: Ferrite magnet Motor case: Iron Rotor: Iron
Solenoid Valve	Made of metal: Body, brass Made of resin: Body, polyacetal
Float Switch	Polypropylene
Power Cord, Wiring Material, etc.	Wiring material and board coated by synthetic rubber and resin

## Failure indication and Its Contents

Alarm	Indication	Condition	Corrective measures
Water cutoff alarm	Feed Water Alarm Check Flow & Pressure	When raw water pressure decreases ( $<0.5\text{kg f/cm}^2$ ), or when water cutoff occurs	Check raw water.
Pretreatment filter exchange notification	It's time to exchange Hollow Filter	When 6 months passed under continuous energizing condition	Change the pretreatment filter. Press and hold the reset switch on backside of the door till a beep is heard. Then, the alarm indication is reset.
Ion-exchange resin S exchange notification	Water Quality NG It's time to exchange Ion-EXCH Resin-S	When the conductivity of pure water exceeds $1 \times 10^{-4}$ S/m	Change the ion-exchange resin. Press and hold the reset switch on backside of the door till a beep is heard. Then, the alarm indication is reset.
Membrane filter for distilled water exchange notification	It's time to exchange Distilled Water Membrane Filter	When 3 months passed under continuous energizing condition	Change the membrane filter for distilled water. Press and hold the reset switch on backside of the door till a beep is heard. Then, the alarm indication is reset.
Membrane filter for pure water exchange notification	It's time to exchange Ion-EXCH Water Membrane Filter	When 3 months passed under continuous energizing condition	Change the membrane filter for pure water. Press and hold the reset switch on backside of the door till a beep is heard. Then, the alarm indication is reset.
Maintenance time notification	It's time to maintenance Service Call	When 3 years passed under continuous energizing condition	Perform maintenance of the unit. Press and hold the reset switch on backside of the door till a beep is heard. Then, the alarm indication is reset.

## Failure indication and Its Contents

Error	Indication	Cause	Symptom	Countermeasure
Controller error	Controller Error Service Call	When the setting value which is memorized in the memory chip cannot be read properly, or when an abnormal value is displayed	All controls of the heater and solenoid valve are turned OFF.	Turn the breaker on again. If the trouble persists, please call our customer service center.
Water leakage error	Leak Error Service Call	When the resistance value of the water leakage sensor input becomes less than the water leakage error judgment value		Turn the breaker off and check the piping parts. For details, refer to page 45.
Overheat of heater	Over Heat Error Service Call	When temperature at the heater exceeds the error judgment value, or when breakage or shortage occurs on the temperature sensor		Change the heater.
Burnout of heater	Heater Error Service Call	When temperature of the heater did not rise after certain time passed during distillation		Change the heater.
Tank water level meter error	Tank Water Sensor Error Service Call	When the condition of the float contacting points in the tank water level meter becomes abnormal		Change the float switch.
Pure water conductivity meter (S) error	Ion-Exchange-S Sensor Error Service Call	When the state of breakage or shortage of the thermistor sensor for pure water conductivity gauge continues longer than error judgment time		Change the pure water conductivity sensor.
Distilled water conductivity meter error	Distilled Water Sensor Error Service Call	When the state of breakage or shortage of the thermistor sensor for distilled water conductivity gauge continues longer than error judgment time		Change the distilled water conductivity sensor.

## Failure indication and Its Contents

Others	Indication	Cause	Symptom	Countermeasure
Boiler drain error	Boiler Water Waste Error Service Call	When the heater operation water level input kept OFF even if the time for required to evaluate the boiler water level error passed after starting water supply to the boiler	All controls of the heater and solenoid valve are turned OFF.	Check the solenoid valve for drain and drain path.
Coolant error	A Coolant Error Service Call	When the state that became boiler water overflow input ON in the float pipe continued longer than coolant error judgment time		Check the coolant solenoid valve and the coolant path.
Water level error of boiler	Boiler Water Level Error Service Call	When the heater operation water level input kept OFF even if the time for required to evaluate the boiler water level error passed after starting water supply to the boiler		Check the feedwater solenoid valve and feedwater path whether manual drain cock is opened or not.
Water level meter of boiler error	Boiler Water Sensor Error Service Call	When the condition of the float contacting points in the float pipe becomes abnormal		Change the float switch.

- When an error occurs, confirm the error message shown at the message window, and call the shop from which you made a purchase or our customer support center.

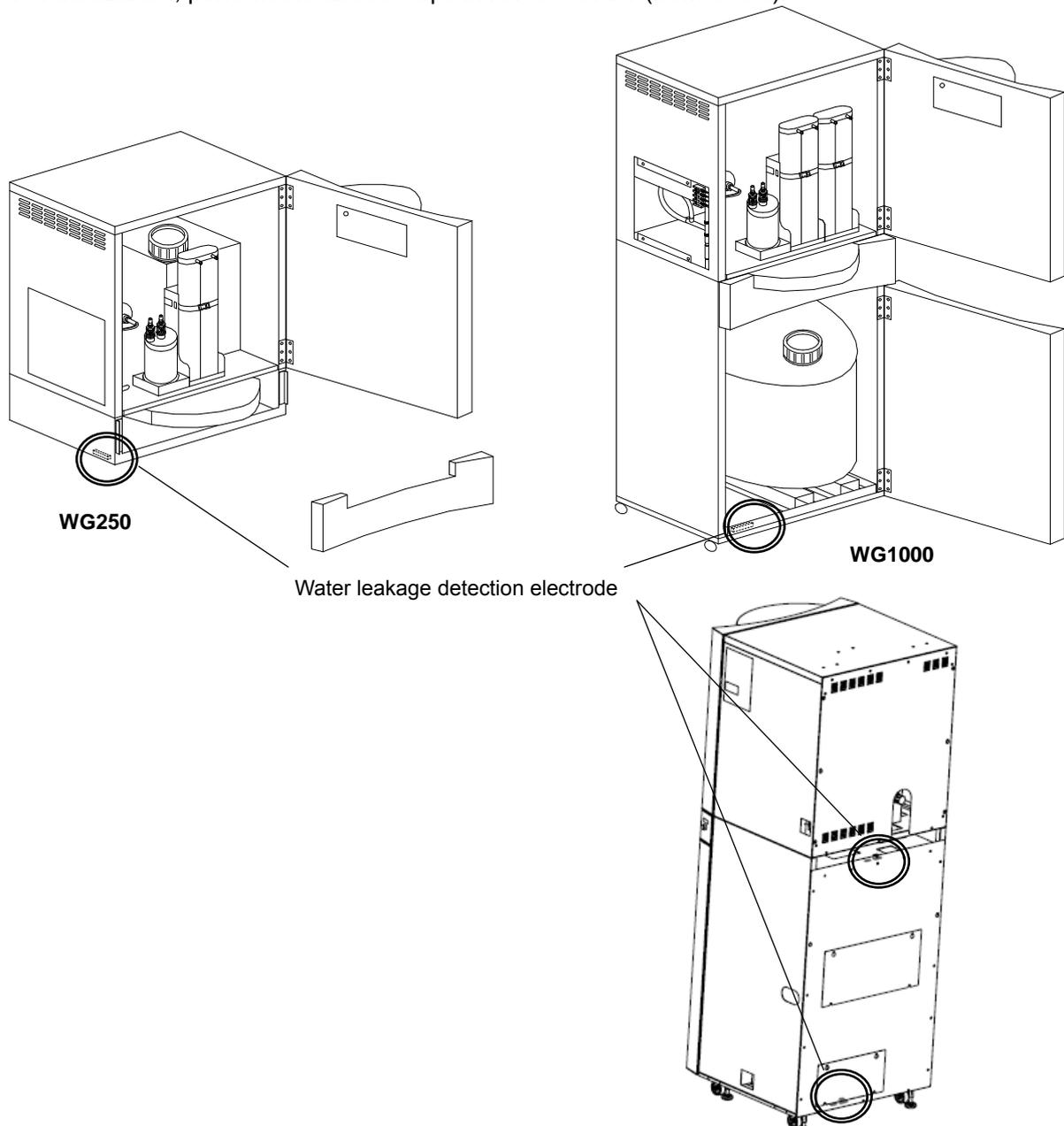
## Remedy for Trouble

### Countermeasure against water leakage error

1. Turn off the earth leakage breaker at left surface of the main unit.
2. After repairing the defective area, wipe water off at the bottom in the unit, and dry thoroughly for re-starting the operation.
3. If the electrode is removed, make sure to reinstall it.
4. Close the door.
5. Turn on the earth breaker, and press POWER key. Now the defect is repaired, and the unit starts normal operation.

### <How to remove the lower front panel of WG250>

1. Remove the screws at left/right positions of the lower front panel.
2. Pull the panel frontward. Be careful of the cable of the drain switch specially used for water sampling table.
3. Disconnect the cable of the drain switch for water sampling table. Then, remove the lower front panel. For installation, perform the above steps in reverse order (from 3 to 1).



## Trouble Shooting

Condition	Check the following
Water is not supplied.	<ul style="list-style-type: none"> <li>• Defect of raw water supply solenoid valve.</li> <li>• Insufficient city water pressure or water failure.</li> <li>• Defect of pressure switch.</li> <li>• Clogging of pre-treatment cartridge.</li> </ul>
Water supply does not stop.	<ul style="list-style-type: none"> <li>• Defect of float switch.</li> <li>• Defect of raw water supply solenoid valve.</li> </ul>
No water is supplied to boiler.	<ul style="list-style-type: none"> <li>• Defect of boiler water supply solenoid valve.</li> <li>• Defect of float switch.</li> <li>• Clogging of pre-treatment cartridge.</li> <li>• Opened boiler water drain cock.</li> </ul>
Heater does not turn on.	<ul style="list-style-type: none"> <li>• Defect of float switch.</li> <li>• Break in heater.</li> </ul>
Cooling water does not flow.	<ul style="list-style-type: none"> <li>• Defect of cooling water solenoid valve.</li> </ul>
The initial accumulated water is not drained.	<ul style="list-style-type: none"> <li>• Initial boiled water is not drained.</li> </ul>
Distilled water is not accumulated.	<ul style="list-style-type: none"> <li>• Defect of initial boiled water drain solenoid valve.</li> <li>• Defect of piping.</li> </ul>
Distilled water is not stored.	<ul style="list-style-type: none"> <li>• Defect of float switch.</li> </ul>
Water is not sampled.	<ul style="list-style-type: none"> <li>• Defect of Ion exchanged water/Distilled water sampling solenoid valve.</li> <li>• Defect of distilled water sampling pipe.</li> <li>• Defect of piping.</li> </ul>

## Measures in emergency

### **Error indications/causes**

This unit has a self-diagnosis function. When a trouble occurs during operation, or when a failure occurs on the unit, an error message is displayed on the control panel. Turn off the earth leakage breaker when an alarm occurs, close the tap.

For details of error indications, refer to "Failure indication and Its Contents (page 42)".

### **Measures**

When the following error signs appear, memorize the sign and turn the tap off immediately. If an error occurs, part change or unit check becomes required. Please call the shop from which you made a purchase or our customer support center. In that case, please notify them of the error sign.

### In Case of Request for Repair

If the failure occurs, stop the operation, turn OFF the power switch, and unplug the power plug. Please contact the sales agency that this unit was purchased, or the Yamato Scientific's sales office.

#### < Check following items before contact >

- ◆ Model Name of Product
  - ◆ Production Number
  - ◆ Purchase Date
  - ◆ About Trouble (in detail as possible)
- } See the production plate attached to this unit.

### Minimum Retention Period of Performance Parts for Repair

The minimum retention period of performance parts for repair of this unit is 7 years after discontinuance of this unit.

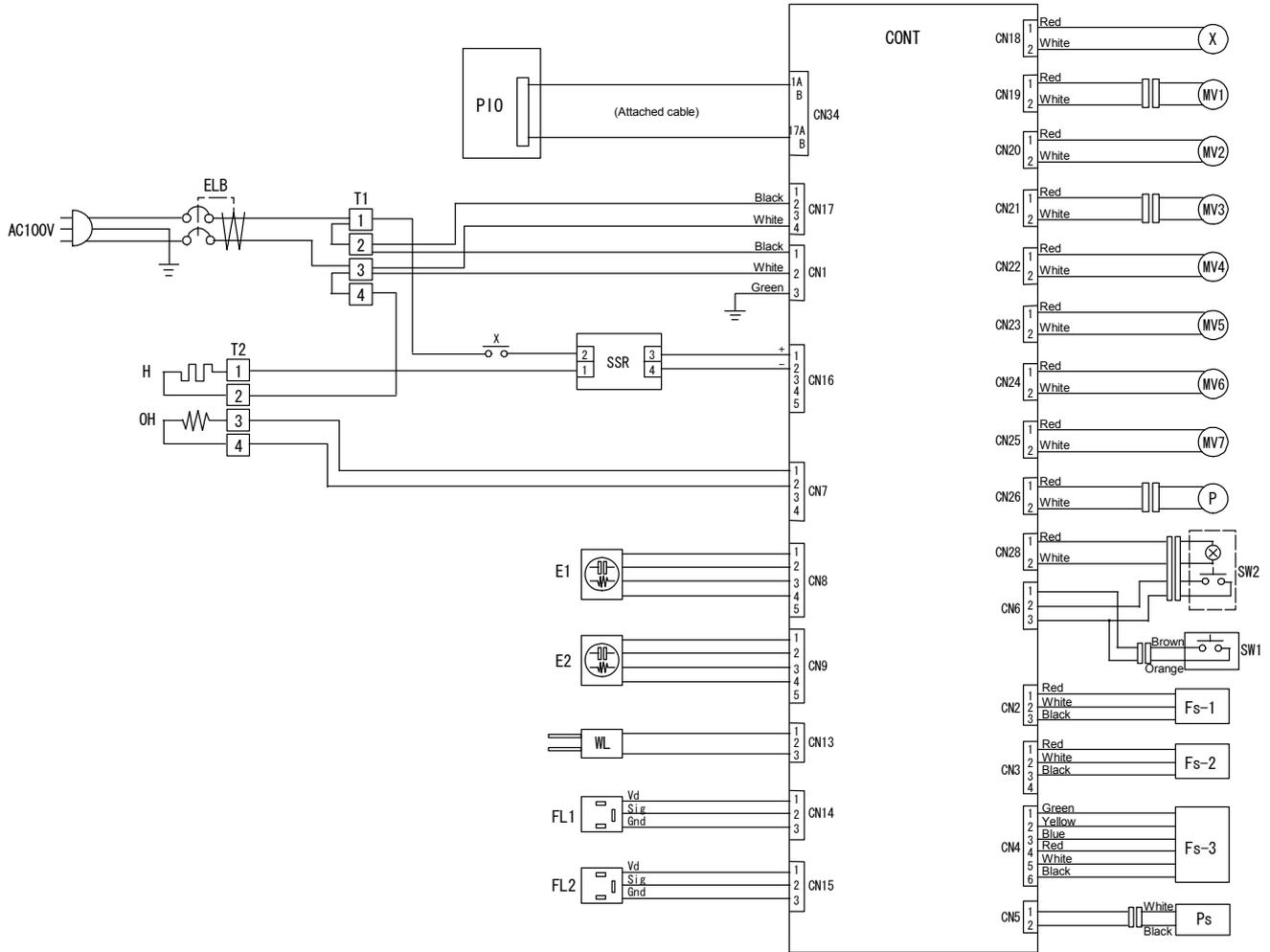
The "performance part for repair" is the part that is required to maintain this unit.

Model		WG250	WG1000
Feedwater method		One-touch coupler connecting resin hose/free hose connecting	
Drain method		Left/right selection connecting method/hose connecting	
Performance	Purified water	Distilled water/ion exchange water	
	Production of distilled water	Approx. 1.8 λ/h	Approx. 5 λ/h
	Collection of distilled water	0.5 to 1.0 λ/min	
	Collection of ion exchange water	0.5 to 1.0 λ/min	
	Setting range of capacity	0.1 to 2 λ (Continuous water collection)	0.1 to 90 λ (Continuous water collection)
Configuration	Condenser	Super hard glass	
	Heater	Ceramic heater 1.4kw	Ceramic heater 1.9kw
	Raw water side filter	Pre-treatment cartridge (PWF-1), Activated carbon + Hollow yarn film 0.1 μ m	
	Ion exchange resin cartridge	CPC-S (2λ × 2types) × 1	CPC-S (2λ × 2types) × 2
	Membrane filter	0.1 μ m × 2	
	Water leakage detection	Water leakage detector forcefully shut off the feedwater solenoid valve when water leakage is detected.	
	Distilled water storage tank	Made of polyethylene, 30λ	Made of polyethylene, 100λ
	Water sampling table	Slide-out type Load-bearing capacity:10kg For 5λ beaker with handle	Slide-out type Load-bearing capacity:20kg For 10λ tank
	Multi-purpose distilled water sampling port	Feedwater connection to WR type: at right side of main unit	
	Water level detection	Lead switch, Five level detection (also used for distillation control function)	
Standard	Raw water pressure range	0.5 × 100 kPa to 5 × 100 kPa (0.5 to 5 kgf/cm <sup>2</sup> )	
	Ambient temp.	5°C ~ 35°C	
	Power supply (50/60 Hz)	100V AC 15A	200V AC 20A <sup>(*)1</sup>
	External dimension <sup>(*)2</sup> (Width X Depth X Height)	600×660×780 mm	600×660×1650 mm
	Weight	Approx.55 kg	Approx.105 kg
Accessories	<ul style="list-style-type: none"> <li>• Water supply hose, drain hose, and connection assembly (1): 1 respectively (for WG250)</li> <li>• Water supply hose, drain hose, and connection assembly (1 and 2): 1 respectively (for WG1000)</li> <li>• Operation manual: This manual</li> <li>• Hose clamp: 1</li> <li>• Scale washing agent (1kg): 1</li> <li>• Pre-treatment cartridge: 1</li> <li>• Ion exchange resin cartridge: 1</li> <li>• Sealing tape: 1</li> <li>• Membrane filter: 2</li> </ul>		

\*1: An electrical plug is not included.

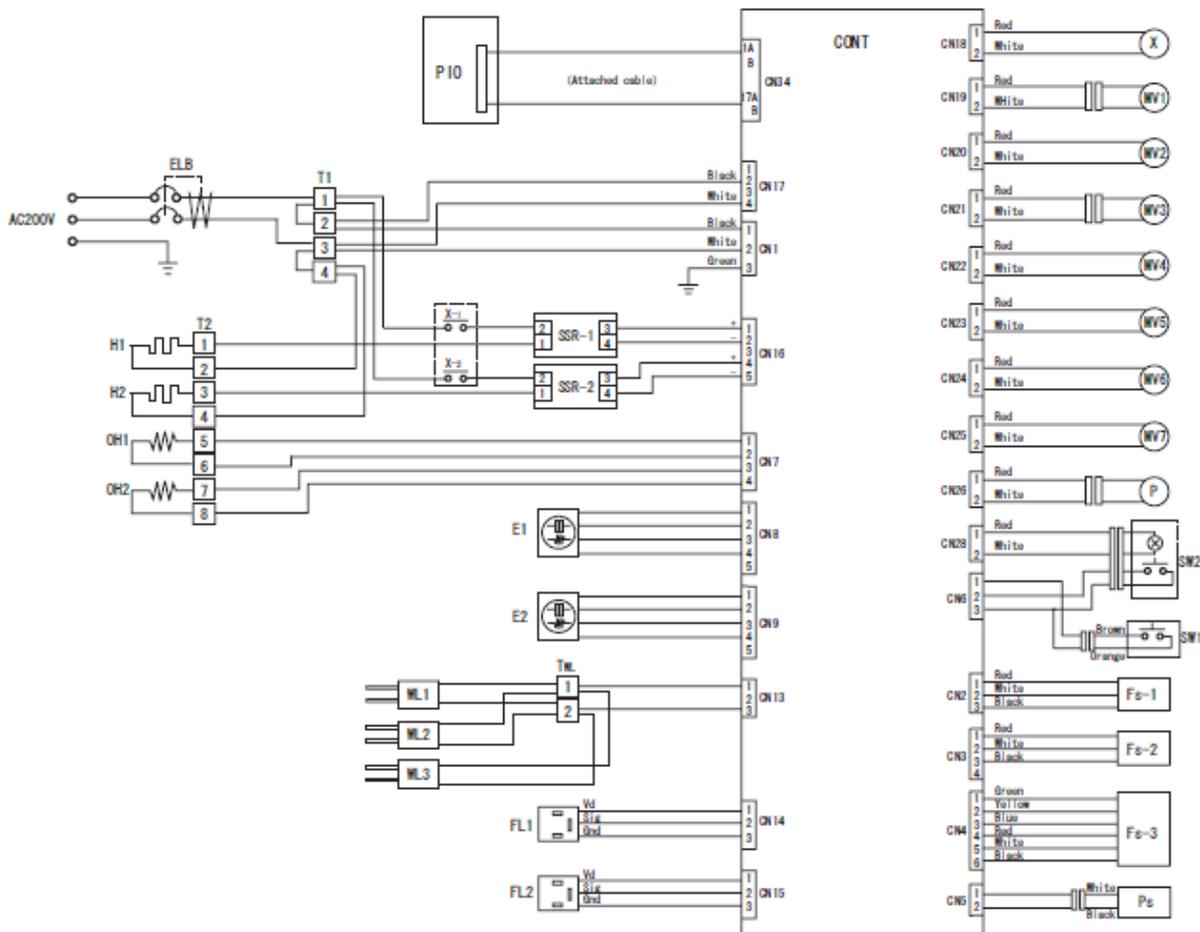
\*2: The protrusion area is not included in the outside dimension.

## WG250



Symbol	Part name	Symbol	Part name
ELB	Earth leakage breaker	X	Main relay
T1, T2	Terminal block	MV1	Raw water solenoid valve
H	Heater	MV2	Boiler water supply solenoid valve
OH	Temperature sensor	MV3	Cooling water solenoid valve
E1	Ion exchange water quality gauge	MV4	Initial accumulated water drain solenoid valve
E2	Distilled water quality gauge	MV5	Boiler drain solenoid valve
WL	Water leakage detector	MV6	Distilled water sampling solenoid valve
FL1	Distilled water flow gauge	MV7	Ion exchange water sampling solenoid valve
FL2	Ion exchange water flow gauge	P	Distilled water sampling pump
Fs1	Control float switch	SSR	Solid state relay
Fs2	Control float switch	PIO	Display board
Fs3	Water level float switch	CONT	PLANAR board
SW1	Reset switch	PS	Pressure switch
SW2	Drain switch		

## WG1000



Symbol	Part name	Symbol	Part name
ELB	Earth leakage breaker	X	Main relay
T1, T2	Terminal block	MV1	Raw water solenoid valve
H	Heater	MV2	Boiler water supply solenoid valve
OH	Temperature sensor	MV3	Cooling water solenoid valve
E1	Ion exchange water quality gauge	MV4	Initial accumulated water drain solenoid valve
E2	Distilled water quality gauge	MV5	Boiler drain solenoid valve
WL1,WL2,WL3	Water leakage detector	MV6	Distilled water sampling solenoid valve
FL1	Distilled water flow gauge	MV7	Ion exchange water sampling solenoid valve
FL2	Ion exchange water flow gauge	P	Distilled water sampling pump
Fs1	Control float switch	SSR1	Solid state relay
Fs2	Control float switch	SSR2	Solid state relay
Fs3	Water level float switch	PIO	Display board
SW1	Reset switch	CONT	PLANAR board
SW2	Drain switch	PS	Pressure switch
TWL	Terminal block		

## List of Dangerous Substances



Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients in this unit.

### EXPLOSIVE

<b>EXPLOSIVE:</b>	Ethylene glycol dinitrate (nitro glycol), Glycerin trinitrate (nitroglycerine), Cellulose nitrate (nitrocellulose), and other explosive nitrate esters
	Trinitrobenzene, Trinitrotoluene, Trinitrophenol (picric acid), and other explosive nitro compounds
	Acetyl hidroperoxide (peracetic acid), Methyl ethyl ketone peroxide, Benzyl peroxide, and other organic peroxides

### FLAMMABLE

<b>IGNITING:</b>	Lithium (metal), Potassium (metal), Sodium (metal), Yellow phosphorus, Phosphorus sulfide, Red phosphorus, Celluloid compounds, Calcium carbide, Lime phosphate, Magnesium (powder), Aluminum (powder), Powder of metals other than magnesium and aluminum, Sodium hydrosulfite
<b>OXIDIZING:</b>	Potassium chlorate, Sodium chlorate, Ammonium chlorate, and other chlorate
	Potassium perchlorate, Sodium perchlorate, Ammonium perchlorate, and other perchlorate
	Potassium peroxide, Sodium peroxide, Barium peroxide, and other inorganic peroxide
	Potassium nitrate, Sodium nitrate, Ammonium nitrate, and other nitrate
	Sodium chlorite and other chlorites
	Calcium hypochlorite and other hypochlorites
<b>INFLAMMABLE LIQUID:</b>	Ethyl ether, Gasoline, Acetaldehyde, Propylene chloride, Carbon disulfide, and other flammable substances having a flash point of lower than -30°C
	Normal hexane, ethylene oxide, acetone, benzene, methyl ethyl ketone, and other flammable substances having a flash point of -30°C or higher but lower than 0°C
	Methanol, Ethanol, Xylene, Pentyl acetate (amyl acetate), and other flammable substances having a flash point of 0°C or higher but lower than 30°C
	Kerosene, Light oil (gas oil), Oil of turpentine, Isopentyl alcohol (isoamyl alcohol), Acetic acid, and other flammable substances having a flash point of 30°C or higher but lower than 65°C
<b>FLAMMABLE GAS:</b>	Hydrogen, Acetylene, Ethylene, Methane, Propane, Butane, and other flammable substances which assume a gaseous state at 15°C and 1 atm

(Source: Appendix Table 1 of Article 6 of the Industrial Safety and Health Order in Japan)



## **Responsibility**

Please follow the instructions in this document when using this unit. Yamato Scientific has no responsibility for the accidents or breakdown of device if it is used with a failure to comply. Never conduct what this document forbids. Unexpected accidents or breakdown may result in.

## **Note**

- ◆ The contents of this document may be changed in future without notice.
- ◆ Any books with missing pages or disorderly binding may be replaced.

Instruction Manual for  
**Water Purifier, Auto Still**  
**Model WG250/1000**  
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