Demineralizers

Still, water, models
WA500/WA570
WA710/WA730

First Edition

- Thank you very much for buying Yamato Scientific AUTO STILL® series WA500/570/710/730 model.
- For proper use of this unit, pleas read the instruction manual and warranty thoroughly before operation. Keep both for any future references.

  Warning : Read and apprehend the important warning signs in this instruction prior to use.

Yamato Scientific Co., LTD.

This paper has been printed on recycled paper.

Contents

Explanation of Graphic Indication

Graphic Indication

This instruction manual and our products apply various graphic indications for safety use. Ignoring thise indicators or improper handling of the unit can cause such situation as indicated below. Please read and apprehend the following contents.

Warning Warning indicates possibility of serious injuries (1) or death.

Caution Caution indicates possibility of injuries (2) on person or damages on property (3).

(1) Serious injuries mean any injuries, electric shocks, bone fractures and poisoning causing after effects or requiring hospitalization or long outpatient treatment.
(2) Injuries mean any injuries and electric shocks not requiring hospitalization or long outpatient treatment.
(3) Damages on property mean any damages on facilities, machinery, buildings, etc.

Meaning of graphic indications

It shows conducts to be surely done.

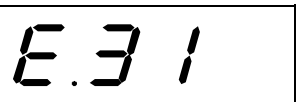
It shows warnings or cautions.

It shows prohibited conducts.

Emergent Troubleshooting

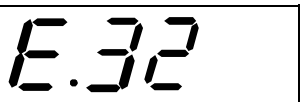
Identification of "TROUBLE" and error codes / Identification of causes

This unit has self-diagnosis function. If any operational abnormalities or machine troubles should occur, the operation panel blinks "TROUBLE" and shows the error code.
If this occurs, check the error code, and immediately disconnect the breaker and turn the tap off.



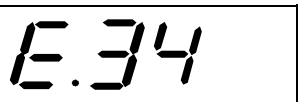
The TROUBLE lamp also blinks.

Water leakage



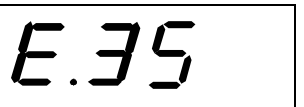
The TROUBLE lamp also blinks.

Heater overheating



The TROUBLE lamp also blinks.

Defect of the float switch for the distilled water tank.

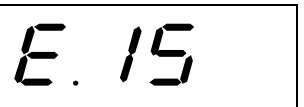


The TROUBLE lamp also blinks.

Abnormal boiler water level

The TROUBLE lamp also blinks.

Defect of the float switch to control the boiler water level.



The TROUBLE lamp also blinks.

Defect in the electric circuit

If any error codes should come up, note the error code and turn the power and the faucet off immediately. Any such troubles require parts exchange or check on the device. Contact the seller or Yamato Scientific's Technical Service Department and tell the error code.

Warning

Do not use this unit in flammable or explosive gas environments.

This unit is not explosive proof. Never use this unit in flammable or explosive environments to prevent fire or explosion.

Never fail to ground the unit.

Be sure to ground the unit correctly, or electric leak could cause shock or fire.

Do not use this unit if malfunction occurs.

If smoke or any strange odor should disburse from the unit, switch off power to prevent fire or electric shock.

Do not bundle the power cable during use.

Overheat or fire can occur if the power code is bundled in use of the unit.

Do not damage the power code.

Forcibly bending, pulling or wrenching damages the power code, and can cause a fire or electric shock.

Do not disassemble or remodel this unit.

Disassembling this unit can cause a fire, electric shock or other crisis. Never disassemble or remodel this unit.

Do not touch hot area.

Pay attention not to get scalded. Some areas of the boiler are hot during or after operation. Make sure if the boiler is cool enough before you start maintenance of the heater or other devices.

Caution

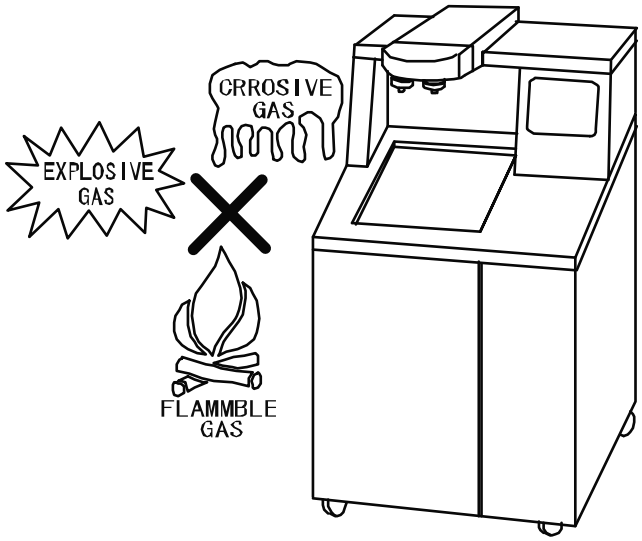
If it begins to thunder.

If it begins to thunder, switch the power off. Neglecting this can result in fire or electric shock.

Warning

Do not Use this unit in flammable or explosive gas environments.

This unit is not explosion proof. Never use this unit in flammable or explosive gas environments. Electric arc occurs when you switch the unit “ON” and “OFF”, and can cause a fire or explosion.

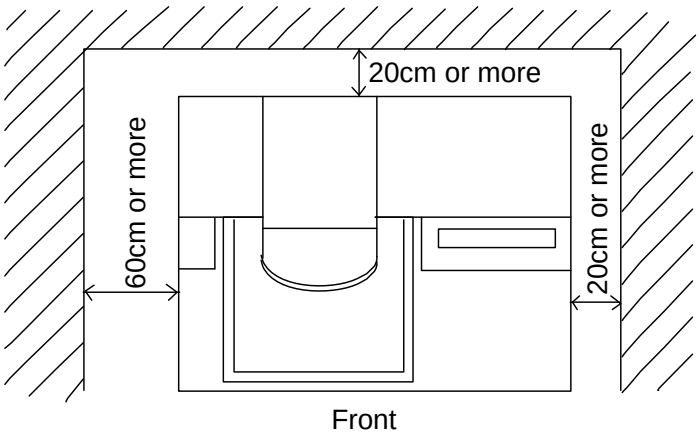


Select carefully the space to install the unit.

Do not install this unit in any of the following environments.

- In inflammable or corrosive gas environments
- In temperature beyond 35℃
- In severe change in temperature
- In very humid locations
- Under direct sun
- In frequently vibrating areas

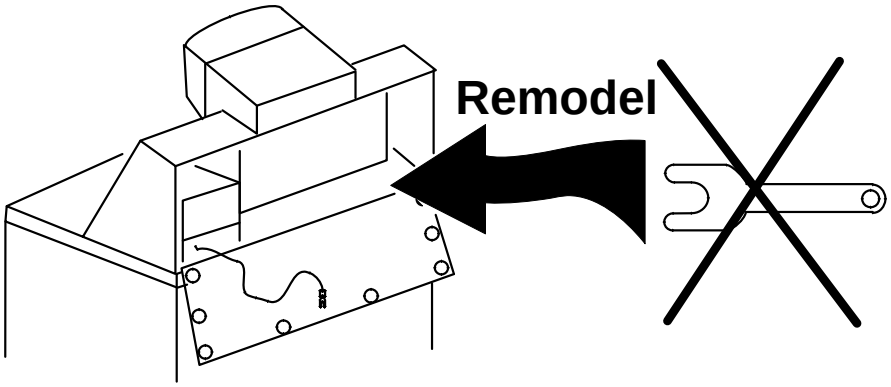
Provide ample space surrounding the unit as indicated below.



Warning

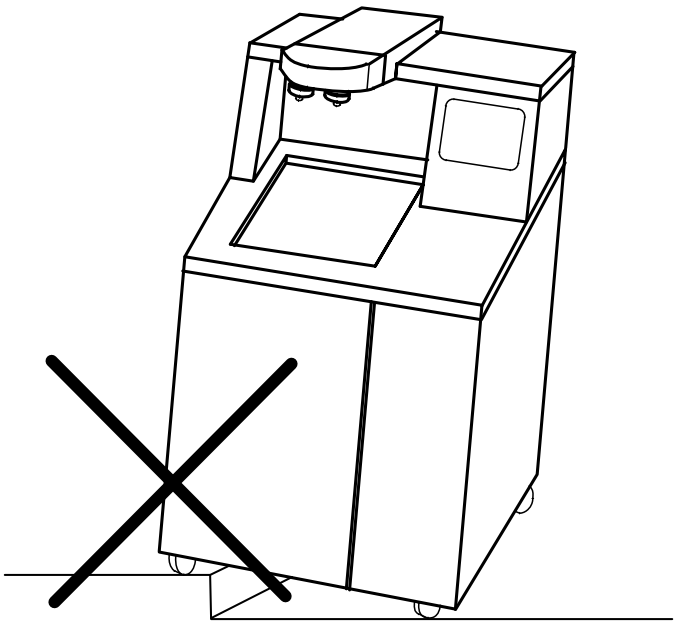
Do not remodel this unit.

- Never disjoint this unit to avoid electric shock.
- There are some high-pressure areas inside the unit. Ask your seller or Yamato Scientific's Technical Service Department for internal adjustment or repair.
- You must follow this instruction manual for your daily check or maintenance. Never remodel the unit by yourself to prevent any troubles.



Install this unit on level areas.

If you do not, unexpected trouble can occur.



Warning

Ground the unit.

- If you do not ground the unit, the earth leakage circuit breaker would not work in case of electric leakage. Be sure to connect the ground lead to prevent electric shock.
- WA500 type needs 100V. Connect the ground lead securely to the switchboard.
- WA570 or 710 type needs 200V power source with a single-phase. Connect the ground lead securely to the switchboard/200V single-phase outlet.
- WA730 type needs 200V with triple-phases. Connect the ground lead securely to the switchboard/200V triple-phase outlet.
- Ground the ground lead to the ground wire or terminal of the power source. The green core of the power cable is the ground lead. Contact an electrician if you have no equipment for grounding.
- Never connect with gas or water pipe.

Use exclusively the switchboard and outlet.

Use a switchboard and outlet with adequate capacity. If you connect to those without enough capacity, you would not take enough distilled water or control properly the unit due to decrease of voltage from the power source. Connect the power code to the sufficient power source.

Necessary capacity :			
WA500	AC100V	single-phase	40A
WA570	AC200V	single-phase	20A
WA710	AC200V	single-phase	40A
WA730	AC200V	triple-phase	30A

Precaution for connecting the power cable.

- Ask your seller or an electrician to connect the power cable for this unit. This connection requires special knowledge and skill. Connection by unskilled person can cause a fire or electric shock.
- No power plug is attached to this unit. Select an adequate capacity plug and terminal according to the power source to connects. Be sure that the breaker for the power source is turned off prior to connecting the power cable. Carefully connect each color core at connecting the power cable.

In case of single-phase	
Core color	Indoor wiring
Black	Voltage
White	Ground
Green	Earth

Incase of triple-phase	
Core color	Indoor wiring
Red	R phase
White	S phase
Black	T phase
Green	Earth

⚠ Warning

Precaution for proper use of the power cable

- Do not bundle the power code during operation, or overheat or fire can occur.
- Do not process, or bend, wrench or pull forcibly the cable. Such conduct can cause a fire or electric shock.
- Do not damage the cable, by placing a desk or chair on it or placing it between objects. Such conducts can result in fire or electric shock.
- Do not place the cable near any stoves or heaters, or the cable coating can melt causing a fire or electric shock.
- If the power cable is damaged (core exposure or disconnection), turn immediately the circuit breaker and the power supply off, and request the seller to change the power cable. Neglecting this procedure can cause a fire or electric shock.
- Connect the cable to an adequate switchboard.
- Check the capacity of the switchboard prior to connecting the cable. WA500 and 570/710 needs AC100V and 200Vrespectively. WA730 needs AC200V power source with triple-phase.

Warning

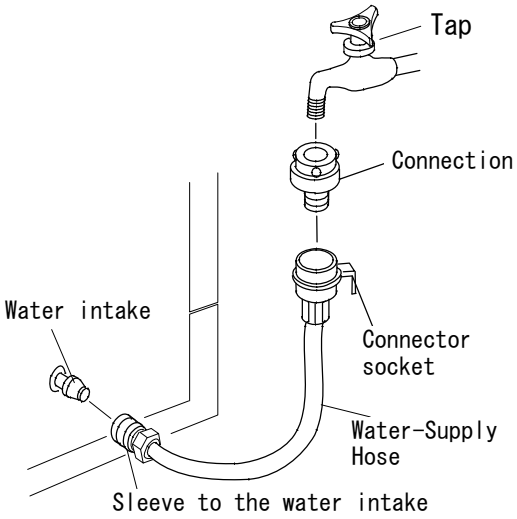
Connect securely the water supply hose.

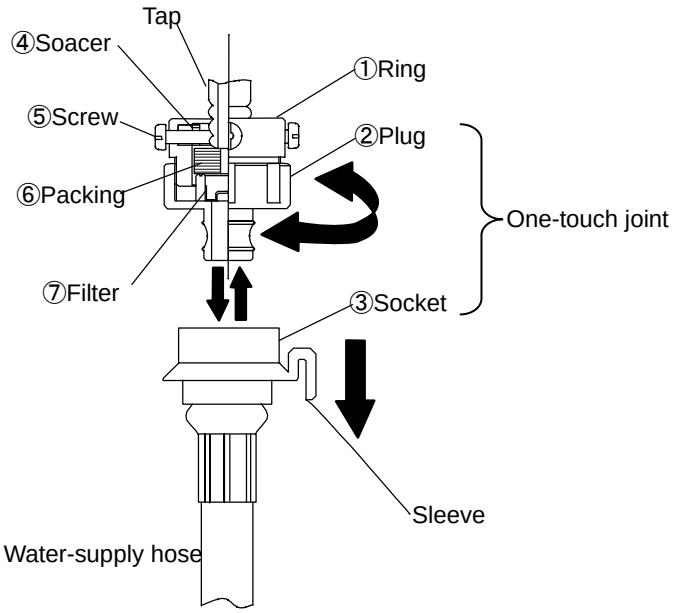
- If you do not connect the joint securely, the water-supply hose or connector would come off, causing water leak or spouting.
- Use the connector and water-supply hose out of accessories for this unit. Install the unit on the level and stable place near a tap and drainage.

Connect securely the water-supply hose in the following procedure.

Connect to tap.

(1) Slide the joint sleeve of the socket ③ to the direction the arrow shows. Then you can separate the connector and the hose.
(2) Loosen the plug ② from the ring ①.
(3) Fasten 4 screws ⑤ in the same way while pushing the ring ① lightly and evenly so that the packing ⑥ touches evenly the tap.
(4) Turn right and fasten securely the plug ②. Then the packing ⑥ seals the tap and connector.
(5) Slide the sleeve to the direction the allow shows and insert the socket ③ securely into the plug ②. Make sure the sleeve goes back to the original position when you loose your hold. Then you can finish the connection.



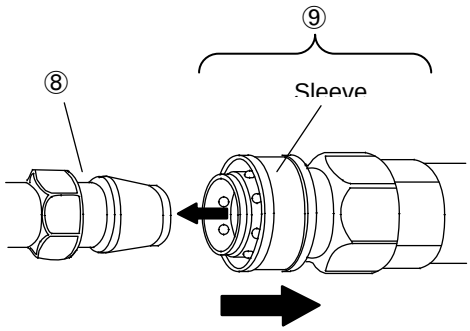


Warning

Connection to the unit

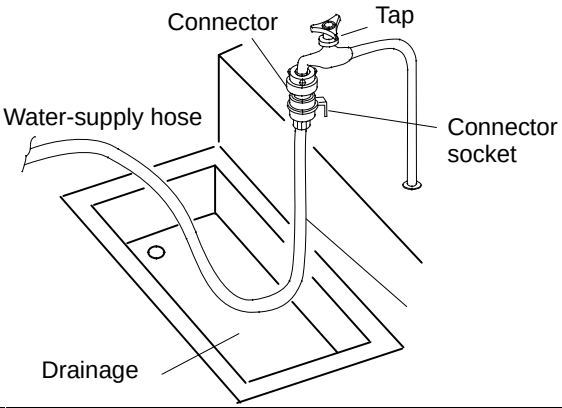
(1) Remove the rubber cap from the plug ⑧.

(2) Slide the sleeve to the direction the arrow shows, and insert securely the socket ⑨ into the plug ⑧.
Make sure the sleeve returns to the original position when you loose your hold. Then, you can finish the connection.
The socket has a built-in valve which would not open for water run until the plug is connected.



Connect the water-supply hose to a tap with drainage system.

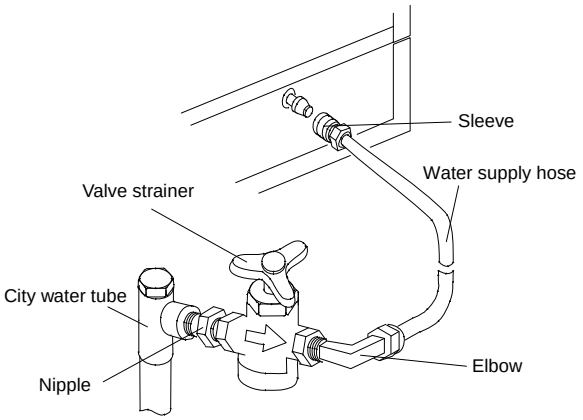
- Connect the hose to a tap with drainage system. If you connect the water-supply hose to a tap without drainage system, damage on the hose could result in overflow of water.



Caution

If drainage facility is away from the tap, use the Water Supply Unit, a non-standard accessory.

- The “Water Supply Unit” includes all items from the sleeve to the nipple. Refer to the instruction manual for the “Water Supply Unit” about connection to the faucet and for more information.
- The “Water Supply Unit” has the structure to keep tight connection to the pipe compared to a normal hose set even when the water pressure changes.



Keep the following pressure of water service.

- Keep water pressure within 1 to 5 × 100kPa (1 to 5kgf/cm2) even for use at night.
- Keep the same water pressure even when you use the non-standard accessory “Water Supply Unit”.

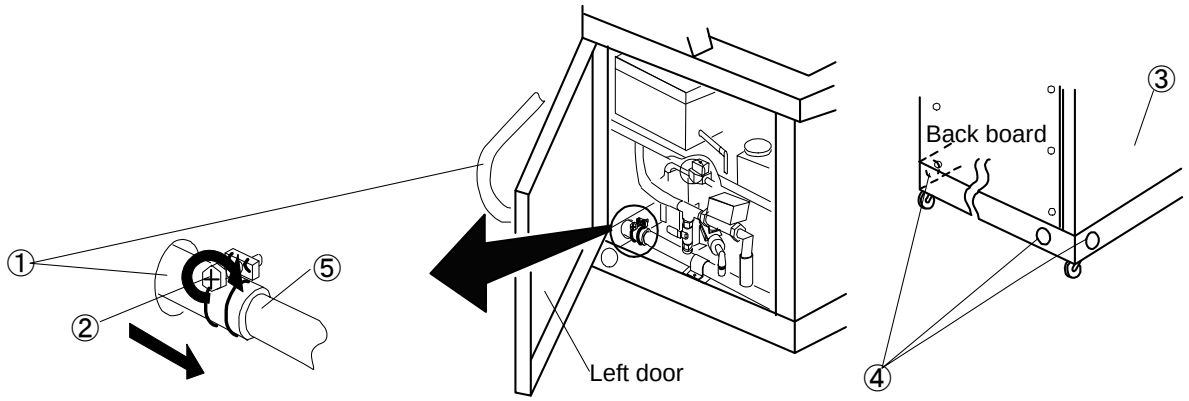
Warning

Connect securely the drainage hose.

- Connect securely the drainage hose. If the hose comes off due to incomplete connection, water would leak inside the unit and might cause machine trouble.

(1) Take the drainage hose ① and the hose band ② out of accessories for the unit.
(2) Make sure the circuit bleaker is off.
(3) Open the left door ③.
(4) Take out the rubber stopper from the drain ⑤.
(5) Select the most convenient inlet out of three in the back to arrange the hose without bending. Pass the hose band over the hose. Then, insert the hose into the drain ⑤ and fasten the hose band.

You must take off the back board to arrange the hose to the drain through the back side of the unit when you insert the hose from the inlet*1.



Be careful to arrange the drainage hose.

- Do not bend the hose nor make any convex part.
- Arrange the hose lower than the drain of the unit.
- Lead the end of the drain hose to drainage capable of about 2L/min. (In case of WA500/570) or 3L/min. (in case of WA710/730) of cooling water drained.
  Drainage with larger capacity is required when boiler water is drained.

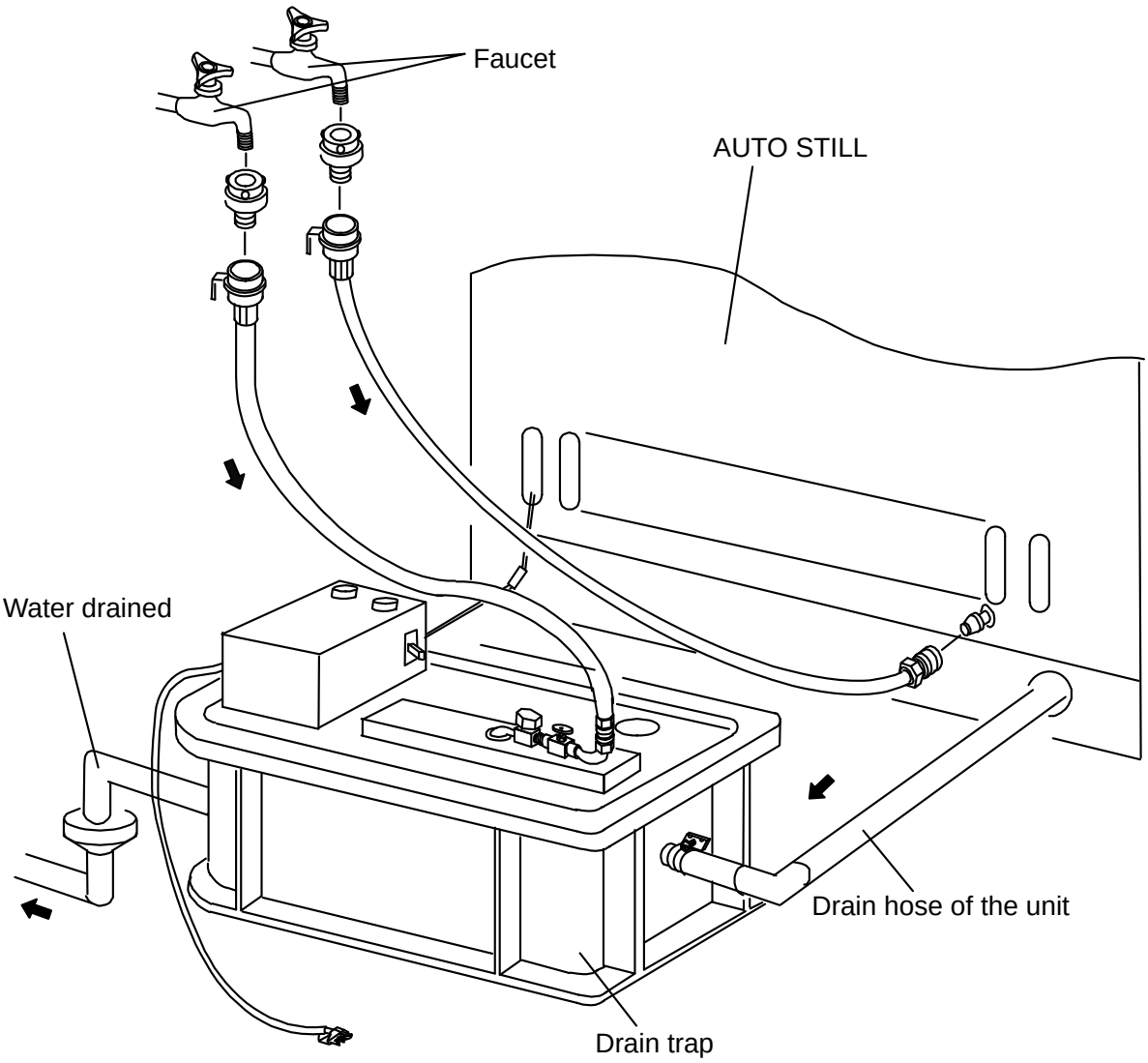
Warning

Check the temperature of drained cooling water.

- The drained water sometimes exceeds 60℃ especially in summer. Do not touch the water carelessly, or you can get scalded. Drain the water away from your work areas.
- Drain hot water away from chloroethylene pipe, if used, in the drainage facility, or the drained the unit, to the chloroethylene pipe in case the pipe temperature does not get lower than 60℃. Use the drain trap of the non-standard accessory even under 60℃ when you do not use the above-said pipe and joint.

If the drain pipe of the drainage facility does not get lower then 60℃

- Connect the drain trap, a non-standard accessory for the unit.
- The trap keeps the drained water for a while to cool the water naturally. In addition, tap water flows into the trap for cooling.

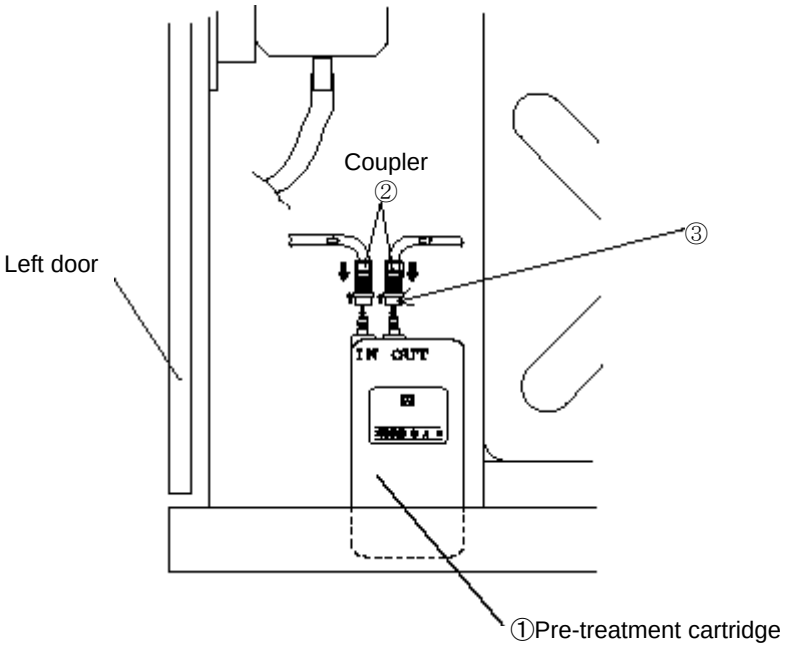


Warning

Connect securely the pre-treatment cartridge.

- Connect securely the inside hose as follows.
- If you do not connect securely, the connected hose would come off, causing water leak.

(1) Make sure the earth leakage circuit bleaker or the unit is switched off, and the tap is being fastened.
(2) Use the pre-treatment cartridge ① out of accessories for the unit.
(3) Take off the caps on the IN and OUT of the cartridge ①.
(4) Open the unit front door. Then you can find one connecting hose with the IN coupler ② and other with the OUT. Connect the respective hoses to IN and OUT of the cartridge ①.
(5) To connect each hose, slide the blue part ③ of the coupler back to the hose side, and fit the end of the coupler to the respective end of the cartridge. Then release the blue part ③.
(6) After you finish the connection, set the pre-treatment cartridge at the left side before the distilled water tank, as the picture shows. Be careful not to bend the hose.



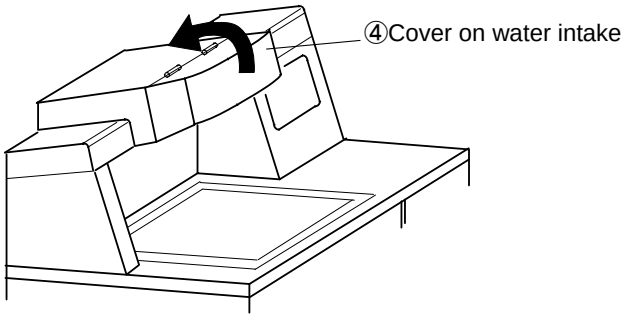
Unit with the front door opened

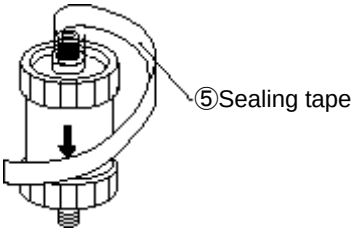
Warning

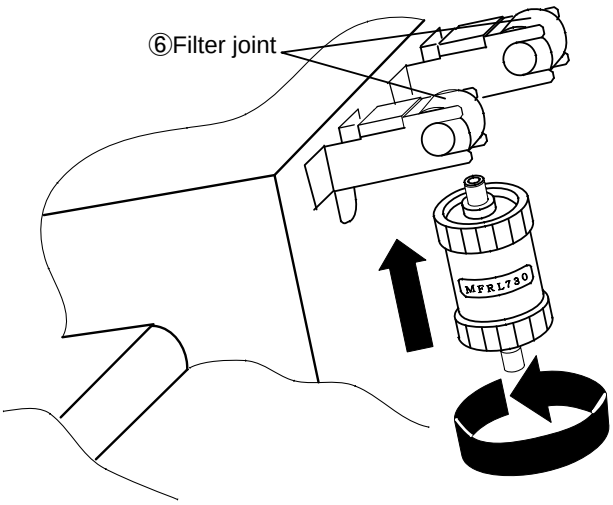
Connect securely the membrane filter.

- Fit the membrane filter as follows.
- If you do not connect firmly, water could leak from the junction, which could pollute collected pure water.

(1) Take two membrane filters and the sealing tape out of accessories for the unit.
(2) Open the direction of the water intake ④.
(3) Check the direction of the membrane according to the arrow. Then pull and wind the sealing tape ⑤ clockwise 2 or 3 times on the membrane filter. Cut the remaining tape
(4) Gibe three turns and screw the membrane into the filter ⑥ joint with the sealed part of the membrane set upward. Be careful not to destroy the screw thread. Check water leak while taking pure water. If any, screw the membrane again.





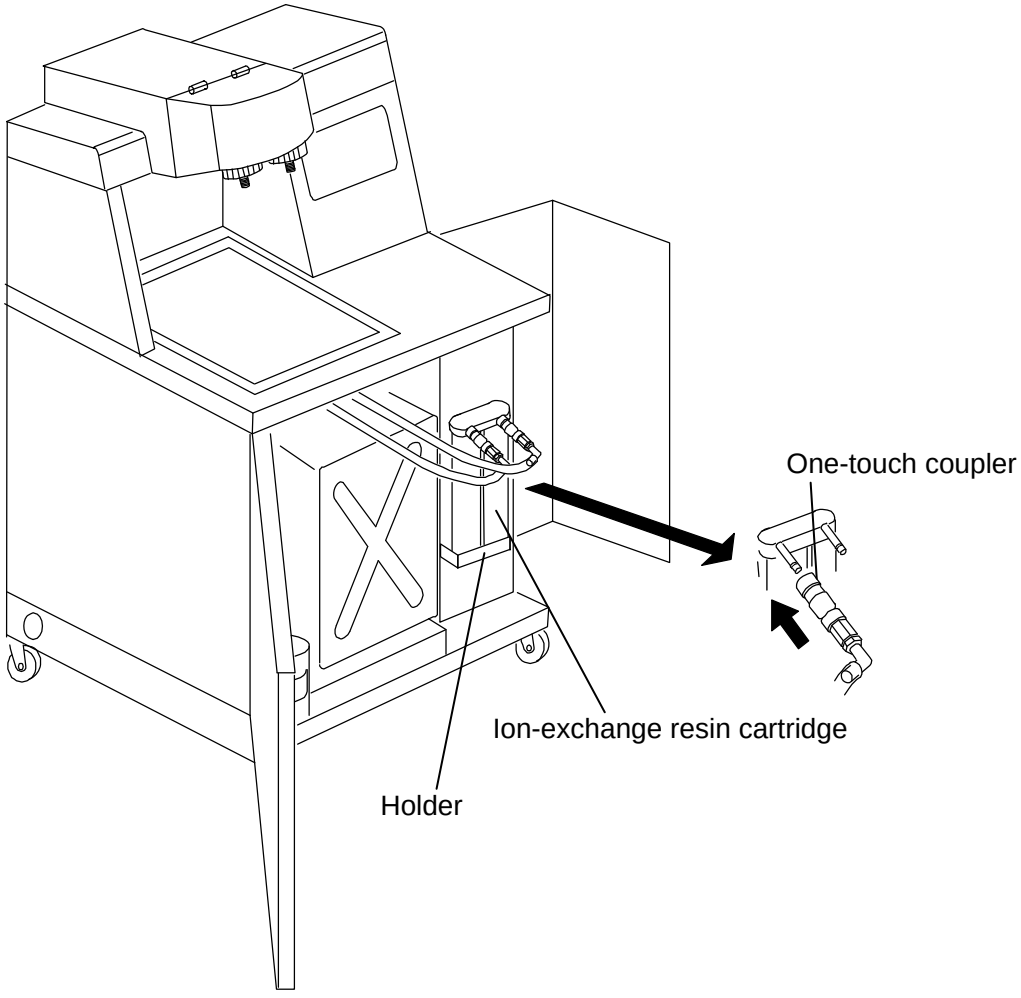


Warning

A high-purity cartridge of a non-standard accessory is apparently same as an ion-exchange resin cartridge. Fit in the same procedure.

- Fit the ion-exchange resin cartridge in the following procedure.
- Fit the cartridge securely. If you do not connect it firmly, water could leak.

(1) Take the ion-exchange cartridge out of accessories for the unit.
(2) Open the front door.
(3) Set the ion-exchange resin cartridge on the holder of the unit.
(4) There are IN and OUT hoses. Connect these hoses to the respective IN and OUT of the cartridge.



Caution for Use

Warning

No use at occurrence of abnormality/troubleshooting

If smoke or any strange odor should disburse from this unit for any reasons, turn off immediately both unit and power source breakers, and request the seller or Yamato Scientific to check the unit. Neglecting this procedure can result in fire or electric shock. Never try repairing the unit yourself. It is too dangerous.

If it begins thundering.

If it begins thundering, turn the circuit breaker off immediately.
Neglecting this procedure can result in circuit disorder, fire or electric shock due to thunderbolts.

When you dispose of the unit.

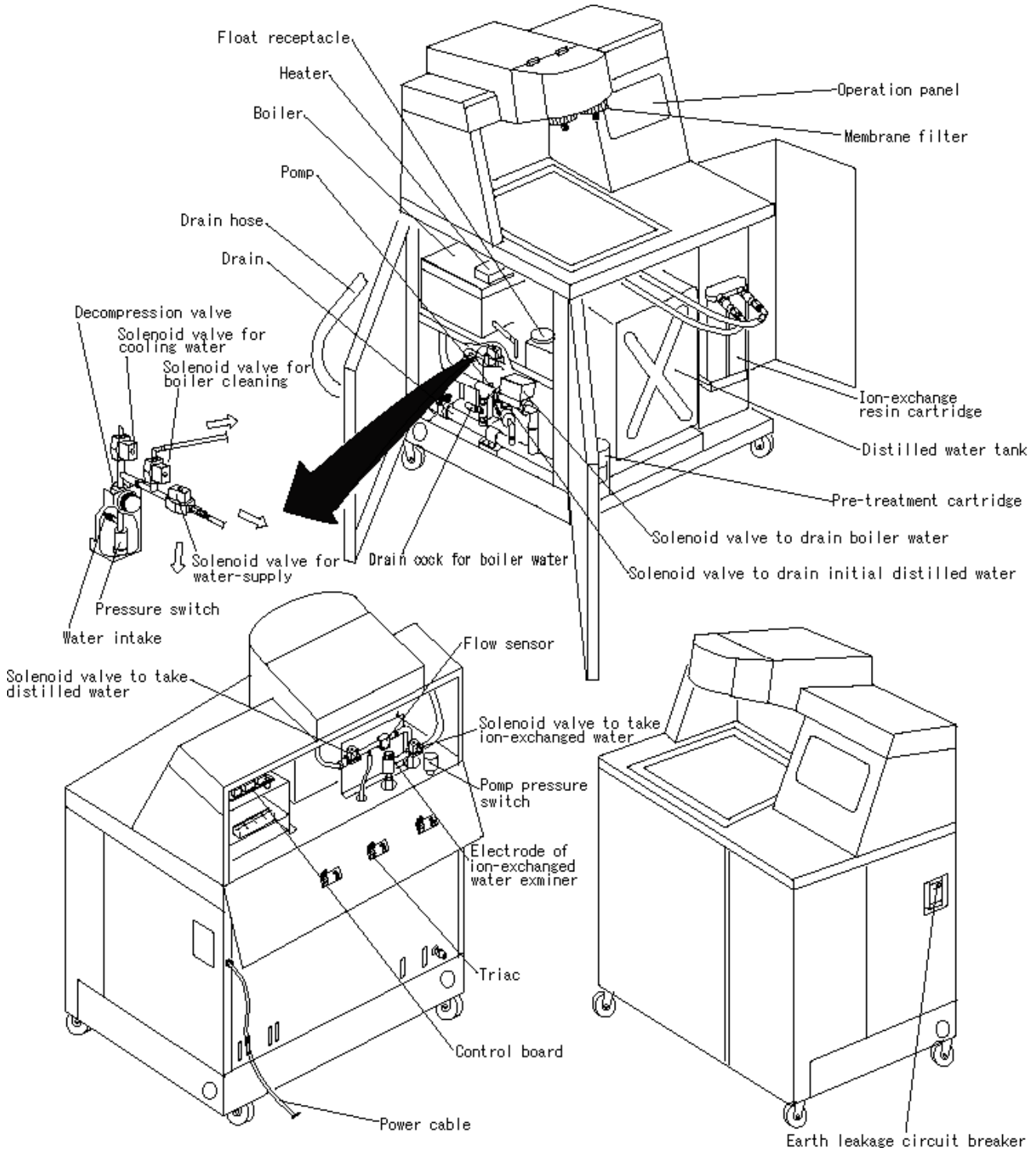
Do not leave the unit in child playground etc.

Be careful to use the cleanser.

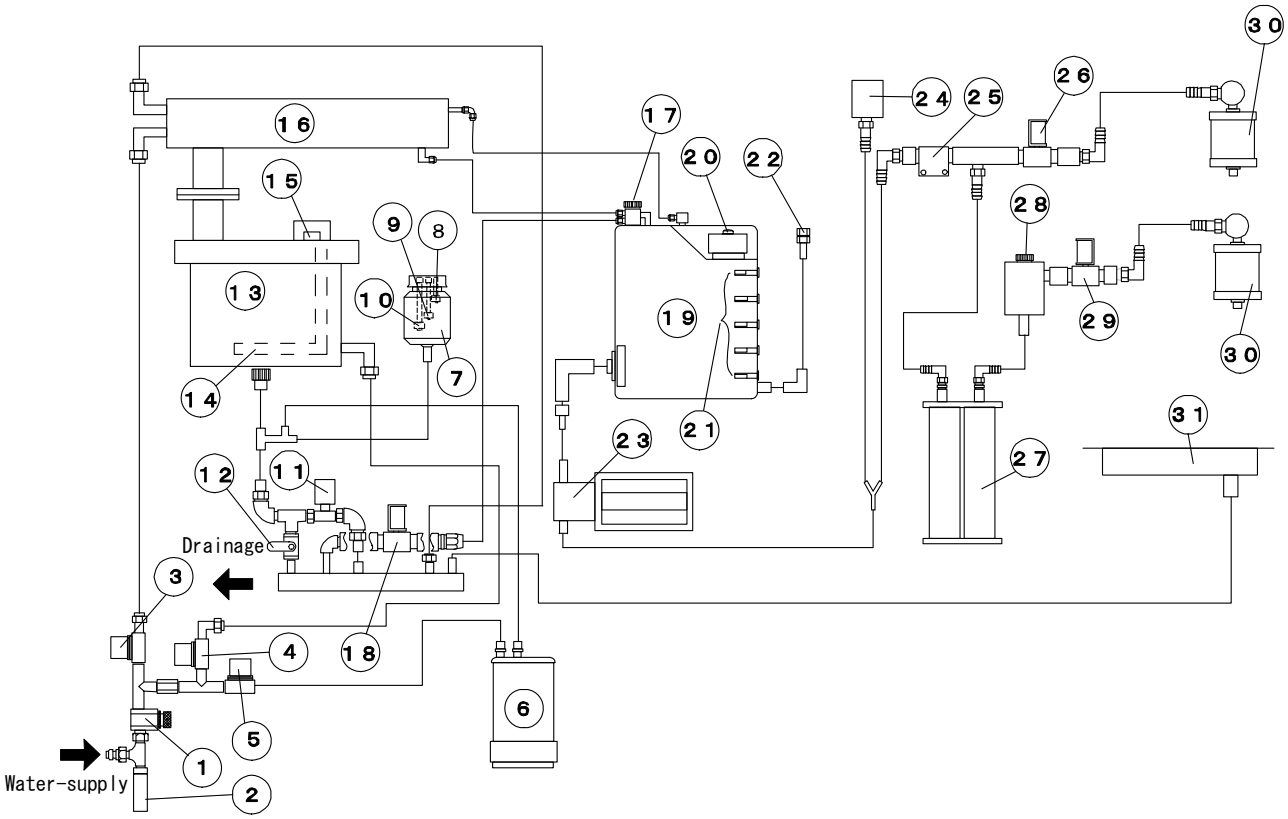
- Keep the cleanser in an airtight container, and avoid preservation in hot and humid areas.
- The main ingredient of the cleanser “Organosol 10” is sulfamic acid (PH1 acid solution).
- Wear protective gloves, mask and glasses to handle the cleanser.
- Wash by pure water the cleanser splashing on body.
- Neutralize cleanser after use with sodium hydroxide after use.
- Check by a PH indicator if cleanser is neutralized irrigation channel or fields.
- Do not use the vacant cleanser container as a drink bottle.
- Do not drain the cleanser container as a drink bottle.
- Do not drain the cleanser into an agricultural irrigation channel or fields. The cleanser can kill rice plants and other form products.

Body (WA710)

This drawing identifies parts.
There are some different parts used for WA500/570/730

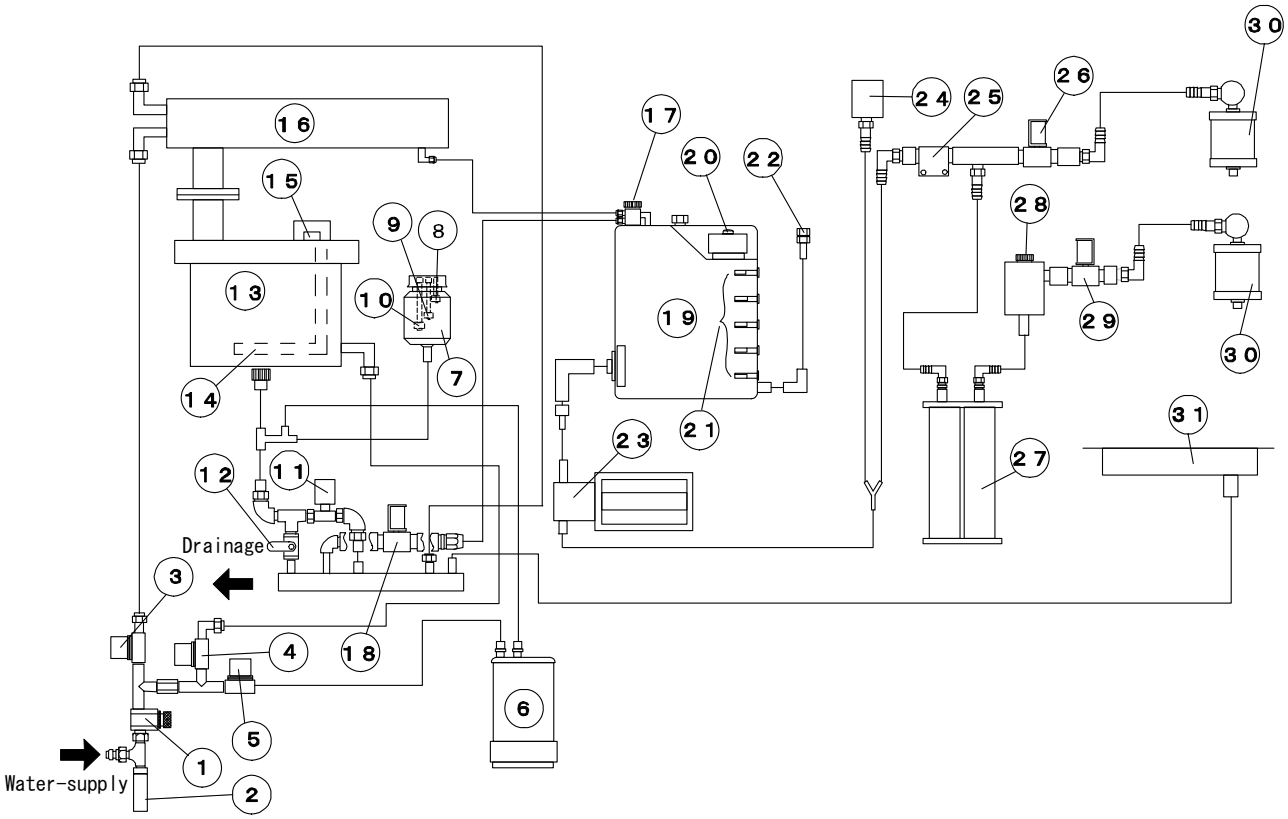


Piping Diagram (WA710/730)



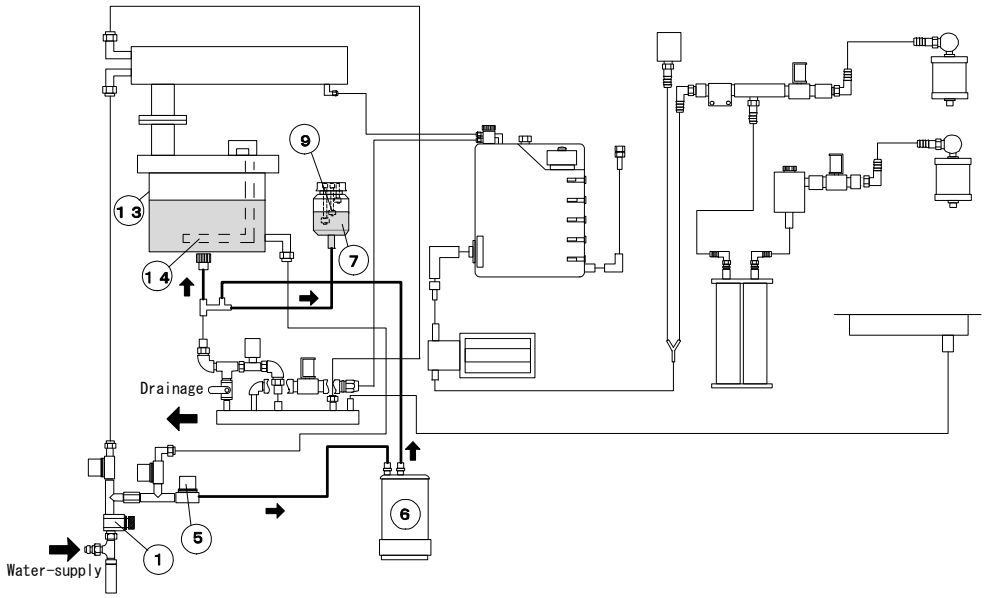
① Decompressor	⑯ Condenser
② Power switch	⑰ Electrode for distilled water examiner
③ Solenoid valve for cooling water	⑱ Solenoid valve to drain the initial distilled water
④ Solenoid valve for boiler cleaning	⑲ Distilled water tank
⑤ Solenoid valve for boiler water supply	⑳ Air filter
⑥ Pre-treatment cartridge	㉑ Float switch to check the water level
⑦ Float receptacle	㉒ Drain for distilled water tank
⑧ Float switch to detect boiler overheat	㉓ Pump
⑨ Float switch to control boiler water level	㉔ Pump pressure switch
⑩ Float switch to control the heater	㉕ Water flow sensor
⑪ Solenoid valve to drain boiler water	㉖ Solenoid valve to take distilled water
⑫ Cock to drain boiler water	㉗ Ion-exchange resin cartridge
⑬ Boiler	㉘ Electrode for ion-exchanged water examiner
⑭ Heater	㉙ Solenoid valve to take ion-Exchanged water
⑮ Over heat detector	㉚ Membrane filter
	㉛ Drainage

Piping Diagram (WA500/570)



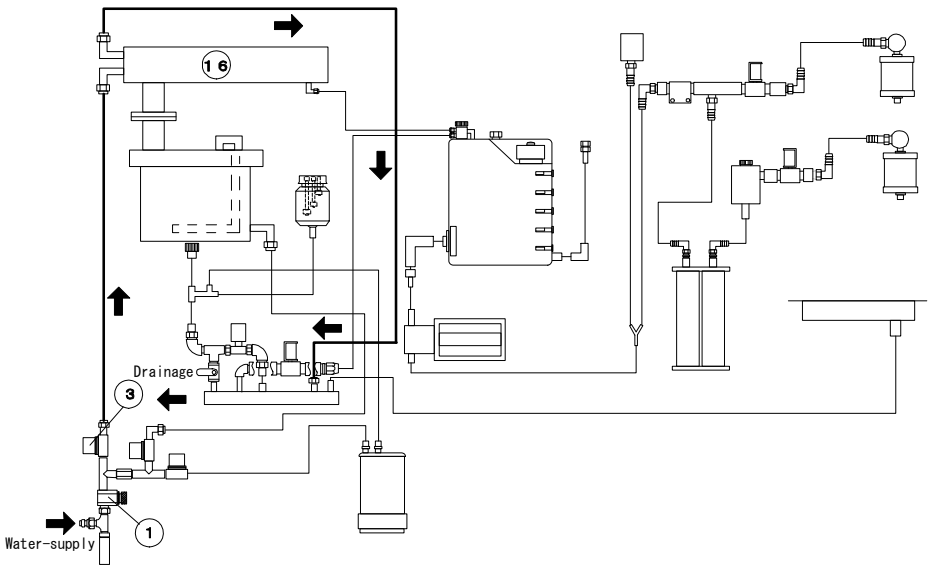
① Decompression valve	⑯ Condenser
② pressure switch	⑰ Electrode to check quality of distilled water
③ Solenoid valve for cooling water	⑱ Solenoid valve to drain initial distilled water
④ Solenoid valve for boiler cleaning	⑲ Distilled water tank
⑤ Solenoid valve for boiler water supply	⑳ Air filter
⑥ Pre-treatment cartridge	㉑ Float switch to check water level
⑦ Float receptacle	㉒ Drain for distilled water tank
⑧ Float switch to check boiler overheat	㉓ Pump
⑨ Float switch to control boiler water level	㉔ Pressure switch for pump
⑩ Float switch to control the heater	㉕ Flow sensor
⑪ Solenoid valve to drain boiler water	㉖ Solenoid valve to take distilled water
⑫ Cock to drain boiler water	㉗ Ion-exchange resin cartridge
⑬ Boiler	㉘ Electrode of ion-exchanged water examiner
⑭ Heater	㉙ Solenoid valve to take ion-Exchanged water
⑮ Over heat detector	㉚ Membrane filter
	㉛ Drainage

(1) Supply and distillation of boiler water



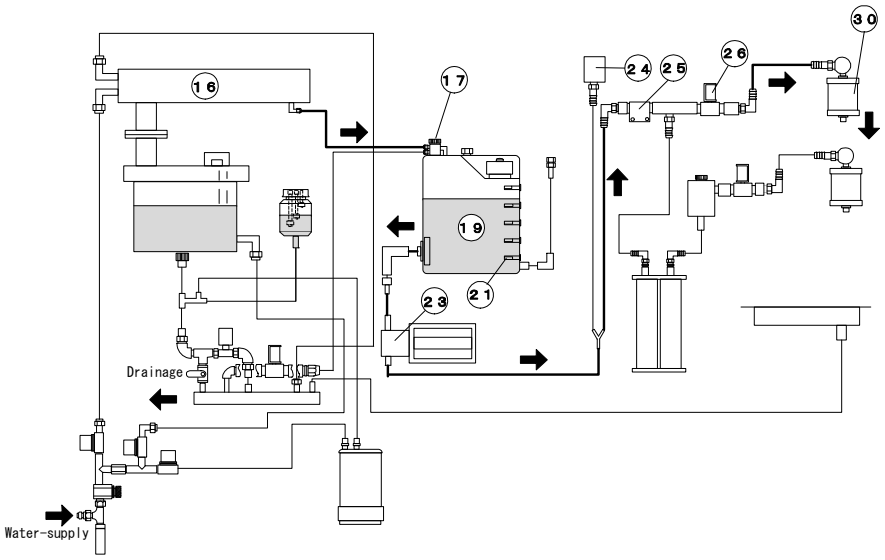
- Water is supplied from the water intake, through ① decompressor, ⑤ solenoid valve for water supply, ⑥ pre-treatment cartridge into ⑦ float receptacle and ⑬ boiler.
  Following initial water supply, when ⑨ float switch (to control the boiler water level) finds water level sufficient, ⑭ heater becomes on to start distillation.
  Following initial water supply, when ⑨ float switch controls water supply into the boiler by opening and closing ⑤ solenoid valve (to supply water into the boiler).

(2) Flow of cooling water



- Cooling water flows from the ① decompressor, ③ cooling water solenoid valve to ⑯ condenser. Water flow stops automatically when distillation stops.

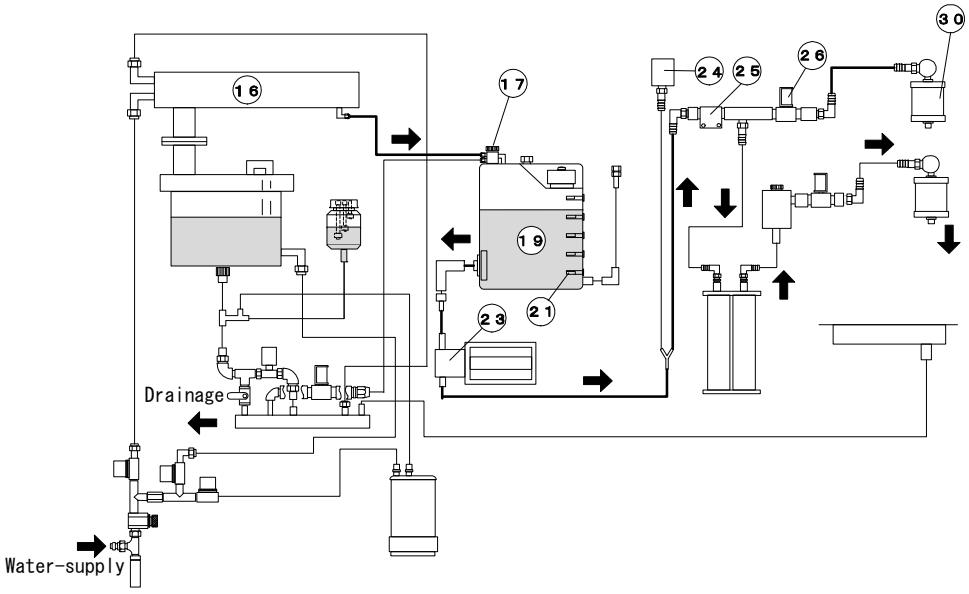
(3) Collection of distilled water



- Distilled water condensed in ⑯ condenser is stored into ⑲ distilled water tank through ⑰ electrode for distilled water. The unit judges water full and stops distillation when the highest float switch ㉑ inside the tank is activated.

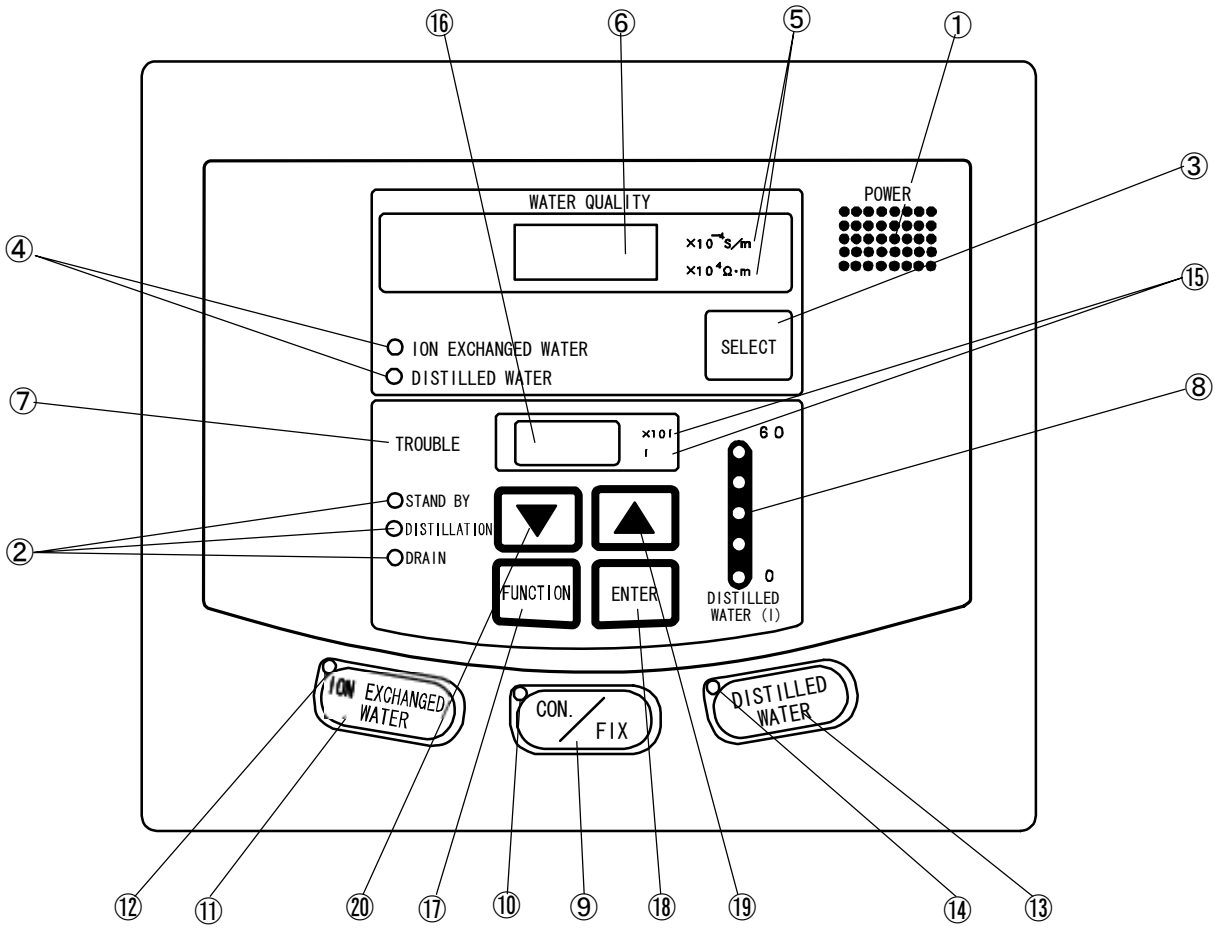
  Distilled water stored is taken out by ㉓ pump through ㉕ water flow sensor, ㉖ solenoid valve to take distilled water and ㉚ membrane filter. However, when the distilled water in the tank gets lower than 8L, the lowest float switch is activated to stop the empty pump operation.

(4) Collection of ion-exchanged water



- Distilled water in storage is taken out by ㉓ pump through ㉗ ion-exchanged resin cartridge, ㉘ ion-exchanged water electrode, ㉙ electrode to collect ion-exchanged water and ㉚ membrane filter.

Operation panel



① Power switch
② Operation indication lamp
③ Select switch
④ Lamp to identify the measured electrode
⑤ Unit of water quality measurement
⑥ Indicator (1)
⑦ Trouble indication lamp
⑧ Distilled water level indicator
⑨ Switch to change methods to take pure water
⑩ Display lamp to identify the method to collect water
⑪ Switch to take ion-exchanged water
⑫ Lamp to indicate collection of ion-exchanged water
⑬ Switch to take distilled water
⑭ Lamp to indicate collection of distilled water
⑮ Unit of amount to collect
⑯ Indicator (2)
⑰ Function key
⑱ Enter key
⑲ Up key
⑳ down key

Operation Panel

POWER

① Power Switch…
This is the switch for power supply. The STAND-BY lamp is lit when the power cable is connected and the earth leakage circuit breaker is on. When you push the switch in this situation, power becomes “ON”. If you push the switch again, then power becomes “OFF”.

○STAND BY
○DISTILLATION
○DRAIN

② Operation Display Lamp…
Stand-By:
(1) The yello0w lamp is lit when the power source is “ON”. But the power switch is “OFF”.
(2) The yellow lamp blinks in case of suspension of water supp;u or decrease of raw water pressure, In addition, the indicator (1) shows unt.
DISTELLATION:
The green light is lit during distillation.
DRAINAGE:
The green light is lit during automatic drainage of boiler water.

SELECT

③ Select Switch…
This switch is to select either electrode for water quality check. Each one push automatically and alternatively select either sensor for ion-exchanged water or the other for distilled water. Then the indicator (1) shows either electrical conductivity or resistivity of the selected electrode.

○ION EXCHANGED WATER
○DISTILLED WATER

④ amps to identify the electrode to measure…
Either lamp is lit to show the electrode selected by the SELECT switch.
ION EXCHANGED WATER : Water quality at the exit of the ion-exchanger
DISTILLED WATER : Quality of distilled water at the exit of the condenser

×10⁻⁴S/m
×10⁴Ω·m

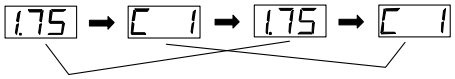
⑤ nit to display water quality…
Either unit of the value the indicator (1) shows is identified.
$\times 10^{-4}$s/m : represents the electrical conductivity (= μ S/cm)
$\times 10^{4}\Omega$·m : represents the resistivity (MΩ·cm)
(The resistivity is shown by the integral number within 1 to 18.)

WATER QUALITY

⑥ Indicator (1)…
The displayed (selected) water quality is the converted value at 25℃. Another water quality not indicated (selected) is always being checked. If either water deteriorates its quality to the specific value, the indicator repeatedly indicates the sensor No. The indicator also gives the respective error codes in case of stop of raw-water supp;u, decrease of water pressure or any other trouble in the device.

＜The standard values to determine deterioration of water quality＞
Ion-exchanged water : $\times 10^{-4}$s/m or more
Distilled water : $\times 10^{4}\Omega$·m or more

＜Example of indication of water deterioration＞
Incase you select the ion-exchanged water by SELECT key : When quality of ion-exchanged water is 1.75×10^{-4}S/m while distilled water is 10×10^{-4}S/m or more. (deterioration of water)



Electric conductivity of the selected Electrode C3 (ion-exchanged water)

Electric conductivity of the electrode C1 (deteriorated distilled water)

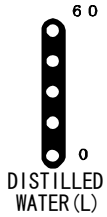
＜Stop of raw-water supply or decrease of water pressure＞
unt comes up and the STAND-BY, an operation display lamp, blinks.

＜In trouble＞
The display identifies the trouble.
Refer to the Trouble Shooting Guide (P.2) for more information.

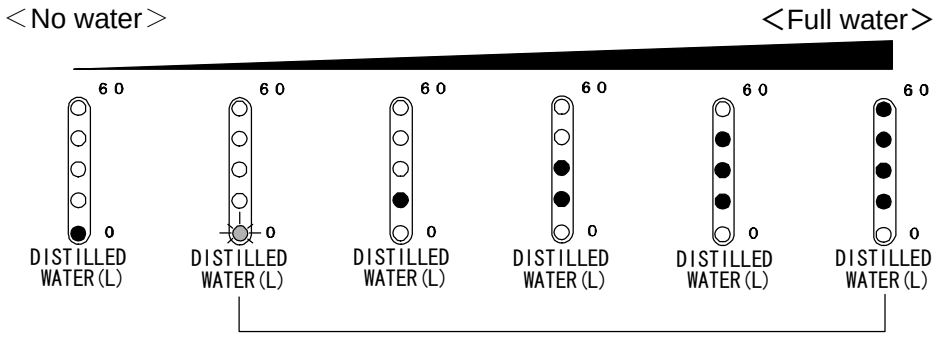
Operation panel

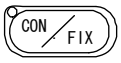
TROUBLE

⑦ Trouble Indication lamp…
The lamp blinks when detects abnormality in operation or trouble of the unit. The indicator (1) identifies such a situation.

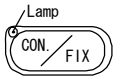


⑧ Distilled Water Level indicator…
The indication lamps show 5 levels of the distilled water in the tank. When the water storage is less than 8L, the lowest yellow lamp is lit. In this case, you can not take distilled or ion-exchanged water for preventing the empty pump operation. When the lowest lamp start blinking, you can take distilled or ion-exchanged water again.





⑨ Switch to change methods to collect pure water…
This is the switch to select taking water repeatedly or by the fixed volume. To select taking the fixed amount, push once. If you push again, you can take water repeatedly.



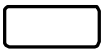
⑩ Lamp to identify the water-collection method…
This lamp is lit only while you select the repeated collection. On the other hand, the lamp foes out when you select collection of the fixed volume.

⑪ Switch to collect ion-exchanged water…
1) In case of repeated collection
Switch ON (one push) to collect ion-exchanged water.
Switch OFF (one more push) to stop collection.
2) In case of collecting the fixed volume
Switch ON (one push) to start collection of ion-exchanged water. The unit stops automatically its operation when the collection reaches the set amount. If you push the switch during collection, the unit would stop operation even before the collection reaches the set amount.

⑫ Lamp to indicate collection of ion-exchanged water…
The green lamp is lit during collection of ion-exchanged water.

⑬ Switch to take distilled water…
1) Incase of repeated collection
Switch ON (one push) to collect distilled water.
Switch OFF (one more push) to stop collection.
2) Incase of collecting the fixed volume
Switch ON (one push) to start collection of distilled water. The unit stops its operation automatically when the collection reaches the set amount. If you push the switch during collection, the operation would stop even before the collection reaches the set amount.

Operation panel

	⑭ Lamp to indicate collection of distilled water… The green lamp is lit during collection of distilled water.
×10ι ι	⑮ Unit of volume to collect… When the indicator (2) shows the volume to take, the unit of (L) is displayed. In other case the indicator shows the total flow, the unit of ×10L is displayed.
	⑯ Indicator (2)… The indicator shows the following. 1) Incase of repeated collection The indicator shows ---. 2) In case of collecting the fixed amount It shows the set volume. The initially set value is 0.1L. The disp;ay set value is decreasing as water is being collected. At the completion of collection, the set value comes up again. 3) Identification of function The indicator also identifies the function selected. a) Sun: Indication of the total flow b) unt: Mode to change the unit for water quality check 4) Display of total flow The total water flow shows the aggregate volume of distilled and ion-exchanged water collected. (However, the total does not include the initial distilled water drained or water supply into boiler.)
	⑰ Function key… Push the select functions. The indicator (2) identifies the selected function.
	⑱ Enter key… A push on the key completes your selection of function. In other word, you need to push this key to escape from the function-selecting mode.
	⑲ Up key… Push the key to set the following 1) At collection of the set volume Set the volume to collect. Each one push increases the set value in the indicator (2). The set value goes up successively when you keep pushing the key. 2) At the selection of a junction You can select the following functions by pushing this key. a) ON or OFF to display the total flow of ion-exchanged water. b) Change of units to indicate water quality.
	⑳ Down key… Push this key to set the following 1) At collection of the set volume Set the volume to collect. Each one push decreases the set value in the indicator (2). The set value goes down successively when you keep pushing the key. 2) At the selection of a function You can select the following functions by pushing this key. a) ON or OFF to display the total flow of ion-exchanged water. b) Change of the unit to indicate water quality.

Preparation and Check before Use

⚠ Caution

1. Check water supply.
Check if the water-supply hose is securely connected. Then, open the tap. Make sure if no water leaks from the joint of the hose.

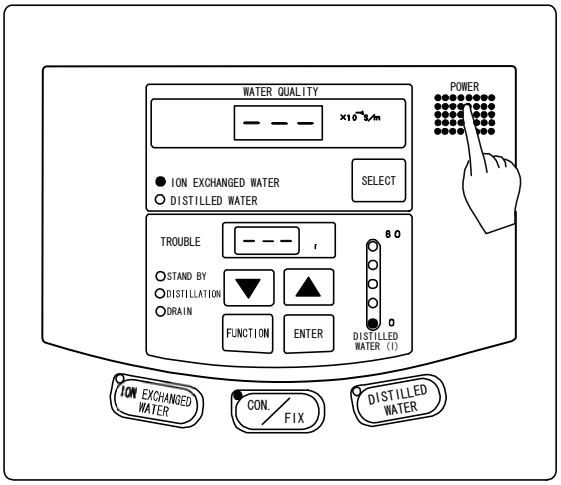
2. Check drain.
Check if the drain hose is securely connected. Make sure if the hose is not bent or if there are no convex parts.

3. Check the power source.
Make sure that the power cable is connected to an appropriate switchboard.

Run menu

Run menu as follows when you are ready for operation.

1. Power-on

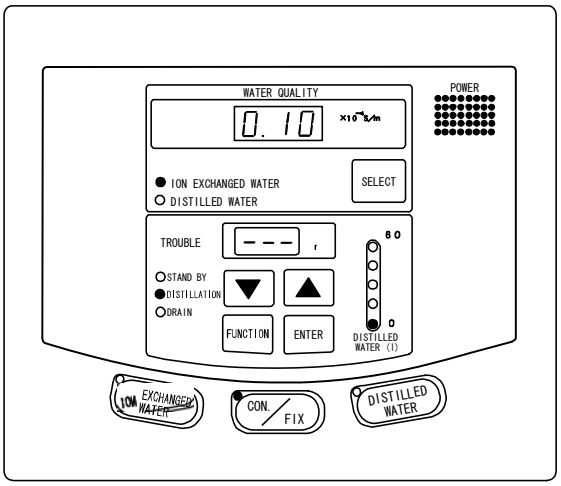


① Switch ON the earth leakage circuit bleaker.
② Push the POWER key.

Operation panel display in about 15 seconds after you push the power key unit the distillation starts.

- The indicator (1) blinks [– – –].
- The STAND-BY, an operational indication lamp, goes out.
  (However, the indication (1) does not show [– – –] if you push the power key some time after switching on the earth leakage circuit bleaker.)

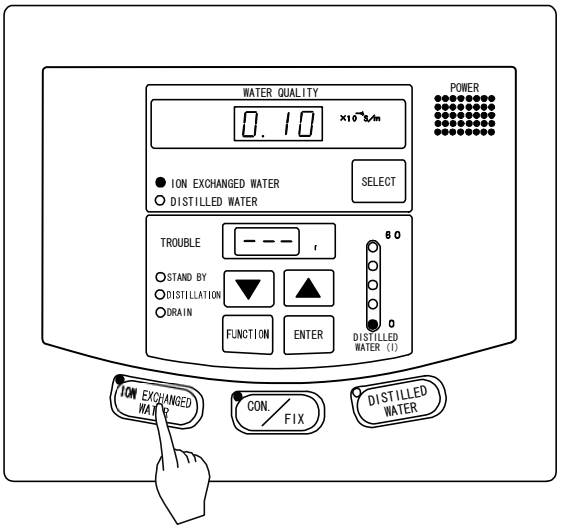
2. 15 minutes after you push the power key.



Display of operation panel…

- The indicator (1) shows electric conductivity of ion-exchanged water. (Ex. [0.10])
- The ION EXCHANGED WATER lamp is lit to identify the electrode being measured.
- Among distilled water level indicators, the yellow lamp is lit to show no water storage.
- Water is supplied to the specific level. At the completion of initial water supply, distillation starts. Then, the green DISTILLATION lamp is lit among operation indication lamps.

Repeated collection of ion-exchanged water



Push once the ION EXCHANGED WATER switch while the CON. lamp, identifying the water collection method, is lit but the yellow (no water) lamp, a distilled water level indicator, is not lit.

Among the operation panel indicators ;

- The lamp indicating collection of ion-exchanged water blinks

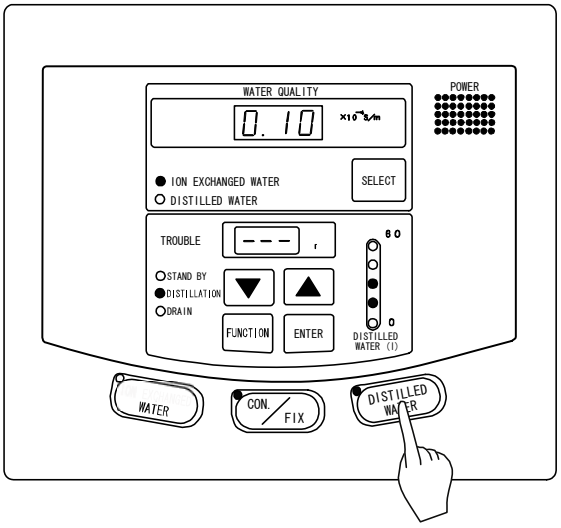
If you push again the ION EXCHANGED WATER switch ;

Among the operation panel indicators ;

- The lamp indicating collection of ion-exchanged water goes out.

(If the yellow “no water” lamp, a distilled water level indicator, gets lit during collection of water, the unit automatically stops taking water and the lamp indicating collection of distilled water goes out.)

Repeated collection of distilled water



Push once the DISTILLED WATER switch while the STAND BY lamp, identifying the method of water collection, is lit but the yellow “no water” lamp, among indicators to show the volume of distilled water, is not lit.

Among the operation panel indicators ;

- The lamp, indicating collection of distilled water, is lit.

If you push again the DISTILLED WATER switch ;

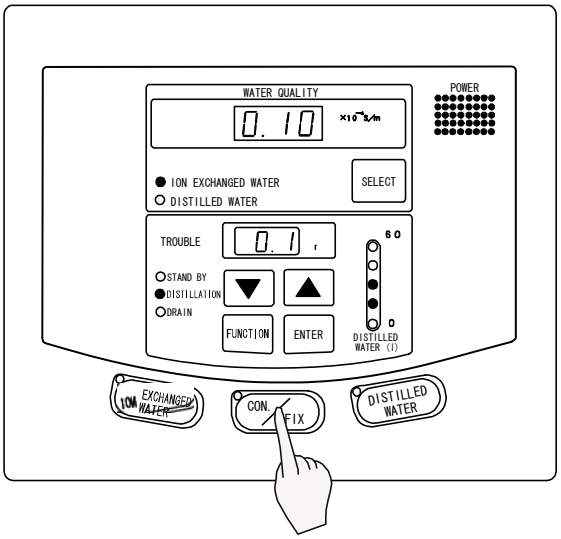
Among the operation panel indicators ;

- The lamp indicating collection of distilled water goes out.

(If, among indicators to show the volume of distilled water stored, the yellow “no water” lamp gets lit during collection of water, the unit automatically stops taking water and the lamp showing collection of distilled water goes out.)

Collection of The Fixed Volume of Ion Exchanged Water

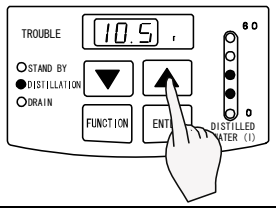
1. Push the switch to change the method to collect water. Then the CON. lamp goes out.



Among the operation panel indicators ;

- The con. lamp, a collection method indicator, goes out.
- The indicator (2) shows the initial value of 0.1. (L), a unit of collection, blinks.

2. Push either ▲ or ▲ key to set the volume to take.

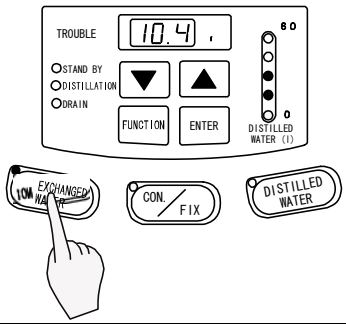


Among the operation panel indicators ;

- The indicator (2) changes the value according to your key touch.

(You can set up to 99.9L.)

3. Push the ION EXCHANGED WATER switch. Ion exchanged water comes out from the intake of the membrane filter.

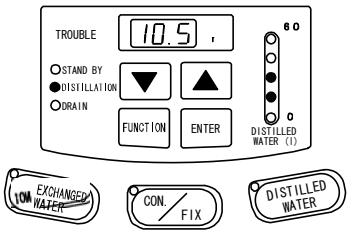


Among the operation panel indicators ;

- The lamp indicating collection of ion exchange water is lit.
- The indicator (2) starts decreasing the displayed value.

(If the yellow “no water” lamp is lit during water collection, the unit stops collection automatically. The lamp indicating collection of ion exchanged water goes out. The, the indicator (2) returns to the set value.)

4. When the indicator (2) decreases the displayed value to 0.1 and the remaining water flow of 0.1L is completed;

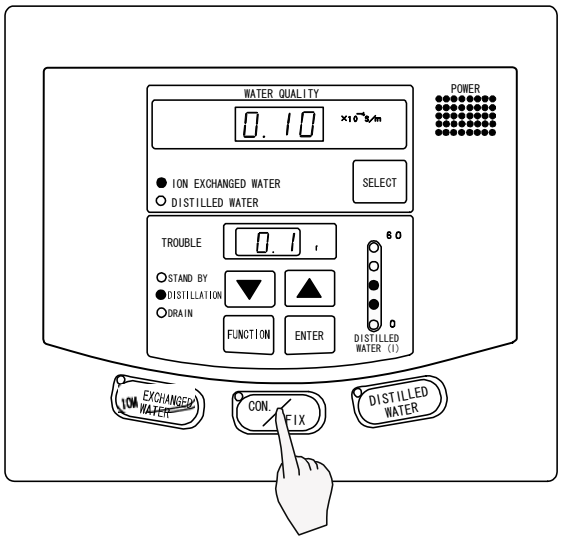


Among the operation panel indicators ;

- The lamp indicating the collection of ion exchanged water goes out.
- The indicator (2) returns to the set value.

Collection of The Fixed Volume of Distilled Water

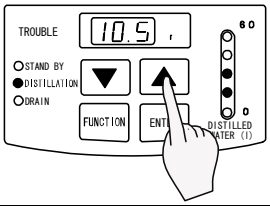
1. Push the switch to change the collection method and put out the CON. lamp.



Among the operation panel indicators ;

- The CON. lamp, the collection method indicator, goes out.
- The indicator (2) shows the initial value of 0.1. At the same time, (L), a unit of water collection, is lit.

2. Push either ▲ or ▲ key to set the volume to take.

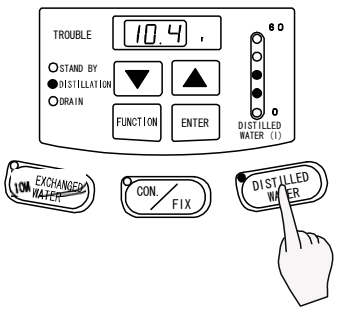


Among the operation panel indicators ;

- The indicator (2) changes the value according to each your key operation.

(You can set up to 99.9L.)

3. Push the DISTILLED WATER switch. distilled water comes out from the intake of the membrane filter.

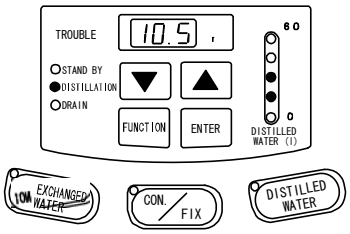


Among the operation panel indicators ;

- The lamp indicating collection of distilled water is lit.
- The indicator (2) starts decreasing the displayed value.

(If the yellow “no water” lamp, one of indicators to show the level of distilled water stored, is lit during water collection, the unit automatically stops collection and the lamp indicating collection of distilled water goes out. In addition, the indicator (2) returns to the set value.)

4. When the indicator (2) decreases the displayed value down to 0.1 and the remaining water flow of 0.1L is completed;



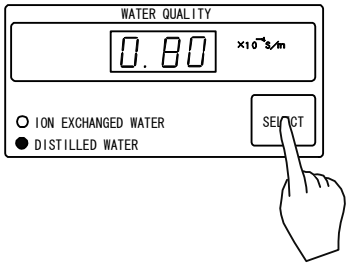
Among the operation panel indicators ;

- The lamp indicating collection of distilled water goes out.
- The indicator (2) returns to the set value.

Indication of Water Quality

Selection of either electrode for ion-exchanged or distilled water

Each one push on SELECT switch selects alternatively the electrode of either water quality examiner to be measured.



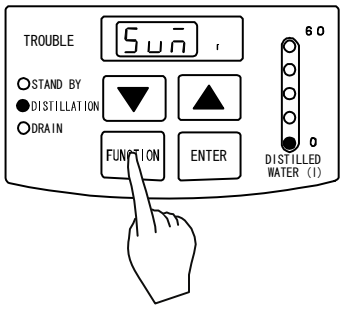
Among the operation panel indicators ;

- Either ION EXCGANGED WATER and DISTILLED WATER is lit alternatively by each push to identify one electrode measured..

(The electric conductivity is shown by the unit of "$\times 10^{-4}$S/m" when the power switch in "ON")

Change of the unit to indicate water quality.

1. Each one push on the FUNCTION key changes displays of indicator (2).

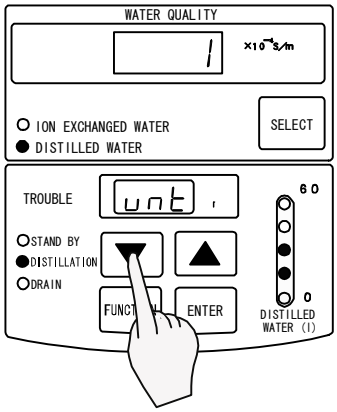


Operation panel display

- The indicator (2) changes its displays as follows.
  Repeated collection
  Mode to display the total water flow
  Mode to change the unit to indicate water quality

Select the display of unt

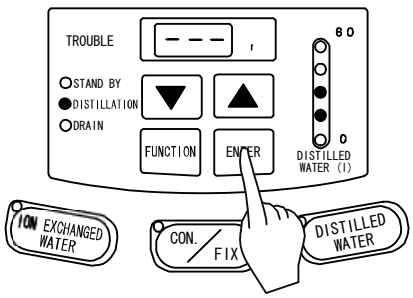
2. Push either ▲ or ▲ key once.



Among the operation panel indicators;

- The unit for water quality indication changes. Then the unit of resistivity "$\times 10^4 \Omega \cdot m$" is shown.
- The indicator (1) also indicates the resistivity by the integral number from 1 to 18 within the range of 1.0 to 18.2 ($\times 10^4 \Omega \cdot m$).

3. Push the ENTER key, Then, you can fix the unit and get out from the function mode.



Among the operation panel indicators;

- The indicator (2) shows ---.
- The unit to indicate water quality returns to the electric conductivity when you switch the POWER key OFF and ON again.

Indication of Water Quality

Electric conductivity

- Electric conductivity shows how much electricity can pass. As water contains more electrolyte or impurity, more electricity can pass through and the value of conductivity gets larger. On the contrary, the value gets smaller as water contains less electrolyte.

- That means water is more pure as the conductivity is smaller.
  However, the value of conductivity shows containment of electrolyte only but does not indicate any containment of non-electrolyte such as organic, colloid, dissolved gas and microorganism. Therefore, conductivity is just one of indicators to show water purity.

- Resistivity is to indicate the same property as the electric conductivity shows. Resistivity is reciprocal to electric conductivity . The larger resistivity indicates higher purity.

- To calculate the resistivity from the electric conductivity;
  R=Resistivity ρ =Electric conductivity

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

  Pure water theoretically has the following value.

  $R=18.3\times10^{4}\ \Omega\cdot m$(18.3M$\Omega\cdot$cm)25℃

  (This unit display the integral number within 18 to $1\times10^{4}\ \Omega\cdot m$. Note there is no decimal number indication.)

  $\rho=0.055\times10^{-4}$S/m(0.055μS/cm)25℃

Quality of ion-exchanged/distilled water

- Ion-exchanged water and distilled water have the following properties respectively. Select either water according to your requirement.

  It is ideal to use distilled water just after you collect. If you do not use the water soon, drain the distilled water tank. When you keep distilled water in the tank for a while, drain the tank and store new distilled water in the tank to use.

(1) Ion-exchanged water

Since almost all electrolyte are removed from ion-exchanged water, you can get water with the lowest electric conductivity. But it is impossible to remove non-electrolytic impurity. Purity is a little low with a new resin or at the re-start of flow after operation stops.

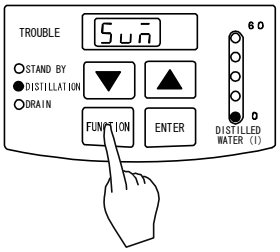
(2) Distilled water

The mode can remove averagely electrolyte and non-electrolyte except ammonia and other substances with low boiling point.
However, water absorbs carbonic acid gas from air and creates carbonic gas during its production process (in condensation and storage).
Accordingly, water quality is worse than ion-exchanged water and becomes weak acid (pH 5 to 6) with its electric conductivity about 1 to 2×10^{-4}S/m 25℃ (1 to 2.5μS/cm)

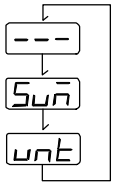
Display of Total Flow/Resetting

Check the total flow to know the time to exchange ion-exchange resin.

1. Each one push on the FUNCTION key changes display of indicator (2).



Among operation panel indicators, the indicator (2) changes indications as follows.



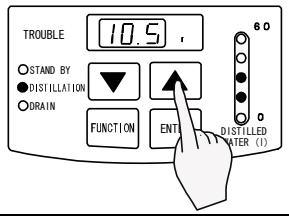
Repeated collection

Mode to display the total flow

Mode to change the unit for indicating water quality

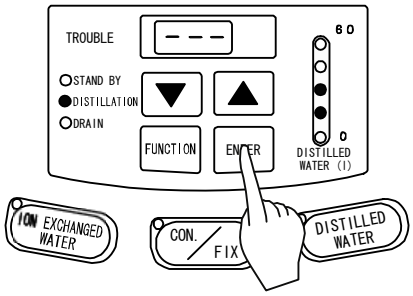
Select and display Sun.

2. Push either ▲ or ▲ key once.



The indicator (2) in the operation panel shows the total flow.

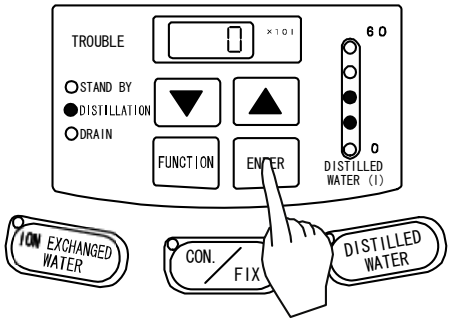
3. Push the ENTER key to cancel the function.



The indicator (2) in the operation panel shows ---.

Resetting the total flow.

Select the total flow in the indicator (2). Then, push the CON/FIX and ENTER key at the same time.



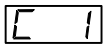
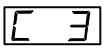
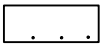
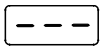
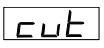
The indicator (2) shows 0.

Displays and Details of Error Code

Safety device	Indicators	Indication	Cause	Effect on operation	Measure
Detecting leakage	Indicator(1)	E.31 is lit	Water leakage	Heaters, solenoid valves and any other controllers become off.	Turn the bleaker off and check parts. (See P36 for troubleshooting)
Heater overheat protection		E.32 is lit	Heater overheat	Heaters, solenoid valves and any other controllers become off.	Contact the seller or Yamato Scientific's Technical Service Department.
Detecting trouble of float switch		E.34 is lit	Trouble of the float switch for distilled water tank	Heaters, solenoid valves and any other controllers become off.	Contact the seller or Yamato Scientific's Technical Service Department.
Detecting abnormal water level		E.35 is lit	Abnormal water level in the float receptacle	Heaters solenoid valves and any other controllers become off.	Check if the boiler water drain cock is Indicated with the cock closed, contact the seller or Yamato Sientific's Technical Service Department.
Detecting float switch trouble		E.36 is lit	Trouble of the float switch for float receptacle	Heaters solenoid valves and any other controllers become off.	Contact the seller or Yamato Scientific's Technical Service Department.
Detecting trouble of the electric circuit		E.15 is lit	Trouble in the electric circuit	Heaters, solenoid valves and any other controllers become off.	Contact the seller or Yamato Scientific's Technical Service Department.

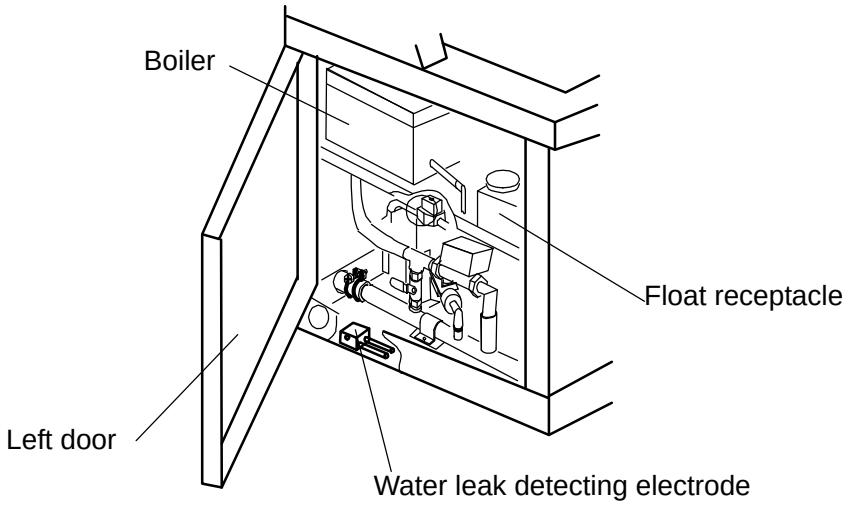
●"TROUBLE" blinks to alarm abnormal situation while the indicator (1) shows a certain error code.

Trouble Displays other than Error Codes/Details

Safety devise	Indicator	Indication	Cause	Effect on operation	Troubleshooting
Detecting abnormal water quality	Indicator(1)		Ion-exchanged water deteriorates lower then the standard. (When the value reaches 10×10^{-4}S/m or more.)	The indicator repeatedly alarms  . However, operation continues as usual.	It is not machine trouble. Change the old ion-exchange resin into new one.
			Distilled water deteriorates lower then the standard. (When the value reaches 10×10^{-4}S/m Or more.)	The indicator repeatedly alarms  . However, operation continues as usual.	Contact the seller or Yamato Scientific's Technical Service Department.
			Water quality is too low to measure.	The usual operation continues. However, the sign is continuously shown when you select the electrode.	Indications of  and  are shown at the same time. Follow the respective Instructions.
Detecting sensor trouble			Disconnection of the measured electrode without water.	The usual operation continues. However the sign is continuously shown when you select the electrode.	This situation sometimes occurs in operation of this device. However, if this indication would not disappear for a long time when water flows, request service.
		 STAND BY lamp is lit	Interruption/pressure decrease of original water flow. When pressure of water service gets lower then 100kPa (1kgf/cm^2)	Distillation stops temporarity.	Make sure if the water pressure is normal and the tap is open. Distillation starts again when the Original water Pressure is re-gained.
	Lamp to Identify the electrode measured	Blinking	Disconnection of the thermistor for temperature compensation of the measured electrode.	The temperature without compensation is shown when you select the electrode.	It is better to request earlier service.

Troubleshooting when E.31 is lit to indicate water leak.

(1) After the defect is repaired, dry enough the bottom areas of the device as well as the leak detecting electrode. Then set the electrode in the original position to re-start the operation.
(2) Close the left door.
(3) Turn the bleaker ON, and push the POWER switch. Normal operation starts as the defect is repaired.



Check and maintenance

Time for periodical check and maintenance (Check periodically the unit to use in stable condition.)

Item to check and maintain	Period	Note
Exchange of pre-treatment cartridge	Each 2 or 3 Months	Durability: About 5000L in case of using water service in Tokyo (with quality of 200×10-4S/m) You need earlier exchange of the cartridge when you use raw water with worse quality.
Exchange of membrane filters	3 months	Durability: About 3000L of pure water flow. Decrease of water collection suggets that you need exchange of the filters.
Exchange of ion-exchange resin cartridge	When the indicator (1) shows  or each 6 months	
Cleaning the still	3 months	You need earlier cleaning when you use raw water with worse quality.
Cleaning the water supply hose filter	6 months	
Hose exchange	2 years	Check the joint once a month.
Exchange of pre-treatment cartridge	When the indicator (1) shows  or each 6 months	

Exchange of Pre-Treatment Cartridge

Refer to Page 13 “Connect securely the pre-treatment cartridge” in the “Safety Precaution”.
Dispose of the old pre-treatment cartridge as nonflammable.
If you use the unit without changing the cartridge, stone attaches increasingly to the inside of the boiler and heaters, which can decrease collection of distilled water and damage heaters.

Exchange of membrane filter

Refer to Page 14 “Connect securely the membrane filter” in the “Safety Precaution”.
Dispose of the exchanged membrane filter as nonflammable.
If you use the unit without changing the filter, that fan decrease collection of distilled water, and the pump pressure switch is activated to stop pure water collection.

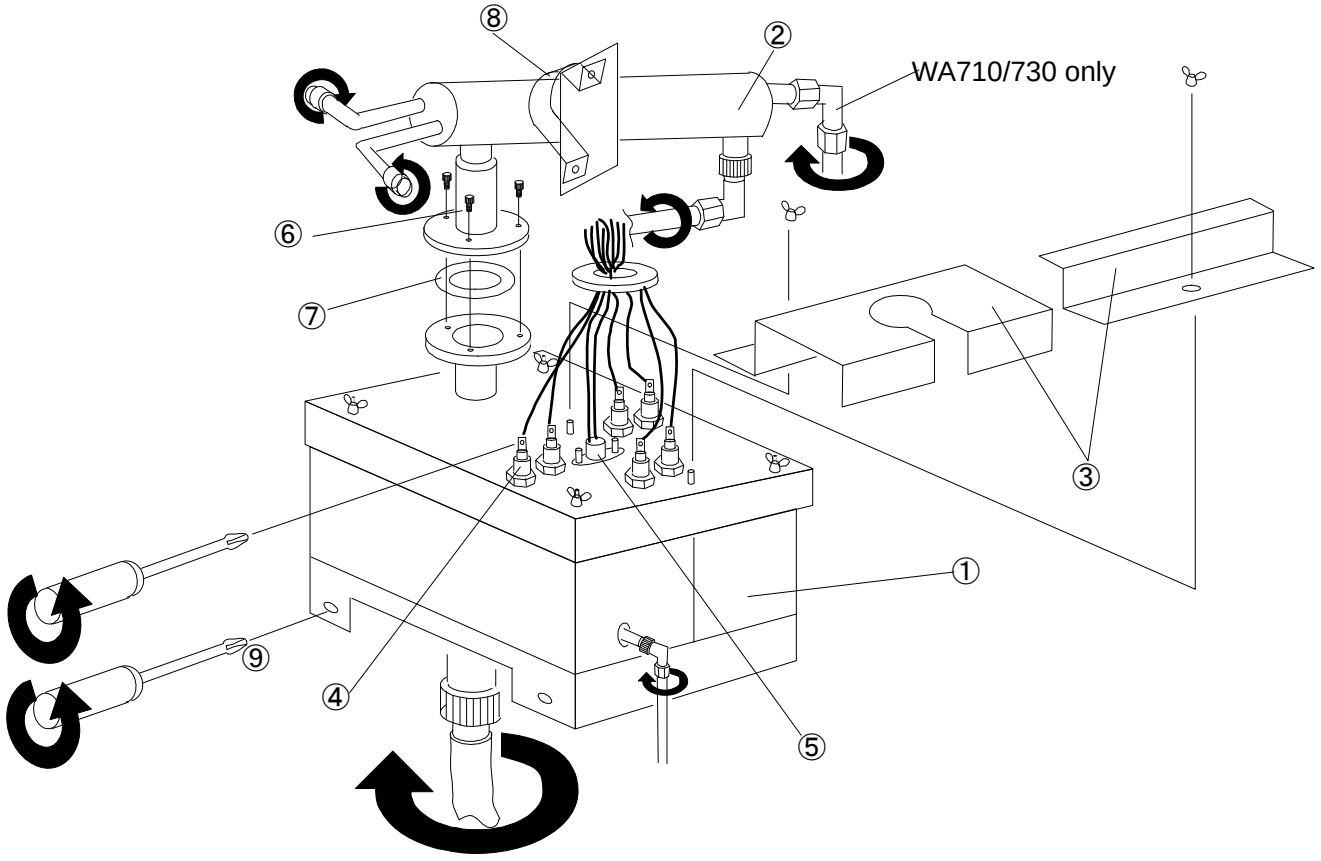
Exchange of Ion Exchange Resin Cartridge

Refer to “Connect securely ion exchange resin cartridge” in the “Safety Precaution”.
Refer to Page 15 “Connect the high purity cartridge in the same way as ion exchange resin cartridge. The high purity cartridge is apparently the same as an ion exchange resin cartridge”.
Dispose of the exchanged cartridge as nonflammable.

Cleaning Still

Removal and setting the still

(1) Turn “OFF” the circuit bleaker.
(2) Close the faucet.
(3) Make sure if the boiler cools down enough (about 30 min. later) after the breaker is turned “OFF”. Open the left door of this unit and the cock to drain boiler water.
(4) Remove both hose connected to the ① boiler and ② condenser respectively. Cap nut is used in the joint. Be careful not to lose or damage the inside packing at removal.
(5) Take off the butterfly nut from ③ heater cover.
(6) Take off ③ heater cover and remove all leads from heaters and overheat detectors.
(7) Take off ④ connecting screws, separate ② condenser and ① boiler. Be careful not to lose or damage ⑤ packing.
(8) Remove ① boiler first from the body. Take off the ⑨ fixed screw by cross driver. Pull ① boiler forward to remove from the body. Be careful about the hose joint at the removal.
(9) Hold ② condenser and loosen ⑥ metal fixture in the middle of ② condenser by cross driver. Be careful not to drop the heavy (about 9kg) boiler.
(10)Fit ① boiler and ② condenser in the reverse procedure. Make sure the positions to cennect securely each hose and lead.



Cleaning Still

Preparing scale detergent

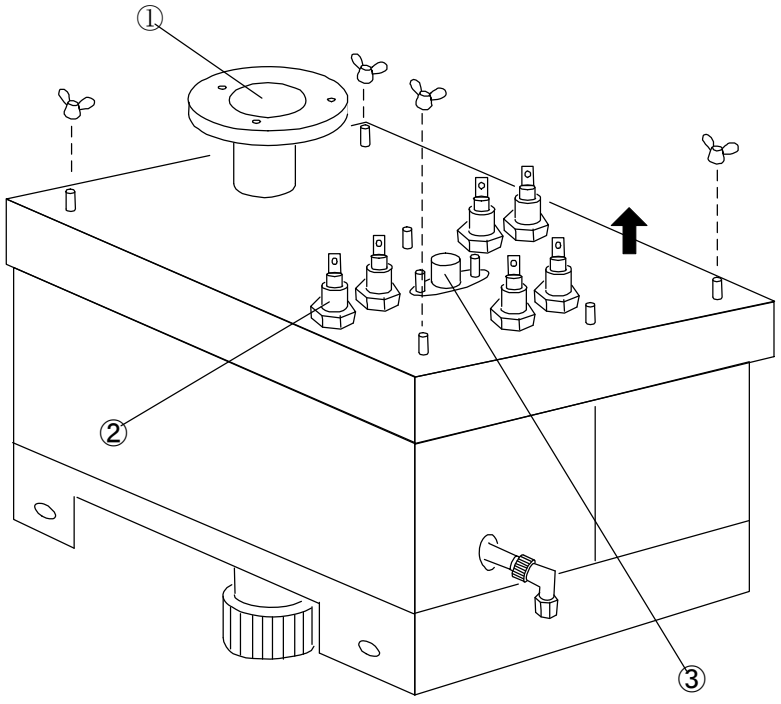
(1) Prepare hot water with temperature between 60 and 75℃.
(2) Dilute “Organozol 10”, an accessory for this unit with hot water.

Type	Hot water (L)	Amount of Organozol (g)
WA500/570	4	330
WA710/730	6	500

Cleaning method

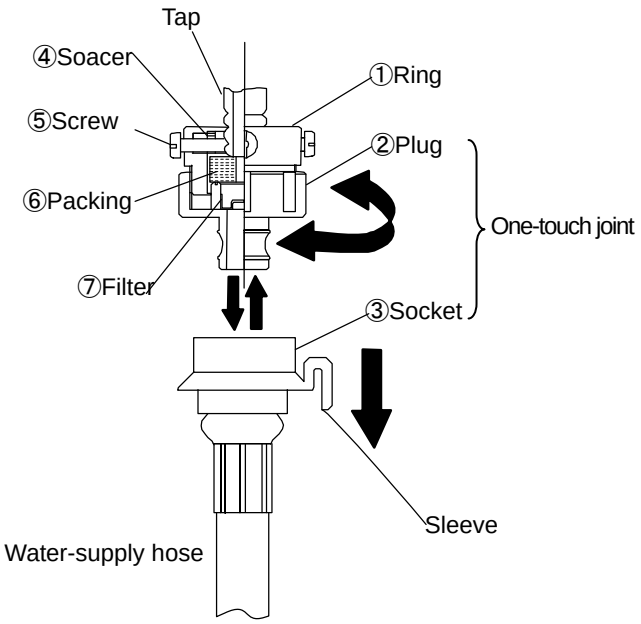
● Clean the boiler and heaters earlier. As more scale attaches, it becomes more difficult to remove those scales which can reduce collection of distilled water or damage the heater.

(1) Stop the boiler hose joint by rubber stopper etc.
(2) Set the boiler stable to pour scale detergent into it.
(3) Pour the scale detergent from ① joint into the condenser with the heater connected. Carefully avoid splashing the scale detergent on any areas.
(4) Almost all scales are removed in about 4 to 5 hours. However, you had better spend more time on cleaning according to condition inside the boiler. When the scale detergent changes its color from purple blue to yellow, that shows the scale detergent can not clean any more. In such case, drain the scale detergent from the boiler. If all scales in the boiler are not removed, add new scale detergent to repeat cleaning.
(5) When those scales are removed, drain scale detergent from the boiler. Take off four butterfly nuts, remove ② heater with the boiler lid to wash by tap water. Do not wet ② heater terminal and ③ overheat detector.
(6) Wipe off by soft brush solid scales not removed by the scale detergent.
(7) To clean the condenser, pour the scale detergent into the cooling pipe of the condenser, and cover the hose joint to stop the cleanser coming out. Almost all fur is removed in about 2 or 3 hours. Then, wash the inside of the condenser by tap water.



Clean Water Supply Hose Filter

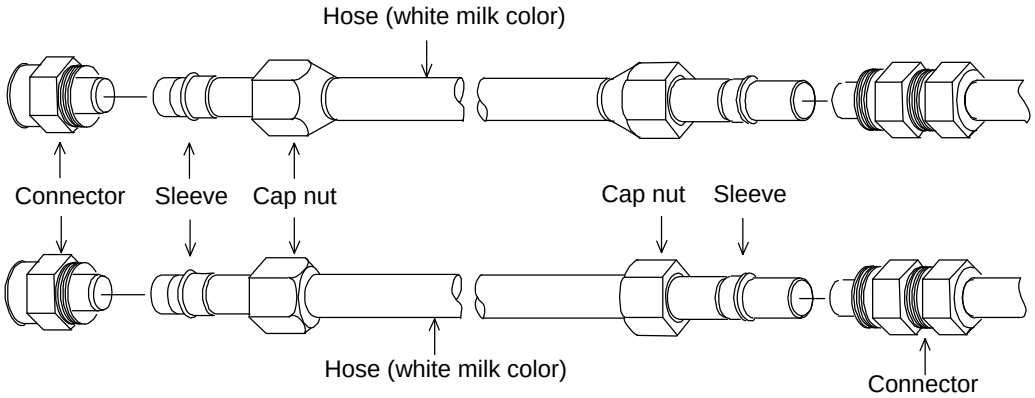
(1) Close the faucet and remove the water supply hose after turning off the unit bleaker.
(2) Turn ② plug to remove from ① ring.
(3) Clean ⑦ filter in the plug by tap water.
(4) Push the filter by flat end of a pencil from the hole at the side of sleeve in case of terrible stoppage.
(5) Brush the filter.
(6) Assemble the filter in the reverse procedure.



Exchange Hoses

- Use the specified hose for exchange.
- Change the pressure-proof hose (white milk color) used for the unit as follows.

(1) Take off cap nuts, and pull the hose out from the connector.
(2) Cut perpendicularly the end of new hose.
(3) Fit the new sleeve and cap nuts to the new hose.
(4) Insert the hose deeply into the connector, and fasten the cap nut through the sleeve.

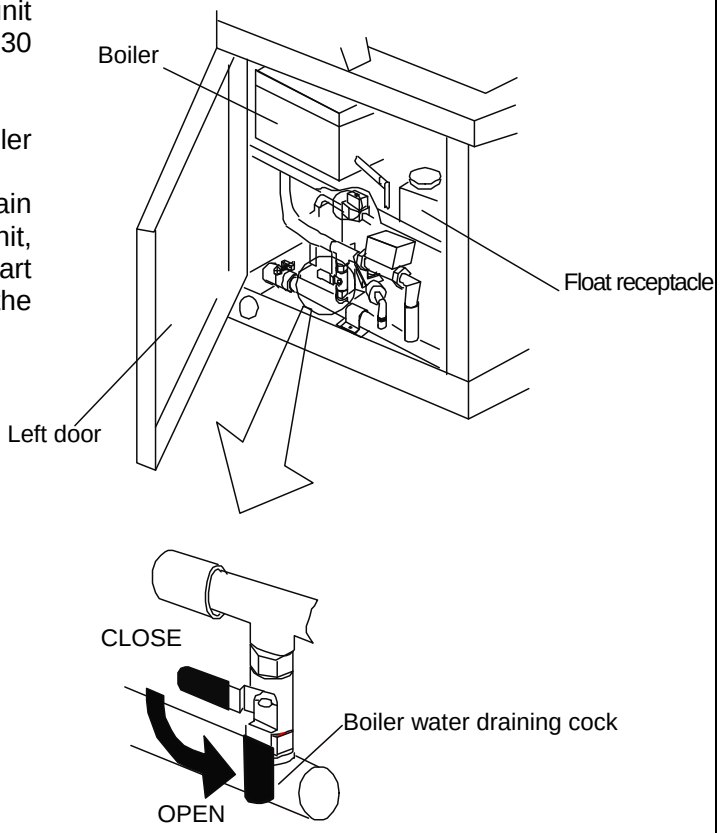


When you do not use the unit for a long time

If you do not use the unit for a long time, turn off the unit bleaker for safety and close the faucet. Water in the boiler and the distilled water tank deteriorates its quality. Drain as follow.

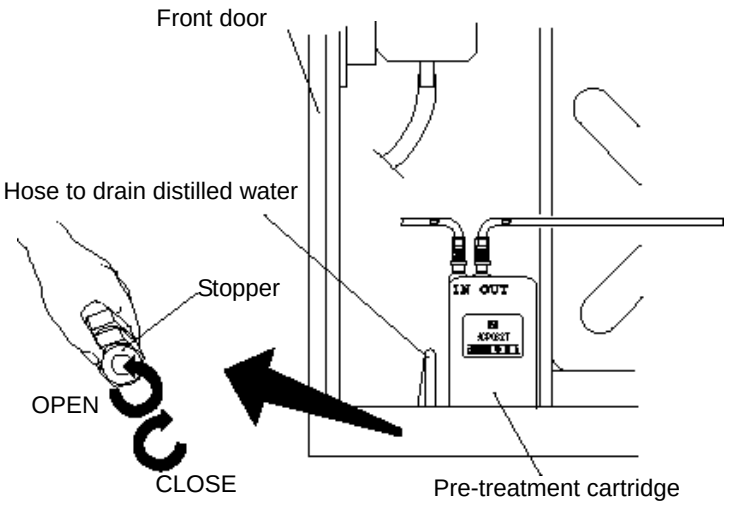
Draining boiler water

(1) Before draining the boiler water, turn off the unit breaker check if faucet is closed and wait for 30 minutes or longer to open left door.
(2) Open the cock to drain the boiler water.
(3) Make sure if all water is drained from the boiler and float receptacle.
(4) Close the boiler water draining cock. If the drain cock remains open in the next use of the unit, water would not flow into the boiler or start distillation. All water would come out from the boiler drain cock.



Draining distilled water

(1) Make sure if the unit breaker is turned off. Open the front door.
(2) Pull out the hose to drain distilled water set at the left back of the pre-treatment cartridge.
(3) Turn end stopper counterclockwise to drain the distilled water from the tank. Check in advance the remaining water level in the tank, and prepare receptacle for drainage.
(4) Be careful not to set the drain hose higher than the bottom level of the distilled water tank, or more tank water remains in the tank.
(5) Insert stopper securely after completing drainage.



After-sales Service and Warranty

When you request repair

If any troubles should occur, note the error code, stop the operation immediately. Turn the power switch off, pull the power cable out and contact the seller or Yamato Scientific's Technical Service Department.

(Necessary information)

- Model number
- Serial number
- Date of purchase
- See the warranty or nameplate on the unit
- Detailed information on difficulties
- The service man requests you to show the warranty on his visit.

Warranty (attachment)

- The seller or Yamato Scientific's fives you the warranty. Keep your warranty card for future references. Check the name of distributor, date of purchase and any other contents of warranty.
- The term of warranty is one year limited commencing the date of purchase. Repair is made without charge according to the contents of warranty.
- As for repair after expiration of the warranty period, consult the seller or our Technical Service Department. As long as the function of the unit can be maintained by repair, we will repair the unit upon your request.

Minimum period to keep repair parts in stock

Minimum period to keep repair parts is 7 year limited after we stop the production of this model of units. The repair parts mean any necessary parts to maintain the performance of the unit.

When you encounter the following

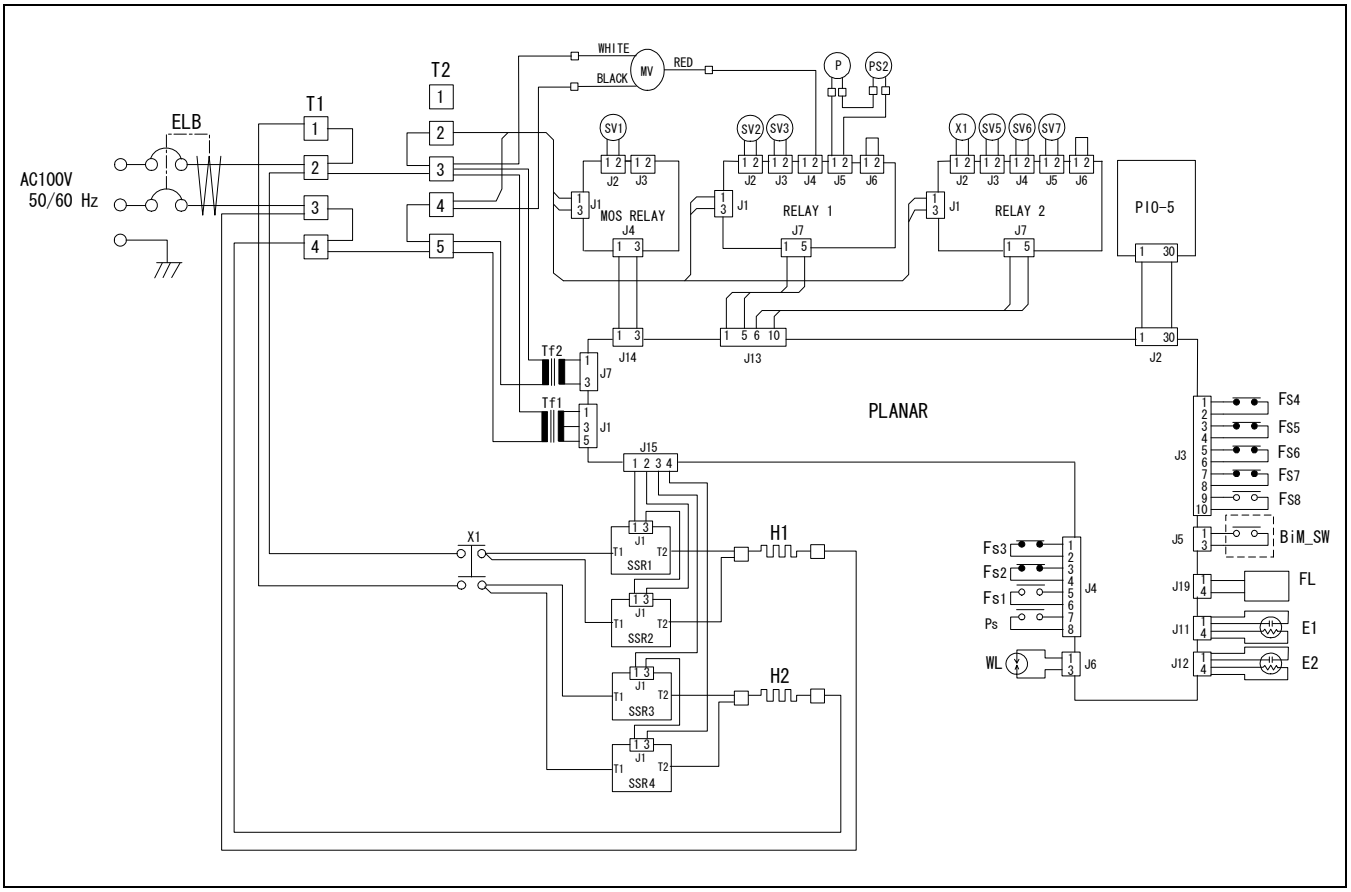
Fault indication	Check points
STAND BY switch is not lit when the breaker is turned on.	● Is the power supply cable is securely connected with a switchboard or outlet? ● Is there any power failure?
No water is supplied. (ion-exchanged water)	● Low pressure or interruption of water service. ● Defect of solenoid valve to take ion-exchanged or distilled water. ● Defect of solenoid valve to supply raw water. ● Defect of pressure switch.
Water supply can not be stopped.	● Defect of float switch. ● Defect of solenoid valve for water supply.
No water is supplied into the boiler.	● Stoppage in the pre-treatment cartridge. ● Defect of float switch. ● Defect of solenoid valve to supply boiler water. ● Defect of solenoid valve to drain boiler water.
Heater can not be turned on.	● Defect of float switch. ● Heater disconnection.
No cooling water flows.	● Defect of solenoid valve for cooling water.
Distilled water is not drained.	● Defect of solenoid valve to drain initial distilled water.
Boiler water is not drained.	● Defect of solenoid valve to drain boiler water.
Distilled water is not stored.	● Defect of solenoid valve to drain initial distilled water. ● Defect in piping.
Distillation would not stop.	● Defect of float switch.
No water is collected.	● Stoppage in the membrane filter. ● Defect of solenoid valve to collect ion-exchanged or distilled water. ● Defect of pump/pressure switch for pump. ● Defect in piping.
Only small amount of water is collected.	● Stoppage in the membrane filter.

Specifications

Type		WA500	WA570	WA710	WA730
Collection method		Distillation ⇒ ion exchange ⇒ Filtration			
Pure water to collect		Distilled / Ion exchanged water			
Volume of distilled water to produce		About 5L/h	About 5L/h	About 10L/h	About 10L/h
Water flow to collect		1 L/min. or more (Distilled / Ion exchanged water)			
Still	Boiler	Stainless steel (SUS304)			
	Condenser	Stainless steel (SUS304)			
	Pipe heater	1.9kw×2	1.9kw×2	2.55kw×3	2.55kw×3
Distilled water tank		Made of polyethylene 60L			
Raw water filter		Pre-treatment cartridge (PWF-1) Activated carbon and hollow fiber membrane (0.1 μ m)			
Pure water filter		Membrane filter (MFRL730) Hollow fiber membrane (0.1 μ m)			
Ion exchanger		Cartridge type (CPC-N) Mix bed resin 3L			
Water quality examiner		Digital display (selection of either electric conductivity or resistivity) 0.05～300×10^{-4}S/m・25℃ (in case of electric conductivity) 18～0.1×10^{4} Ω・m・25℃ (The resistivity is shown by the integral number from 1 to 18)			
Water supply pump		Magnet pump			
Indication of tank water levels		5 levels by LED display			
Water volume to take		0.1～99.9L			
Range of raw water pressure		1～5 ×100kPa (1～5kgf/cm^2)			
Power requirement (50/60Hz)		AC100V About 40A	AC200V Single phase About 20A	AC200V Single phase About 40A	AC200V Triple phase About 26A
External dimensions ★1 (W×D×H)		About 900×600×1,430 (mm)			
Weight		About 120 (kg)			
Supplemental functions		●Water abnormality alarm ●System to prevent operation of the empty pump ●Automatic boiler drainage ●Automatic adjustment of cooling water level ●Prevention of low-water boiling ●Overheat prevention ●Water leak detector ●No water supply detector ●Earth leakage circuit breaker ●Initial distilled water drainage ●Abnormality detection of the float switch for the distilled water tank ●System to set the volume of ion-exchanged water to take ●System to set the volume of distilled water to take			
Expendable supplies		●Pre-treatment cartridge (PWF-1) ●Membrane filter (MFRL730) ●Ion exchanger (CPC-N)			
Accessories		● Water supply hose ●Drain hose (with hose clamp) ●Scale detergent ●Instruction manual ●Warranty			
Non-standard accessories		●Water intake unit (OWH10) ●High purity cartridge (CPC-H) ●Binary raw-water supply system unit (OWA20) ●Installation of supplemental distilled water tank (20L) (OWB20) ●In-take hose joint set (OWF10) ●Drain trap (OWI20/40/50/) ●Pressure pump (OWJ10) ●Soft water producer (OWK20)			

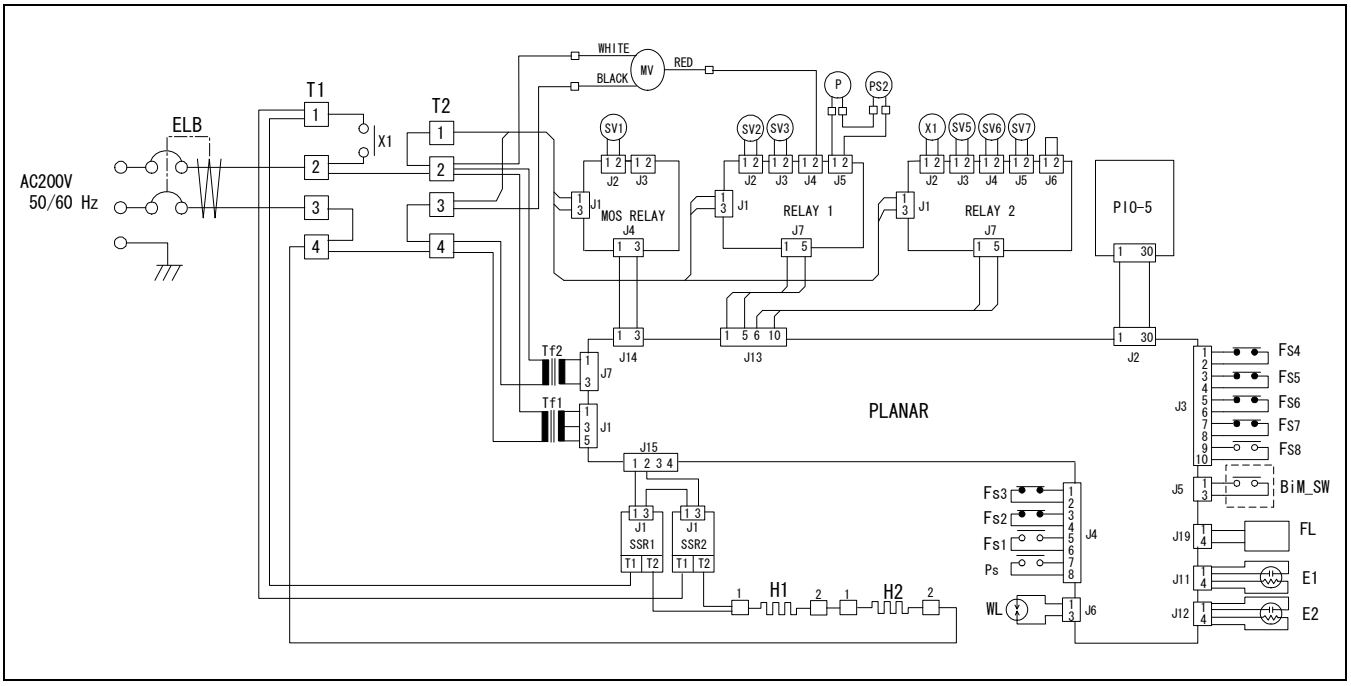
★1…The exterior dimensions exclude projected areas.

WA500



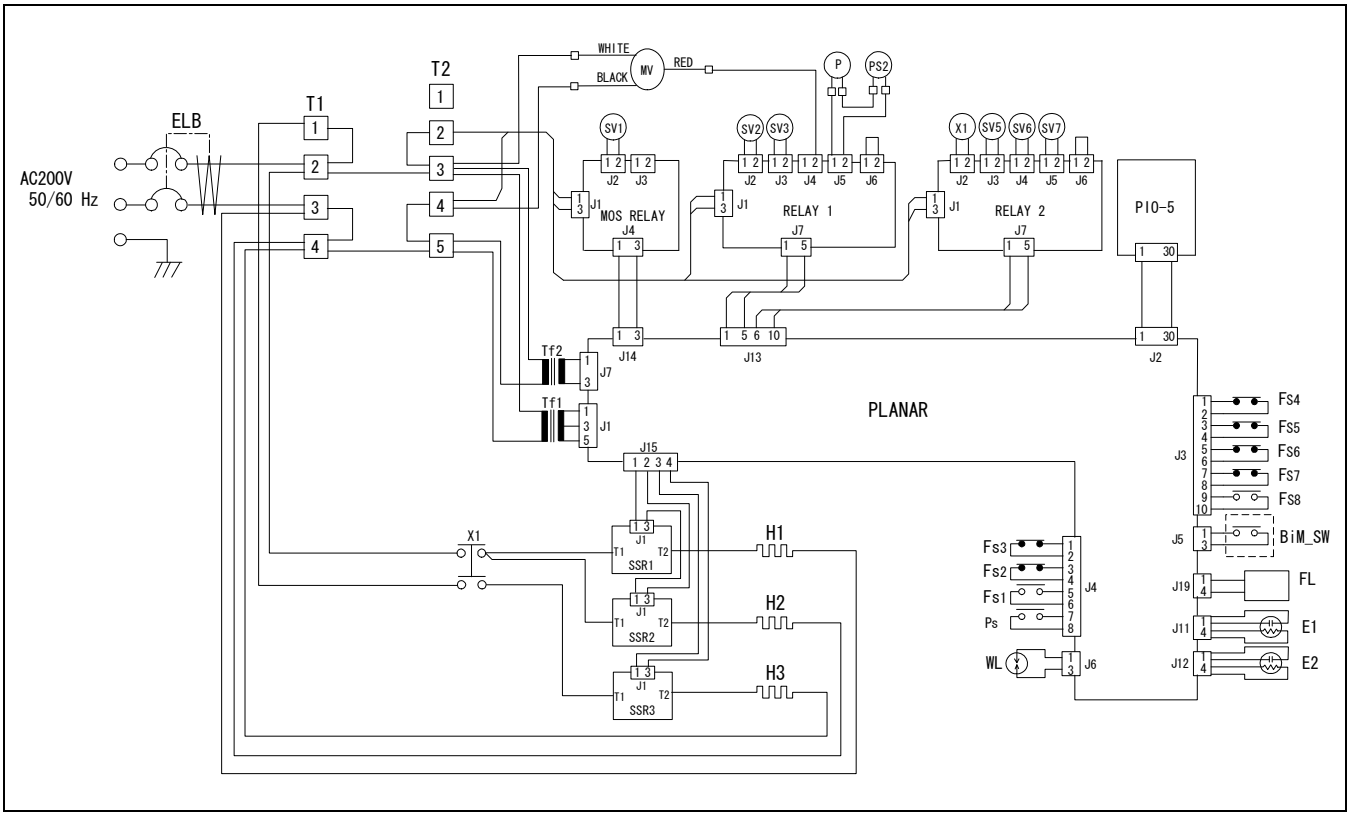
Symbol	Name of Parts	Symbol	Name of Parts	Symbol	Part of name
Bim-SW	Overheat detector (Bimetal system)	SV1	Solenoid valve to supply boiler water	SSR4	SSR board
E1	Electrode for ion-exchanged water	SV2	Solenoid valve for cleaning	T1	Terminal
E2	Electrode for distilled water	SV3	Solenoid valve to drain initial distilled water	T2	Terminal
ELB	Earth leakage circuit breaker	SV5	Solenoid valve to take ion-exchanged water	Tf1	Transformer
FL	Flow sensor	SV6	Solenoid valve for cooling water	Tf2	Transformer
FS1	Float switch to control heater	SV7	Solenoid valve to take distilled water	Wl	Water leak detector
FS2	Float switch to control boiler water level	MV	Solenoid valve to drain boiler water	X1	Relay
FS3	Float switch for boiler overheat	P	Pump	PS2	Pressure switch
FS4	Float switch to check water level	PIO-5	Operation board		
FS5	Float switch to check water level	PLANAR	Planar board		
FS6	Float switch to check water level	PS	Pressure switch		
FS7	Float switch to check water level	RELAY1	Relay board		
FS8	Float switch to check water level	RELAY2	Relay board		
H1	Heater	SSR1	SSR board		
H2	Heater	SSR2	SSR board		
MOSRELAY	MOS relay board	SSR3	SSR board		

WA570



Symbol	Name of Parts	Symbol	Name of Parts	Symbol	Part of name
Bim-SW	Overheat detector (Bimetal system)	SV1	Solenoid valve to supply boiler water	T2	Terminal
E1	Electrode for ion-exchanged water	SV2	Solenoid valve for cleaning	Tf1	Transformer
E2	Electrode for distilled water	SV3	Solenoid valve to drain initial distilled water	Tf2	Transformer
ELB	Earth leakage circuit breaker	SV5	Solenoid valve to take ion-exchanged water	WL	Water leak detector
FL	Flow sensor	SV6	Solenoid valve for cooling water	X1	Relay
FS1	Float switch to control heater	SV7	Solenoid valve to take distilled water	PS2	Pressure switch
FS2	Float switch to control boiler water level	MV	Solenoid valve to drain boiler water		
FS3	Float switch for boiler overheat	P	Pump		
FS4	Float switch to check water level	PIO-5	Operation board		
FS5	Float switch to check water level	PLANAR	Planar board		
FS6	Float switch to check water level	PS	Pressure switch		
FS7	Float switch to check water level	RELAY1	Relay board		
FS8	Float switch to check water level	RELAY2	Relay board		
H1	Heater	SSR1	SSR board		
H2	Heater	SSR2	SSR board		
MOSRELAY	MOS relay board	T1	Terminal		

WA710



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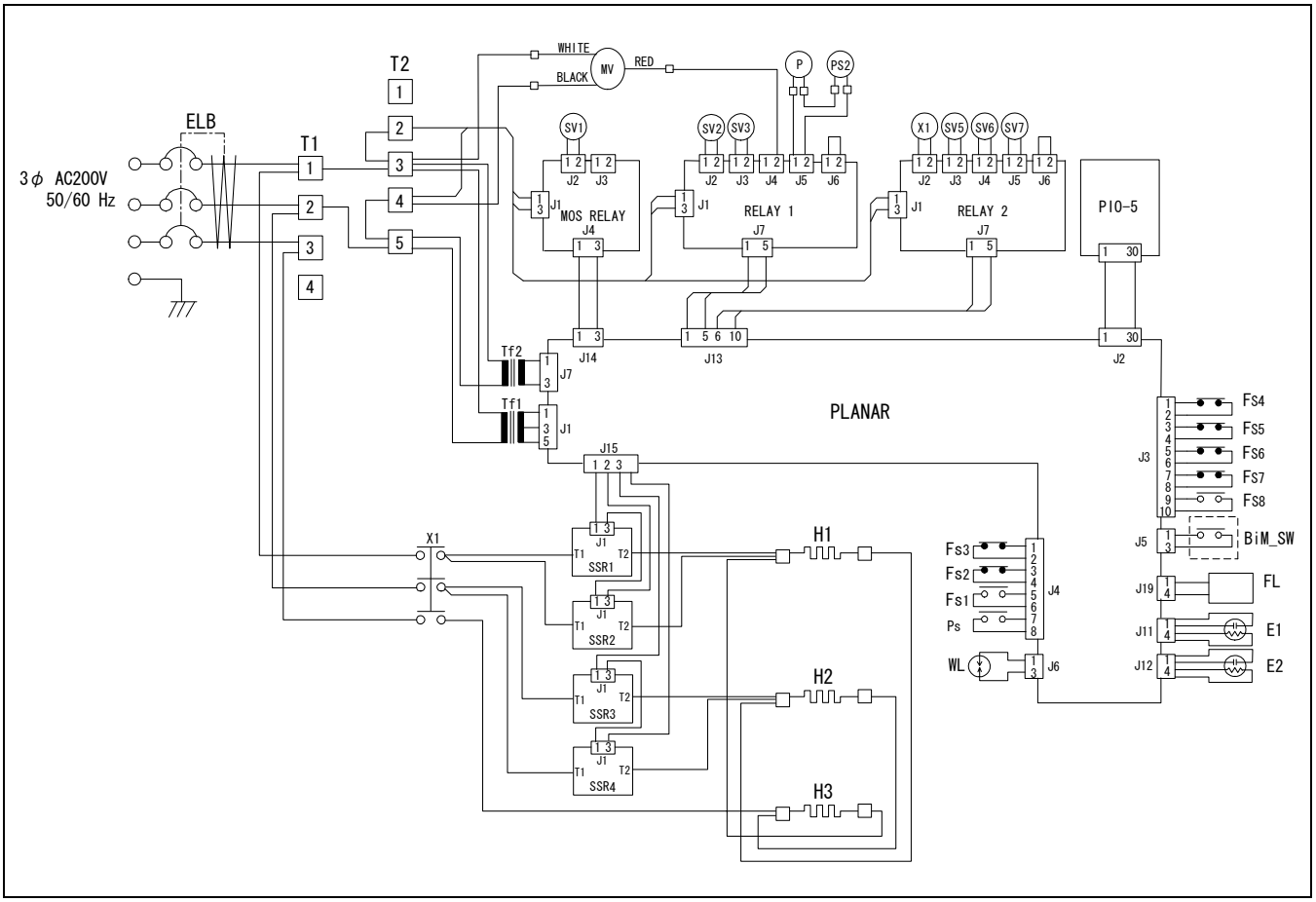
FL	Flow sensor	SV6	Solenoid valve for cooling water	WL	Water leak detector
FS1	Float switch to control heater	SV7	Solenoid valve to take distilled water	X1	Relay
FS2	Float switch to control boiler water level	MV	Solenoid valve to drain boiler water	MOSRELAY	MOS relay board
FS3	Float switch for boiler overheat	P	Pump	PS2	Pressure switch
FS4	Float switch to check water level	PIO-5	Operation board		
FS5	Float switch to check water level	PLANAR	Planar board		
FS6	Float switch to check water level	PS	Pressure switch		
FS7	Float switch to check water level	RELAY1	Relay board		
FS8	Float switch to check water level	RELAY2	Relay board		
H1	Heater	SSR1	SSR board		
H2	Heater	SSR2	SSR board		
H3	Heater	SSR3	SSR board		

WA730



Symbol	Name of Parts	Symbol	Name of Parts	Symbol	Part of name
Bim-SW	Overheat detector (Bimetal system)	SV1	Solenoid valve to supply boiler water	SSR4	SSR board
E1	Electrode for ion-exchanged water	SV2	Solenoid valve for cleaning	T1	Terminal
E2	Electrode for distilled water	SV3	Solenoid valve to drain initial distilled water	T2	Terminal
ELB	Earth leakage circuit breaker	SV5	Solenoid valve to take ion-exchanged water	Tf1	Transformer
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FS1	Float switch to control heater	SV7	Solenoid valve to take distilled water	WL	Water leak detector
FS2	Float switch to control boiler water level	MV	Solenoid valve to drain boiler water	X1	Relay
FS3	Float switch for boiler overheat	P	Pump	MOSRELAY	MOS relay board
FS4	Float switch to check water level	PIO-5	Operation board	PS2	Pressure switch
FS5	Float switch to check water level	OLANAR	Planar board		
FS6	Float switch to check water level	PS	Pressure switch		
FS7	Float switch to check water level	RELAY1	Relay board		
FS8	Float switch to check water level	RELAY2	Relay board		
H1	Heater	SSR1	SSR board		
H2	Heater	SSR2	SSR board		
H3	Heater	SSR3	SSR board		