Water Purifier, Auto Still®

Model

WA 200

Instruction Manual

- Version 7 -

- Thank you for purchasing "Auto Still®, WA 200" 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.

Contents

Explanation

MEANING OF ILLUSTRATED SYMBOLS

Illustrated Symbols

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

⚠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.

Table of Illustrated Symbols

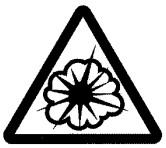
Warning


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

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

WARNING!

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

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

Be sure to connect grounding wire.

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

If a problem occurs

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

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

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

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

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

Do not disassemble or modify this unit

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

Do not touch hot portion

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

Close the tap when unit is out of service

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

Fundamental Matters of “WARNING!” and “CAUTION!”

⚠CAUTION!

During a thunder storm

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

Exercise care in handling washing liquid (Orgazor)

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

Requirements for Installation

WARNING!

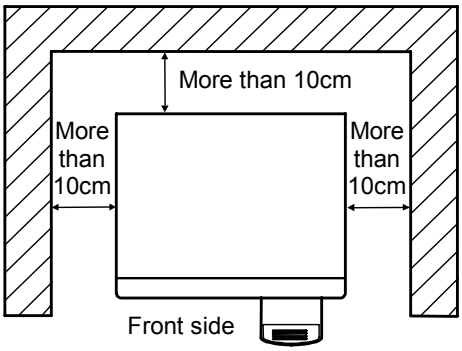
1. Always ground this unit

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

2. Choose a proper place for installation

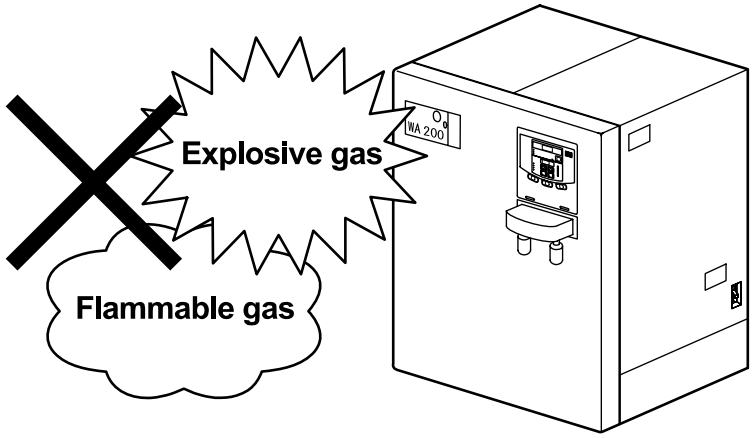
- Do not install this unit in a place where:
  - Rough or dirty surface.
  - Flammable gas or corrosive gas is generated.
  - Ambient temperature exceeds 35°C.
  - Ambient temperature fluctuates violently.
  - There is direct sunlight.
  - There is excessive humidity and dust.
  - There is a constant vibration.

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



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

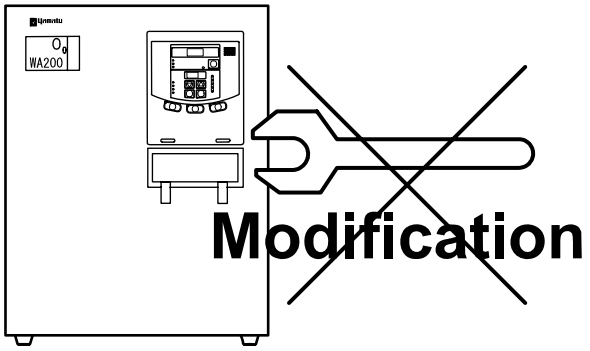
- Never use this unit in an area where there is flammable or explosive gas. This unit is not explosion-proof. An arc may be generated when the power switch is turned ON or OFF, and fire/explosion may result. (To know about flammable or explosive gas, refer to Page 51 “List of Dangerous Substances”.)



Requirements for Installation

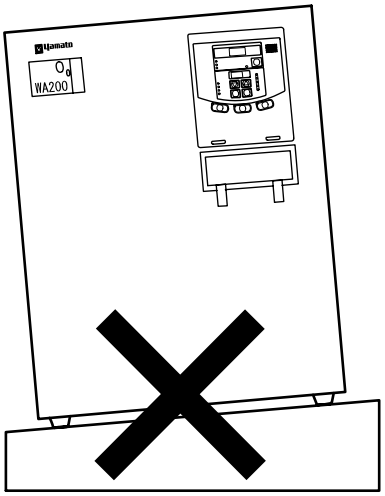
4. Do not modify

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



5. Installation on horizontal surface

- Set this unit to the flattest place. Setting this unit on rough or slope place could cause the vibration or noise, or cause the unexpectible trouble or malfunction.



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: 100V AC 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 this unit 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.

Requirements for Installation

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 outlet which is supplied appropriate power and voltage.

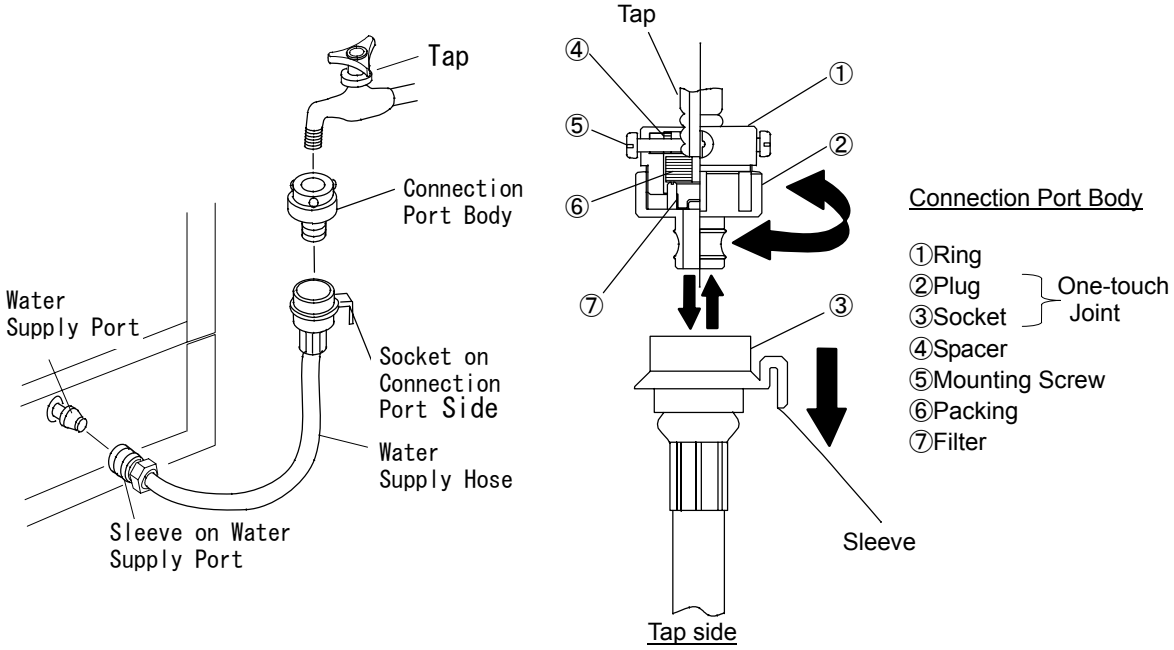
9. Connect the water supply hose securely

- Always ensure that breaker on power unit side is "Off" before connecting power cord. Power plug of this unit 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.

10. Connect the water supply hose securely

- Connection on tap side

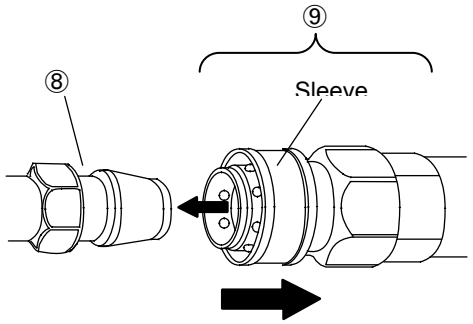
1. Slide the sleeve of socket ③ on connection port side in the arrow direction, then connection port body and water supply hose can be separated. There separate the two parts.
2. Once loosen the plug ② from the ring ①.
3. Tighten the 4 mounting screws ⑤ uniformly while pressing the ring ① slightly and 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.



Requirements for Installation

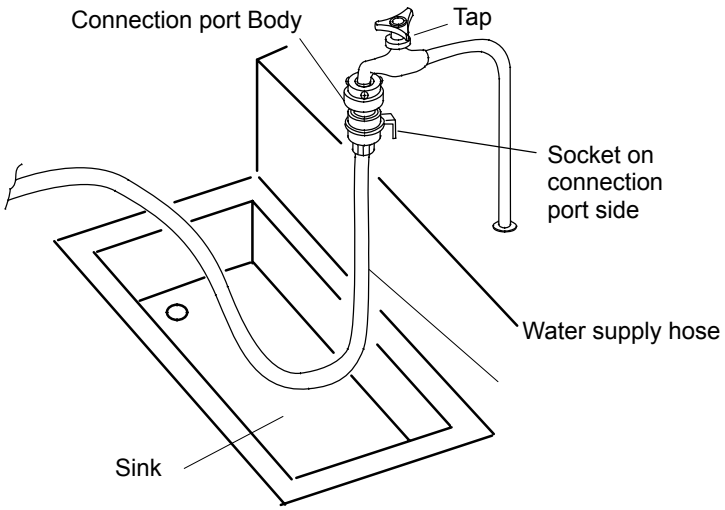
11. Connection on body side

1. Remove the rubber cap from the 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.



12. 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.

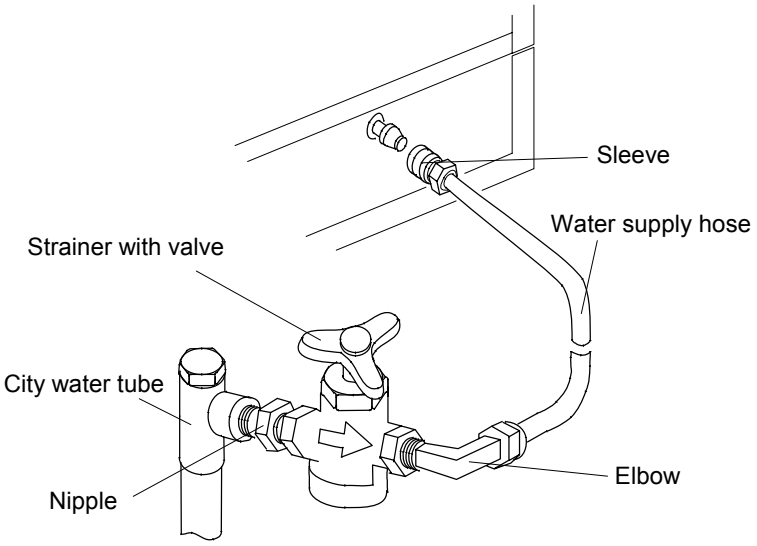


Requirements for Installation

⚠CAUTION!

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

- Water supply port unit is made in a set from the nipple to the sleeve shown on the right. See the instruction manual of "Water Supply Port Unit" for detail, such as the method for connecting to city water tube.
- "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.



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

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

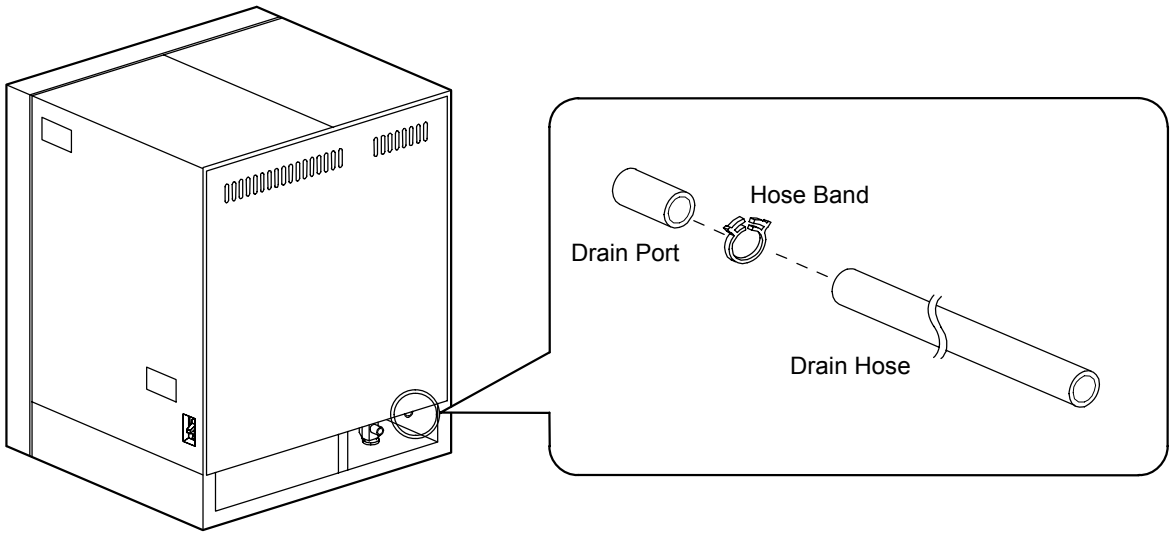
Requirements for Installation

WARNING!

15. Connect the drain hose securely

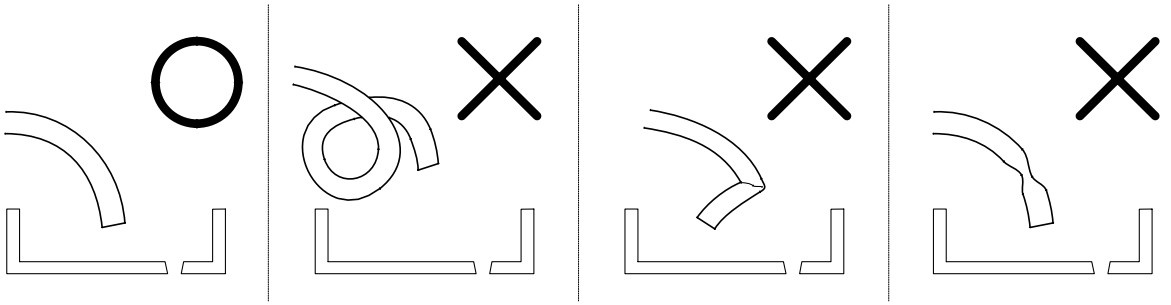
- If the drain hose is not connected securely, it may be disconnected, leaking water in the unit, or leading to trouble of system.

1. Take the drain hose and hose band out of attachments to the body.
2. Always make sure that the electric leakage breaker of the unit is "OFF".
3. Remove the rubber cap located at the outlet of drain port.
4. Feed the hose through the hose band, then into the drain port, and tighten the hose band securely.



16. Use care in routing of drain hose

- Do avoid making bend or projection of drain hose.
- 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.



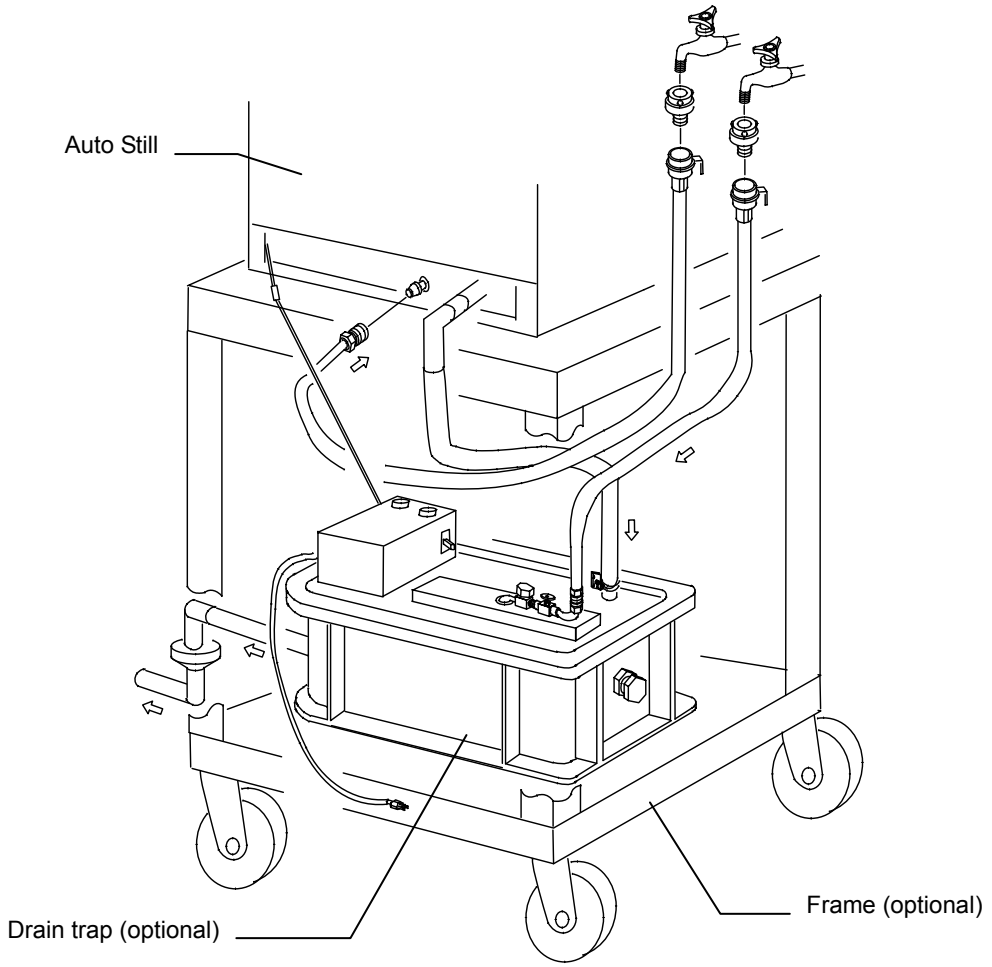
Requirements for Installation

17. Check the drain temperature of cooling water

- Drain temperature may exceed 60℃ in drainage from boiler. Drain to a place remote from working environment not to be touched easily because there is a danger of burns.
- The cooling water with hot temperature may flow out. It may cause deterioration of pipe when vinyl chloride pipe is used for sink drain equipment, so drain to a position farther than sink drainpipe. Further, use VP pipe (JIS K6741) for vinyl chloride pipe, and DV-RR joint for joint part, and use a drain trap (nonstandard options) when drain temperature is high (above 60℃) even if insertion socket (JIS K6739) is used. Even when drain temperature is below 60℃, use a drain trap attached in nonstandard if the tube and joint above are not used.

18. When drain temperature of sink equipment does not fall under 60℃

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



Requirements for Installation

19. Install the ion exchange resin cartridge (CPC-N) and soft water resin cartridge (OWA30) securely

- Install the ion exchange resin cartridge (CPC-N) and soft water resin cartridge (OWA30) following the procedure shown below.
- Connect securely because insecure connection may cause water leakage.

1. Make sure that the electric leakage breaker of this unit is "Off" and that the tap is tightened.
2. Take the ion exchange resin cartridge and soft water resin cartridge out of attachments to the body.
3. Place the ion exchange resin cartridge and soft water resin cartridge taken out on the receiver within the unit. (See Fig.1.)
4. Fix the ion exchange resin cartridge and soft water resin cartridge with the band of receiver. (See Fig.2.)

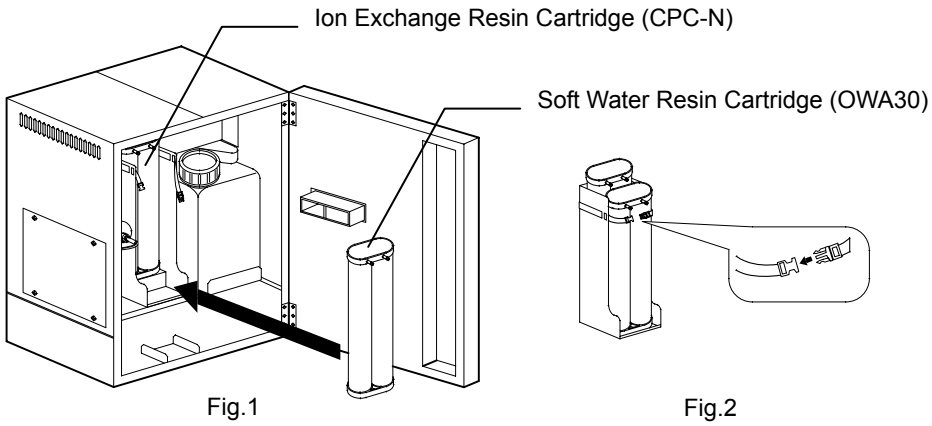
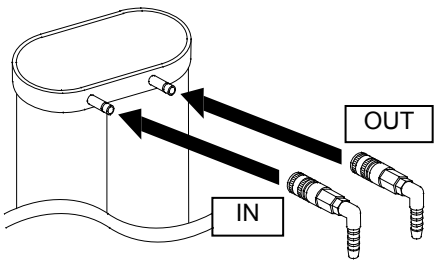


Fig.1 Fig.2

5. Remove the rubber cap attached to the inlet and outlet of ion exchange resin cartridge and soft water resin cartridge.
6. Fit in the coupler marked with (N) (IN) to the inlet of ion exchange resin cartridge (left) until click is heard.
7. Fit in the coupler marked with (N) (OUT) to the outlet of ion exchange resin cartridge (right) until click is heard.
8. Fit in the coupler marked with (soft water) (IN) to the inlet of soft water resin cartridge (left) until click is heard.
9. Fit in the coupler marked with (soft water) (OUT) to the outlet of soft water resin cartridge (right) until click is heard.

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



❖ Yellowish colored water may come out through Ion Exchange Resins packed in Soft Water Resin Cartridge at the beginning. This yellowish colored water will be caused by the polystyrene sulfonic acid(PSA) in Ion Exchange Resins only at the beginning and is not the Remarkable phenomenon. This PSA will be stayed inside the boiler at distilling process and never dissolved into the distilled water. However, yellowish colored water can be drained by opening the boiler drain cock around 20 minutes (about 20 litters).

Requirements for Installation

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

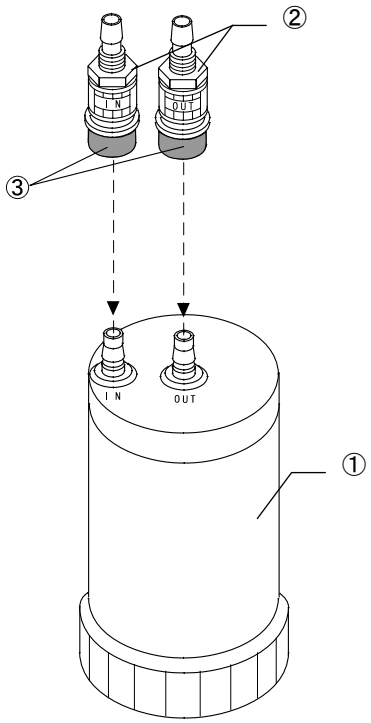


Fig.3

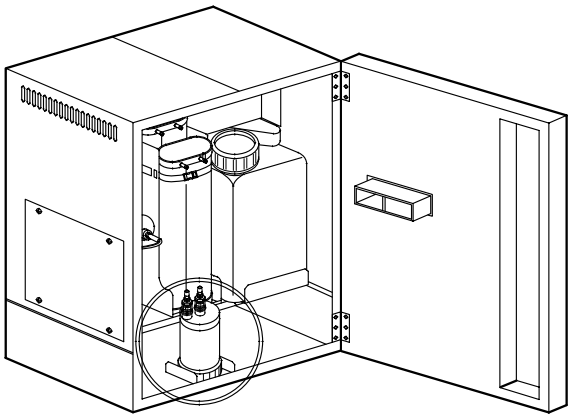


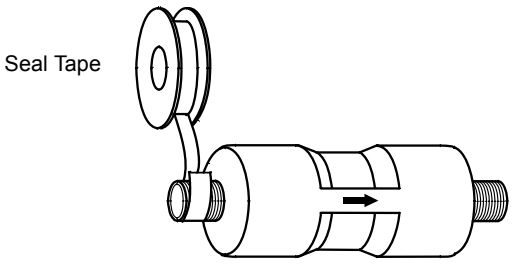
Fig.4

Requirements for Installation

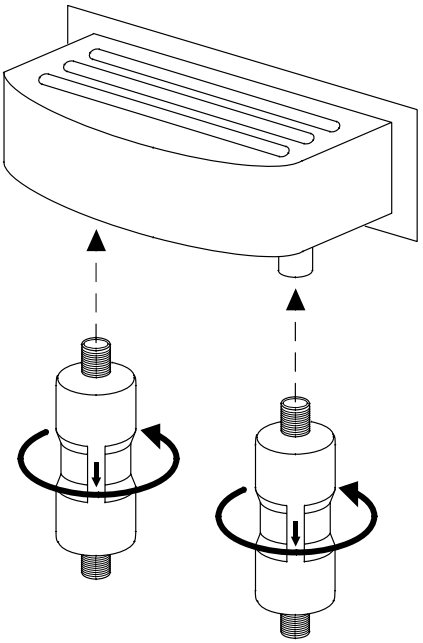
21. Connect the membrane filter securely

- Install the membrane filter by the procedure shown below.
- Connect securely because insecure connection may cause water leaking from screwed part, mixing into and contaminating collected pure water.

1. Take two membrane filters and sealing tape out of attachments to the body.
2. Wrap the seal tape a few winds around with a slight tension clockwise viewing from wrapping side. At that time, pay attention to the direction of arrow on the membrane filter.



3. Screw the membrane filter about 3 turns into the screw of filter joint with seal tape side up. At that time, pay attention not to crush threads. Check for water leakage in sampling pure water. If any leakage is found, screw in further.

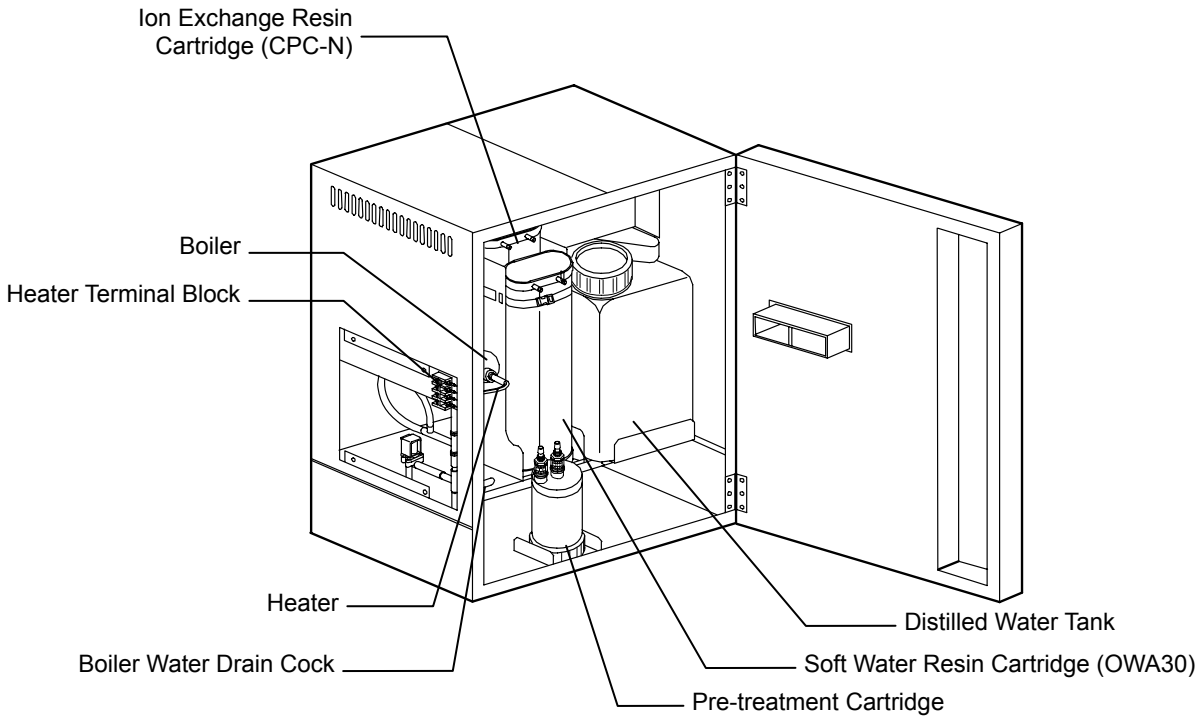


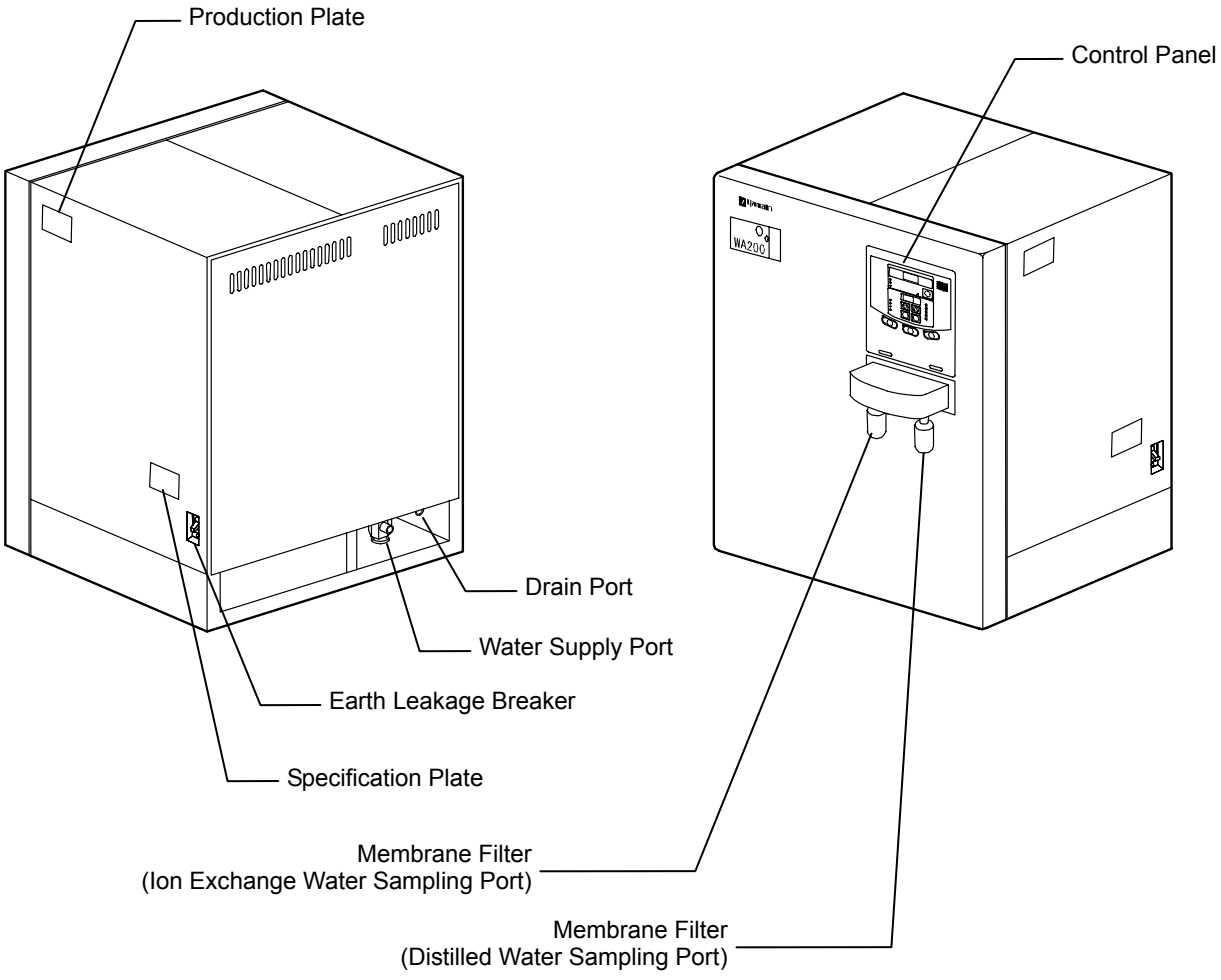
22. After installation

- This unit may topple over due to unexpected earthquake or shock causing injury. Take an appropriate measure against toppling for safety.

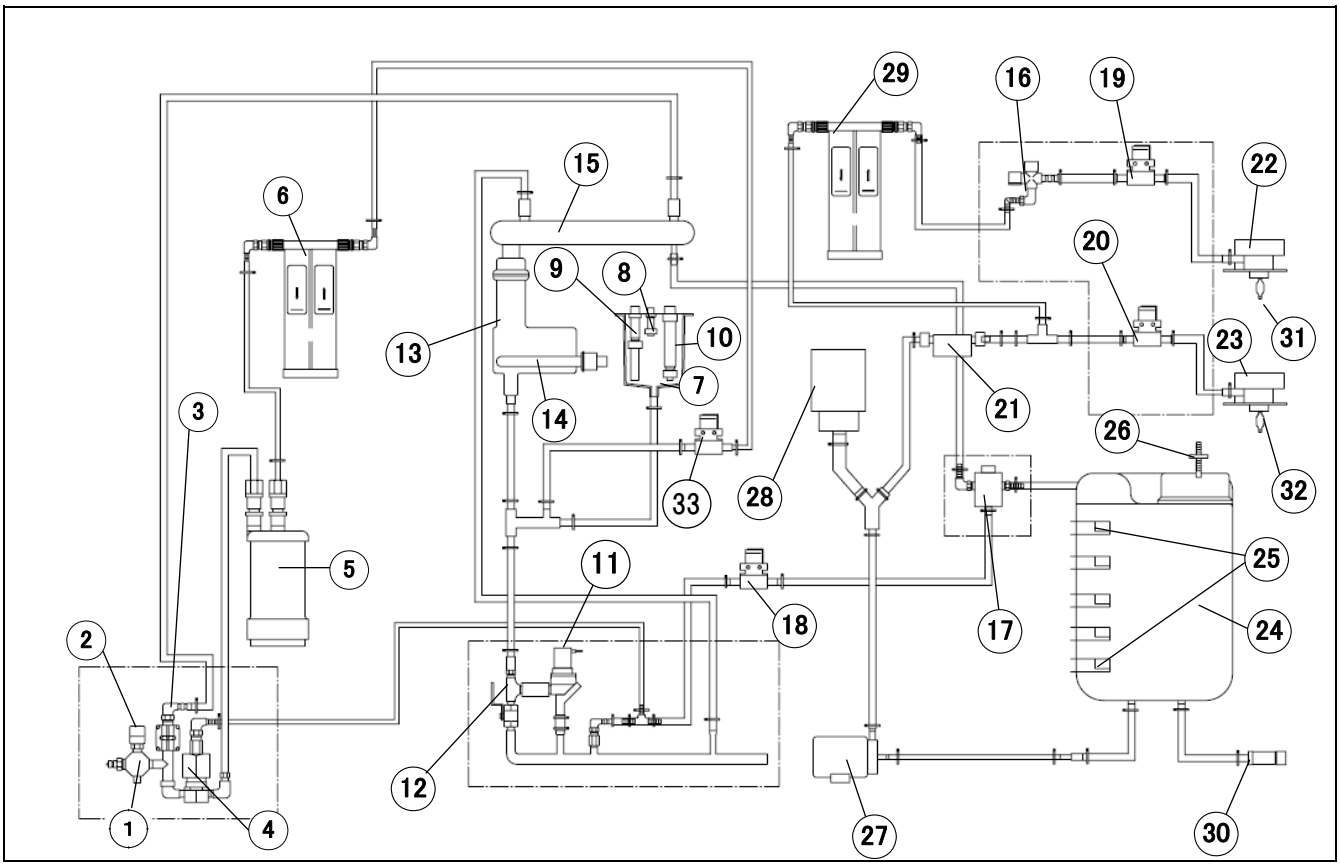
Main Unit

The name of each part is shown below.





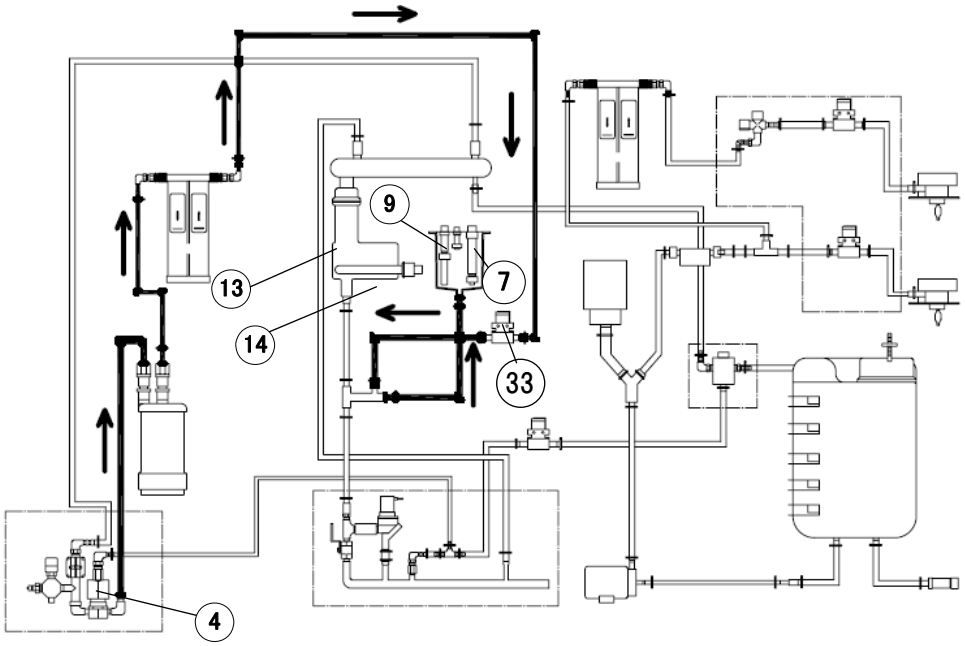
Piping System View



①	Pressure Reduction Valve	⑰	Distilled Water Quality Gauge Electrode
②	Pressure Switch	⑱	Initial Accumulated Water Drain Solenoid Valve
③	Cooling Water Solenoid Valve	⑲	Ion Exchange Water Sampling Solenoid Valve
④	Boiler Water Supply Solenoid Valve	⑳	Distilled Water Sampling Solenoid Valve
⑤	Pre-treatment Cartridge	㉑	Flow Rate Sensor
⑥	Soft Water Resin Cartridge	㉒	Ion Exchange Water Sampling Port
⑦	Float Cylinder	㉓	Distilled Water Sampling Port
⑧	Boiler Overheat Detecting Float Switch	㉔	Distilled Water Tank
⑨	Boiler Water Level Control Float Switch	㉕	Water Level Detecting Float Switch
⑩	Heater Control Float Switch	㉖	Air Filter
⑪	Boiler Water Drain Solenoid Valve	㉗	Magnet Pump
⑫	Boiler Drain Cock	㉘	Pressure Detector
⑬	Boiler	㉙	Ion Exchange Resin Cartridge
⑭	Heater	㉚	Distilled Water Tank Drain Port
⑮	Condenser	㉛	Membrane Filter
⑯	Ion Exchange Water Quality Gauge Electrode	㉜	Membrane Filter
		㉝	Boiler Water Level Control Solenoid Valve

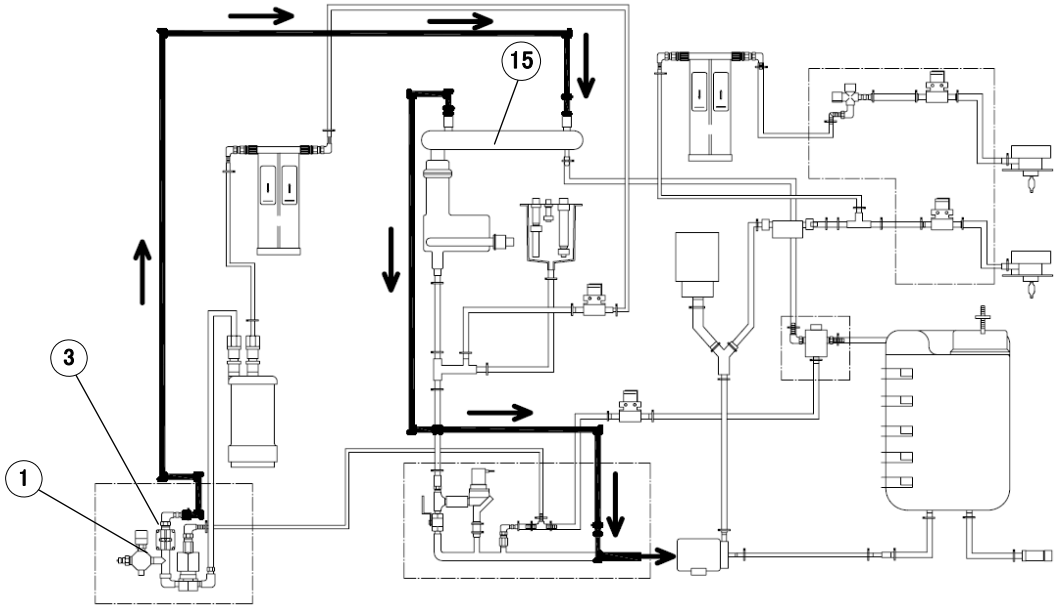
Principle of Operation

1. Boiler Water Supply and Distilling Operation



Turn "ON" the electric leakage breaker, and press the power switch, then the boiler water supply solenoid valve (4), Boiler Water Level Control Solenoid Valve (33) opens, feeding water to the boiler. When the boiler water level control float switch (9) in the float cylinder (7) detects water level, the heater (14) is energized and distilling is started. Water supply to the boiler is controlled by opening and closing the boiler water supply solenoid valve by use of boiler water level control float switch (9).
Boiler water is automatically drained every 6 hours, which prevents condensation of boiler water.

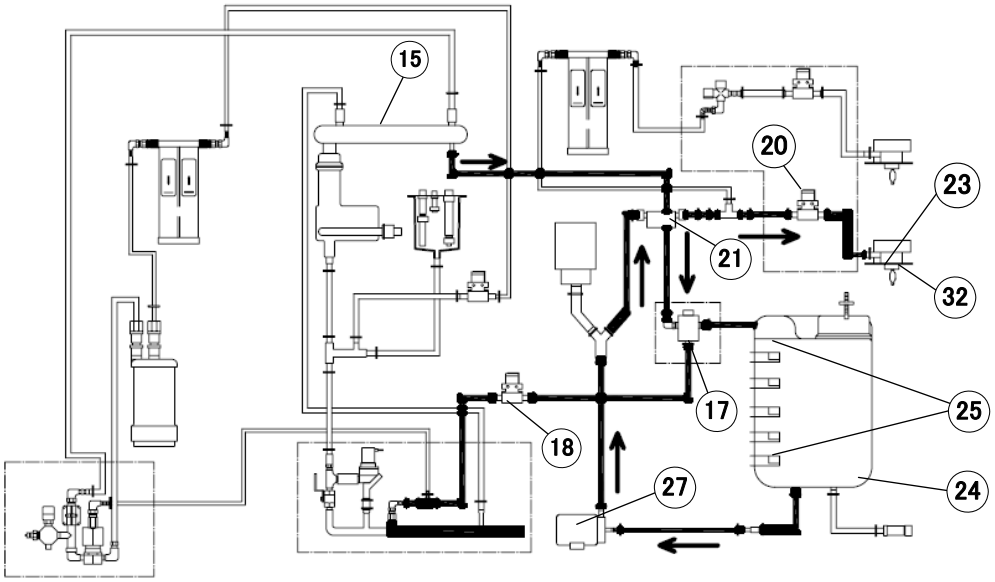
2. Flow of Cooling Water



During distilling operation, water is fed and drained in the order of Pressure reducing valve (1), Cooling water solenoid valve (3), and Condenser (15). Distilling is stopped when distilled water tank is full, and feeding of cooling water is also automatically stopped.

Principle of Operation

3. Sampling of Distilled Water



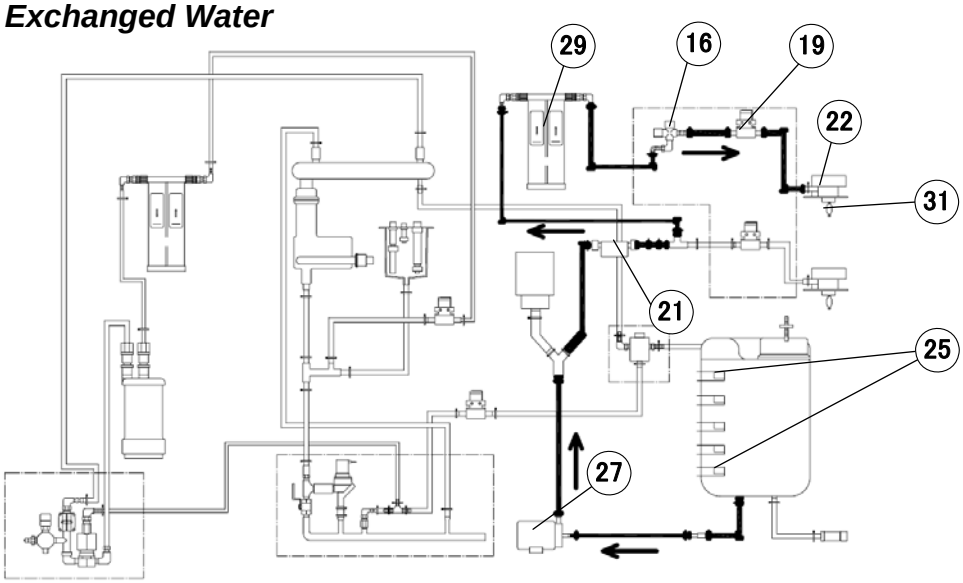
The distilled water condensed in the condenser (15) is stored in the distilled water tank (24) from the distilled water quality electrode (17) after discharging the initial boiled water via the initial boiled water discharge solenoid valve (16) for about 10 min. since the distillation is started. If the float switch (25) on top of the tank trips, it is deemed as Full Tank, and distillation is stopped. When distilled water is sampled and a specified amount is consumed, distilled water is produced automatically.

Knurled Screw

The stored distilled water is sampled by distilled water sampling pump (27) through flow rate sensor (21), distilled water sampling solenoid valve (20), and membrane filter (32).

When the storage of distilled water in the tank goes below 2l approx., float switch at the bottom operates and the pump stops automatically in order to prevent idling of pump

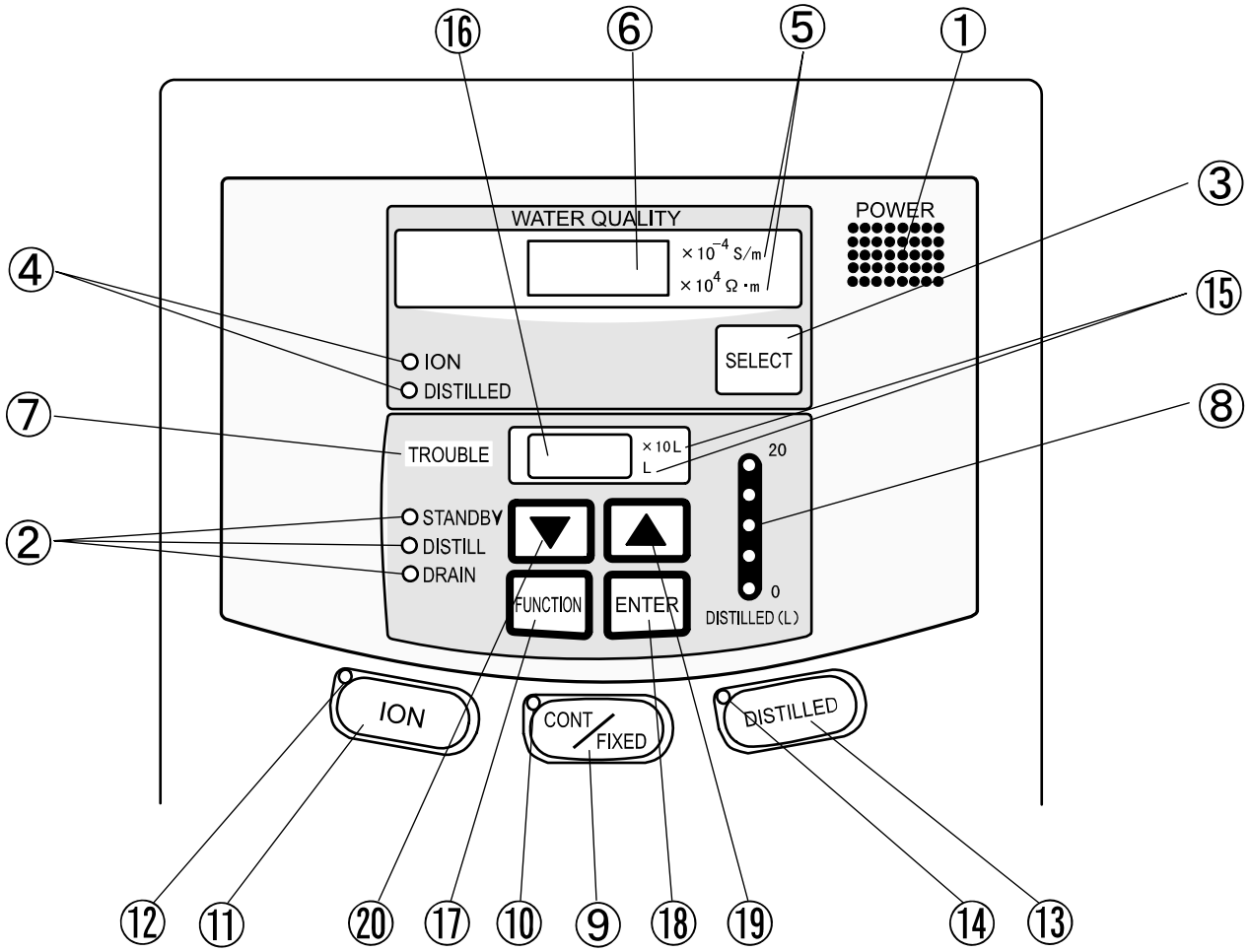
4. Sampling Ion Exchanged Water



The stored distilled water is collected by sampling pump (27) through flow rate sensor (21), ion exchange resin cartridge (29), ion exchanged water quality electrode (16), ion exchanged water sampling solenoid valve, and membrane filter (31).

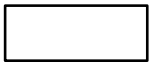
When storage of distilled water in the tank goes below 2l approx., float switch at the bottom operates and the pump stops automatically in order to prevent idling of pump.

Control Panel



① Power Switch
② Operation Status Display Lamp
③ Select Switch
④ Measurement Electrode Display Lamp
⑤ Unit of Water Quality Display
⑥ Indicator (1)
⑦ Error Display Lamp
⑧ Distilled Water Storage Indicator
⑨ Pure Water Sampling Procedure Selector Switch
⑩ Sampling Procedure Display Lamp
⑪ Ion Exchange Water Sampling Switch
⑫ Ion Exchange Water Sampling Display Lamp
⑬ Distilled Water Sampling Switch
⑭ Distilled Water Sampling Display Lamp
⑮ Sampled Volume Unit
⑯ Indicator (2)
⑰ Function Key
⑱ Enter key
⑲ Up Key
⑳ Down Key

Control Panel

POWER 	① Power Switch:	This is a switch for power. When it is connected with power cable and electric leakage breaker is "ON", "Standby" of operation status display lamp turns on. When the power switch is pressed here, it turns "ON". When it is pressed again, it turns "OFF".
○STANDBY ○DISTILL ○DRAIN	② Operation States Display Lamp:	STANDBY: 1. When the power switch is "OFF" with electric leakage breaker "ON", the yellow lamp turns on. 2: When it turns to water failure, or raw water pressure falls, the yellow lamp blinks, and cut lights up on the indicator (1). DISTILL: Green lamp turns on in distillation. DRAIN: Green lamp turns on when boiler water is automatically drained.
SELECT	③ Select Switch:	Switch for selecting measurement electrode of water quality gauge. Sensor is automatically changed between ion exchange water and distilled water every pressing of this switch, and electric conductivity or specific resistance corresponding to electrode is displayed on indicator (1).
○ION ○DISTILLED	④ Measurement Electrode Display Lamp:	Lamp of electrode selected by select switch turns on. ION: Water quality at the outlet of ion exchange resin cartridge. DISTILLED: Quality of distilled water at the outlet of condenser.
X 10^{-4}S/m X 10^{4}Ω・m	⑤ Unit of Water Quality Display:	It shows the unit of value displayed on indicator (1). X 10^{-4}S/m: It shows electric conductivity. (= μS/cm) X 10^{4}Ω・m: It shows specific resistance (= MΩ・cm) (Note that the specific resistance ranges 18 to 1, displayed in integer.)
WATER QUALITY 	⑥ Indicator (1):	Water quality selected for display is displayed in converted value at 25°C. Water quality other than selected for display is always being checked, and when either water quality falls below certain value, pertinent sensor number is displayed repeatedly. In addition, when taps run dry or raw water pressure falls, it is displayed, and when any fault occurs on system, error code is displayed.

<Specified value in judging water quality fall>

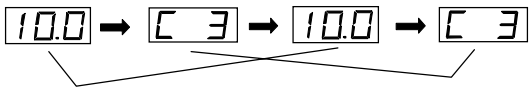
Ion exchanged water: 1 X 10-4 S/m or above (0.1 X 10-4Ω ・m or below)

Distilled water: 10 X 10-4 S/m or above (0.1 X 10-4Ω ・m or below)

<Example of water quality fall display>

Select distilled water by select key:

When ion exchanged water is 0.10 X 10-4 S/m, and distilled water is 10 X 10-4 S/m or above



Electric conductivity of selected electrode C3 (distilled water)

Electric conductivity of distilled water electrode number (C3) (distilled water) whose water quality has fallen

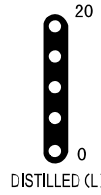
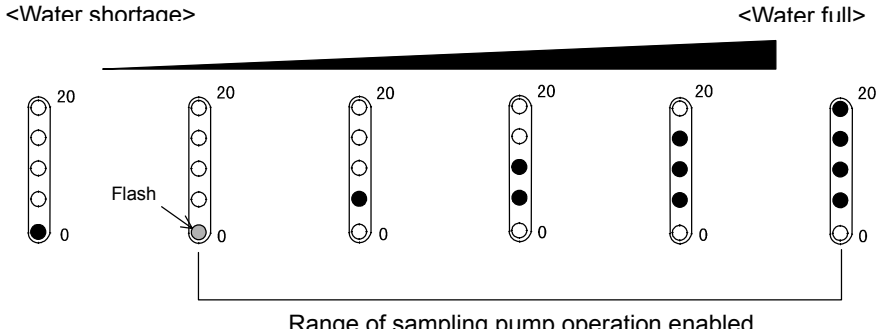
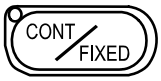
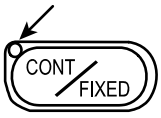
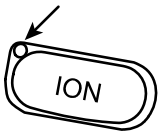
<Failure of raw water pressure and fall of water pressure>

cut turns on and standby of operation status display lamp blinks.

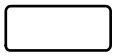
<Error>

Detail of present fault is displayed. See Page 46 “Remedy in Emergency” for detail.

Control Panel

TROUBLE	⑦ Error Display Lamp:	It blinks when operation is in error or system is out of order, and displays its detail on indicator (1).
	⑧ Distilled Water Storage Indicator	Amount of water stored in distilled water tank is displayed in 5 steps by lamp lighting. When water storage is below 2 (ı), yellow lamp at the lower end turns on; therefore sampling of distilled water or ion exchanged water is not allowed for preventing idling of sampling pump as long as this yellow lamp is on. When the lamp at the lower end changes to blinking, distilled water can be sampled. 
	⑨ Pure Water Sampling Procedure Changeover Switch	This is the switch for changing between continuous sampling and specified quantity sampling, and enables specified quantity sampling when pressed, and continuous sampling when pressed again.
	⑩ Sampling Procedure Display Lamp	It turns on when continuous sampling is selected, and turns off when specified quantity sampling is selected.
	⑪ Ion Exchange Water Sampling Switch	For continuous sampling: It turns "ON" when pressed once, allowing sampling of ion exchanged water, and turns "OFF" when pressed again, stopping sampling. For specified quantity sampling: It turns "ON" when pressed, starting sampling of ion exchanged water. When preset sampling quantity is reached, sampling is automatically stopped. When this switch is pressed during sampling, sampling is stopped irrespective of setting.
	⑫ Ion Exchange Water Sampling Display Lamp	Green lamp turns on while ion exchanged water is being sampled.
	⑬ Distilled Water Sampling Switch	For continuous sampling: It turns "ON" when pressed once, allowing sampling of distilled water, and turns "OFF" when pressed again, stopping sampling. For specified quantity sampling: When preset sampling quantity is reached, sampling is automatically stopped. When this switch is pressed during sampling, sampling is stopped irrespective of setting.
	⑭ Distilled Water Sampling Display Lamp	Green lamp turns on while distilled water is being sampled.
X 10 λ λ	⑮ Unit of Sampling Volume	It shows "λ" when sampling volume is displayed on indicator (2). It shows "X 10 λ" when cumulative water feed is displayed on indicator (2).

Control Panel

	⑯ Indicator (2)	It displays as follows: 1. For continuous sampling [---] is displayed. 2. For specified quantity sampling Displays preset sampling quantity. Initial setting value is 0.1 (λ). In sampling, displayed value is decremented according to collected quantity. It returns to preset value as soon as sampling is finished. 3) Display of description of function Displays the description of selected function. a) [Sum]:Display of cumulative water feed b) [unt]:Switching mode of unit of water quality display 4) Display of cumulative water feed Accumulative water feed displays total of distilled water sampling and ion exchanged water sampling. (Initial accumulated water drain and boiler water supply are not included in cumulative water feed.)
	⑰ Function Key	When it is pressed, the function is selected. Description of selected function is displayed on indicator (2).
	⑱ Enter key	In selecting a function, setting is completed by pressing this key. In order to exit function selecting status, this key must be pressed.
	⑲ Up Key	When it is pressed, the following is set: 1. When sampling specified quantity Sampling volume is set. Setting value on indicator (2) is incremented every time this key is pressed. When it is held down, the value keeps on increasing. 2. When choosing a function When this key is pressed, the following can be selected in each function: a) "ON" and "OFF" of cumulative water feed display b) Switching of unit of water quality display
	⑳ Down Key	When it is pressed, the following is set: 1. When sampling specified quantity Sampling volume is set. Setting on indicator (2) is decremented every time this key is pressed. When it is held down, the value keeps on decreasing. 2. When choosing a function When this key is pressed, the following can be selected in each function: a) "ON" and "OFF" of cumulative water feed display b) Switching of unit of water quality display

Setup and Check before Use

⚠WARNING!

1. Check of water supply

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

2. Check of drain

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

3. Check of power supply

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

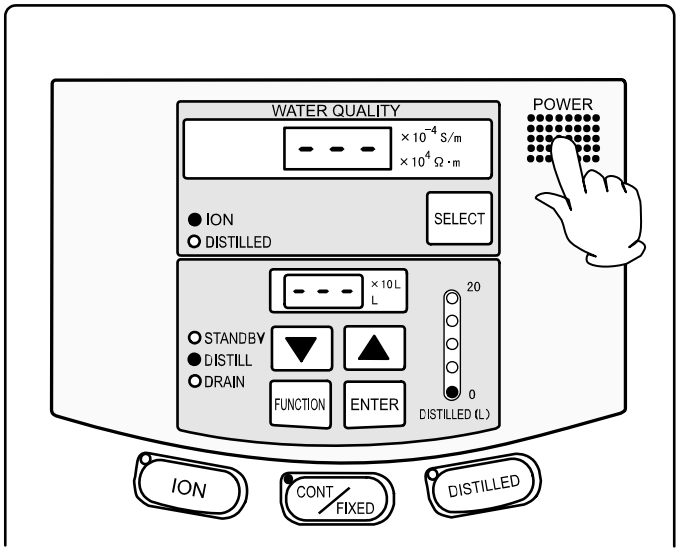
4. Immediately after operation

- 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, soft water resin cartridge, and 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.
- Yellowish colored water may come out through Ion Exchange Resins packed in Soft Water Resin Cartridge at the beginning. This yellowish colored water will be caused by the polystyrene sulfonic acid(PSA) in Ion Exchange Resins only at the beginning and is not the Remarkable phenomenon. This PSA will be stayed inside the boiler at distilling process and never dissolved into the distilled water. However, yellowish colored water can be drained by opening the boiler drain cock around 20 minutes (about 20 litters).

Operation Procedure

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

1. Turning on power

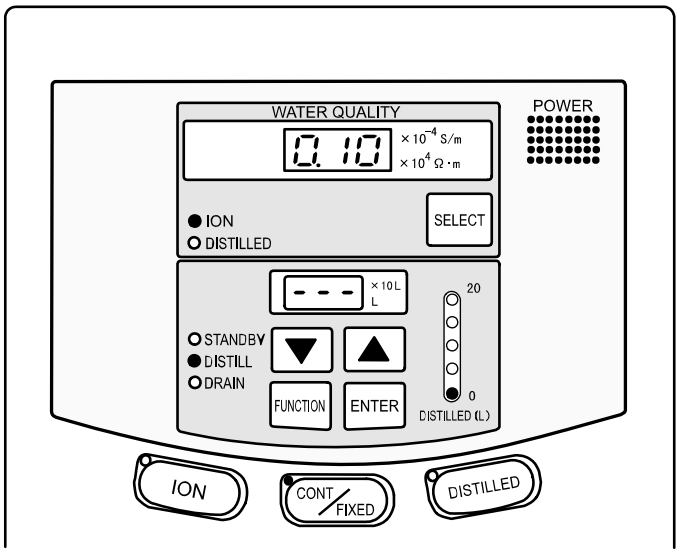


1. Turn "ON" electric leakage breaker.
2. Press the power switch (power supply).

Display on operation panel for about 15 seconds from pressing of power switch to start of distillation:

- Indicator (1) displays [– – –] in blinking.
- Operation status display lamp "Standby" turns off. (However, if power switch is pressed when some time has elapsed since electric leakage breaker is turned "ON", indicator (1) does not display [– – –] .)

2. When more than 15 seconds passes after pressing of power switch

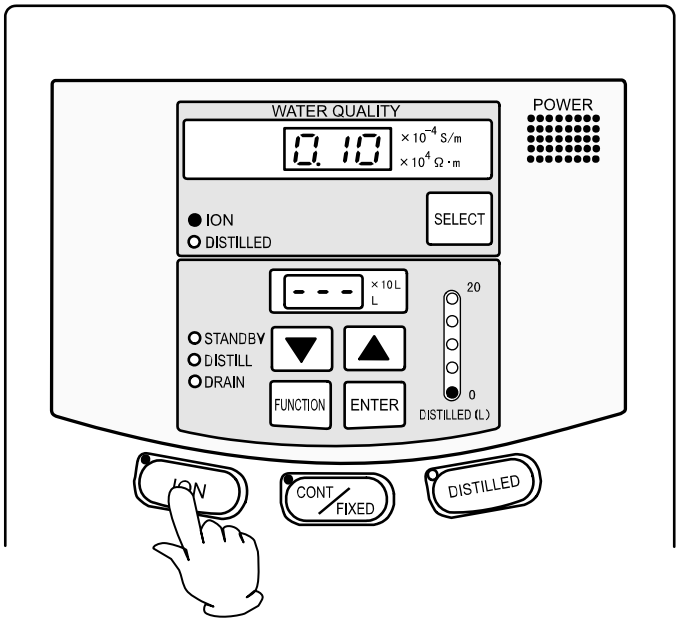


Display on operation:

- Indicator (1) displays electric conductivity of ion exchanged water (Ex. [0.10] .)
- Ion exchange water lights up on measurement electrode display lamp.
- Yellow lamp of initial water shortage lights up on distilled water storage indicator.
- As for operation status display lamp, when water is supplied into boiler to a specified level and initial water supply is completed, green lamp of distillation turns on and distillation is started.

Sampling of Pure Water

Continuous sampling of ion exchanged water



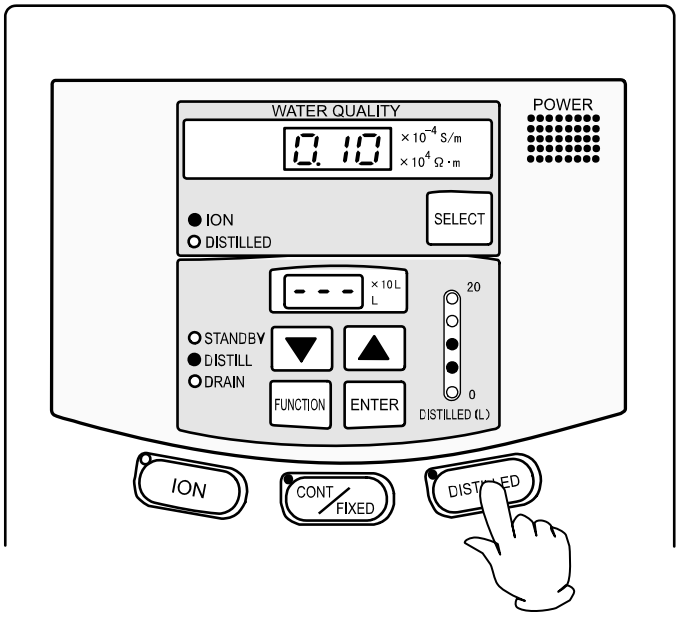
When the ion exchange water sampling switch is pressed once with yellow lamp (water shortage) of distilled water storage indicator off, and sampling procedure display lamp "continuous" on,
Display on operation panel is as follows:

- Ion exchange water sampling display lamp turns on.

When ion exchange water sampling switch is pressed again,
Display on operation panel is as follows:

- Ion exchange water sampling display lamp turns off. (When yellow lamp "Water shortage" of distilled water storage indicator turns on in sampling, sampling is automatically stopped on the moment, and distilled water sampling display lamp also turns off.)

Continuous sampling of distilled water



When distilled water sampling switch is pressed once with yellow lamp (water shortage) of distilled water storage indicator off, and sampling procedure display lamp "continuous" on,
Display on operation panel is as follows:

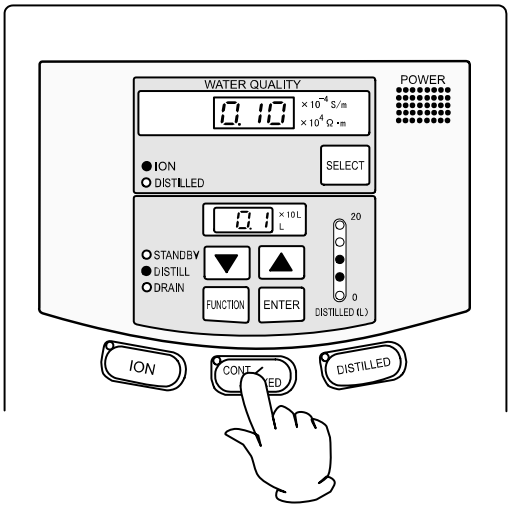
- Distilled water sampling display lamp turns on.

When distilled water sampling switch is pressed again,
Display on operation panel is as follows:

- Distilled water sampling display lamp turns off. (When yellow lamp "Water Shortage" of distilled water storage indicator turns on in sampling, sampling is automatically stopped on the moment, and distilled water sampling display lamp also turns off.)

Sampling Specified Quantity of Ion Exchange Water

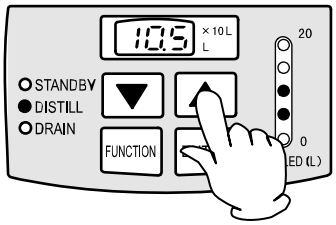
1. Press the sampling procedure changeover switch to turn off "Continuous" lamp.



Display on operation panel:

- Sampling procedure display lamp "Continuous" turns off.
- Indicator (2) displays initial 0.1 , with sampling volume unit "λ" lit up.

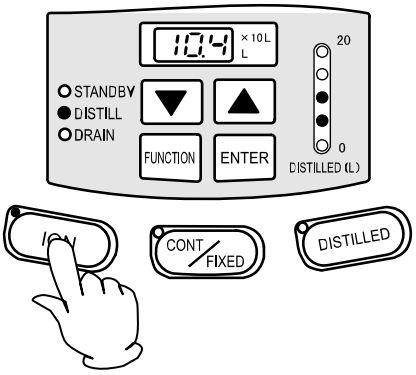
2. Set at desired volume by pressing UP ▲ and DOWN ▼ key.



Display on operation panel:

- Value on indicator (2) is incremented or decremented according to key operation. (Setting is allowed up to 99.9λ.)

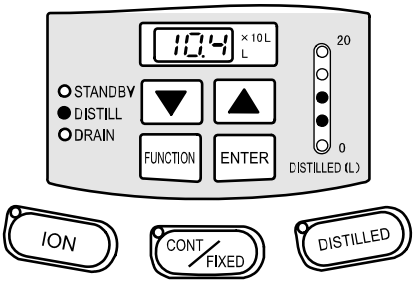
3. Press ion exchange water sampling switch.
Ion exchange water flows out of membrane filter sampling port.



Display on operation panel:

- Ion exchange water sampling display lamp turns on.
- Value on indicator (2) starts decremental counting. (When yellow lamp "Water Shortage" of distilled water storage indicator turns on during sampling, sampling is automatically stopped on the moment, ion exchange water sampling display lamp also turns off, and indicator (2) returns to setting.)

4. When display on indicator (2) is counted in decremental manner up to 0.1 ,
and remaining water feed of 0.1λ is completed,

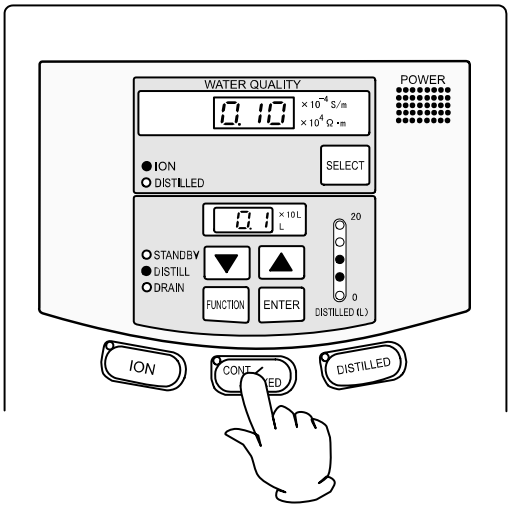


Display on operation panel:

- Ion exchange water sampling display lamp turns off.
- Indicator (2) returns to preset value. (Actual sampling quantity may increase or decrease approx. 10% at the most.)

Sampling Specified Quantity of Distilled Water

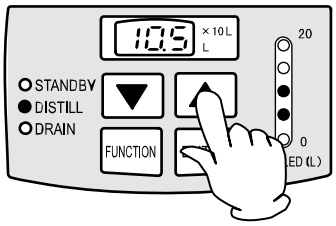
1. Press the sampling procedure changeover switch to turn off "Continuous" lamp.



Display on operation panel:

- Sampling procedure display lamp "Continuous" turns off.
- Indicator (2) displays initial 0.1 , with sampling volume unit "λ" lit up.

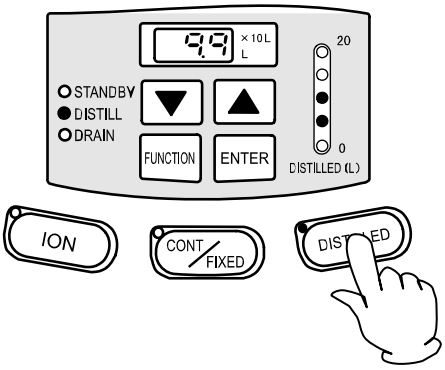
2. Set at desired volume by pressing UP ▲ and DOWN ▼ key.



Display on operation panel:

- Value on indicator (2) is incremented or decremented according to key operation. (Setting is allowed up to 99.9λ.)

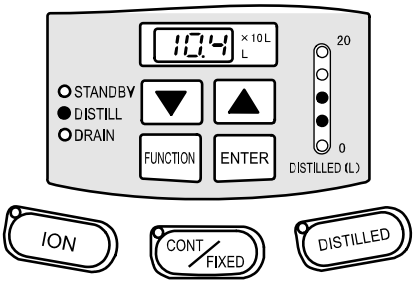
3. Press distilled water sampling switch.
Distilled water flows out of membrane filter sampling port.



Display on operation panel:

- Distilled water sampling display lamp turns on.
- Value on indicator (2) starts decremental counting. (When yellow lamp "Water Shortage" of distilled water storage indicator turns on during sampling, sampling is automatically stopped on the moment, distilled water sampling display lamp also turns off, and indicator (2) returns to setting.)

4. When display on indicator (2) is counted in decremental manner up to 0.1 ,
and remaining water feed of 0.1λ is completed,



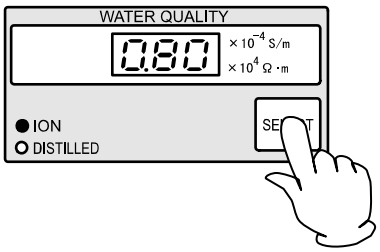
Display on operation panel:

- Ion exchange water sampling display lamp turns off.
- Indicator (2) returns to preset value. (Actual sampling quantity may increase or decrease approx. 10% at the most.)

Display of Water Quality

Switching of water quality electrode of ion exchange water and distilled water

It can be switched every time the select switch for selecting measurement electrode on water quality gauge is pressed.

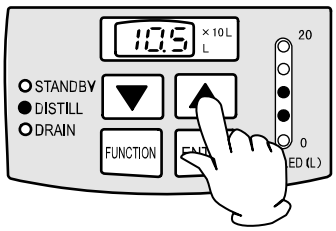


Display on operation panel:

- Ion exchange water and distilled water light up by turns on measurement electrode display lamp. (When power switch is turned "ON", display is always in "X 10^{-4} S/m" of electric conductivity.)

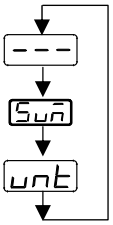
Switching of unit of water quality display

1. Display on indicator (2) changes every time function key is pressed.



Display on operation panel:

- Display on indicator (2) changes as follows:



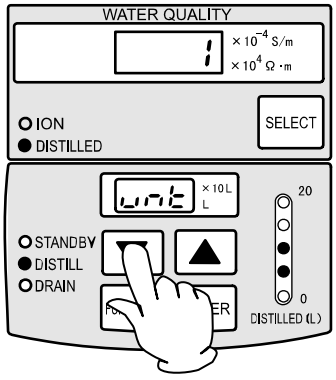
Continuous sampling

Accumulative water feed display mode

Unit of water quality display switching mode

There, provide display of unt.

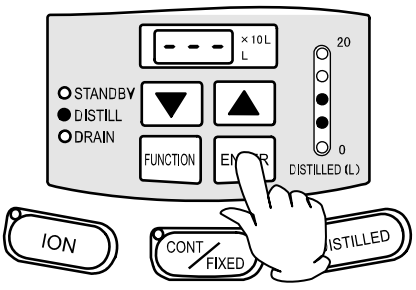
2. Press either UP ▲ or DOWN ▼ key once.



Display on operation panel:

- Unit of water quality display changes to unit display of specific resistance (X 10^{-4} Ω·m).
- Indicator (1) also displays water quality by specific resistance.
  The range 18.2 to 1.0 (X 104 Unit of water quality display changes to unit display of specific resistance (X 10^{-4} Ω·m) is displayed in integer 18 to 1.

3. Press the enter key, then unit is fixed, and control exits function status.



Display on operation panel:

- Indicator (2) displays ---.

(When power switch is turned off and on, unit of water quality display returns to electric conductivity.)

Display of Water Quality

Measurement of Electric Conductivity

The lamp of the water quality meter on the operation panel indicates the electric conductivity at the outlet of the ion exchange resin cartridge. Use this indication as the reference for the timing of replacing the ion exchange resin cartridges. Be sure to read the indication when the electrodes dip in water; namely while the ion exchange water passes. In the following cases, the electrodes do not dip in water and air bubbles affect the operation, thus causing incorrect readings.

1. In the initial stage of operation, and when the system is stopped
2. Immediately after pre-treatment cartridge, soft water resin cartridge, and ion exchange resin cartridge are replaced.
3. Immediately after start of distillation process

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 × 10^4 Ω・m(18.3MΩ・cm)25℃
(Note that specific resistivity 18 to 1X10^4 Ω・m is displayed in integer, and decimal portion is not displayed.)
ρ =0.055 × 10^{-4}S/m(0.055 μ S/cm)25℃

Quality of ion exchange water and distilled water

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

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

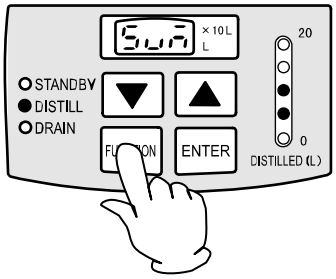
  1. Ion exchange water
  Most of electrolyte in water is removed, and water with the lowest electric conductivity is obtained. However, non-electrolyte cannot be removed. In addition, slight fall of purity is found while resin is new and when water is fed again after halt of system.

  2. Distilled water
  Electrolyte and non-electrolyte can be removed in average except for low boiling point substance such as ammonia. However, carbon dioxide gas in the atmosphere is absorbed and carbon oxide is generated in the process of manufacturing (condensing/storing), and so the electric conductivity is worse than ion exchange water, that is 1 to 2.5 X 10-4 S/m (1 to 2.5 μS/cm) at 25C, and represents weak acid (pH5 to 6).
  See "2 - Common item (11) Water" of JIS K0102 (Plant drain test procedure) for removal of dissolved gas (oxygen and carbon dioxide) in pure water.

Display and Reset of Accumulative Water Feed

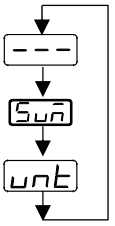
Check accumulative water feed for standard of replacement timing of ion exchange resin, soft water resin cartridge, and pre-treatment cartridge.

1. Display on indicator (2) changes every time function key is pressed.



Display on operation panel:

- Display on indicator (2) changes as follows:



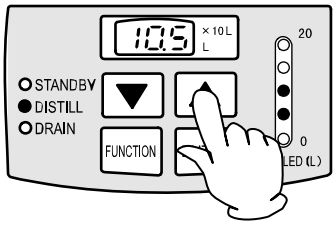
Continuous sampling

Accumulative water feed display mode

Unit of water quality display switching mode

There, provide display of [Sun].

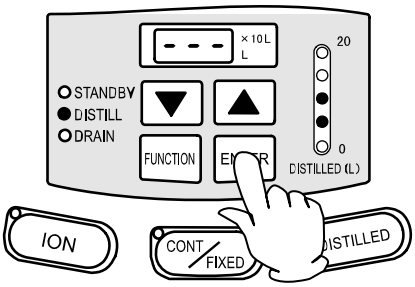
2. Press either UP [▲] or DOWN [▼] key once.



Display on operation panel:

- Accumulative water feed is displayed on indicator (2).
  Accumulative water feed is X 10 liters.

3. Press the enter key, then unit is fixed, and control exits function status.

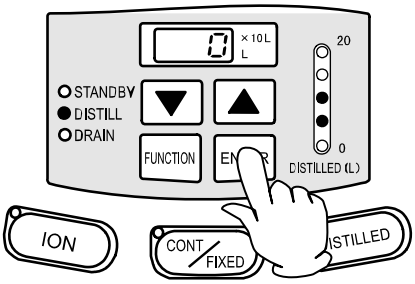


Display on operation panel:

- Indicator (2) displays [---].

Reset of accumulative water feed

Allow display of accumulative water feed on indicator (2), and press the pure water sampling procedure changeover switch [CONT/FIXED] and the enter key [ENTER] at the same time.



Display on operation panel:

- Indicator (2) displays [0].

WARNING!

If a problem occurs

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

During a thunder storm

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

Take enough care in handling detergent (liquid)

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

Do not step on this unit

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

Do not put anything on this unit

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

In power failure

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”).

Daily Inspection and Maintenance

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

Maintenance/check items	Reference for timing	Remarks
Replacement of Pre-treatment Cartridge	6 to 12 months	Processing capacity: Approx. 5000 liters of city water in Tokyo. When quality of raw water is poor, replace the cartridge sooner.
Replacement of Soft Water Resin Cartridge	6 months	Processing capacity: Approx. 3000 liters of city water in Tokyo. When quality of raw water is poor, replace the cartridge sooner.
Replacement of Ion Exchange Resin Cartridge	When C1 is displayed on indicator (1) or in 6 months	Processing capacity: Replacement together with soft water resin cartridge is recommended.
Replacement of membrane filter	3 months	Processing capacity: Approx. 500 liters of pure water feed. When sampling flow rate is small, replacement timing has come.
Washing of distiller	3 months	When quality of raw water is not good, wash the unit sooner.
Washing of water supply hose filter	6 months	
Replacement of hose	2 years	Check the connection once a month.
Drain of distilled water tank	3 months	Drain water as well when the unit is put out of use for a long time.

Replacement of Pre-treatment Cartridge

- See Page 13 "20. Secure the pre-treatment cartridge securely" for replacement procedure.
- Dispose of replaced cartridge as incombustible.
- When the cartridge is put to use without replacement, life span of soft water resin cartridge and ion exchange resin cartridge becomes short.
- Much scale is deposited on boiler and heater, which causes decrease of collected distilled water and damage to heater.

Replacement of Soft Water 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 12 "19. Install the ion exchange resin cartridge (CPC-N) and soft water resin cartridge (OWA30) securely".
- Dispose of replaced cartridge as incombustible.
- 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.

Daily Inspection and Maintenance

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 12 "19. Install the ion exchange resin cartridge (CPC-N) and soft water resin cartridge (OWA30) securely".
- Dispose of replaced cartridge as incombustible.
- Yellowish colored water may come out through Ion Exchange Resins packed in Soft Water Resin Cartridge at the beginning. This yellowish colored water will be caused by the polystyrene sulfonic acid(PSA) in Ion Exchange Resins only at the beginning and is not the Remarkable phenomenon. This PSA will be stayed inside the boiler at distilling process and never dissolved into the distilled water. However, yellowish colored water can be drained by opening the boiler drain cock around 20 minutes (about 20 litters).

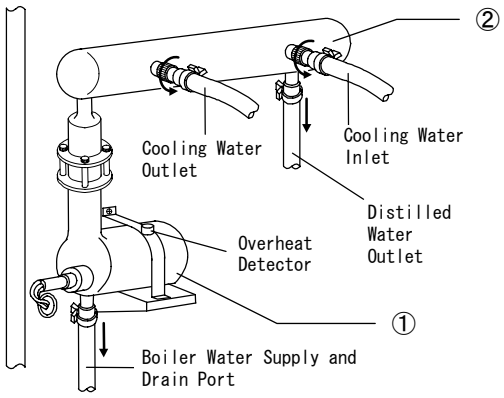
Replacement of Membrane Filter

- See Page 14 "21. Connect the membrane filter securely" for replacement.
- Dispose of replaced filter as incombustible.
- When membrane filter is used without replacement, sampling of pure water may be decreased, or pump pressure switch may work to disable sampling of pure water.

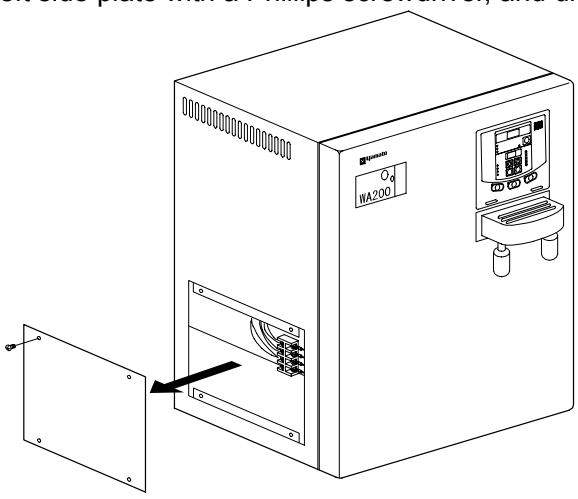
Washing of Distiller

Dismounting of Distiller

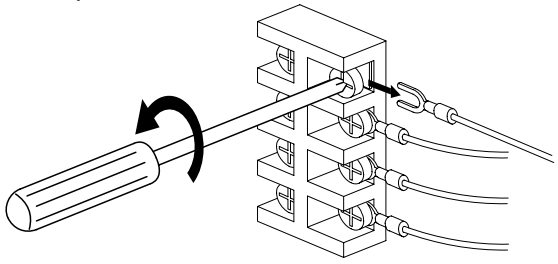
1. Turn "OFF" the electric leakage breaker of the unit.
2. Close the tap.
3. Check that the boiler is not hot (longer than 30 minutes after the breaker is turned "OFF"), then open the front door of the unit, and open the boiler water drain cock.
4. Disconnect the hose connected to the boiler ① and condenser 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. Turn the nut at the inlet and outlet of cooling water counterclockwise for removing. Packing is placed inside those nuts. Be careful not to lose it.



5. Remove 4 screws on the left side plate with a Phillips screwdriver, and dismount the left side plate.



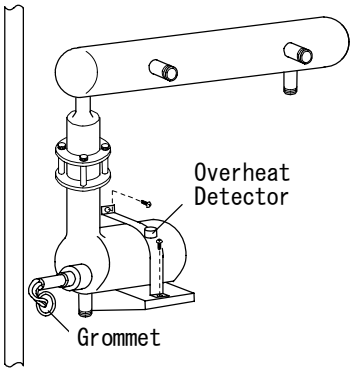
6. Loosen 4 screws on the right of terminal block located at the right top of the body frame with left side plate dismounted by use of Phillips screwdriver, and disconnect the heater lead terminal.



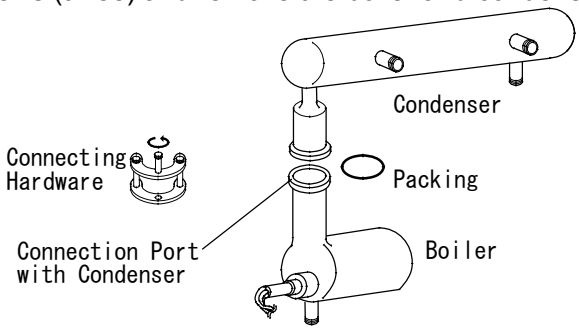
Washing of Distiller

7.

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



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



Washing of boiler

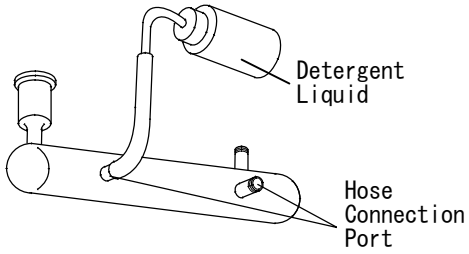
1. Adjust detergent liquid.
   1) Prepare approx. 2 liters of hot water at 50 to 60°C.
   2) Add attached scale detergent (Orgazor) approx. 200g to hot water prepared in 1) and agitate well.
2. Seal the hose connection port at the bottom of boiler (boiler supply and drain port) by use of rubber stopper,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

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

Washing of Distiller

Washing of Condenser

1. Pour detergent liquid into the cooling pipe of condenser.
   (See Page 35 “Washing of boiler” for formulating detergent liquid..)



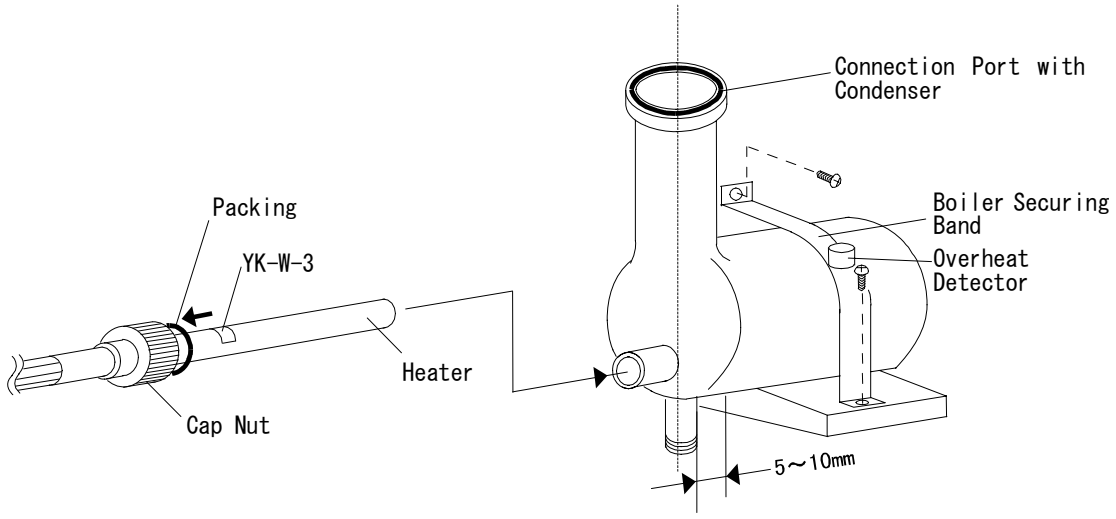
2. If detergent liquid should flow out of hose connection port, seal with rubber stopper. Most fur can be removed in 4 - 5 hours approximately.
3. Drain detergent liquid, and then wash enough with city water.

Handling of Detergent Liquid (also refer to Page 31 “Handling Precautions”)

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

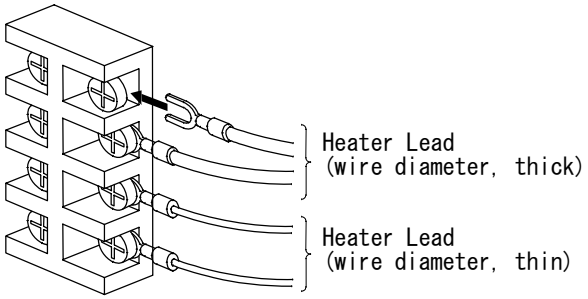
Installation of boiler

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



Washing of Distiller

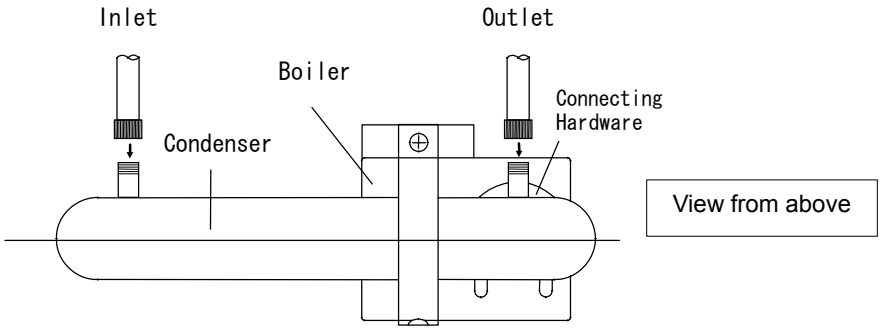
2. Attach 4 heater lead terminals to the terminal block.



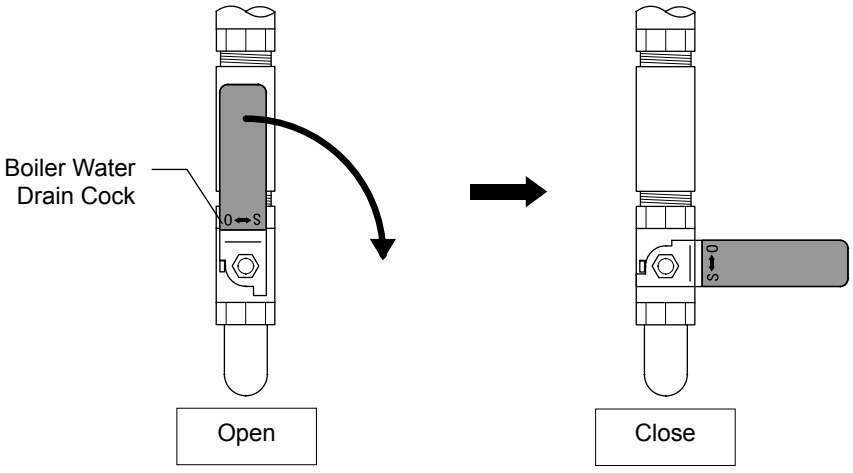
3. Install the left side plate on the body.
4. Insert the hose to the boiler water supply and drain port, and secure with the hose band.

Installation of condenser

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



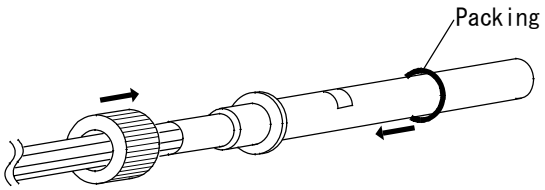
2. Connect the hose respectively to the cooling water inlet, outlet, and distilled water outlet of condenser.
3. Close the boiler water drain cock.



Replacement of Heater

- If the heater should be disconnected or damaged due to deposit of scale, replace it by the procedure below. (Also refer to Page 34 “Washing of Distiller” in working.)

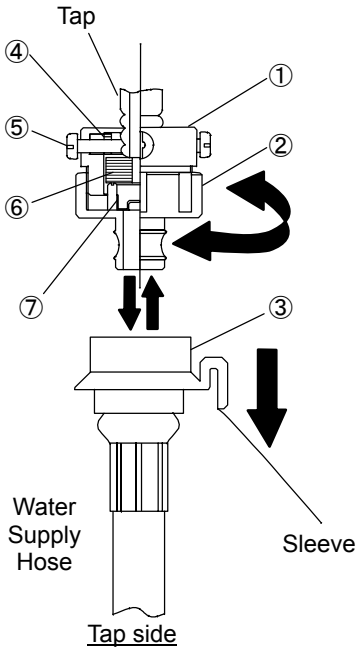
1. Turn "OFF" the electric leakage breaker of this unit.
2. Close the tap.
3. Turn "OFF" electric leakage breaker, and when more than 30 minutes has passed, open the front door of this unit, and open the boiler water drain cock.
4. Open the left side plate of the body, loosen the four screws on the right 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 electric leakage breaker of this unit.
15. Ensure that the standby lamp on the operation panel is on.
16. Press the power switch (power supply).

Washing of Water Supply Hose Filter

1. Turn "OFF" the electric leakage breaker of this unit, then close the tap and disconnect the water supply hose.
2. Remove the plug ② from ring ① as turning.
3. Wash the filter ⑦ inserted in the plug with city water.
4. When clogging is heavy, push out the filter through the hole on sleeve side of plug by use of flat face of a pencil, etc.
5. Wash the filter with spray, etc.
6. Assemble by reversing the procedure.



Connection Port Body

①Ring
②Plug
③Socket
One-touch Joint
④Spacer
⑤Mounting Screw
⑥Packing
⑦Filter

Replacement of Hose

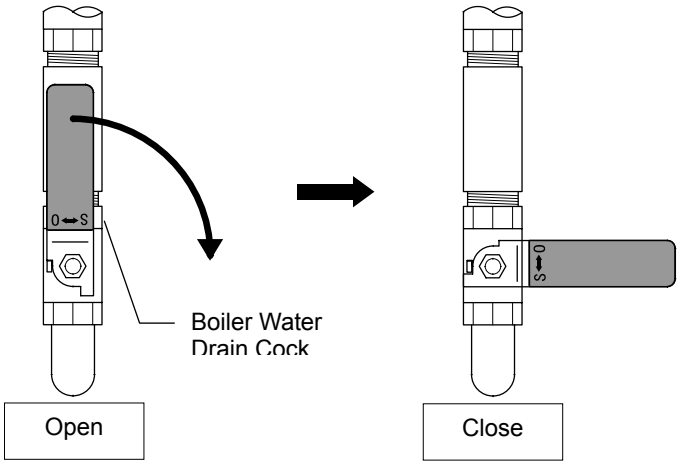
- Be sure to use a hose specified by Yamato Scientific for replacement.

When not using this unit for long term / When disposing

- If this unit is to be put out of service for a long time, be sure to turn of the electric 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:

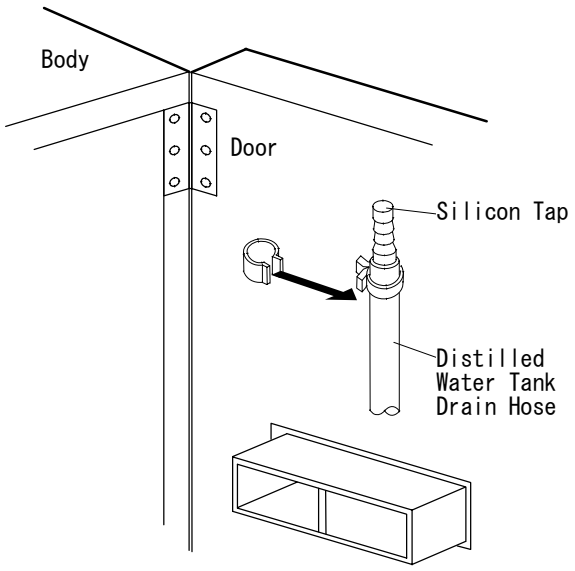
Boiler Water Drain

1. In draining boiler water, turn off the electric 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.



Drain of Distilled Water Tank

1. Make sure that the electric leakage breaker of this unit is turned off, then open the front door.
2. Distilled water tank drain hose is found at the left top on the rear face of front door. Pull it out.
3. Remove the silicon stopper and lay down the hose, then water left in the distilled water tank flows out. Check the quantity of water left in the tank, and prepare a container for draining.
4. Note that water in the tank is not cleared away if the distilled water tank drain hose is placed higher than the bottom of the tank in progress.
5. When drainage is finished, be sure to attach the silicon stopper securely at the tip, and incorporate in the original folder.



Long storage and disposal

When not using this unit for long term / When disposing

⚠WARNING!

When disposing…

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

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

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

Environmental protection should be considered

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

Component Name	Material
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	Made of iron, bonded steel plate, melamine resin baking finish
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 Leg	Synthetic rubber
Condenser Holder	Brass
Production Plates	Polyester
Main Components of Water Circuit System	
Boiler	Hard glass
Condenser	Hard glass
Float Cylinder	Polypropylene
Pure Water Tank	Polypropylene
Drain Port	Polypropylene
Float Cylinder Branch Pipe	Polypropylene
Electrode Holder	Polypropylene
Water Sampling Port	Polypropylene
Water Sampling Cover	Alkyl benzene sulfonate (ABS) resin

Long storage and disposal

When not using this unit for long term / When disposing

Component Name	Material
Main Components of Water Circuit System	
Resin Cylinder Case	Polypropylene
Ion Exchange Resin	Polystyrene Resin
Soft Water Resin	Polystyrene Resin
Water Quality Gauge Electrode	Titan
Heater	Ceramic
Heater Mounting Nut	Teflon
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	Polyacetal
Power Cord, Wiring Material, etc.	Wiring material and board coated by synthetic rubber and resin

Trouble display and description of error code

Safety Device	Display unit	Display	Cause	Phenomenon in operation	Remedy
Water leakage detection	Indicator (1)	**E.31**	Water leakage	Control of all equipment such as heater and solenoid valve is turned "OFF".	Turn "OFF" the breaker, then check piping parts. (See "Remedy for Trouble" on P. 45.)
Heater overheat	Indicator (1)	**E.32**	Overheat of heater	Control of all equipment such as heater and solenoid valve is turned "OFF".	Make a call for service.
Float switch fault detection	Indicator (1)	**E.34**	Distilled water tank float switch abnormal	Control of all equipment such as heater and solenoid valve is turned "OFF".	Make a call for service.
Abnormal water level detection	Indicator (1)	**E.35**	Abnormal water level of float cylinder	Control of all equipment such as heater and solenoid valve is turned "OFF".	Check that boiler water drain cock is not opened. If fault should be detected when the cock is closed, make a call for a service.
Float switch fault detection	Indicator (1)	**E.36**	Float cylinder float switch abnormal	Control of all equipment such as heater and solenoid valve is turned "OFF".	Make a call for service.
Electronic circuit fault detection	Indicator (1)	**E.15**	Trouble on electronic circuit	Control of all equipment such as heater and solenoid valve is turned "OFF".	Make a call for service.

In trouble, indicator (1) displays an error code in lighting, and also trouble display lamp "TROUBLE" blinks. Contact the dealer or Yamato Scientific Service Office.

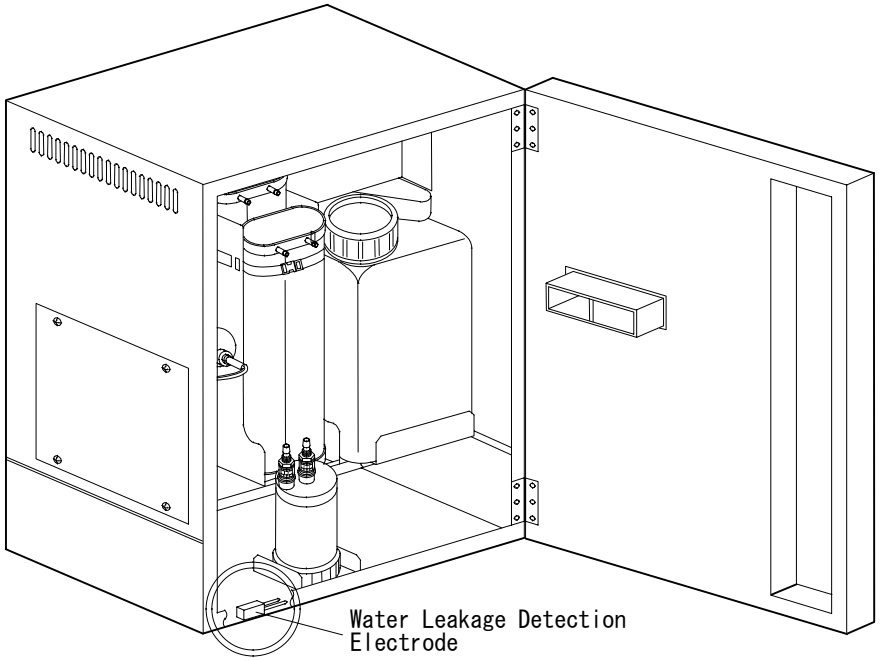
Display of Trouble Other than Error Code

Safety Device	Display unit	Display	Cause	Phenomenon in operation	Remedy
Water quality fault detection	Indicator (1)	C 1	When quality of ion exchange water falls below specified value (1 X 10^{-4} S/m or above).	Normal operation is performed except that alarm display C1 is repeated.	Life of ion exchange resin is exhausted, which is not a trouble of system. Replace with new one.
	Indicator (1)	C 3	When quality of distilled water falls below specified value (10 X 10^{-4} S/m or above).	Normal operation is performed except that display on the left is shown when pertinent electrode is chosen.	Life of soft water resin is exhausted, which is not a trouble of system. Replace with new one.
	Indicator (1)	. . .	Quality of water falls below measurable range.	Distillation operation and ion exchange water collecting operation are stopped temporarily.	C1 and C3 are also displayed at the same time. Follow respective remedy.
Sensor fault detection	Indicator (1)	---	No water on measurement electrode Break in electrode	Distillation operation and ion exchange water collecting operation are stopped temporarily.	It may occur in progress of system operation; while ask for service if it does not disappear long when water is fed.
	Indicator (1)	cut **"Standby"** lamp blinking	Water failure or fall of raw water pressure When raw water pressure falls below 50kPa (0.5 kgf/cm^2)	Distillation operation and ion exchanged water collecting operation are stopped temporarily.	Check raw water pressure and ensure that tap is opened. Operation will be restarted when raw water pressure is recovered.
	Measurement electrode display lamp	Blinking	Break in measurement electrode temperature compensation thermistor	When corresponding electrode is selected, value without temperature compensation is displayed.	Ask for service office soon.

Remedy for Trouble

Remedy when water leakage detection E.31 lights up

1. Turn "OFF" the electric leakage breaker on the right side of body.
2. When restarting after the faulty portion is repaired, wipe off water accumulated at the bottom of system, dry up, remove the electric leakage detection electrode, and dry up enough.
3. Be sure to reset the electrode to the original condition.
4. Close the door.
5. Turn "ON" the electric leakage breaker and press the power switch. Normal operation is started because faulty portion is repaired.



Before call us...

Condition	Check the following.
Water is not supplied.	• Defect of boiler 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.	• Defective float switch • Defective boiler water supply solenoid valve
No water is supplied to boiler.	• Defective boiler water supply solenoid valve • Defective float switch • Clogging of pre-treatment cartridge • Opened boiler water drain cock
Heater does not turn ON.	• Defective float switch • Break in heater
Cooling water does not flow.	• Defective cooling water solenoid valve
Initial accumulated water is not drained.	• Initial accumulated water drain solenoid valve defective
Distilled water is not stored.	• Initial accumulated water drain solenoid valve defective • Defective piping
Distillation does not stop.	• Defective float switch
Water cannot be collected.	• Clogging of membrane filter • Ion exchanged water/Distilled water sampling solenoid valve defective • Sampling pump defective • Piping defective

Remedy in Emergency

Error Sign/Cause

This unit is equipped with self-diagnosis function onboard. If fault in use or trouble of system should occur, alarm lamp on the operation panel lights up. When alarm is issued, turn off the electric leakage breaker of this unit, and close the tap.
See "Trouble display and description of error code" on Page 43 for detail of fault sign.

E.31 blinking Error lamp blinking	E.32 blinking Error lamp blinking	E.34 blinking Error lamp blinking
Water leakage	Overheating of heater	Distilled water tank float switch is defective.

E.35 blinking Error lamp blinking	E.36 blinking Error lamp blinking	E.15 blinking Error lamp blinking
Water level of boiler is abnormal.	Boiler water level control float switch is defective.	Electronic circuit system is defective.

Procedure for Remedy

When these error codes are displayed, record the error code, immediately turn off power, and close the tap. If fault should occur, parts must be replaced or system checked. Contact your dealer or Yamato Scientific sales office, or customer support center. In making contact, be sure to inform us the error code.

When power failure occurs…

- If the device is stopped due to power failure in operation and power is supplied, system is placed in "Standby" status. In restarting operation, start from ("1. Turning on power" on P. 24).

In Case of Request for Repair

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

< Check following items before contact >

- ◆ Model Name of Product
- ◆ Production Number
- ◆ Purchase Date

} See the production plate attached to this unit.

- ◆ About Trouble (in detail as possible)

Minimum Retention Period of Performance Parts for Repair

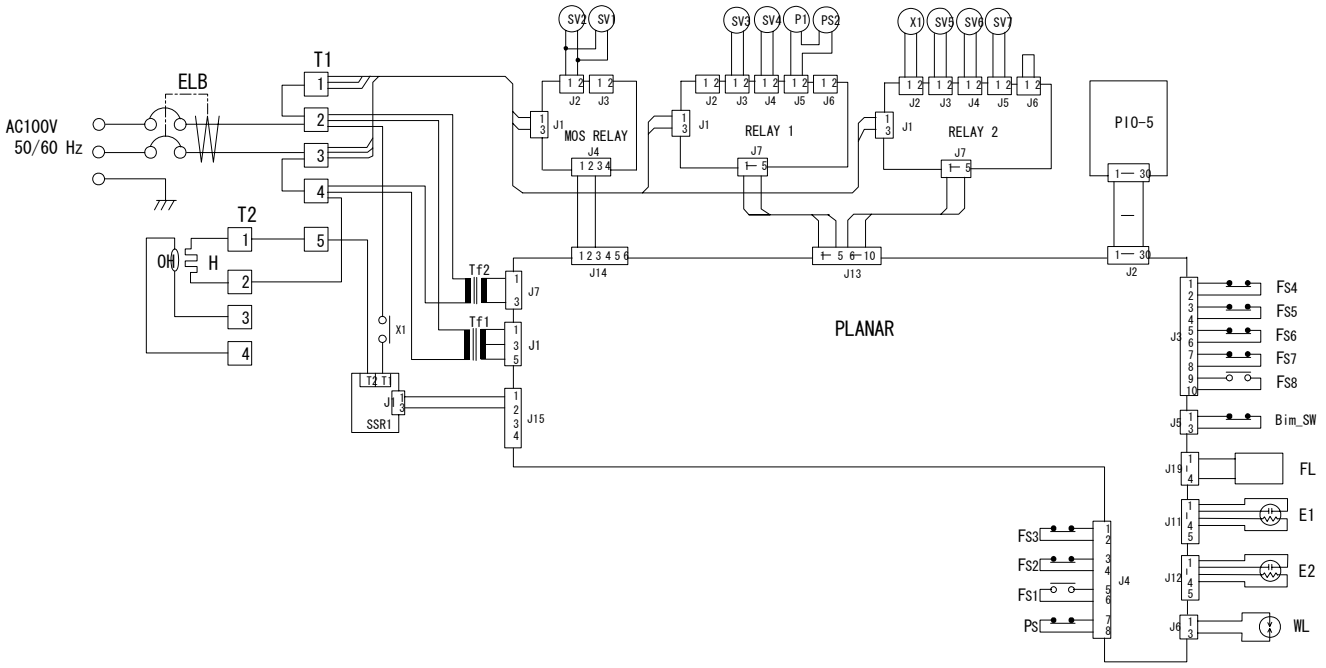
The minimum retention period of performance parts for repair of this unit is 7 years after discontinuance of this unit.
The "performance part for repair" is the part that is required to maintain this unit.

Specification

Model			WA200
Performance	Collecting method		Distillation ⇒ Ion exchange ⇒ Filtering
	Sampled pure water		Distilled water/Ion exchange water
	Quantity of distilled water		Approx. 1.8λ/h
	Sampling flow rate		1λ/min. or more (ion exchanged water/distilled water)
Configuration	Distiller	Boiler	Super hard glass
		Condenser	Super hard glass
		Heater	Ceramic heater 1.4kw
	Distilled water storage tank		Made of polyethylene, 20λ
	Raw water side filter		Pre-treatment cartridge (PWF-1), Activated carbon + Hollow yarn film 0.1μm
	Water softener		One-touch connection cartridge type (OWA30), quantity of resin 3λ
	Ion exchange resin cartridge		One-touch connection cartridge type (CPC-N), mixed floor type, quantity of resin 3λ
	Membrane filter		Filtering precision (OWN10) 0.1μm
	Water quality gauge		Automatic temperature compensation, digital display (Electric conductivity/Specific resistance switching system) • 0.05 to 300 x 10^{-4} S/m•25℃(Display of electric conductivity) • 18 to 0.1 x 10^{4}Ω・25℃ (Specific resistance displayed in integer between 18 and 1)
	Water sending pump		Magnet pump
	Display of tank water level		Display on LED in 5 steps
	Sampling volume setting range		0.1～99.9λ
Standard	Raw water pressure range		0.5×100 kPa 5×100kPa（0.5 to 5 kgf／cm^2）
	Power supply (50/60 Hz)		100V AC 15A
	External dimension (*) (Width X Depth X Height)		570 x 455 (590: including sampling port) x 730 (mm)
	Weight		Approx.50 (kg)
Attached mechanism			• Automatic control of cooling water quantity • Prevention of baking heater with no load • Prevention of heater overheat • Detection of water leakage • Detection of water failure • Electric leakage breaker • Initial boiled water drain • Detection of distilled water tank float switch fault • Distilled water sampling volume setting mechanism • Ion exchanged water sampling volume setting mechanism
Accessories			• Water supply hose, drain hose, and connection assembly: 1 respectively • Operation manual: This manual • Certification sheet: 1 • Hose clamp:1 • Scale washing agent (1kg): 1 • Pre-treatment cartridge: 1 • Soft water resin cartridge: 1 • Ion exchange resin cartridge: 1 • Membrane filter: 2 • Seal tape: 1
Optional accessories (Model/Product code)			• Water supply port unit (OWH10/253686) • Drain trap (OWI10/253211) • Pressurizing pump (OWJ10/253220) • Frame (AS200/253175)

* : The projection is not included for external dimensions.

Wiring Diagram



Symbol	Part name	Symbol	Part name
E1	Ion exchange water quality electrode	SV5	Ion exchange water sampling solenoid valve
E2	Distilled water quality electrode	SV6	Cooling water solenoid valve
ELB	Earth leakage breaker	SV7	Distilled water sampling solenoid valve
FL	Flow rate sensor	Bim_SW	Overheat detection
FS1	Heater control float switch	P1	Water sampling pump
FS2	Boiler water level control float switch	PIO-5	Operation board
FS3	Boiler overheat detection float switch	PLANAR	Control board
FS4	Water level detection float switch	RELAY1	Relay board
FS5	Water level detection float switch	RELAY2	Relay board
FS6	Water level detection float switch	SSR	SSR board
FS7	Water level detection float switch	T1	Terminal block
FS8	Water level detection float switch	T2	Terminal block
H	Heater	Tf1	Transformer
MOS RERAY	MOS relay board	Tf2	Transformer
SV1	Boiler water Level Control solenoid valve	WL	Water leakage detector
SV2	Boiler water supply solenoid valve	X1	Relay
SV3	Initial accumulated water drain solenoid valve	PS1	Pressure switch (raw water)
SV4	Boiler water drain solenoid valve	PS2	Pressure switch (pump)

Replacement Parts Table

Part Name	Code No.	Specification	Manufacturer
Ion exchange water quality electrode	5-13-000-0001	GZY WG240/260	Yamato Scientific
Distilled water quality electrode	1-01-189-0001	WG25･220	Yamato Scientific
Earth leakage breaker	2-06-000-0020	FG32R/20	Fuji Denki
Flow rate sensor	1-26-001-0001	ND05-PATAAC-8	Tohken
Heater control float switch	2-04-002-0004	NV-120YA	Tokyo Seigyo Kiki
Boiler water level control float switch	2-04-001-0003	FD-113	Tokyo Seigyo Kiki
Boiler overheat detection float switch	2-04-002-0003	NVH-112YA	Tokyo Seigyo Kiki
Water level detection float switch	2-04-003-0003	FR-1-100	Tokyo Seigyo Kiki
Heater	2-42-001-6003	YK-W-3	Yamato Scientific
MOS relay board	1-24-011-0001	HITEC IV WP	Yamato Scientific
Boiler water supply solenoid valve	3-02-001-0018	AG33-02-2-AC100V	CKD
Initial accumulated water drain solenoid valve	3-02-003-0001	J241-120	CKD
Boiler water drain solenoid valve	3-02-003-0003	J244-023	CKD
Ion exchange water sampling solenoid valve	3-02-003-0001	J241-120	CKD
Cooling water solenoid valve	3-02-007-6019	AB21-02-2-AC100V	CKD
Distilled water sampling solenoid valve	3-02-003-0001	J241-120	CKD
Overheat detection (110℃)	1-03-000-0007	TH-53F580FSWA	Yamato Scientific
Water sampling pump	2-15-006-0005	WP-LK8-100V	Iwaki
Operation board	1-24-000-0074	HITEC IV WP	Yamato Scientific
Control board	1-24-000-0039	HITEC IV WP	Yamato Scientific
Relay board	1-24-000-0094	HITEC IV WP	Yamato Scientific
SSR board	LT00028423	SSR-01	Yamato Scientific
Terminal block (T1)	2-07-023-0002	MO11-OFX 5P	Toyo Giken
Terminal block (T2)	2-07-008-0003	TB-20C 4P	Sakatsume
Transformer (Tf1)	2-18-000-0033	For HITEC IV WP 100V	Yamato Scientific
Transformer (Tf2)	2-18-000-0034	HT-601	Toyoden
Water leakage detector	WG261-41430		Yamato Scientific
Relay	2-05-000-0056	G7L-1A-TUB 100V	OMRON
Pressure switch (raw water)	2-04-004-0001	ST-B-BR1-N2	Sanyo Keiki
Pressure switch (pump)	2-04-004-0005	PU3-03-2CWA	UEDA
Pressure reduction valve	3-15-002-0001	B2519-2C-N	CKD
Condenser	WA200-30200		Yamato Scientific
Boiler	WA200-30210		Yamato Scientific
Boiler water Level Control solenoid valve	3-02-003-0001	J241-120	CKD

List of Dangerous Substances

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

EXPLOSIVE

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

FLAMMABLE

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

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

Responsibility

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

Note

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

Instruction Manual for

Water Purifier, Auto Still®
Model WA200
Version 7 JAN. 11, 2011
Revision FEB . 13, 2012

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