



Water Purifier
Pure Line®
WL220T

Instruction Manual

Second edition

● Thank you very much for purchasing this Yamato Pure Line® WL220T.

● Please read the “Operating Instructions” and “Warranty” before operating this unit to assure proper operation. After reading these documents, be sure to store them securely together with the “Warranty” at a handy place for future reference.



Warning:

Before operating the unit, be sure to read carefully and fully understand important warnings in the operating instructions.

Yamato Scientific America Inc.
Santa Clara, CA

The documents are printed on recycled paper.

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1. Safety precautions


Explanation of pictograms

About pictograms

A variety of pictograms are indicated in this operating instruction and on products for safe operation. Possible results from improper operation ignoring them are as follows.

Be sure to fully understand the descriptions below before proceeding to the text.

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

 **Caution** Indicates a situation which may result in minor injury (Note 2) and property damages (Note 3.)

(Note 1) Serious injury means a wound, an electrical shock, a bone fracture or intoxication that may leave after effects or require hospitalization or outpatient visits for a long time.

(Note 2) Minor injury means a wound or an electrical shock that does not require hospitalization or outpatient visits for a long time.

(Note 3) Property damage means damage to facilities, devices and buildings or other properties.

Meanings of pictograms



This pictogram indicates a matter that encourages the user to adhere to warning ("caution" included).
Specific description of warning is indicated near this pictogram.



This pictogram indicates prohibitions
Specific prohibition is indicated near this pictogram.



This pictogram indicates matters that the user must perform
Specific instruction is indicated near this pictogram.

1. Safety precautions

List of symbols

Warning



General warnings



Danger!: High voltage



Danger!: High temperature



Danger!: Moving part



Danger!: Hazard of explosion

Caution



General cautions



Electrical shock!



Burning!



Caution for no liquid heating!



Caution for water leak!



For water only



Poisonous material

Prohibitions



General bans



Fire ban



Do not disassemble



Do not touch

Compulsions



General compulsions



Connect ground wire



Install levelly



Pull out the power plug



Regular inspection

1. Safety precaution

Warning • Caution

Warning



Never operate the unit in an atmosphere containing flammable or explosive gas

Never operate the unit in an atmosphere containing flammable or explosive gas. Otherwise, an explosion or a fire may result since the unit is not explosion-proof. See section "13. List of dangerous materials" on page 38.



Be sure to connect the earth wire.

Connect the earth wire to the earth socket outlet. If the earth socket outlet is not available, use the grounding adaptor to connect the earth lead to the ground. Otherwise, electric leakage occurs, causing electric shock or fire.



Be sure to insert the power cord plug firmly.

Insert firmly the power cord to the extreme depth of the main body power socket. If not inserted firmly, overheat or fire may occur.



Stop using in case of abnormality



Should any fuming or questionable odor be detected, turn OFF the power switch on the right-hand side of main body immediately, and disconnect the power plug from the master power supply. Then request inspection to the shop from which you have purchased the product, our sales office or our customer service center.

If left unattended, such abnormality may cause fire or electric shock.



Never use electrical power cords bundled.

When these are used bundled, they might overheat causing a fire.



Take care not to damage electrical power cords.

Avoid tightly bend, pull with a strong force or twist to prevent electrical power cords from damaging. A fire or an electrical shock may result.



Never try to disassemble or alter the unit.

Never try to disassemble or alter the unit. A malfunction, a fire or an electrical shock may result.



Always keep the tap closed when the product is not operated.

Always keep the tap closed when the product is not to be operated (during nighttime or holidays). Otherwise, water leakage may occur.



Do not place an object on this product.

Any object, if placed on the system, may drop. Placement of the solvent may also cause trouble.



Do not ride on this product.

The person riding on the product may overturn or the system may be damaged, resulting in injury or trouble.

1. Safety precautions

Warning • Cautions

Warning



Install the unit at a place higher than the connecting port on the constant temperature and humidity chamber.

This unit is dedicated for the constant temperature and humidity chamber and supplies water to it by gravity. Installing the unit at a place lower than the connecting port of the constant temperature and humidity chamber may cause insufficient supply of water to the chamber or a malfunction.



When installing the unit on the constant temperature and humidity chamber, be sure to use the optional “Installation tray”(See “5. Useful Functions” on P. 23).



Do not adjust the reducing valve.

The reducing valve has been set to the water supply rate of about 1.0L/min(raw water pressure : $3 \times 100\text{kPa}$, reducing valve pressure : $0.4 \times 100\text{kPa}$) at the factory. Never attempt to readjust the reducing valve.
If the factory setting of the valve is lost, water leak or reduction in flow may result.



Cut the connecting hose of the constant temperature and humidity chamber to a necessary length before use.

Run the connecting hose for the constant temperature and humidity chamber without a kink or twisting so that any trap (water pool) will not occur at any point along the hose.



Be sure to install the unit level.

The unit is equipped with a leak detecting sensor in case of a leak accident. Be sure to install the unit level since the sensor may not operate properly if the unit is installed inclined by three degree or more in back and forth or left or right direction.



Caution



In case of thundering



When thundering begins, turn OFF the power switch on the right-hand side of main body immediately and pull out the power cord.
Otherwise, lightening may cause failure of the control circuit of the system or may cause fire and electric shock.



In case of power failure

Although the unit will stop when a power outage occurs, the unit will not supply water to the tank if water is left in the tank at the recovery from the power outage while the power switch is ON. In contrast, it will start supplying water to the tank to the highest level if it is empty at the time of recovery.

Turn the power switch on the right side of the unit to OFF for safety when a power outage occurs. To resume operation, follow the steps in “Turning power on” in the “4.Operation Method” on P.17

2. Before operating the unit

Installing procedures and preparation before operation

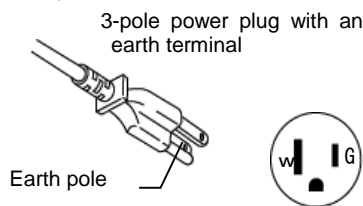
Warning

1. Be sure to connect the earth wire.

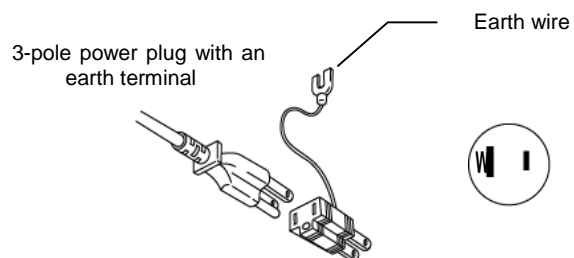


- Be sure to connect the earth wire (green wire of the power cord) to the earth wire or to the earth terminal.
- Never connect the earth wire to the gas pipe or water pipe, in order to prevent fire.
- The earth wire must never be used for grounding of the telephone line and lightning arrestor. This is to prevent fire and electric shock.
- Never use the branch socket outlet because it causes hazardous heat generation.

Used of ground socket outlet recommended



When using a diode socket outlet



When there is no ground terminal.

● In this case, class D grounding work is necessary and please consult your dealer or our customer service center.

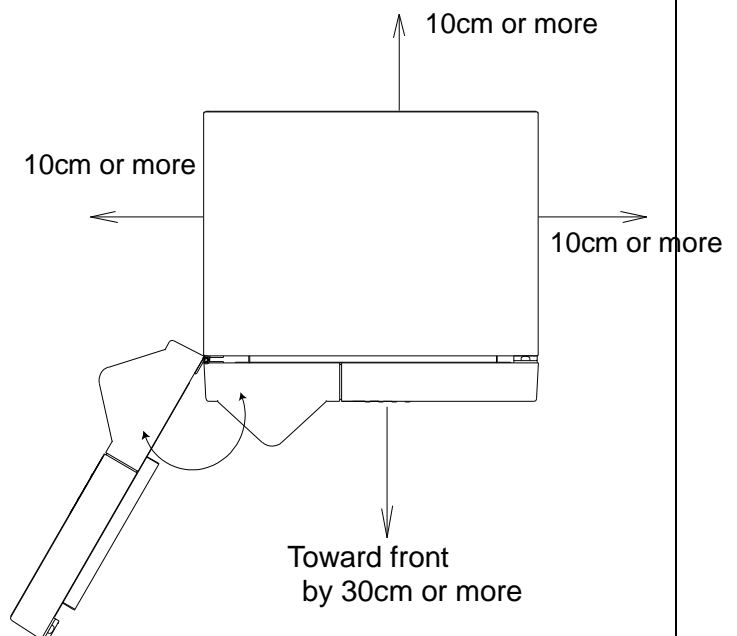
● Insert the ground adaptor into a power plug confirming the polarity of the outlet. Connect the grounding wire (green) of the ground adaptor to the ground terminal on the power supply equipment.

2. Carefully select an installation site.



Take special care not to install the unit at a place described below:

- Uneven surfaces or dirty surfaces
- Where flammable gas or corrosive gas exists
- Where the ambient temperature is 5°C or less
- Where the ambient temperature is 35°C or more
- Where temperature changes severely
- Where dusty and humidity is high
- Where subject to direct sunlight
- Where vibration is severe
- Where unstable power supply
- Where uneven floor (within reference ± 3 degree)
- Where raw water pressure is high
- Where with raw water pressure is low
- Outdoors
- At a place lower than the suction port of the constant temperature and humidity chamber
- On a device or a laboratory table (with locked adjusters, etc.)



It is recommended to secure the space of the range wider than the one shown above around the product.

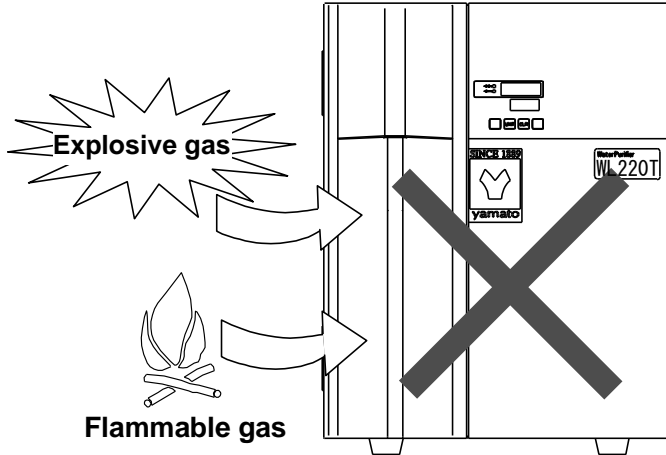
2. Before operating the unit

Precautions for installation

3. Never operate the unit in an atmosphere containing flammable or explosive gas.



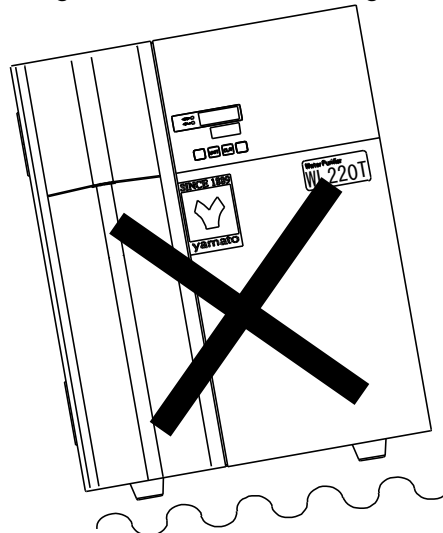
- Never operate the unit in an atmosphere containing flammable or explosive gas. Since This product is not of an explosion-proof structure. Accordingly, when the power switch on the right side of the unit is turned ON/OFF and in the course of operation, arc may occur, possibly causing fire and explosion.
- See the section “13. List of dangerous materials” on page 38 for flammable and explosive gases.



4. Install on a level surface.



- If it is not installed level, the leak detection function may not operate properly when water should leak at the pipes in the unit. The permissible error in the levelness shall be ± 3 degree and properly set the adjusters of the constant temperature and humidity chamber or of the laboratory table to make it level.
- The unit weight is about 17kg. Handle with care during transportation and installation.



5. Take the power supply from the dedicated socket outlet.



- Use the socket outlet appropriate to the power capacity (1A or larger capacity).
- The deficient power capacity causes not only decrease in the water supplying rate, but makes correct control impossible due to drop of the supply voltage. Always connect the product to the power supply system with sufficient allowance in the supply voltage.
Power capacity : WL220T Single phase AC100~240V 0.5A or less
- Note that the use of extension with a cord reel may cause drop of the voltage. Avoid starburst connection with branch socket outlet so as to prevent fire and electric shock.

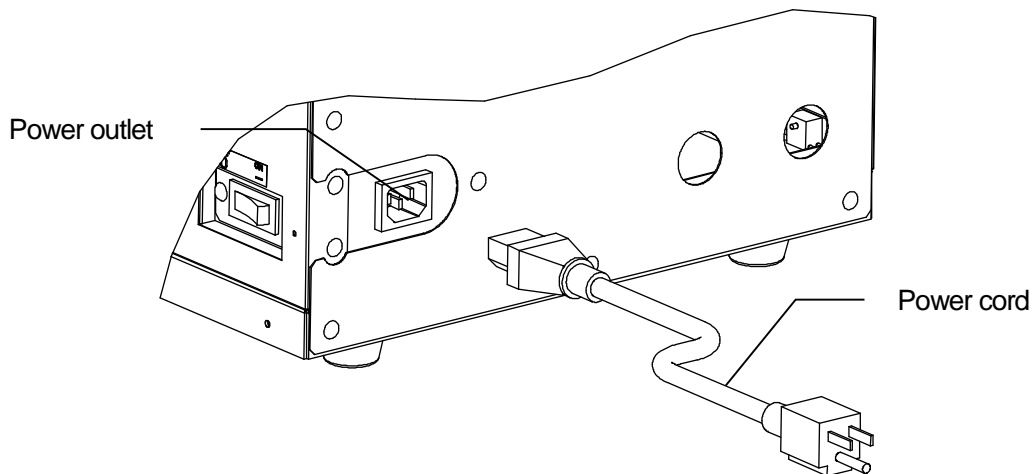
2. Before operating the unit

Precautions when installing the unit

6. Connecting the power cord



- Connect the attached power cord to the power socket. Confirm that the power switch on the right side of the main body is OFF, and connect the power cord plug to the socket outlet. The power cord plug attached to this product is the three-wire cord including the earth wire, and the plug is also of a ground plug. If the socket outlet to be used does not match the plug (that is, the 2P outlet), use the ground adapter. When using this adapter, be sure to connect the earth lead wire to the ground.



7. Handling of a power cord



- Never use electrical power cords bundled. When these are used bundled, they might overheat causing a fire.
- Do not convert, forcibly bend, twist or pull the power cord. Otherwise, a fire or an electrical shock may result.
- Do not place the power cord under a desk or a chair, or sand between objects to avoid it from being damaged. Otherwise, a fire or an electrical shock may result.
- Do not place the power cord close to a stove or other heat generating device. Sheath of the cord may burn and result in a fire or an electrical shock.
- If the power cord should be damaged (exposure of core wire or disconnection), immediately turn the power supply in the right side of the main body off, disconnect the power plug and ask your dealer to replace the cord. If the unit is operated with a damaged power cord, a fire or an electrical shock may result.
- Connect the power cord to an appropriate wall outlet or distribution board.

8. Be sure to keep the raw water pressure from water supply within the specified range.



- Use the supply water pressure within a range of $0.5 \sim 5 \times 100\text{kPa}$ ($0.5 \sim 5\text{kgf/cm}^2$) 24 hours a day.
Note that the water feeding range to the tank becomes 1.0 L/min or less at the raw water pressure of $1.0 \times 100\text{kPa}$ (1kgf/cm^2) or less.
- The raw water pressure range is the same even when the optional water inlet unit (see Page 23) is used.

9. Use the installation tray (optional).



- When installing the unit at a higher place such as on the constant temperature and humidity bath, the product may fall off during an earthquake and cause a dangerous situation. We strongly recommend using the optional installation tray to stably secure the unit. The installation tray can accept leak water and discharge using the drain hose when a water leak accident should occur.

2. Before operating the unit

Installation procedures

1. Always connect the feed water hose firmly.



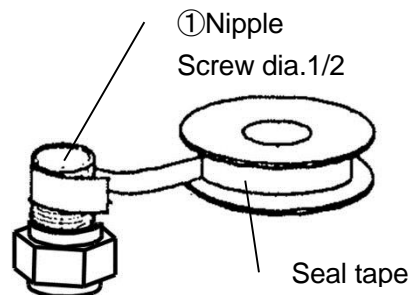
- Take out the water supply hose included in the accessories of the main unit.
- Failure to securely connect it may cause water to gush out and to result in a leak.

2. Make connections on the water faucet side.

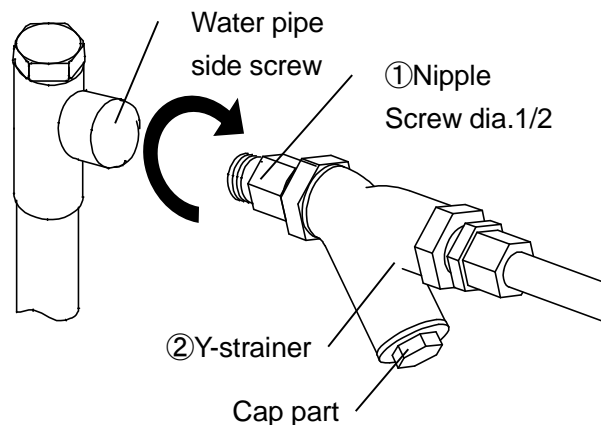


- First tighten the main valve before connecting the water supply hose to the water pipe side.

- (1) Wrap included seal tape around the nipple ① of the water supply hose. Wrap the seal tape clockwise looked from you two to three rounds while lightly pulling it and cut off excess portion.



- (2) Connect the water pipe side screw and the nipple ① using a wrench. Take care so that the cap part of the Y-strainer ② will be the under side.



※The size of the water supply hose screw is 1/2 male. When the size of the water pipe side screw is other than 1/2 female, prepare a nipple of a different diameter.

※Use tap water as raw water.

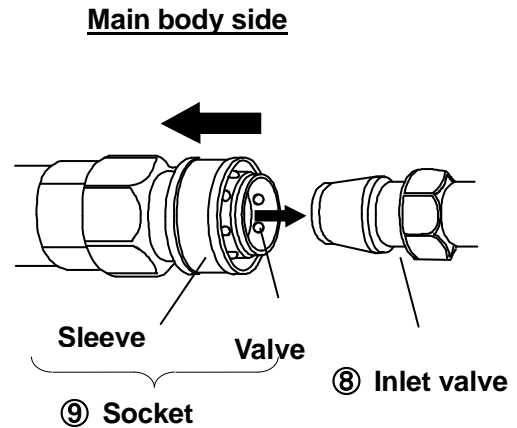
2. Before operating the unit

Installation procedures

3. Carry out connection on the main body side.



- (1) Remove rubber cap from the water inlet plug ⑧.
- (2) With the sleeve slid in the direction indicated with arrow, and insert the main body water inlet plug ⑧ to the socket ⑨. Connection is completed when the sleeve returns to the original position when released. The socket has a built-in valve. This valve does not open and allow water to flow unless connected with the inlet valve ⑧.



4. If you want a part with a valve, use the optional “water inlet plug unit” (see P.29).



The “water inlet plug unit” has its own valve and enables you to remove the water supply hose without tightening the main plug of the water pipe. It also has a structure that prevents the connection to the water plug from loosening even when tap water pressure fluctuates.

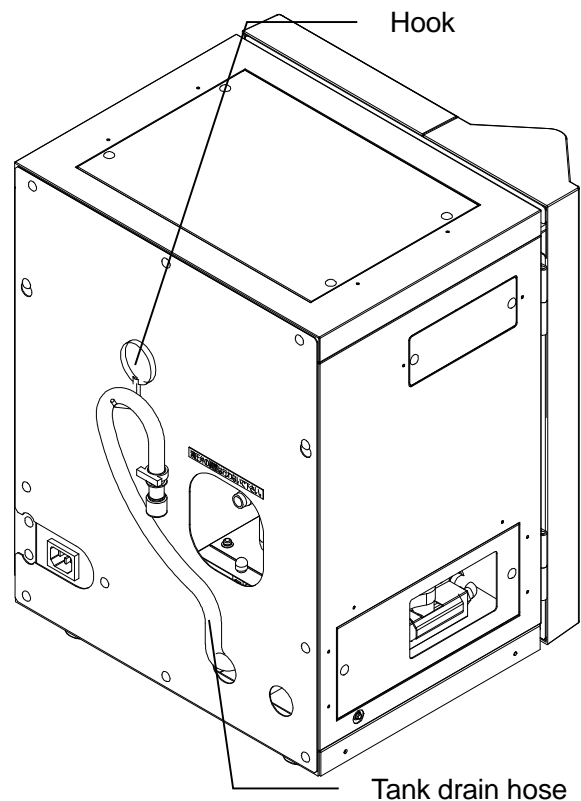
5. Put the tank drain hose on the hook.



Take out the hook included in the accessories of the main unit.

- (1) Attach the hook on the back of this product. The hook has a magnet and can be placed at any place you want.
- (2) Put the tank drain hose on the hook.

※ Although the tank drain hose is plugged, if it is laid on the floor and the plug comes off, water in the tank will be drained. Be sure to put the tank drain hose on the hook. If you use the optional “installation tray” (See “5 Useful function”. on P-23), it will not cause any problem if you do not use the hook and connect the tank drain hose directly to the installation tray.



2.Before operating the unit

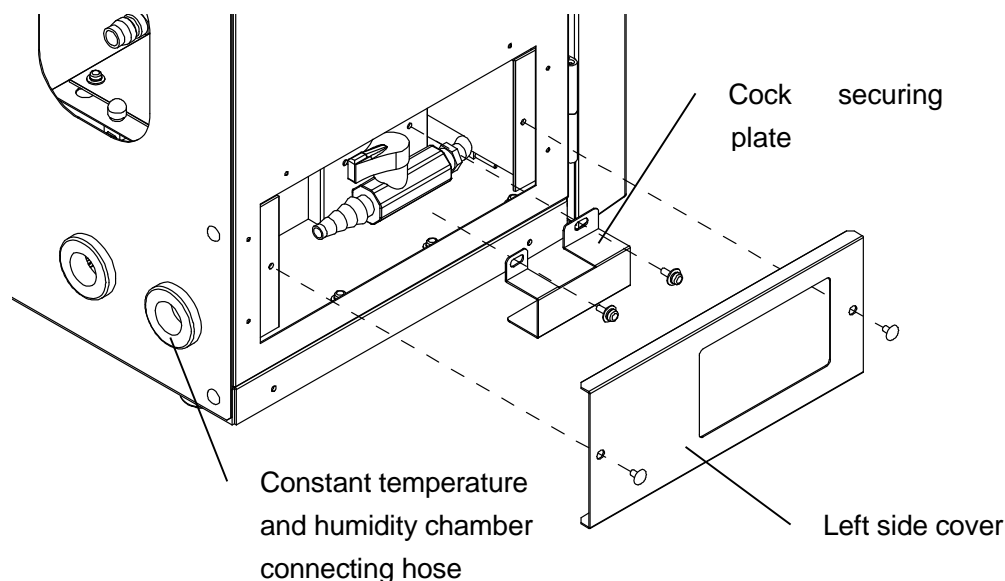
Installation procedures

6. Install the connecting hose of the constant temperature and humidity chamber to the cock on the left side of the main unit.

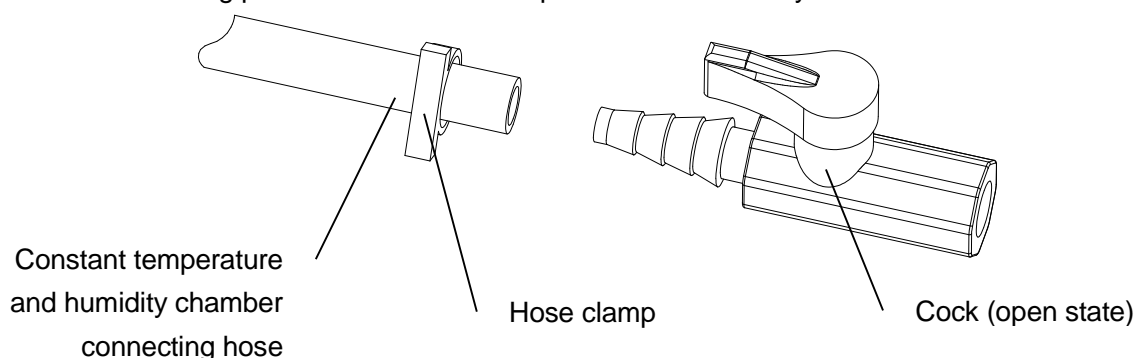


Take out the connecting hose of the constant temperature and humidity chamber($\phi 9\text{mm} \times \phi 13\text{mm}$ 3m) included in the accessories of the main unit.

- (1) Remove the screws on that hold the left side cover to the main unit.
- (2) Remove the screws that hold the cock installing plate.



- (3) Connect the connecting hose of the constant temperature and humidity chamber (I.D.: $\phi 9\text{mm}$) to the cock. After connecting the hose, secure it with attached hose clamp.
- (4) Run the connected hose through the hole on the back plate and connect to the connecting port on the constant temperature and humidity chamber.



- ※ Cock has been shipped in the closed status. After connecting the hose, turn the cock by 90° anticlockwise to open it.
- ※ Cut the connecting hose of the constant temperature and humidity chamber into an appropriate length to prevent it from kinking or twisting.

When the optional “remote water supply input terminal” is used

- (1) Install the connecting hose of the constant temperature and humidity chamber to the solenoid valve nipple on the back side.

2. Before operating the unit

Installation procedures

7. Connect the ion exchange resin cartridge (CPC-P, CPC-E) firmly.

- Install the ion exchange resin cartridge (CPC-P, CPC-E) as follows:

- (1) Confirm that the power switch on the right side of main body is OFF and that the faucet is closed.
- (2) Install the selected ion exchange resin cartridge firmly to the resin installation plate inside the system. For installation of the ion exchange resin cartridge of WL220, provide CPC-P in the front and CPC-E in the rear. (See Figs. 01)
- (3) Secure the ion exchange resin cartridge with a band to the resin installation plate. (See Figs. 02)

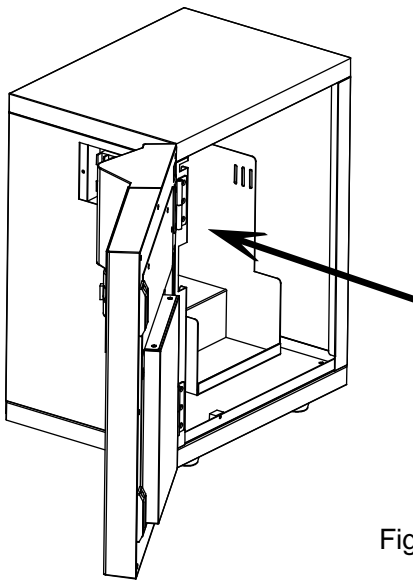


Fig. 01

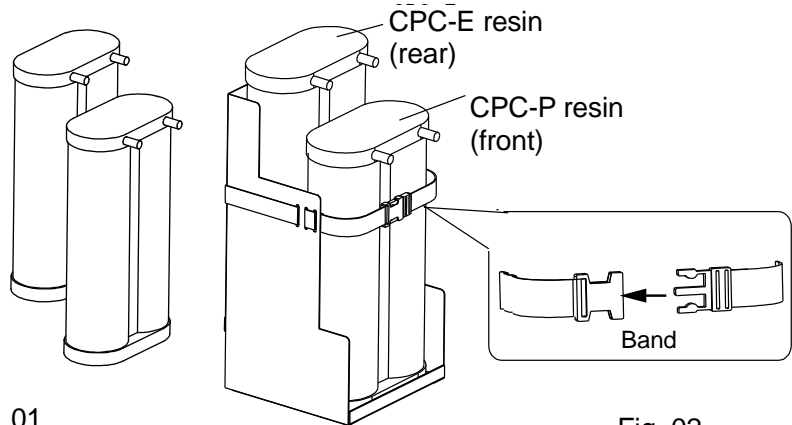


Fig. 02

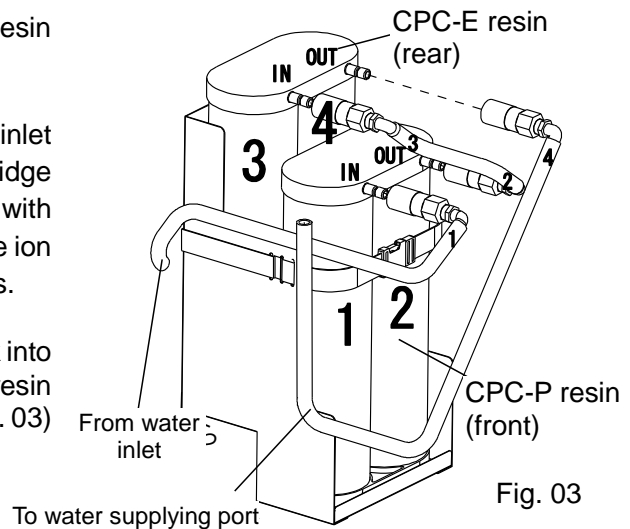
2. Before operating the unit

Installation procedures



- Connect ion exchange resin cartridges (CPC-C and CPC-E) as follows.
Remove a rubber cap from the inlet and outlet of each ion exchange resin cartridge.

- (1) Press the coupler with (4,OUT) mark into the outlet (right side) of the ion exchange resin cartridge (CPC-E) till it clicks.
- (2) Press the coupler with (3,IN) mark into the inlet (left side) of the ion exchange resin cartridge (CPC-E) till it clicks and press the coupler with (2,OUT) mark into the inlet (right side) of the ion exchange resin cartridge (CPC-P) till it clicks.
- (3) Press the coupler with (1,IN) mark into the inlet (left side) of the ion exchange resin cartridge (CPC-P) till it clicks. (See Fig. 03)



- ※ Initially, the coupler may be hard to insert and application of excessive force for insertion may cause the insertion port to break. When this is hard to insert, carry out connection in a state as removed from the resin installation plate while taking care not to insert in the bent state.
- ※ Once the coupler is inserted, pull on the hose to confirm connection and to make sure that the coupler is not disconnected.
- ※ Set the coupler connected to the ion exchange resin cartridge (CPC-P) to face laterally (on the left side as viewed from the front). If the coupler is allowed to face downward, it contacts the door back plate to make door closing impossible.
- ※ The coupler can be removed with ease by pulling on it while pressing a black portion to the depth. For removal, reverse the order (1→2→3→4) of installation. Note also that water may drip from the ion exchange resin cartridge when the coupler is disconnected.
- ※ Reverse installation of ion exchange resin cartridges or wrong connection of IN and OUT of each cartridge may cause failure, resulting in shorter service life of the cartridges.

8. After installation



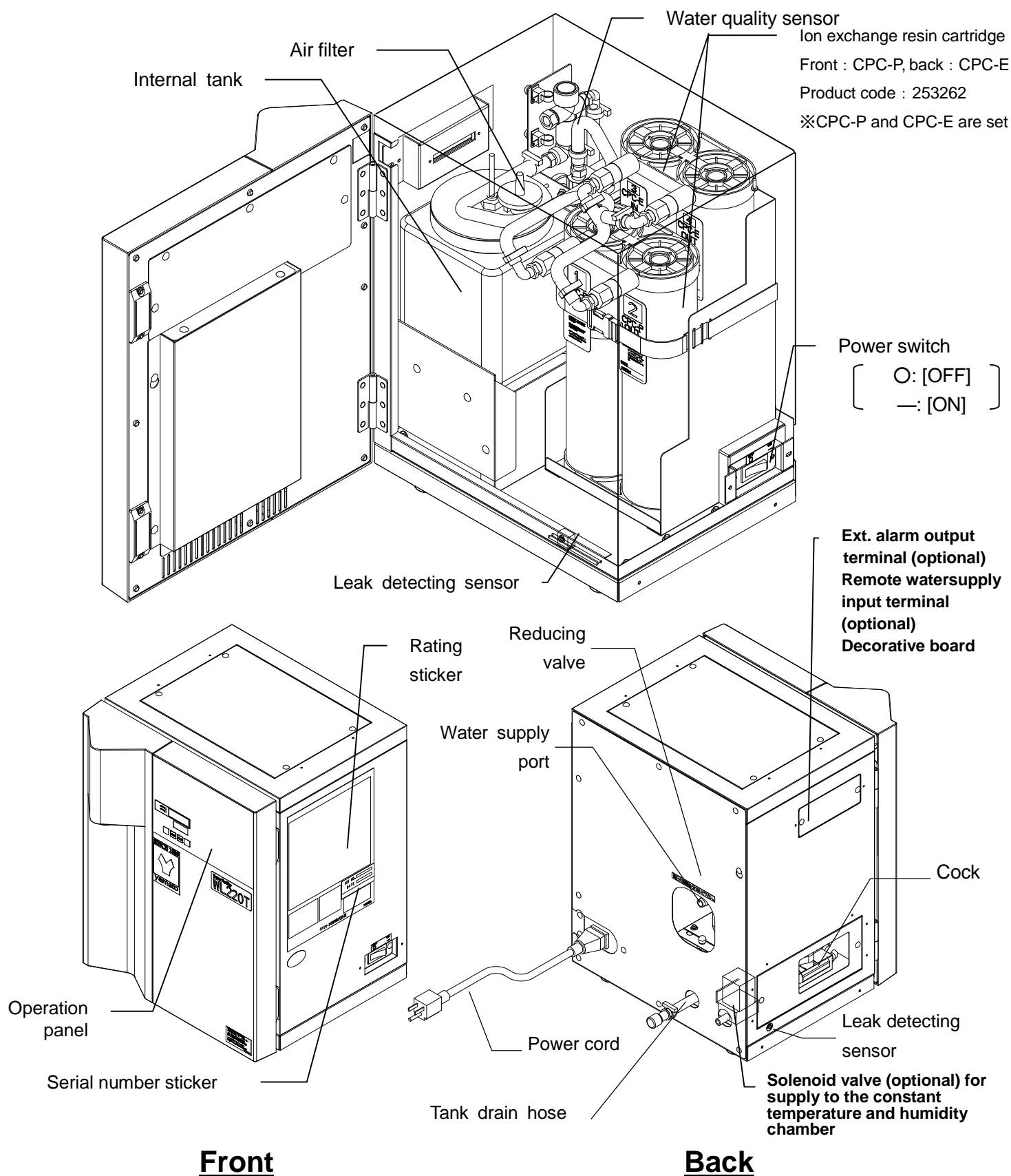
Install the unit at a place higher than the connecting port on the constant temperature and humidity chamber. When installing the unit on the constant temperature and humidity chamber, be sure to use the optional "Installation tray" (See "5 Useful function" on P-23).



The product may topple down and cause a personal injury due to an earthquake or an unexpected shock. Implement appropriate preventive measures for safety.

3. Names and Functions of Parts

Main unit



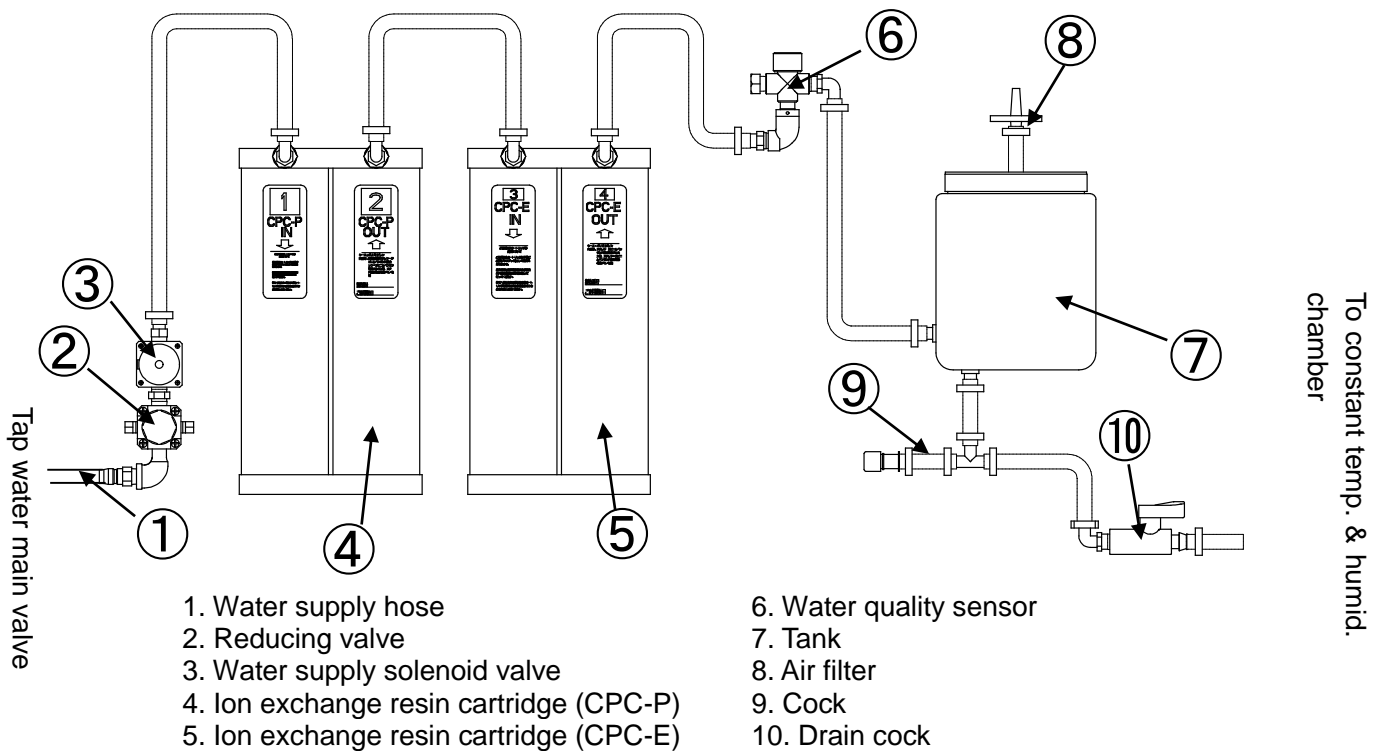
Front

Back

Note: The reducing valve has been set to the water supply rate of about 1.0L/min (raw water pressure : $3 \times 100\text{kPa}$, reducing valve pressure : $0.4 \times 100\text{kPa}$) at the factory. Never attempt to readjust the reducing valve.

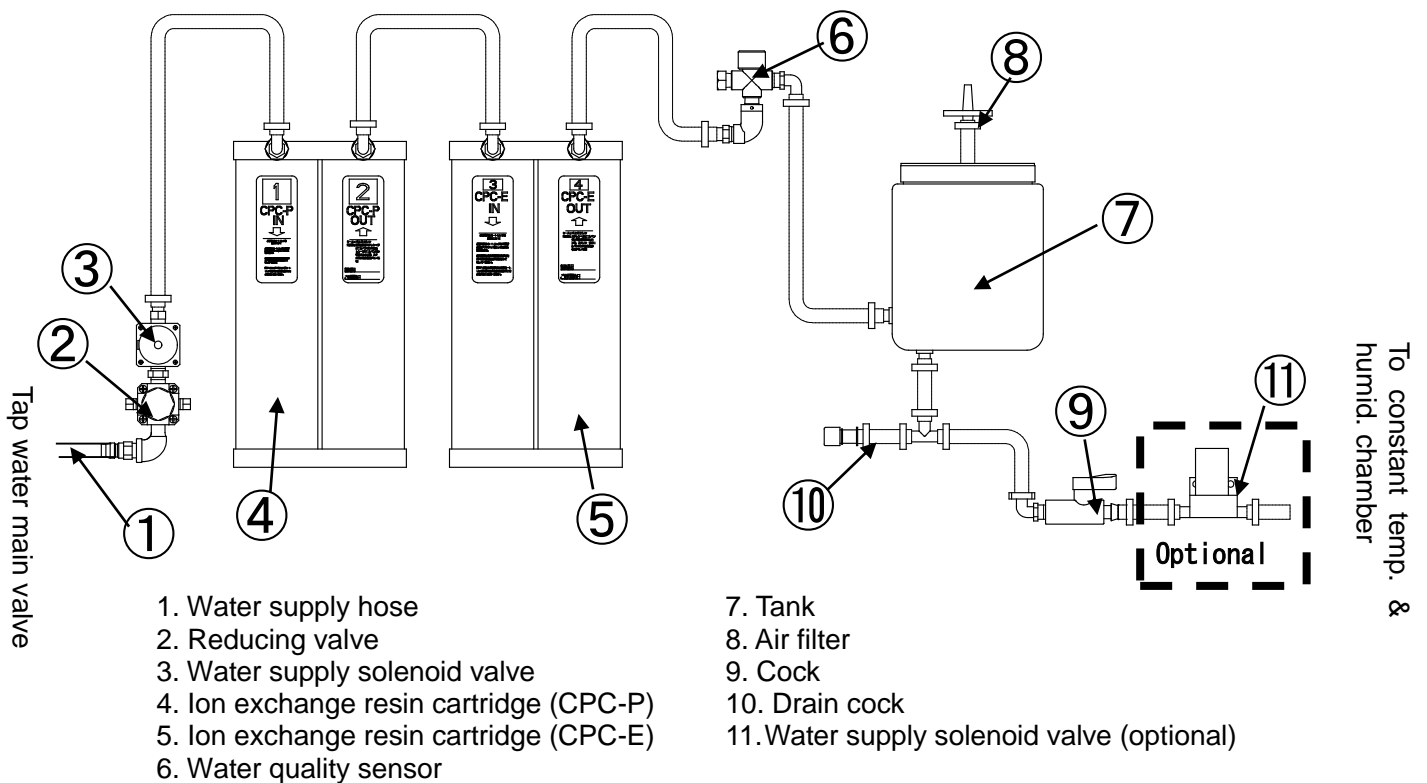
3. Names and Functions of Parts

Piping diagram



※ The reducing valve pressure has been set to $0.4 \times 100\text{kPa}$ (raw water pressure : $3 \times 100\text{kPa}$) at the factory.

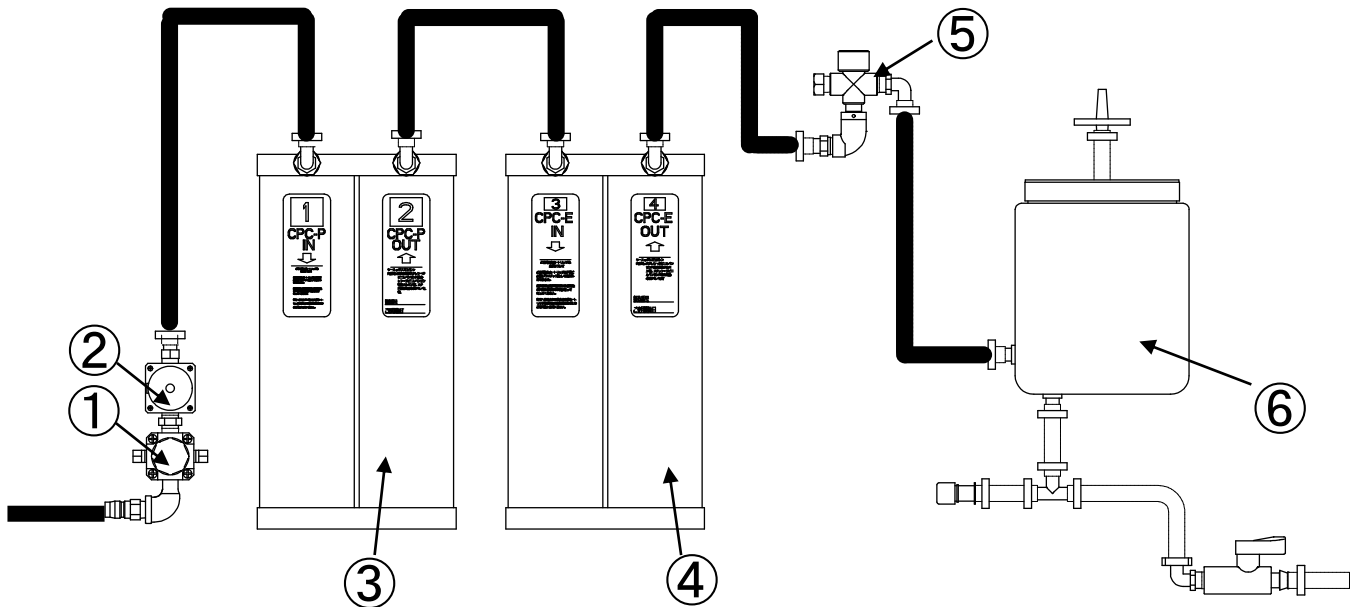
Remote water supply input terminal (optional)



※ The reducing valve pressure has been set to $0.4 \times 100\text{kPa}$ (raw water pressure : $3 \times 100\text{kPa}$) at the factory.

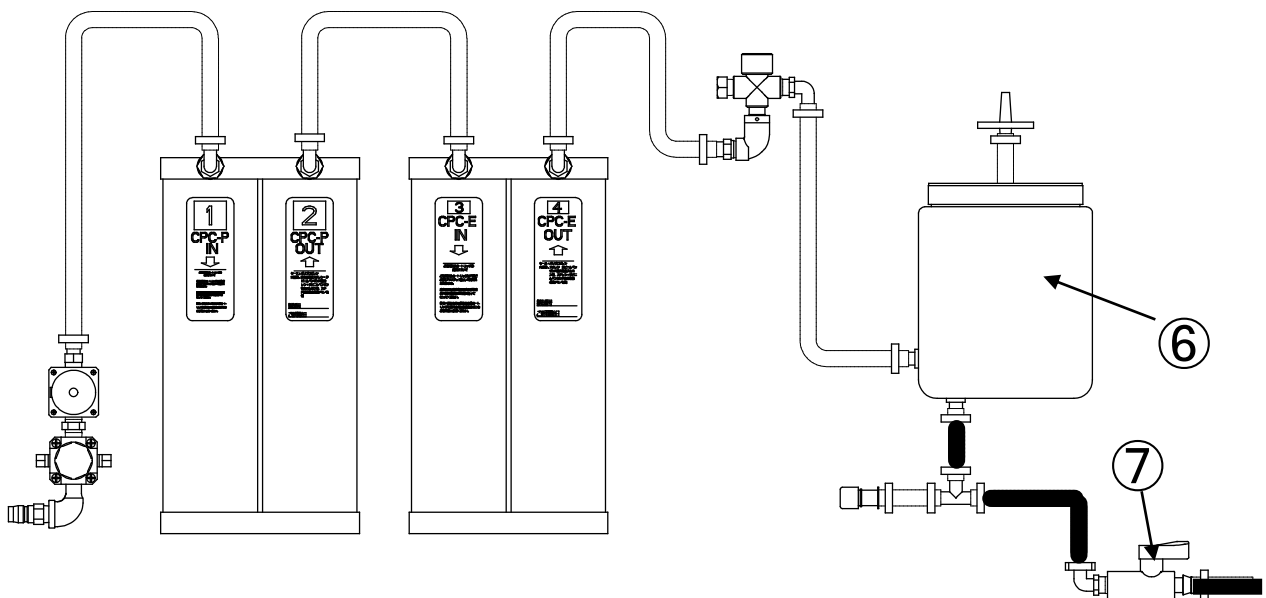
3.Names and functions of parts

Water supply to the tank



- Ion exchange water flows through ① reducing valve, ② water supply solenoid valve, ③ & ④ ion exchange resin cartridges (CPC-P & CPC-E) and ⑤ water quality sensor and is supplied to the ⑥ tank.

Water supplying to the constant temperature and humidity chamber

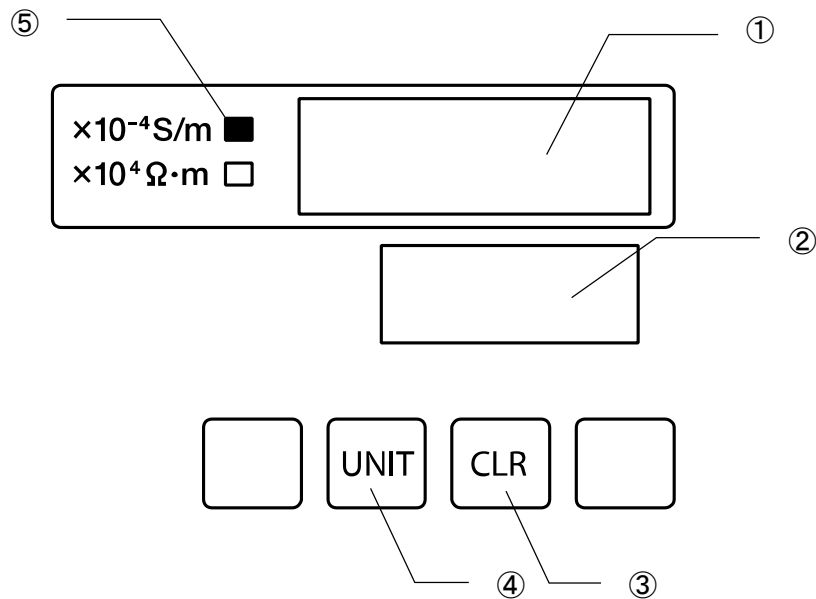


- Ion exchange water in the tank will be supplied to the constant temperature and humidity chamber after flowing through the ⑥ tank and the ⑦ cock when the solenoid valve of the constant temperature and humidity chamber opens.

※ The water supply solenoid valve opens or closes in response to signals from the constant temperature and humidity chamber in the case the supply terminal option is employed for the constant temperature and humidity chamber.

3.Names and functions of parts

Operation panel



No.	Nomenclature	Control/operation
①	Water quality display	Displays the quality of deionized water.
②	Information display	Displays errors, replacement timing of consumable parts and the unit operation status.
③	CLR key	Used when consumables are replaced
④	UNIT key	Selects the water quality unit ($\times 10^{-4} \text{S/m} \Leftrightarrow \times 10^4 \Omega \cdot \text{m}$)
⑤	Water quality unit lamp	The side of the water quality unit selected will come on.

List of displayed characters

0	1	2	3	4	5	6	7	8	9
A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	-	Blank		

4.Operation Method

Pre-start preparation and checks

Be sure to check again before use.

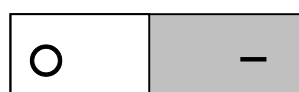
- (1) Confirmation of water feed
 - Confirm that the feed water hose is firmly connected.
 - Open the faucet.
 - Confirm that the connection of feed water hose is free from water leakage.
- (2) Confirmation of power supply
 - Check if the power cord is connected to the appropriate socket outlet.
 - Confirm that the power cord is inserted to the depth of main body power cord socket outlet.

Operation method

Upon completion of preparation, start operation as follows.

Power application

Power switch



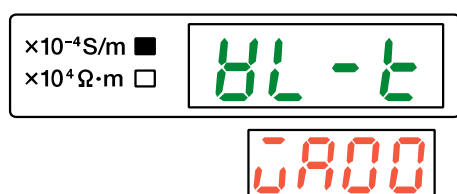
OFF

ON

- ① Set the power switch on the right side of main body to "ON (—) ."

Operation panel (initial display)

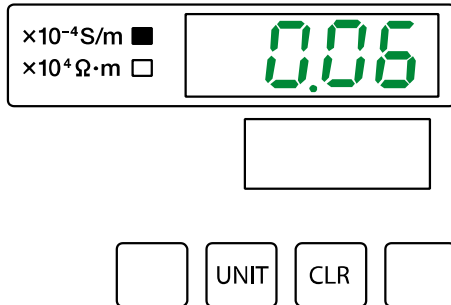
● Initial display for 4 seconds



4. Operating procedures

Water supply to the tank

Water supply to the tank



When the tank is empty

- Automatically start supplying water to the tank.
- The information display shows an animation of supplying water to the tank.

Animation of supplying water to the tank



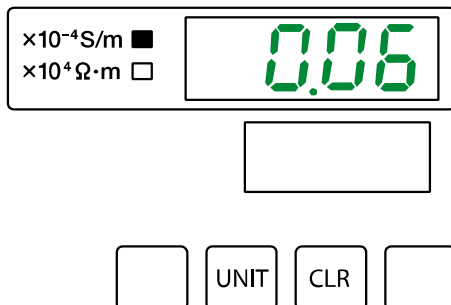
When the tank is full or has remaining water

- Animation of supplying water to the tank is turned off in the information display

- ※ After initial powering on or replacement of the ion exchange resin cartridge, discharge water completely at the tank discharge port on the back when the tank has become full. Be sure to turn power OFF because supplying water to the tank will start if power is ON.
- ※ If there is water remaining in the tank, supplying water to the tank will not start even when power is turned ON.

Water supply to the constant temperature and humidity chamber

Supplying water to the constant temperature and humidity chamber



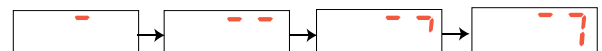
Standard specification (natural fall system)

- The solenoid valve in the constant temperature and humidity chamber opens to start supplying water to the constant temperature and humidity chamber automatically.
- The information display is blank.

Remote water supply terminal (optional)

- The optional remote water supply terminal has a solenoid valve for supplying water.
- External output of the constant temperature and humidity chamber opens the water supply solenoid valve in WL220T to start supplying water to the constant temperature and humidity chamber automatically.
- The information display shows an animation during water supply to the constant temperature and humidity chamber.

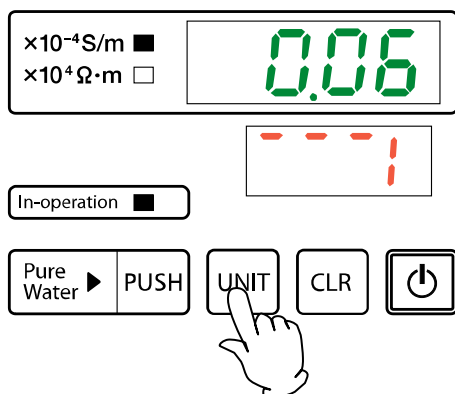
Animation of supplying water to the constant temperature and humidity chamber



4. Operating procedures

Selecting the water quality unit

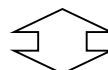
Selecting the water quality unit



Press the **UNIT** key, and the water quality unit can be changed.

To change the water quality unit:

- Electric conductivity (conductivity) display



- Specific resistance display



For details, refer to “Electric Conductivity (Conductivity)” of P. 20

4.Operation Method

Water quality and water quality display

Measuring the electric conductivity (conductivity)

The Water Quality Display of operation panel shows the electric conductivity at the outlet of ion exchange resin cartridge. Use the displayed reading as a guideline to determine the cartridge replacement timing. Read the conductivity while the electrode is fully immersed in water, that is, while the deionized water is flowing.

Correct reading cannot be made in the following cases because of failure of immersion of electrode into the water or the effects of air bubbles:

1. During initial operation period and while the unit is down
2. Immediately after replacement of ion exchange resin cartridge and the pretreatment cartridge (optional).

Electric conductivity (conductivity)

- The electric conductivity is the numerical value representing the easiness of the material to conduct electricity. Water tends to conduct electricity more readily with increasing content of dissolved electrolyte, that is, impurities. The numerical value of such conductivity decreases with decreasing content of electrolyte.
- The smaller numerical value of electric conductivity means higher purity of pure water.
Note however that the numerical value of electric conductivity refers only to electrolyte and not to non-electrolytes (organic and colloidal substances, dissolved gases, microorganisms). The value does not represent the total purity and should be handled only as one of indices to represent the water purity.
- The resistivity (R) is a factor representing the content the same as for the electric conductivity (ρ). Since the resistivity is the reciprocal of electric conductivity, the higher numerical value of resistivity means higher purity.

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

Accordingly, factors for the theoretical pure water are defined as follows:

$$R = 18.2 \times 10^4 \Omega \cdot m \quad (18.2 M\Omega \cdot cm) \quad 25^\circ C$$

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

Water quality of deionized water

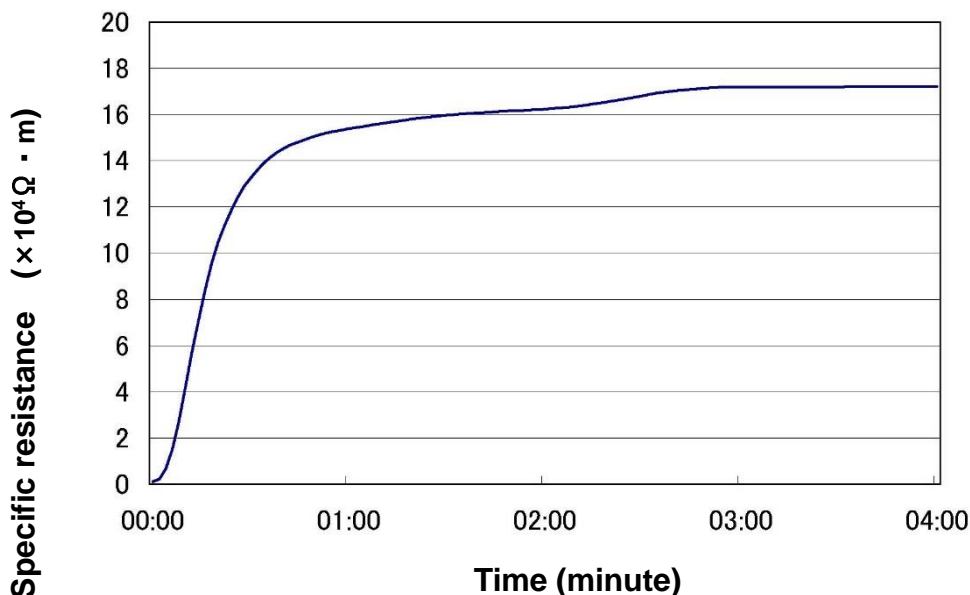
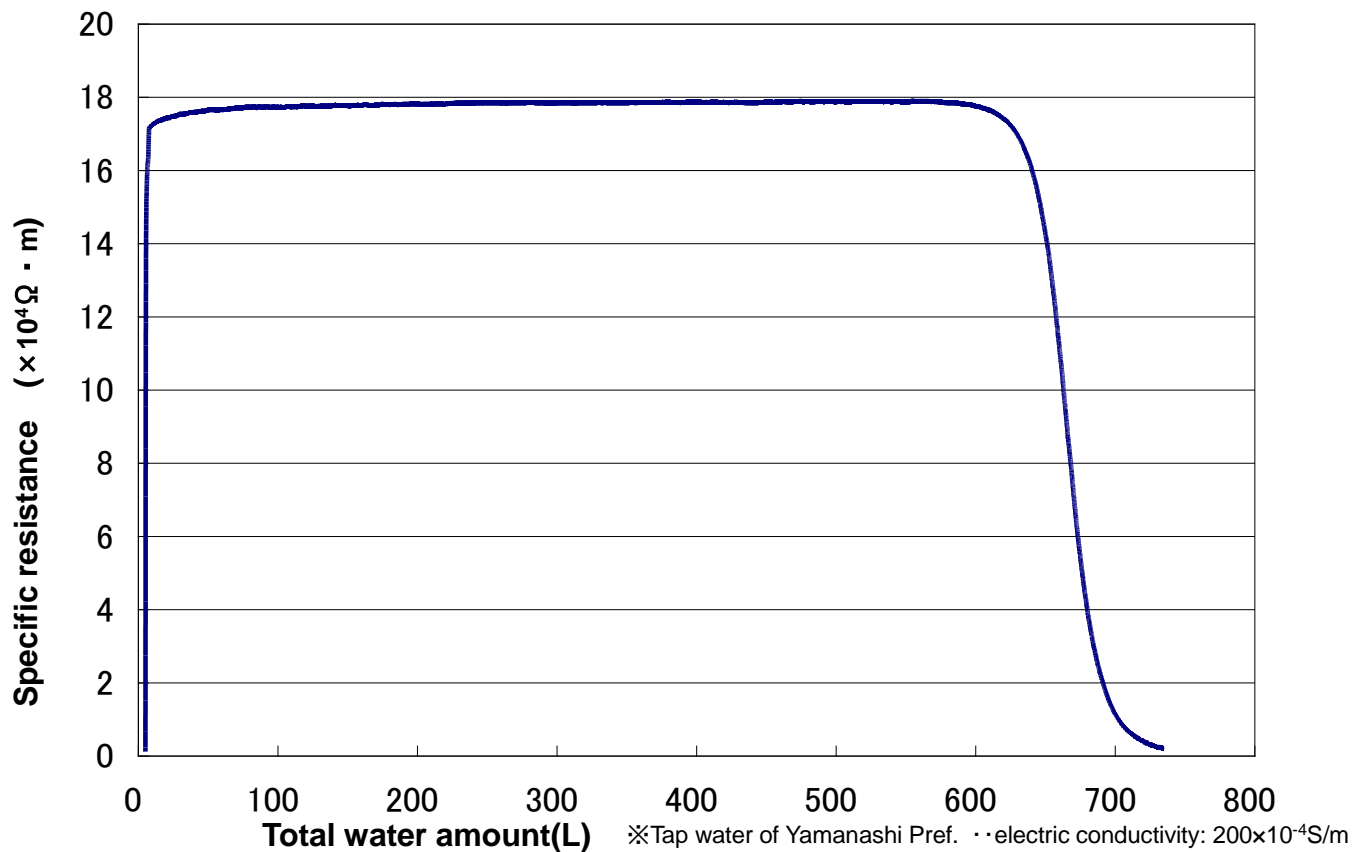
Deionized water

Water with the lowest electric conductivity can be obtained by eliminating most of electrolytes in water, except that non-electrolytes can be removed. More or less deterioration of purity may be observed immediately after replacement of resin or at resumption of water flow after shutdown of the system.

4. Operating procedures

Water quality characteristics data (reference)

The use life of the ion exchange resin cartridge is about 700L (at electric conductivity of $200 \times 10^{-4} \text{S/m}$).



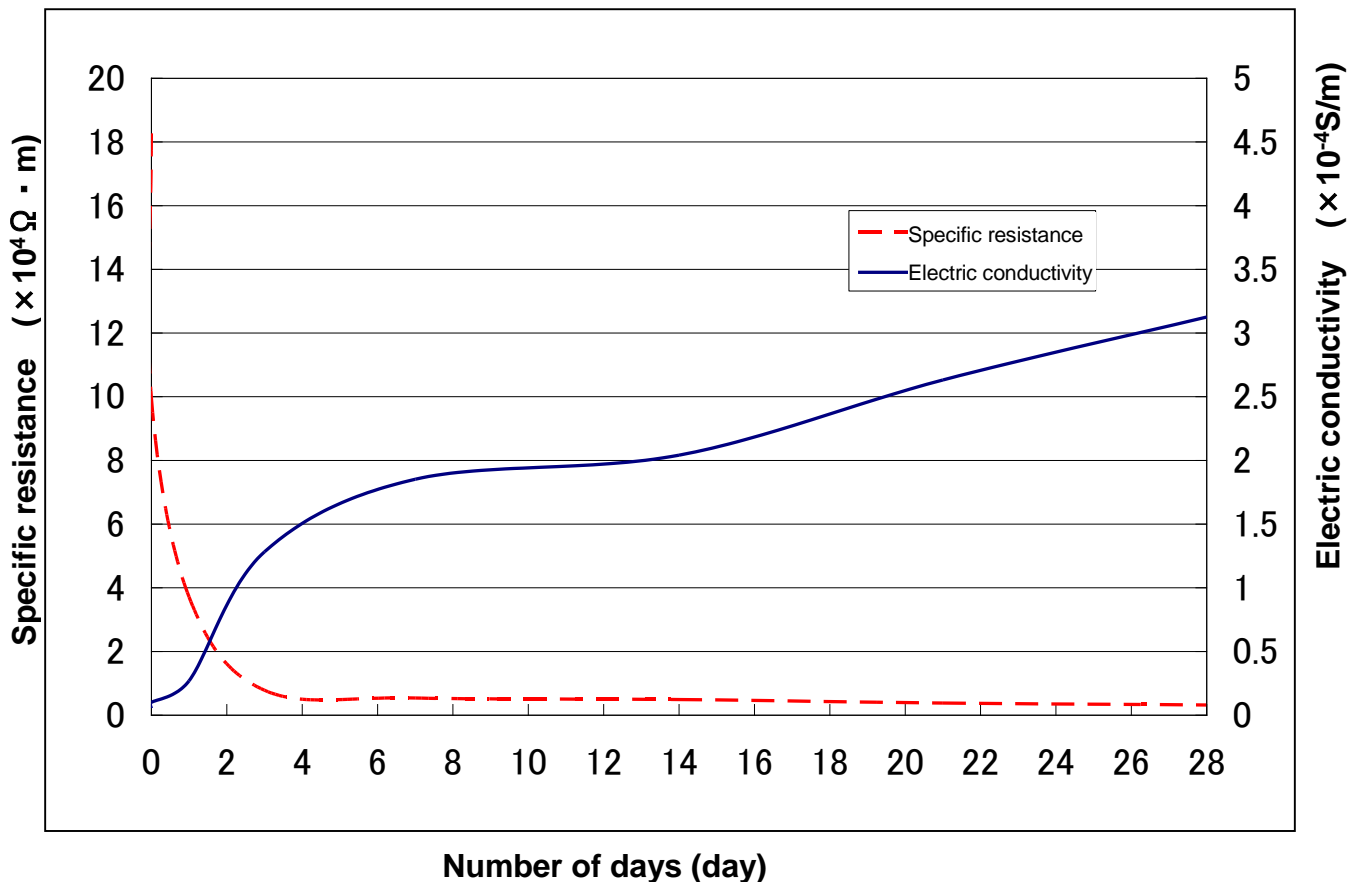
One of water quality characteristics of water immediately after replacement of the ion exchange resin cartridge is the transient characteristic above which requires several minutes to be stable. Thus fill the 3L tank immediately after replacement of the ion exchange resin cartridge and then discharge water in the tank completely at the discharge port. Use the data as a reference only since the same results will not be always obtained depending on the specific cartridge or raw water quality.

4. Operating procedures

Data of deterioration of tank water quality (reference)

The quality of pure water in the tank will deteriorate if it is left as it is. The water quality is A3 (electric conductance: $1 \times 10^{-4}\text{S/m}$ or lower) at the time of supplying to the tank, which will be A1 ($5 \times 10^{-4}\text{S/m}$ or lower) in three days. The reason pure water shall be used for the constant temperature and humidity chamber is to prevent accumulation of stone of humidifying water, which means pure water having quality of A1 ($5 \times 10^{-4}\text{S/m}$ or lower) or higher may be used. If the water in the tank is not used for one month, the A1 quality ($5 \times 10^{-4}\text{S/m}$ or lower) may be maintained.

Use the data as a reference only since the same results will not be always obtained depending on the specific cartridge or raw water quality.



※Tap water of Kanagawa pref. ···Electric conductivity $150 \times 10^{-4}\text{S/m}$

5. Useful Functions

List of optional parts

Item name	Product code	Supported model	Remarks
Installation tray (OWL50)	253271	WL220T	This unit can be stably fixed on the constant temperature and humidity chamber. The tray has a discharge port and is put under the unit so that leak water will not drip onto the constant temperature and humidity chamber.
Feed water port unit (OWH10)	253686	WL200 WL220 WL220T	Used when the raw water feed port is not equipped with the sink. Install a faucet to the water supply line.
Reducing valve for raw water (OWG42)	253769	WL200 WL220 WL220T	Used to keep the raw water pressure constant. Use this valve when the raw water pressure is not constant or is $5 \times 100\text{kPa}$ (5kgf/cm^2) or more.
Remote water supply input terminal (OWL48) ※2	253272	WL220T	This terminal is used when you want to supply water to the constant temperature and humidity chamber with the supply signals from that chamber. A solenoid valve for supplying water is added inside the unit. This shall be specified at the time of placing an order.
Power cord 4m (OWL52)	253273	WL220T	This is used when the existing power cord is short. ※ Do not use this power cord for electric appliances other than the supported products of Yamato.
MIZU guard	254199	Y-MGB	A line type leak sensor is installed around the water purifier. This detects a small amount of leak on the unit and closes the water supply pipe to the unit with a motor valve to stop leak.

※1 Please specify at the time of placing the order for the main unit.

5. Useful Functions

Setting of the input terminal for remote water supply (optional)

The remote water supply function that uses the input terminal for remote water supply can be used to supply water stored in the tank to the constant temperature and humidity chamber by opening/closing the solenoid valve in the unit using remote signals from the chamber.

Connect terminals	
<p>(←Rear) (Front→)</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>ALARM</p> </div> <div style="text-align: center;"> <p>REMOTE</p> </div> </div> <p>(Example) Connect the switch for use.</p>	<p>Connect to the remote supply input terminal in the upper portion of the left side of main body.</p> <p>REMOTE Non-voltage contact input</p> <ul style="list-style-type: none"> • Supplying Shorting the contacts causes start of supplying water. • Supplying stop Opening the contacts causes stop of supplying water. <p>※ Do not apply voltage to the input terminal for remote water supply. It will result in a malfunction of the unit.</p> <p>※ When you use the unit with remote operation, we recommend use of the MIZU guard (product code: 254199) that detects water leak from a wrong operation signal or a malfunction of the unit and stops water supply for safety.</p>

Setting of the external alarm output (optional)

This is a function to output the alarm signal in case of abnormality of the main body or to notify the consumables replacement timing.


Connecting the terminal (Terminal block size : M4)	
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>ALARM</p> </div> <div style="text-align: center;"> <p>REMOTE</p> </div> </div> <p>Load power Connected load</p> <p>Example) Alarm lamp or buzzer can be connected to the terminal.</p>	<p>Connect to the external alarm output terminal in the upper portion of the left side of main body.</p> <p>ALARM Relay a contact (Normal Open)</p> <p>Contact capacity : AC250V 1A (resistance load) DC30V 1A (resistance load)</p> <p>Load</p> <ul style="list-style-type: none"> • The relay contact closes at a time of alarm of consumables and in case of abnormality in the unit. • The external alarm output is maintained even while the buzzer is cancelled temporarily. • External alarm is canceled when the power key is OFF.

6. Maintenance procedures

Maintenance and inspection

Frequency of maintenance and inspection

(We recommend daily inspection to assure stable operation of our products.)

Maintenance/inspection items	Timing	Remarks
Replacement of the ion exchange resin cartridge CPC-P & CPC-E (See P.11, 12)	When  appears on the information display.	Replacement timing: About 700L of raw water of 200×10^{-4} S/m
Washing of the supply hose strainer (See P.27.)	Six months	Perform this earlier when raw water quality is low.
Replacement of the piping hose. (See P.27.)	Two years	Check the connections every month for water leak.

※ Deterioration of water quality indicates that you need to replace consumable parts.

※ Actual timing for replacement will differ depending on the raw water quality.

Replacing the ion exchange resin cartridges

See “7. Connect the ion exchange resin cartridge (CPC-P, CPC-E) firmly.” on P.16 for how to replace. The alarm is reset automatically when water quality improves after replacement.

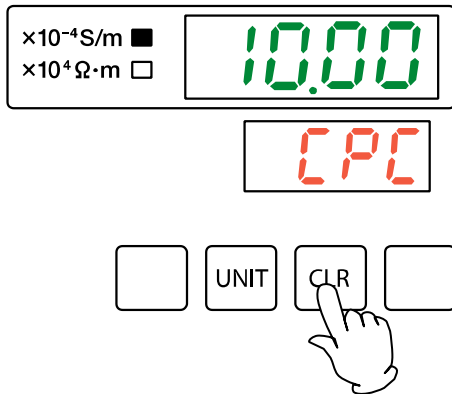
- Spare cartridges will gradually deteriorate during storage even if you do not use them. Prepare new spare parts sufficiently before the expected replacement timing judged based on the actual use status. Rough storage period is about four months.
- We would be grateful if you return used cartridges to us using the specified letter of transmittal attached to the new cartridge. We promote adequate disposal, recovery and recycling for preservation of the environment. If you want to dispose used cartridges, follow the appropriate disposing method as non-combustible waste.
- When you replace ion exchange resin cartridges, replace both CPC-P and CPC-E cartridges at the same time. If not, a sufficient amount of water cannot be supplied to maintain the specified water quality.
- After having replaced each cartridge, discharge all water at the tank discharge port on the back when the tank has become full in order to remove initial foreign matters. Be sure to turn power OFF before discharging since water will be supplied to the tank if power is left ON.

6.Maintenance procedures

Resetting after replacement of consumable parts (when an alarm is triggered)

Error of consumable parts will be displayed when water quality has deteriorated. Once consumable parts have been replaced, the error will be reset automatically when water quality improves. You can also reset errors manually using the procedures below.

Resetting a consumable part error



- ① Turn the power switch on the right side of the main unit ON.
- ② Keep the **CLR** key on the operation panel pressed longer to sound the acceptance beep and to reset the **CPC** indication.

※ Perform resetting operation only after having replaced consumable parts.

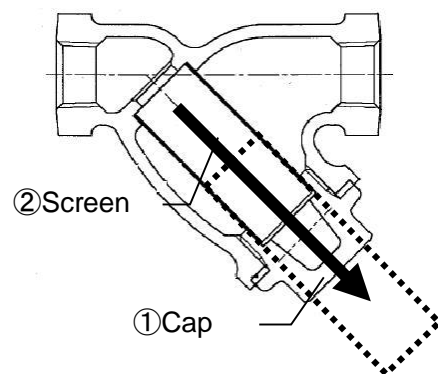
※ Even if you keep the **CLR** key longer without replacing the ion exchange resin cartridges (CPC-P and CPC-E), alarm will be triggered again unless water quality improves.

6.Maintenance procedures

Washing the supply hose strainer

Washing the supply hose strainer

- (1) Turn the power switch on the right side of the main unit OFF, close the main cock of the tap water pipe and then remove the ① cap using a wrench.
- (2) Take out the ② screen in the strainer by pulling it in the direction of the arrow.
- (3) Clean the ② screen carefully using compressed air or detergent not to damage the metal mesh.
- (4) Replace the ② screen to the original position following the procedures above in the reversed order and then tighten the ① cap using a wrench.



- ※ Note that liquid inside will flow out when you remove the lower cover to wash the strainer screen.
- ※ Failure to secure connection will cause water to spout and lead to water leak.

Replace the piping hose.

Replace the piping hose.

- Be sure to use our specified hose for replacement.
- The guideline for replacement of piping hose is two years.

- ※ Be sure to contact us before replacement.

7. When the unit is not to be used for a long time or when disposing



Warning

1. For disposal



- Dispose of the product as a waste.
- When disposing of, do not leave the product in a place where children gather to play.

2. When the product is not to be operated in the nighttime and during holidays



- Be sure to turn OFF the power switch on the right side of main body.
- Be sure to close the faucet.
- Fluctuating water supply pressure may cause water leakage, resulting in unexpected accident.

Requests in case of disposal

Always pay attention to the preservation of the global environment.

- We highly recommend taking the unit apart as far as possible for separation or recycling to contribute to the preservation of the global environment. Major components and materials for the unit are as follows:

Name of principal parts	Material
Principal components of exterior	
Exterior	Ferrous, galvanized sheet steel, melamine resin baking finishing
Exterior back plate	Ferrous, galvanized sheet steel, melamine resin baking finishing
Door	ABS resin
Door back plate	Stainless steel plate SUS304
Installation plates (coated)	Ferrous, galvanized sheet steel, melamine resin baking finishing
Installation plates (uncoated)	Stainless steel plate SUS304
Piping part installation plate	Stainless steel plate SUS304
Hinge	Stainless steel plate SUS
Rubber legs	Synthetic rubber
Nameplates	Polyester film
Principal components of water circuit system	
Feed water port	Brass
Water quality sensor	Polypropylene resin
Tank	Polypropylene resin
Water circuit components	
Ion exchange resin	Polyester resin
Water quality sensor electrode	Titanium
Reducing valve	Metallic : body of brass

7. When the unit is not to be used for a long time or when disposing

Requests in case of disposal

Name of principal parts	Material
Principal components of piping system	
Feed water hose	Vinyl chloride
Piping hose (transparent)	Vinyl
Hose clamp	Polyacetal
Hose nipple (resin white)	Polypropylene resin
Hose nipple (metal)	Brass
Principal components of electric system	
Feed water electromagnetic valve	Metallic : body of brass
Substrate	Composite component of fiber glass and other materials
Power cord and wiring materials Others	Wiring materials and substrates of synthetic rubber insulation and resin insulation

When the unit is not to be used for a long time



When you are not going to use the unit for a long period of time, be sure to turn the power switch on the right side to OFF, close the faucet, discharge water in the tank completely at the tank discharge port on the back and then pull out the power plug of the unit from the power outlet for safety.

Ion exchanger resin cartridges will deteriorate even if they are not used. Prepare new ion exchange resin cartridges before resuming operation because the consumable part replacement error is anticipated.

8.Troubleshooting Guide

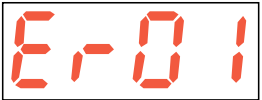
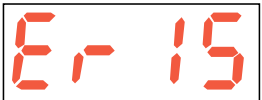


Display and contents

How to take the countermeasure

In case of display of the error as follows in the Error • Consumables Replacement Display, take note of the content of error. Turn OFF the power switch on the right side of main body and close the faucet. In case of abnormality, parts replacement or system check is necessary. Contact the shop from which you have purchased the product, our sales office, or our service center.


Note that the serial number must also be informed together with the details of abnormality when contacting us.

The contact address of the customer service center is shown at the end of this manual.


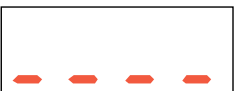
Alarm	Indication	Causes	Countermeasures
Water quality error		Stops all operations when disconnection/short circuit of the temperature compensation sensor of the water quality sensor or temperature outside the measurement range of 0 °C ~ 100 °C continued beyond the specified period.	Turn ON the power switch on the right side of main body again. If error persists, call the service center.
Controller error		The settings stored in the memory device in the substrate can not be read correctly. Or stops all operations when an abnormal condition is detected for the A/D circuit when the value is abnormal.	Turn ON the power switch on the right side of main body again. If error persists, call the service center.
Water leak error		Stops all operations when water splashes on the leak sensor.	Turn OFF the power switch on the right side of main body, check for water leak at piping components and call the service center. (See P.32.)
Float switch error		Stops all operations when the sensor input of the float switch is abnormal.	Turn ON the power switch on the right side of main body again. If error persists, call the service center.

8. Troubleshooting

Display and contents

Alarm	Display	Conditions	Countermeasure
Notifying ion exchange resin replacement		Water quality of deionized water: $1 \times 10^{-4} \text{S/m}$ or more $1 \times 10^4 \Omega \cdot \text{m}$ or less	Replace the ion exchange resin. (See P. 11) Continue supplying till the water quality is improved and the CPC display disappears after replacement (automatic reset) (Alarm display can be temporarily reset by pressing [CLR] continuously during alarm after replacement.)

- ※1 Use life of consumable parts depends on the raw water quality and will have influences on the water quality value.
- ※2 The buzzer sound activated can be temporarily canceled by pressing any switch of the operation panel (the error display continues). On detecting abnormality in the water quality again, the buzzer sound is resumed for notification.

Other displays	Display	Conditions	Countermeasures
Measurement over range		Exceeding the upper limit of water quality measurement <ul style="list-style-type: none"> Electric conductivity $< 0.05 \times 10^{-4} \text{S/m}$ Specific resistance $> 20 \times 10^4 \Omega \cdot \text{m}$ 	Discharge water in the tank at the tank discharge port and supply water to the tank again. If any numeric value does not appear after supplying water, call the service center.
		Exceeding the lower limit of water quality measurement <ul style="list-style-type: none"> Electric conductivity $> 10 \times 10^{-4} \text{S/m}$ Specific resistance $< 0.1 \times 10^4 \Omega \cdot \text{m}$ 	Replace the ion exchange resin. (See P.11.) If any numeric value does not appear after replacement, call the service center.

If a malfunction is suspected

Symptom	Probable cause
Power not applied	<ul style="list-style-type: none"> ● Faulty connection of the power cord and power socket outlet ● Wire breakage of connection cord ● Faulty power switch
Water is not supplied to the tank.	<ul style="list-style-type: none"> ● Insufficient tap water pressure or water outage ● Water supply solenoid valve defective ● Faulty float switch
Supply of water to the tank will not stop.	<ul style="list-style-type: none"> ● Faulty water supply solenoid valve ● Faulty float switch
Water is not supplied to the constant temperature and humidity chamber.	<ul style="list-style-type: none"> ● Cock is closed ● Faulty water supply solenoid valve (when option is set only)
Water quality is low.	<ul style="list-style-type: none"> ● Deterioration of the CPC-P and CPC-E ion exchange resin cartridges ● Air remaining in the ion exchange resin cartridge ● Ion exchange resin cartridge has not been used for an extended period of time

8. When a trouble occurs

Troubleshooting

Countermeasures when water leak detection error **E-31** is displayed

1. Imperfect connection of the water supply port coupler and the ion exchange resin cartridge coupler

※ When water is leaking from other piping, immediately shut power off and close the main cock of the tap water and consult your dealer or the general customer service center.

2. When water splashed on the ion exchange resin cartridge during its replacement work.

Countermeasures

(1) Turn the power switch on the right side of the main body to OFF.

(2) Isolate the leaking point. The leak detecting sensors are located at two points below:

- Inside the door.
- Inside the left cover of the cock.

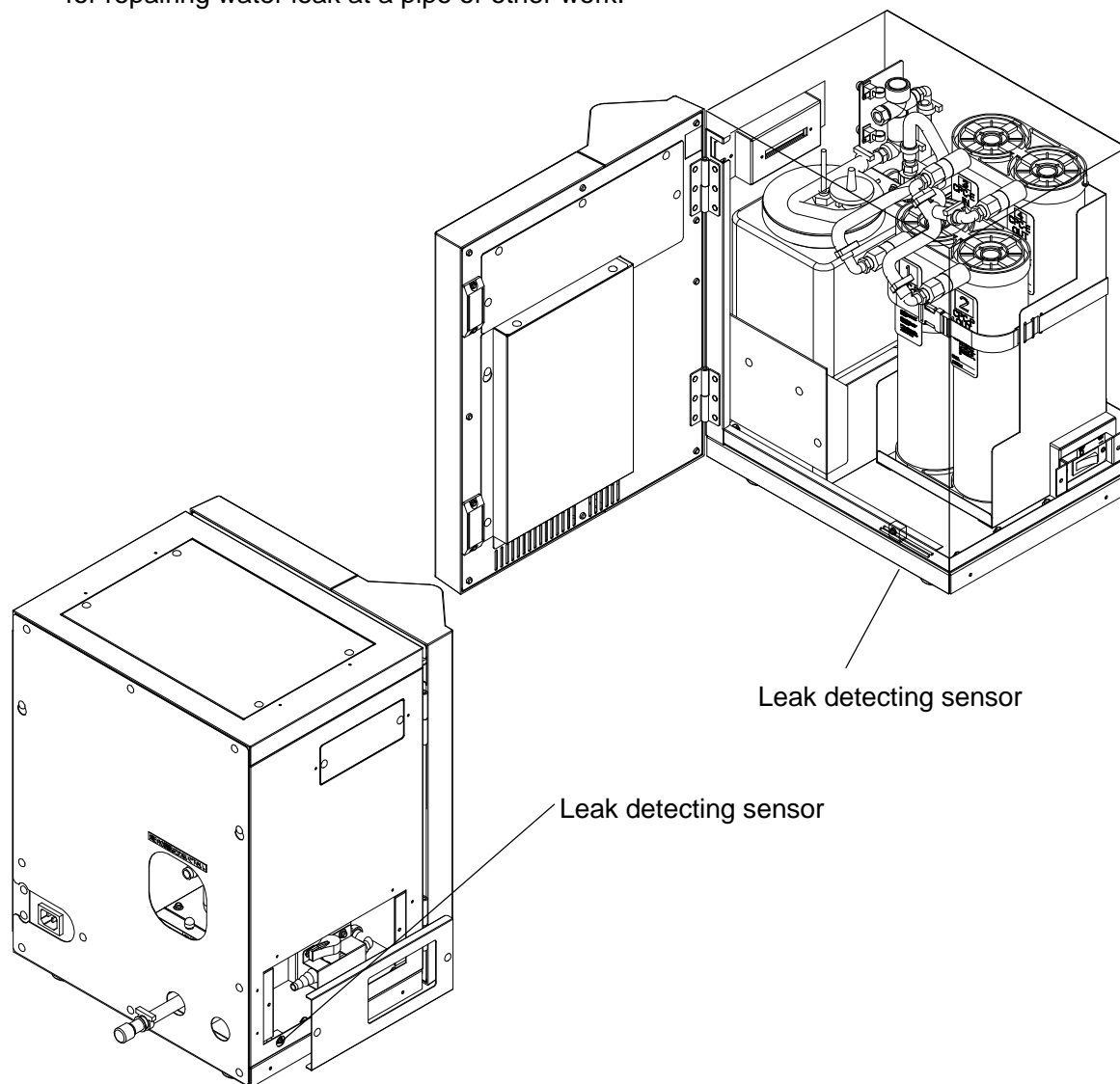
(3) Wipe off water remaining in the bottom of the unit and allow it completely dry, remove the screws that hold the water leak sensor and remove, carefully wipe and allow the electrode off the main body to completely dry.

(4) When water has been wiped out, be sure to replace the leak detecting sensor to the original position.

(5) Replace the door or the left side cover.

(6) Turn the power switch on the right side of the main body to ON, press the **POWER** key on the operation panel to resume regular operation.

※ Be sure to first close the main cock of raw water before disassembling the piping assembly for repairing water leak at a pipe or other work.



9. After sales service and warranty

When requesting a repair

When requesting a repair

If any trouble occurs, immediately stop operation, turn the power switch off, disconnect the power plug and contact your dealer or our sales office.

Information necessary for requesting a repair

- Model name of the product
 - Serial number
 - Date (y/m/d) of purchase
 - Description of trouble (as in detail as possible)
- } See the warranty card or the nameplate on the unit.
} See the section “3. Names and Functions of Parts” on page 13.

Be sure to indicate the warranty card to our service representative.

Warranty card (attached separately)

- Warranty card is given by your dealer or one of our sales offices and please fill in your dealer, date of purchase and other information and fax it to our customer center (the number is described in the back cover), then store it securely.
- Warranty period is one full year from the date of purchase. Repair service for free is available according to the conditions written on the warranty card.
- For repairs after the warranty period consult your dealer or one of our sales offices. Paid repair service is available on your request when the product's functionality can be maintained by repair.

Minimum holding period of repair parts

The minimum holding period of repair parts for this product is seven years after end of production. Repair parts here refer to parts necessary for maintaining performance of the product.

10.Specifications

Model		WL220T		
※1 Performance	Water suctioning system	Ion exchange		
	Water supply system	Tap water connecting hose with a Y-strainer & 1/2 male screws for tap water connection		
	Pure water quality	JIS K 0557 A3 ion exchange water		
	Yield of pure water ※2	Approx 1L/min of ion exchange water		
Configuration	Ion exchange resin cartridge ※4	2L ion exchange resin with activated charcoal(CPC-P) x 1 2L ion exchange resin (CPC-E) x 1		
	Internal tank	3L polyethylene tank		
	Detection of water leakage	Forcibly shuts off the water supply solenoid valve when water leak is detected.		
Standards	Raw water pressure range	0.5~5×100kPa (0.5~5kgf/cm ²)		
	Safety unit	Circuit breaker, leak detecting sensor, reducing valve, water quality abnormality alarm		
	Power supply (50/60Hz) ※3	Single phase AC100~240V 0.05~0.2A		
	External dimensions※4 (W×D×H)	350mm×350mm×450mm		
	Weight	Approx. 17kg(dry), approx. 20kg(tank is full)		
Display	Water quality display	7-LED display(electric conductivity/specific resistance)		
	Other displays	Display to prompt replacement of consumable parts(CPC-P and CPC-E : Replace simultaneously when water quality has deteriorated) Alarm display (water leak alarm)		
Accessories		Water supply hose with Y-strainer (4m)	1	
		Power cord(2m) ※4	1	
		Constant temperature and humidity chamber connection hose(3m)	1	
		Instruction manual	This document	
		Warranty card	1 sheet	
		Ion exchange resin (CPC-P)	1	
		Ion exchange resin (CPC-E) ※5	1	
		Seal tape	1	
		Hook	1	
		Hose clamp	2	
Consumable parts		Part name	Model	Product code
		Ion exchange resin cartridge	CPC-P + CPC-E	253262

※1 The performance applies to the conditions with power supply of AC100~240V, room temperature of 23°C±5°C, and humidity of 65%RH±20%.

The ambient temperature of this unit ranges from 5°C to 40°C. For the raw water temperature, the guideline must be set to 10°C~35°C.

※2 When raw water is 1.0×100kPa(1kgf/cm²) or below, yield of pure water will be 1.0L/min or lower and it takes time until the tank is filled with water.

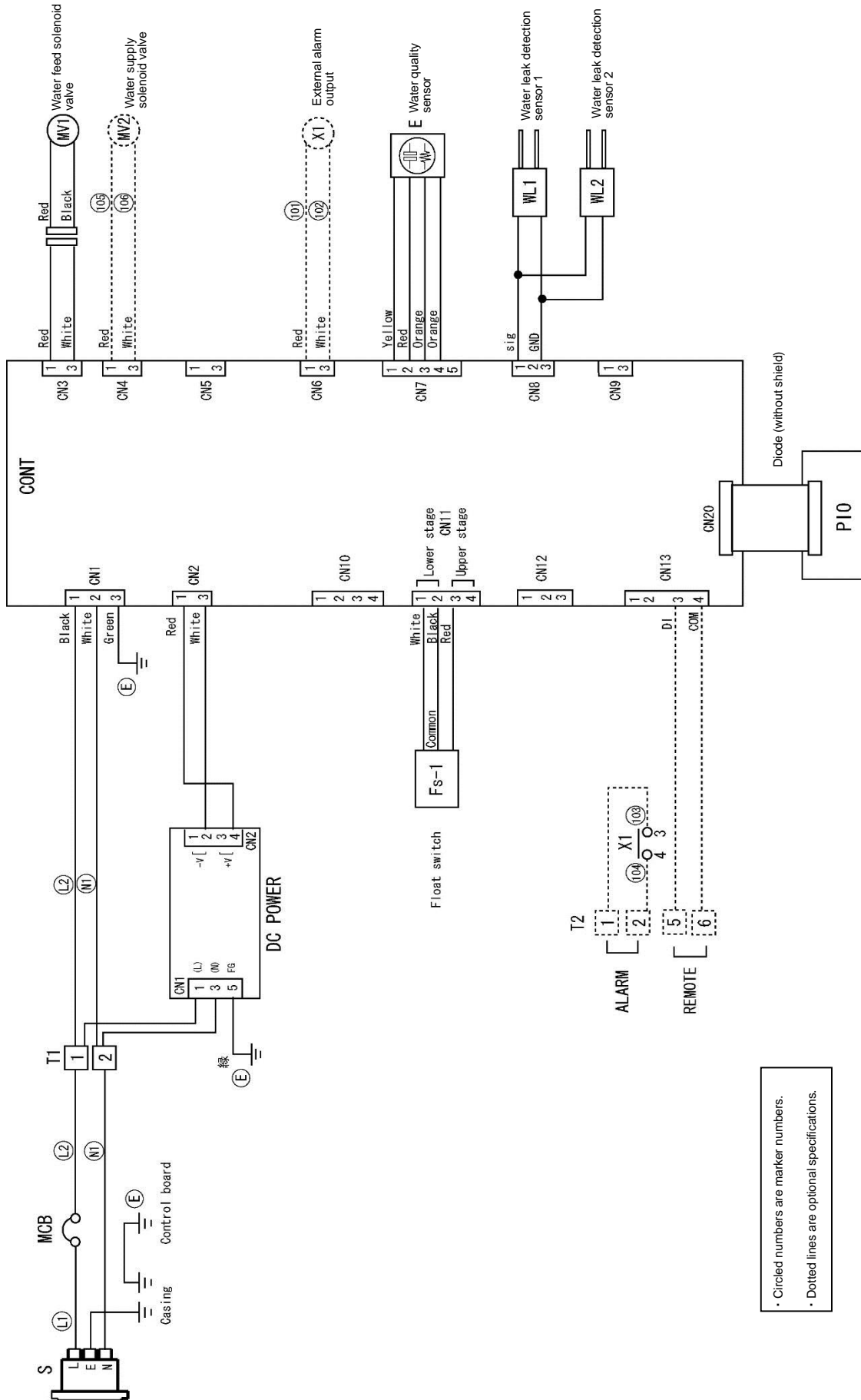
※3 The 100V power cord (with 3P plug attached) is provided.

※4 No projection included

※5 CPC-E and CPC-P are marketed as a set and not sold separately and individually.

11. Electric diagram

Wiring diagram



11.Electric diagram

Part symbols of wiring diagram

• Standard parts

Symbol	Part name	Symbol	Part name
S	Power socket	MV1	Water supply solenoid valve
MCB	Circuit protector	Fs-1	Float switch for the internal tank
T1	Terminal block	E	Water quality sensor
CONT	Planar substrate	WL1	Leak detecting sensor1 (front of the main body)
PIO	Display substrate	WL2	Leak detecting sensor2 (front of the main body)
DC POWER	Switching power		

• Optional parts

Symbol	Part name	Symbol	Part name
X1	External alarm output relay	T2	Optional terminal block
MV2	Water supply solenoid valve (Solenoid valve for supplying to the constant temperature and humidity chamber)		

12.Replacement part table

Part name	Code No.	Specifications	Maker
Ion exchange resin cartridge	253262	CPC-P + CPC-E	Yamato
Water reserve tank	WL22T30210	WL22T-30210	Yamato
Air filter	9020020001	4210	German Science
Plastic flexible hose	3040060005	φ 9mm × φ 13mm	Yamato
One-touch joint	3140030008	QJ-22D	Wamoto

13. List of dangerous materials



Never use an explosive substance a flammable substance or a substance containing them for this device.

Explosive substance	①Nitroglycol, glycerine trinitrate, cellulose nitrate and other explosive nitrate esters
	②Trinitrobenzen, trinitrotoluene, picric acid and other explosive nitro compounds
	③Acetyl hydroperoxide, methyl ethyl ketone peroxide, benzoyl peroxide and other organic peroxides
	④Metallic azide, including sodium azide, etc.
Explosive substances	① Metal “lithium” ② metal “potassium” ③ metal “natrium” ④ yellow phosphorus ⑤ phosphorus sulfide ⑥ red phosphorus ⑦ phosphorus sulfide ⑧ celluloids, calcium carbide (a.k.a, carbide) ⑨ lime phosphide ⑩ magnesium powder ⑪ aluminum powder ⑫ metal powder other than magnesium and aluminum powder ⑬ sodium dithionous acid (a.k.a., hydrosulphite)
Oxidizing substances	①Potassium chlorate, sodium chlorate, ammonium chlorate, and other chlorates
	②Potassium perchlorate, sodium perchlorate, ammonium perchlorate, and other perchlorates
	③Potassium peroxide, sodium peroxide, barium peroxide, and other inorganic peroxides
	④Potassium nitrate, sodium nitrate, ammonium nitrate, and other nitrates
	⑤Sodium chlorite and other chlorites
	⑥Calcium hypochlorite and other hypochlorites
Flammable substances	① Ethyl ether, gasoline, acetaldehyde, propylene chloride, carbon disulfide, and other substances with ignition point at a degree 30 or more degrees below zero.
	②n-hexane, ethylene oxide, acetone, benzene, methyl ethyl ketone and other substances with ignition point between 30 degrees below zero and less than zero.
	③Methanol, ethanol, xylene, pentyl n-acetate, (a.k.a.amyl n-acetate) and other substances with ignition point between zero and less than 30 degrees.
	④Kerosene, light oil, terebinth oil, isopenthyll alcohol(a.k.a. isoamyl alcohol), acetic acid and other substances with ignition point between 30 degrees and less than 65 degrees.
Combustible gas	Hydrogen, acetylene, ethylene, methane, ethane, propane, butane and other gases combustible at 15°C at one air pressure.

Quoted from the separate table 1 in Article 6, the enforcement order of the Industrial Safety and Health Law; Dangerous Substances (in Article 1, 6 and in 3 of Article 9)

14. Standard installation manual

* Install the product according to the following: (Confirm separately for optional items or special specifications)

Model	Serial number	Date	Installation mgr.(company name)	Installation mgr.	Judgment

No.	Item	Implementation method	TOC No. Reference page of the operating instruction manual	Judgment
Specifications				
1	Accessories	Check for number of accessories on the basis of the column for accessories.	10. Specifications field P.34	
2	Installation	▪ Visually check the environmental conditions Caution : Take care for the environment	2. Before operating the unit P.5 ▪ On the installation site	
		▪ Secure sufficient space		
		▪ Check the level of the unit(±3°C or less)		
		▪ The proper height difference must be assured between the water supplying assembly of the unit and the water supply destination (water supply assembly of the constant temperature and humidity chamber)		
Operation-related matters				
1	Source voltage	▪ Measure the user side voltage (outlet, distribution board, etc.) with a tester ▪ Measure voltage during operation (shall meet the specifications) Caution: Always use a plug that meets the specification for attaching to the ELB.	2. Before operating the unit ▪ Be sure to connect the ground wire. P.5 ▪ Power supply is P.5 10.Specifications P.7 ▪ Specification - power supply P.34	
2	Water supplying	Explain supplying to the customer while referring to the manual	4.Operation Method P.17~ ▪ Operation method 20	
Description				
1	Operational descriptions	Explain the customer about each assembly as per the operation manual.	4. Operating procedures P.17~ ▪ Operating procedures 20 1. Safety precautions P.1~38 ~ 13. List of dangerous materials	
2	Error sign	Explain the error sign and the method to reset it to the customer while referring to the manual.	8. Troubleshooting ~9. After sales service and warranty P.30~ 33	
3	Maintenance and inspection	Explain operations of each component according to the operational instructions	6. Maintenance procedures P.25 ~ ▪ Daily inspection/ maintenance 27	
4	Completion of installation Entries	▪ Fill in the installation date and the installation mgr. on the nameplate of the main unit ▪ Fill in necessary information to the warranty card and hand it over to the customer ▪ Explanation of the route for after-sales service	9. After sales service and warranty P.33	

Limited liability

Be sure to use the unit strictly following the handling and operating instructions in this operating instruction.

Yamato Scientific Co., Ltd. assumes no responsibility for an accident or a malfunction caused by use of this product in any way not specified in this operating instruction.

Never attempt to perform matters prohibited in this operation instruction.

Otherwise, an unexpected accident may result.

Notice

- Descriptions in this operating instruction are subject to change without notice.
- We will replace a manual with a missing page or paging disorder.

Instruction Manual

Water Purifier

Pure Line®

WL220T

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