



Water Purifier SUPER AUTO STILL®

Model

WG270/280

Instruction Manual

- Third Edition -

- Thank you for purchasing "Auto Still®", WG 270/280 of Yamato Scientific Co., Ltd.
- To use this unit properly, read this "Instruction Manual" thoroughly before using this unit. Keep this instruction manual around this unit for referring at anytime.



WARNING!:

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

Yamato Scientific Co., Ltd.

This paper has been printed on recycled paper.

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MEANING OF ILLUSTRATED SYMBOLS

Illustrated Symbols

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

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

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

Meaning of Symbols



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



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



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

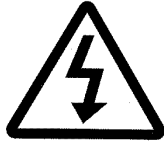
1. Cautions in Using with Safety

Table of Illustrated Symbols

Warning



Warning,
generally



Warning,
high voltage



Warning,
high
temperature



Warning,
drive train



Warning,
explosive

Caution



Caution,
generally



Caution,
electrical shock



Caution,
scald



Caution,
no road heating



Caution,
not to drench



Caution,
water only



Caution,
deadly poison

Prohibit



Prohibit,
generally



Prohibit,
inflammable



Prohibit,
to disassemble



Prohibit,
to touch

Compulsion



Compulsion,
generally



Compulsion,
connect to the
grounding
terminal



Compulsion,
install on a flat
surface



Compulsion,
disconnect the
power plug



Compulsion,
periodical
inspection

1. Cautions in Using with Safety

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

WARNING!



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

Never use this unit in an area where there is flammable or explosive gas. This unit is not explosion-proof. An arc may be generated when the power switch is turned on or off, and fire/explosion may result. (Refer to Page 67 "List of Dangerous Substance")



Be sure to connect grounding wire.

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



If a problem occurs

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



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

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



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

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



Do not disassemble or modify this unit

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



Do not touch hot portion

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



Close the tap when unit is out of service

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

CAUTION!



During a thunder storm

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



Exercise care in handling washing liquid (Orgazor)

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

2. Before Using this unit

Requirements for Installation



WARNING!

1. Be sure to connect grounding wire.



- Always connect the equipment to the ground. If the equipment is not grounded, ground leakage, if any, may not activate the ground leakage breaker, resulting in extremely-hazardous electric shock.
- Connect the grounding wire either to the grounding wire or grounding terminal block of the electric power equipment. If the grounding equipment is not available, consult the nearest electric constructor and carry out grounding according to Article 18 (Type III Grounding Work of 100Ω or less) of the Technical Standards for Electric Equipment.
- Never connect the grounding wire to gas pipe or water supply pipe.

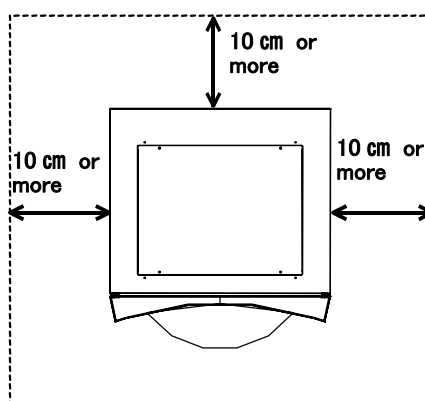
2. Choose a proper place for installation



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



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



2. Before Using this unit

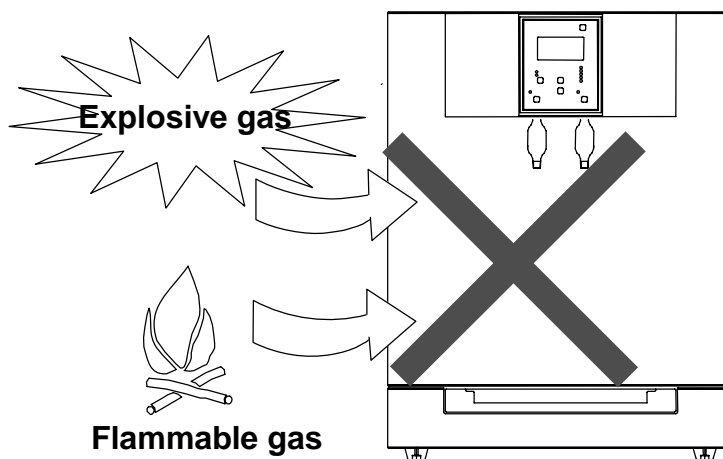
Requirements for Installation

! WARNING!

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



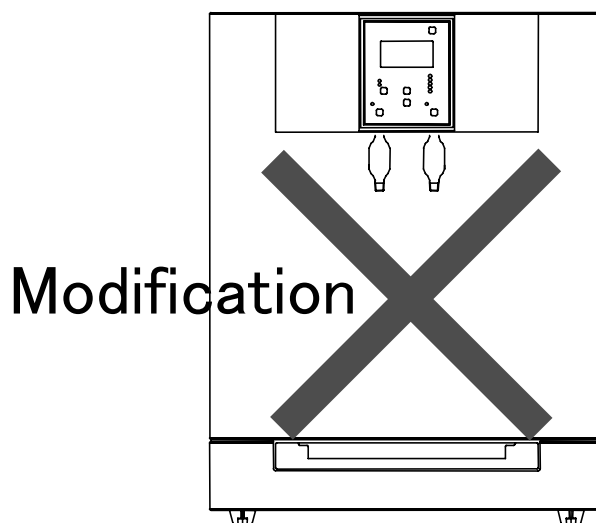
- Never use this unit in an area where there is flammable or explosive gas. This unit is not explosion-proof. An arc may be generated when the power switch is turned ON or OFF, and fire/explosion may result.
- To know about flammable or explosive gas, refer to Page 67 "List of Dangerous Substances".



4. Do not modify



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



2. Before Using this unit

Requirements for Installation

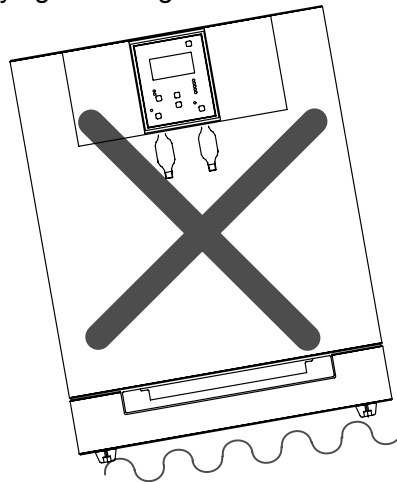


WARNING!

5. Installation on horizontal surface



- Set this unit to the flattest place. Setting this unit on rough or slope place could cause the unexpectible trouble or malfunction.
The unit WG270 weighs 55kg gross, and the unit WG280 weighs 56kg gross. Two or more persons are required for carrying or setting these units.



6. Choose a correct power distribution board or receptacle



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

Electric capacity : WG270/280 AC100V Single phase 15A

7. Connection of power cord



- Always ensure that breaker on power unit side is "Off" before connecting power cord. Power plug of WG270/280 uses 3-core cord including grounding wire, and the plug is grounded type. If your plug socket is not compatible (2P), use a ground adapter attached in nonstandard. In using ground adapter, be sure to ground a grounding lead.

8. Handling of power code



- Do not entangle the power cord. This will cause overheating and possibly a fire.
- Do not bend or twist the power cord, or apply excessive tension to it. This may cause a fire and electrical shock.
- Do not lay the power cord under a desk or chair, and do not allow it to be pinched in order to prevent it from being damaged and to avoid a fire or electrical shock.
- Keep the power cord away from any heating equipment such as a room heater. The cord's insulation may melt and cause a fire or electrical shock.



- If the power cord becomes damaged (wiring exposed, breakage, etc.), immediately turn off the power at the rear of this unit and shut off the main supply power. Then contact your nearest dealer for replacement of the power cord. Leaving it may cause a fire or electrical shock.



- Connect the power plug to the receptacle which is supplied appropriate power and voltage.

2. Before Using this unit

Requirements for Installation



WARNING!

9. Observe the specified pressure range of raw water from waterworks



- Apply the range of city water pressure between 0.5 - 5 X 100kPa (0.5 - 5kgf/cm²) including nighttime.
- Range of raw water pressure is the same when "Water Supply Port Unit" (optional accessory) is used.

10. Connect the water supply hose securely

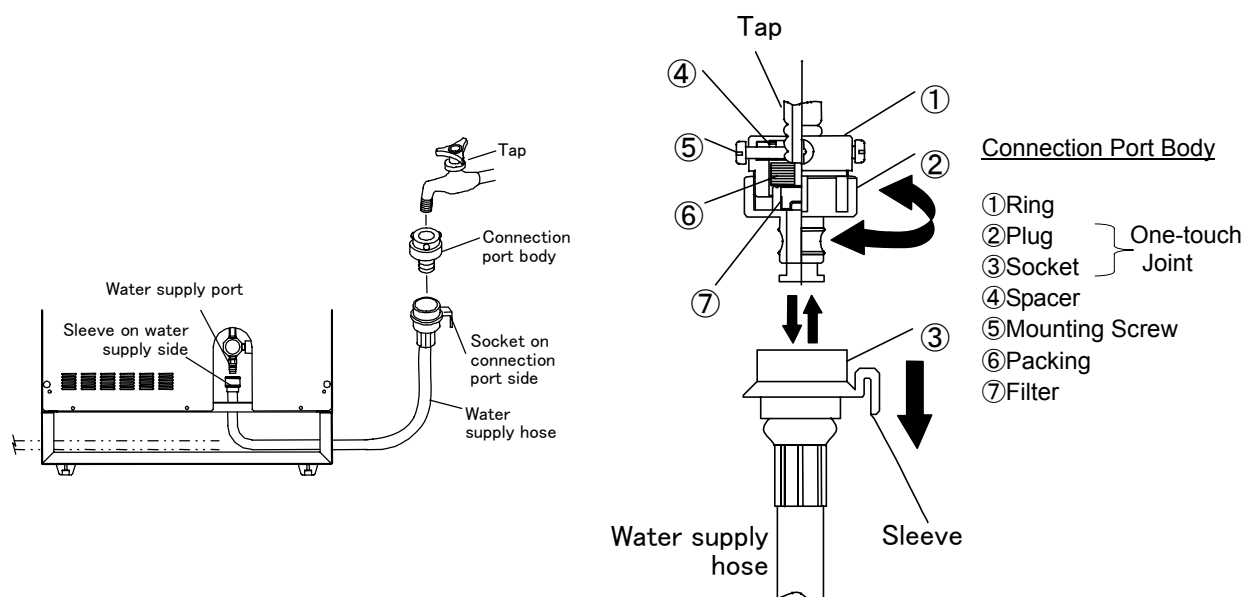


- Take the supply hose (with connection port) out of attachments. Install the unit on a horizontal and stable place nearby tap and sink.
- If not connecting the water supply hose securely, the water supply hose or connection port may be disconnected, resulting in water leakage such as water bursting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

11. Connect the tap side



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



2. Before Using this unit

Requirements for Installation

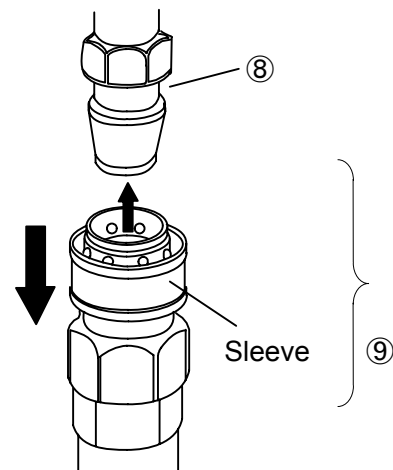


12. Connection on body side



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

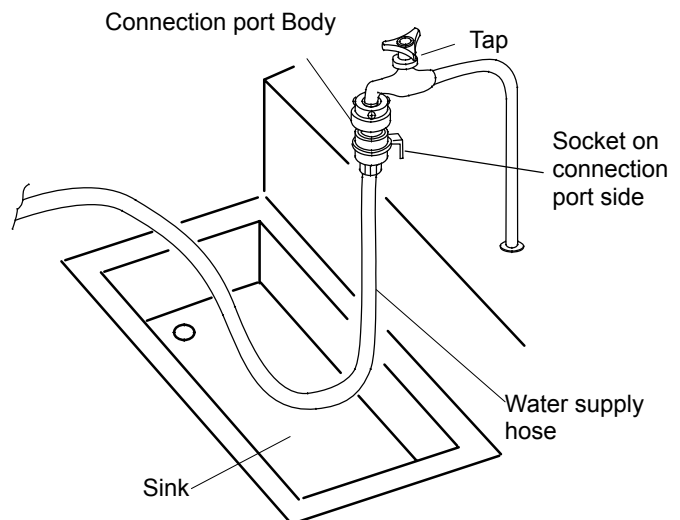
Body side



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



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



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



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

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

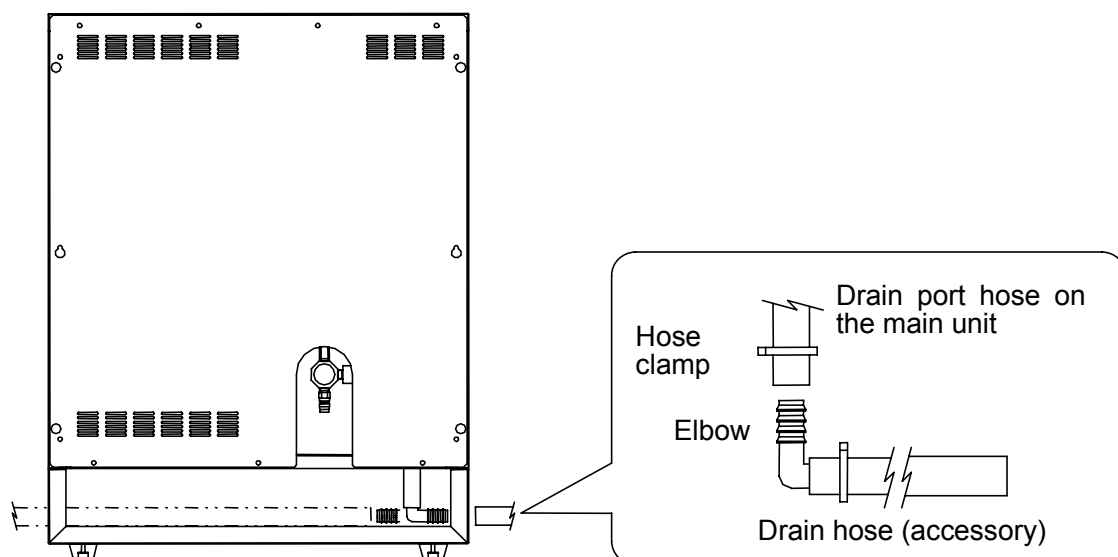


WARNING!

16. Connect the drain hose securely



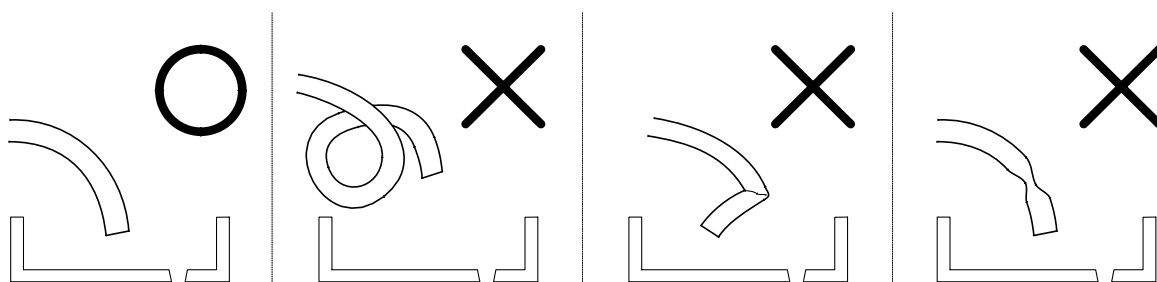
- If the drain hose is not connected securely, it may be disconnected, leaking water in the unit, or leading to trouble of system.
1. Pick up the drain hose (with elbow) and the hose clamp from the main unit accessories.
 2. Always make sure that the earth leakage breaker of the unit is "OFF".
 3. Remove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



17. Use care in routing of drain hose



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





WARNING!

18. Check the drain temperature of cooling water



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

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



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

2. Before Using this unit

Requirements for Installation

! WARNING!

20. Install firmly the ion exchange resin cartridge (CPC-N) and high-purity cartridge (CPC-H).



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

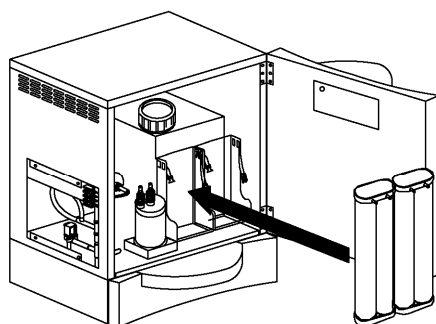


Fig.1

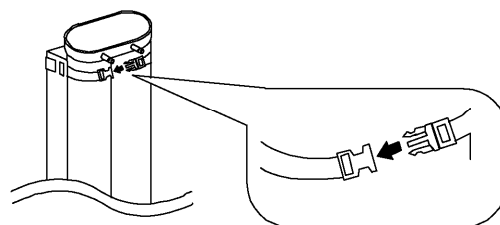


Fig.2

5. Remove the rubber cap attached to the inlets and outlets of ion exchange resin cartridge and high-purity cartridge.
6. Fit in the coupler marked with (IN) to the inlet of ion exchange resin cartridge (left) until click is heard and repeat the procedure in the same way for high-purity cartridge. (See Fig.3.)
7. Fit in the coupler marked with (OUT) to the outlet of ion exchange resin cartridge (right) until click is heard and repeat the procedure in the same way for high-purity cartridge. (See Fig.3.)

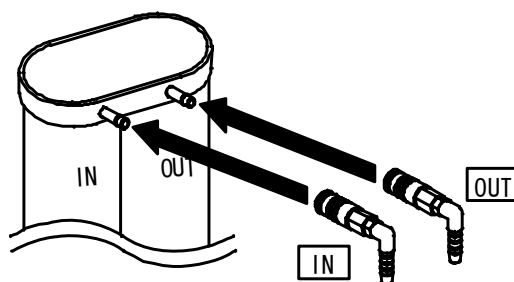


Fig.3

Coupler may be hard at first. When applying force in inserting, do not make it curved because insertion port may be broken.

8. Coupler can be removed easily from the ion exchange resin cartridge by pulling it toward yourself while pushing the black part of the coupler to the depth.

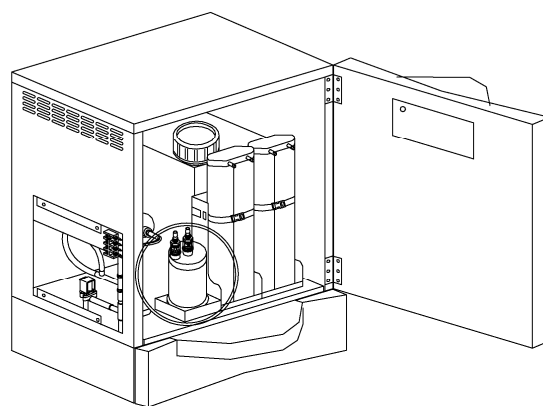
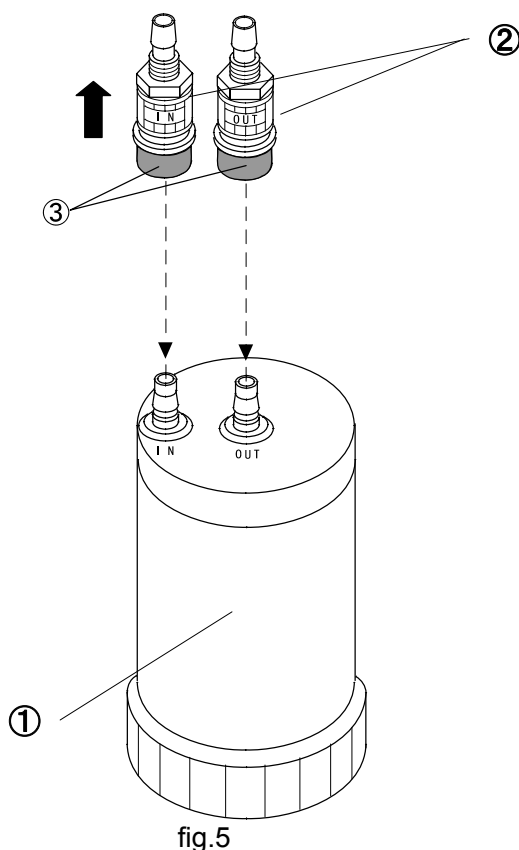


WARNING!

21. Secure the pre-treatment cartridge securely



- Connect the hose in the body securely following the procedure shown below.
 - Insecure connection may cause disconnection of connection hose, resulting in accident by water leakage.
1. Make sure that the earth leakage breaker of this unit is "OFF" and that the tap is tightened.
 2. Take the pre-treatment cartridge ① out of attachments to the body.
 3. Inlet and outlet of the pre-treatment cartridge ① are provided with a cap, so remove it.
 4. When the front door of this unit is opened, connection hose marked IN and OUT is found in the coupler② there make connection matching them with IN and OUT on pre-treatment cartridge ①.
 5. In connecting, mate the coupler and port of cartridge while sliding the blue portion ③ of coupler toward the hose, push in, then release the blue portion ③.
 6. When connection is finished, place the pre-treatment cartridge at the position shown on the right (near side on the left of distilled water tank) as paying attention to the bend of hose.



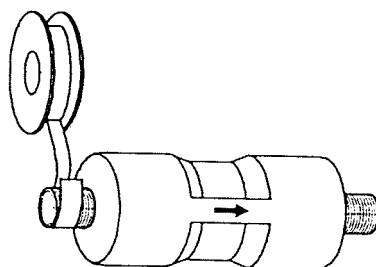


22. Install the membrane filter firmly.

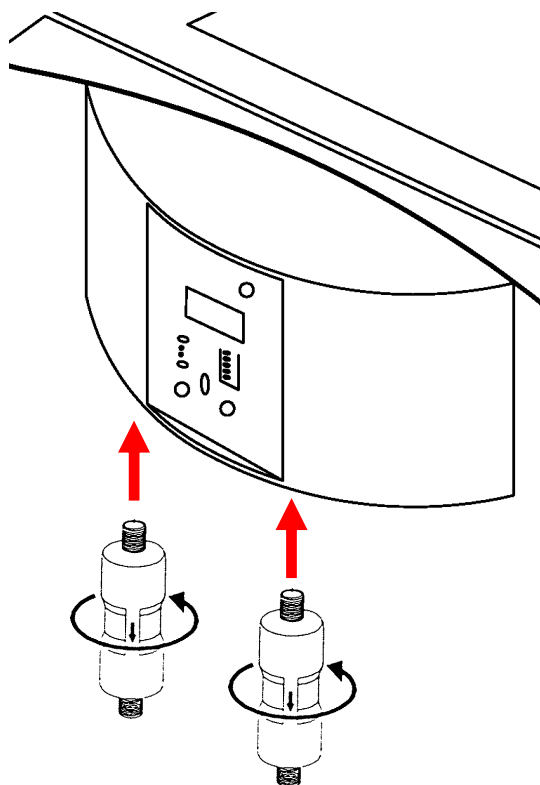


- Install the membrane filter as follows:
- Unless firm connection is made, water may leak from the threaded portion and may be mixed into and contaminate the sampled pure water. Always ensure firm connection.

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



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





WARNING!

23. Essential Points for Initial Use



- In the case of WG270/280, the quality of distilled water stored in the distilled water tank may be worse than the A4 level quality temporarily because of contact with the atmospheric air. WG270/280 is equipped with the function to recover the water quality of such pure water to the A4 level by means of circulation under ultraviolet ray irradiation and removal of CO₂ gas.
- It may take hours for the distilled water stored in the tank after initial start of WG270/280 to reach the A4 level water quality. Carry out cleaning of the tank inside as follows:
 - (1) Install and start operation of WG270/280 system. Keep operation till the tank is filled with the distilled water.
 - (2) Discharge the distilled water totally from the outlet of distilled water tank.
 - (3) Start operation again and keep operation till the tank is filled with the distilled water.
 - (4) When the tank is full of the distilled water, continue operation without turning OFF power supply (keep the distilled water circulating). In four or more hours, use the distilled water. (This step is necessary for initial operation only).
- A guideline is as follows. If the specific resistance of distilled water is maintained at $1.2\text{M}\Omega \cdot \text{cm}$ or more for one hour or more continuously, the distilled water with the A4 level or higher water quality can always be sampled.
If the specific resistance of distilled water is less than $1.2\text{M}\Omega \cdot \text{cm}$, continue operation (keep the distilled water circulating) for approximately four hours or more before sampling the distilled water.
- When the distilled water has been stored for two weeks or more in the tank, drain the water totally and start operation. Take steps (3) and (4) above before using the distilled water.

24. After installation

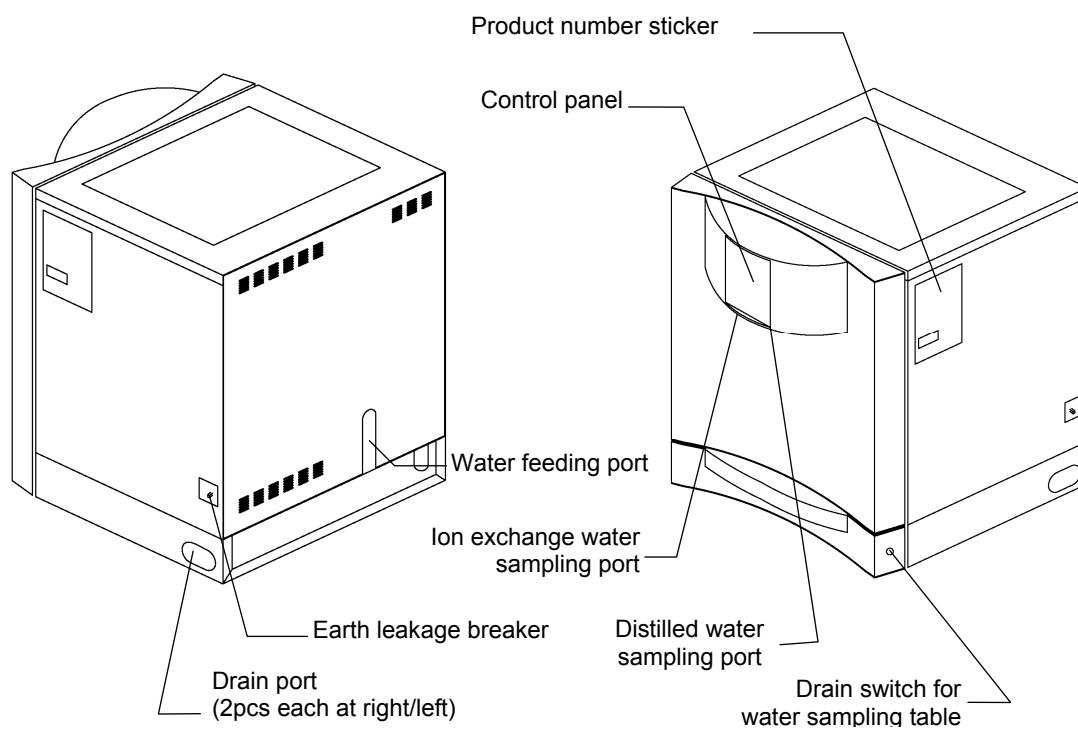
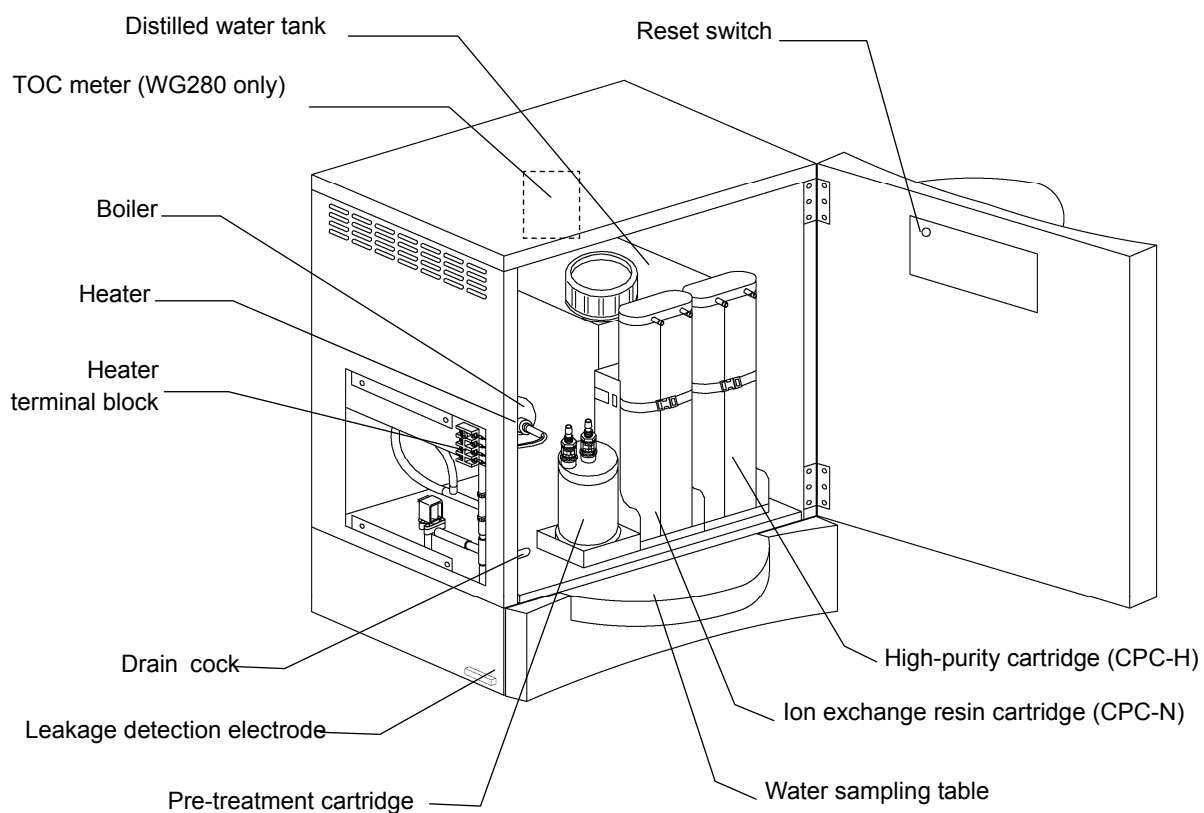


This unit may be turned over under unexpected earthquake or impact. Provide adequate measures against such turn-over to ensure the safety.

3. Description and Function of Each Part

Main Unit

WG270/280



3. Description and Function of Each Part

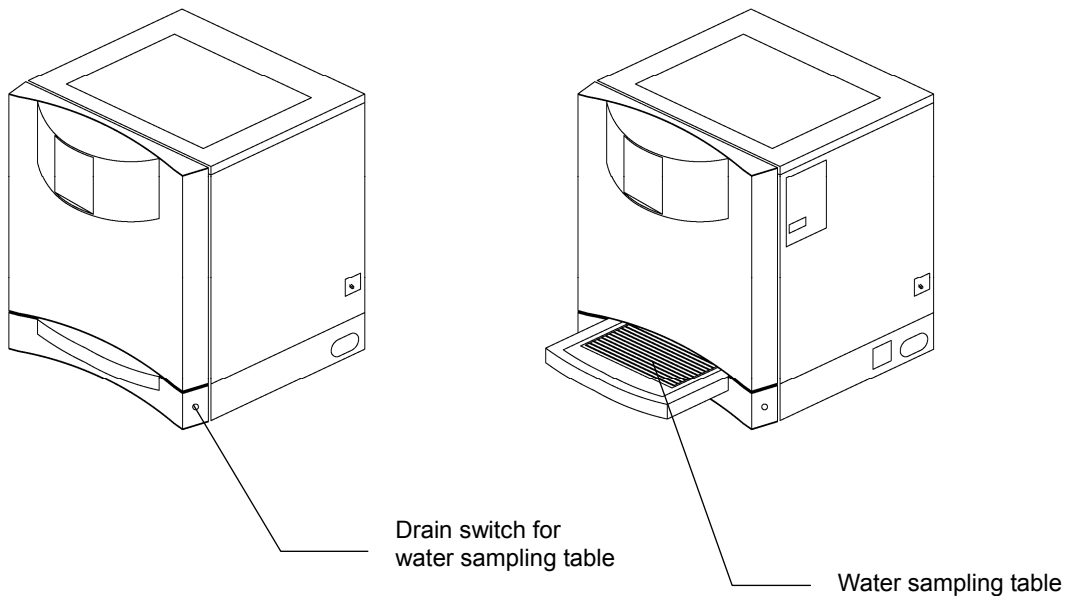
Water Sampling Table

Water sampling table

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

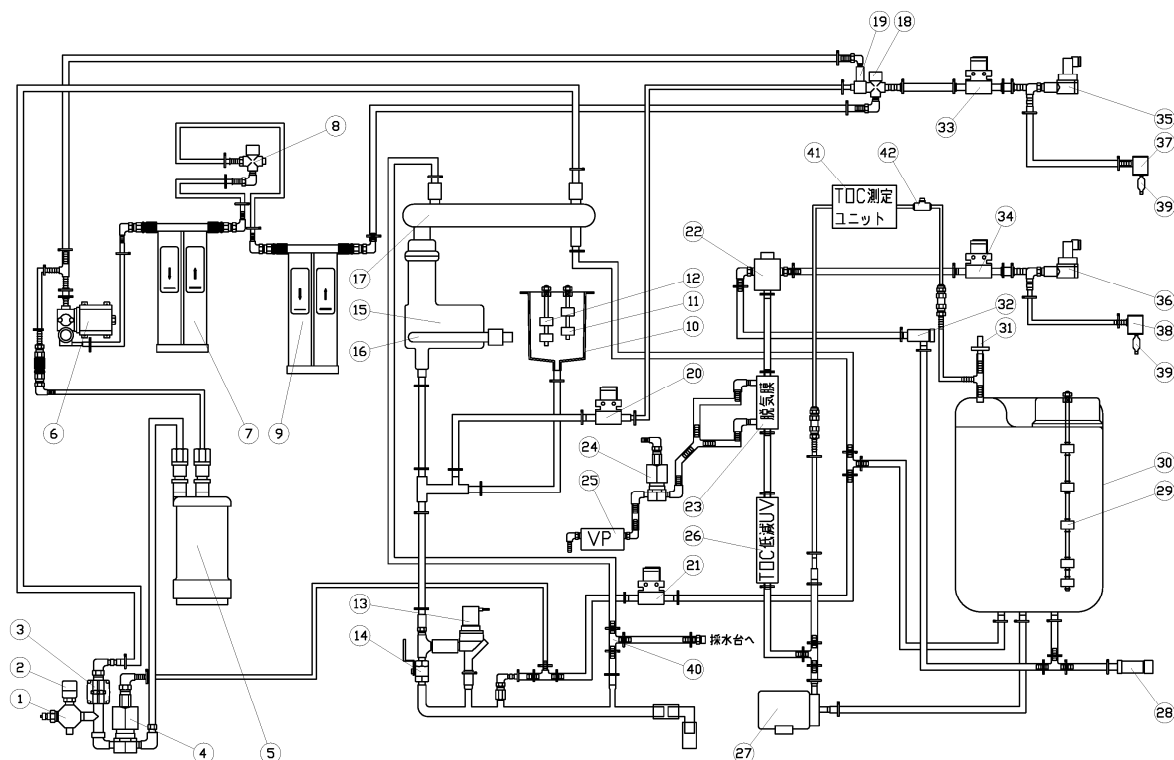
Coolant flows for one minute, and then, the water sampling table is drained. After that, returns to the condition before pressing the switch.

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



3. Description and Function of Each Part

Piping System View



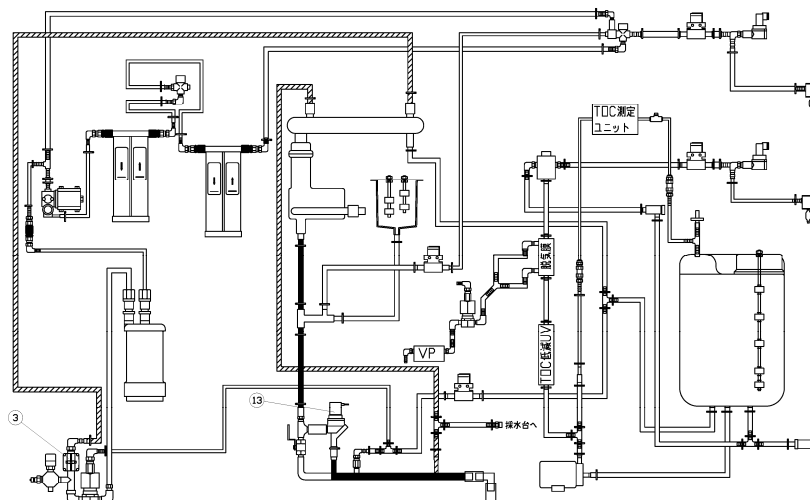
- | | |
|--|--|
| 1. Pressure reduction valve | 22. Distilled water quality gauge electrode |
| 2. Pressure switch | 23. Deaeration membrane module |
| 3. Cooling water solenoid valve | 24. Solenoid valve for vacuum pump |
| 4. Raw water supply solenoid valve | 25. Vacuum pump |
| 5. Pre-treatment cartridge | 26. OC reducing UV lamp |
| 6. Electromagnetic pump | 27. Distilled water sampling pump |
| 7. Ion exchange resin cartridge (CPC-N) | 28. Distilled water tank drain port |
| 8. Ion exchange water quality gauge electrode (for CPC-N) | 29. Float switch (3) |
| 9. High-purity cartridge (CPC-H) | 30. Distilled water tank |
| 10. Float cylinder | 31. Air filter |
| 11. Float switch (1) | 32. Check valve for circulation return |
| 12. Float switch (2) | 33. Ion exchange water sampling solenoid valve |
| 13. Boiler drain solenoid valve | 34. Distilled water sampling solenoid valve |
| 14. Boiler drain cock | 35. Ion exchange water flow sensor |
| 15. Boiler | 36. Distilled water flow sensor |
| 16. Heater | 37. Ion exchange water sampling port |
| 17. Condenser | 38. Distilled water sampling port |
| 18. Ion exchange water quality gauge electrode (for CPC-H) | 39. Membrane filter |
| 19. Check valve | 40. Aspirator |
| 20. Boiler water supply solenoid valve | 41. TOC measuring unit (WG280 only) |
| 21. Initial accumulated water drain solenoid valve | 42. Constant flow valve (WG280 only) |

3. Description and Function of Each Part

Principle of Operation

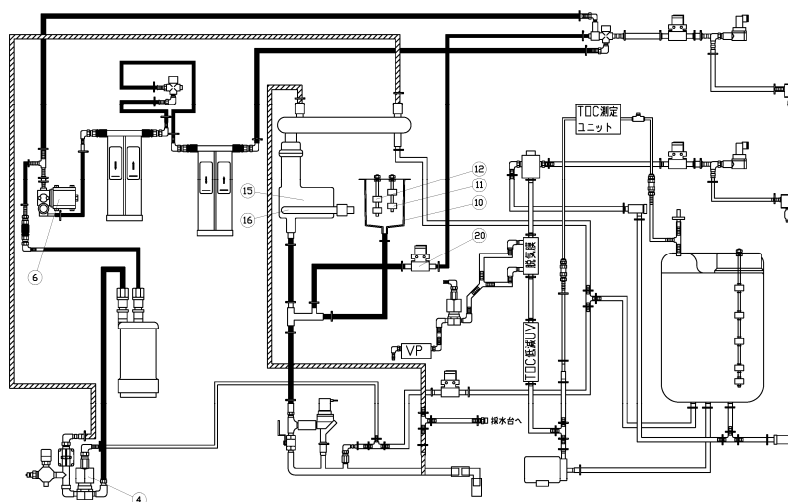
Description of the operation mechanism of WG270/280.

(1) Drain of the boiler



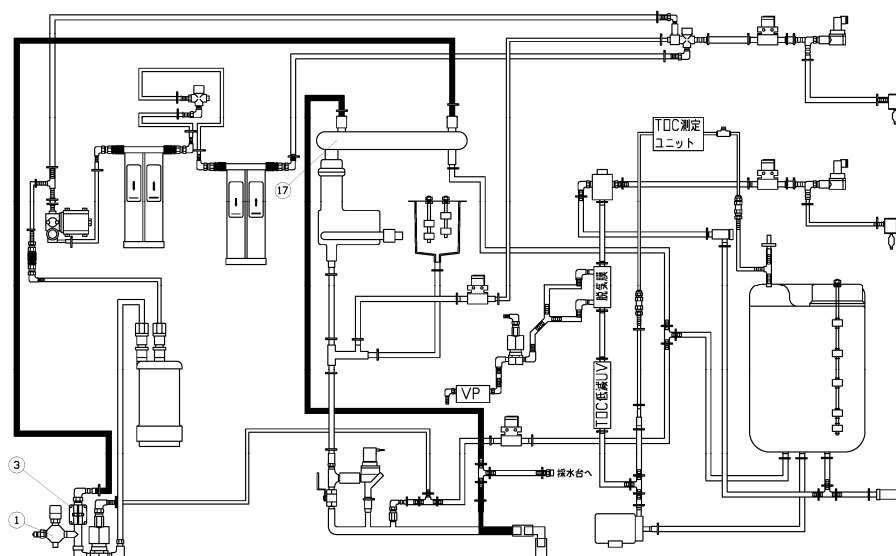
- Set the earth-leakage breaker to “ON”, and the standby screen appears in about four seconds. In this state, press the POWER key, the boiler drain solenoid valve ⑬ and cooling water solenoid valve ③ open simultaneously for about 40 seconds. Boiler drain is made every five hours of distillation operation.

(2) Boiler Water Supply and Distilling Operation



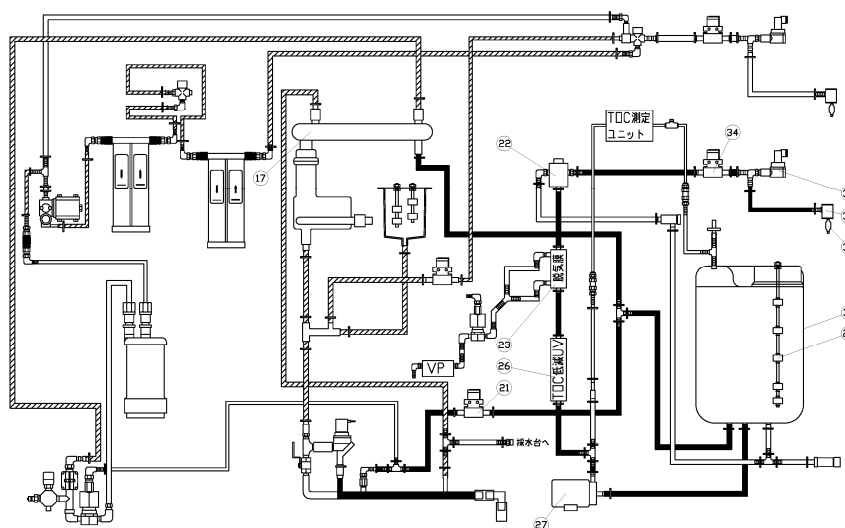
- When drain of boiler is finished, both the raw water supply solenoid valve ④ and boiler water supply solenoid valve ⑳ open simultaneously, supplying water to the boiler ⑮. When the float switch (1) ⑪ in the float cylinder ⑩ detects the water level, the heater ⑯ is energized to start distillation. Water supply to the boiler is controlled by opening/closing the raw water supply solenoid valve ④ and boiler water supply solenoid valve ⑳ with the float switch (2) ⑫. The supply-water circulation pump ⑥ keeps circulation of the ion-exchanged water normally during distillation, ensuring stable water supply to the boiler ⑮.

(3) Flow of Cooling Water



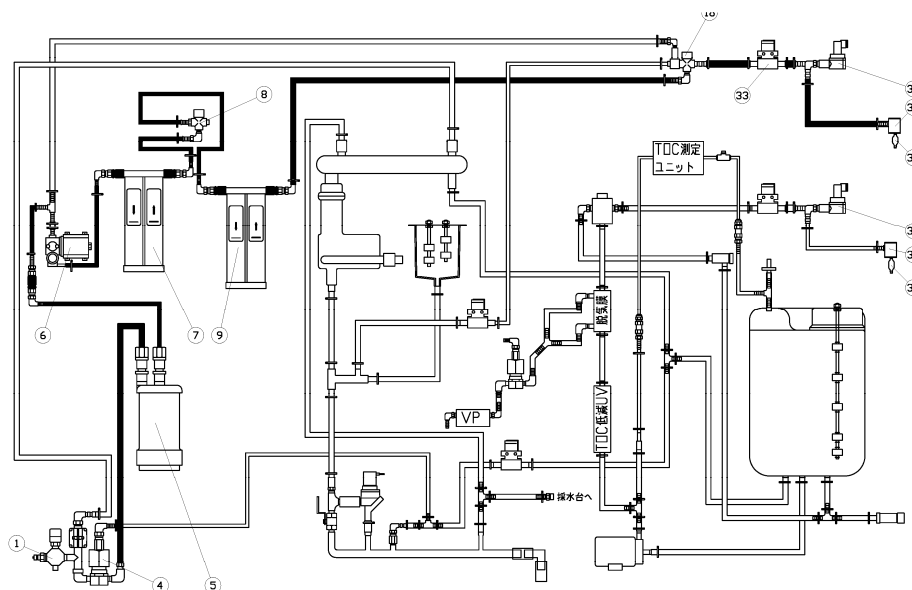
During distillation, water is supplied and discharged in the order: ① pressure-reducing valve, ③ cooling water solenoid valve and condenser ⑰. When the distilled water tank is full, or when ion exchanged water is sampled, distillation is stopped, and the cooling water is also stopped automatically.

(4) Sampling of Distilled Water



- Distilled water condensed in the condenser ⑭ is stored in the distilled water tank⑳ for about 10 minutes from the start of distillation. In this case, the initial accumulated water drain solenoid valve㉑ opens to discharge this water beforehand. When the float switch㉒ at the top portion inside the tank is activated, the tank is judged to be full and distillation stops. When the distilled water is consumed to a certain level through its sampling, the unit generates the distilled water automatically. Stored distilled water is sampled, via TOC reduction UV㉓, deaeration membrane module㉔, distilled water quality electrode㉕, distilled water sampling solenoid valve㉖, distilled water flow sensor㉗, distilled water sampling port㉘, and membrane filter㉙, by the distilled water sampling pump㉚.

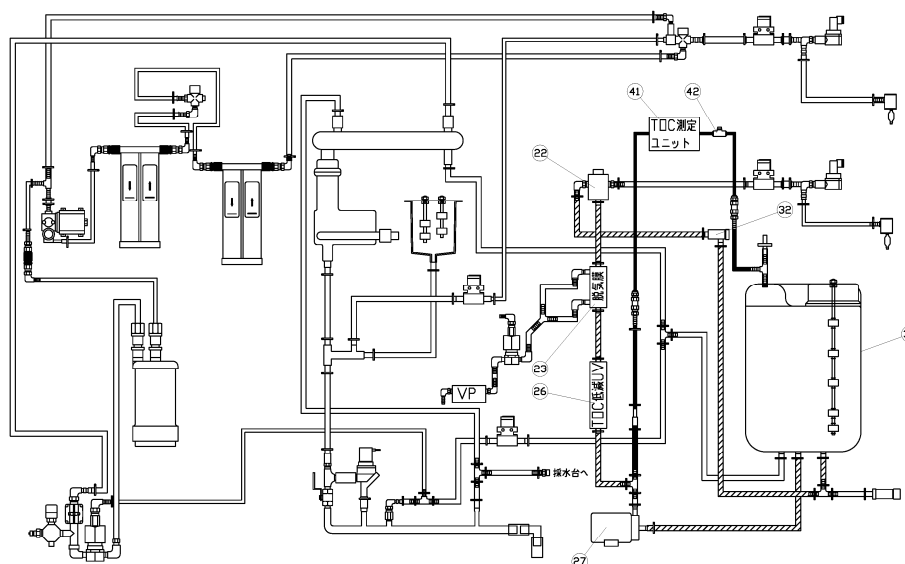
(5) Sampling Ion Exchanged Water



- Ion exchange water is sampled by way of the pressure-reducing valve ①, raw water supply solenoid valve ④, pre-treatment cartridge ⑤, supply-water circulation pump ⑥, ion exchange resin cartridge ⑦(CPC-N), ion exchange water quality electrode ⑧ CPC-N (front), high-purity cartridge (CPC-H) ⑨, ion exchange water quality electrode CPC-H (rear)⑩, ion exchange water sampling solenoid valve⑪, ion exchange water flow sensor ⑫, ion exchange water sampling port⑬, and membrane filter⑭.

During ion exchange water sampling, the supply-water circulation pump ⑥ runs to circulate the ion exchange water.

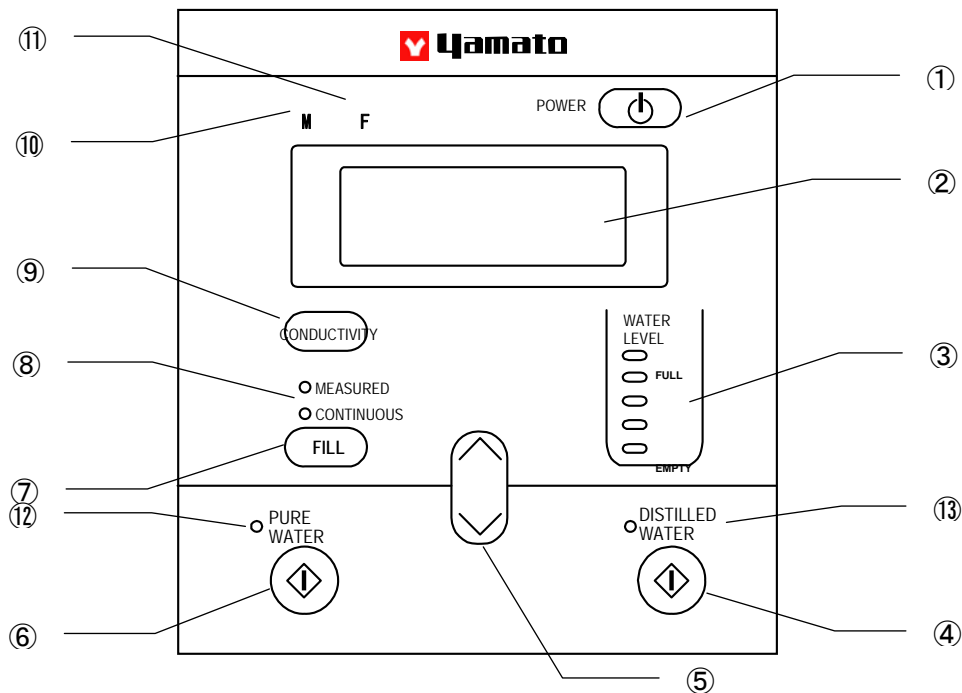
(6) TOC Reduction system



- The TOC reduction system consists of returning the distilled water stored in the distilled water tank, via TOC reduction UV, deaeration membrane module, distilled water quality electrode, and circulation return check valve, to the distilled water tank by means of the distilled water sampling pump. WG280 is equipped with the TOC measuring unit and continuous flow valve. This system enables sampling of the distilled water on the stable level.
- With LED (the second LED from the bottom, which corresponds to the water amount of about 5.5 liters) indicating the distilled water level in the tank going ON in green, the TOC reduction system is activated, starting circulation. Almost simultaneously with passage of the distilled water through the deaeration membrane module, the deaeration vacuum pump is activated. The electric conductivity of deaerated distilled water decreases. When the electric conductivity of distilled water in the tank exceeds $0.83\mu\text{S}/\text{cm}$, the TOC reduction UV lamp goes ON. The TOC value decreases along with increase in this electric conductivity. When the electric conductivity increases above $0.95\mu\text{S}/\text{cm}$, the TOC reduction UV lamp goes OFF. Then, the distilled water is sampled. Circulation and vacuum pumps stop when the level LED (the LED in the bottom, which corresponds to the water amount of about 2.5 liters). Under other conditions, both circulation and vacuum pumps are in operation normally while the TOC reduction UV lamp goes ON/OFF depending on the conditions. In this manner, the distilled water quality in the tank can be maintained.
- To protect the vacuum pump (VP), the pump is open to the atmosphere for five minutes every two hours by means of the solenoid valve. In this case, VP exhaust sound may become louder.

3. Description and Function of Each Part

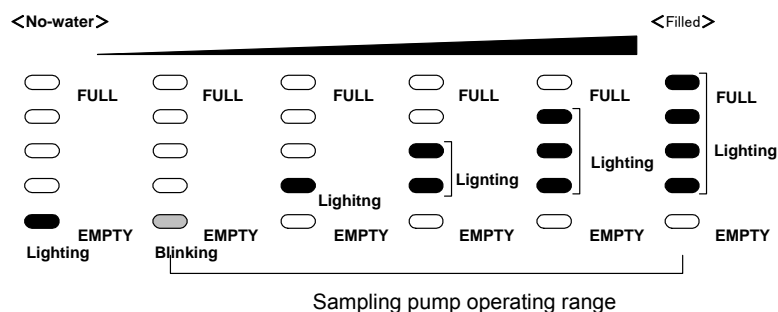
Control Panel



No.	Name	Operation/Action
①	POWER key	Turns on/off the power of the controller.
②	Message indication area	Indicates the measured value and setting value.
③	WATER LEVEL lamp	Indicates water level in the distilled water tank in five levels.
④	DITILLED WATER key	Starts/stops drawing distilled water.
⑤	▲▼key	Selects the value setting item.
⑥	PURE WATER key	Starts/stops drawing ion exchange water.
⑦	FILL key	Switches water collecting method. (Measured filling/Continuous filling)
⑧	FILL lamp	Lights up when either of MEASURED or CONTINUOUUS is selected.
⑨	CONDUCTIVITY key	Switches conductivity indication unit. (S/m⇔ppb*⇔Ω·m⇔ppb*)
⑩	M key	Used when entering submenu or maintenance mode. Also (confirms the setting) then shifts to the next setting item.
⑪	F key	(Cancels the setting) then returns to the previous setting item.
⑫	Pure water lamp	Lighting during pura water sampling
⑬	Distilled water lamp	Lighting duringdistilled water sampling

③ Water level lamp

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





WARNING!

1. Check of water supply

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

2. Check of drain

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

3. Check of power supply

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

4. Before operation

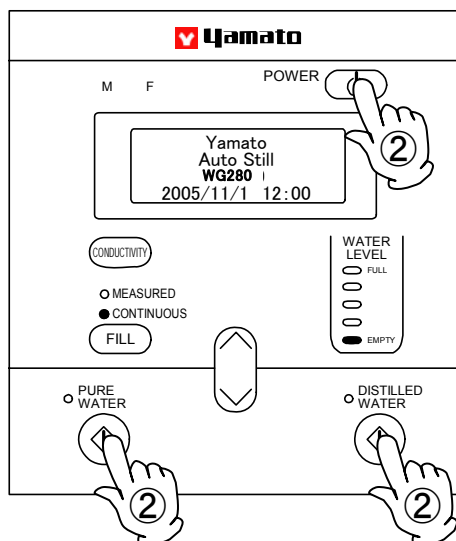
- Turn on the earth leakage breaker, then, perform calibration before pressing **POWER** key. Perform calibration operation at first-time using this unit (refer to page 24) and when changing the heater of the boiler (refer to page 42). Press **POWER** key while holding down **PURE WATER** key and **DISTILLED WATER** key. Perform calibration operation (at the measured values of heater temperature and power-supply voltage) for about five minutes, after then, distillation starts automatically. The calibrator is used to save the reference temperature (under normal operation state) of temperature sensor incorporated into the heater into the internal controller. If the temperature exceeds the reference temperature by +20°C or more due to certain reasons, it is detected as abnormal. Key operation becomes disable while calibration operation. In case that power failure occurs while calibration operation, please perform calibration again.

5. Caution at initial operation

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

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

1. Turning on power



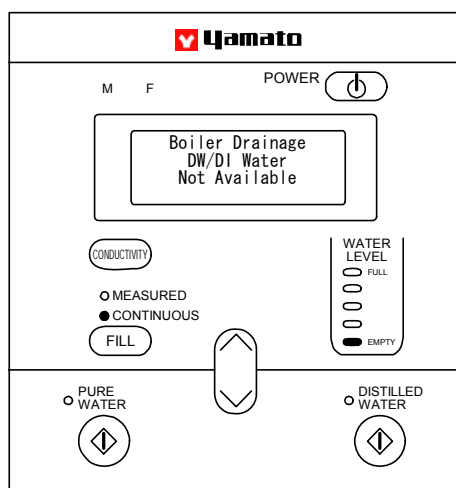
When first-time using the unit, perform calibration operation.

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

From the second time using:

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

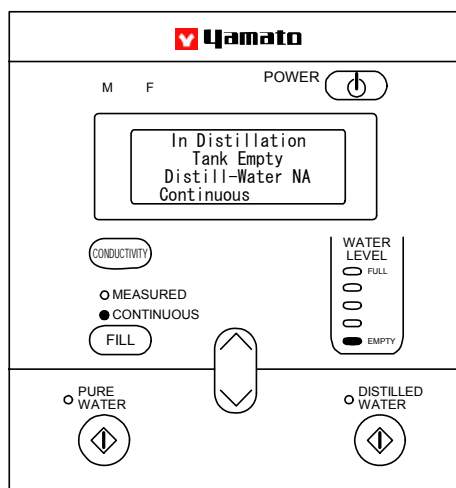
2. Drain of the boiler



Drain of the boiler starts.

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

3. Distillation operation



Distillation operation starts.

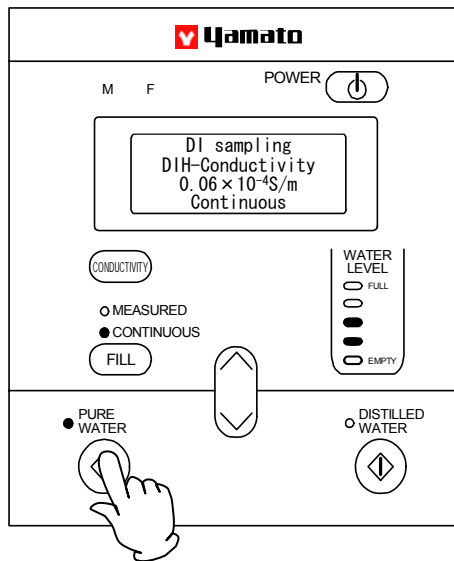
When there is no water in the tank, the left screen is displayed and sampling continues to be impossible after removal of the empty state 'Red LED flashing). When the level LED changes from flashing in red to continuous lighting in green, circulation of distilled water begins. The screen shown below appears.

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

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

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

Continuous collection of pure water

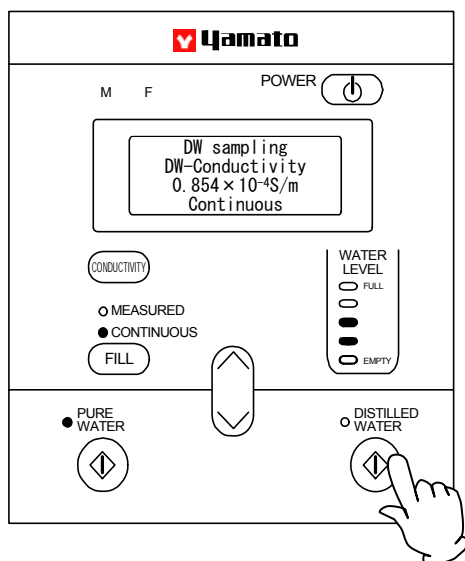


During distillation or when the distilled water tank is full, pressing the **PURE WATER** key while “CONTINUOUS” of the sampling selector lamp is ON causes the pure water lamp goes ON, enabling sampling of the pure water.

(If distillation is being made, the distillation operation is stopped temporarily.)

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

Continuous collection of distilled water



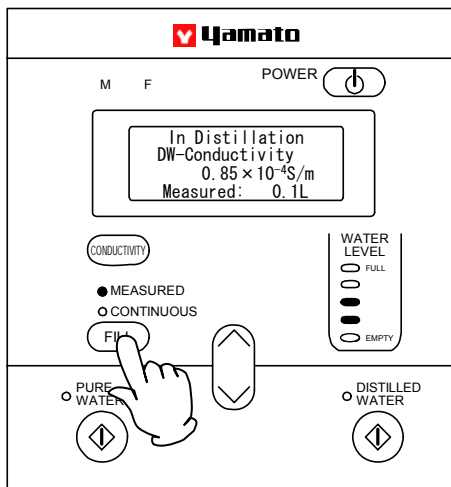
While the distilled water tank level LED is ON in green and when “CONTINUOUS” of the sampling selector lamp is ON, pressing the **DISTILLED WATER** key causes the distilled water lamp to go ON, enabling sampling of the distilled water.

To stop sampling, press the **DISTILLED WATER** key again, and the distilled water lamp goes OFF.

During sampling of distilled water, distillation is continued.

Sampling is possible till the distilled water tank level LED goes ON in red.

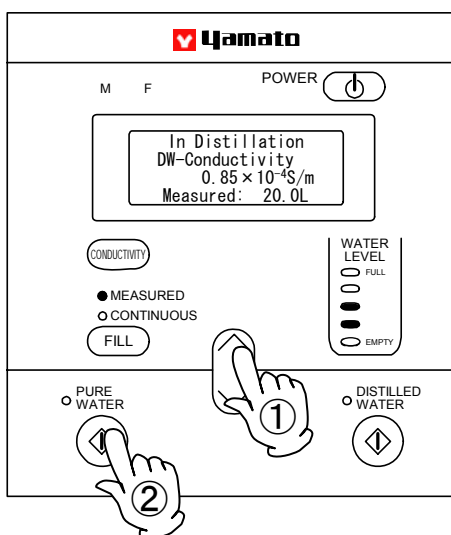
1. Switching water collection method



Switch to “MEASURED” amount water collection method.

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

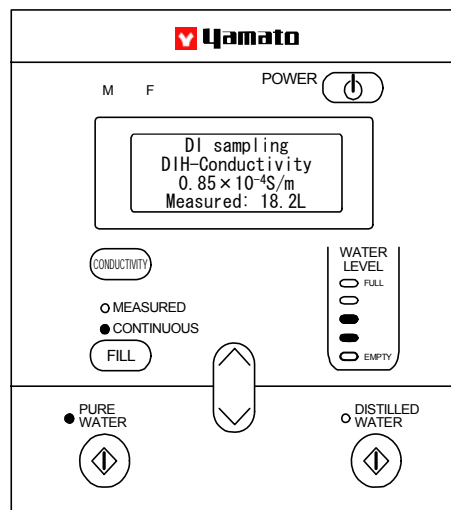
2. Amount of collecting water setting



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

1. Set the amount of pure water by pressing ▲▼ key.
WG270/280: Setting can be made up to 20 liters
2. After setting, pressing **PURE WATER** key starts water collection.

3. Collecting

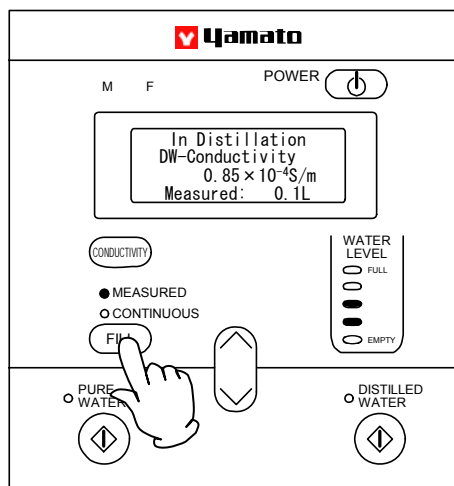


Water collection of measured amount starts.

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

Collection of Measured Amount of Distilled Water

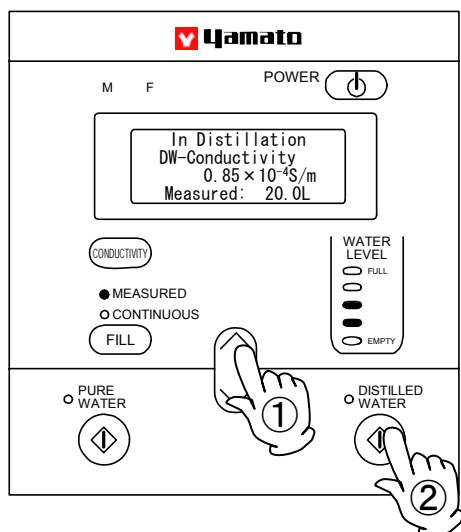
1. Switching water collection method



Switch to "MEASURED" amount water collection method.

Switch from "CONTINUOUS" to "MEASURED" by pressing **FILL** key.

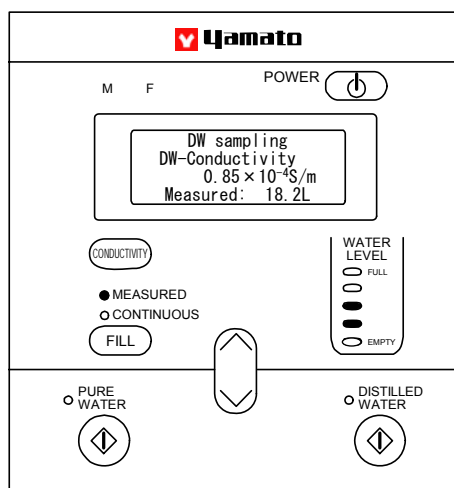
2. Amount of collecting water setting



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

1. Set the amount of distilled water by pressing **▲▼** key.
WG270/280: Setting can be made up to 20 liters
2. After setting, pressing **DISTILLED WATER** key starts water collection.

3. Collecting



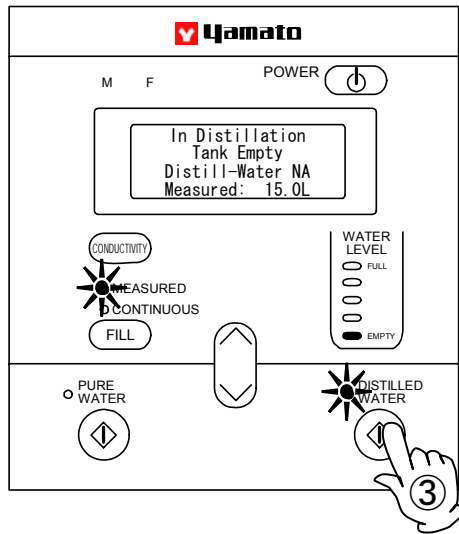
Water collection of measured amount starts.

1. The counter starts decrementing from the setting value.
2. When collecting water is finished, message "Measured: 0.0L" appears on the window.
3. Go back to clause 2.

❖ If pressing **DISTILLED WATER** key while collecting water, the operation stops and the setting value is reset.

Collection of Measured Amount of Distilled Water

In case that the tank becomes empty while collecting water

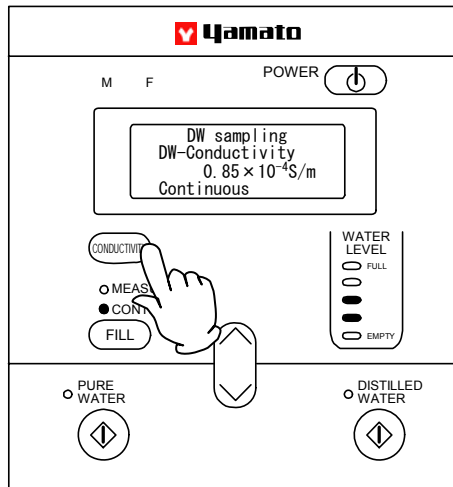


1. The left screen is displayed when the tank becomes empty during collecting water, and DISTILLED WATER lamp blinks and operation of water collection is suspended.
2. Distillation starts.
3. In case that "EMPTY" lamp of WATER LEVEL display does not light up, press **DISTILLED WATER** key again to start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

Cautions

1. During distillation and ion exchange, the supply water circulation solenoid pump is always running. When the distilled water tank is full, this pump stops. To sample pure water while this pump is stopped, set this pump normally ON in the sub-menu and sample pure water after stabilization of the water quality. This pump can be set to normal operation from the sub-menu while the distillation water tank is full.
2. If the supply water circulation pump has been set to normally ON, its setting is cancelled under following conditions:
 - ① Power key turned OFF
 - ② Distilled water sampled, the storage tank water level lowering, and distillation resumed
 - ③ Abnormality

Switching conductivity unit/Start & stop of TOC measurement*

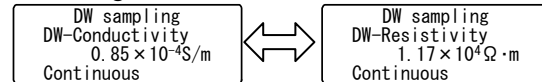


Switch the conductivity unit.

Pressing **CONDUCTIVITY** key for 2 seconds switches the conductivity unit.

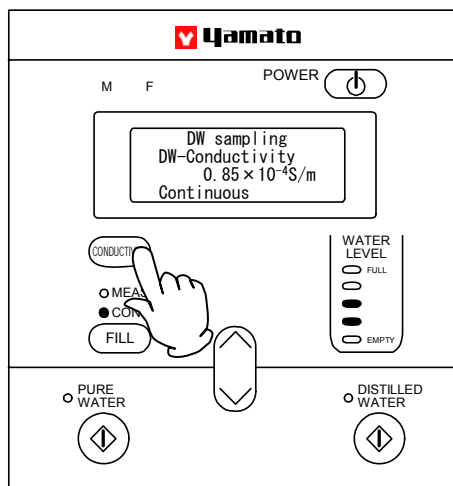
Ex)

In case of switching the conductivity unit during collecting distilled water



- * In case of WG280, when the distilled water conductivity/specific resistance is displayed, pressing the **CONDUCTIVITY** key for two seconds causes start of distilled water TOC measurement. When the TOC value is displayed, pressing the **CONDUCTIVITY** key for two seconds causes stop of this measurement in ten minutes. Display is made in the following order: Conductivity → TOC value → Specific resistance → TOC value → Conductivity. By changing the TOC value display screen to another screen and returning to the TOC value display screen within 10 minutes, TOC measurement continues. Beyond 10 minutes, TOC measurement is turned OFF automatically. (In the case of WG270, the TOC value is not displayed.)

Switching conductivity display

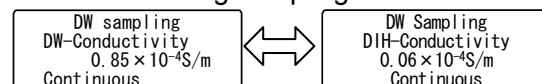


Switch the conductivity display.

The ion water conductivity is displayed during sampling of pure water. In other cases, the conductivity of distilled water is displayed. (Excluding the period up to start of circulation of distilled water inside the tank.)

Pressing the **Conductivity** key enables switching of water quality display in the order of pure water CPC-H → pure water CPC-N → TOC → distilled water → pure water CPC-H. (The TOC value is not displayed when TOC measurement is stopped.)

Example : To display the pure water conductivity during sampling of the distilled water:



Without key operation for about 10 seconds, the conductivity returns to the original one. (In the case of WG270, the TOC value is not displayed.)

Measurement of Electric Conductivity

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

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

Electric conductivity

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

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

So the theoretical value of pure water is as follows:

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

(Take notice that the resistivity is displayed in integer form (not in decimal) in the range 18 to $1 \times 10^4 \Omega \cdot m$.)

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

Quality of ion exchange water and distilled water

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

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

1. Ion exchange water

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

2. Distilled water

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

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

About TOC

- TOC stands for “Total Organic Carbon.”
TOC represents contamination of the water by means of the amount of carbon contained in organics in water. Of carbon compounds dissolved in water, the TOC value may be used to represent the total amount of carbon in organic compounds.
- For the A4 water specified in JIS, this is 50ppb or less. (JIS K 0557)
- For measurement, the UV oxidation + direct conductivity measurement methods are used. The UV oxidation conductivity measurement method consists of measurement of the conductivity before and after organic decomposition and of calculation of TOC as the decomposition product from the difference.
TOC units: [mgC/L], [μgC/L], [ppm], [ppb]
 $1[\text{mgC/L}] = 1000[\mu\text{gC/L}] = 1[\text{ppm}] = 1000[\text{ppb}]$
- The conventional predominant measurement technology has been of a batch type. However, the TOC meter to be installed in WG280 is of a flow water measurement method that can measure the TOC value continuously.

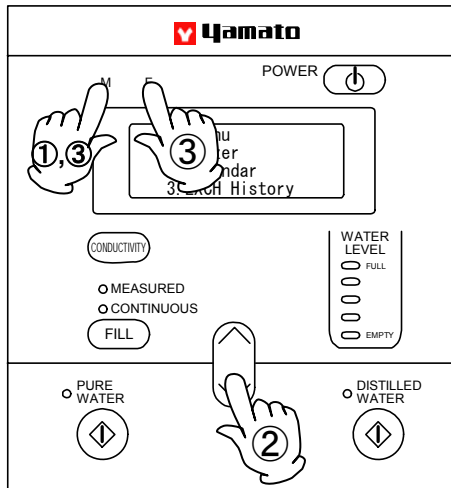
To obtain the repeatability of analytical result in the experiment, it is essential to use the super pure water of certain water quality. To check the water quality, it is necessary to control the water quality by means of “electric conductivity” and “TOC value.”

Item	Water quality standard (JIS K 0557)			
	A1	A2	A3	A4
Total organic carbon (TOC) mgC/l	1 or less	0.5 or less	0.2 or less	0.05 or less
Conductivity mS/m (25°C)	0.5 or less	0.1 or less	0.1 or less	0.1 or less
Zinc μgZn/l	0.5 or less	0.5 or less	0.1 or less	0.1 or less
Silica μgSiO ₂ /l	-	50 or less	5.0 or less	2.5 or less
Chloride ion μgCl ⁻ /l	10 or less	2 or less	1 or less	1 or less
Sulfate ion μgSO ₄ ²⁻ /l	10 or less	2 or less	1 or less	1 or less



- In the case of WG270/280, the quality of distilled water stored in the distilled water tank may be worse than the A4 level quality temporarily because of contact with the atmospheric air.
WG270/280 is equipped with the function to recover the water quality of such pure water to the A4 level by means of circulation under ultraviolet ray irradiation and removal of CO₂ gas.
- It may take hours for the distilled water stored in the tank after initial start of WG270/280 to reach the A4 level water quality. Carry out cleaning of the tank inside as follows:
 - (1) Install and start operation of WG270/280 system. Keep operation till the tank is filled with the distilled water.
 - (2) Discharge the distilled water totally from the outlet of distilled water tank.
 - (3) Start operation again and keep operation till the tank is filled with the distilled water.
 - (4) When the tank is full of the distilled water, continue operation without turning OFF power supply (keep the distilled water circulating). In four or more hours, use the distilled water. (This step is necessary for initial operation only).
- A guideline is as follows. If the specific resistance of distilled water is maintained at 1.2 MΩ · cm or more for one hour or more continuously, the distilled water with the A4 level or higher water quality can always be sampled.
If the specific resistance of distilled water is less than 1.2 MΩ · cm, continue operation (keep the distilled water circulating) for approximately four hours or more before sampling the distilled water.
- When the distilled water has been stored for two weeks or more in the tank, drain the water totally and start operation. Take steps (3) and (4) above before using the distilled water.

1. Setting/display of submenu



Perform setting/display of submenu.

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

Items of submenu are:

- 1) Buzzer
- 2) Calendar
- 3) EXCH History
- 4) M History
- 5) Error History
- 6) Outage History
- 7) Water Alarm
- 8) Pump Manual
- 9) Language
- 10) Resume FUNC

2. Setting/display of each item

2.1. Setting of ON/OFF of buzzer sound

Buzzer
1. Key Click
2. Error Buzz

To set a key clicking sound/alarm buzzer sound:

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

2.2. Calendar setting

Calendar
2006 year
9/27 month/day
12:00 h:min

To set the calendar:

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

2. Setting/display of each item

2.3. Consumables replacement history

EXCH History
1. Hollow Filter
2. Ion-Exchange N
3. Ion-Exchange H

4. DW M-Filter
5. DI M-Filter
6. MHF
7. TOC-d UV Lamp
8. TOC-m UV Lamp

For display of the history of the pre-treatment filter • ion exchange resin (N) •

Ion exchange resin (H) • distilled water M filter • ion change water M filter • deaeration membrane module • TOC reduction UV lamp • TOC measurement UV lamp (WG280 only) ,

① Select the submenu item to be displayed with ▲ and ▼ keys.

② Acknowledge with the **[M]** key and move to the history display screen.

③ Acknowledge the history with ▲ and ▼ keys.

④ Return to the previous screen with the **[F]** key.

※ For each switching history, maximum 20 cases can be displayed. Beyond 20 cases, the oldest history is deleted.

Cautions

1. During distillation and pure water sampling, the supply water circulation solenoid pump is always running. When the distilled water tank is full, this pump stops. To sample pure water while this pump is stopped, set this pump normally ON in the sub-menu and sample pure water after stabilization of the water quality. This pump can be set to normal operation from the sub-menu while the distillation water tank is full.
2. If the supply water circulation pump has been set to normally ON, its setting is cancelled under following conditions:
 - ① Power key turned OFF
 - ② Distilled water sampled, the storage tank water level lowering, and distillation resumed
 - ③ Abnormality

When the distilled water tank is full, set the supply water circulation pump to “Normally ON” according to Setting and Displaying Submenu, “2.8 PUMP manual operation” in Page 34.

<p>2.4. Maintenance history</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Maintenance History No.1 </div>	<p>To display the maintenance history:</p> <ol style="list-style-type: none"> 1. Confirm the maintenance history by pressing ▲▼ key. 2. Pressing F key returns to the previous screen. <p>❖ Up to 20 records are displayed for each change history. If it exceeds 20 records, the oldest record is deleted.</p>
<p>2.5. Error occurrence history</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Error History History No.1 Leak error 2005/09/29 12:25 </div>	<p>To display the error occurrence history:</p> <ol style="list-style-type: none"> 1. Confirm the maintenance history by pressing ▲▼ key. 2. Pressing F key returns to the previous screen. <p>❖ Up to 20 records are displayed for each change history. If it exceeds 20 records, the oldest record is deleted.</p> <p>❖ For details of error alarms, refer to page 47.</p>
<p>2.6. Power failure occurrence history</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Outage History History No.1 ↓ 05/09/29 12:25 ↑ 05/09/29 12:30 </div>	<p>To display the power failure occurrence history:</p> <ol style="list-style-type: none"> 1. Confirm the maintenance history by pressing ▲▼ key. 2. Pressing F key returns to the previous screen. <p>❖ Up to 20 records are displayed for each change history. If it exceeds 20 records, the oldest record is deleted.</p>
<p>2.7. Water cutoff occurrence history</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Water Alarm History No.1 ↓ 05/09/29 12:25 ↑ 05/09/29 12:30 </div>	<p>To display the water cutoff occurrence history:</p> <ol style="list-style-type: none"> 1. Confirm the maintenance history by pressing ▲▼ key. 2. Pressing F key returns to the previous screen. <p>❖ Up to 20 records are displayed for each change history. If it exceeds 20 records, the oldest record is deleted.</p>
<p>2.8. Pump manual operation</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Pump manual 1.RUN 2.Cancel </div>	<p>To set the pump manual operation,</p> <ol style="list-style-type: none"> 1. Select the submenu item to be set with ▲ and ▼ keys. 2. Acknowledge with the M key and return to the submenu screen. <p>(Effective only when the distilled water tank is full)</p>
<p>2.9. Language selection</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Language 1. English 2. Japanese </div>	<p>To select display language:</p> <ol style="list-style-type: none"> 1. Select an item of submenu by pressing ▲▼ key. 2. Confirm the item by pressing M key. The submenu screen appears.
<p>2.10. Power failure recovery function</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Resume Function 1. No 2. Yes </div>	<p>To set the power failure recovery:</p> <ol style="list-style-type: none"> 1. Select an item of submenu by pressing ▲▼ key. 2. Confirm the item by pressing M key. The submenu screen appears. <p>❖ This function is set to "invalid" at default setting.</p>
<p>3. Finishing of setting/display</p>	
<p>Press M key for 2 seconds. The screen returns to the previous display before setting/display submenu.</p>	

5. Handling Precautions



WARNING!

1. If a problem occurs



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

2. During a thunder storm



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

3. Take enough care in handling detergent (liquid)



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

4. Do not step on this unit



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

5. Do not put anything on this unit



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

6. In power failure (Factory setting :no power failure recovery function)

When system has halted during operation due to power failure etc. and is provided with power again, system is brought to standby status. When restarting operation, start from (Page 24 "1. Turning on power").

7. Do not look directly into the TOC reduction UV lamp while this lamp is ON.

While the TOC reduction system is operating, the TOC reduction UV lamp may go ON if the specific resistance of the distilled water in the tank increases to $1.05\text{M}\Omega \cdot \text{cm}$ or more. Never look directly into the UV lamp when opening the front door of this instrument.
When replacing consumables, turn OFF the circuit breaker beforehand.

6. Maintenance Method

Inspection and Maintenance

Timing of maintenance and inspection

(Perform daily inspection for stable use of product.)

Maintenance/check items	Reference for timing	Remarks
Replacement of pre-treatment cartridge	Approx. 6 months Exchange message appears on the indication area.	Throughput: About 5000 liters of city water in Tokyo. If the quality of raw water is not good, perform this maintenance as soon as possible.
Replacement of membrane filter	Approx. 3 months Exchange message appears on the indication area.	Throughput: approx. 1500 liters for pure water. Need to exchange if the amount of collection is less than the above value.
Replacement of ion exchange resin cartridge CPH-N	Exchange message appears on the indication area. (Displayed when the conductivity of pure water is more than 1×10^{-4} S/m.)	Throughput: About 600 liters with the raw water of 200×10^{-4} S/m.
Replacement of ion exchange resin cartridge CPC-H	Exchange message appears on the indication area. (Displayed when the conductivity of pure water is more than 0.2×10^{-4} S/m.)	Throughput : about 600 liters with the raw water of 200×10^{-4} S/m By replacing CPC-N, the CPC-H service life can be extended substantially.。
Replacement of deaeration membrane module	About one year Exchange message appears in the indication area.	Throughput : Maintains the specific resistance of distilled water to $1.0 \text{ M}\Omega \cdot \text{cm}$ or more
Replacement of TOC reduction UV lamp	About 4000 hours Exchange message appears in the indication area.	Throughput : TOC of the distilled water stored in the tank may be maintained at 50 ppb or less (equivalent to A4 water of JIS) for about week. If the tank has been left unused for a long period of time, drain first, and store the distilled water again before use.
Replacement of TOC measurement UV lamp	About 4000 hours Exchange message appears in the indication area.	Throughput : Measurement of TOC of the distilled water Measurement range : 1~200ppb Resolution : 1ppb (WG280 only)
Cleaning of distiller	3 months	If the quality of raw water is not good, perform cleaning early.
Cleaning of water supply hose filter	6 months	
Replacement of hose	2 years	Connections shall be checked monthly.
Drainage of distilled water tank	3 months	If not used for a long time, drain water from the tank.
Inspection of the vacuum pump	One year	Change the consumable parts.

Replacement of pre-treatment cartridge

See Page 12 "Secure the pre-treatment cartridge securely " for replacement procedure.

When the cartridge is put to use without replacement, life span of ion exchange resin cartridge becomes short.

Please dispose used cartridge as noncombustible. When it is sent back to our company, fill in the designated invoice attached to a new cartridge, and send it with the used cartridge to us.

Replacement of ion exchange resin cartridge

When a cartridge is stored for a long time, deterioration of water quality and fall of processing capacity are found; therefore prepare a spare cartridge in a planned manner for replacement timing. Standard for storage is about 4 months.

In replacement, see Page 11 "Install firmly the ion exchange resin cartridge (CPC-N) and high-purity cartridge (CPC-H)."

When a cartridge is used without replacement, much scale is deposited on boiler and heater, which causes decrease of distilled water sampling and damage to heater.

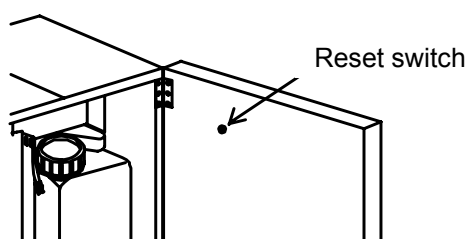
Please dispose used cartridge as noncombustibles. When it is sent back to our company, fill in the designated invoice attached to a new cartridge, and send it with the used cartridge to us.

We promote the reasonable disposal, collection, and recycling of cartridge for environmental protection.

※ After replacement of pre-treatment cartridge・membrane filter・ion exchange resin cartridge, and high purity cartridge, press the reset switch on the backside of front door, with power of the unit ON, for two seconds. The acceptance sound is issued. Alarm display is reset and registered in the consumables replacement history.

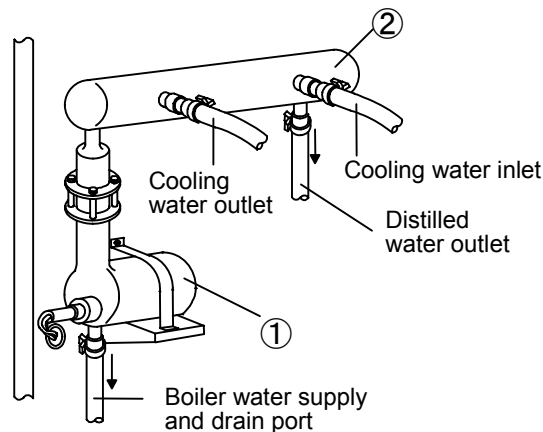
In case of replacement of multiple components, register one component at a time in the order of replacement. Note that the history of ion exchange resin cartridge is registered last of all.

(Alarm for ion exchange resin and high-purity cartridges is automatically reset. Pressing the reset switch causes recording of the replacement history.)

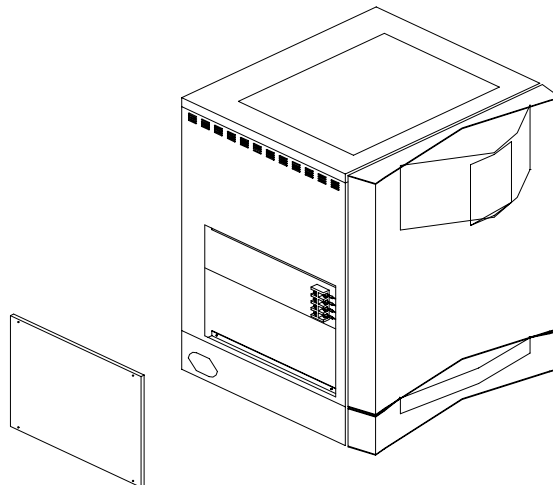


• Dismounting of Distiller

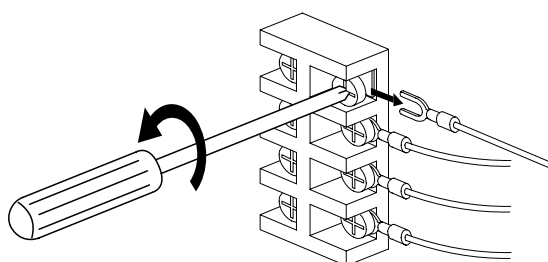
1. Turn "OFF" the earth leakage breaker of the unit.
2. Close the tap.
3. Check that the boiler is not hot (longer than 30 minutes after the breaker is turned "OFF"), then open the front door of the unit, and open the boiler water drain cock.
4. Disconnect the hose connected to the boiler ① and condenser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



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

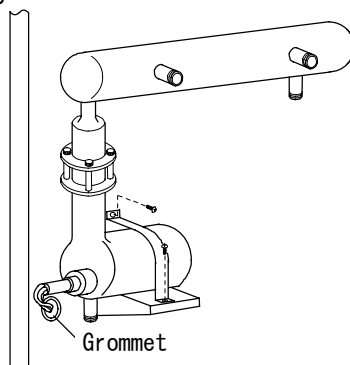


6. Loosen 4 screws on the right of terminal block located at the right top of the body frame with left side plate dismantled by use of Phillips screwdriver, and disconnect the heater lead terminal.

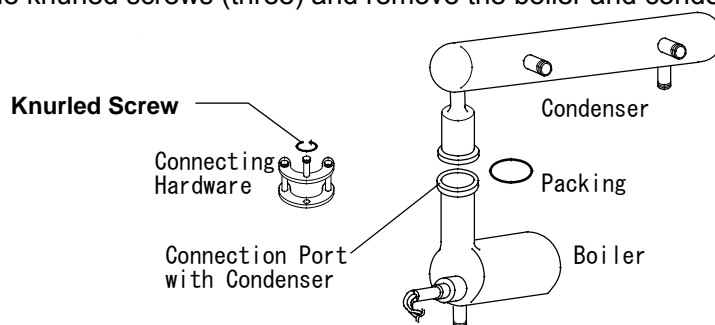


7.

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



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

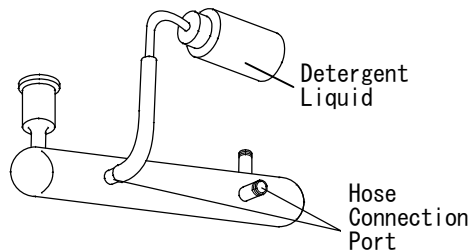


• Washing of boiler

1. Adjust detergent liquid.
 - 1) Prepare approx. 2 liters of hot water at 50 to 60°C.
 - 2) Add attached scale detergent (Orgazor) approx. 200g to hot water prepared in 1) and agitate well.
 2. Seal the hose connection port at the bottom of boiler (boiler supply and drain port) by use of rubber stopper, etc.
 3. Secure the boiler at a stable position to prevent washing liquid from spilling.
 4. Pour in washing liquid through connection port with condenser with heater turned on.
Most scale is removed in 4 to 5 hours approximately. Drain washing liquid in the boiler. If much scale is distiller deposited, pour in washing liquid newly, and repeat washing
 - 1) When scale-removing work is finished, take the heater out of boiler and wash each of them enough with city water. Here, in washing the heater with water, be sure to fill a larger beaker with water and wash the heater inside so that lead wire and its routing port are not wet by water.
Avoid washing the heater directly with water from tap.
 - 2) If solid scale distiller remains after washing by washing liquid, follow the remedy below:
Boiler: Scrub with brush etc. for removing.
Heater: Scrub with something soft such as wood piece or plastic.
- In this connection, remove scale on the heater uniformly in general, never leaving solid scale in part. In an extreme case, only such part has a great heat resistance, causing damage to the heater.

• Washing of Condenser

1. Pour detergent liquid into the cooling pipe of condenser.
(See Page 39 "Washing of boiler" for formulating detergent liquid.)



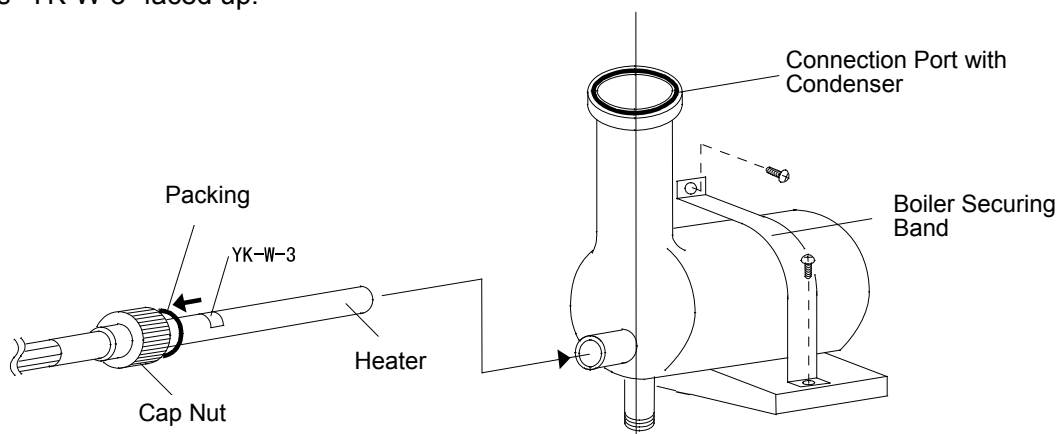
2. If detergent liquid should flow out of hose connection port, seal with rubber stopper. Most fur can be removed in 4 - 5 hours approximately.
3. Drain detergent liquid, and then wash enough with city water.

• Handling of Detergent Liquid (also refer to Page 35 "Handling Precautions")

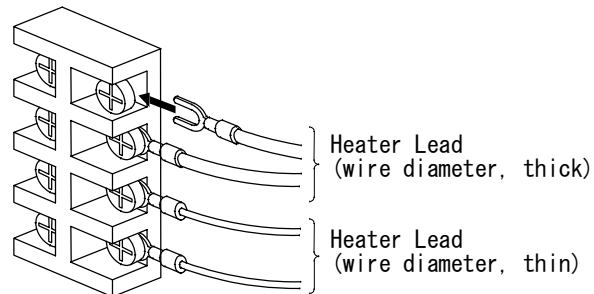
1. Wash the boiler and heater sooner. If the more scale is deposited, the more difficult is its removal, which may cause decrease of distilled water sampling and damage to heater.
2. When washing is finished, drain detergent liquid out of the unit, and apply neutralization by neutralizer (such as sodium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

• Installation of boiler

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



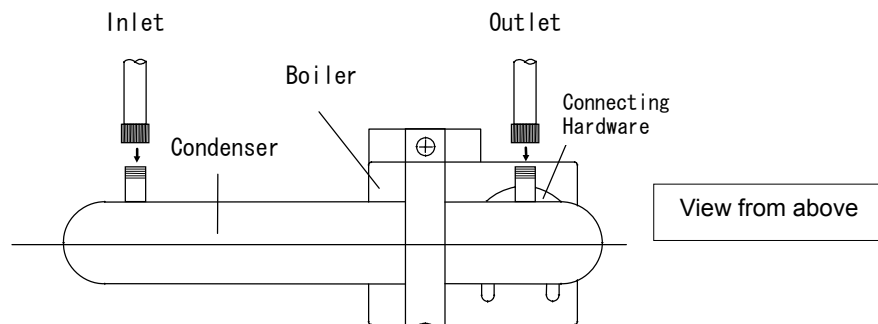
2. Attach 4 heater lead terminals to the terminal block.



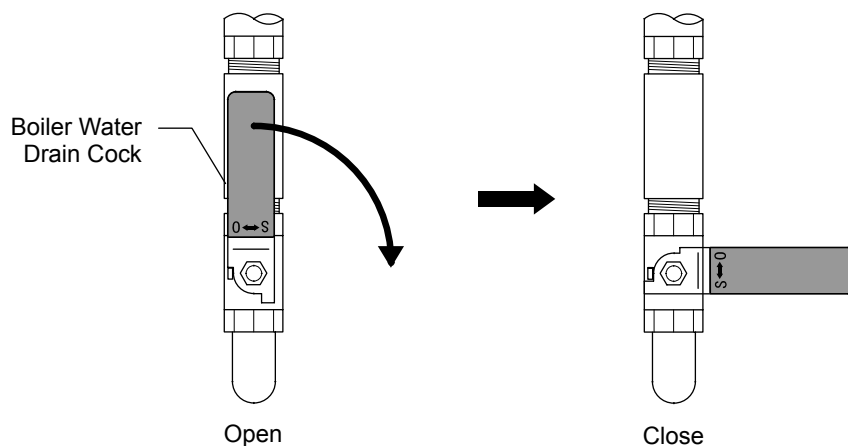
3. Install the left side plate on the body.
4. Insert the hose to the boiler water supply and drain port, and secure with the hose band.

• Installation of condenser

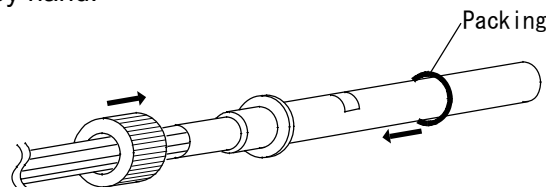
1. Place packing in the connection port of boiler with condenser, and secure with connecting hardware so that the boiler and condenser are placed in the same direction.



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



- If the heater should be disconnected or damaged due to deposit of scale, replace it by the procedure below. (Also refer to Pages 38 to 41 "6. Maintenance Method " in working.)
1. Turn "OFF" the earth leakage breaker of this unit.
 2. Close the tap.
 3. Turn "OFF" earth leakage breaker, and when more than 30 minutes has passed, open the front door of this unit, and open the boiler water drain cock.
 4. Open the left side plate of the body, loosen the four screws on the right of the terminal block, and disconnect the heater lead terminal.
 5. Pull the heater lead out of the grommet.
 6. Remove the cap nut of heater, and pull out the heater.
 7. Remove the packing and cap nut from the damaged heater.
 8. Install the packing and cap nut on the new heater. At that time, do not touch with bare hand in order to prevent soiling by hand.

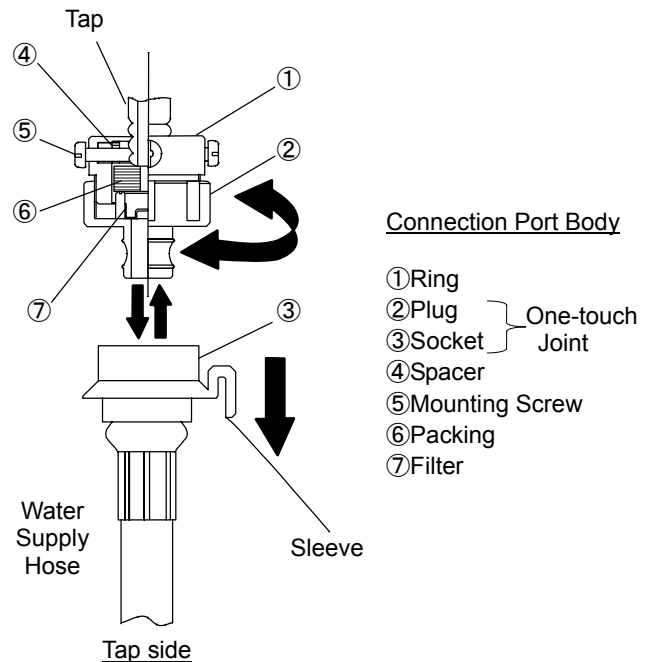


9. Install on the boiler so that "YK-W-3" mark of the heater is faced up.
10. Feed the heater lead wire through the grommet, check the heater lead wire attaching position, and secure to the terminal block.
11. Mount the left side plate.
12. Close the boiler water drain cock.
13. Close the front door, and then open the tap.
14. Turn on the earth leakage breaker.
15. The standby screen appears at the display window of the control panel.
16. Perform calibrations by pressing **POWER** key while holding down **PURE WATER** key and **DISTILLED WATER** key. (Refer to page 24.)
(Calibration is performed for storing the standard temperature of the sensors in each heater under normal operation in the inner controller. Performing calibration detects errors when the temperature rises higher than the standard temperature + 20°C.)
17. During calibration, a message is displayed at the message window of the control panel.
18. After approx. 5 minutes passed after starting calibration, normal operation starts automatically.

6. Maintenance Method

Washing of Water Supply Hose Filter

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



Replacement of Hose

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

Distilled water tank drain method

1. Turn OFF the earth leakage breaker of the unit to "OFF."
2. Take out the hose in the lower portion on the backside of system.
3. There is a cap at the end of hose. Remove the cap and drain the distilled water tank.
4. When draining is over, be sure to reset the cap firmly. If not firmly provided, the can may cause water leakage.

6. Maintenance Method

Replacing the TOC reduction UV lamp

1. Turn OFF the earth leakage breaker of the unit.
2. Close the tap.
3. Open the door of the main body. (See Photo 1)



Photo 1



Photo 2

4. Remove the pre-treatment cartridge and ion exchange resin (CPC-N).
5. Remove a plate fixing the ion exchange resin (CPC-N) and remove a cover plate of the TOC reduction UV lamp. (See Photos 2 and 3)

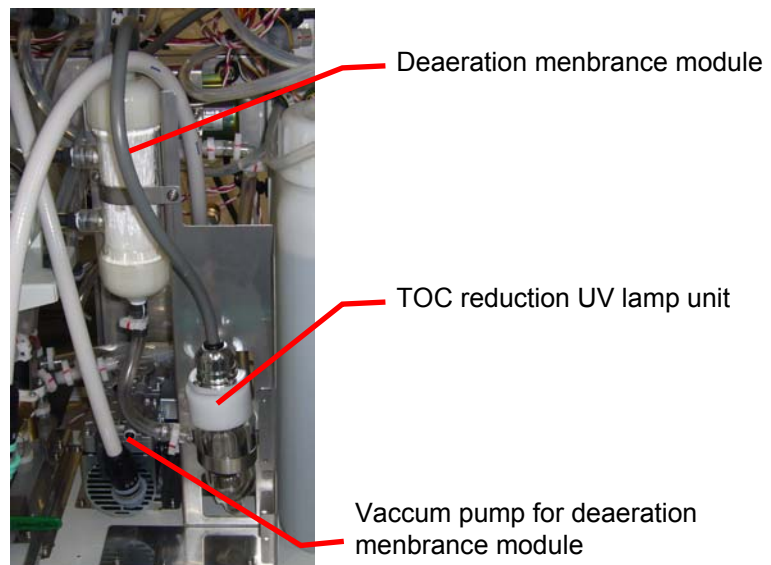


Photo 3

6. Remove screws at four points on top of the TOC reduction UV lamp.
 7. Raise the socket and remove the lamp.
 8. Remove the lamp from the socket.
 9. For installation, reverse the above procedure.
- (※) Never touch the quartz glass directly during replacement of the UV lamp.

6. Maintenance Method

Checking if the TOC reduction UV lamp goes ON

- Checking if the TOC reduction UV lamp goes ON.

Open the front door of the unit. There are the switch to turn ON the TOC reduction UV lamp of Photo 1 and the TOC reduction UV lamp ON glow on top of the tank.



Normally, the TOC reduction UV lamp does not go ON unless the TOC reduction system is activated.

Checking of the TOC reduction UV lamp and TOC reduction UV lamp ON glow can be made with ease by turning ON the TOC reduction UV lamp ON switch.

※ : The TOC reduction UV lamp ON switch is automatically reset to OFF when released.

6. Maintenance Method

Replacing the deaeration membrane module

1. Turn OFF the earth leakage breaker of the unit.
2. Close the tap.
3. Open the door of the main body. (See Photo 1)



Photo 1



Photo 2

4. Remove the pre-treatment cartridge and ion exchange resin (CPC-N).
5. Remove a plate fixing the ion exchange resin (CPC-N). (See Photos 2 and 3)



Photo 3

Deaeration menbrance module

TOC reduction UV lamp unit

Vaccum pump for deaeration menbrance module

6. Remove the piping connected to the deaeration membrane module as well as fixing screws.
7. For installation, reverse the above procedure.

1. Maintenance

Check as follows at least once every three days during operation:

- (1) Check for any abnormal sound.
- (2) Check if the pump is abnormally hot.
- (3) Check if exhaust is made correctly.

2. Regular inspection

(1) List of consumables

Parts	Quantity	Material	Reference life
Diaphragm	2	Synthetic rubber (EPDM)	10,000 H
Suction • exhaust valves	4	Synthetic rubber (FPM)	10,000 H
Head gasket	2	Synthetic rubber (EPDM)	10,000 H
Bearing	1 set		10,000 H

(2) Guidelines for replacement

• Diaphragm

Replace when the surface shows fine cracks, wear, hardening, deformation.

• Suction • exhaust valves

Replace if they show any deformation, chipping, bend, etc.

• Head gasket

Replace if it shows any hardening, crack, elongation.

• Bearing

Request repair if grease shortage, abnormal sound, or abnormal motor vibration (chattering) is detected.

3. Replacing the consumables

Caution : Be sure to turn OFF power supply to the unit before proceeding to replacement of consumables.

When replacing, refer to the exploded diagram. Depending on the disassembling portion, special tool may be necessary to handle a part of components.

(a) Replacing the diaphragm

Remove four cross-recessed pan-head machine screws (M4×12(with SW)) ② of the pump head ①.

Remove the pump head and remove one cross-recessed pan-head machine screw (M5×12) ④ of the diaphragm holding plate ③.

(※) Replace a total of two diaphragms ⑤, one for each pump head, with the new ones.

During reassembly, apply small amount (enough to cover three to four threads at the end) of an agent to prevent loosening (Locktight 242, etc.) to cross-recessed pan-head machine screws (M5×12) ④. Tighten screws with a torque of 4.0 ~ 4.5 N • m.

(b) Replacing the head gasket

Remove one cross-recessed pan-head machine screw (M4 × 6) ⑦ of head cover ⑥.

There is a black head gasket ⑧ under the head cover. Remove this gasket and replace the new one.

(※) There are total of two head gasket ⑧, one for each pump head.

Reassemble the head gasket and head cover in this order to the pump head.また、

During reassembly, apply small amount (enough to cover three to four threads at the end) of an agent to prevent loosening (Locktight 242, etc.) to cross-recessed

pan-head machine screws (M4 × 6). Tighten screws with a torque of 1.2 ~ 1.3 N·m.

(c) Replacing suction·exhaust valves (special tool necessary)

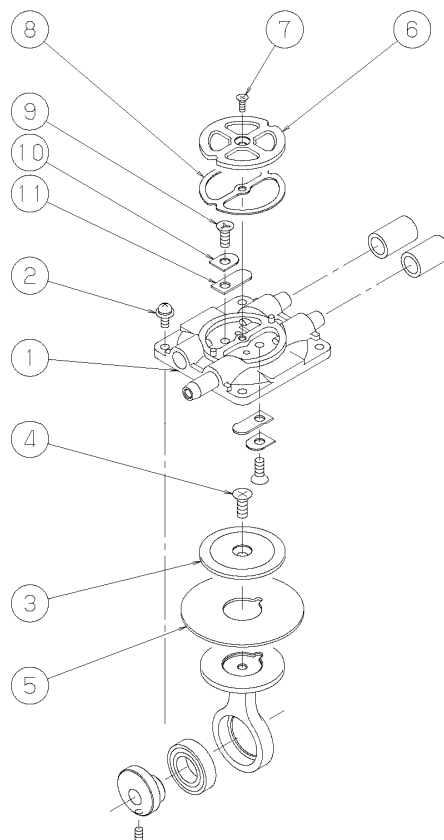
Remove one cross-recessed pan-head machine screw (M4 × 6) ⑦ of head cover ⑥, and remove the head gasket ⑧.

Remove four cross-recessed pan-head machine screws (M4 × 12(with SW)) ② of the pump head ①.

Remove the screw (M3 × 4) ⑨ and valve holder ⑩ on both sides of pump head and replace suction·exhaust valves ⑪.

(※) There are a total of four suction·exhaust valves ⑪, two for each pump head.

During reassembly, apply small amount of an agent to prevent loosening (Locktight 242, etc.) to cross-recessed screws (M3 × 4) ⑨. Tighten screws with a torque of 0.2 ~ 0.25 N·m.



Exploded diagram

7. Long storage and disposal

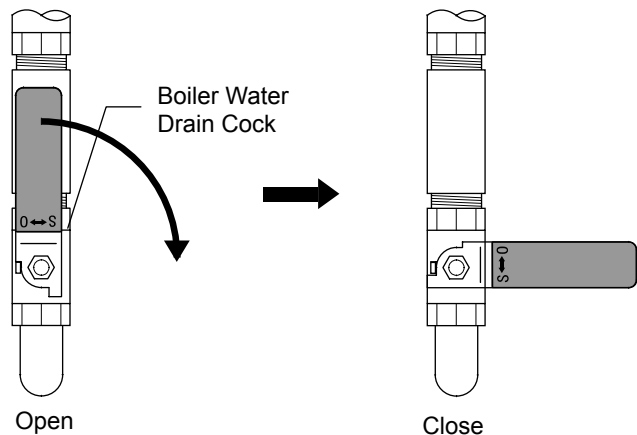
When not using this unit for long term



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

Boiler Water Drain

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



When the distilled water has been left stored in the tank for two weeks or more, drain the tank content completely and start operation. Start using the distilled water when the water is ready for sampling and when the specific resistance becomes $1.2\text{M}\Omega\cdot\text{cm}$ or more and after operation for one hour or more.

7. Long storage and disposal



WARNING!

1. When disposing...



- Dispose of the unit as bulky waste.
- When disposing, avoid a place visited by playing children frequently.

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



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

Considerations on disposing

Environmental protection should be considered

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

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

7. Long storage and disposal

Considerations on disposing

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

8. In the Event of Failure...

Failure indication and Its Contents

Alarm	Indication	Condition	Corrective measures
Water cutoff alarm	Feed Water Alarm Check Flow & Pressure	When raw water pressure decreases ($<0.5\text{kg f/cm}^2$), or when water cutoff occurs	Check raw water.
Pretreatment filter exchange notification	It's time to exchange Hollow Filter	When 6 months passed under continuous energizing condition	Change the pretreatment filter. Press and hold the reset switch on backside of the door till a beep is heard. Then, the alarm indication is reset.
Ion-exchange resin CPC-N exchange notification	Water Quality NG It's time to exchange Ion-EXCH Resin-N	When the conductivity of pure water exceeds $1 \times 10^{-4} \text{ S/m}$	Change the ion-exchange resin. Press and hold the reset switch on backside of the door till a beep is heard. Then, the alarm indication is reset.
Ion-exchange resin CPC-H exchange notification	Water Quality NG It's time to exchange Ion-EXCH Resin-H	When the conductivity of pure water exceeds $0.2 \times 10^{-4} \text{ S/m}$	Change the ion-exchange resin. Press and hold the reset switch on backside of the door till a beep is heard. Then, the alarm indication is reset.
Membrane filter for distilled water exchange notification	It's time to exchange Distilled Water Membrane Filter	When 3 months passed under continuous energizing condition	Change the membrane filter for distilled water. Press and hold the reset switch on backside of the door till a beep is heard. Then, the alarm indication is reset.
Membrane filter for pure water exchange notification	It's time to exchange Ion-EXCH Water Membrane Filter	When 3 months passed under continuous energizing condition	Change the membrane filter for pure water. Press and hold the reset switch on backside of the door till a beep is heard. Then, the alarm indication is reset.
TOC reduction UV lamp exchange message	It's time to exchange TOC-d UV Lamp.	When concecutive power application hours of 4000 hours have passed	Replace the TOC reduction UV lamp. Keep pressing the reset switch on the door backside for an extended period of time. The confirmation sound is issued and the alarm display is reset.

8. In the Event of Failure...

Failure indication and Its Contents

Deaeration membrane module exchange message	It's time to exchange MHF	When consecutive water supply of one year has passed	Replace the deaeration membrane module. Keep pressing the reset switch on the door backside for an extended period of time. The confirmation sound is issued and the alarm display is reset.
Maintenance time notification	It's time to maintenance Service Call	When 3 years passed under continuous energizing condition	Perform maintenance of the unit. Press and hold the reset switch on backside of the door till a beep is heard. Then, the alarm indication is reset.
TOC measurement UV lamp exchange message (WG280 only)	It's time to exchange TOC-m UV Lamp	When the cumulative TOC measurement hours of 4000 hours have passed	Replace the TOC measurement UV lamp. Keep pressing the reset switch on the door backside for an extended period of time. The confirmation sound is issued and the alarm display is reset.
TOC meter error (WG280 only)	TOC unit Error Service Call	When any internal abnormal state of TOC meter has continued for more than the period necessary to determine abnormality	Request repair of the TOC meter.
Error that the TOC measurement UV lamp does not go ON (WG280 only)	TOC-m UV failed Be replace TOC-m UV Lamp	The TOC measurement UV lamp does not go ON because of certain abnormality in the lamp.	Replace the TOC measurement UV lamp. Keep pressing the reset switch on the door backside for an extended period of time. The confirmation sound is issued and the alarm display is reset.
TOC measurement system check error (WG280 only)	TOC unit System Check Failed	When the TOC meter cannot be activated correctly	Stop TOC measurement and resume measurement. If the error cannot be canceled, request repair.

8. In the Event of Failure...

Failure indication and Its Contents

Error	Indication	Cause	Symptom	Countermeasure
Controller error	Controller Error Service Call	When the setting value which is memorized in the memory chip cannot be read properly, or when an abnormal value is displayed	All controls of the heater and solenoid valve are turned OFF.	Turn the breaker on again. If the trouble persists, please call our customer service center.
Water leakage error	Leak Error Service Call	When the resistance value of the water leakage sensor input becomes less than the water leakage error judgment value		Turn the breaker off and check the piping parts. For details, refer to page 56 .
Overheat of heater	Over Heat Error Service Call	When temperature at the heater exceeds the error judgment value, or when breakage or shortage occurs on the temperature sensor		Change the heater.
Burnout of heater	Heater Error Service Call	When temperature of the heater did not rise after certain time passed during distillation		Change the heater.
Tank water level meter error	Tank Water Sensor Error Service Call	When the condition of the float contacting points in the tank water level meter becomes abnormal		Change the float switch.
Pure water conductivity meter (N) error	Ion-Exchange-N Sensor Error Service Call	When the state of breakage or shortage of the thermistor sensor for pure water conductivity gauge continues longer than error judgment time		Change the pure water conductivity sensor.①
Pure water conductivity meter (H) error	Ion-Exchange-H Sensor Error Service Call	When the state of breakage or shortage of the thermistor sensor for pure water conductivity gauge continues longer than error judgment time		Change the pure water conductivity sensor.②
Distilled water conductivity meter error	Distilled Water Sensor Error Service Call	When the state of breakage or shortage of the thermistor sensor for distilled water conductivity gauge continues longer than error judgment time		Change the distilled water conductivity sensor.

8. In the Event of Failure...

Failure indication and Its Contents

Others	Indication	Cause	Symptom	Countermeasure
Boiler drain error	Boiler Water Waste Error Service Call	When the heater operation water level input kept OFF even if the time for required to evaluate the boiler water level error passed after starting water supply to the boiler	All controls of the heater and solenoid valve are turned OFF.	Check the solenoid valve for drain and drain path.
Coolant error	A Coolant Error Service Call	When the state that became boiler water overflow input ON in the float pipe continued longer than coolant error judgment time		Check the coolant solenoid valve and the coolant path.
Water level error of boiler	Boiler Water Level Error Service Call	When the heater operation water level input kept OFF even if the time for required to evaluate the boiler water level error passed after starting water supply to the boiler		Check the feedwater solenoid valve and feedwater path whether manual drain cock is opened or not.
Water meter level of boiler error	Boiler Water Sensor Error Service Call	When the condition of the float contacting points in the float pipe becomes abnormal		Change the float switch.
Circulation pump error	PUMP Erroe Service Call	When the time has elapsed for the period necessary to determine error during ion water circulation		Turn ON the breaker again and sample the ion water for about one minute. If error cannot be canceled, request repair.
Distilled water sampling pump error	DW PUMP Error Service Call	When the time has elapsed for the period necessary to determine error during sampling of distilled water		Check the distilled water pump and the sampling route. Check the membrane filter for clogging. If error cannot be canceled, request repair.

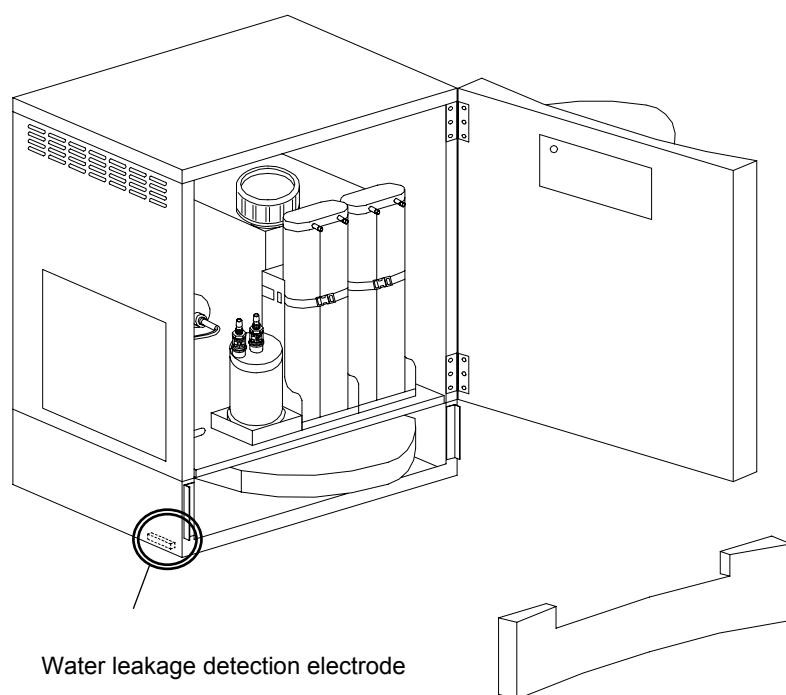
- When an error occurs, confirm the error message shown at the message window, and call the shop from which you made a purchase or our customer support center.

Countermeasure against water leakage error

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

<How to remove the lower front panel of WG270/280>

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



8 . In the Event of Failure...

Trouble Shooting

When a trouble occurs

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

Measures in emergency

Error indications/causes

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

For details of error indications, refer to "Failure indication and Its Contents (pages 52 and 55)".

Measures

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

When requesting the repair

If any error should occur, record the error message and stop operation immediately. Turn OFF power supply and unplug the power cord from the receptacle. Then contact the shop from which you have purchased the product or our office.

(Data necessary for information)

- Product type name
- Serial No.
- Year/month/day of purchase
- ※ Check to find the date in the guarantee card or the nameplate attached to the unit. (See “Description and Function of Each Part” in pages 13 and 14.)
- Contents of trouble (as detailed as possible)
- Be sure to present the guarantee card when our service personnel visits your site.

Guarantee card (attached separately)

- The guarantee card will be delivered from the shop from which you have purchased our product or our office. Confirm that the shop name and the date of purchase are entered and read the card carefully. Keep the card with care.
- The guarantee period is one year from the “date of purchase.” Free repair may be available according to the content of the card.
- For repair after expiration of the guarantee period, consult the shop from which you have purchased our product or our office. If the repair can help maintaining the function, we will provide the repair service with charge if so requested by the customer.

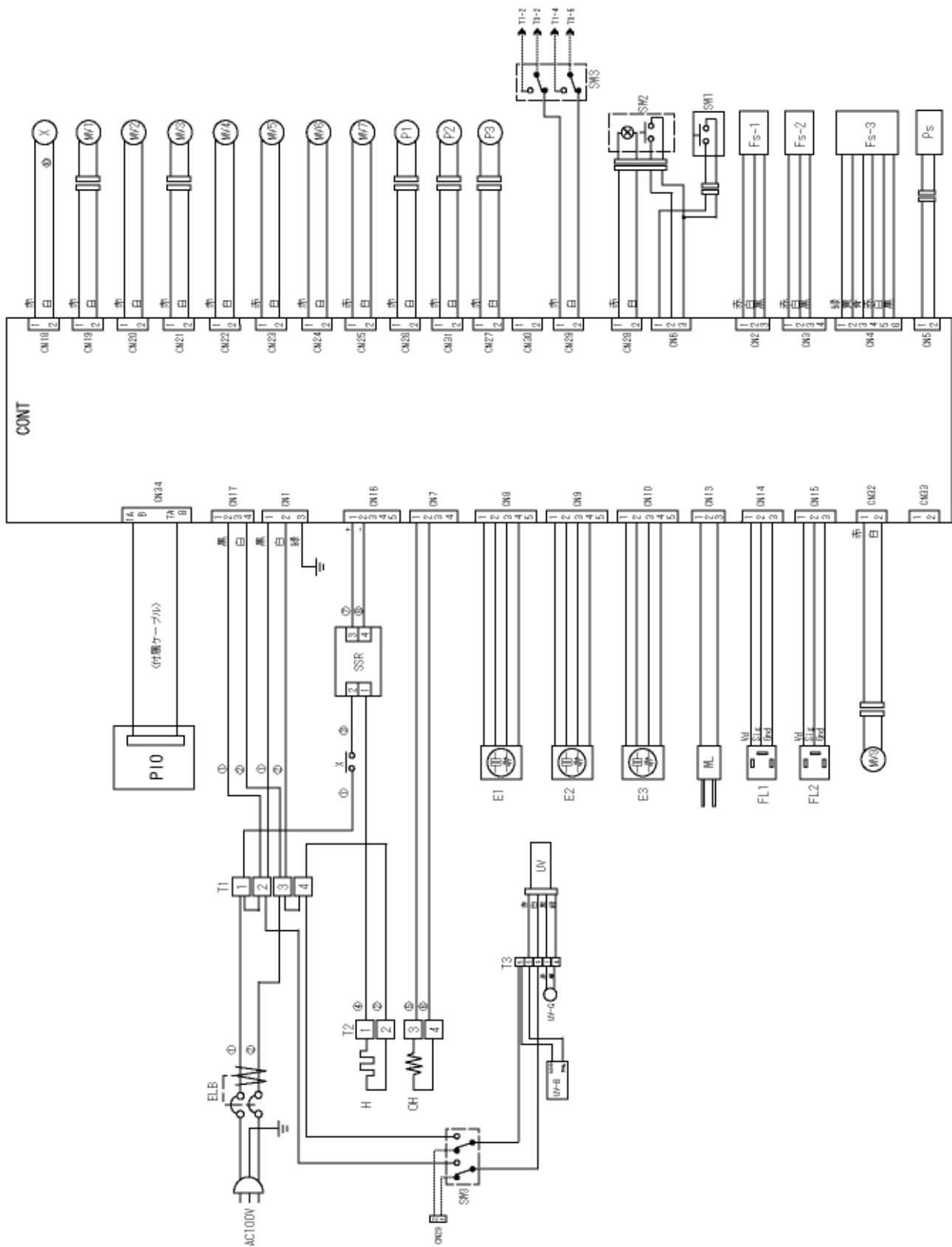
Minimum hold period of performance parts for repair

The minimum holding period of repair parts for this unit is seven years after termination of the production. Repair parts mean those necessary to maintain the performance of the product.

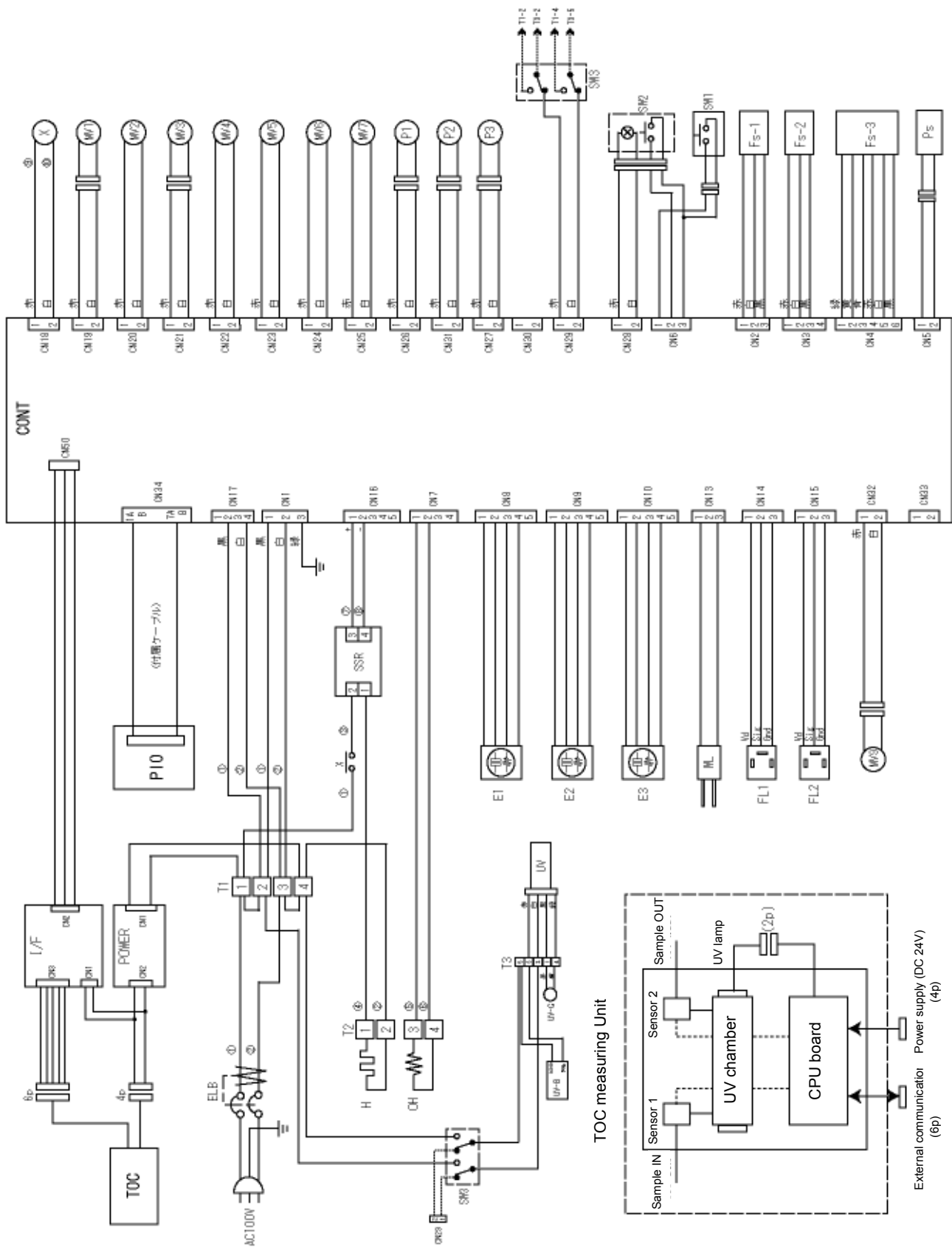
10. Specifications

Model		WG270	WG280
Feedwater method		One-touch coupler connecting resin hose/free hose connecting	
Drain method		Left/right selection connecting method/hose connecting	
Performance	Purified water	Distilled water/Ion exchange water	
	Production of distilled water	Approx. 1.8 λ/h	
	Collection of distilled water	0.5 to 1.0 λ/min	
	Collection of ion exchange water	0.5 to 1.0 λ/min	
	Setting range of capacity	0.1 to 20 λ (Measured amount/continuous water collection)	
Configuration	Condenser	Super hard glass	
	Heater	Ceramic heater 1.4kW	
	Raw water side filter	Pre-treatment cartridge (PWF-1), Activated carbon + Hollow yarn film 0.1 μ m	
	Ion exchange resin cartridge	Ion exchange resin cartridge (CPC-N) High-purity cartridge (CPC-H)	
	Membrane filter	0.1 μ m × 2	
	Water leakage detection	Water leakage detector forcefully shut off the feedwater solenoid valve when water leakage is detected.	
	Distilled water storage tank	20λ PE tank	
	Water sampling table	Slide-out type Load-bearing capacity:10kg For 5λ beaker with handle	
	Water level detection	Lead switch, five level detection (also used for distillation control function)	
	TOC meter	—	Standard equipment (its value displayed in the control panel)
Standard	Raw water pressure range	0.5 to 5 × 100 kPa (0.5 to 5 kgf/cm ²)	
	Ambient temp.	5°C~35°C	
	Power supply (50/60 Hz)	100V AC 15A	
	External dimension ^(*) (Width X Depth X Height)	600×660×780 mm	
	Weight	Approx.55 kg	Approx.56 kg
Accessories		WG270 : Water supply hose (with connection port), drain hose assembly, and connection hose 1 respectively WG280 : Water supply hose (with connection port), drain hose assembly, and connection hose 1 respectively Operation manual: This manual Guarantee card: 1 Hose clamp: 1 Scale washing agent (1kg): 1 Pre-treatment cartridge: 1 Ion exchange resin cartridgeCPC-N: 1 High-purity cartridge CPC-H: 1 Sealing tape: 1 Membrane filter: 2	

* 1 The protrusion area is not included in the outside dimension.



Symbol	Part name	Symbol	Part name
ELB	Earth leakage breaker	X	Main relay
T1, T2, T3	Terminal block	MV1	Raw water solenoid valve
H	Heater	MV2	Boiler water supply solenoid valve
OH	Temperature sensor	MV3	Cooling water solenoid valve
E1	Distilled water quality gauge	MV4	Initial accumulated water drain solenoid valve
E2	Ion exchange water quality gauge CPC-N	MV5	Boiler drain solenoid valve
E3	Ion exchange water quality gauge CPC-H	MV6	Distilled water sampling solenoid valve
WL	Water leakage detector	MV7	Ion exchange water sampling solenoid valve
FL1	Distilled water flow gauge	MV9	Three-way solenoid valve for vaccum
FL2	Ion exchange water flow gauge	P1	Distilled water circulation/sampling pump
Fs-1	Control float switch	P2	Deaeration membrane vacuum pump
Fs-2	Control float switch	P3	Ion water circulation pump
Fs-3	Tank water level float switch	UV	TOC reduction UV lamp
SW1	Reset switch	UV-B	Ballast
SW2	Drain switch	UV-G	Glow
SW3	UVlamp turn-on switch	PI0	Display board
Ps	Pressure switch	CONT	PLANAR board
SSR	Solid state relay		



Symbol	Part name	Symbol	Part name
ELB	Earth leakage breaker	X	Main relay
T1, T2, T3	Terminal block	MV1	Raw water solenoid valve
H	Heater	MV2	Boiler water supply solenoid valve
OH	Temperature sensor	MV3	Cooling water solenoid valve
E1	Distilled water quality gauge	MV4	Initial accumulated water drain solenoid valve
E2	Ion exchange water quality gauge CPC-N	MV5	Boiler drain solenoid valve
E3	Ion exchange water quality gauge CPC-H	MV6	Distilled water sampling solenoid valve
WL	Water leakage detector	MV7	Ion exchange water sampling solenoid valve
FL1	Distilled water flow gauge	MV9	Three-way solenoid valve for vaccum
FL2	Ion exchange water flow gauge	P1	Distilled water circulation/sampling pump
Fs-1	Control float switch	P2	Deaeration membrane vacuum pump
Fs-2	Control float switch	P3	Ion water circulation pump
Fs-3	Tank water level float switch	UV	TOC reduction UV lamp
SW1	Reset switch	UV-B	Ballast
SW2	Drain switch	UV-G	Glow
SW3	UV lamp turn-on switch	PI0	Display board
Ps	Pressure switch	CONT	PLANAR board
SSR	Solid state relay	TOC	TOC measuring init
POWER	DC24VSwitching power supply	I/F	Interface board

12. Replacement Parts List

WG270/280(common)

Symbol	Parts	Code No.	Specifications	Manufacturer
ELB	Earth leakage breaker	LT00029776	NV-L22GR 20A	Mitsubishi
T1	Terminal board	2070230001	MO11OFX 4P	Toyo Giken
T2	Terminal board	2070080003	TB-20C 4P	Sakazume Electric
T3	Terminal board	2070230002	MO11OFX 5P	Toyo Giken
H, OH	Heater (temperature sensor)	2420016003	YK-W-3	Kowa Dennetsu
E1	Distilled water quality meter	1011890001	For WG252/220	Yamato Scientific
E2,E3	Pure water quality meter	5130000001	For WG240/260	Yamato Scientific
Fs-1	Float switch for control	LT00014440	WA050514-1	Yashima Sokki
Fs-2	Float switch for control	LT00014441	WA050514-2	Yashima Sokki
Fs-3	Tank water level float switch	LT00019425	YF4-2040	Yashima Sokki
SW1	Reset switch	2010010014	A2A-4W	Omron
SW2	Drain switch	LT00014520	AH164-LS1 1H1	Fuji Electric
SW3	UV lamp ON switch	LT00023393	M-2025	Nihon Kaiheiki
X	Main relay	2050000056	G7L-1A-TUB 100V	Omron
MV1	Raw water solenoid valve	LT00014451	AG3X-A300-100V	CKD
MV2	Boiler water supply solenoid valve	LT00014450	J241-811	CKD
MV3	Cooling water solenoid valve	LT00014453	AB2X-1242	CKD
MV4	Initial distilled water drain solenoid valve	LT00014450	J241-811	CKD
MV5	Boiler drain solenoid valve	LT00014456	J244-085	CKD
MV6	Distilled water sampling solenoid valve	LT00014450	J241-811	CKD
MV7	Pure water sampling solenoid valve	LT00014450	J241-811	CKD
MV9	Three-way solenoid valve for opening to the atmosphere	LT00014451	AG3X-A300-100V	CKD
P1	Distilled water sampling pump	LT00005462	MD-20RZ-N	Iwaki
P2	Deaeration membrane vacuum pump	LT00019426	DAP-6D	Ulvac
P3	Ion water circulation pump	LT00035062	WP-LM9 YR-2 (100V)	Iwaki
WL	Water leakage sensor	WG55005328	Lead wire 2,7m	Yamato Scientific
SSR	Solid state relay	2160000035	TRS5225	Toho
Ps	Pressure switch	2040040001	ST-B-BR1-N2	Sanyo Keiki
PIO	Display board	LT00019738	WG280	Yamato Scientific
CONT	Planer board	LT00013591	WG250	Yamato Scientific
FL1	Distilled water flow meter	1260010005	FHK-33	Yamato Scientific

12. Replacement Parts List

FL2	Pure water flow meter	1260010005	FHK-33	Yamato Scientific
UV	TOC reduction UV lamp	LT00019420	SGL-180T4U Z	Nippo Electric
UV-B	Stabilizer	LT00019424	FBAB-11L-US9	NEC
UV-G	Glow	LT00024700	FE-7E/X	Panasonic Electric Works

Added for WG280

Symbol	Parts	Code No.	Specification	Manufacturer
I/F	Interface board	LT00018506	WG280-TOC-I/F	Yamato Scientific
POWER	DC24V switching power supply	LT00019732	VS10C-24	LAMBDA
TOC	TOC measurement unit	LT00019736	TAC-ACCURA-Mini	Yamato Scientific

13. Consumable parts

WG270/280 (common)

Parts	Replacement timing	Quantity
Pre-treatment cartridge	About 6 months	1
Ion exchange cartridge(CPC-N)	About 600 liters	1
Ion exchange cartridge(CPC-H)	About 1200 liters	1
Distilled water membrane filter	About 3 months	1
Pure water membrane filter	About 3 months	1
Deaeration membrane module	About 1 year	1
Consumables of vacuum pump	10000 hours	
1.Diaphragm		2
2.Suction·exhaust valve		4
3.Head basket		2
4.Bearing		1
TOC reduction UV lamp	About 4000 hours	1
Glow	About 1 year	1
TOC measurement UV lamp(WG280 only)	About 4000 hours	1

14. List of Dangerous Substances

Explosive substance	Explosive substance	① Nitroglycol, glycerine trinitrate, cellulose nitrate and other explosive nitrate esters
		② Trinitrobenzen, trinitrotoluene, picric acid and other explosive nitro compounds
		③ Acetyl hydroperoxide, methyl ethyl ketone peroxide, benzoyl peroxide and other organic peroxides
	Flammable substances	Explosive substances
		Metal “lithium”, metal “potassium”, metal “natrium”, yellow phosphorus, phosphorus sulfide, red phosphorus, celluloids, calcium carbide (a.k.a, carbide), lime phosphide, magnesium powder, aluminum powder, metal powder other than magnesium and aluminum powder, sodium dithionous acid (a.k.a., hydrosulphite)
		Oxidizing substances
		Flammable substances
		Combustible gas

(Quoted from the separate table 1 in Article 6, the enforcement order of the Industrial Safety and Health Law)

Responsibility

Please follow the instructions in this document when using this unit. Yamato Scientific has no responsibility for the accidents or breakdown of device if it is used with a failure to comply.

Never conduct what this document forbids. Unexpected accidents or breakdown may result in.

Note

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

**Instruction Manual for
Water Purifier, Super Auto Still®
Model WG270/280
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Yamato Scientific Co., Ltd.
2-1-6 Nihonbashi Honcho, Chuo-ku,
Tokyo, 103-8432, Japan
<http://www.yamato-net.co.jp>