

Demineralizers

Still, water, model WG201

First Edition

Thank you very much for buying Yamato Scientific AUTO STILL series WG201 model.

For proper use of this unit, please 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 manual prior to use.

Yamato Scientific CO.,LTD

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Explanation of Graphic Indication

This instruction manual and our products apply various graphic indications for safety use. Ignoring these indicators or improper handling of the unit can cause such situations 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.



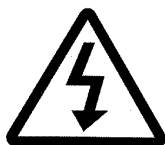
It shows prohibited conducts.

Table of Symbol Mark

Warning



General Warning



Warning of High Potential voltage



Warning of High Temperature



Warning of drive section



Warning of explosion

Caution



General Caution



Caution of electric shock



Caution of scald



Caution of low-water boiling



Caution of water leak



Water only



Caution of deadly poison

Prohibition



General Prohibition



Prohibition of fire



Prohibition of disassembling



Prohibition of touch

Compulsion



General Compulsion



Ground the unit



Install on level area



Pull electric power plug



Fixed time check or maintenance

Caution for Safety



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.

See Page5 for dangerous element Table of Dangerous Element



Never fail to ground the unit.

Connect with the grounded outlet. If you do not have grounded outlet, use the adapter for grounding that is non-standard accessories, and then be sure to ground the lead. 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.



Fasten the tap when you do not use the unit

When you do not use the unit (in the nighttime or holidays) , certainly fasten the tap to prevent the accident of water leak .

Caution for Safety



Caution



If it begins to thunder.

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



Be careful for using the cleanser (Organosol).

The main ingredients of the cleanser (organosol) is sulfamic acid and the solution is about PH1. Wear protective gloves, mask and glasses to handle the cleanser. Wash immediately by pure water the cleanser splashing on body.

Table of Dangerous Element

Explosive	Explosive Substance	Nitroglycol, Nitroglycerin, Nitrocellulose, and other explosive nitric esters.
		Trinitrobenzene, Trinitrotoluene, Picric acid, and other explosive nitro compounds.
		Peracetic acid, Methyl ethyl ketone peroxide, Benzoyl peroxide, and other organic peroxides.
		Sodium azide, and other metallic azides
Flammable	Combustible Substance	Metallic lithium, Metallic potassium, Metallic sodium, Yellow phosphorus, Phosphorus sulfide, Red phosphorus, Celluloid, Calcium carbide, Lime phosphate, Magnesium powder, Aluminum powder, and other combustible metal powders and sodium dithionite (hydrosulfite).
	Oxidant	Potassium chlorate, Sodium chlorate, Ammonium chlorate, and other chlorates.
		Potassium perchlorate, Sodium perchlorate, Ammonia perchlorate, and other perchlorates.
		Potassium peroxide, Sodium peroxide, Barium peroxide, and other inorganic peroxides.
		Potassium nitrate, Sodium nitrate, Ammonia nitrate, and other nitrates.
		Sodium chlorite and other chlorites.
		Calcium hypochlorite and other hypochlorites.
	Ignitable Substance	Ethyl ether, Gasoline, Acetaldehyde, Propylene Oxide, Carbon disulfide, and other flammable substances with a flash point below minus 30°C.
		Normal hexane, Ethylene oxide, Acetone, Benzene, Methyl ethyl ketone, and other flammable substances with a flash point between minus 30°C and 0°C.
		Methanol, Ethanol, Xylene, Pentyl acetate (amyl acetate), and other flammable substance with a flash point between 0°C and 30°C.
		Kerosene, Light oil, Turpentine oil, Isoamyl alcohol, Acetic acid, and other flammable substances with a flash point between 30°C and 65°C
	Combustible Gas	Hydrogen, Acetylene, Ethylene, Methane, Ethane, Propane, Butane and other flammable gas at 15 degree and under 1 atmosphere.

Installation and Preparation for Use



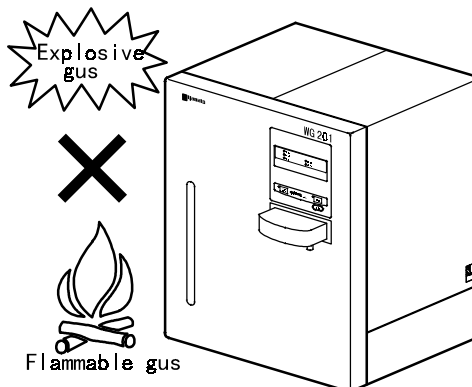
Warning



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.

See Page 5 (Table of dangerous element) about flammable or explosive gas.

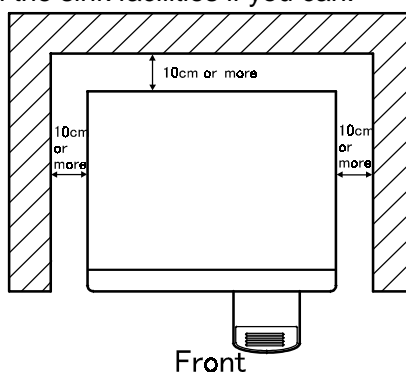


Select carefully the space to install the unit.

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.
Install the unit in the place with the sink facilities if you can.



Installation and Preparation for Use



Warning

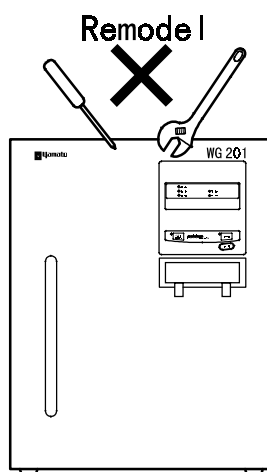


Do not remodel this unit.

Never disjoint this unit to avoid electric shock.

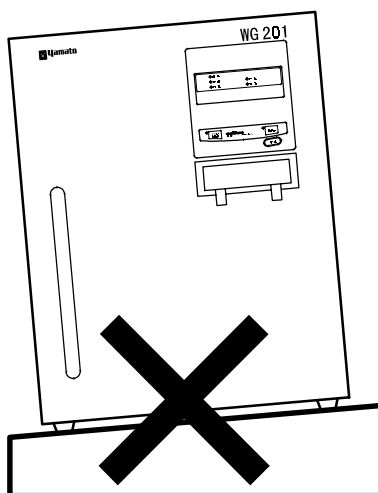
There are some high-pressure areas inside the unit. Ask your seller or Yamato Scientific's Technical Service Department for internal adjustment or repair.

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.



Installation and Preparation for Use



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.

Ground the ground lead to the ground wire or terminal of the power source. Contact an electrician if you have no equipment for grounding.

Never connect with gas or water pipe.



Use exclusively the outlet.

Use an outlet with adequate capacity (more than 15 A).

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 cord to the sufficient power source.

Necessary capacity : AC100V single-phase 15A



Precaution for connecting the power cord.

Check certainly that the circuit breaker of power source is "off" and connect the power cord for this unit. Power plug of this unit is three core cable. So the plug has grounding line. If you do not have adaptable outlet (See Page2), use the adapter for grounding that is non-standard accessories. If you use it, be sure to ground the lead wire.



Precaution for proper use of the power cord

Do not bundle the power cord during operation, or overheat or fire can occur.

Do not process, or bend, wrench or pull forcibly the cord. Such conduct can cause a fire or electric shock.

Do not damage the cord, 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 cord near any stoves or heaters, or the cable coating can melt causing a fire or electric shock.

If the power cord is damaged (core exposure or disconnection), turn immediately the circuit breaker and the power supply off, and request the seller to change the power cord. Neglecting this procedure can cause a fire or electric shock.

Connect the cord to an appropriate outlet.

Installation and Preparation for Use



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.

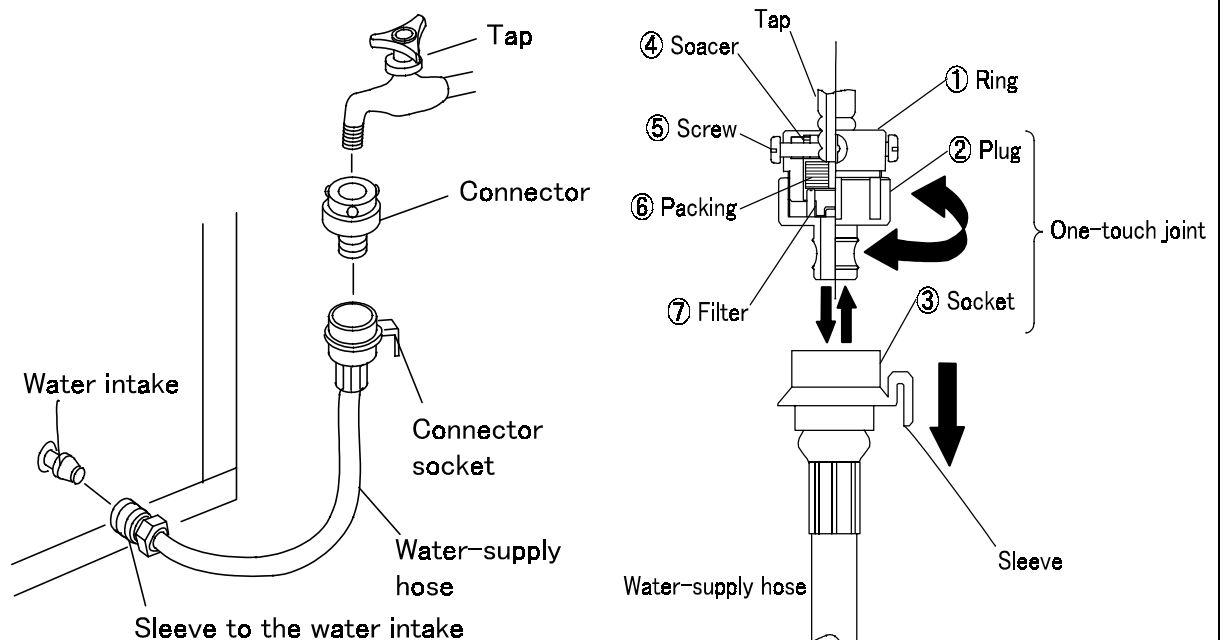
Use the connector and water-supply hose out of accessories for this unit. Install the unit on the level and stable place near a tap and drainage.



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

Connect to a tap.

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



Installation and Preparation for Use

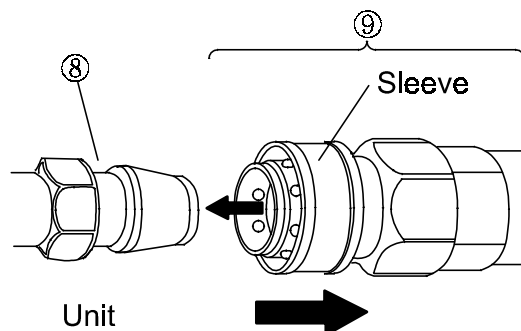


Warning



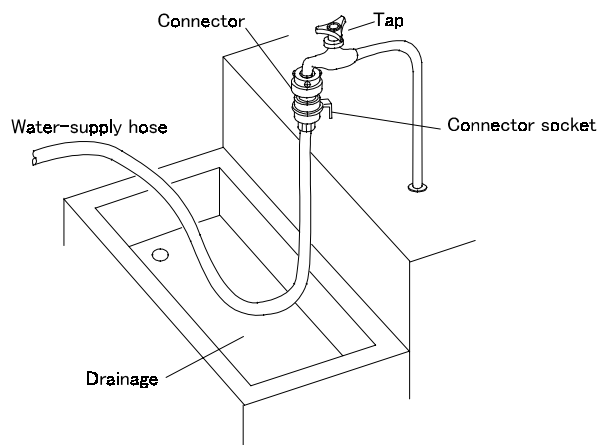
Connection to the unit

- (1) Remove the rubber cap from the plug .
- (2) Slide the sleeve to the direction the arrow shows, and insert securely the socket into the plug .
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.



Installation and Preparation for Use



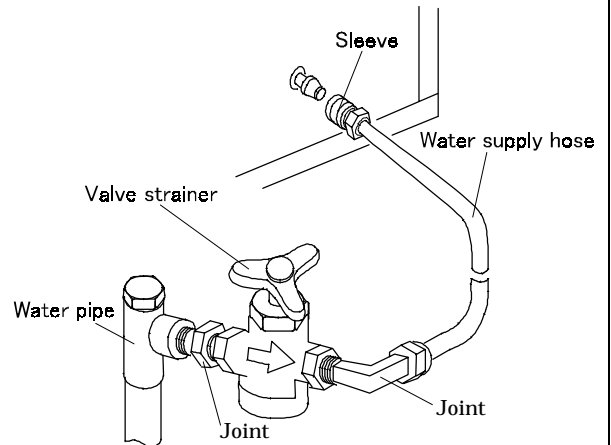
Caution



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 joint. 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 0.5 to 5×100kPa (0.5 to 5kgf/cm²) even for use at night.

Keep the same water pressure even when you use the non-standard accessory "Water Supply Unit",



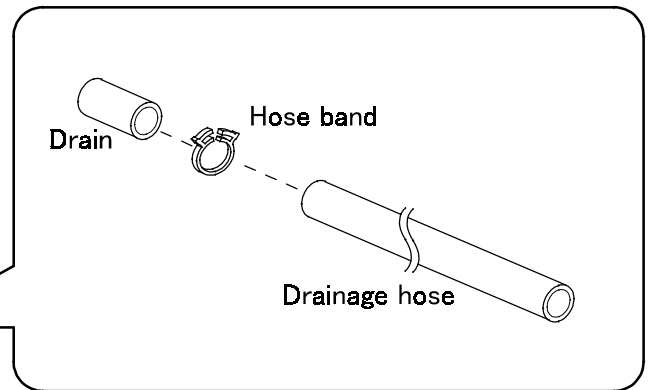
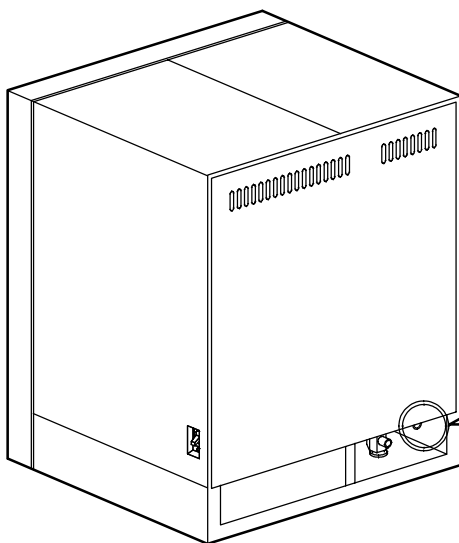
Warning



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 and the hose band out of accessories for the unit.
- (2) Make sure the circuit breaker is off.
- (3) Take out the rubber stopper from the drain .
- (4) Pass the hose band over the hose. Then, insert the hose into the drain and fasten the hose band.

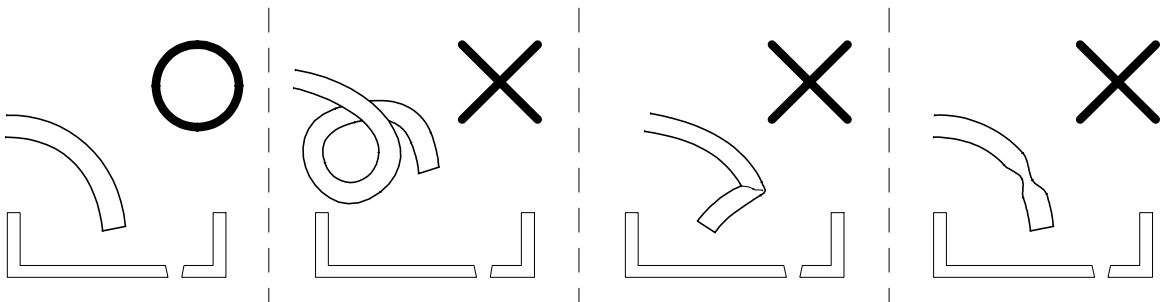


Be careful to arrange the drainage hose.

Do not bend the hose nor make any convex part.

Arrange the hose lower than the drain of the unit. And also avoid the connection which make water accumulate in the drainage hose or drain exit and become resistance for drain.

Lead the end of the drain hose to drainage capable of about 2 ℓ/min. of cooling water drained. Drainage with larger capacity is required when boiler water is drained.



Installation and Preparation for Use



Warning



Check the temperature of drained cooling water.

The drained water sometimes exceeds 60 °C in drainage of boiler water. 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 water can deteriorate the pipe. You must connect the drain trap, a non-standard accessory for the unit, to the chloroethylene pipe in case the pipe temperature does not get lower than 60 °C.

Use the drain trap of the non-standard accessory even under 60 °C when you do not use the above-said pipe and joint.

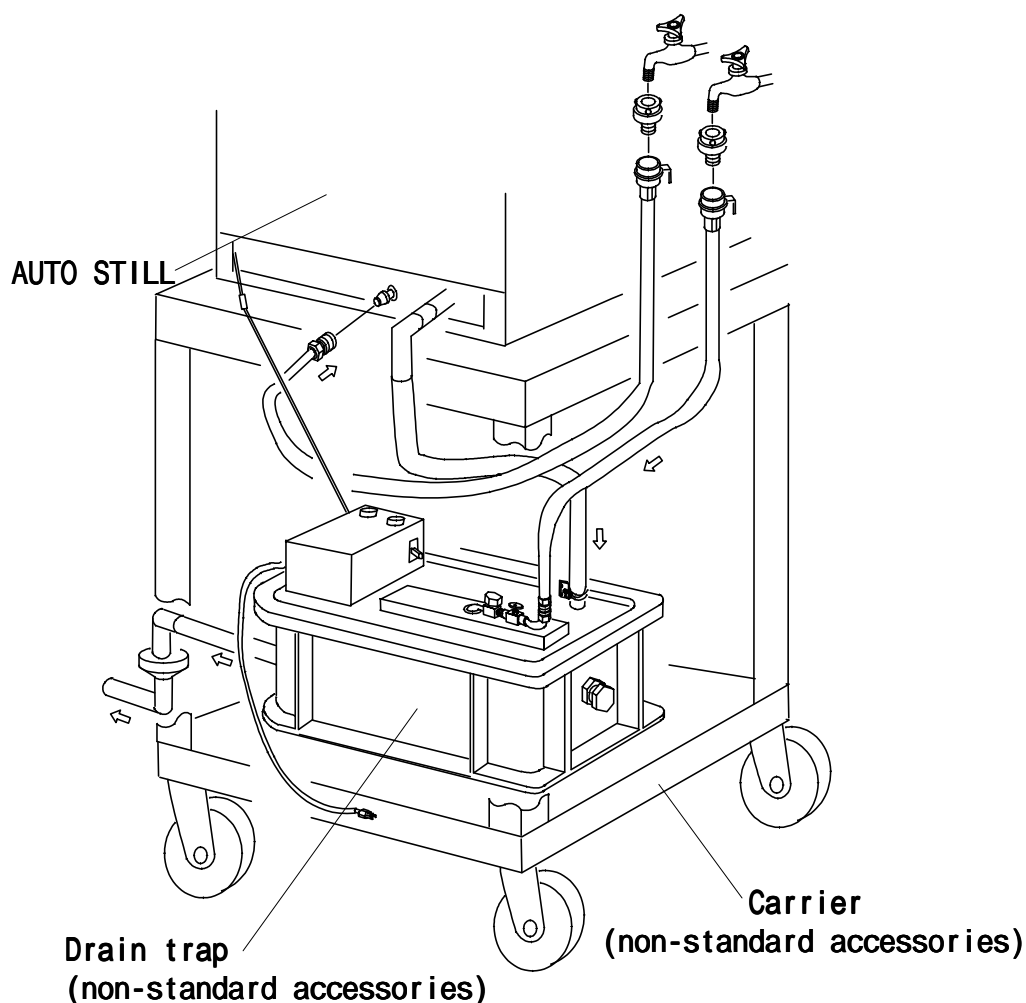


If the drain pipe of the drainage facility does not get lower than 60 °C.

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, the trap mixes tap water and cooled drained water. Then mixed water is drained to drainage facility after mixed water is cooled down.

If you want to know about the details of the drain trap, ask your seller or Yamato Service Department.





Warning



Connect securely the Ion-exchange resin cartridge.(CPC-N)

Connect securely the ion-exchange resin cartridge(CPC-N) as follows.

If you do not connect securely, the connected hose would come off, causing water leak.

- (1) Make sure the earth leakage circuit breaker or the unit is switched off, and the tap is being fastened.
- (2) Use the ion-exchange resin cartridge out of accessories for the unit.
- (3) Put the ion-exchange resin cartridge on the receive table.(See Fig.01)
- (4) Fix the ion-exchange resin cartridge with the band of the receive table.(See Fig.02)

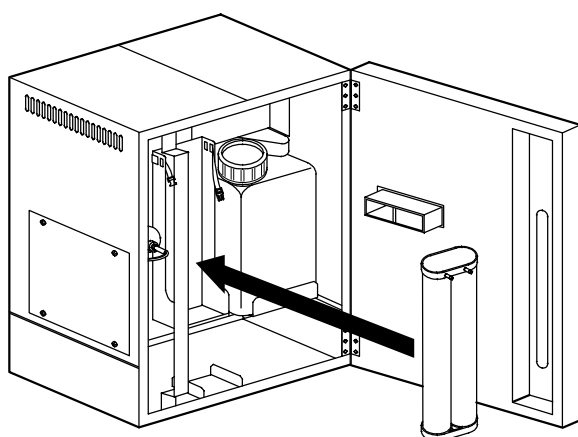


Fig.01

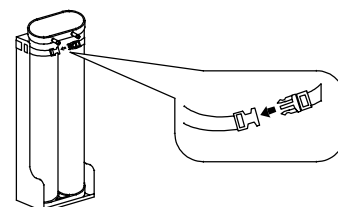
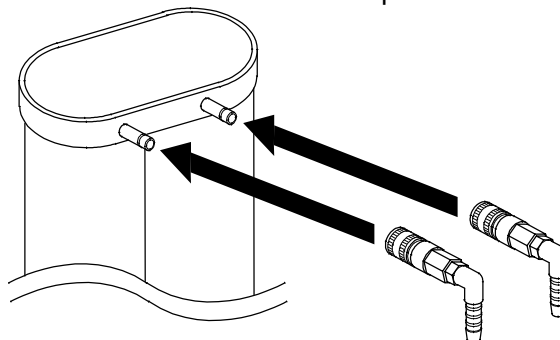


Fig.02

- (5) Remove the rubber cap from the entrance and exit of the ion-exchange resin cartridge.
- (6) Insert the coupler which marked "IN" into the entrance(left side) of the ion-exchange resin cartridge as far as making sounds like "katchi".
- (7) Insert the coupler which marked "OUT" into the exit(right side) of the ion-exchange resin cartridge as far as making sounds like "katchi".

Sometimes the coupler is not easy to be inserted. If you insert the coupler hard, you may break the insertion. Be careful not to insert the coupler curved.



- (8) When you want to remove the coupler from the ion-exchange resin cartridge, it makes easy to remove the coupler that you pull the coupler forward with pushing the black part of the coupler deeply .



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 breaker or the unit is switched off, and the tap is being fastened.
- (2) Use the pre-treatment cartridge out of accessories for the unit.
- (3) Take off the caps on the IN and OUT of the cartridge .
- (4) Open the unit front door. Then you can find one connecting hose with the IN coupler and other with the OUT. Connect the respective hoses to IN and OUT of the cartridge .
- (5) To connect each hose, slide the blue part 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 .(See Fig.03)
- (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.(See Fig.04)

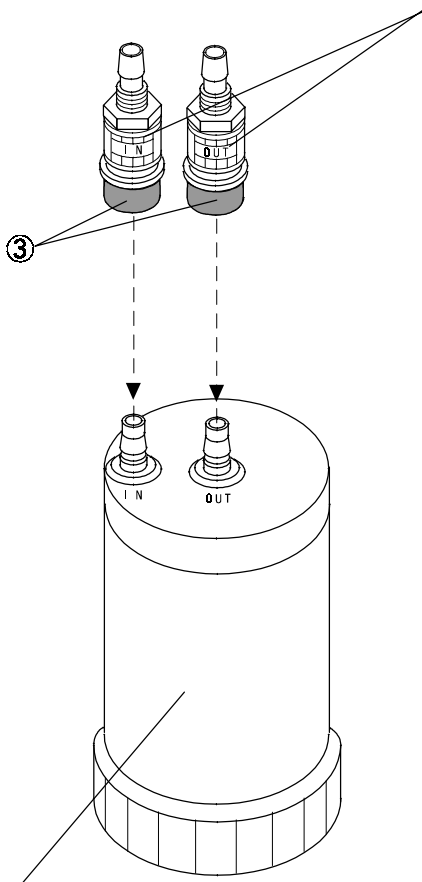


Fig.03

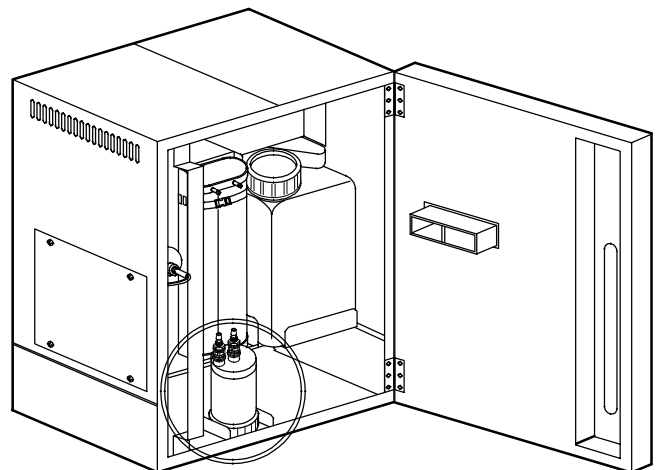


Fig.04



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 unit source breakers, extract the electric power plug, 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.

Dispose of the unit as large-sized discarded article.
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 the neutralizer (sodium hydroxide etc.).
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 into an agricultural irrigation channel or fields. The cleanser can kill rice plants and other farm products.

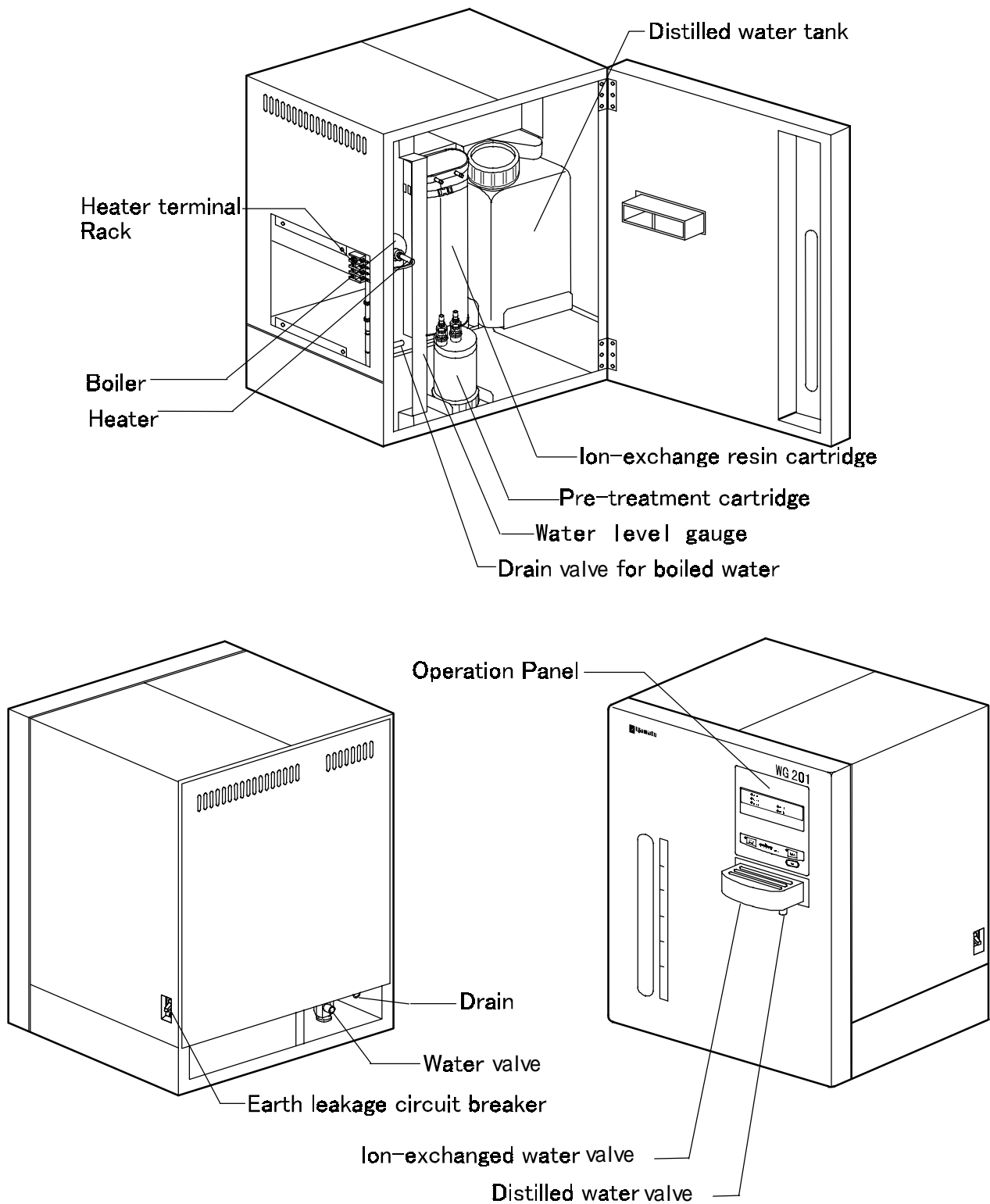


When you do not use the unit in the nighttime or holidays

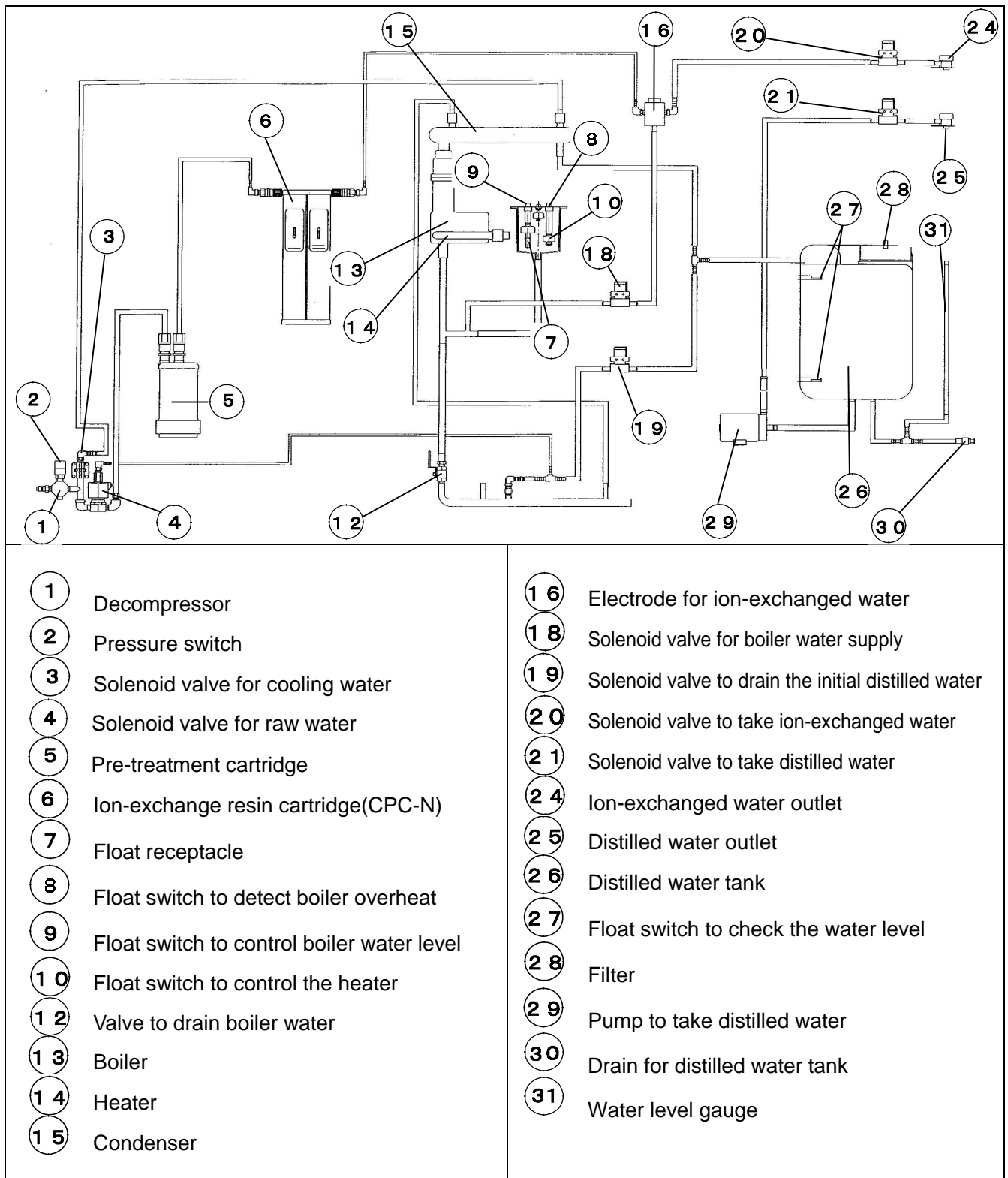
Turn the circuit breaker off.
Be sure to Fasten the tap.
The change of water pressure may cause some accident like water leakage.

Body

This drawing identifies parts.

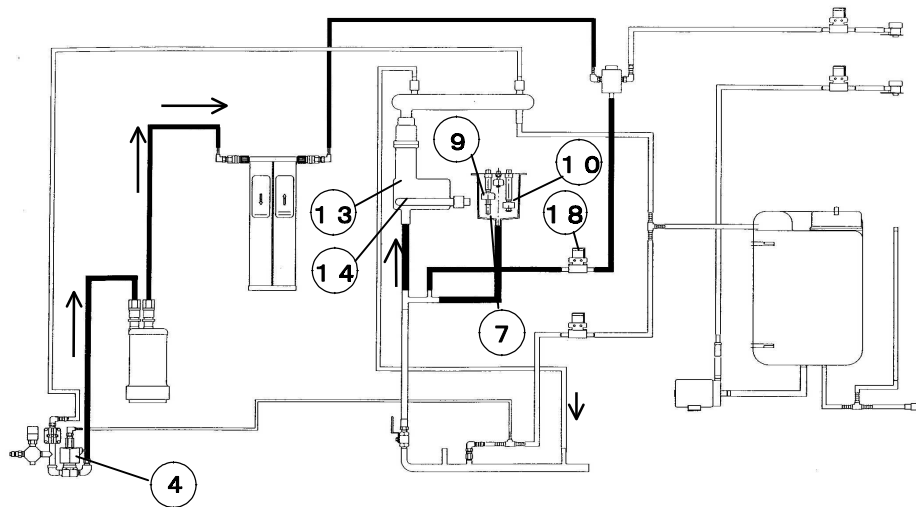


Piping Diagram



Operation System

(1) Supply and distillation of boiler water

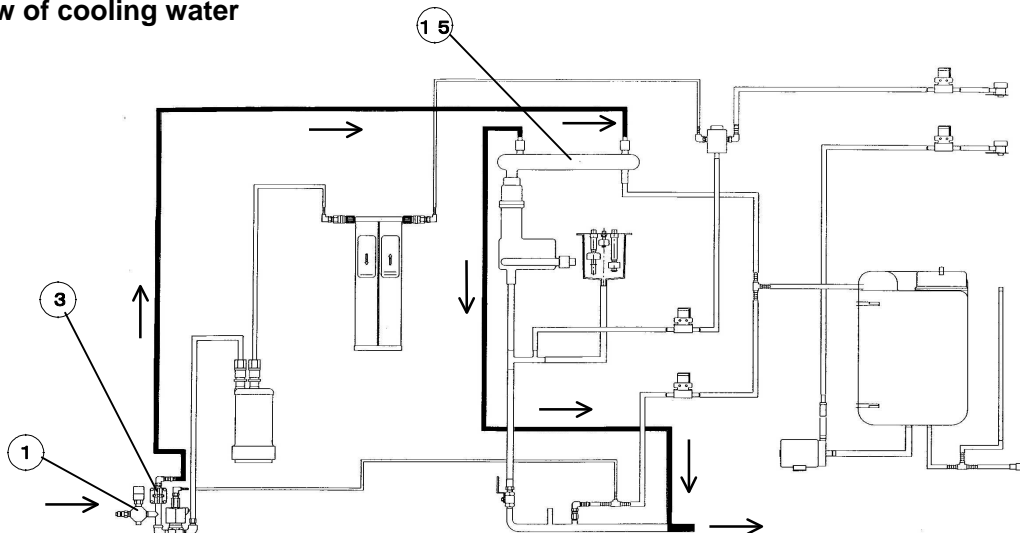


Turn the circuit breaker on and push the power switch ,then, (4) solenoid valve for raw water and (18) solenoid valve for boiler water opens at the same time ,and then water is supplied into (13) boiler.

When (10) float switch to control the heater in the (7) float receptacle finds water level sufficient, (14) heater becomes on to start distillation.

Following water supply, when (9) float switch controls water supply into the boiler by opening and closing (4) solenoid valve for raw water and (18) solenoid valve for boiler water.

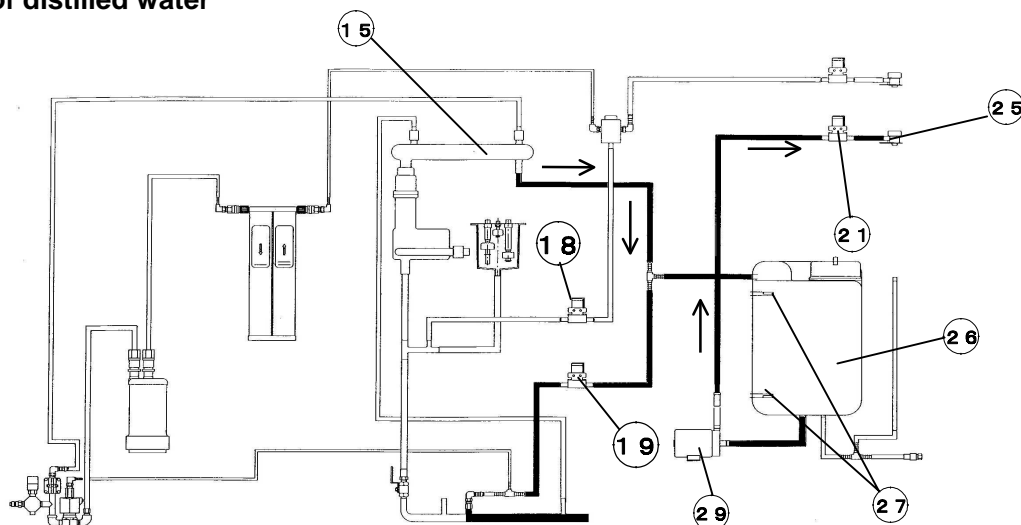
(2) Flow of cooling water



In distillation of boiler water ,cooling water flows and drains from the (1) decompressor, (3) cooling water solenoid valve to (15) condenser. When distilled water tank is full of water or taking ion-exchanged water , distillation stops and water flow and drain stops automatically.

Operation System

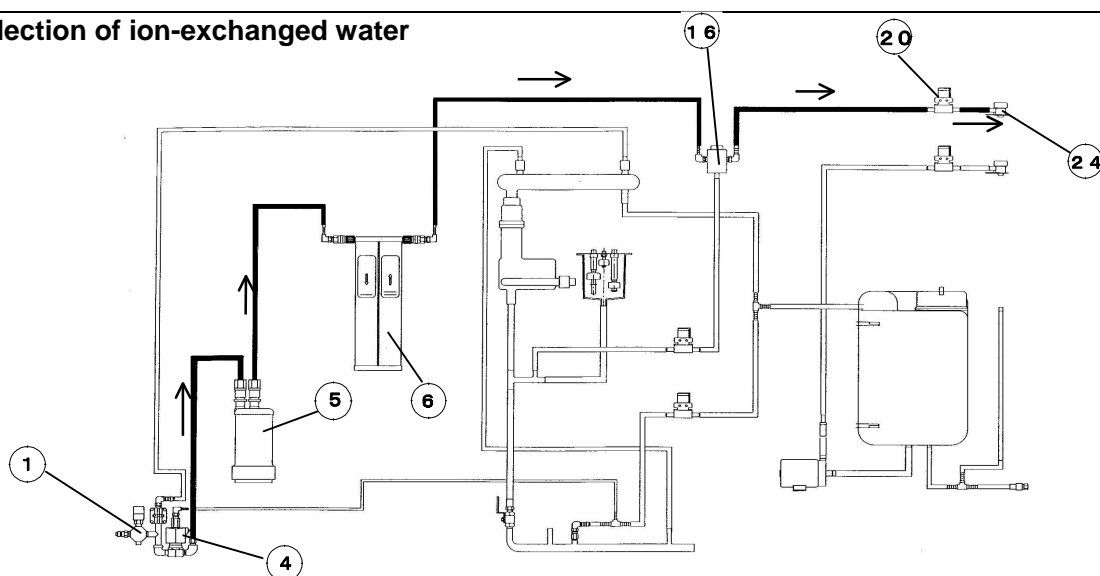
(3)Collection of distilled water



For about 11min. from the power switch pushed, distilled water condensed in (15) condenser is stored into (26) distilled water tank, after initial water is drained by (19) solenoid valve (to drain the initial distilled water) opened. The unit judges water full and stops distillation when the highest (27) float switch inside the tank is activated. After collecting distilled water and using some amount of distilled water, the distilled water is made automatically.

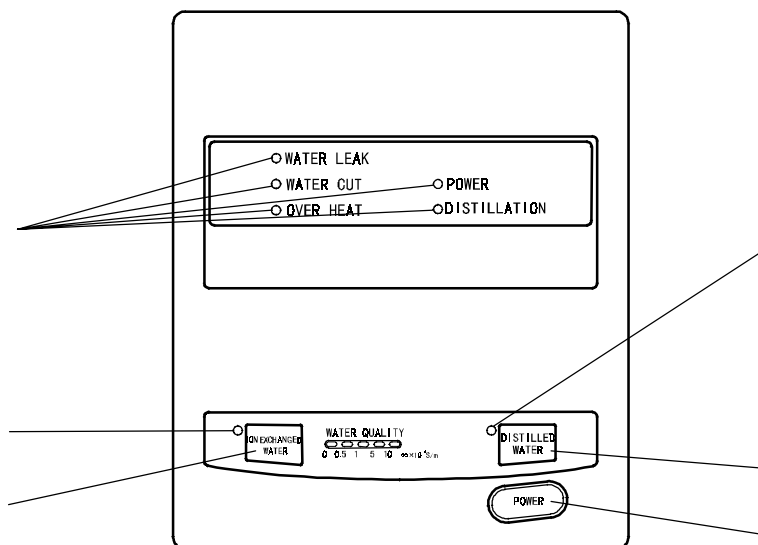
Distilled water stored is taken out by (29) pump (to take distilled water) through (21) solenoid valve to take distilled water and (25) distilled water outlet.

(4)Collection of ion-exchanged water



Ion-exchanged water is taken out by through (1) decompressor, (4) solenoid valve for raw water, (5) pre-treatment cartridge, (6) ion-exchange resin cartridge (CPC-N), (16) electrode for ion-exchanged water, (20) solenoid valve to take ion-exchanged water, and (24) ion-exchanged water outlet.

Operation Panel



Power switch

This is the switch for power supply. When you push the switch, power becomes "ON". If you push the switch again, then power becomes "OFF".

Operation indication lamp

POWER : The green lamp is lit when the power source is "ON".
 DISTILLATION : The green lamp is lit during distillation.
 WATER LEAK : The red lamp is lit during water leak.
 WATER CUT : The red lamp is lit during the interruption or pressure decrease of original water flow.
 OVER HEAT : The red lamp is lit during the heater overheating.

Switch to take ion-exchanged water

When you push this switch, the switch becomes "ON" to collect ion-exchanged water. If you push the switch again, then the switch becomes "OFF" to stop collection.

Lamp to indicate collection of ion-exchanged water

The green lamp is lit during collection of ion-exchanged water.

Water quality indicator of ion-exchanged water

This indicator shows 5 levels of the electric conductivity of ion-exchanged water with the lamp lit. The green lamp of left edge is lit while the conductivity is the lowest. : while the water quality is the best. When the electric conductivity become higher, the lamp that is lit moves to the right lamp. When electric conductivity is more than 10×10^{-4} S/m (10μ S/cm) , the red lamp of right edge is lit. If the red lamp is lit during the ion-exchanged water collecting, it means the life of the ion-exchange resin cartridge. Exchange it with the new ion-exchange resin cartridge.

Switch to take distilled water

When you push this switch, the switch becomes "ON" to collect distilled water. If you push the switch again, then the switch becomes "OFF" to stop collection. When the amount of the water in distilled water storage tank is less than 2ℓ, you can not take distilled water. The unit stops its operation automatically when the collection reaches less than 2ℓ during collection,

Lamp to indicate collection of distilled water

The green lamp is lit during collection of distilled water.

Identification of “TROUBLE” / Identification of causes

This unit has self-diagnosis function. If any operational abnormalities or machine troubles should occur, the alarm lamp in operation panel blinks. If this occurs, immediately disconnect the breaker and turn the tap off.

See page 27 “Troubleshooting” ,if you need to know about the details of identification of “TROUBLE”.

LEAKAGE

The LEAKAGE lamp blinks.

Water leakage

INTERRUPTION

The INTERRUPTION lamp blinks.

Interruption or pressure decrease
of original water flow

OVERHEATING

The TROUBLE lamp also blinks.

Heater overheating

Preparation and Check before Use

**Warning**

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.
- If the hose is bent, not only the unit does not run correctly, but also it may cause the accident of water leak. Sometimes check if the drain is done correctly.

3. Check the power source.

- Make sure that the power cable is connected to an appropriate outlet.

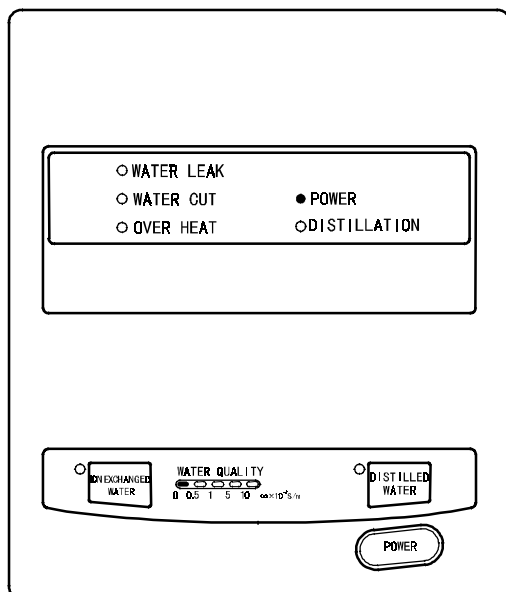
4. Just after run

- After turning on electricity initially or drain from distilled water tank, It takes much time to start collecting of distilled water because of the air in pump or pipe.
- Just after exchanging pre-treatment cartridge or Ion-exchange resin cartridge, it also takes much time to start collecting of distilled water. And when you change the some of cartridge, drain about 5 liters to remove the initial impurities.

Run Menu

Run menu as follows when you are ready for operation.

1. Power-on

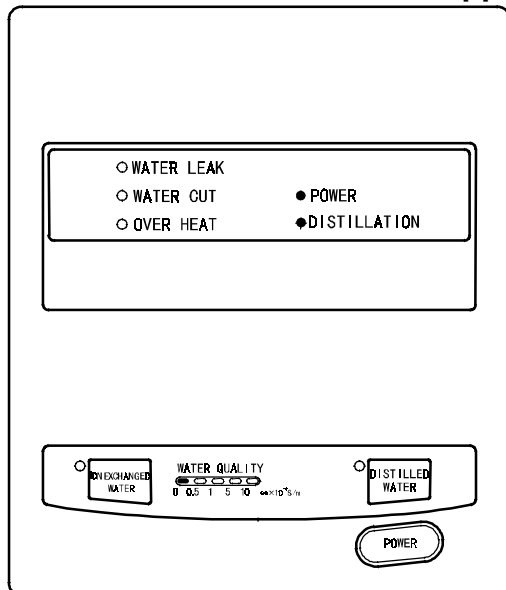


- 1 Switch ON the earth leakage circuit breaker.
- 2 Push the POWER switch after a few seconds.

The POWER, an operational indication lamp of green color, is lit.

The lamp which shows the quality of ion-exchanged water in the indicator is lit.

2. The distillation starts after supply of boiler water.



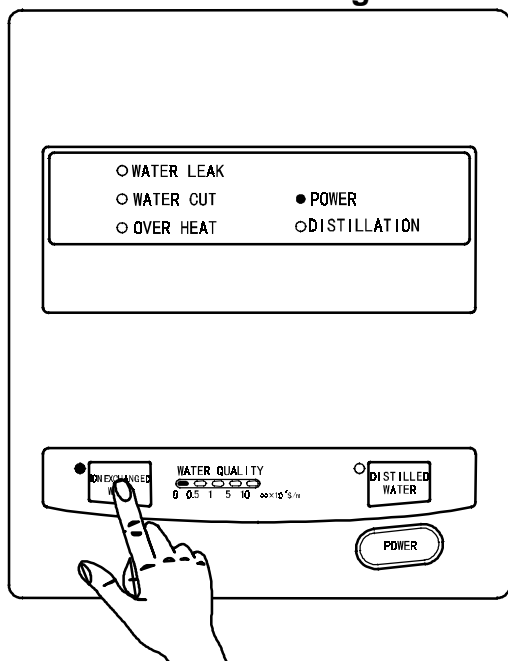
The DISTILLATION, an operational indication lamp of green color, is lit.

3. The distillation stops after distilled water tank is full of water.

The DISTILLATION, an operational indication lamp, goes out.

Collection of Pure Water

Collection of ion-exchanged water



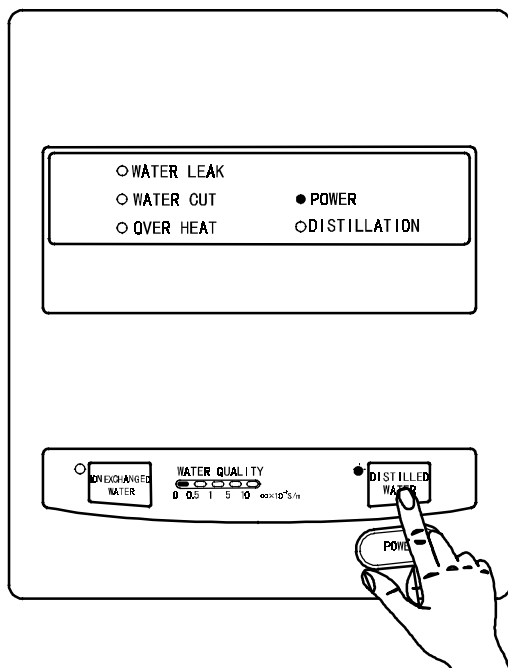
If you push the ION EXCHANGED WATER switch during the distillation,

The DISTILLATION, an operational indication lamp, goes out.

The lamp indicating collection of ion-exchanged water blinks.

You can collect the water from ion-exchanged water intake.

Collection of distilled water



If you push the DISTILLED WATER switch,

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

You can collect the water from distilled water intake.

Check if the amount of water in the tank is more than 2 liters by watching water level gauge.

When the amount of water in the tank is less than 2 liters, you can not take distilled water.

Indication of Water Quality

Measurement of Electric conductivity

The lamp of water quality examiner in the operation panel shows the electric conductivity at the exit of ion-exchange resin cartridge. Use the indication as the standard for exchanging ion-exchange resin cartridge. When you read the indication, be sure that the part of electrode is in the full of water; that is in the flowing of ion-exchanged water. Besides that the part of electrode is not in the water, the indication is not correct for the influence of bubbles in the following case.

1. At the beginning of running or during the unit stopped
2. Just after exchanging pre-treatment cartridge or ion-exchange resin cartridge

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 shows 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;

$R = \text{Resistivity} = \frac{1}{\rho \times \text{Electric conductivity}}$

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

Pure water theoretically has the following value.

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

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

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.

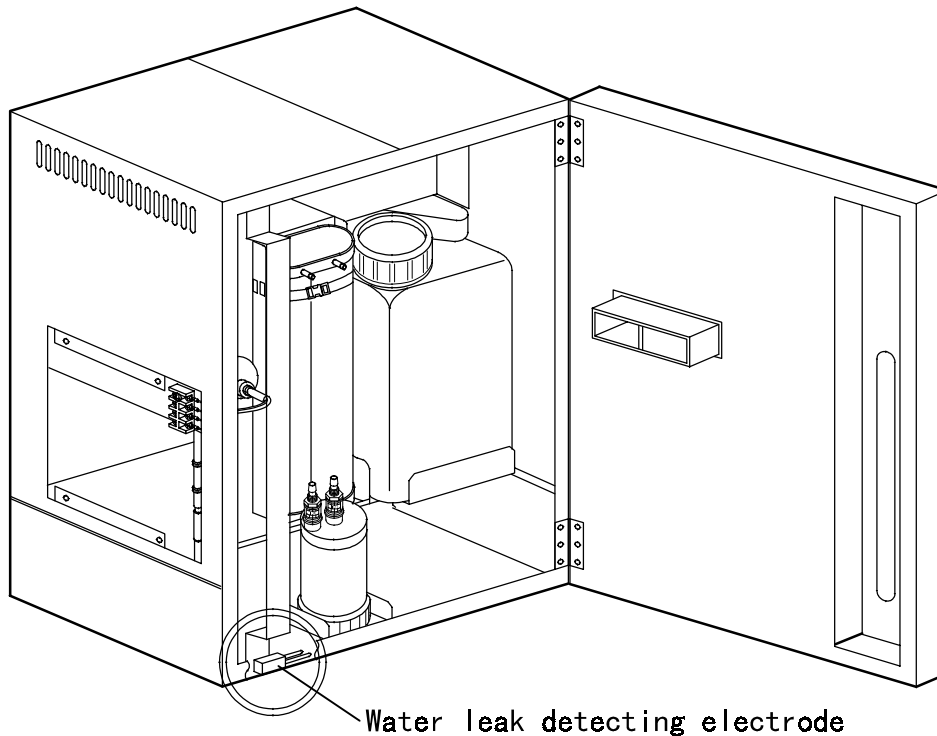
However, water absorbs carbonic acid gas from air and creates carbonic gas during its production process (in condensation and storage).

Accordingly, water quality is worse than ion-exchanged water and becomes weak acid (pH5 to 6) with its electric conductivity about $1 \text{ to } 2 \times 10^{-4} \text{ S/m } 25$ (1 to 2.5 $\mu \text{ S/cm}$).

Troubleshooting

Troubleshooting when “LEAKAGE “ to indicate water leak is lit.

- (1) Turn the earth leakage circuit breaker in the right side of the unit OFF.
- (2) After the defect is repaired, to re-start the operation, wipe the water at the bottom areas of the device and dry it, and also remove the water leak detecting electrode and dry it.
- (3) Set the electrode in the original position.
- (4) Close the door.
- (5) Turn the breaker ON, and push the POWER switch. Normal operation starts as the defect is repaired.



Troubleshooting when “INTERRUPTION “ to indicate interruption or decrease of water pressure is lit.

- (1) Make sure if the water pressure is normal and the tap is open (if the water comes to the unit)
- (2) When the pressure of the raw water comes back, the unit returns automatically.

Troubleshooting when “OVERHEATING“ to indicate overheating is lit.

- (1) Make sure if the cooling water is flowing.
- (2) In case the cooling water is flowing, the heater is overheating or snapped.
- (3) In that case, contact the seller or Yamato Scientific's Technical Service Department.

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 5000 ℓ in case of using water service in Tokyo (with quality of 200×10^{-4} S/m) You need earlier exchange of the cartridge when you use raw water with worse quality.
Exchange of ion-exchange resin cartridge	When the red lamp of the water quality is lit.	Durability: About 650 ℓ of raw water with quality of 200×10^{-4} S/m
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.
Distilled water tank	3 months	

Exchange of Pre-Treatment Cartridge

Refer to Page 15 “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 pre-treatment cartridge, the span of life of the ion-exchange resin cartridge is made short.

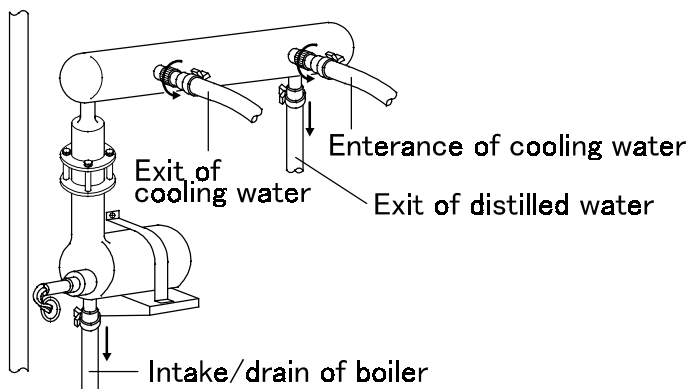
Exchange of Ion Exchange Resin Cartridge

Because the keeping of the cartridge for long time makes the water quality and durability worse, prepare the spare cartridge for the time to exchange. The standard of keeping is about four months.
 Refer to Page 14 “Connect securely ion-exchange resin cartridge” in the “Safety Precaution”.
 Dispose of the exchanged 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.

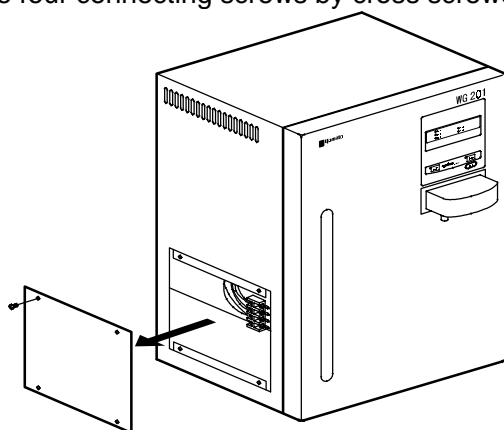
Cleaning Still

Removal the still

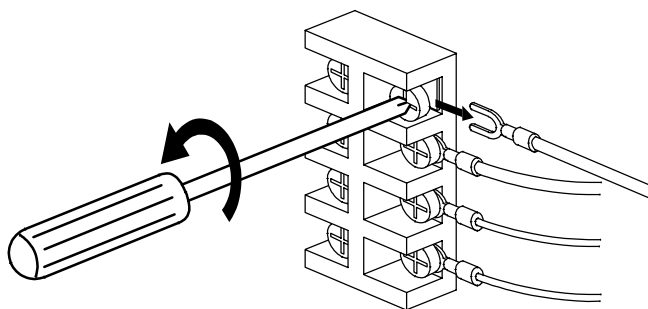
1. Turn "OFF" the circuit breaker.
2. Close the faucet.
3. Make sure if the boiler cools down enough (about more than 30 min. later). Open the front door of this unit and the valve to drain boiler water.
4. Remove both hose connected to the boiler and condenser respectively. Twist the hose-band by using tools, move the part of notches and you can remove the exit of distilled water and intake/drain of boiler. When you remove them, be careful not to damage the glasses with giving excessive power. Remove the nut of entrance and exit of cooling water by rotating counterclockwise. Be sure not to lose the inside packing.



5. Take off the four connecting screws by cross screwdriver, and take off the left side board.



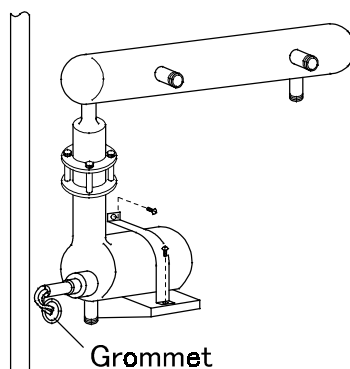
6. By cross screwdriver, loosen the four connecting screws in right side of terminal rack that is in the upper right of framework made by removing the left side board. Pull the heater terminal.



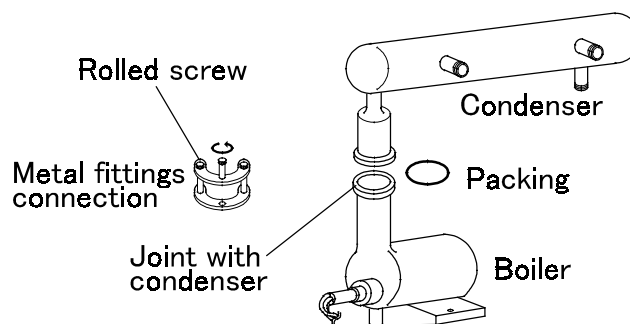
Cleaning Still

Removal the still

- 7.(1) Pull the heater terminal from the grommet.
But do not bend or pull leads from heaters beyond the necessity.
- (2) Remove the two screws of band for boiler fixed by cross screwdriver, and take off the boiler condenser.



- (3) Loosen the three rolled screw of metal fittings connection, and remove the boiler condenser.



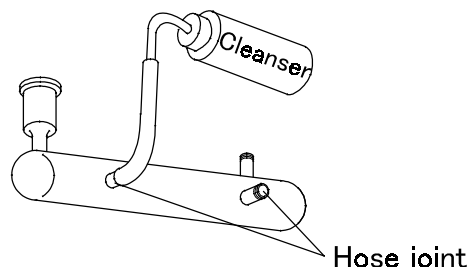
Cleaning the boiler

1. Preparing scale detergent
 - (1) Prepare hot water with temperature between 50 and 60 about 2 liters.
 - (2) Mix well "Organosol 10" about 200g, an accessory for this unit, and hot water prepared (1).
 2. Stop the hose joint in the lower part of the boiler (intake/drain of boiler) by rubber stopper etc.
 3. Set the boiler at the stable place not to pour scale detergent from the boiler.
 4. Pour the scale detergent from joint into the condenser with the heater connected.
 5. Almost all scales are removed in about 4 to 5 hours. Drain the scale detergent from the boiler. If a lot of scales in the boiler are not removed, add new scale detergent to repeat cleaning.
 - (1) If you finished removing the scales, take off the heaters from the boiler and wash them thoroughly by the tap water. Wash them in the big beaker with full of water not to be wet of leads and drain.
Do not wash them by the tap water directly.
 - (2) If solid scales is not removed by the scale detergent, do the following treatment.
Boiler : Wipe off by brush etc.
Heater: Wipe off by soft material like chip or plastic etc.
- The scales in the heater must be wiped equally and the solid scales must not be left partly. Extremely the part only become a large heat resistance, therefore the heater may be broken.

Cleaning Still

Cleaning the condenser

1. Pour the scale detergent into the cooling pipe of the condenser.
(See page30 about the preparing scale detergent)



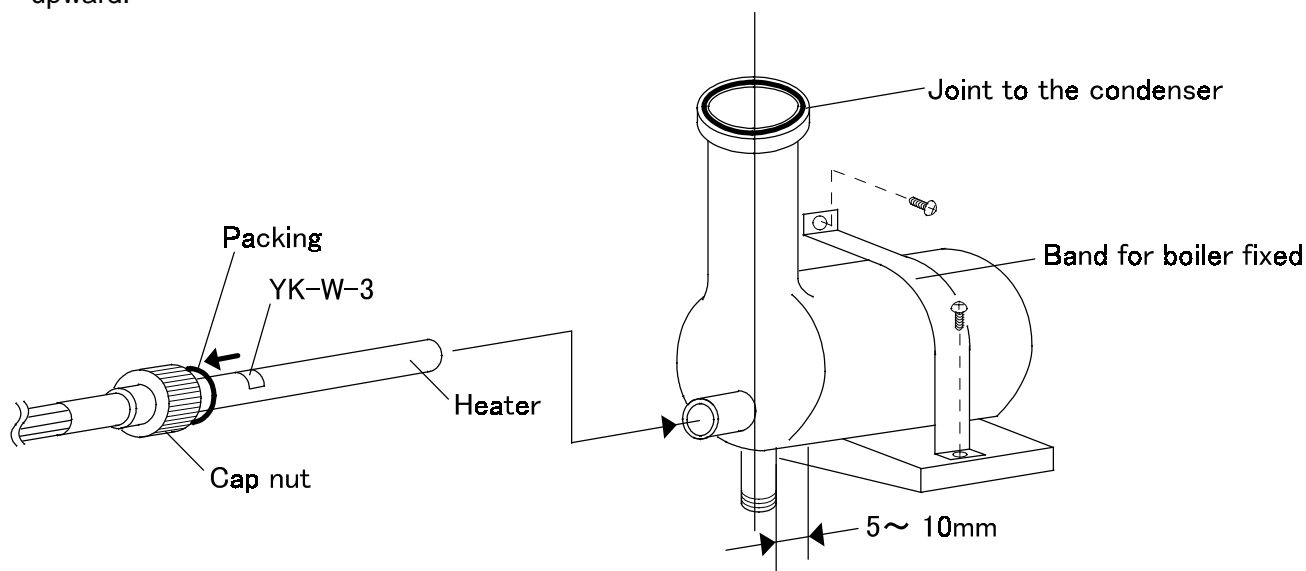
2. If the cleanser comes out from the hose joint, stop the hose joint by silicone stopper etc. Almost all fur is removed in about 4 or 5 hours.
3. After the scale detergent drained, wash the inside of condenser by tap water thoroughly.

About the treatment of the cleanser (See page16 “Caution for Use”)

1. Wash the boiler and the heater a little early. The more the amount of the scales adhesion is, the more difficult you remove it. And it may cause that the amount of taking distilled water decreases and the heater is broken.
2. After washing, drain the cleanser from them and neutralize cleanser by the neutralizer. Check by a PH indicator if cleanser is neutralized irrigation channel or fields. (the main ingredient of the scales cleanser : sulfamic acid , PH of the solution : about PH1 acid)
3. Keep the cleanser in an airtight container, avoid preservation in hot and humid areas, and keep the cleanser in cool and dark areas.
4. Wear protective gloves, mask and glasses to handle the cleanser.
5. Wash by pure water the cleanser splashing on body.
6. Do not use the vacant cleanser container as a drink bottle.
7. Do not drain the cleanser directly into an agricultural irrigation channel or fields. The cleanser can kill rice plants and other farm products.

Installation of the boiler

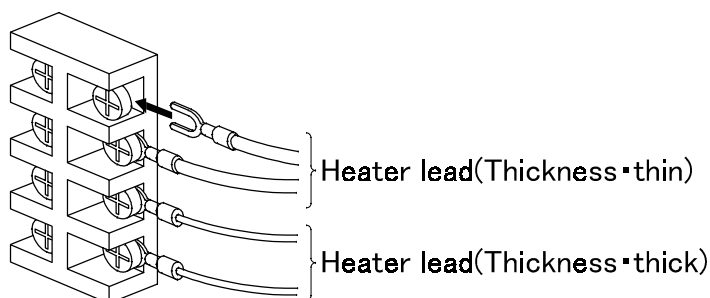
1. Set the joint (to the condenser) level by the band for boiler fixed.
After you check that there is packing in the cap nut, insert it into the boiler with the characters “YK-W-3” upward.



Cleaning Still

Installation of the boiler

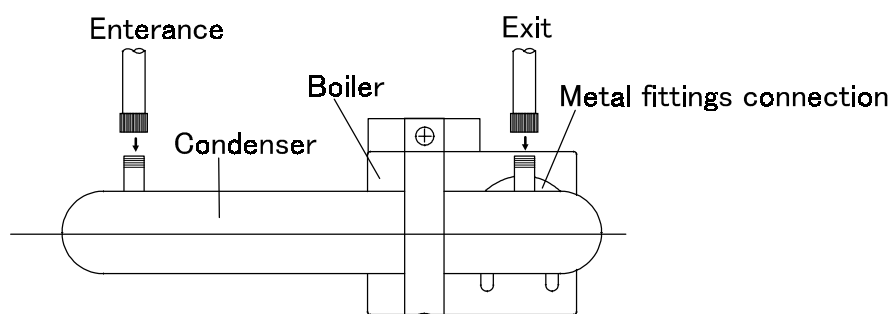
2. Connect the four heater terminals with the terminal rack.



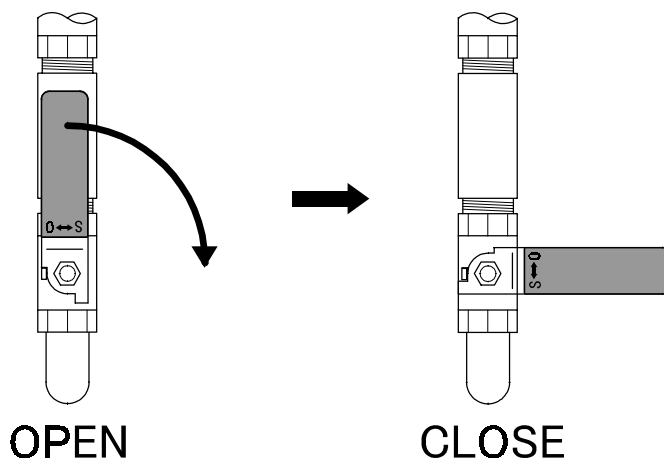
3. Install the left side board on the unit.
4. Insert the tube into supply and drain for boiler and fix it by hose band.

Installation of the Condenser

1. Insert the packing into the joint with boiler and condenser, and fix boiler and condenser in the same direction by metal fittings connection.



2. Connect the each hose to entrance of cooling water, exit of cooling water, and exit of distilled water.
3. Close the valve to drain boiler water.

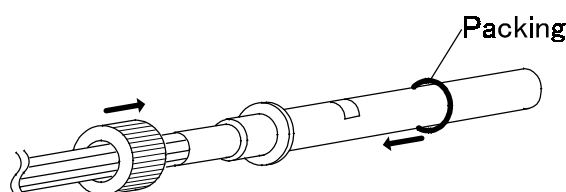


Exchange Heaters

If the heater snapped or was broken, exchange the heater as follows.(Refer to P.29 ~ 32 for exchanging)

1. Turn "OFF" the circuit breaker.
2. Close the faucet.
3. About more than 30 min. later after turned "OFF" the circuit breaker, open the front door of this unit and the valve to drain boiler water.
4. Open the left side board, loosen the four connecting screws in right side of terminal rack, and pull the heater terminal.
5. Pull the heater terminal from the grommet.
6. Remove the cap nut of the heater, and pull the heater.
7. Remove the packing and the cap nut from the broken heater.
8. Install the packing and the cap nut to the new heater.

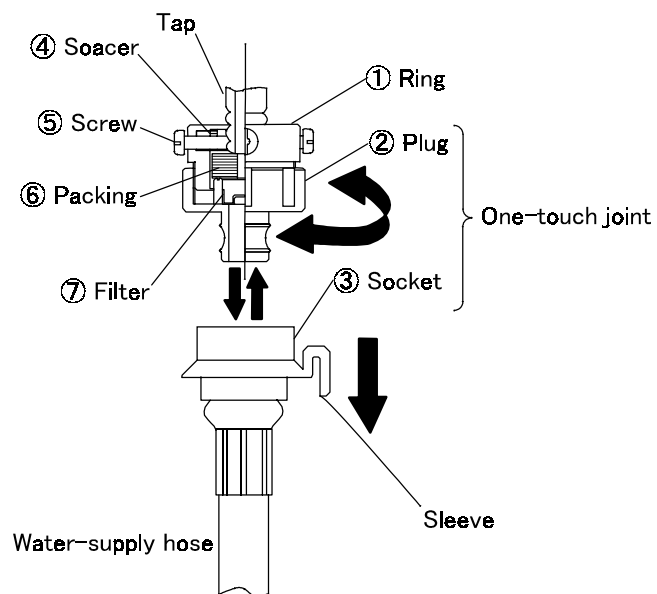
At this time, do not touch it with empty hands not to apply the finger marks.



9. Insert it into the boiler with the heater mark "YK-W-3" upward.
10. Insert the heater terminal into the grommet, and fix it in the terminal rack with checking the position of installing heater lead.
11. Install the left side board on the unit.
12. Close the valve to drain boiler water.
13. Open the faucet after closing the front door.
14. Turn "ON" the circuit breaker.
15. Push the power switch in the operation panel, and the supply of boiler water starts.

Clean Water Supply Hose Filter

- (1) Close the faucet and remove the water supply hose after turning off the unit breaker.
- (2) Remove plug from ring with turning.
- (3) Clean filter in the plug by tap water.
- (4) Push the filter by flat end of a pencil etc. 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.

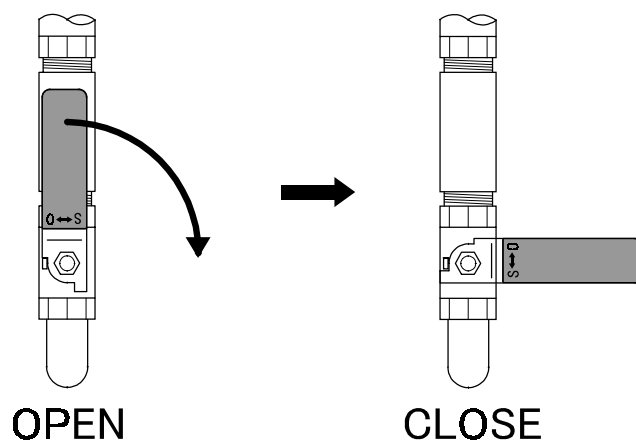
When you do not use the unit for a long time



If you do not use the unit for a long time, turn off the unit breaker for safety and close the faucet. Water in the boiler and the distilled water tank deteriorates its quality by the growth of unwanted bacteria and algae. Drain as follow.

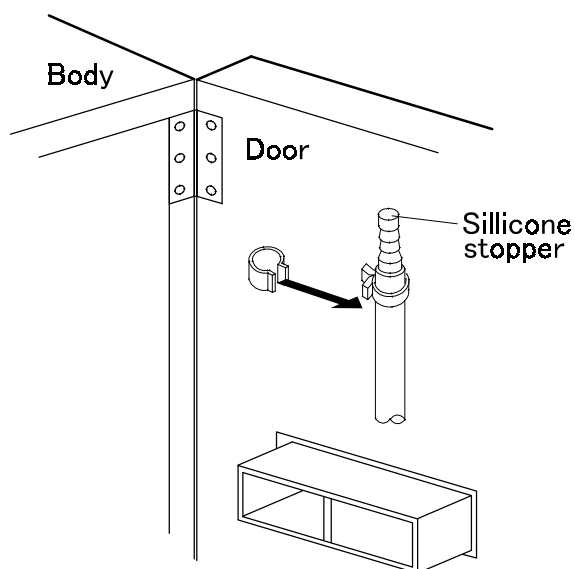
Draining boiler water

- (1) Before draining the boiler water, turn off the unit breaker , check if faucet is closed , and wait for 30 minutes or longer.
- (2) Open the valve 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 valve. If the drain valve remains open in the next use of the unit, water would not flow into the boiler or start distillation.



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 upper left on the back of front door.
- (3) Remove the silicone stopper 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) Install the silicone stopper at the point tightly, and insert stopper securely in the original folder 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 cord 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 gives 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 years 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.

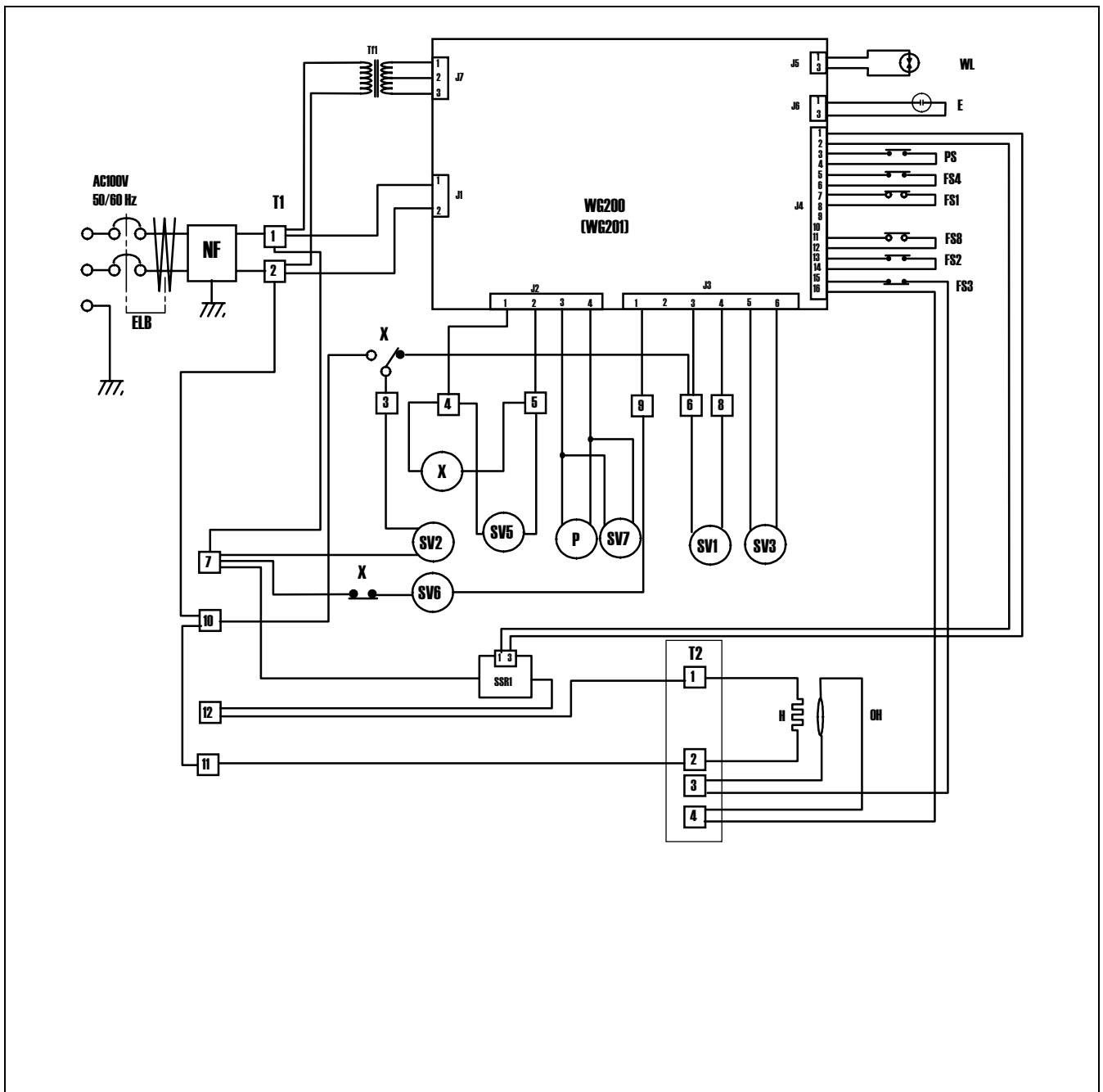
When you encounter the following

Fault indication	Check points
STAND BY switch is not lit when the breaker is turned on.	Is the power supply cord is securely connected with the outlet? Is there any power failure?
No water is supplied.	Defect of solenoid valve to collect ion-exchanged or distilled water Defect of solenoid valve to supply raw water. Low pressure or interruption of water service. Defect of pressure switch.
Water supply can not be stopped.	Defect of float switch. Defect of solenoid valve to supply raw water.
No water is supplied into the boiler.	Defect of solenoid valve to supply boiler water Defect of float switch. Stoppage in the pre-treatment cartridge.
Heater can not be turned on.	Defect of float switch. Heater disconnection.
No cooling water flows.	Defect of solenoid valve for cooling water.
Initial distilled water is not drained.	Defect of solenoid valve to drain initial distilled 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.	Defect of solenoid valve to collect ion-exchanged or distilled water. Defect of pump to take distilled water. Defect in piping.

Type	WG201	
Collection method	ion exchange	Distillation
Pure water to collect	Ion exchanged / Distilled water	
Volume of distilled water to produce	About 1.8ℓ/h	
Water flow to collect	1 ℓ/min. or more (Distilled / Ion exchanged water)	
Still	Boiler	Super hard glass
	Condenser	Super hard glass
	heater	Ceramic heater 1.4kw
Distilled water tank	Made of polyethylene 20ℓ	
Raw water filter	Pre-treatment cartridge (ACF0827) Activated carbon and hollow fiber membrane (0.1 μ m)	
Ion-exchange resin cartridge	Cartridge type of one-touch connect (CPC-N)	Mix bed Resin 3ℓ
Water quality examiner	5 levels by lamp display 0 ~ $\times 10^{-4}$ S/m \cdot 25 (in case of electric conductivity)	
Water supply pump	Magnet pump	
Range of raw water pressure	0.5 ~ 5 $\times 100$ kPa (0.5 ~ 5 kgf / cm ²)	
Power requirement (50 / 60 Hz)	AC100V About 15A	
External dimensions *1 (W x D x H)	About 570 x 455(590:including intake) x 730 (mm)	
Weight	About 40 (kg)	
Supplemental functions	Water abnormality alarm 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	
Accessories	Water supply hose , Drain hose , Joint hose Instruction manual Warranty Scale detergent (1kg) Hose clamp Pre-treatment cartridge Ion-exchange resin cartridge	1 (for each) this book 1 1 1 1 1
Non-standard accessories	Type Water intake unit ----- (OWH10) Drain trap ----- (OWI10) Pressure pump ----- (OWJ10) WQ500/501 joint unit ----- (OWQ10) Carrier ----- (AS200) WL100 joint unit (Joint unit G)----- (OWL20) Joint unit of membrane filter ----- (OWM30) Membrane filter ----- (OWN10) Air filter unit for tank----- (OWT10)	Part No. 253686 253211 253220 253695 253175 253668 253667 253670 253696

*1...The exterior dimensions exclude projected areas.

Wiring Diagram



Symbol	Name of Parts	Symbol	Name of Parts	Symbol	Part of Name
E	Electrode for ion-exchanged water	SV1	Solenoid valve to supply boiler water	T1	Terminal
ELB	Earth leakage circuit breaker	SV2	Solenoid valve to supply raw water	T2	Terminal
FS1	Float switch to control heater	SV3	Solenoid valve to drain initial distilled water	Tf1	Transformer
FS2	Float switch to control boiler water level	SV5	Solenoid valve to take ion-exchanged water	WL	Water leak detector
FS3	Float switch for boiler overheat	SV6	Solenoid valve for cooling water	X1	Relay
FS4	Float switch to check water level	SV7	Solenoid valve to take distilled water	PS	Pressure switch
FS8	Float switch to check water level	OH	Overheat detector	NF	Noise Filter
H	Heater	P	Poup to take water		
		SSR	SSR board		