




**Water Purifier  
Autostill®**

**Models WG251/1001**

**Instruction Manual**

First Edition

- Thank you for choosing WG series Water Purifier Autostill® from Yamato Scientific Co., Ltd.
- For proper equipment operation, please read and become thoroughly familiar with this instruction manual before use. Always keep equipment documentation safe and close at hand for convenient future reference.

 **Warning:** Read instruction manual warnings and cautions carefully and completely before proceeding.

**Yamato Scientific America Inc.  
Santa Clara, CA**

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# 1. SAFETY PRECAUTIONS


## Explanation of Symbols


### A Word Regarding Symbols

Various symbols are provided throughout this text and on equipment to ensure safe operation. Failure to comprehend the operational hazards and risks associated with these symbols may lead to adverse results as explained below. Become thoroughly familiar with all symbols and their meanings by carefully reading the following text regarding symbols before proceeding

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 **Warning** Signifies a situation which may result in serious injury or death (Note 1.)

 **Caution** Signifies a situation which may result in minor injury (Note 2) and/or property damage (Note 3.)

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(Note 1) Serious injury is defined as bodily wounds, electrocution, bone breaks/fractures or poisoning, which may cause debilitation requiring extended hospitalization and/or outpatient treatment.

(Note 2) Minor injury is defined as bodily wounds or electrocution, which will not require extended hospitalization or outpatient treatment.

(Note 3) Property damage is defined as damage to facilities, equipment, buildings or other property.

### Symbol Meanings



Signifies warning or caution.  
Specific explanation will follow symbol.



Signifies restriction.  
Specific restrictions will follow symbol.



Signifies an action or actions which operator must undertake.  
Specific instructions will follow symbol.

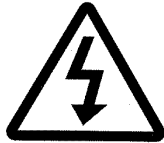
# 1. SAFETY PRECAUTIONS

## Symbol Glossary

### WARNING / CAUTION



General Warning



Danger!  
High Voltage



Danger!  
Extremely Hot



Danger!  
Moving Parts



Danger!  
Blast Hazard



Caution:  
Water Only



Caution:  
Shock Hazard!



Caution:  
Burn Hazard!



Caution:  
Do Not Heat  
Without Water!



Caution:  
May Leak Water!



Caution:  
Toxic Chemicals

### RESTRICTION



General  
Restriction



No Open Flame



Do Not  
Disassemble



Do Not Touch

### ACTION



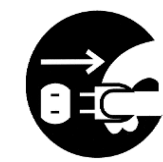
General Action  
Required



Connect Ground  
Wire



Level Installation



Disconnect Power



Inspect  
Regularly

# 1. SAFETY PRECAUTIONS

## Warnings and Cautions



### Install in a location free of flammables and explosives.



Never install or operate unit in a flammable or explosive gas atmosphere. Unit is NOT fire or blast resistant. Simply switching earth leakage breaker (ELB) "ON" or "OFF" can produce a spark, which can then be relayed during operation, causing fire or explosion when near flammable or explosive fluids, chemicals or gases/fumes.

See "15. LIST OF HAZARDOUS SUBSTANCES" (P.67) for information on flammable and explosive gases.



### Ground wire **MUST** be connected properly (WG251)



Connect power cable to a grounded outlet in order to avoid electric shock. Never connect ground wire to gas lines, water pipes, telephone grounding lines or lightning rods. Doing so may result in fire, electric shock or equipment malfunction. Never insert multiple plugs into a single outlet. Doing so may result in power cable overheating, fire or drop in voltage.

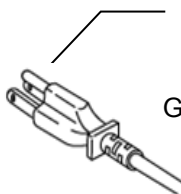
#### Connect to grounded outlet

Grounded outlet



Grounding prong

Grounded plug



#### When no ground terminal is found

Contact original dealer of purchase for location-specific electrical requirements.



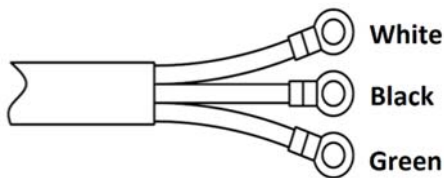
### Ground wire **MUST** be connected properly (WG1001)



If no ground terminals found, contact original dealer of purchase for location-specific electrical requirements.

Securely connect to a distribution board.

No power plugs or connectors of any kind are included with WG251/1001. When using a power plug, use a plug that meets the voltage and electrical capacity.



Core color	Wiring on distribution board
White	Neutral
Black	Live
Green	Ground



Never connect ground wire to gas lines, water pipes, telephone grounding lines or lightning rods. Doing so may result in fire, electric shock or equipment malfunction.

# 1. SAFETY PRECAUTIONS

## Warnings and Cautions



### Turn OFF (○) ELB immediately when an abnormality occurs.

If unit begins emitting smoke or abnormal odors for reasons unknown, turn OFF (○) ELB immediately, disconnect power cable from power supply, and contact original dealer of purchase for assistance. Continuing to operate without addressing abnormalities may cause fire or electric shock, resulting in serious injury or death. Never attempt to disassemble or repair unit. Repairs should always be performed by a certified technician.



### Handle power cable with care.

- DO NOT operate equipment with power cable bundled or tangled. Operating unit with power cable bundled or otherwise tangled, may cause power cable to overheat and/or catch fire.
- Do not modify, bend, forcibly twist or pull on power cable. Fire or electric shock may result.
- Do not risk damage to power cable by positioning it under desks or chairs, or by allowing it to be pinched between objects. Doing so may cause fire and/or electric shock.
- Do not place power cable near kerosene/electric heaters or other heat-generating devices. Doing so may cause power cable insulation to overheat, melt and/or catch fire, which may result in electric shock.
- Turn off ELB immediately and disconnect from facility terminal or outlet, if power cable becomes partially severed or damaged in any way. Contact original dealer of purchase for information about replacing power cable. Failure to do so may result in fire or electric shock.
- Always connect power cable to appropriate facility outlet or terminal.



### Do not disassemble or modify equipment

Never attempt to disassemble or modify unit. Doing so may cause malfunction, fire, electric shock, or personal injury. Note that any malfunction resulting from unauthorized modifications or customizations to unit will void the warranty and are not the responsibility of Yamato.



### DO NOT climb or place any objects on top of equipment.

Personal injury or equipment malfunction may result due to falling.  
Do not place any products other than those specified as options on top unit.

# 1. SAFETY PRECAUTIONS

## Warnings and Cautions



CAUTION



### **DO NOT operate equipment during thunderstorms**

In the event of a thunderstorm, turn off ELB and disconnect power cable immediately. A direct lightning strike may cause equipment damage, fire or electric shock, resulting in serious injury or death.



### **Turn OFF (○) ELB in case of power failure.**

Operation stops when power failures occur. For added safety however, turn OFF (○) ELB in the event of a power failure.



### **Handle scale cleaner (Orgazole) with care.**

The main component of Orgazole 10 scale cleaner is sulfamic acid (the pH of the water solution is about 1). Always wear protective equipment (gloves, mask, and glasses) when handling the cleaner. If the cleaner comes in contact with any part of human body, wash thoroughly with clean water.



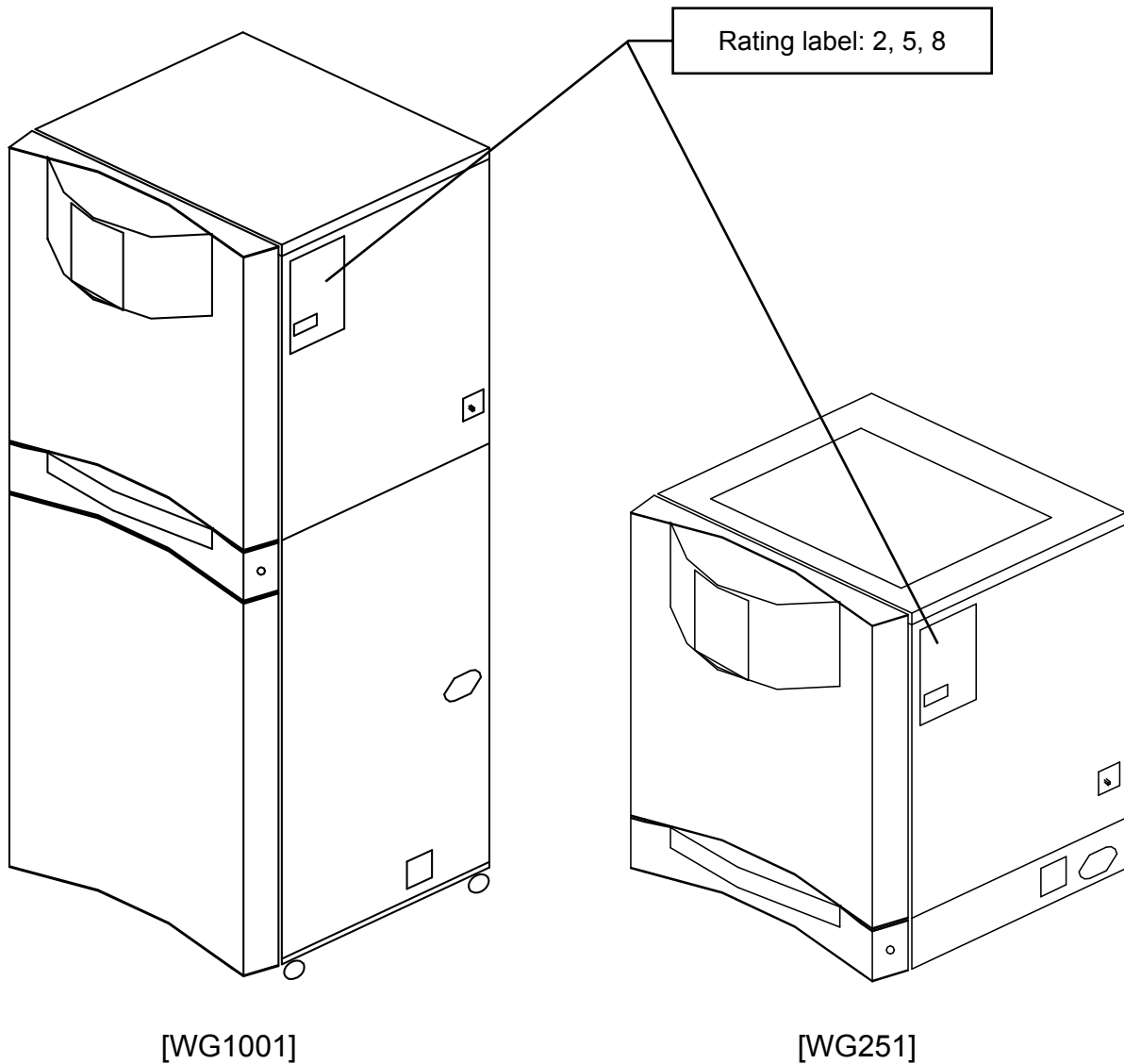
# 1. SAFETY PRECAUTIONS

## Residual Risk Map

These figures indicate positions of caution labels.

The numbers shown in the figure indicate the numbers listed in the "List of Residual Risks" in this manual.

For details of individual residual risks, see the List of Residual Risks.



Contact us if the caution signs are no more visible because nameplate is peeled off or texts are eliminated. We will send you a new nameplate. (for charge)

# 1. SAFETY PRECAUTIONS

## List of Residual Risks

### List of residual risks (instructions for risk avoidance)

This list summarizes residual risks to avoid personal injuries or damages to properties during or related to the use of equipment.

**Be sure to fully understand or receive instructions on how to use, maintain and inspect equipment before starting operation.**

Loading/Installation				
No	Degree of risks	Risk description	Protective measures taken by the user	Relevant page(s)
1	CAUTION	Injury	Use cargo-handling equipment for transportation and installation. Transport unit with sufficient number of people and an appropriate work method when carrying out manually.	19
2	WARNING	Fire/ Electric shock	Carefully select an installation site.	19
3	CAUTION	Injury	Install unit on a level surface.	20
4	CAUTION	Injury	Take appropriate safety measures when installing.	20
5	WARNING	Explosion/Fire	Install in a location free of flammables and explosives.	3
6	WARNING	Fire/ Electric shock	Always connect power cable to appropriate facility outlet or terminal.	20
7	WARNING	Fire/ Electric shock	Handle power cable with care.	4
8	WARNING	Fire/ Electric shock	Ground wire MUST be connected properly	3
9	WARNING	Fire/ Electric shock	DO NOT disassemble or modify.	4

Use				
No	Degree of risks	Risk description	Protective measures taken by the user	Relevant page(s)
10	WARNING	Fire/ Electric shock	Turn OFF (○) ELB immediately when an abnormality occurs.	4
11	CAUTION	Fire	Turn OFF (○) ELB when the unit stops due to a power failure during operation.	40
12	WARNING	Burn	DO NOT touch hot surfaces.	40
13	WARNING	Injury	DO NOT climb or place any objects on top of equipment.	4
14	WARNING	Fire	DO NOT operate equipment during thunderstorms	5
15	CAUTION	Injury	Handle scale cleaner (Orgazole) with care.	5

# 1. SAFETY PRECAUTIONS

## List of Residual Risks

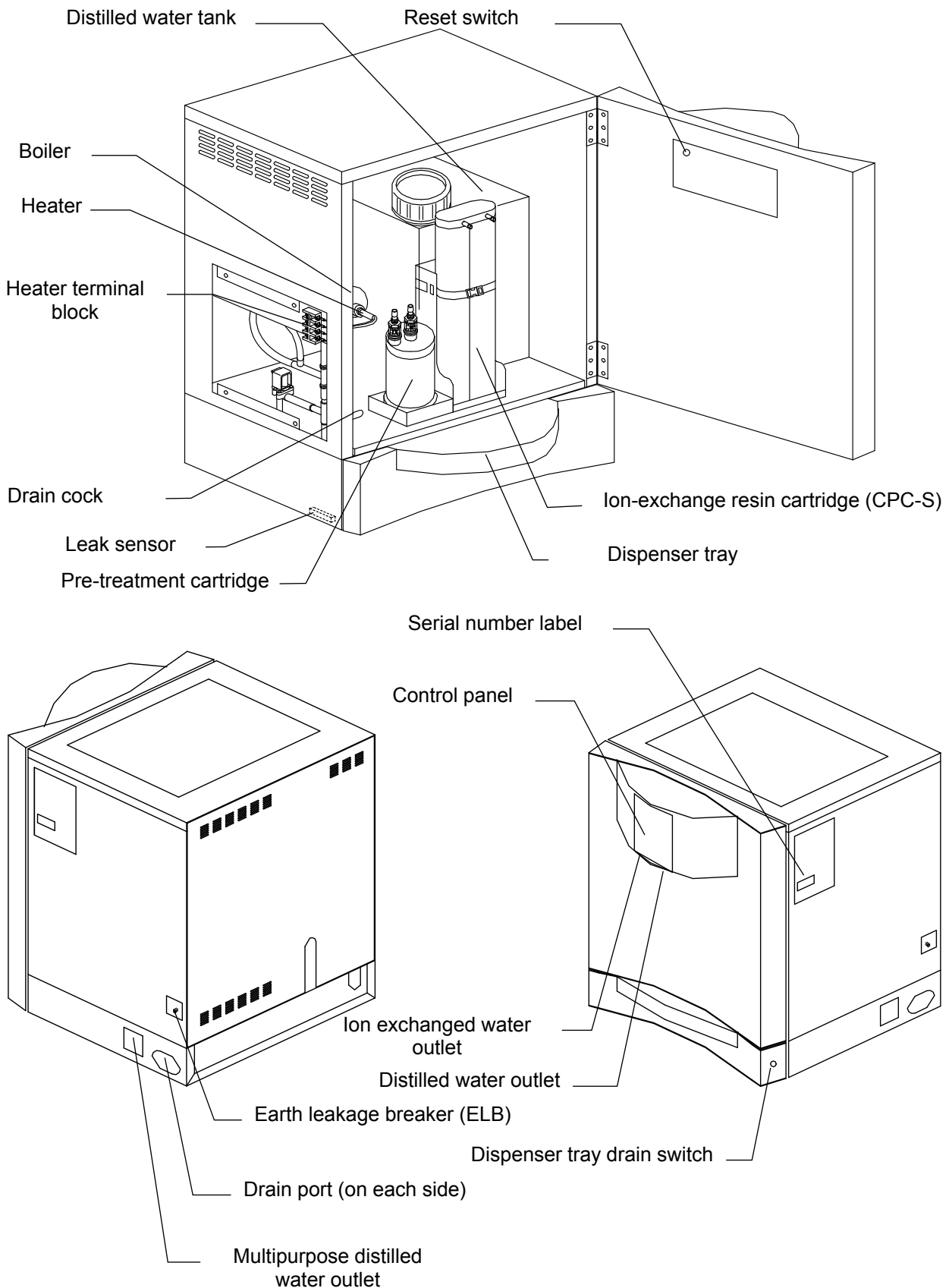
Daily inspection/maintenance				
№	Degree of risks	Risk description	Protective measures taken by the user	Relevant page(s)
16	WARNING	Fire/ Electric shock	Remove the power cable for inspection and maintenance.	41
17	WARNING	Burn	Perform inspections and maintenance when unit is at room temperature.	41
18	WARNING	Fire/ Electric shock	NEVER disassemble or modify unit	4

Extended storage/disposal				
№	Degree of risks	Risk description	Protective measures taken by the user	Relevant page(s)
19	CAUTION	Injury	Do not leave unit in a location where children may have access	52

## 2. COMPONENT NAMES AND FUNCTIONS

Main Unit

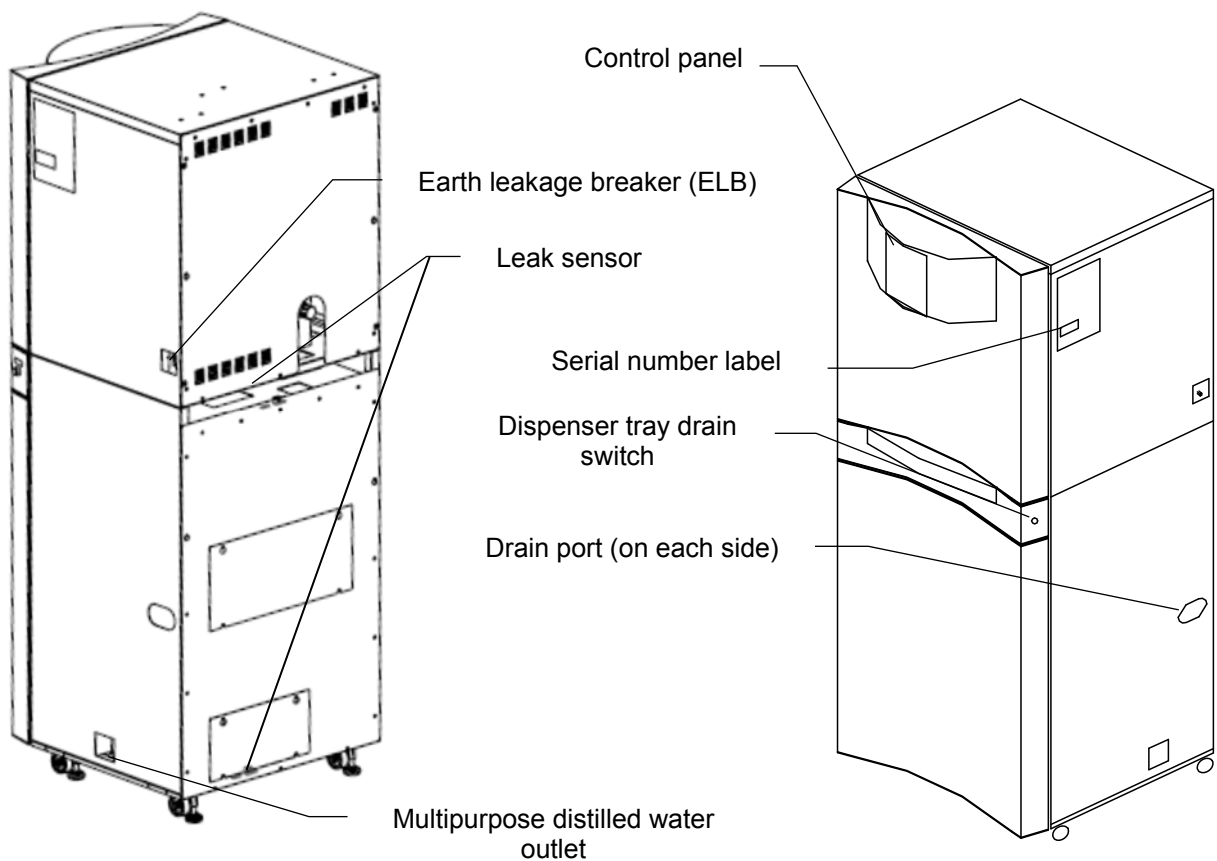
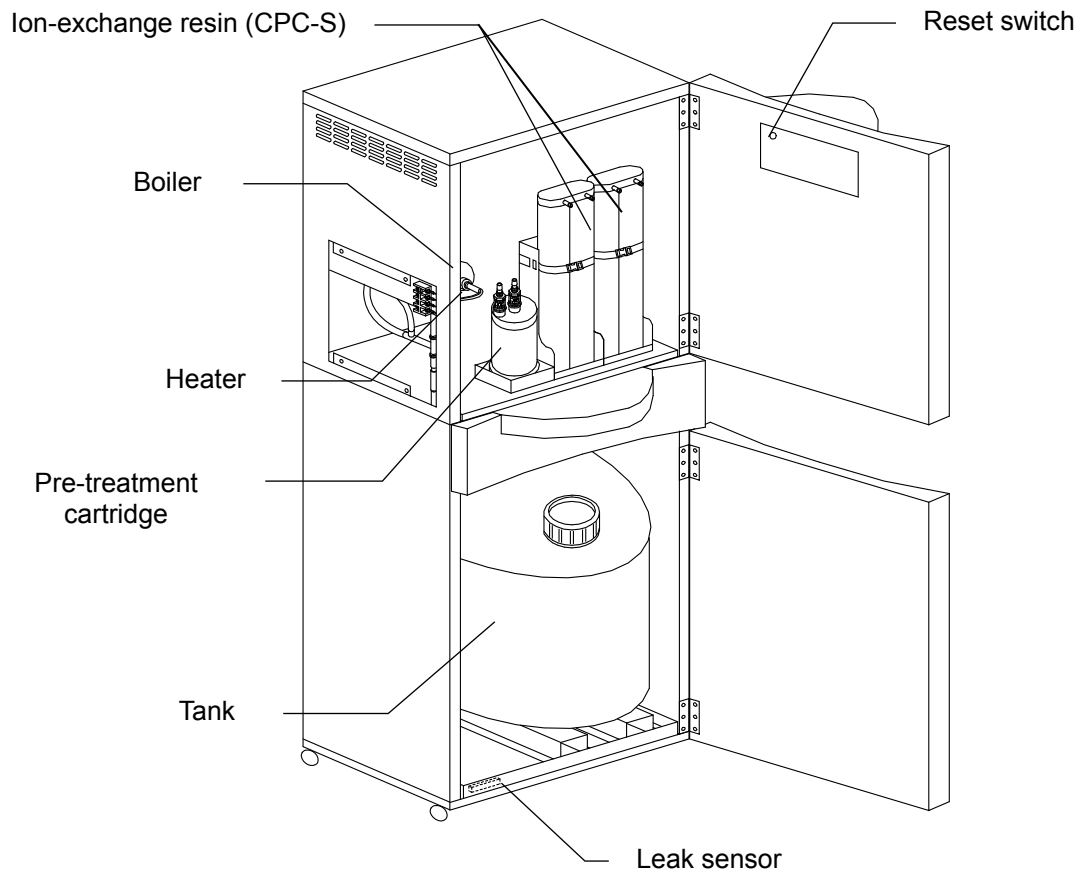
### WG251



## 2. COMPONENT NAMES AND FUNCTIONS

### Main Unit

#### WG1001



## 2. COMPONENT NAMES AND FUNCTIONS

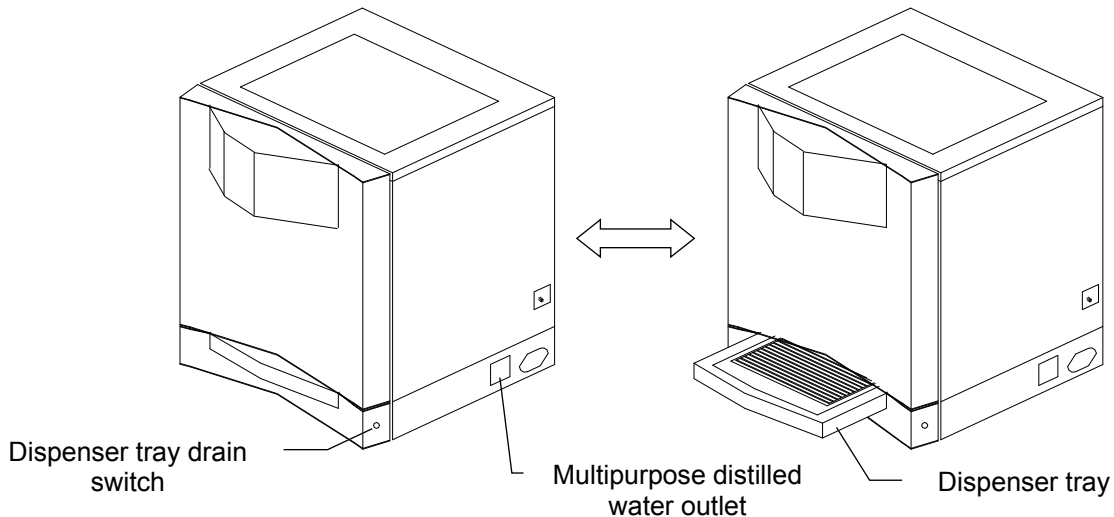
### Dispenser tray / Multipurpose Distilled Water Outlet

#### Dispenser tray

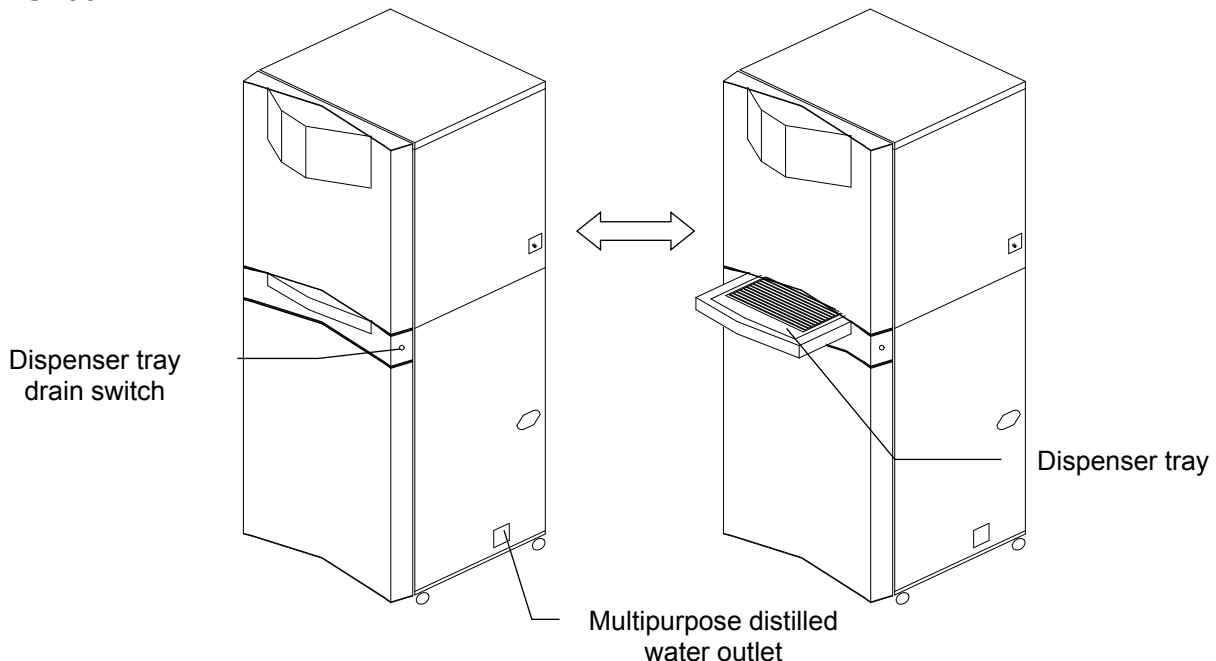
Draw out dispenser tray when using. The load capacity of the tray is 10 kg for WG251 and 20 kg for WG1001. Cooling water for condenser is used to drain water that has accumulated on dispenser tray. Press the drain switch on the right side of dispenser tray under the following conditions. Cooling water flows for one minute, and water will be drained from the tray. Thereafter, unit automatically returns to the state before pressing the switch.

- ① When the tank is full (distillation is stopped)
- ② When collecting ion exchanged water
- ③ In the standby state (ELB is "ON(|)", the POWER key is "OFF(○)")

#### WG251



#### WG1001



#### Multipurpose distilled water outlet

The multipurpose distilled water outlet is located on the right side of unit and equipped with one-touch joint (see P.12 for handling). Pull out the plug and connect the rigid tube with an O.D. of  $\phi 8$  mm. This allows to collect distilled water directly from the tank. It can also be used as a connection port for options, etc.

\* Note that the one-touch joint does not have a check valve function, so that water will come out when the plug or tube is detached.

## 2. COMPONENT NAMES AND FUNCTIONS

### Dispenser tray / Multipurpose Distilled Water Outlet

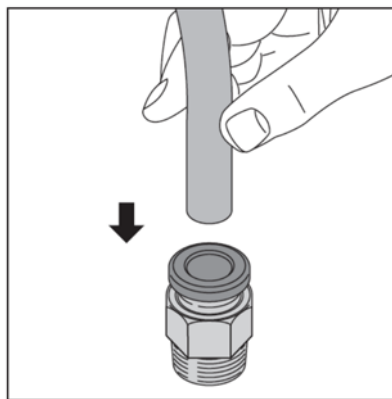
#### Handling of one-touch joint

When using the multipurpose distilled water outlet, attach and detach the plug and tube by following procedure.

Note that the one-touch joint does not have a check valve function, so that water will come out when the plug or tube is detached.

#### ● Insertion of the tube

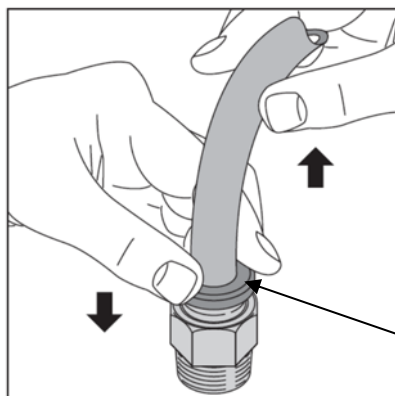
1. Check that the tube is cut at right angles, not deformed, and has no scratch or damage in the outer surface.
2. Insert the tube firmly deep into the one-touch joint. Unless the tube is inserted properly, water leakage may result.
3. After inserted, pull the tube to ensure that it does not come out.



#### ● Removal of the tube

Push the release ring evenly in and pull out the tube.

Be sure to push the ring deep downward, or the tube may not be pulled out or may get worn away, letting its shavings remain inside the joint.



Release ring

## 2. COMPONENT NAMES AND FUNCTIONS

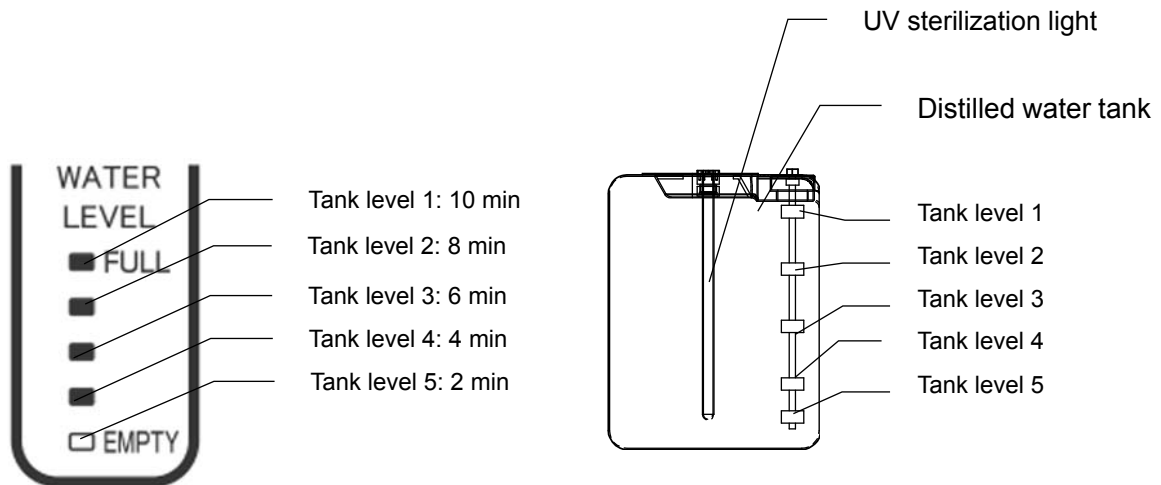
### UV Sterilization Light (Optional)

#### UV sterilization light

Over time, bacteria grows in stored distilled water in the tank, decreasing its quality. This unit employs a UV sterilization light that is effective in eliminating bacteria. The light can be turned on at regular interval or manually.

Automatic operation: The UV light comes on for up to 10 minutes every 24 hours once ELB of unit is turned ON (I)

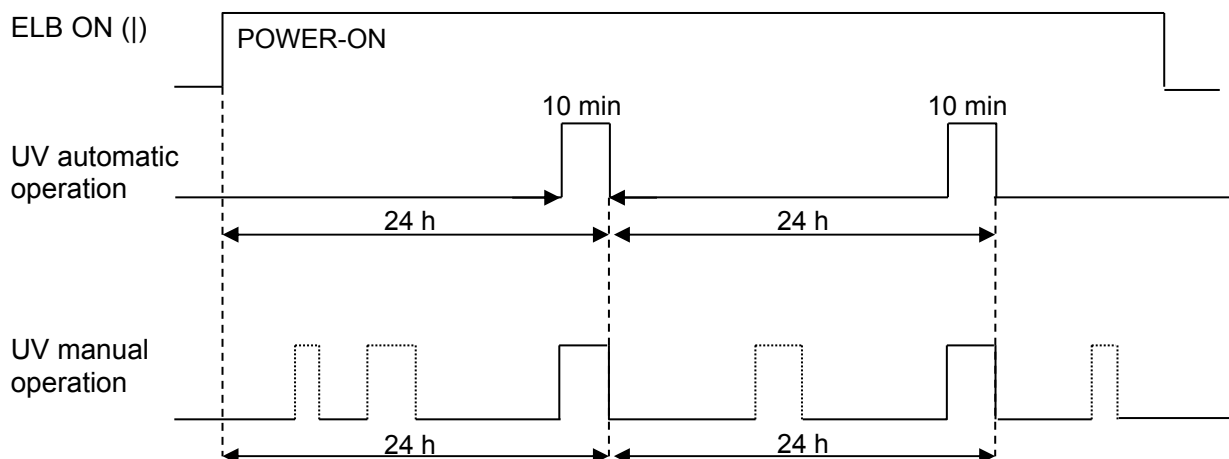
- The duration of UV irradiation differs by the distilled water tank level.



WATER LEVEL lamp

- Manual operation: This enables UV light to be turned on manually by selecting "ON" from "UV light manual operation" in the submenu. The duration of time that the UV light stays on also depends on the water level of the tank.  
(The lighting cycle of automatic operation does not change even if the light is manually turned on in automatic operation.)

#### [UV lighting time]

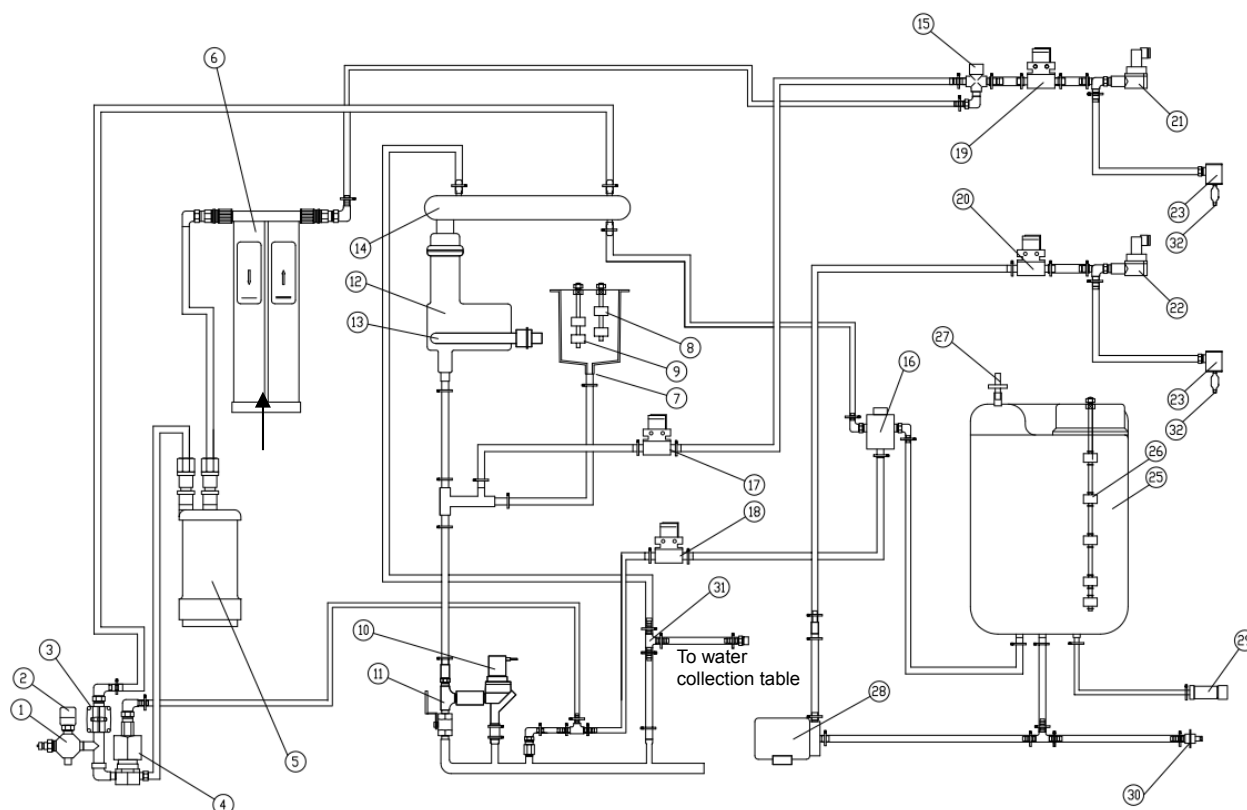


\* Extended irradiation with UV light may deteriorate distilled water tank and other components.



## 2. COMPONENT NAMES AND FUNCTIONS

### Piping System Diagram



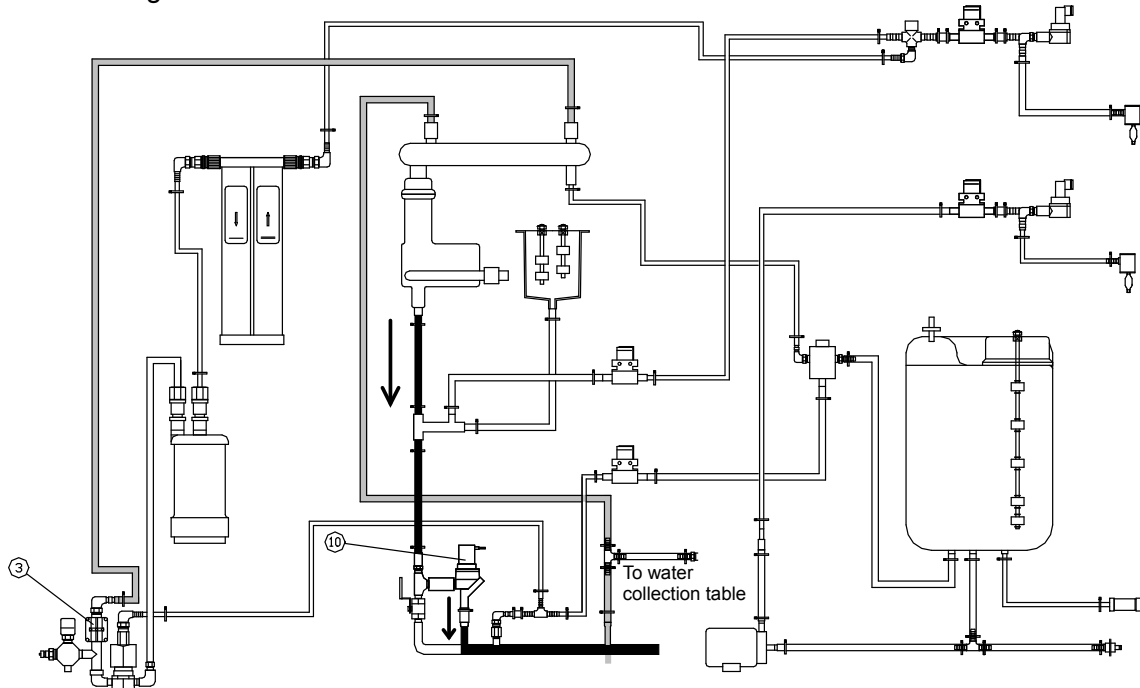
- |  |   |
|--|---|
| ① Pressure reducing valve                                  | ⑬ Heater  |
| ② Pressure switch  | ⑭ Condenser   |
| ③ Solenoid valve for cooling water                         | ⑮ Ion exchanged water quality gauge electrode.      |
| ④ Solenoid valve for raw water supply                      | ⑯ Distilled water quality gauge electrode           |
| ⑤ Pre-treatment cartridge                                  | ⑰ Solenoid valve for boiler water supply            |
| ⑥ Ion-exchange resin cartridge (CPC-S)<br>(two for WG1001) | ⑱ Solenoid valve for initial distilled water drain  |
| ⑦ Float cylinder   | ⑲ Solenoid valve for ion-exchanged water collection |
| ⑧ Float switch (1)   | ⑳ Solenoid valve for distilled water collection     |
| ⑨ Float switch (2)   | ㉑ Ion exchanged water flow rate sensor              |
| ⑩ Solenoid valve for boiler drainage                       | ㉒ Distilled water flow rate sensor                  |
| ⑪ Boiler drain cock  | ㉓ Ion-exchanged water outlet                        |
| ⑫ Boiler   | ㉔ Distilled water outlet                            |
| ⑬ Heater   | ㉕ Distilled water tank                              |
| ⑭ Condenser  | ㉖ Float switch (3)                                  |
| ⑮ Ion exchanged water quality gauge electrode.             | ㉗ Air filter  |
|  | ㉘ Distilled water dispensing pump                   |
|  | ㉙ Distilled water tank drain port                   |
|  | ㉚ Multipurpose distilled water outlet               |
|  | ㉛ Aspirator   |
|  | ㉜ Membrane filter                                   |

## 2. COMPONENT NAMES AND FUNCTIONS

### Operation Principles

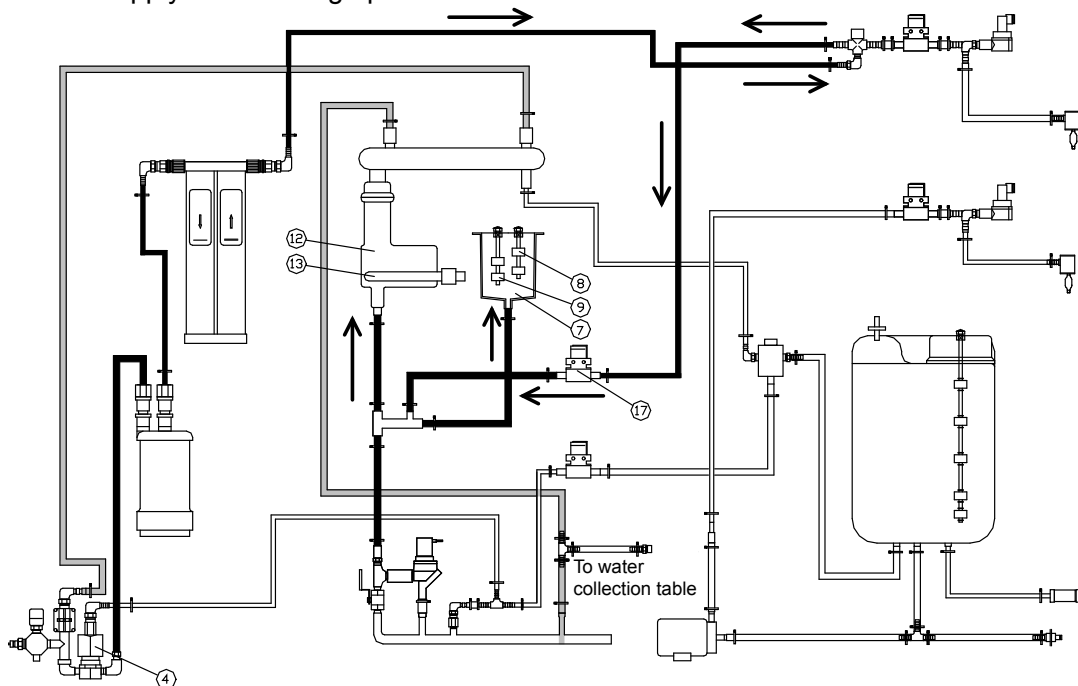
The operation principles of WG251/1001 for each process is defined as follows.

#### (1) Boiler drainage



- Turn ON (I) ELB and press the POWER key. ⑩ *Solenoid valve for boiler drainage* opens for about 30 seconds to perform initial boiler drainage (WG251 only). Boiler drainage is also performed once every five hours of distillation.

#### (2) Boiler water supply and distilling operation

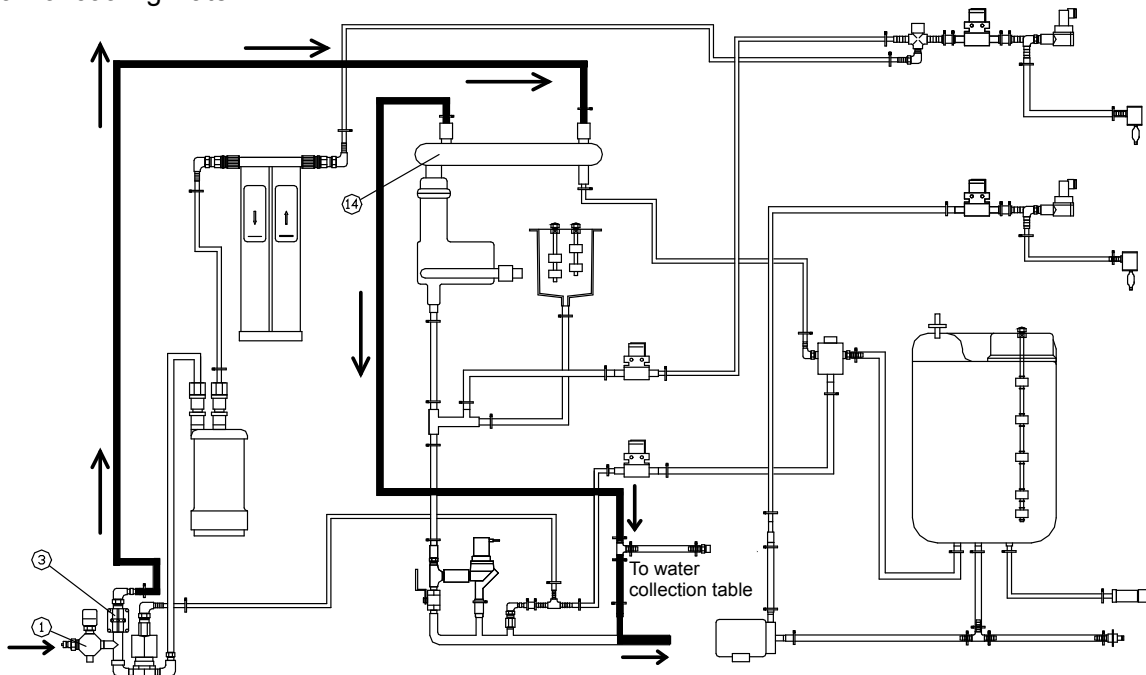


- When boiler drainage completes, ④ *Solenoid valve for raw water supply* and ⑰ *Solenoid valve for boiler water supply* open simultaneously. Then water is supplied to ⑫ *Boiler*. When ⑧ *Float switch (1)* in the ⑦ *Float cylinder* detects the water level, ⑬ *Heater* is energized to start distillation. At this moment, ③ *Solenoid valve for cooling water* opens as well. The water supply to ⑫ *Boiler* is regulated by opening and closing ④ *Solenoid valve for raw water supply* and ⑰ *Solenoid valve for boiler water supply*, using ⑨ *Float switch (2)*.

## 2. COMPONENT NAMES AND FUNCTIONS

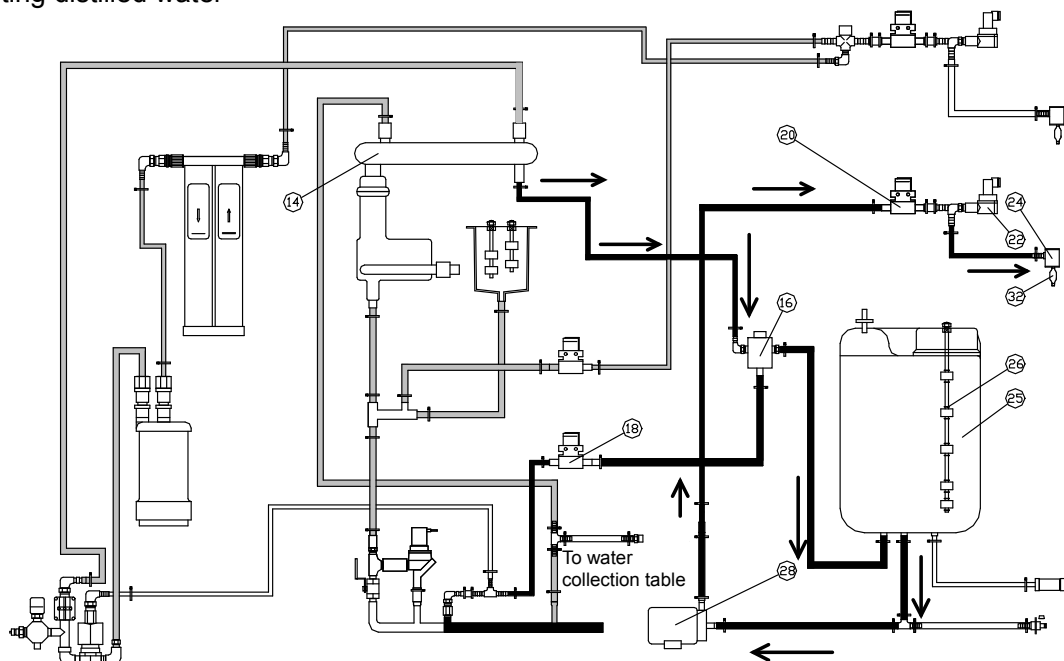
### Operation Principles

#### (3) Flow of cooling water



- During distillation, cooling water flows and drains through ① *Reducing valve*, ③ *Solenoid valve for cooling water*, ⑭ *Condenser*. Distillation stops when the ⑫ *Distilled water tank* is full, or while collecting ion exchanged water. Cooling water also stops automatically.

#### (4) Collecting distilled water

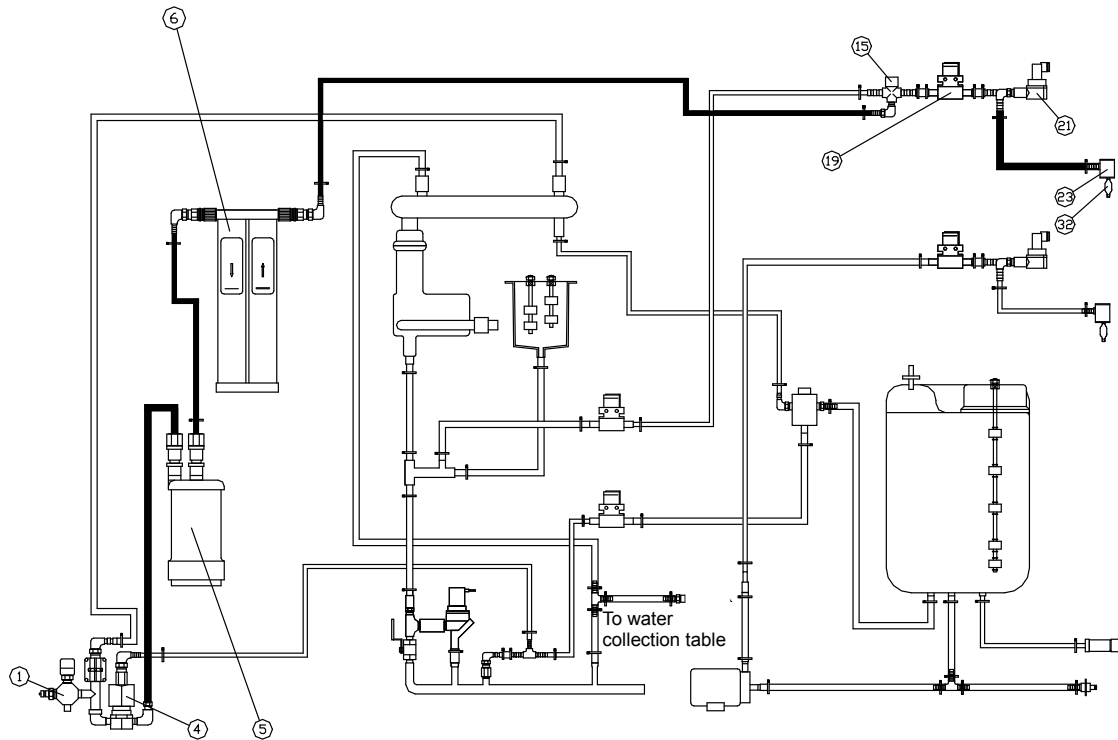


- ⑮ *Solenoid valve for initial distilled water drain* opens for about 10 minutes from the start of distillation and the distilled water condensed in the ⑭ *Condenser* flows out as initial distilled water. Then, ⑮ *Solenoid valve for initial distilled water drain* closes, and distilled water is stored in ⑫ *Distilled water tank*. When float switch in the tank works, it is judged that the water is full and distillation stops. When distilled water is consumed at a certain level, unit automatically begins to produce distilled water. Stored distilled water is dispensed by ⑮ *Distilled water dispensing pump* through ⑯ *Solenoid valve for distilled water collection* → ⑰ *Distilled water flow rate sensor* → ⑱ *Membrane filter* (⑲ *Distilled water outlet*).

## 2. COMPONENT NAMES AND FUNCTIONS

### Operation Principles

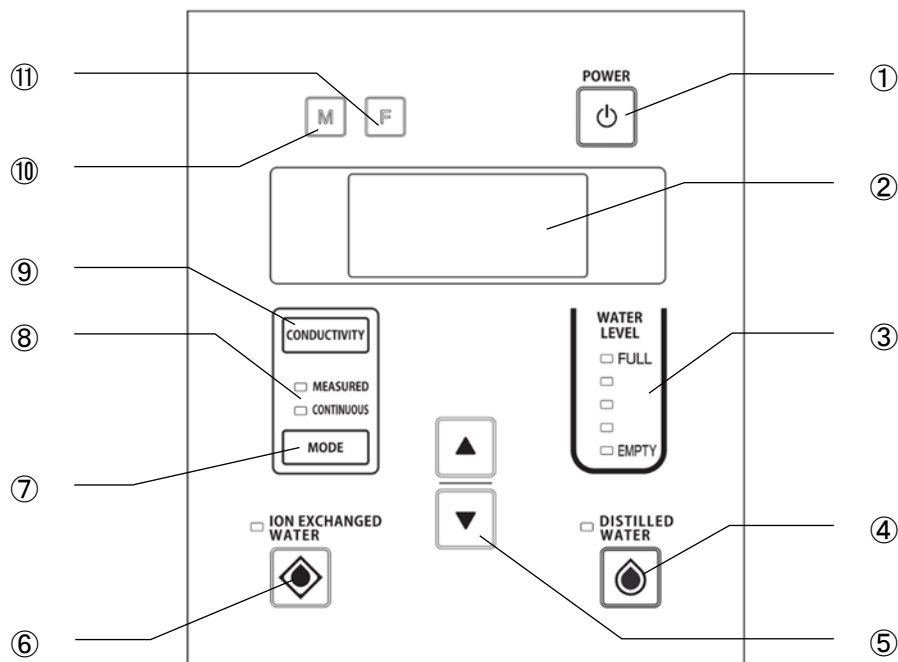
#### (5) Collecting ion exchanged water



- Ion exchanged water is dispensed by way of ①Reducing valve, ④Solenoid valve for raw water supply, ⑤Pre-treatment cartridge, ⑥Ion-exchange resin cartridge (CPC-S), ⑮Ion exchanged water quality gauge electrode, ⑲Solenoid valve for collecting ion exchanged water, ⑳Ion exchanged water flow sensor, ㉓Ion exchanged water outlet, and ㉔Membrane filter.

## 2. COMPONENT NAMES AND FUNCTIONS

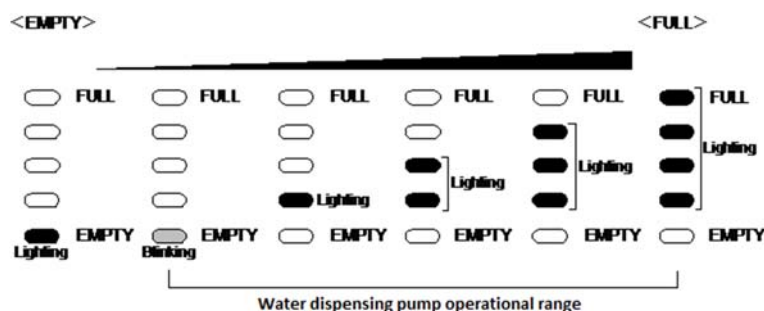
### Control Panel



No.	Panel Item	Description
①	POWER key	Turns on/off controller
②	Message screen	Displays measurements and settings
③	WATER LEVEL lamp	Indicates the water level of distilled water tank in 5 levels.
④	DISTILLED WATER key	Starts/stops dispensing distilled water
⑤	▲ ▼ Key	Used to select the numeric setting items
⑥	ION EXCHANGED WATER key	Starts/stops dispensing ion exchanged water
⑦	MODE key	Switch the water collection modes (Measured-amount mode / Continuous mode)
⑧	MODE lamp	Illuminates when MEASURED or CONTINUOUS is selected.
⑨	CONDUCTIVITY key	Switch the water quality display unit (S/m ↔ Ω·m).
⑩	M key	Used to enter submenu, and to complete settings and move to the following setting item
⑪	F key	Used to cancel settings and return to the previous setting item.

#### ③WATER LEVEL lamp

The amount of distilled water stored in distilled water tank is indicated in five levels by the WATER LEVEL lamp. When the remaining amount of the water decreases, the red lamp at the bottom flashes to indicate the water level has become low. When the tank is emptied and the red lamp becomes constant, distilled water collection will be disabled in order to prevent water dispensing pump from idling. The red lamp will change from constant to flashing when the amount of reserved distilled water increases, however, distilled water cannot yet be dispensed. Distilled water can be dispensed when the red lamp goes out and the first green lamp right above the red lamp illuminates, until the red lamp lights up again.



### 3. PRE-OPERATION PROCEDURES

#### Installation Precautions



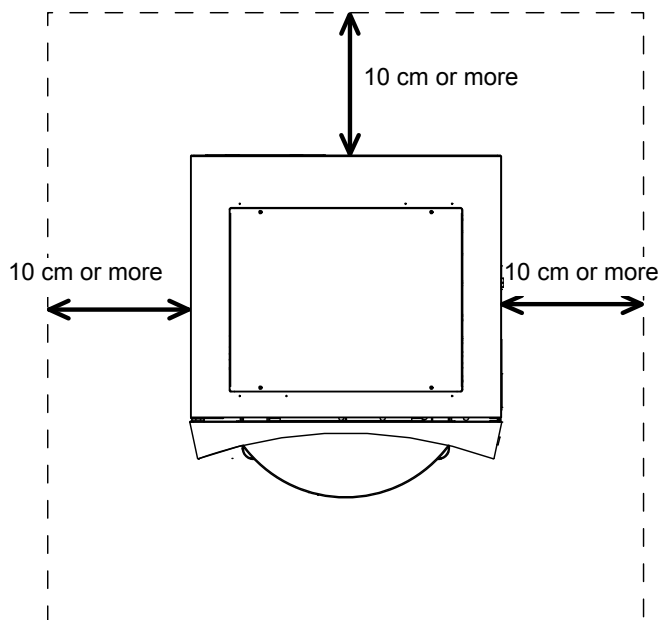
#### Choose an appropriate installation site.

DO NOT install unit:

- where installation surface is not completely level, not even or not clean.
- where flammable or corrosive gases/fumes may be present.
- where external temperature will exceed 35 °C, will fall below 5 °C or will fluctuate largely.
- in excessively humid or dusty locations.
- in direct sunlight or outdoors.
- where there is constant vibration.
- in direct contact with the outside air
- where power supply is erratic.
- where there is a risk of freezing or condensation.
- where raw water pressure is higher than  $5.0 \times 100 \text{ kPa}$
- where raw water pressure is lower than  $0.5 \times 100 \text{ kPa}$



Install WG series unit in a location with sufficient space, as specified below.



#### Use cargo-handling equipment for transportation and installation.

Always use cargo-handling equipment to move or install unit. Transport unit with sufficient number of people and an appropriate work method when carrying out manually. Since WG1001, in particular, has a high center of gravity, exercise caution in transportation.

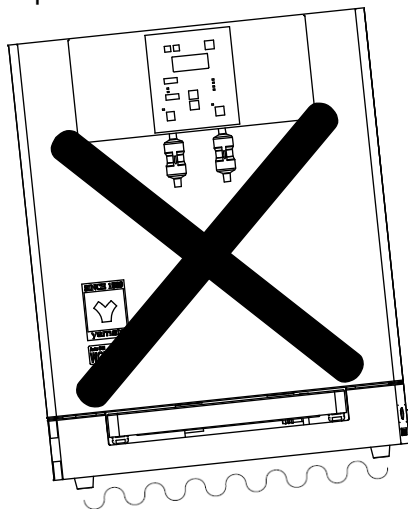
### 3. PRE-OPERATION PROCEDURES

#### Installation Precautions



#### Install equipment on a level surface.

Install unit on level and even surface. Failure to do so may cause abnormal vibrations or noise, possibly resulting in complications and/or malfunction.



#### Stabilize equipment properly to assure safe operation and a safe work area

Implement appropriate safety measures suitable for the installation environment.

In the event of an earthquake or other unforeseen incident, unit may unexpectedly shift or fall, causing serious injury.



#### Always connect power cable to appropriate facility outlet or terminal.

Connect power cable to a suitable facility outlet or terminal, according to the electrical requirements.

Electrical requirements:	WG251: 115 V AC single phase 50/60 Hz 11 A (ELB capacity: 20 A)
	WG1001: 220 V AC single phase 50/60 Hz 18 A (ELB capacity: 30 A)

Standard test conditions with no load should be as follows. Operational voltage range:  $\pm 10\%$ , Voltage range at which specified performance is guaranteed:  $\pm 5\%$ , Frequency rating:  $\pm 1\%$ .

\* Check the line voltage on distribution board and properly evaluate whether to utilize a line being shared by other equipment. If unit is not activated by turning on ELB, take an appropriate course of action, such as connecting unit to a dedicated power source. Inserting multiple cords into a single outlet, using branch outlets or extension cords, may cause a drop in voltage, which may affect performance, resulting in failure to control or maintain proper temperature.



#### Ensure adequate raw water pressure as specified.

- Operate with tap water pressure in the range of  $0.5$  to  $5.0 \times 100$  kPa ( $0.5 \sim 5$  kgf/cm<sup>2</sup>), including nighttime.
- The ranges of the raw water pressure is the same when using optional "water supply unit" (P.66).



#### Raw water

- Use tap water as raw water.
- Do not use chemicals or lubricants. Equipment malfunction may result.
- Check that the raw water is not contaminated with red rust. If raw water is not clean, it may cause equipment malfunction. Likewise, water quality may fall below specified quality level.

# 3. PRE-OPERATION PROCEDURES

## Installation Procedure

### 1. Connect the water supply hose securely.



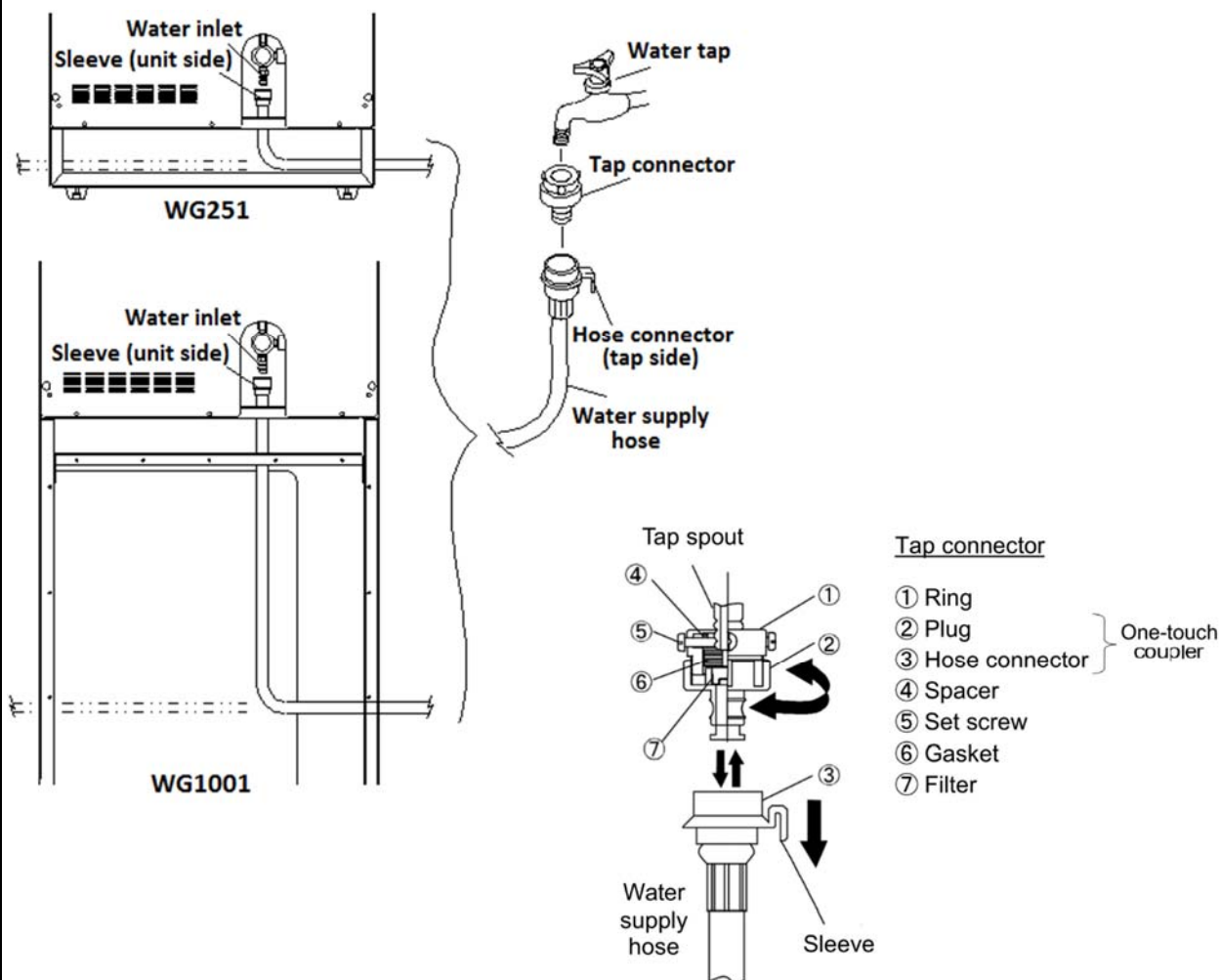
- Take out water supply hose set (tap connector, water supply hose) from among the accessories. Install unit on a level and stable location close to a water tap and sink.
- Improper connection may cause water supply hose or tap connector to come off, resulting in water splash or leakage.
- Note that tap connector can possibly break when fastened more than necessary.

### 2. Make connection on the water tap side.



- (1) Slide the sleeve of ③ *Hose connector* on the tap side in the arrow direction. Tap connector and water supply hose can be separated.
- (2) Loosen ② *Plug* from ① *Ring*.
- (3) Uniformly fasten four ⑤ *Set screws* while pressing ① *Ring* slightly to the tap so that ⑥ *Gasket* contacts evenly with the tap spout. Where the tap is a laboratory tap, adjust the position that ⑤ *Set screws* come into the lowest trough of the tap spout as shown in the figure below.
- (4) Turn ② *Plug* to fasten securely. This will seal the tap and tap connector with ⑥ *Gasket*.
- (5) Slide the sleeve in the arrow direction and insert ③ *Hose connector* into ② *Plug*. Release the sleeve of ③ *Hose connector* and it will return to its original position. This completes the connection.

\* A valve is provided in tap connector. Water stops when ③ *Hose connector* comes off.





## 3. PRE-OPERATION PROCEDURES

### Installation Procedure

#### 3. Connection on main unit side.

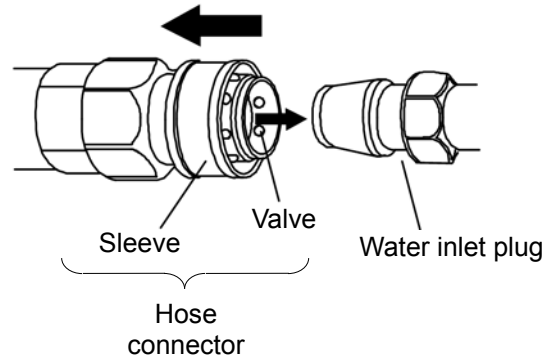


(1) Remove the rubber cap from the  
⑧ *Water inlet plug*.

(2) Connect Hose connector to  
⑧ *Water inlet plug* on main unit, with  
the sleeve slid in the direction of  
arrow. Release the sleeve and it will  
return to its original position. This  
completes the connection. A valve is  
provided in hose connector, which  
opens only when connected with ⑧  
*Water inlet plug*. Water will not flow  
without this valve opened.

Water supply hose

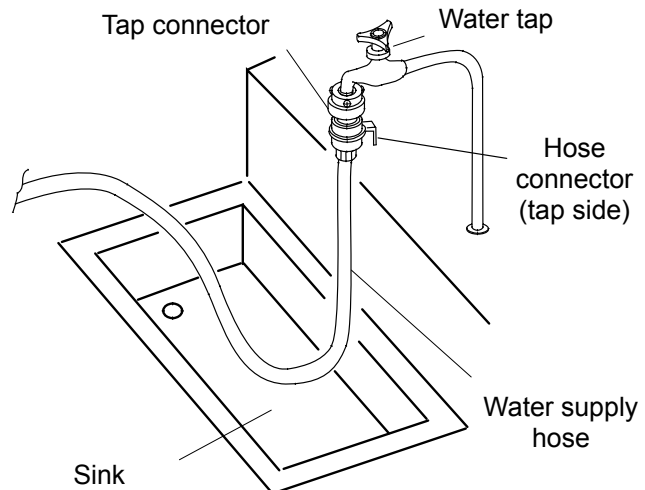
Main unit side



#### 4. Be sure to attach the water supply hose to a tap with the drainage facility.



If water supply hose is connected to  
a water tap without drainage facility,  
and the hose comes off or becomes  
damaged, severe water damage  
may result. Be sure to connect water  
supply hose to a water tap with  
drainage.



#### 5. Use optional "water supply unit" when the drainage facility is away from the tap.



Compared to the structure of standard "water hose set", that of "water inlet unit" is superior in  
preventing connections from loosening when the water pressure fluctuates.

\* If there is no water supply equipment, select and use an appropriate coupling from "Water inlet coupler" in "List of Options" (P.66).

## 3. PRE-OPERATION PROCEDURES

### Installation Procedure

#### 6. Connect ion-exchange resin cartridge (CPC-S) securely.



● Connect ion-exchange resin cartridge (CPC-S) according to the following procedure.

Remove the rubber caps from the IN and OUT of the cartridge.

- (1) Make sure that ELB on unit is "OFF (○)" and that water tap is closed.
- (2) Take out ion-exchange resin cartridge from among the accessories.
- (3) Install ion-exchange resin cartridge (CPC-S) on the mount in unit (Fig. 01).
- (4) Secure ion-exchange resin cartridge with fixing band of the mount (Fig. 02).

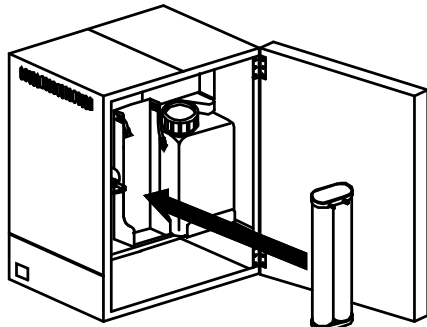


Fig. 01

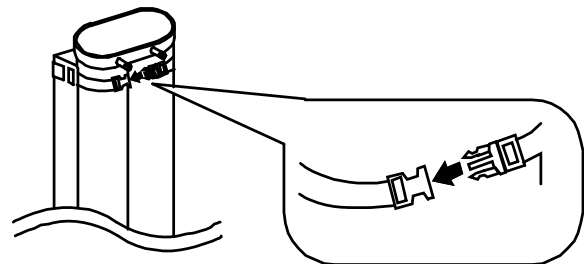


Fig. 02

- (5) Push the one-touch joint marked with (IN CPC-S) into the inlet (on left) of ion-exchange resin cartridge until it clicks.  
Push the one-touch joint marked with (OUT CPC-S) into the outlet (on right) of ion-exchange resin cartridge until it clicks (Fig. 03).
- (6) Turn ON (I) ELB and wait for about 10 seconds. Press the reset switch on the back of front door for two seconds (Fig. 04).

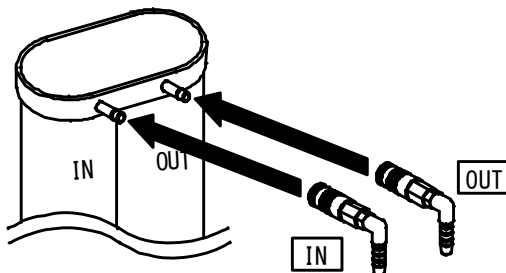


Fig. 03

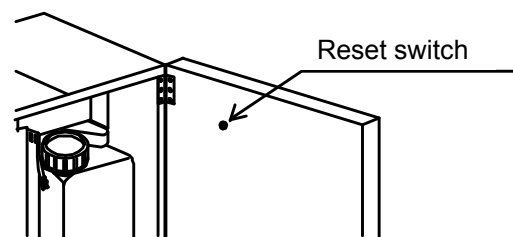


Fig. 04

- \* One-touch joints may be stiff at the outset. Note that forcing one-touch joint diagonally into plug-in port may result in damage to one-touch joint or plug-in port. If it is difficult to connect one-touch joint to a cartridge, take the cartridge off the resin cylinder mounting plate, and carefully push the joint into plug-in port.
- \* After inserting one-touch joint, pull it once to confirm that one-touch joint is securely connected, and will not come off
- \* To remove the ion-exchange resin cartridge, pull the one-touch joint frontward with the black portion pressed in. Be careful that water may drip from the cartridge when the one-touch joint is removed.
- \* Connecting the IN and OUT of each resin cartridge in reverse may cause malfunction. Use caution when making connection of the cartridges.

### 3. PRE-OPERATION PROCEDURES

#### Installation Procedure

#### 7. Connect pre-treatment cartridge securely.



- Connect pre-treatment cartridge according to the following procedure  
Remove caps on IN and OUT ports on pre-treatment cartridge.

- (1) Make sure that ELB on unit is "OFF (○)" and that water tap is closed.
- (2) Take out ① pre-treatment cartridge from among the accessories.
- (3) Remove caps on IN and OUT ports on ① pre-treatment cartridge.
- (4) Open front door. There are connection hoses labeled IN and OUT on ② couplers. Connect the hoses to ① pre-treatment cartridge so that the IN and OUT coincide with the IN and OUT of the cartridge.
- (5) When connecting the coupler, slide the ③ slide part of ② coupler to the hose side, align the ports of ② coupler and the cartridge. Push them in and then release ③ slide part.
- (6) When the connection is properly made, put ① pre-treatment cartridge in place as shown in the right figure below (left side of ion-exchange resin cartridge). Use caution not to bend or twist the hoses when mounting the cartridge.
- (7) Turn ON (I) ELB and wait for about 10 seconds. Press the reset switch on the back of front door for two seconds.

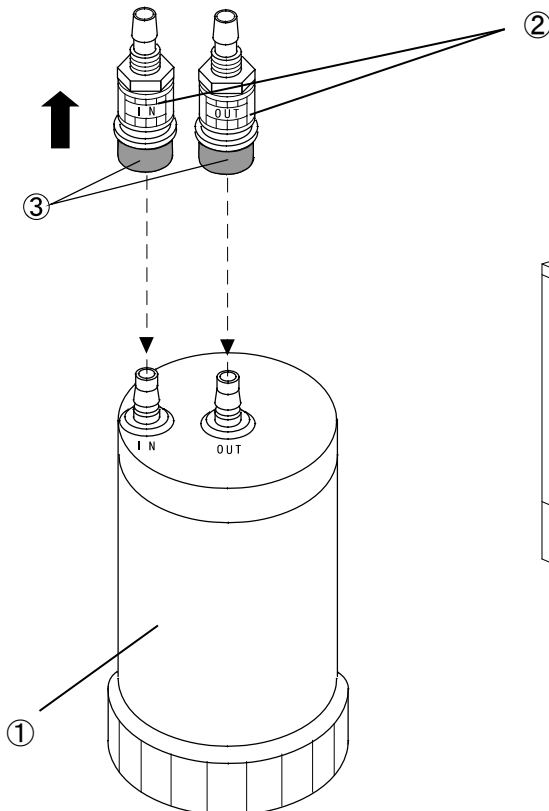


Fig. 05

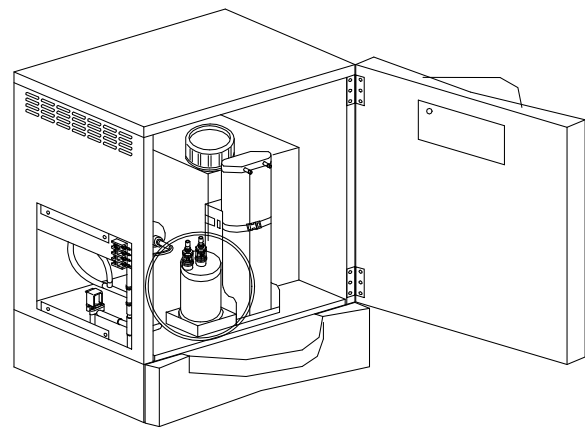


Fig. 06

After inserting pre-treatment cartridge coupler, pull it once to confirm that the coupler is securely connected, and will not come off.

Pre-treatment cartridge coupler can be easily removed by vertically pulling out the coupler while pulling a ring of the slide part up to the hose side. Be careful that water may drip from pre-treatment cartridge when the coupler is removed.

### 3. PRE-OPERATION PROCEDURES

#### Installation Procedure

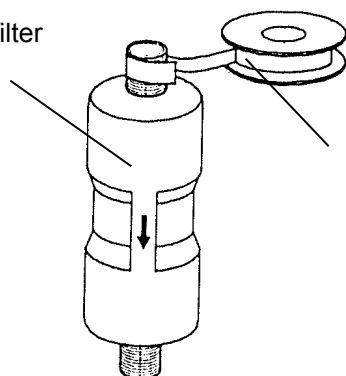
#### 8. Install membrane filter securely.



- Install membrane filter according to the following procedure.
- Unless firm connection is ensured, water may leak from the threaded portion.

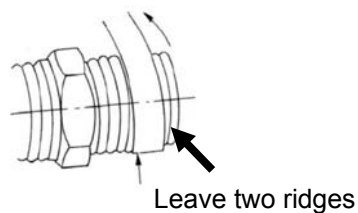
- (1) Take out membrane filter and seal tape from among the accessories.
- (2) Observe the direction of an arrow on membrane filter. Wind seal tape firmly clockwise as viewed from the tape winding side two to three turns. Remaining tape should be cut away. Start winding the tape at a point two thread ridges away from the end.

Membrane filter

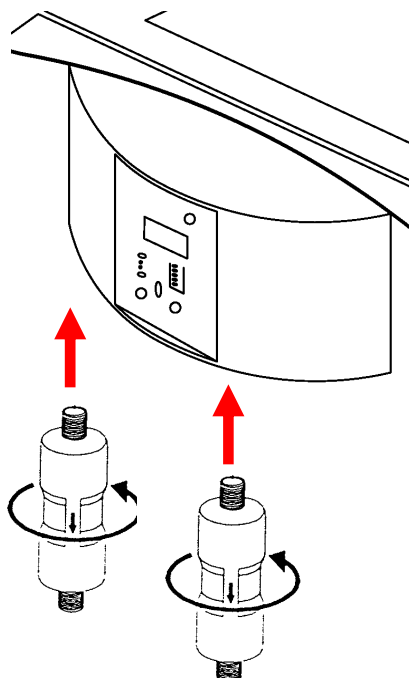


Seal tape

**Enlarged to show detail**



- (3) With the tape-wound side up, screw membrane filter in the water outlet. Use caution not to crush the threads. Check for water leakage while dispensing pure water. If any, screw the filter further. Rough guidance of the number of tightening is two and a half to three turns.



\* Securely store the seal tape, which is to be required when replacing membrane filter.

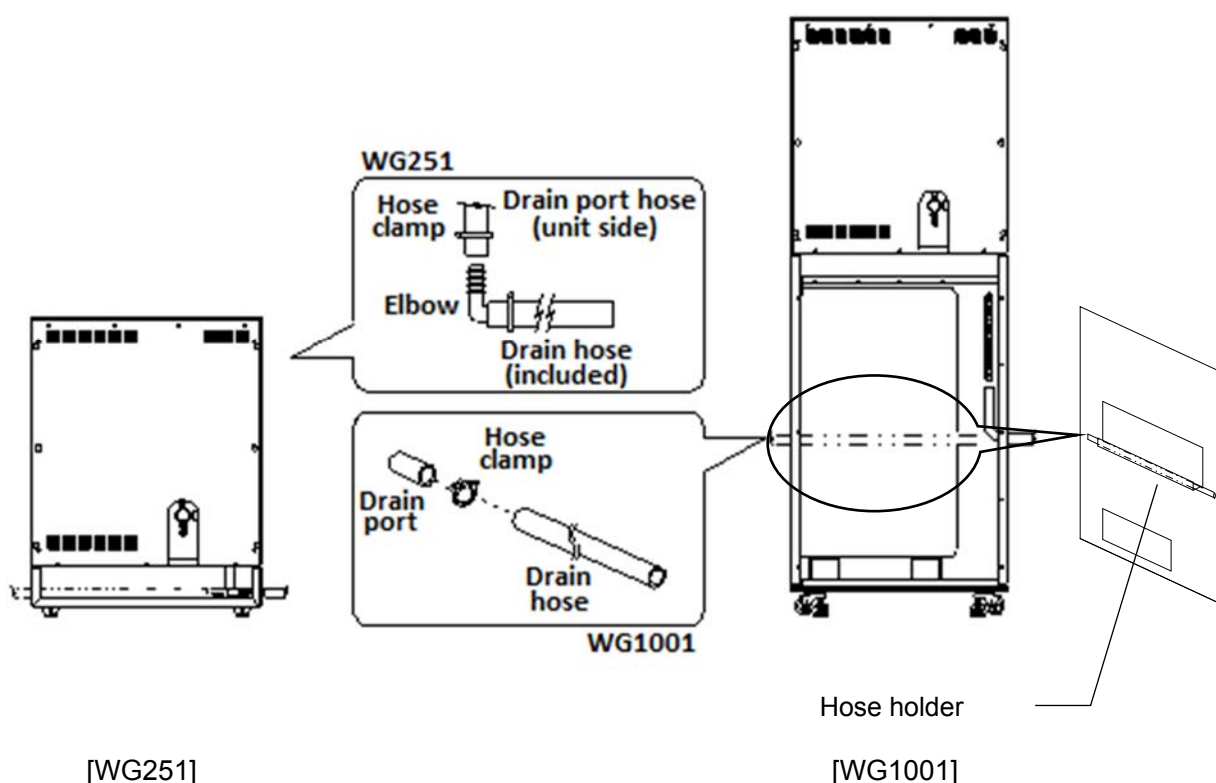
### 3. PRE-OPERATION PROCEDURES

#### Installation Procedure

#### 9. Connect drain hose to main unit.



- Connect drain hose according to the following procedure.
  - Unless firm connection is ensured, water may leak from the threaded portion.
- (1) Take out drain hose with elbow, and hose clamp from among the accessories.
  - (2) Make sure that ELB on unit is "OFF (○)"
  - (3) Remove rubber plug from the end of hose on drain port.
  - (4) Pass the elbow of drain hose through the hose clamp. Connect the hose to drain port of main unit, and fasten it securely with hose clamp.
  - (5) Pull the hose out from the drain hose connection in the left, right or rear side of unit.  
WG1001 unit has a hose holder on the rear panel. Ensure that the hose is placed in the holder.

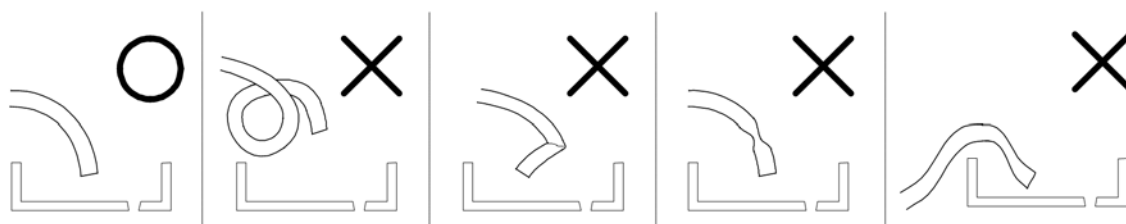


- ❖ Be sure to draw drain hose into a drainage facility

#### 10. Pay due attention when routing drain hose.



- Make sure that drain hose does not bend, or form protrusions.
- If drain hose is bent and water is not drained properly, it may cause backflow or damage to the hoses inside unit.
- Lead drain hose to a drainage facility lower than drain port of unit. Avoid piping that allow paddles in the middle or end of the hose, which can interrupt water to be drained.
- The drain hose end should be positioned in drainable area. While producing distilled water, about 2 L/min (WG251) and 2.6 L/min (WG1001) of cooling water is discharged. In addition, the amount of drainage water will increase when draining boiler, there is a need for a drainage facility with sufficient capacity.



### 3. PRE-OPERATION PROCEDURES

#### Installation Procedure

##### 11. After installation



Unit may tip over or fall, causing injury or death during an earthquake or other unforeseen incident. Be sure to stabilize unit properly to assure safe operation and a safe work area (earthquake-resistant fitting is available for WG1001 as an option).

##### 12. Check drainage temperature of cooling water.



- When draining boiler, drainage temperature may exceed 60 °C. Drain water to a location distant from the work environment in order to avoid a direct contact with hot water. Failure to do so may result in burn injury.
- High temperature cooling water may flow out. Discharge the water at a place away from the drainage facility if PVC pipes are used for the piping of drainage. Hot cooling water may cause damage or degradation to the piping. VP pipe (JIS K 6741) is used for the PVC pipe, and DV-RR joint and plug-in socket (JIS K 6739) are used for the fitting. Use optional drain trap (WG251: OWI11, WG1001: OWI21) if the drainage temperature does not fall below 60 °C. Likewise, use drain trap if not using the above mentioned piping and joints, even if drainage temperature is 60 °C or less.

##### 13. When drainage temperature of the sink does not fall below 60 °C



- Use optional drain trap (WG251: OWI11, WG1001: OWI21).
- Drain trap reduces temperature by temporarily storing the drainage water. And then adds tap water to cool it furthermore. The drainage water will be discharged after adequately cooled.
- For details on drain trap, contact original dealer of purchase.

## 4. PRE-OPERATION PREPARATIONS

### Preparations before Use

Check again before use.

(1) Water supply

Be sure that water supply hose is securely connected.

Open the tap.

Check that there is no water leak from the connection of water supply hose.

(2) Drainage water

Be sure that drain hose is securely connected.

- Make sure that the drain hose is connected to a sink without being bent or twisted.
- If drain hose is bent or twisted, it may lead to a water leak as well as to hinder proper unit operation.

Inspect drain hose periodically to confirm that water drains properly.

(3) Power supply

Check that power cable is connected to a proper power source.

(4) Before operation

Turn ON (I) ELB, and calibrate unit before pressing the **POWER** key.

Carry out calibration when unit is used for the first time (P.29) or when heater of boiler is replaced (P.42).

Press the **POWER** key while holding down the **ION EXCHANGED WATER** key and **DISTILLED WATER** key.

Unit performs calibration (heater temperature and power supply voltage reading) for about five minutes, and then automatically shifts to the distilling operation. All the keys become unresponsive while calibration is in progress. If power failure occurs during calibration, it must be carried out once again.

(5) Precautions for initial operation

- At the time of initial energization, or after draining distilled water storage tank, it takes time to begin dispensing distilled water because air is contained in the pump and piping. The pump may generate a loud noise when dispensing distilled water, but this is not a failure of unit. (If the noise persists, remove membrane filter and dispense distilled water to bleed air)

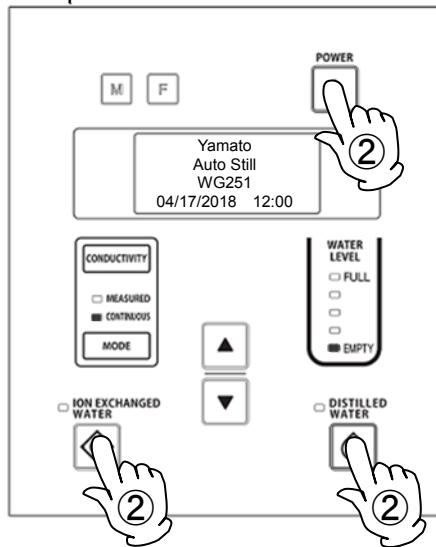
Likewise, when dispensing ion exchanged water immediately after replacement of pre-treatment cartridge and ion-exchange resin cartridge, it takes time to become ready due to air accumulation. When replacing each cartridge, drain about five liters of water to remove the initial impurities and to bleed air.

# 5. OPERATION PROCEDURES

## Initial Operation

Perform initial operation according to the following procedure.

### 1. Turn on power



Carry out calibration when unit is used for the first time.

- ① Turn the ELB ON (I).
- ② Press the **POWER** key while holding down the **ION EXCHANGED WATER** key and the **DISTILLED WATER** key.

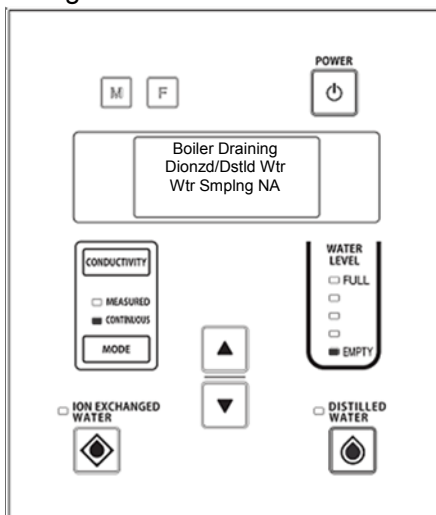
After five minutes, distillation starts automatically.

Proceed to Step 3

for the second and subsequent times:

- ① Turn ELB ON (I).
- ② Press the **POWER** key.

### 2. Draining boiler

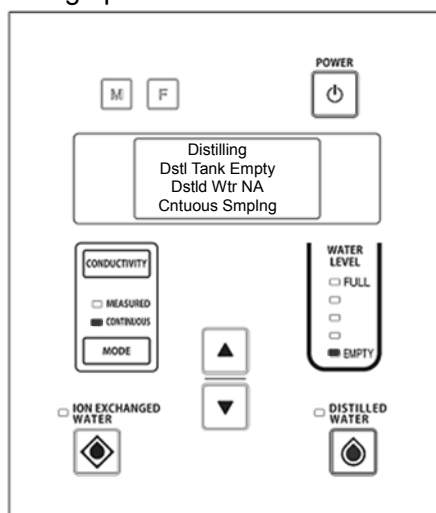


Unit begins to drain boiler.

Unit begins to drain boiler when ELB is turned ON (I) or OFF (O), and after five hours of distillation. (Unless the **POWER** key is pressed, unit will not start draining)

Only WG251 unit performs initial boiler drainage. Boiler drainage is also performed once every five hours of distillation.

### 3. Distilling operation



When the tank is empty, the screen shown on the left and below will display in turn at five-second intervals. While draining initial distilled water (for 10 minutes), " $\cdot \cdot \cdot \times 10^{-4}$  S/m" is displayed because the water storage tank is empty and water quality sensor is not immersed in water. After drainage, the following screen will be displayed.

Distilling  
Dstld Wtr Cndvty  
 $0.85 \times 10^{-4}$  S/m  
Cntuous Smping

Estimated time required to reach the water level, which enables water collection, is about four hours. Above screen will be displayed.

When the tank becomes full, the following message will appear.

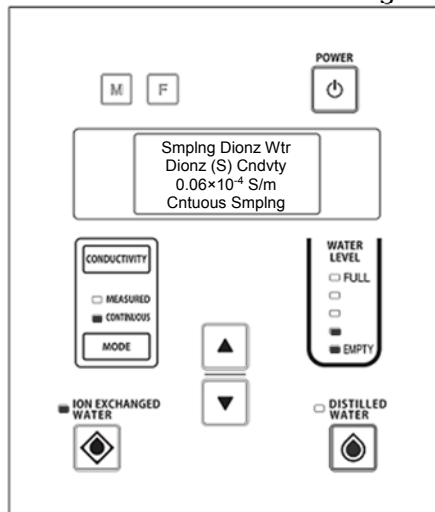
Distill Stop  
Tank Full  
Cntuous Smping



## 5. OPERATION PROCEDURES

### Pure Water Collection

#### Continuous collection of ion-exchanged water

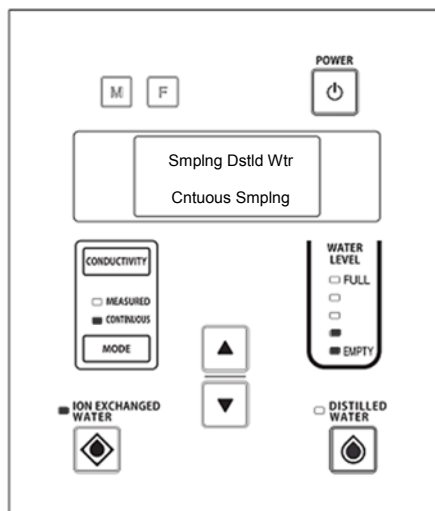


When pressing the **ION-EXCHANGED WATER** key while MODE lamp "CONTINUOUS" is on, ION-EXCHANGED WATER lamp illuminates and unit dispenses ion exchanged water.

Press the **ION-EXCHANGED WATER** key again to stop dispensing. The ION-EXCHANGED WATER lamp goes out.

When water collection completes, unit reverts to distilling operation.

#### Continuous collection of distilled water



When pressing the **DISTILLED WATER** key while MODE lamp "CONTINUOUS" is on, DISTILLED WATER lamp illuminates and unit dispenses distilled water.

Press the **DISTILLED WATER** key again to stop dispensing. The DISTILLED WATER lamp goes out.

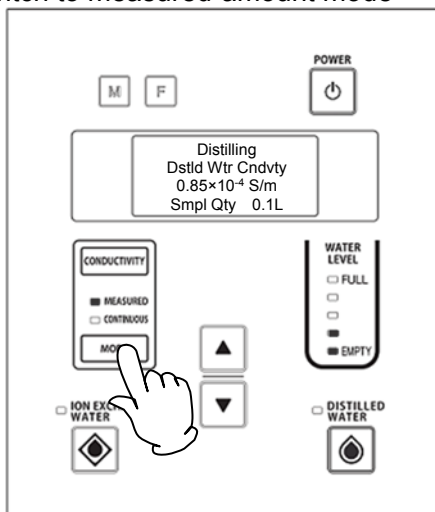
When water collection completes, unit reverts to distilling operation.

\* The pump may generate a loud noise when dispensing water, but this is not a failure of unit. (If the noise persists, remove membrane filter and dispense distilled water to bleed air)

## 5. OPERATION PROCEDURES

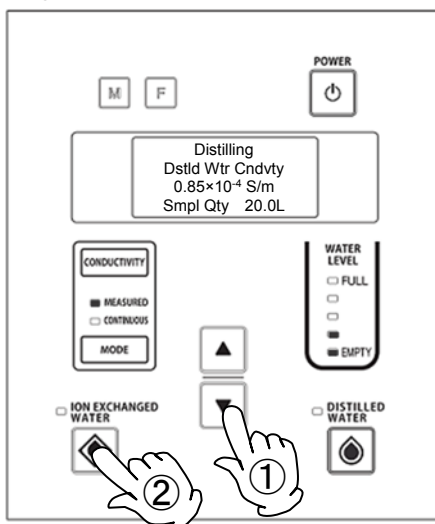
### Measured-amount Collection of Ion Exchanged Water

#### 1. Switch to measured-amount mode



Switch the collection mode lamp from "CONTINUOUS" to "MEASURED" by pressing the **MODE** key.

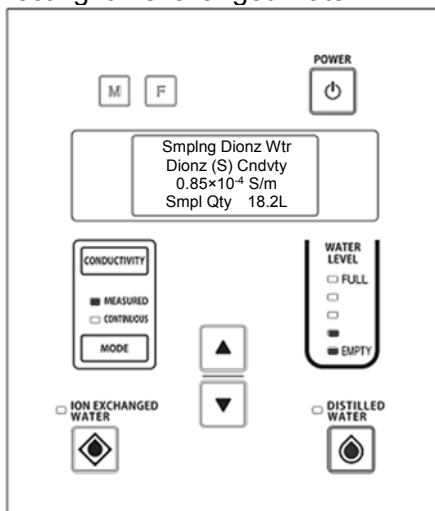
#### 2. Setting the volume of water collection



Enter the volume of ion exchanged water collection. The settings screen is common to ion exchanged water and distilled water.

- ① Enter the volume of water to be collected, using the  $\blacktriangle$   $\blacktriangledown$  keys. Setting range: up to 30 L (WG251), up to 100 L (WG1001)
- ② After setting, press the **ION EXCHANGED WATER** key to start water collection.

#### 3. Collecting ion exchanged water



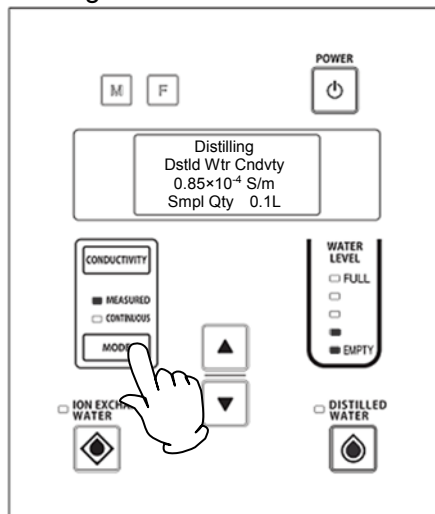
- ① The value of collection volume counts down while dispensing water in measured-amount mode.
- ② When water collection is completed, display shows "Smpl Qty 0.0L"
- ③ Display returns to the screen in Section 2.

Pressing the **ION EXCHANGED WATER** key while dispensing water stops operation and resets collection volume.

## 5. OPERATION PROCEDURES

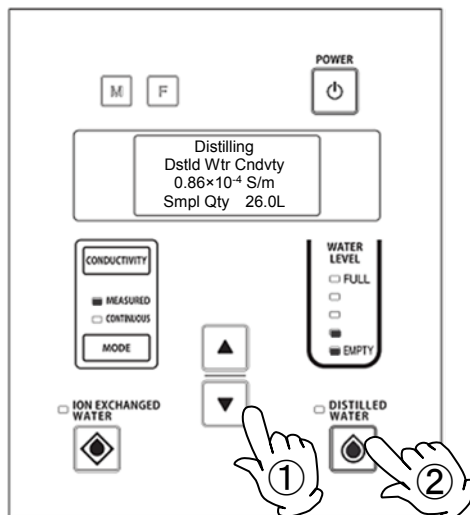
### Measured-amount Collection of Distilled Water

#### 1. Switching water collection mode



Switch the collection mode lamp from "CONTINUOUS" to "MEASURED" by pressing the **MODE** key.

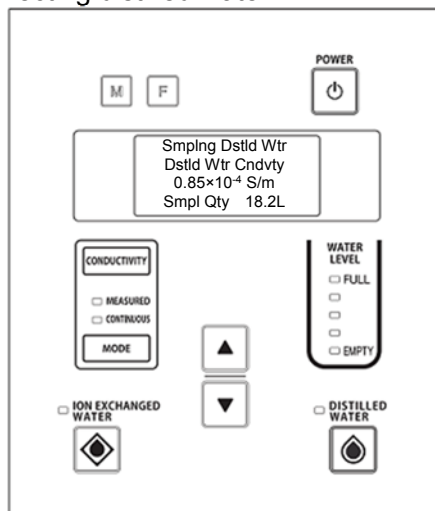
#### 2. Setting the volume of water collection



Enter the volume of distilled water collection  
The setting screen is common to ion exchanged water and distilled water.

- ① Enter the volume of water to be collected, using the  $\blacktriangle$   $\blacktriangledown$  keys.  
Setting range: up to 30 L (WG251), up to 100 L (WG1001)
- ② After setting, press the **DISTILLED WATER** key to collect water.

#### 3. Collecting distilled water



- ① The value of collection volume counts down while dispensing water in measured-amount mode.
- ② When water collection is completed, display shows "Smpl Qty 0.0L".
- ③ Display returns to the screen in Section 2.

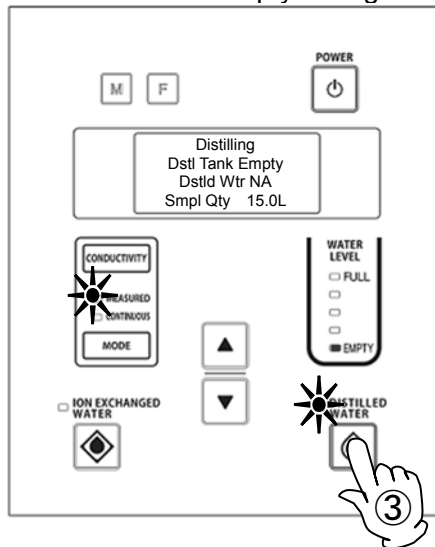
\* Pressing the **DISTILLED WATER** key while dispensing water stops operation and resets collection volume.

\* The pump may generate a loud noise when dispensing water, but this is not a failure of unit. (If the noise persists, remove membrane filter and dispense distilled water to bleed air)

## 5. OPERATION PROCEDURES

### Measured-amount Collection of Distilled Water

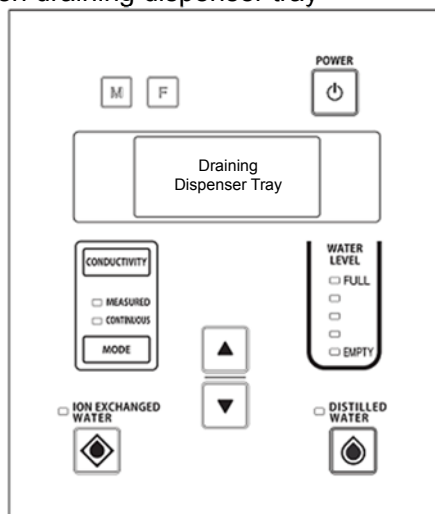
#### ●When tank becomes empty during water collection



- ① If the tank becomes empty while collecting water, the DISTILLED WATER lamp flashes and a message appears on screen as shown in the figure. Water collection is put on hold.
- ② Unit begins distillation.
- ③ Press the **DISTILLED WATER** key when a green lamp of WATER LEVEL indicator illuminates, to resume water collection. Pressing the **ION EXCHANGED WATER** key releases the holding state.
- ④ When water collection is completed, display shows " Smpl Qty 0.0L" and then reverts to standby screen.

### Draining dispenser tray

#### ●When draining dispenser tray



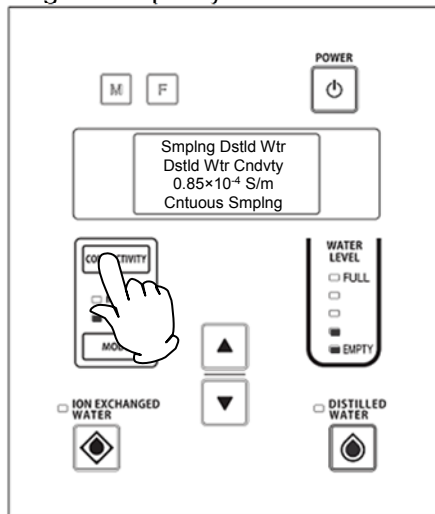
Pressing the dispenser tray drain switch during standby begins to drain water.  
See "Dispenser tray" (P.11) for detail.

- ❖ Draining operation is performed for one minute and then automatically stopped.
- ❖ Keys are disabled while draining.

## 5. OPERATION PROCEDURES

### Water Quality Readout

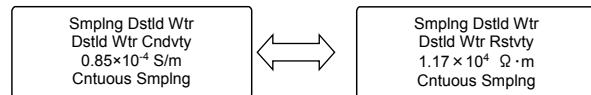
#### ● Switching water quality unit



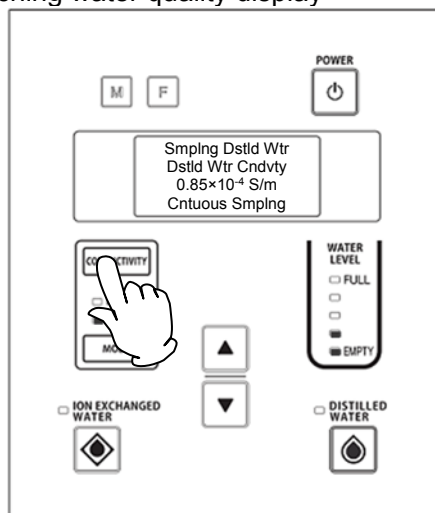
Switches the unit of water quality.

Press the **CONDUCTIVITY** key for two seconds to switch the water quality unit.

Example: Switching water quality unit while dispensing distilled water



#### ● Switching water quality display

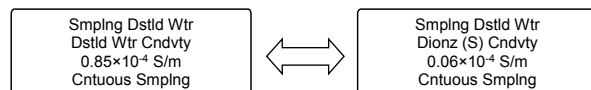


Switches the water quality readout.

The quality of distilled water, and ion exchanged water are automatically displayed during distilling operation, and ion exchanged water collection respectively.

Press the **CONDUCTIVITY** key to switch the water quality readout for ion exchanged water, and distilled water.

Example: To display the quality of ion exchanged water while collecting distilled water



If not operated for 10 seconds, display reverts to the readout for distilled water.

## 5. OPERATION PROCEDURES

### Water Quality Readout

#### Measuring electrical conductivity

Water quality gauge on control panel indicates the conductivity at the outlet of ion-exchange resin cartridge and at the outlet of condenser for distilled water. Water quality readout for ion exchanged water should be used as a guide to determine a time for ion-exchange resin cartridge replacement. Be sure to read display with the electrode completely immersed in water, i.e., while dispensing ion exchanged water. In the following cases, the electrode is not immersed in water and is affected by air bubbles. Therefore, displayed values are not accurate.

1. When unit has just started operation, or during stop
2. Immediately after replacement of ion-exchange resin cartridge and pre-treatment cartridge
3. Immediately after the start of the distillation process

#### Electrical conductivity

- Electrical conductivity ( $\rho$ ) is a numerical value representing the ease of passing electricity. When greater quantity of electrolytes or impurities are dissolved, water is more likely to pass electricity and in that state the value of electrical conductivity is high. The smaller value represents the better purity of pure water.
- However, the value of electrical conductivity does not show the content of non-electrolytic substances (organic substances, colloidal substances, dissolved gases, microorganisms, etc.) but only indicates electrolytic substances. Consider it as one index of the purity of water.
- Specific resistance ( $R$ ) also indicates the flow of electric current. Specific resistance is inversely related to the electrical conductivity. The higher value, therefore, represents the better purity of water.

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

The value of theoretical pure water is calculated as follows:

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

(Note that the specific resistance is represented in integers in the range of 18 to  $1 \times 10^4 \Omega \cdot m$  and does not show decimal point)

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

#### Water quality of ion exchanged water and distilled water

- Ion exchanged water and distilled water have the following characteristics. Use them suitably for the purpose.

It is the best to use pure water immediately after collection. If it is not going to be used for a long period of time, drain all the water from distilled water tank. If the water has been stored in distilled water tank for a long period of time, drain the tank and produce distilled water once again.

##### (1) Ion exchanged water

Most of the electrolytes in the water are removed, resulting in water with the lowest electrical conductivity. Non-electrolytic substances cannot be removed. More or less, the purity of water occasionally drops while the resin is new, or when produced after extended storage of unit.

##### (2) Distilled water

Distillation can remove both electrolytic and non-electrolytic substances averagely, except for substances of low boiling point such as ammonia. However, in the production process (condensation and storage), water absorbs carbon dioxide gas in the air, and produces carbonic acid gas. This makes electrical conductivity  $1$  to  $2.5 \times 10^{-4} S/m$  ( $1$  to  $2.5 \mu S/cm$ )  $25^\circ C$  which is worse than that of ion exchanged water, and pH will be 5 to 6, indicating weak acidity.

See JIS K 0102 (Testing methods for industrial wastewater) for how to remove dissolved gas (oxygen/carbon dioxide) in pure water.

## 5. OPERATION PROCEDURES

### Water Quality Readout

Ion exchanged water and distilled water processed by this unit conform to the JIS K0557 A4 standard.

#### JIS K0557 standard

JIS K0557 standard is a standard for pure water used for testing industrial water and plant wastewater. The classification and quality of pure water are defined as shown in the table below.

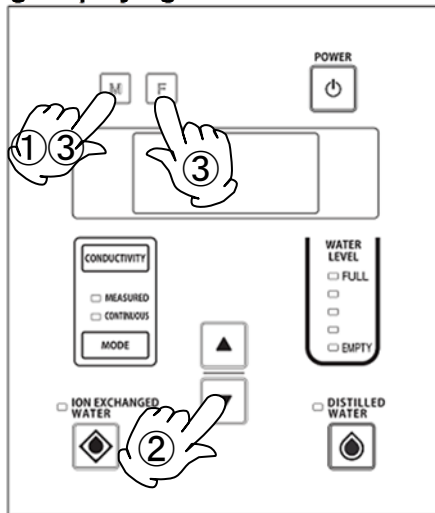
Item		Classification and quality			
		A1	A2	A3	A4
Electrical conductivity	mS/m (at25 °C)	0.5 or less	0.1 or less	0.1 or less	0.1 or less
Specific resistance	mΩcm (at25 °C)	0.2 or more	1 or more	1 or more	1 or more
Total organic carbon	mg/L	1 or less	0.5 or less	0.2 or less	0.05 or less
Zinc	μg/L	0.5 or less	0.5 or less	0.1 or less	0.1 or less
Silica	μg/L	-	50 or less	5.0 or less	2.5 or less
Chloride ion	μg/L	10 or less	2 or less	1 or less	1 or less
Sulfate ion	μg/L	10 or less	2 or less	1 or less	1 or less

- A1 is used for cleaning instruments, or as material for pure water of A2~A and A3.
- A2 is used for general tests and as material for pure water of A3~A and A4.
- A3 is used for preparation of reagents and microanalysis.
- A4 is used for microanalysis. (Refined by distillation using a quartz glass distillation unit, or a procedure which yields equivalent water quality)
- ❖ The specific resistance is shown as reference. The original standard does not contain specific resistance.

## 5. OPERATION PROCEDURES

### Setting/Displaying Submenu

#### Setting/Displaying Submenu



Make settings in submenu.

- ① Press the M key for two seconds.  
Submenu appears on screen.
  - ② Select a submenu item to set or display using the ▲ ▼ keys.
  - ③ Confirm with the M key.  
Moves to the selection screen.  
Pressing the F key discards setting and display returns to the previous screen.
- ❖ If not operated for two minutes, display reverts to the screen before entering submenu.

The following items can be set or monitored in submenu:

1. Buzzer sound ON/OFF
2. Calendar setting
3. Replacement history of consumables
4. Maintenance history
5. Error history
6. Power failure history
7. Water cut-off history
8. UV light manual operation (optional)
9. Language select
10. Auto-resume function

#### 2. Setting and display of each item

##### 2.1. Buzzer sound ON/OFF setup

Tones  
1. Key Tone  
2. Error Tone

- ① Select a submenu item to set using the ▲ ▼ keys.
  - ② Confirm with the M key and move to the selection screen.
  - ③ Select "OFF" or "ON" for each item with the ▲ ▼ keys. Press the M key to finalize the setting.
  - ④ Press the F key to return to the submenu screen.
- ❖ Factory default is "ON"

##### 2.2 Calendar setting

Date & Time  
2018 year  
1/1 month/day  
12:00 hr:min

- ① Select an item to set (year, month, day, hour, minute) using the ▲ ▼ keys.
- ② Confirm with the M key.
- ③ The selected item will show on the screen. Enter the desired value and press the M key to complete. Display shifts to the selection screen.
- ④ Press the F key to return to the submenu screen.



## 5. OPERATION PROCEDURES

### Setting/Displaying Submenu

#### 2.3 Replacement history of consumables

Replcmnt Hstry  
1. Pre-Crtrdge  
2. Dion Crtrdge S  
3. Dstl M-Fltr

5. Dionz M-Fltr  
6. UV Light

\* 6. UV Light is optional

To show replacement history of each filter and cartridge:

- ① Select a submenu item to display using the ▲▼ keys.
- ② Press M to move to the history view.
- ③ Check the history using the ▲▼ keys.
- ④ Press the F key to return to the previous screen.

❖ Up to 20 records of each replacement history can be displayed. When the number of records exceeds 20, it will be deleted in the order from the earliest record.

#### 2.4 Maintenance history

Maintenance  
Inspctn Hstry 1  
  
01/01/2018 12:00

- ① Check the history using the ▲▼ keys.
- ② Press the F key to return to the submenu screen.
- ❖ Up to 20 records of history can be displayed. When the number of records exceeds 20, it will be deleted in the order from the earliest record.

#### 2.5 Error history

Error Alert  
Event Hstry 1  
Leak Error  
01/01/2018 12:00

- ① Check the history using the ▲▼ keys.
- ② Press the F key to return to the submenu screen.
- ❖ Up to 20 records of history can be displayed. When the number of records exceeds 20, the earliest record will be deleted.
- ❖ See P.55 for the types of alarm.

#### 2.6 Power failure history

Pwr Restore  
Event Hstry 1  
↓ 01/01/18 15:00  
↑ 01/01/18 15:10

- ① Check the history using the ▲▼ keys.
- ② Press the F key to return to the submenu screen.
- ❖ Up to 20 records of history can be displayed. When the number of records exceeds 20, the earliest record will be deleted.

#### 2.7 Water cut-off history

Alert: Wtr Loss  
Event Hstry 1  
↓ 01/01/18 15:00  
↑ 01/01/18 15:10

- ① Check the history using the ▲▼ keys.
- ② Press the F key to return to the submenu screen.
- ❖ Up to 20 records of history can be displayed. When the number of records exceeds 20, the earliest record will be deleted.

#### 2.8 Language select

Language  
1. Japanese  
2. English

- ① Select a submenu item to set or display using the ▲▼ keys.
- ② Press the M key to return to the submenu screen.

## 5. OPERATION PROCEDURES

### Setting/Displaying Submenu

#### 2.9 Auto-resume function

Rstr Op Fn  
1. OFF  
2. ON

- ① Select a submenu item to set using the ▲▼ keys.
  - ② Press the M key to return to the submenu screen.
- ❖ The default setting is "OFF".

#### 3. Closing submenu

Press the M key for two seconds.  
Display reverts to the screen before entering submenu.

## 6. HANDLING PRECAUTIONS

### Warnings and Cautions



#### WARNING



#### **DO NOT touch hot surfaces.**

Some parts of boiler become hot during operation or for a while after operation. Use caution not to get burned. Make sure that boiler is cooled before inspecting/maintaining heater.



#### CAUTION



#### **Close the tap when not in operation.**

Be sure to close the tap when not operating (during the night or holidays). Failure to do so may result in water leakage.



#### **Handle scale cleaner carefully.**

- Store scale cleaner in a sealable container and avoid high temperature and humidity.
- The main component of Orgazole 10 scale cleaner is sulfamic acid (the pH of the water solution is about 1).
- Always wear protective equipment (gloves, mask, and glasses) when handling the cleaner.
- If the cleaner comes in contact with any part of human body, wash thoroughly with clean water.
- Neutralize the liquid used for cleaning with neutralizer (sodium hydrate, etc.).
- Use pH test paper to check whether the liquid has been neutralized.
- Empty container must not be used to contain drinks.
- Do not release the cleaner into agricultural canals and fields. Doing so may cause withering of crops.



#### **In the event of a power failure (where auto-resume function is "OFF")**

In the event of a power loss during operation, unit will be put in standby when power is restored. To resume operation, follow the procedures in "Initial Operation" (P.29)

## 7. INSPECTION AND MAINTENANCE

### Precautions before Inspection



#### WARNING

- Be sure to disconnect power cable before daily inspection and maintenance.
- Perform inspections and maintenance when unit is at room temperature.
- Never attempt to disassemble unit.

### Precautions in Daily Maintenance



#### CAUTION

- Clean unit using a soft, damp cloth. Never use benzene, paint thinner, scouring powder, scrubbing brush or other abrasives and solvents to clean unit. Superficial damage and/or discoloration, as well as deformity to some components may result.

### Maintenance and Inspection

Maintenance and inspection period

(Daily inspection is highly recommended to ensure proper operation for longer period of time)

Item	Estimated timing	Description
Ion-exchange resin cartridge (CPC-S) replacement (P.23)	When a replacement alarm appears on the message screen	Notice appears when water quality becomes $1 \times 10^{-4}$ S/m or more ( $1 \times 10^4 \Omega \cdot \text{m}$ or less). * Treatment capacity: approx. 700 L with $200 \times 10^{-4}$ S/m of raw water
Pre-treatment cartridge replacement (P.24)	When a replacement alarm appears on the message screen *1	Notice appears when accumulated power-on time counts 6 months. * Treatment capacity: approx. 5000 L
Membrane filter replacement (P.25)	When a replacement alarm appears on the message screen *2	Notice appears when accumulated power-on time counts 3 moon.
	When the water delivery rate becomes 0.5 L/min regardless of whether replacement alarm shows up or not. *2	
Cleaning water supply hose filter (P.51)	6 months	When raw water quality is poor, more frequent treatment may be required.
Hose replacement	2 years	Check the hose and its connection each month for water leakage or discoloration.
Pump replacement	2 years	Replace once every two years.
Solenoid valve and reducing valve replacement	5 years	Replace once every five years.
ELB inspection (P.45)	1 month	Inspect each month
Draining distilled water tank	3 months	Discharge water when unit is not in use for a long period of time.
UV sterilization light (optional) replacement	2 years	Notice appears when the accumulated run time reaches 170 hours
Washing of Distiller	3 months (recommended)	Should be periodically carried out to maintain water quality.

\* 1 Be sure to replace pre-treatment cartridge once a year regardless of whether replacement alarm shows up or not.

\* 2 Replace membrane filter once every 6 months irrespective of the frequency of use.

\* Notification of the consumables replacement time is made based on the water quality and the total water flow time. The actual replacement time varies depending on the quality of raw water.

## 7. INSPECTION AND MAINTENANCE

### Replacement of Ion-exchange Resin Cartridge

See "6. Connect ion-exchange resin cartridge (CPC-S) securely." (P.23) for replacement procedure. Alarm will be automatically released when replacement completes. See "Reset after Consumables Replacement" (P.44) for the procedure for resetting the total water flow time of consumables.

- Long term storage of the cartridge will compromise the performance of the cartridge, leading to degraded water quality and treatment capacity. Preparing (requesting for) the cartridge right before replacement is, therefore, recommended. The standard storage period is about four months.
- Dispose of the replaced cartridges according to the local laws and regulations.
- Yamato Scientific Co., Ltd. promotes proper collection and recycle for environmental preservation.
- When replacing ion-exchange resin cartridges (CPC-S), drain about five liters of water to remove the initial impurities and to bleed air. In doing so, release all the air in the resin until the water comes to flow without intermission.

### Pre-treatment Cartridge Replacement

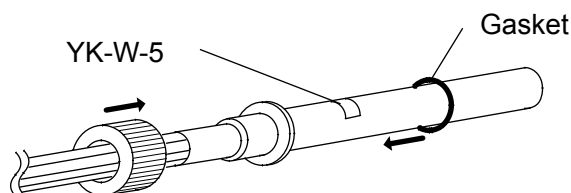
See "7. Connect pre-treatment cartridge securely." (P.24) for replacement procedure. See "Reset after Consumables Replacement" (P.44) for the procedure for resetting the alarm after replacement. Note that continuing to use the cartridge without replacement may shorten the life span of ion-exchange resin cartridge.

- Dispose of the replaced cartridges according to the local laws and regulations.
- Yamato Scientific Co., Ltd. promotes proper collection and recycle for environmental preservation.

### Heater Replacement Procedure

- If heater is disconnected or damaged due to scale build-up, replace heater according to the following procedure.

1. Turn OFF (○) ELB.
2. Close the water tap.
3. Leave unit at least 30 minutes to cool boiler down, and open front door and turn on boiler drain cock.
4. Open the left side panel of main unit, and loosen four screws on the right side of the terminal block, and pull out the heater lead wire terminals.
5. Pull out the heater lead wire from the grommet.
6. Remove the cap nut of heater and pull out heater.
7. Remove the gasket and cap nut from damaged heater.
8. Put gasket and cap nut on new heater.  
Use caution not to touch heater with bare hands, in order to prevent heater from being soiled by handling.
9. Install heater into boiler so that the letter "YK-W-5" turns up. \*



\* YK-W-4 for WG1001

## 7. INSPECTION AND MAINTENANCE

### Heater Replacement Procedure

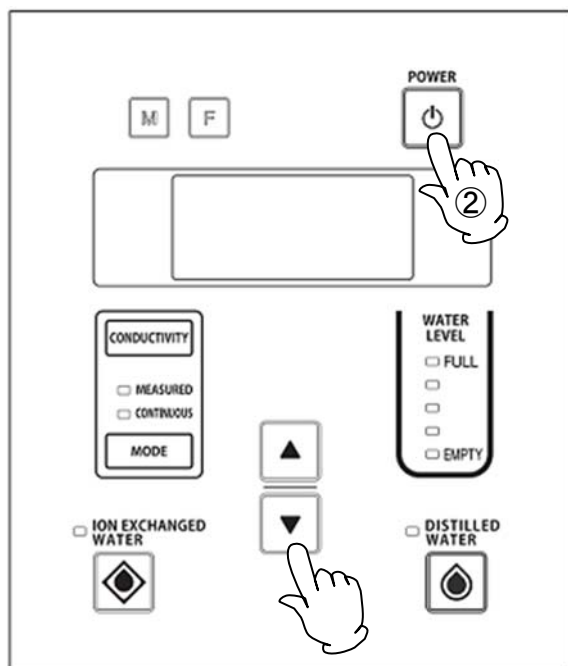
10. Pass the heater lead wire through the grommet, confirm the connecting destination of the heater lead wire, and fasten it to the terminal.
11. Replace the left side panel.
12. Close the boiler drain cock.
13. Close front door and then open the water tap.
14. Turn ON (I) ELB.
15. The display on the control panel displays the standby screen.
16. Press the **POWER** key while holding down the **ION EXCHANGED WATER** key and the **DISTILLED WATER** key. Calibration begins (P.29)  
(Temperature sensor is embedded in each heater. Calibration is to store temperature of the sensors under normal operating conditions in the internal controller as a reference temperature. When heater temperature exceeds this reference temperature by 20 °C or more, an alarm will be raised.)
17. A message is displayed on the message screen of the control panel until calibration completes.
18. After calibrating for about five minutes, unit automatically begins normal operation.

## 7. INSPECTION AND MAINTENANCE

### Reset after Consumables Replacement

For each consumable component, total volume of water flow is specified. Unit counts the total water flow time by each consumable as a guide of replacement time. When the accumulated power-on time reaches the limit, a consumables replacement alarm will occur. After replacing relevant consumable, reset accumulated power-on time for the consumable according to the following procedure.

Resetting replacement alarm and the total water flow time for consumables (in alarm conditions)



① Turn ON (I) ELB on the right side of unit.

② Press the **POWER** key.

#### • Alarm for a single consumable

③ Press and hold reset switch on the back of front door.

Alarm display will reset accompanying confirmation tone.

A record of replacement is stored in consumables replacement history. Operation now can be restarted.

#### • Alarm for multiple consumables

Follow the procedure above for each consumable to reset and enter replacement record in the order of occurrence.

Note that ion-exchange resin cartridge replacement will be recorded last

The alarm of the ion-exchange resin cartridge will be automatically released when replacement completes.

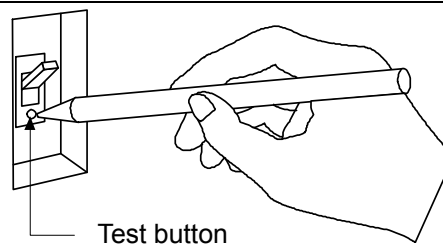
- ❖ Be sure to reset alarms after all the consumables have been replaced. Be sure to reset alarms after all the consumables have been replaced.
- ❖ For multiple alarms, repeat the operation as many times as there are alarms.
- ❖ If the water quality has not improved, the alarm may be raised again.

## 7. INSPECTION AND MAINTENANCE

### Inspect Breaker

#### ● Inspect ELB ON and OFF function.

- Prepare unit for inspection by connecting power cable to a facility outlet or terminal.
- Turn ON( ) ELB.
- Press the test button on ELB using a ball-point pen or other fine-tipped object. If ELB shuts OFF (○), it is functioning normally.



- ❖ ELB must be inspected, as prescribed above, prior to every instance of extended or overnight operation.

### Inspect Power Plug

#### ● Check power plug for damage

- Check visually for dust or dirt on the prongs of the power plug. Check power plug for dust or dirt on its prongs, and clear off if any accretions found.
- Visually check that the prongs of power plug are not bent or damaged. Replace if bent or damaged.
- Check the power plug for discoloration or abnormal heat generation. If there is discoloration or abnormal heating, the internal contact of the outlet may be faulty.








## 7. INSPECTION AND MAINTENANCE

### Washing of Distiller

Scale builds up on distiller (boiler, condenser, and heater) by distillation. Scale will accumulate as the duration of use becomes longer, which may cause drop in water quality or interruption of heater. Clean condenser regularly with the included scale cleaner.

Cleaning condenser requires tools such as a Philips screwdriver and plier, and these tools should be prepared separately.

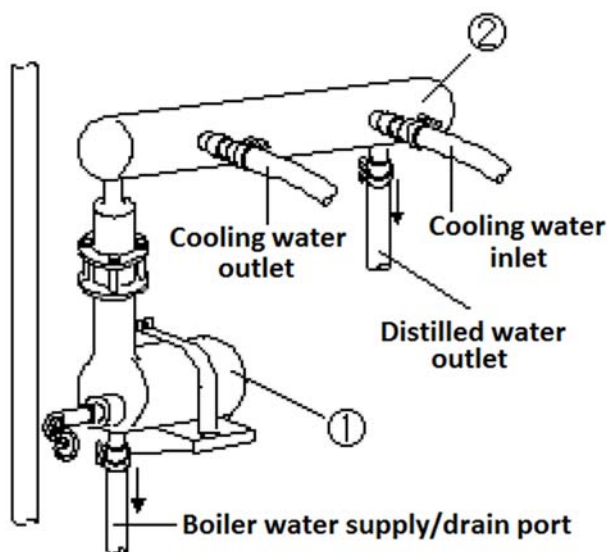
Precautions in cleaning condenser Read carefully before cleaning condenser.	
	Turn OFF (○) ELB. Turn OFF (○) ELB before cleaning condenser. Electric shock may result.
	Always carry out cleaning after condenser is sufficiently cooled. Condenser becomes very hot after distillation. Leave unit at least 30 minutes after turning ELB OFF (○). It may cause burn injury or damage to condenser.
	Use protective equipment. Always wear protective equipment (gloves, mask, and glasses) when cleaning condenser. Direct contact with bare hands may cause damage to condenser. If the cleaner comes in contact with any part of human body, wash thoroughly with clean water.
	Handling of condenser. <ul style="list-style-type: none"><li>• Be careful not to allow condenser to contact other components when removing boiler.</li><li>• Always place condenser onto level surface and avoid location that condenser can fall. Since condenser is made of a fragile material (boiler/condenser: hard glass, heater: ceramic), it may break on impact of contact or falling.</li><li>• Be sure to install the gasket and hose band at the condenser joint. Water leakage may result.</li></ul>
	Handling of heaters <ul style="list-style-type: none"><li>• Do not touch new heater with bare hands. Doing so may cause damage to heater.</li><li>• Do not forcibly bend the heater lead wire in an improper direction. The lead wire may break.</li><li>• Ensure that the screw is not loosened after fastening the lead wire to the terminal block. Electric shock may result.</li></ul>

## 7. INSPECTION AND MAINTENANCE

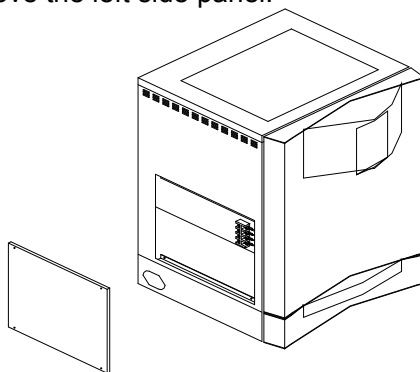
### Washing of Distiller

#### ●Removing distiller

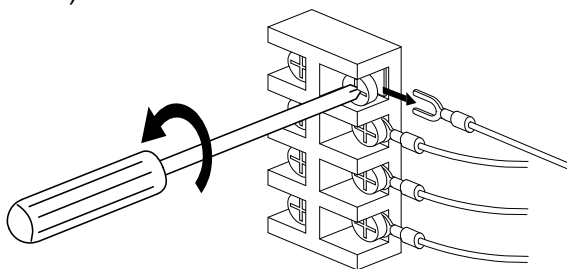
1. Turn OFF (○) ELB.
2. Close the water tap.
3. Turn OFF (○) ELB and wait for at least 30 minutes to dissipate heat, and then open front door and turn on boiler drain cock.
4. Remove the hose connected to ①boiler and ②condenser. Remove the distilled water outlet and boiler water supply/drain port by twisting the hose band with a tool to disengage the meshing portion (serrated portion). Remove the glass carefully, the glass may break if excessive force is applied.



5. Remove hole plugs, which cover screw holes, from the left side panel, remove four screws with a Phillips screwdriver, and remove the left side panel.



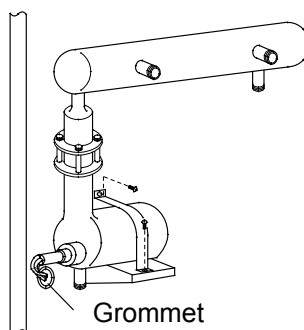
6. A terminal block will appear in the upper right corner of the frame. Loosen four screws on the right side of the terminal block, and pull out the heater lead wire terminals. (since WG1001 employs two heaters, there are eight screws)



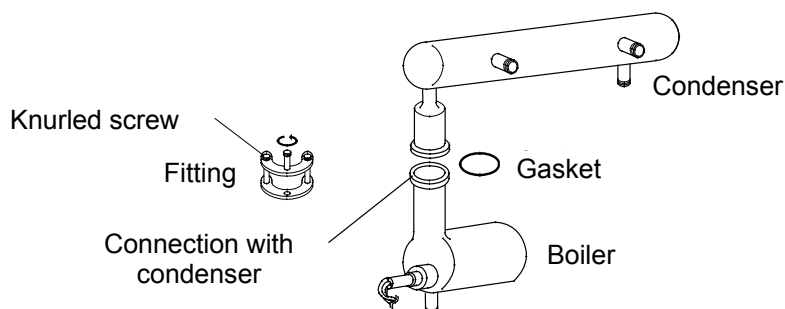
## 7. INSPECTION AND MAINTENANCE

### Washing of Distiller

7. Pull out the heater lead wire from the grommet. Use caution not to bend or pull the heater lead wire to an excessive degree.



8. Remove two screws of the boiler fixing band with a Phillips screwdriver, and take boiler and condenser out of main unit.
9. Loosen the three knurled screws of the fitting and remove boiler and condenser.



#### Cleaning of boiler

1. Density adjustment of scale cleaner
  - 1) Prepare about 2 L of hot water at 50 to 60 °C.
  - 2) Add about 200 g of scale cleaner (Orgazole) to the hot water, and stir it thoroughly.
2. Plug water inlet/drain port at the bottom of boiler with a rubber stopper, etc.
3. Secure boiler on a level and stable surface to prevent the cleaner from spilling.
4. With heater on, pour the cleaner into boiler through the connection port to condenser.

Most scale will be removed in about four to five hours. Drain scale cleaner out of boiler. When the scale cannot be completely removed and much left inside boiler, add the cleaner and wash once again.

  - 1) Once scale removing completes, dismantle heater from boiler, and wash each of them thoroughly with tap water. Always clean heater in a large beaker or other container filled with water in order to avoid wetting lead wire and its outlet.

Do not pour water directly through a water tap.
  - 2) Follow the procedure below if solid scale remains after washing with the cleaner.

Boiler: Scrape off with a brush, etc.

Heater: Scrape off with a wood piece or other soft object.

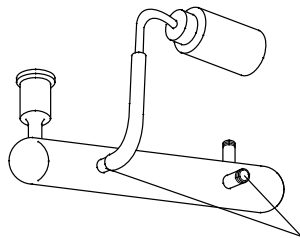
Ensure that all the scale over heater is removed evenly and not sparsely left in solid form. In an extreme case, the thermal resistance may increase only at that part, causing serious damage to heater.

## 7. INSPECTION AND MAINTENANCE

### Washing of Distiller

#### ●Cleaning of condenser

1. Pour the cleaner into the cooling pipe of condenser.  
(For preparation of the cleaner, see P. 48)



Hose connection port

2. If scale cleaner flows out from the hose connection port, seal it with a rubber stopper. Most scale will be removed in about four to five hours.
3. After draining the cleaner, wash thoroughly with tap water.

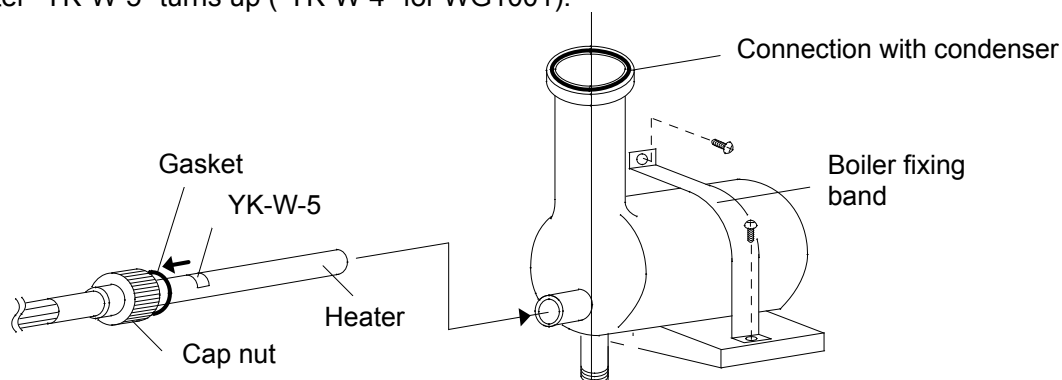
#### ●Handle scale cleaner with care.

1. Cleaning boiler and heater in shorter period is recommended. When large amount of scale accumulates, it becomes more difficult to remove, and may lower the volume of distilled water collection, or cause damage to heater.
2. After cleaning, discharge the cleaner and neutralize it with neutralizer (sodium hydrate, etc.). Use pH test paper to check whether the liquid has been neutralized. The main component of the scale cleaner is sulfamic acid (the pH of the water solution is about 1).
3. Store scale cleaner in a sealable container and avoid high temperature and humidity.
4. Always wear protective equipment (gloves, mask, and glasses) when handling the cleaner.
5. If the cleaner comes in contact with any part of human body, wash thoroughly with clean water.
6. Empty container must not be used to contain drinks.
7. Do not release the cleaner into agricultural canals and fields. Doing so may cause withering of crops.

#### ●Installation of boiler

1. Secure boiler with the boiler fixing band so that the connection port of the condenser becomes horizontal.

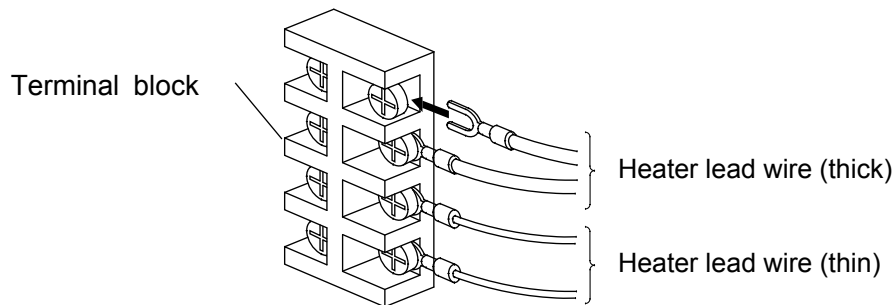
Make sure that the gasket is placed inside the cap nut before installing heater into boiler so that the letter "YK-W-5" turns up ("YK-W-4" for WG1001).



## 7. INSPECTION AND MAINTENANCE

### Washing of Distiller

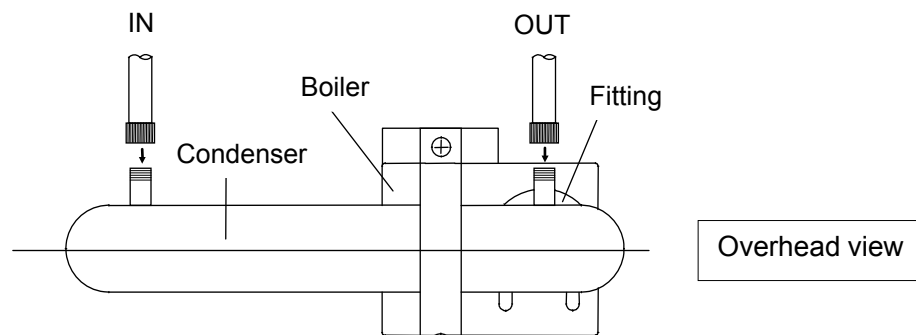
2. Connect the four heater lead wires to the terminal block.



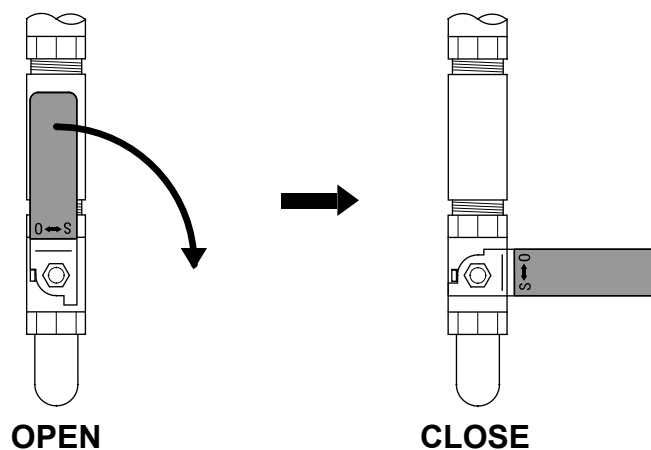
3. Replace the left side panel.
4. Insert a hose into boiler water inlet/drain port and fix it with a hose band.

#### ●Installation of condenser

1. Insert a gasket between the connection ports of boiler and condenser. Secure boiler and condenser in the same orientation using the attachment bracket.



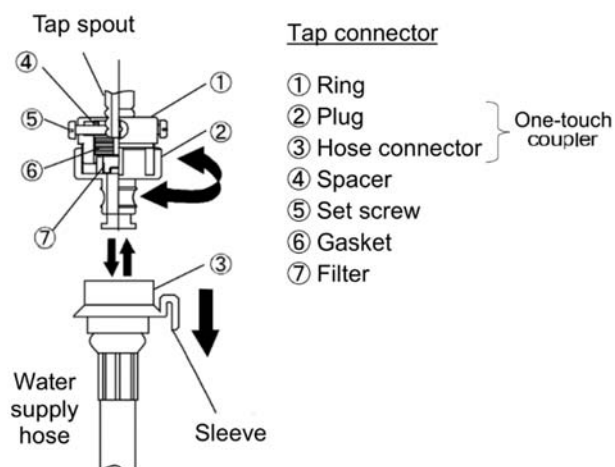
2. Connect each hose to cooling water inlet, outlet, and distilled water outlet of condenser. Close boiler drain cock.



## 7. INSPECTION AND MAINTENANCE

### Cleaning Water Supply Hose Filter

1. Turn "OFF (○)" ELB on the right side of unit, close the tap, slide the sleeve in the arrow direction, and remove water supply hose from tap connector.
  2. Turn and remove ② *Plug* from ① *Ring*.
  3. Clean out ⑦ *Filter* attached to gasket with tap water.
  4. Use a brush to clean ⑦ *Filter*.
  5. Assemble it in the reverse order.
- ❖ Clean the filter of water supply hose once in about 6 months.



## 8. EXTENDED STORAGE AND DISPOSAL

### Extended Storage

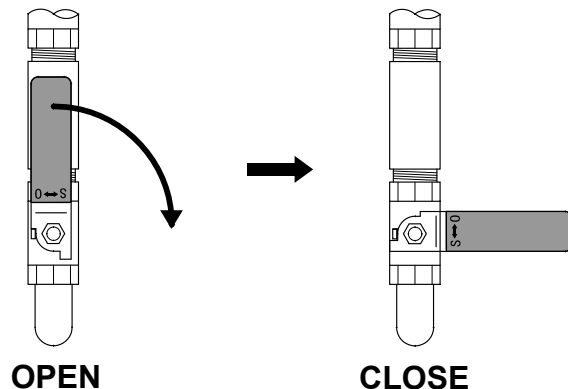


#### When unit will be out of service for an extended period.

Be sure to turn OFF (○) ELB and close water tap for safety. Leaving the water stored in boiler and distilled water tank will allow the growth of bacteria or algae, impairing the water quality. Discharge water by following the steps below.

#### Drain boiler

- (1) When draining boiler, turn OFF (○) ELB, close water tap and wait for at least 30 minutes to dissipate heat, and then open front door and turn on boiler drain cock.
- (2) Open boiler drain cock.
- (3) Check that all the water in boiler and float cylinder has been discharged.
- (4) Be sure to close boiler drain cock. If boiler drain cock is open at the next use, all the water will be discharged from drain cock and will not flow into boiler, hindering distillation.



#### When unit will be out of service for an extended period.

- Turn OFF (○) ELB on the right side of unit.
- Be sure to close the tap.
- If unit is used in a place where it becomes extremely cold in winter, beware of freezing of tank, boiler, and condenser while unit is in storage.

### Disposal Considerations



#### Unit disposal



- Dispose of this unit in accordance with local laws and regulations.
- Do not leave unit where it may be unattended, or in a location where children may have access.

#### Dispose of or recycle this unit in a responsible and environmentally friendly manner.

Yamato Scientific Co., Ltd. strongly recommends disassembling unit, as far as is possible, in order to separate parts and recycle them in contribution to preserving the global environment. Major components and materials, comprising WG series unit are listed in the table below

## 8. EXTENDED STORAGE AND DISPOSAL

### Disposal Considerations

Component Name	Material
<b>Exterior Parts</b>	
Exterior	Chromium-free electrogalvanized steel sheet, baked-on finish
Exterior rear panel	Chromium-free electrogalvanized steel sheet, baked-on finish
Door	Chromium-free electrogalvanized steel sheet, baked-on finish
Door back plate	Stainless steel sheet metal
Mounting plates (coated)	Chromium-free electrogalvanized steel sheet, baked-on finish
Mounting plates (uncoated)	Stainless steel sheet metal
Hinges	Stainless steel sheet metal
Rubber feet	Synthesized rubber
Nameplates, Labels	Polyethylene terephthalate
<b>Water circuit</b>	
Boiler	Hard glass
Condenser	Hard glass
Float cylinder	Polypropylene
Pure water tank	Polyethylene
Drains	Polypropylene
Float cylinder branch tube	Polypropylene
Electrode holder	Polypropylene
Pure water outlet	Polypropylene
Control panel	ABS resin
Dispenser tray	ABS resin
Resin cylinder case	Polypropylene rubber
Ion-exchange resin	Polystyrene resin
Water quality gauge electrode	Titanium
Heater	Ceramic
Heater mounting nut	Teflon
<b>Internal Piping</b>	
Water supply hose	Vinyl chloride
Drain hose	Ethylene-propylene rubber
Hose (transparent)	Vinyl chloride
Hose (opalescent)	Silicon rubber
Hose clamp	Polyacetal
Hose nipple (resin black)	Polyamide
Hose nipple (resin white)	Polypropylene
Hose nipple (metal)	Brass



## 8. EXTENDED STORAGE AND DISPOSAL

### Disposal Considerations

Component Name	Material
<b>Electrical parts</b>	
Pump	Casing: Polypropylene Impeller: Polypropylene Magnet: Ferrite magnet Motor case: Iron Rotor: Iron
Solenoid valve (metal)	Body: Brass
Solenoid valve (resin)	Body: Polyacetal
Float switch	Polypropylene
Power cable, wiring and other components	Synthetic rubber or resin coated wiring materials, boards

## 9. TROUBLESHOOTING

### Error Indications and Descriptions

#### Troubleshooting guide

When any of these error messages appears on the screen, confirm the error message and its detail. Then turn "OFF (○)" ELB immediately and close the tap. When an error message is displayed, replacing consumable(s) or unit inspection is required. Contact original dealer of purchase or Yamato sales office for assistance.

Please inform of the error message appeared on the screen and serial number of main unit.

Symptom	Error message	Possible causes	Possible measures
Ion-exchange resin (S) replacement alarm	Dio Wtr Qlty Err Rplc Rsn Ctrdg S	When the quality of ion exchanged water becomes over $1 \times 10^{-4}$ S/m (the alarm will be automatically released when replacement completes)	Replace ion-exchange resin cartridge. (P.23) After replacement completes, press and hold the reset switch on the back of front door. Alarm display will reset accompanying confirmation tone. (P.44)
Pre-treatment cartridge replacement alarm	Rplce Pre-Ctrdg	When the accumulated power-on time has reached 6 months	Replace pre-treatment cartridge. (P.24) After replacement completes, press and hold the reset switch on the back of front door. Alarm display will reset accompanying confirmation tone. (P.44)
Distilled water membrane filter replacement alarm	Rplc Dstl Mb Flt	When the accumulated power-on time has reached 3 months	Replace membrane filter for distilled water. (P.25) After replacement completes, press and hold the reset switch on the back of front door. Alarm display will reset accompanying confirmation tone. (P.44)
Ion-exchanged water membrane filter replacement alarm	Rplc Ion Mb Fltr	When the accumulated power-on time has reached 3 months	Replace membrane filter. (P.25) After replacement completes, press and hold the reset switch on the back of front door. Alarm display will reset accompanying confirmation tone. (P.44)
Water cut-off alarm	Alert: Wtr Loss Chk Flw&Prssr	When the raw water is cut off or the raw water pressure becomes $0.5 \times 100$ kPa or less (When the raw water pressure returns to normal, unit will automatically resume operation).	Ensure that the water is not suspended, and turn on the tap further. If problem persists, call for service.

## 9. TROUBLESHOOTING

### Error Indications and Descriptions

Symptom	Error message	Possible causes	Possible measures
UV sterilization light replacement alarm (Optional)	Rplc UV S Lite	When the accumulated power-on time has reached 100 hours.	Replace the UV sterilization light. Press and hold the reset switch on the back of front door. Alarm will be released, accompanying confirmation tone. (P.44)
Maintenance notice	Mntnce Rqd Call for Service	When the accumulated power-on time has reached 3 years	Contact original dealer of purchase or Yamato sales office to request for inspection Press and hold the reset switch on the back of front door. Alarm will be released, accompanying confirmation tone.
Above replacement alarms simultaneously occur at a time	Each replacement alarm alternately appears	When multiple consumables have reached their replacement period.	Replace relevant consumables. After replacement completes, press and hold the reset switch on the back of front door. Alarm display will reset accompanying confirmation tone. Repeat until all of alarms are released. (P.44)

## 9. TROUBLESHOOTING

### Error Indications and Descriptions

Symptom	Error message	Possible causes	Possible measures
Controller failure	Controller Error Call for Service	When the set value stored in the storage cell cannot be read or is an abnormal value	Reset ELB on the right side of unit. If problem persists, contact original dealer of purchase.
Water leakage error	Leak Error Call for Service	When water contacts leak sensor.	If water leaks, or accidentally splashes on the sensor when replacing consumables, turn OFF (○) ELB and dry leak sensor (P.59) If water leaks from the piping, contact original dealer of purchase.
Heater overheat	Overheat Error Call for Service	When temperature of heater unit exceeds the abnormality determination value, or when the temperature sensor is interrupted or short-circuited.	Replace heater.
Heater interruption or disconnection	Heater Error Call for Service	If heater temperature does not rise after a certain time has passed in distilling operation.	Replace heater.
Tank water level gauge failure	Tnk Wtr Snsr Err Call for Service	When float contact points in water level gauge are in an abnormal state.	Replace float switch.
Ion exchanged water (H) quality gauge failure	Dionz H Snsr Err Call for Service	Thermistor sensor of ion exchanged water quality gauge continues being interrupted/short-circuited for longer than the abnormality determination time.	Replace ion exchanged water quality sensor
Distilled water quality gauge failure	Dst Wtr Snsr Err Call for Service	Thermistor sensor of distilled water quality gauge continues being interrupted/short-circuited for longer than the abnormality determination time.	Replace distilled water quality sensor

## 9. TROUBLESHOOTING

### Error Indications and Descriptions

Symptom	Error message	Possible causes	Possible measures
Boiler drain error	Boiler Water Waste Error Service Call	If the heater operation water level is entered ON after the abnormality determination time has passed from the start of boiler drain.	Contact original dealer of purchase
Cooling water failure	A Coolant Error Service Call	When the boiler overflow input of float cylinder keeps ON for longer than the abnormality determination time.	Contact original dealer of purchase
Boiler water level error	Boiler Water Level Error Service Call	If the heater operation water level is entered OFF after the abnormality determination time has passed from the start of water supply to boiler.	Contact original dealer of purchase
Boiler water level gauge failure	Boiler Water Sensor Error Service Call	When float contact points in float cylinder are in an abnormal state.	Replace float switch.

\* When an abnormality occurs or an error message appears, heater, solenoid valves and all the other controls are shut off.

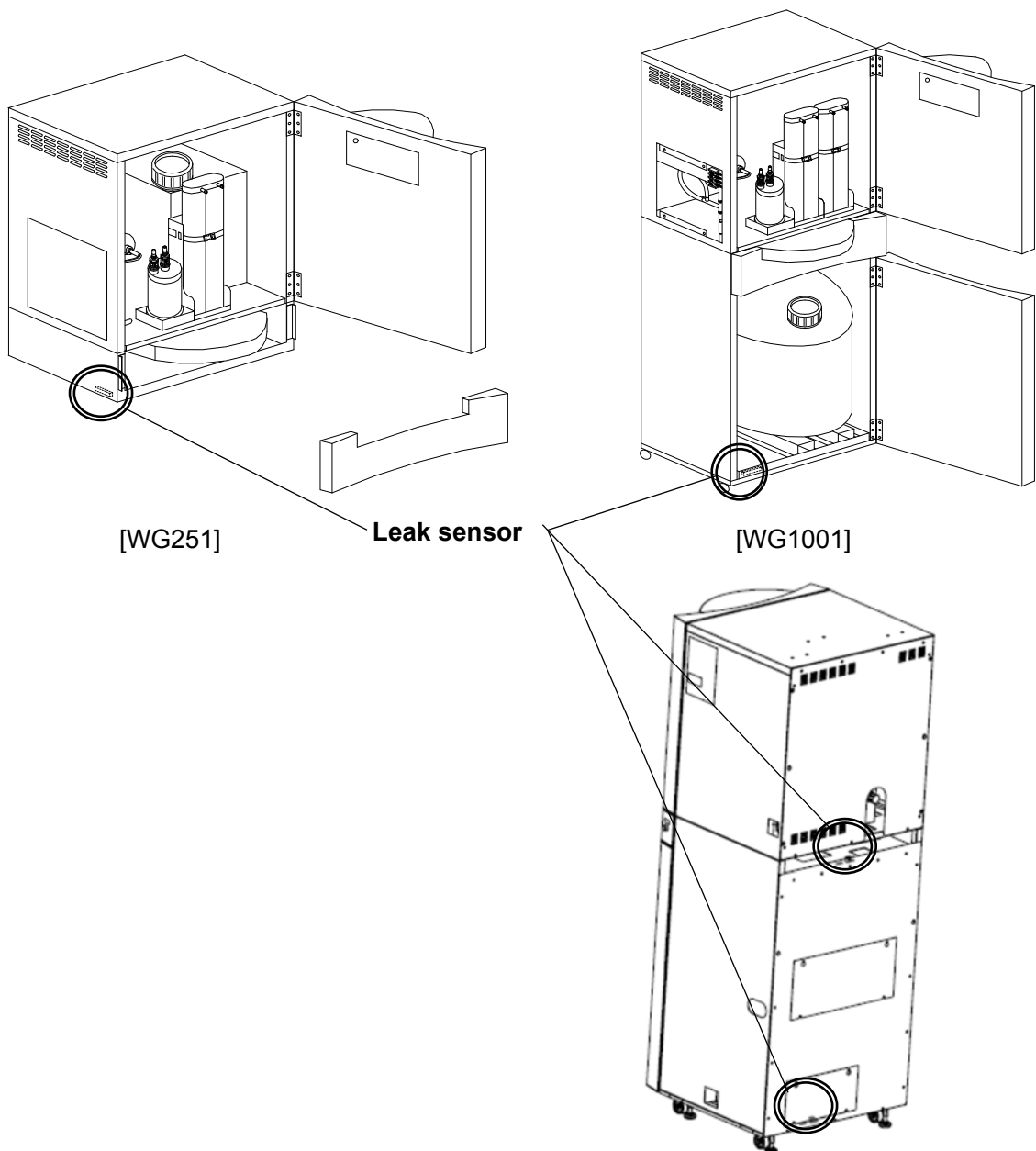
\* In the event of malfunction, confirm the message on screen and contact original dealer of purchase or Yamato sales office.

### When water leakage alert is displayed

#### Corrective actions

- (1) Turn OFF (○) ELB on the right side of unit.
- (2) Identify the water leakage point.
- (3) Wipe off water at the bottom of unit. Remove leak sensor and dry the electrode thoroughly.  
(A Philips screw driver is required to remove leak sensor)
- (4) Reinstall leak sensor.
- (5) Close front door.
- (6) Turn "ON (I)" ELB on the right side of main unit, and press the **POWER** key on control panel to resume operation.

❖ Close the tap before disassembling the piping, such as repairing water leakages from the piping.



# 9. TROUBLESHOOTING

## Troubleshooting Guide

Symptom	Possible causes	Possible measures
Displays are blank when control panel is turned on	● ELB is OFF (○)	Turn ON (I) ELB on the right side of unit.
	● Power supply failure	Check the power supply capacity. WG251: 1 φ 115 V AC WG1001: 1 φ 220 V AC
	● ELB failure	Replace relevant parts
No water is supplied	● Water tap is not sufficiently open.	Open the tap.
	● Water is cut off or pressure is low.	Check whether the tap is turned on.
	● Water supply hose is not properly connected	Reconnect water supply hose (P.28)
	● Raw water supply solenoid valve failure	Replace relevant parts
	● Boiler water supply solenoid valve failure	Replace relevant parts
	● Float switch failure	Replace relevant parts
	● Pre-treatment cartridge is clogged	Check whether the consumables have been replaced at regular intervals.
Water supply will not stop	● Boiler drain solenoid valve is open	Close the drain cock.
	● Raw water supply solenoid valve failure	Replace relevant parts
Water collection of ion exchanged water will not stop.	● Float switch failure	Replace relevant parts
	● Failure in solenoid valve for ion exchanged water collection	Replace relevant parts
Distilled water collection will not stop.	● Failure in solenoid valve for distilled water collection	Replace relevant parts
	● Float switch failure	Replace relevant parts
Heater does not turn on	● Heater interruption or disconnection	Replace relevant parts
	● Failure in solenoid valve for cooling water	Replace relevant parts
Cooling water does not flow	● Failure in solenoid valve for initial distilled water drainage	Replace relevant parts
Initial distilled water is not discharged.	● Failure in solenoid valve for initial distilled water drainage	Replace relevant parts
Distilled water is not accumulated.	● Failure in solenoid valve for initial distilled water drainage	Replace relevant parts
Distillation will not stop	● Float switch failure	Replace relevant parts
Cannot collect water	● Failure in solenoid valve for ion exchanged water collection/distilled water collection	Replace relevant parts
	● Pre-treatment cartridge, ion-exchange resin cartridge or membrane filter is clogged	Check whether the consumables have been replaced at regular intervals.
	● Piping connection failure	Check the hose connection. (P.28)
Poor water quality	● Ion-exchange resin cartridge is degraded	Dispense about 5 L of water. If not improved, replace ion-exchange resin cartridge.
	● Remaining air in ion-exchange resin cartridge	
	● Ion-exchange resin cartridge has not been used for a long period of time	
	● Distilled water is stored in distilled water tank for an extended period.	Drain distilled water tank and produce distilled water again.

#### Warranty card (attached separately)

Warranty card will be handed by dealer or Yamato personnel upon delivery and installation, or will be attached to equipment if no one from dealer or Yamato is to be present at delivery and installation.

Register warranty card at <https://www.yamato-net.co.jp/support/warranty.htm>

- Keep warranty card safe.

#### Requests for Repair

If abnormalities remain after confirming "Troubleshooting Guide", terminate operation, turn off controller and ELB, and disconnect power cable. Contact original dealer of purchase or Yamato sales office for assistance.

The following information is required for all repairs.

- Product Name
  - Model
  - Serial Number
  - Date (year/month/day) of Delivery
  - Description of problem in as much detail as possible
- } Refer to warranty card.
- Repair this equipment for free of charge according to the contents on warranty card. Warranty period is 1 (one) year from date of purchase.
  - Consult with original dealer of purchase or Yamato sales office for any repair after warranty ended. Charged repair service of this equipment will be available on customer's request when it can be maintained functional by its repair.

\* Be sure to present warranty card to the service representative.

#### Guaranteed Supply Period for Repair Parts

Guaranteed maximum supply period for repair parts is 7 (seven) years from date of discontinuation for this equipment.

"Repair parts" is defined as components which, when installed, allow for continued equipment operation.



# 11. SPECIFICATIONS

Model		WG251	WG1001
System / Performance	Water purifying system	Ion exchange → distillation → filtration	
	Water supply system	Resin hose connection to water tap with one-touch coupler/free hose connection	
	Drain system	Drain water connector on both sides for the connection of a drain hose	
	Purified water	Ion-exchange water, distilled water	
	Distilled water production	Approx. 1.5 L/h	Approx. 5 L/h
	Distilled water delivery rate *2	0.5 to 1.0 L/min	
	Ion exchanged water delivery rate *2	0.5 to 1.0 L/min	
	Water collection capacity setting range	0.1 to 30 L / Continuous collection	0.1 to 100 L / Continuous collection
Configuration	Condenser	Hard glass	
	Heater	Ceramic heater 1.2 kW	Ceramic heaters 1.9 kW x 2
	Pre-treatment cartridge	0.1µm hollow fiber membrane + activated carbon (PWF-1)	
	Ion-exchange resin cartridge	CPC-S 4 L: 1 pc (High-purity cartridge with activated carbon)	CPC-S 4 L: 2pc (High-purity cartridge with activated carbon)
	Final filtration	0.1 µm × 2 (Membrane filter)	
	Water leakage detection	When water leakage is detected, leak sensor shuts off water supply solenoid valve.	
	Distilled water storage tank	30 L PE tank	100 L PE tank
	UV sterilization for distilled water	Optional	
	Dispenser tray	Drawer type Load capacity: 10 kg for 5 L beaker with a handle	Drawer type Load capacity: 20 kg for 10 L tank
	Multipurpose distilled water outlet	Water supply connection to WR type: Right side of main unit	
	Water level detection	Float switch 5-stage detection	
Standard	Raw water pressure range	0.5 to 5×100 kPa(0.5 to5 kgf/cm2)	
	Operational external temperature range	5 to 35 °C	
	Power supply (50/60 Hz) Rated current	115 V AC 11 A (20 A)	220 V AC 18 A (30 A)
	External Dimensions *3	W600 × D660 × H780 mm	W600 × D660 × H1650 mm
	Weight	Approx. 55 kg	Approx. 105 kg
Display	Water level indication	LED display	
	Water quality readout	Digital display (electrical conductivity/specific resistance)	
	Other displays	Consumables replacement alarm (Ion-exchange resin cartridge, pre-treatment cartridge, sterilization light *2, membrane filter), error message/alarm display, error history display, consumables replacement history display (20 records), Japanese/English language select, maintenance display	
Accessories		Water supply hose (2 m) Drain hose (2 m) Connection hose assembly Scale cleaner Pre-treatment cartridge Ion-exchange resin cartridge Membrane filter Hose clamp Seal tape Instruction manual Warranty card	1 1 1 1 1 1 2 1 1 1 This manual 1

\*1 Performance data above based on WG251: 115V AC supplied power, 23 °C ±5 °C room temperature, and 65%RH ±20% humidity.

WG1001: Power supply 220 V AC, room temperature 23 °C ± 5 °C, humidity 65 %RH ± 20 %

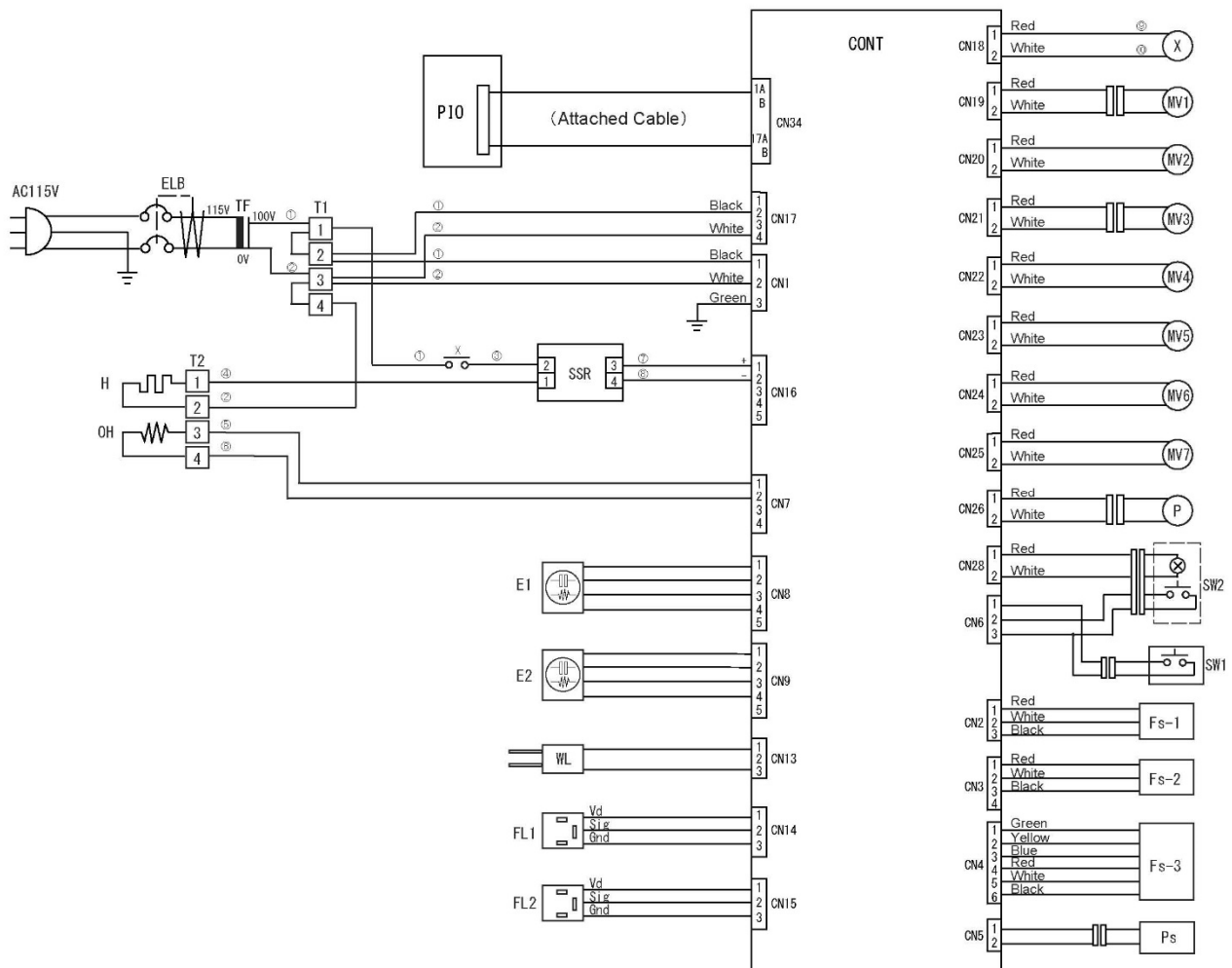
Operating temperature range for WG251/1001 is between 5 °C and 35°C. Keep temperature range of raw water between 5 °C and 30 °C. When raw water temperature is high, the drainage temperature may also be high.

\*2 Performance guarantee ranges are raw water pressure of 2.0 to 5.0 × 100 kPa (2 to 5 kgf per cm2) and water temperature of 20 °C. Water collection volume varies depending on water temperature.

\*3 Protrusions excluded.

# 12. WIRING DIAGRAM

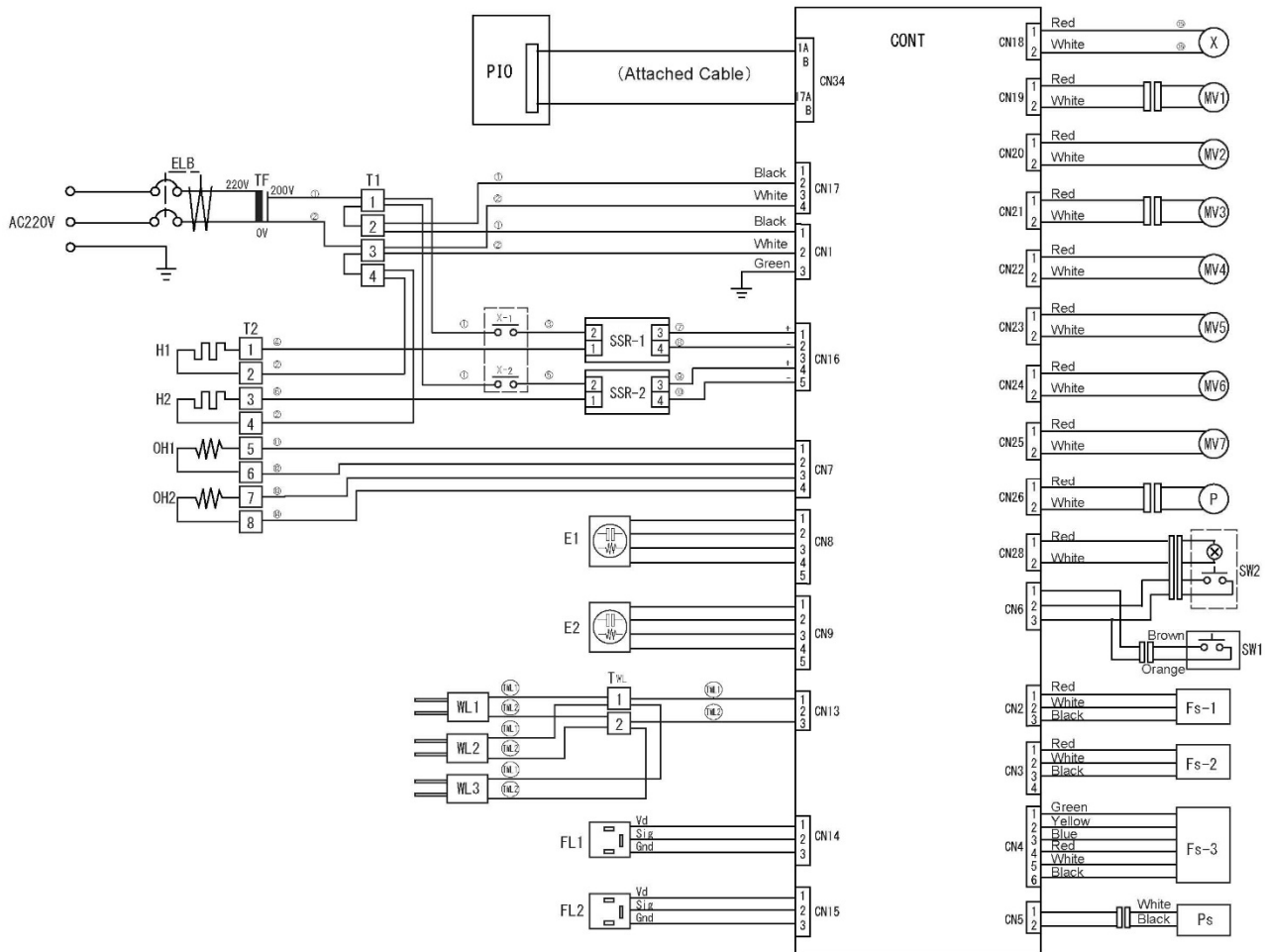
## WG251 Wiring Diagram



Symbol	Component	Symbol	Component
ELB	Earth leakage breaker	X	Main relay
T1,T2	Terminal block	MV1	Solenoid valve for raw water supply
H	Heater	MV2	Solenoid valve for boiler water supply
OH	Temperature sensor	MV3	Solenoid valve for cooling water
E1	Ion exchanged water quality gauge.	MV4	Solenoid valve for initial distilled water drain
E2	Distilled water quality gauge.	MV5	Solenoid valve for boiler drainage
WL	Leak sensor	MV6	Solenoid valve for distilled water collection
FL1	Distilled water flowmeter	MV7	Solenoid valve for ion exchanged water collection
FL2	Ion exchanged water flowmeter	P	Distilled water dispensing pump
Fs-1	Control float switch	SSR	Solid state relay
Fs-2	Control float switch	P10	Display board
Fs-3	Tank level float switch	CONT	CPU board
SW1	Reset switch	Ps	Pressure switch
SW2	Drain switch	TF	Transformer

# 12. WIRING DIAGRAM

## WG1001 Wiring Diagram



Symbol	Component	Symbol	Component
ELB	Earth leakage breaker	X	Main relay
T1,T2	Terminal block	MV1	Solenoid valve for raw water supply
H	Heater	MV2	Solenoid valve for boiler water supply
OH	Temperature sensor	MV3	Solenoid valve for cooling water
E1	Ion exchanged water quality gauge	MV4	Solenoid valve for initial distilled water drain
E2	Distilled water quality gauge	MV5	Solenoid valve for boiler drainage
WL1,WL2,WL3	Leak sensor	MV6	Solenoid valve for distilled water collection
FL1	Distilled water flowmeter	MV7	Solenoid valve for ion exchanged water collection
FL2	Ion exchanged water flowmeter	P	Distilled water dispensing pump
Fs-1	Control float switch	SSR1	Solid state relay
Fs-2	Control float switch	SSR2	Solid state relay
Fs-3	Tank level float switch	PIO	Display Board
SW1	Reset switch	CONT	CPU board
SW2	Drain switch	Ps	Pressure switch
TWL	Terminal block	TF	Transformer

## 13. REPLACEMENT PARTS LIST

### Consumables

Component Name	Model	Code No.
Pre-treatment cartridge	PWF-1	253099
Ion-exchange resin cartridge	CPC-S	253080
Air vent filter for tank	AVF-1(4210)	9020020001
Sterilization light (optional)	OWG20	253202
Sterilization light (optional)	OWG22	253203
Scale cleaner (1 kg)	-	8190010001
Membrane filter (2 pcs)	MFRL727	9020010004

## 14. OPTIONAL ACCESSORIES

### List of Options

Some options must be specified when placing order for main unit.  
Contact original dealer of purchase for requests for options.

Product Name	Product code	Model	Description
Stand	253174	AS250	External dimensions: W603 × D683 × H870 mm
Water collecting hose unit	253204	OWG24	Length of hose: 2 m
Water inlet unit	253686	OWH10	Used when there is no sink near water supply equipment. Install a water faucet to the tap water line.
Pressure reducing valve for raw water	253769	OWG42	Regulates raw water pressure. Used when the raw water pressure is not constant or when the raw water pressure is 5 × 100kPa (5kgf/cm <sup>2</sup> ) or higher.
Sterilization light	253202	OWG20	For WG251
Sterilization light	253203	OWG22	For WG1001
Connecting unit G	253668	-	WL100 + WG Series
Drain trap	253221	OWI11	For WG251
Drain trap	253222	OWI21	For WG1001

## 15. LIST OF HAZARDOUS SUBSTANCES



Never attempt to process explosives, flammables or any items which contain explosives or flammables.

Explosive substances	①Nitroglycol, Glycerine trinitrate, Cellulose Nitrate and other explosive nitrate esters
	②Trinitrobenzen, Trinitrotoluene, Picric Acid and other explosive nitro compounds
	③Acetyl Hydroperoxide, Methyl Ethyl Ketone Peroxide, Benzoyl Peroxide and other organic peroxides
	④Metallic Azide, including Sodium Azide, etc.
Combustible substances	①Metal "Lithium" ②Metal "Potassium" ③Metal "Natrium" ④Yellow Phosphorus
	⑤Phosphorus Sulfide ⑥Red Phosphorus ⑦Phosphorus Sulfide
	⑧Celluloids, Calcium Carbide (a.k.a, Carbide) ⑨Lime Phosphide ⑩Magnesium Powder
	⑪Aluminum Powder ⑫Metal Powder other than Magnesium and Aluminum Powder
	⑬Sodium Dithionous Acid (a.k.a., Hydrosulphite)
Oxidizing substances	①Potassium Chlorate, Sodium Chlorate, Ammonium Chlorate, and other chlorates
	②Potassium Perchlorate, Sodium Perchlorate, Ammonium Perchlorate, and other perchlorates
	③Potassium Peroxide, Sodium Peroxide, Barium Peroxide, and other inorganic peroxides
	④Potassium Nitrate, Sodium Nitrate, Ammonium Nitrate, and other nitrates
	⑤Sodium Chlorite and other chlorites
	⑥Calcium Hypochlorite and other hypochlorites
Flammable substances	①Ethyl Ether, Gasoline, Acetaldehyde, Propylene Chloride, Carbon Disulfide, and other substances having ignition point of 30 or more degrees below zero.
	②n-hexane, Ethylene Oxide, Acetone, Benzene, Methyl Ethyl Ketone and other substances with ignition point between 30 degrees below zero and less than zero.
	③Methanol, Ethanol, Xylene, Pentyl n-acetate, (a.k.a. amyl n-acetate) and other substances having ignition point of between zero and less than 30 degrees.
	④Kerosene, Light Oil, Terebinth Oil, Isopenthyll Alcohol (a.k.a. Isoamyl Alcohol), Acetic Acid and other substances having ignition point of between 30 degrees and less than 65 degrees.
Combustible gas	Hydrogen, Acetylene, Ethylene, Methane, Ethane, Propane, Butane and other gases combustible at 15°C, ambient air pressure.

# 16. STANDARD INSTALLATION MANUAL

\* Install this equipment according to following format (check options and special specifications separately).

Model	Serial Number	Installation Date	Charged Personnel or Company Name for Installation	Installation proved by	Judgment

No	Item	Implementation method	Chapter No & Reference page of instruction manual	Judgment
<b>Specifications</b>				
1	Accessories	Quantity check according to the accessories column	11. SPECIFICATIONS P.62	
2	Installation	<ul style="list-style-type: none"> <li>- Visual check of surrounding conditions Caution: Take care for environment</li> <li>- Securing a space</li> </ul>	3. PRE-OPERATION PROCEDURES P.19 <ul style="list-style-type: none"> <li>• Choose an appropriate...</li> </ul>	
<b>Operation-related matters</b>				
1	Power supply voltage	<ul style="list-style-type: none"> <li>- Measure line voltage (power distribution board of facilities, outlet etc.) with a tester.</li> <li>- Measure line voltage during operation (must meet required voltage).</li> </ul> Caution: Use a compliant device to install	1. SAFETY PRECAUTIONS <ul style="list-style-type: none"> <li>• Ground wire MUST be... P.3</li> </ul> 3. PRE-OPERATION PROCEDURES P.19 <ul style="list-style-type: none"> <li>• Always connect power cable to... P. 62</li> </ul> 11. SPECIFICATIONS <ul style="list-style-type: none"> <li>• Standard-Power Supply</li> </ul>	
2	Raw water	Confirmation of raw water	3. PRE-OPERATION PROCEDURES P. 19 <ul style="list-style-type: none"> <li>• Raw water</li> </ul>	
3	Water collection	Explain about water dispensing operation according to instruction manual.	5. OPERATION PROCEDURES P.29 - 37 <ul style="list-style-type: none"> <li>• Measured-amount collection of...</li> </ul>	
<b>Description</b>				
1	Operational descriptions	Explain operations of each component and handling precautions according to instruction manual.	1. SAFETY PRECAUTIONS P.1 - 67 - 15. LIST OF HAZARDOUS SUBSTANCES	
2	Error messages and indications	Explain about error messages and procedures for reset according to instruction manual.	9. TROUBLESHOOTING P.55 - 60 <ul style="list-style-type: none"> <li>• Error Indications and...</li> </ul>	
3	Maintenance and inspection	Explain about maintenance of equipment and each component according to instruction manual	7. INSPECTION AND MAINTENANCE P.41 - 51	
4	Completion of installation  Matters to be stated	<ul style="list-style-type: none"> <li>- Enter the date of installation and name of the charged personnel in the main unit nameplate.</li> <li>- Write necessary information on warranty card and hand it over to customer</li> <li>- Explain how to contact with service personnel</li> </ul>	10. SERVICE & REPAIR P.61	

## Limited Liability

Always operate equipment in strict compliance to the handling and operation procedures set forth by this instruction manual.

Yamato Scientific Co., Ltd. assumes no responsibility for malfunction, damage, injury or death, resulting from negligent equipment use.

Never attempt to disassemble, repair or perform any procedure on **WG251/1001 Water Purifier Autostill®** which are not expressly mandated by this manual. Doing so may result in equipment malfunction, serious personal injury or death.

## Notice

- Instruction manual descriptions and specifications are subject to change without notice.
- Yamato Scientific Co., Ltd. will replace flawed instruction manuals (pages missing, pages out of order, etc.) upon request.

Instruction Manual

**Water Purifier Autostill®**

**Models WG251/1001**

First Edition: July 30, 2018

Revised:

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