INSTALLATION MANUAL

Mega-Q

All-Electric Commercial Hot Water Generation System

Refrigerant
R410A
R134a

English

Français

Español

MODELS

Hot Water Generation System

Heat source unit: RXHWQ120MQTJA
Cascade unit: BWLP120TJU
Controller kit: BRP26B2VJU

Please visit the following website for the most current version of installation instructions. In the event of conflicting information, the online installation instruction is to be used.

[DAIKIN CITY URL]
https://www.daikincity.com/Library/

[DAIKIN URL]
http://www.daikinac.com/

Safety considerations

PROP 65 WARNING

FOR CALIFORNIA CONSUMERS

⚠ WARNING

Cancer and Reproductive Harm

- www.P65Warnings.ca.gov

Read these Safety considerations for Installation carefully before installing a unit. After completing the installation, make sure that the unit operates properly during the startup operation. Instruct the customer on how to operate and maintain the unit. Inform customers that they should store this Installation Manual with the Operation Manual for future reference.
Always use a licensed installer or contractor to install this product.
Improper installation can result in water or refrigerant leakage, electrical shock, fire, or explosion.

Meanings of **DANGER**, **WARNING**, **CAUTION**, **NOTE** and **INFORMATION** symbols:

⚠ **DANGER**	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ **WARNING**	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ **CAUTION**	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
⚠ **NOTE**	Indicates situations that may result in equipment or property damage accidents only.
INFORMATION . . .	This symbol identifies useful tips or additional information.

⚠ DANGER

- Perform grounding work.
  Do not ground units to water pipes, gas pipes, telephone wires, or lightning rods as incomplete grounding will result a severe shock hazard resulting in severe injury or death. Additionally, grounding to gas pipes will result a gas leak and potential explosion resulting in severe injury or death.
- Refrigerant gas is heavier than air and replaces oxygen. A massive leak will result in oxygen depletion, especially in basements, and an asphyxiation hazard will result in serious injury or death.
- If refrigerant gas leaks during installation, ventilate the area immediately. Refrigerant gas will result in producing toxic gas if it comes into contact with fire. Exposure to this gas will result in severe injury or death.
- Do not install unit in an area where flammable materials are present due to risk of explosions that will result in serious injury or death.
- Safely dispose of all packing and transportation materials in accordance with federal/state/local laws or ordinances. Packing materials such as nails and other metal or wood parts, including plastic packing materials used for transportation will result in injuries or death by suffocation.
- After completing the installation work, check that the refrigerant gas does not leak anywhere in the system.
  If refrigerant gas leaks inside a room and comes into contact with fire, such as in a fan heater, stove or burner, the emission of toxic gas may result

⚠ WARNING

- Never mix substances other than the designated refrigerant, air, oxygen, etc. into the refrigeration cycle.
  Doing so might cause an explosion, fire, or injury.
- Only qualified personnel must carry out the installation work. Installation must be done in accordance with this installation manual. Improper installation could result in water leakage, electric shock, or fire.
- When installing the unit in a small room, take measures to keep the refrigerant concentration from exceeding allowable safety limits. Excessive refrigerant leaks, in the event of an accident in a closed ambient space, could result in oxygen deficiency.
- Use only specified accessories and parts for installation work. Failure to use specified parts could result in water leakage, electric shocks, fire, or the unit falling.
- Install the unit on a foundation strong enough that it can withstand the weight of the unit. A foundation of insufficient strength could result in the unit falling and causing injuries.
- Take into account strong winds, typhoons, or earthquakes when installing. Improper installation could result in the unit falling and causing accidents.
- Make sure that a separate power supply circuit is provided for this unit and that all electrical work is carried out by qualified personnel according to local, state and national regulations. An insufficient power supply capacity or improper electrical construction could result in electric shocks or fire.
- This equipment can be installed with a Ground-Fault Circuit Interrupter (GFCI). Although this is a recognized measure for additional protection, with the grounding system in North America, a dedicated GFCI is not necessary.
- Before touching electrical parts, turn off the unit.
- Make sure that all wiring is secured, that specified wires are used, and that no external forces act on the terminal connections or wires. Improper connections or installation could result in fire.
- When wiring, position the wires so that the control box cover can be securely fastened. Improper positioning of the control box cover could result in electric shocks, fire, or the terminals overheating.
- Securely fasten the unit terminal cover (panel). If the terminal cover/panel is not installed properly, dust or water may enter the unit and could result in fire or electric shock.
- Do not directly touch refrigerant leaking from a refrigerant piping junction.
  There is a danger of frostbite.
- Do not stand on the unit, the tank control board, or put things on it.

This may result in an accident caused by falling or dropping of items.
- When installing or relocating the system, keep the refrigerant circuit free from substances other than the specified refrigerant (R410A) such as air. Any presence of air or other foreign substance in the refrigerant circuit could result in abnormal pressure rise or rupture, resulting in injury.
- Do not change the setting of the protection devices. If the pressure switch, thermal switch, or other protection device is shorted and operated forcibly, or parts other than those specified by Daikin are used, fire or explosion could result.

⚠ CAUTION

- For the hot water generation system, use tap water that complies with the water quality standards prescribed by local regulations relating to water quality.
  Water containing foreign matter may cause corrosion of condensers and piping and generation of microorganisms.
- If shutting off the power supply circuit breaker in an environment where the outside air is below freezing, be sure to drain the water from the inside of the cascade unit.
  The water will freeze, damaging the unit and water piping.
- Install the power supply and transmission wires for the unit and the tank control board at least 10 ft. (3 m) away from televisions or radios to prevent image interference or noise. Depending on the radio waves, a distance of 10 ft. (3 m) may not be sufficient to eliminate the noise.
- Handheld remote controller (wireless kit) transmitting distance can be shorter than expected in rooms with electronic fluorescent lamps (inverter or rapid start types). Install the unit far away from fluorescent lamps as much as possible.
- Do not install the unit in the following locations:
  (a) Where a mineral oil mist or oil spray or vapor is produced, for example, in a kitchen.
  Plastic parts may deteriorate and fall off and thus may result in water leakage.
  (b) Where corrosive gas, such as sulfurous acid gas, is produced.
  Corroding copper pipes or soldered parts may result in refrigerant leakage.
  (c) Near machinery emitting electromagnetic waves.
  Electromagnetic waves may disturb the operation of the control system and cause the unit to malfunction.
  (d) Where flammable gas may leak, where there is carbon fiber, or ignitable dust suspension in the air, or where volatile flammables such as thinner or gasoline are handled. Operating the unit in such conditions may result in a fire.
  (e) Take adequate measures to prevent the unit from being used as a shelter by small animals. Small animals making contact with electrical parts may result in malfunctions, smoke, or fire. Instruct the customer to keep the area around the unit clean.
- Do not touch the switch with wet fingers. Touching a switch with wet fingers may result in electric shock.
- Do not allow children to play on or around the unit or it may result in injury.
- The heat exchanger fins are sharp enough to cut, and may result in injury if improperly used. To avoid injury wear glove or cover the fins when working around them.
- Do not touch the refrigerant pipes during and immediately after operation as the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor, and other refrigerant cycle parts. It may result in your hands getting burns or frostbite if you touch the refrigerant pipes. To avoid injury, give the pipes time to return to normal temperature or, if you must touch them, be sure to wear proper gloves.
- Close the front panels when charging refrigerant or during operation as the fusible plug may blow off, spewing refrigerant.
- Install drain piping to proper drainage. Improper drain piping may result in water leakage and property damage.
- Insulate piping to prevent condensation.
- Be careful when transporting the product.
- Do not turn off the power immediately after stopping operation. Always wait for at least 5 minutes before turning off the power. Otherwise, water leakage may result.
- Do not use a charging cylinder. Using a charging cylinder may cause the refrigerant to deteriorate.
- Refrigerant R410A in the system must be kept clean, dry, and tight.
  (a) Clean and Dry - Foreign materials (including mineral oils such as SUNISO oil or moisture) should be prevented from getting into the system.
  (b) Tight - R410A does not contain any chlorine, does not destroy the ozone layer, and does not reduce the earth's protection again harmful ultraviolet radiation. R410A can contribute to the greenhouse effect if it is released. Therefore take proper measures to check for the tightness of the refrigerant piping installation. Read the chapter Refrigerant Piping and follow the procedures.
- Since R410A is a blend, the required additional refrigerant must be charged in its liquid state. If the refrigerant is charged in a gaseous state, its composition can change and the system will not work properly.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.
- This equipment is designed for outdoor installation only at a max altitude of 10,500 ft. above sea level or a min altitude of -184 ft. below sea level.
- Hot water generated by the equipment is not potable.

⚠ NOTE

- Dismantling the unit, treatment of the refrigerant, oil and additional parts must be done in accordance with the relevant local, state, and national regulations.
- Do not use the following tools that are used with conventional refrigerants: gauge manifold, charge hose, gas leak detector, reverse flow check valve, refrigerant charge base, vacuum gauge, or refrigerant recovery equipment.
- If the conventional refrigerant and refrigerator oil are mixed in R410A, the refrigerant result in deterioration.
- This unit is an appliance that should not be accessible to the general public.
- The hot water generation system is that uses a two-source refrigerant circuit. In the low refrigerant temperature source

side circuit R410A is used.
During installation work, only the piping connection of the low source side circuit and the work of charging the refrigerant are performed.

- The hot water generation system uses a two-source refrigerant circuit (Cascade configuration).
  In the high refrigerant temperature source side circuit R134a is used, and in the low refrigerant temperature source side circuit R410A is used.
  As maximum allowable pressure of the R410A circuit (the low refrigerant temperature source side circuit) is 580 psi (4.0 MPa), the wall thickness of field-installed pipes should be selected in accordance with the relevant local, state, and national regulations.
- Observe the following precautions to ensure the system operates property.
  (a) Never place objects near the air inlet or the air outlet of the unit. It may cause deterioration in the performance or stop the operation.
  (b) Keep the remote controller at least 3.5 ft. (1 m) away from televisions, radios, stereos, and other similar equipment.
  Failing to do so may cause static or distorted pictures.
  (c) It takes time for the tank water temperature to reach the set temperature.
  Start the operation in advance using schedule operation.

Codes and Regulations

This product is designed and manufactured to comply with national codes. Installation in accordance with such codes and/or prevailing local codes/regulations is the responsibility of the installer. The manufacturer assumes no responsibility for equipment installed in violation of any codes or regulations. Designed performance is achieved after 72 hours of operation.

All-Electric Commercial Hot Water Generation System
Heat source unit: RXHWQ120MQTJA
Cascade unit: BWLP120TJU

Table of Contents

1. Before installation

About Mega-Q

NOTE	The heat source component of Mega-Q should be used for heating water for non-potable use only, not for other applications such as but not limited to space heating or cooling.

(1) Mega-Q is an all-electric hot water generation system composed of a cascade unit, heat source unit and a controller kit to form a hot water generation system.
The heat source unit cannot be used alone.
Also, the system consists of a dedicated heat source unit (RXHWQ120MQTJA) and a cascade unit (BWLP120TJU).
The model name of the control kit is shown in the front cover of this instruction manual.

(2) Up to 8 Mega-Q systems can be controlled by one tank controller kit and operate together depending on the capacity required.
(In the case of a multiple hot water storage tank configuration, a controller kit is required for each hot water storage tank.)

(3) The hot water generation system uses a two-source refrigerant circuit (Cascade configuration).
In the high refrigerant temperature source side circuit **R134a** is used, and in the low refrigerant temperature source side circuit **R410A** is used.
During installation work, only the piping connection of the low source side circuit and the work of charging the refrigerant are performed. Please note the following when performing work.
- The **R134a** circuit is complete and hermetically sealed from the factory.
- With **R410A**, a greater level of strictness is required to prevent impurities (mineral oil such as SUNISO oil and water) from being mixed in.
  Strictly observe the precautions in **[5. Refrigerant piping work]**.
- The maximum allowable pressure of the **R410A** circuit (the low refrigerant temperature source side circuit) is **580 psi (4.0 MPa)** (550 psi (3.8 MPa) on the **R134a** circuit (the high refrigerant temperature source side circuit)).
  For piping specifications, refer to **[5. Refrigerant piping work]**.
- R410A is a **mixed refrigerant**.
  Be sure to charge the refrigerant in a liquid state. If charged a in gaseous state, the composition of the refrigerant changes and normal operation is not possible.

Before use

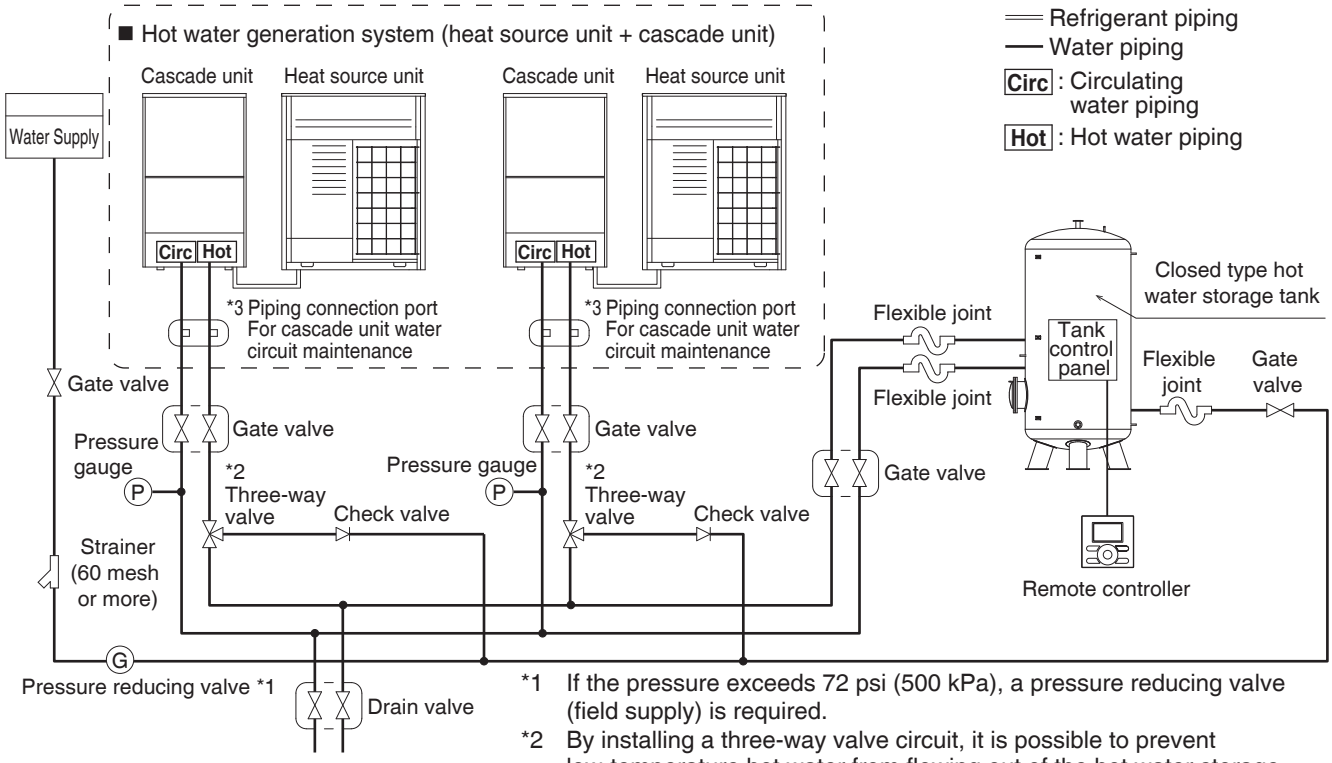
Read this section to understand the products

NOTE	The heat source component of Mega-Q should be used for heating water for non-potable use only, not for other applications such as but not limited to space heating or cooling.

Mega-Q is an all-electric hot water generation system composed of a cascade unit that turns the water from the water supply line into hot water (*), a heat source unit and a tank controller kit.

(*) Hot water generated by Mega-Q is non-potable and cannot be used for drinking. Water quality may change due to accumulation of scales in the tank due to long-term use or deterioration of piping materials.
Explanations about the following hot water generation systems are noted in this operation manual.

Hot water generation system (closed tank system)



*1 If the pressure exceeds 72 psi (500 kPa), a pressure reducing valve (field supply) is required.

*2 By installing a three-way valve circuit, it is possible to prevent low-temperature hot water from flowing out of the hot water storage tank during defrost operation or antifreezing operation.

*3 For cascade unit water circuit maintenance, refer to [6. Water piping work] .

Unit composition and amount of fluorocarbon used

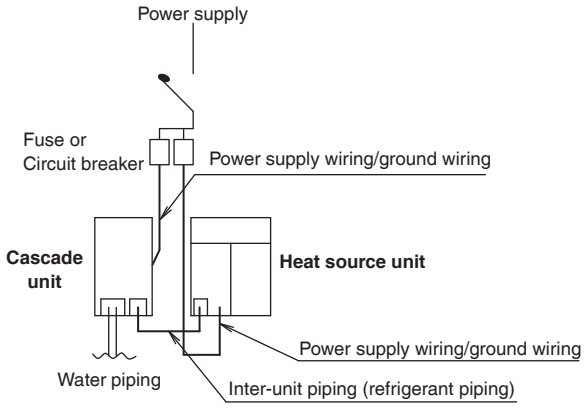
- Table 1 shows the model names of the hot water generation system and configuration.
- Each unit is charged with the fluorocarbon listed in Table 1 at the time of shipment from the factory.

Table 1

Configuration unit		Fluorocarbon charged at the time of factory shipment		
Unit name	Model name	Refrigerant type	Refrigerant amount	GWP
Heat source unit	RXHWQ120MQTJA	R410A	18.1 lbs (8.2 kg)	2090
Cascade unit	BWLP120TJU	R134a	13.2 lbs (6.0 kg)	1430

CAUTION

It is recommended that the cascade unit be placed on the left side of the heat source unit.
Different arrangements complicate refrigerant piping, water piping and electrical wiring work.



Accessories

Check that the accessories are included. Refer to Fig. 1-1, 1-2 for the storage locations.

<Accessories stored on the R410A heat source unit side>

Table 2-1

Name	Clamp(1)	Clamp(2)	Vinyl tube	Manuals, etc.
Quantity	7 pcs.	1 pc.	5 pcs.	1 pc. each
Shape	 (Small)	 (Large)		• Operation Manual • Installation Manual • REQUEST FOR THE INDICATON label (Installation records)

Name	Liquid side accessory pipe (1)	Liquid side accessory pipe (2)	Gas side accessory pipe (1)	Gas side accessory pipe (2)	L type accessory joint
Quantity	1 pc.	1 pc.	1 pc.	1 pc.	1 pc.
Shape					

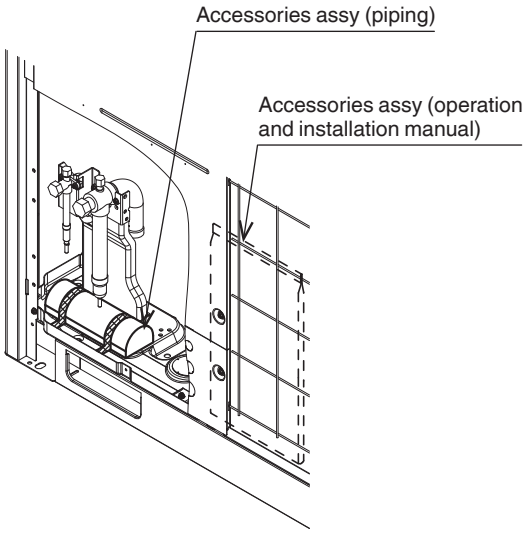
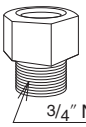


Fig. 1-1

<Accessories stored on the cascade unit side>

Table 2-2

Name	Gas side attached piping			Liquid side attached piping	
	(3)	(4)	(5)	(3)	(4)
Quantity	1 pc.	1 pc.	1 pc.	1 pc.	1 pc.
Shape	 Ø7/8 in. (22.2 mm)	 Ø7/8 in. (22.2 mm)		 Ø1/2 in. (12.7 mm)	 Ø1/2 in. (12.7 mm)

Name	Vinyl tube	Conduit Mounting Plate	Pipe Adaptor
Quantity	2 pcs.	2 pcs.	2 pcs.
Shape			 3/4″ NPT male

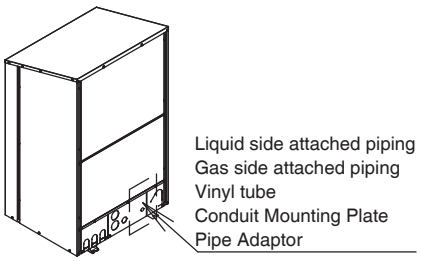


Fig. 1-2

Note

- Accessories are stored separately in the heat source unit and the cascade unit.
  Be sure to check both accessories.
- Accessories are required for installation work.
  Please keep them safe, and do not lose them.
  Also, ask the customer to keep the explanatory documents after the installation work is completed.

2. Selection of installation location

Please pay attention to the following conditions and select the installation location with consent of the customer.

(1) A location where there is no danger of flammable gas leakage

(2) A location where the operating sound and airflow will not disturb the neighbours

(3) Ensure the installation location is flat and which can withstand the weight and vibration of the unit

(4) A location where the refrigerant/water piping are within the allowable piping limits (Refer to **[12-1 Piping work]**.)

(5) A recommended installation location (heat source unit) not being affected by strong winds

- If wind blows directly into the air inlet or air outlet of the unit, operation may be hindered. Install a wind barrier or the like as necessary.
- When installing an snow hood at the outlet, install the snow hood so that the blowing surface faces at a right angle or away from the direction of the winter seasonal wind.

(6) A location where sufficient ventilation can be secured and a service space for safe maintenance and inspection can be secured (For required space, refer to **[Example of required space]**.)

CAUTION

(1) The hot water generation system (both heat source unit and cascade unit) may cause electronic noise generated from AM broadcasting. Examine where to install the hot water generation system and electric wires, keeping proper distances away from stereo equipment, personal computers, etc.
Particularly for locations with weak reception, ensure there is a distance of at least 10 ft. (3 m) for the remote controller, place power wiring and transmission wiring in conduits, and ground the conduits.

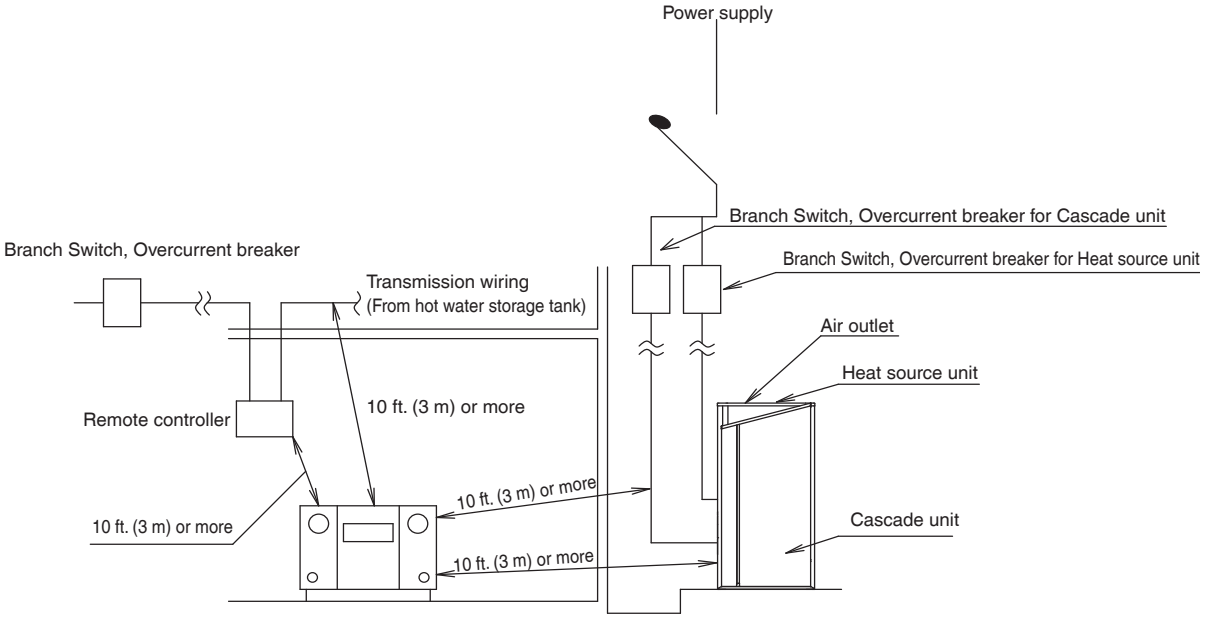


Fig. 2

(2) The drain water from the hot water generation system (both heat source unit and cascade unit) (condensation water on the heat exchanger and outer plate, defrost water after defrosting operation) drops from gaps and holes in the bottom frame. If this is a problem due the installation conditions, use a stand and a drain pan for the stand (field supply).

(3) Take the following measures when operating continuously in an area where the outside air temperature is below freezing for a long time.

- Attach a drain pan heater (sold separately) to the heat source unit to prevent freezing in the bottom frame.
- Leave enough space between the bottom frame of the heat source unit and the foundation surface to prevent freezing at the foundation surface from reaching the bottom frame.
  In cold regions, it is recommend to leave 20 in. (500 mm) to 40 in. (1000 mm).

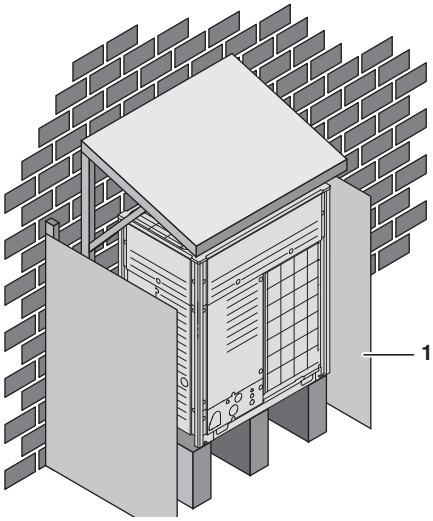
CAUTION

(4) When installing in a place with a lot of snow, take the following measures.

NOTE

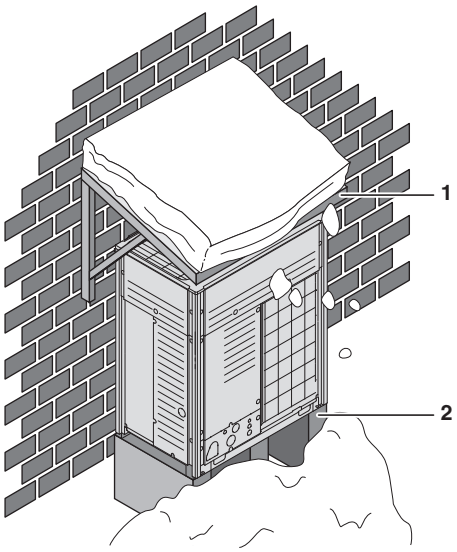
- When operating the unit in a low outdoor ambient temperature, be sure to follow the instructions described below.
- The following images are for reference only. For more details contact your local dealer.

To prevent exposure to wind and snow, install baffle plates on the air side of the outdoor unit (see 2. Selection of installation location):



1 Baffle plates

In heavy snowfall areas it is very important to select an installation site where the snow will not affect the unit. Additionally, installation of a snow guard is recommended. When installing the unit in a location where there is heavy snowfall, remove the coil guards to prevent snow from accumulating on the fins.
If lateral snowfall is possible, make sure that the heat exchanger coil is not affected by the snow (if necessary construct a lateral canopy).
Install the outdoor unit so that the bottom frame is at least 19-11/16 in.(500 mm) above predicted snowfall levels.



1 Construct a large canopy.
2 Construct a pedestal.

NOTE

When operating the unit in a low outdoor ambient temperature with high humidity conditions, make sure to take precautions to keep the drain holes of the unit free by using proper equipment such as the optional drainpan heater. For more information consult your local Daikin Sales representative.

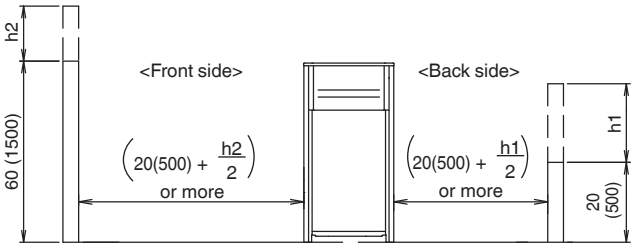
Example of required space

- When installing, select an appropriate pattern from Fig. 3 according to the local space, taking into account the passage of people and flow of air.
  (If the number of installations is larger than the pattern in Fig. 3, please consider short circuits before installation.)
- On the front side, secure the space required for installation of on-site refrigerant piping.
- If a snow hood (sold separately) is attached, secure the required space with the dimensions including the snow hood as product dimensions.
- If the examples of required space do not apply to your construction conditions, consult your local Daikin Sales representative for further information.

(Note) <Pattern 1> is for the following cases.

- Front wall height: 60 in. (1500 mm) or less
- Rear wall height: 20 in. (500 mm) or less
- Side wall height: unlimited

If the wall height exceeds the above, the space on the front and back sides should be larger than the required space in Fig. 3 plus h2/2 and h1/2 in Fig. 4 respectively.

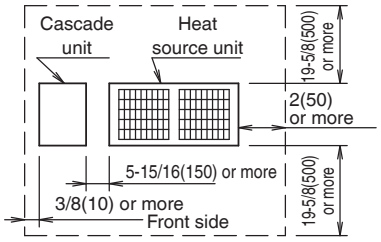


(Unit: in. (mm))

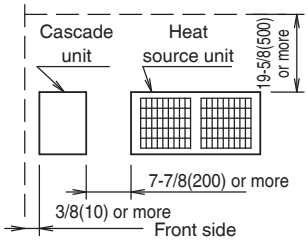
Fig. 3

When installing alone (Unit: in. (mm))

<Pattern 1> (Note)

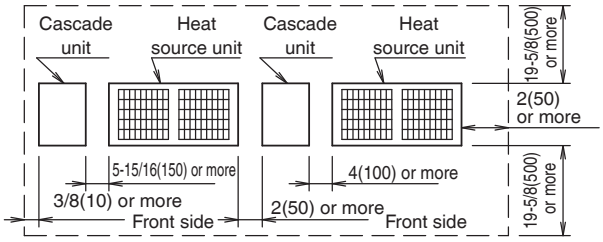


<Pattern 2>



When installing in series (Unit: in. (mm))

<Pattern 1> (Note)



<Pattern 2>

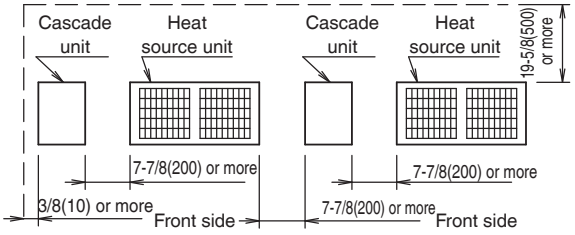


Fig. 4

3. Inspecting, handling and unpacking the unit

3-1 Inspection

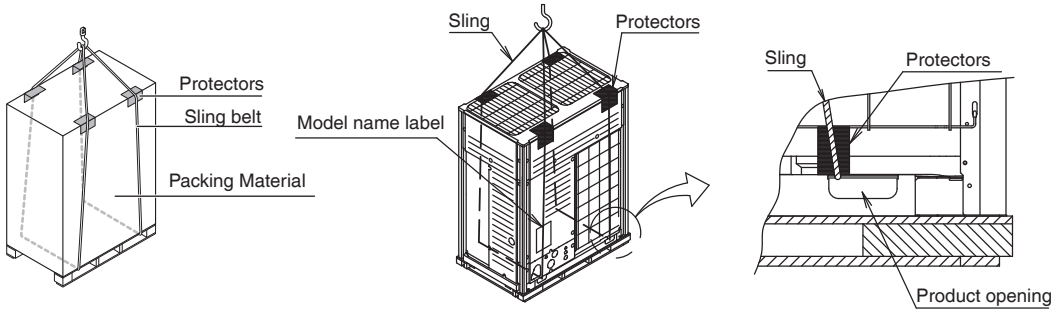
At delivery, the unit must be checked and any damage must be reported immediately to the carrier's claims agent.

3-2 Handling

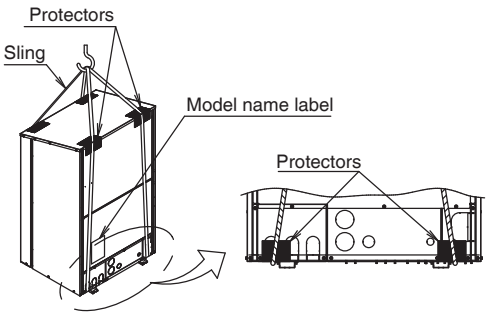
1. When handling the unit, take into account the following:

   Fragile, handle the unit with care.

   Keep the unit upright in order to avoid compressor damage.
2. Choose beforehand the path along which the unit is to be brought in.
3. Bring the unit as close as possible to its final installation position in its original package to prevent damage during transport.



Heat source unit slinging procedure



Cascade unit slinging procedure

4. Lift the unit preferably with a crane and 2 belts of at least 27 ft. (8 m) long as shown in the figure above.
   Always use protectors to prevent belt damage and pay attention to the position of the unit's center of gravity.

NOTE	Use a belt sling of ≤ 3/4 in. (20 mm) wide that adequately bears the weight of the unit.

A forklift can only be used for transport as long as the unit remains on its pallet as shown above.

3-3 Unpacking

CAUTION	To avoid injury, do not touch the air inlet or aluminum fins of the unit.

WARNING	Tear apart and throw away plastic packaging bags so that children will not play with them. Children playing with plastic bags face danger of death by suffocation.

NOTE	Package materials must be recycled or disposed of in accordance with the relative local, state, and national regulations.

1. Remove the unit from its packing material.
   Take care not to damage the unit when unpacking.
2. Remove the 4 bolts fixing the unit to its pallet.
3. Make sure that all accessories as mentioned on "Accessories" in [1. Before installation] on page 4 are available in the unit.

4. Product installation

- To prevent vibration and noise, check the foundation strength and levelness before installation.
- Make the foundation support the product in the area above the shaded area in Fig. 6.
  Also, when installing anti-vibration rubber, install it on the entire support surface of the foundation.
- The height of the foundation should be at least 6 in. (150 mm) above the floor.
- Fix the product securely with foundation bolts, washers and nuts.
  (Prepare 4 sets of commercially available M12 foundation bolts, washers and nuts for each heat source unit and cascade unit.)
- 13/16 in. (20 mm) is most appropriate length of foundation bolt protrusion. (refer to Fig. 5)

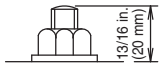
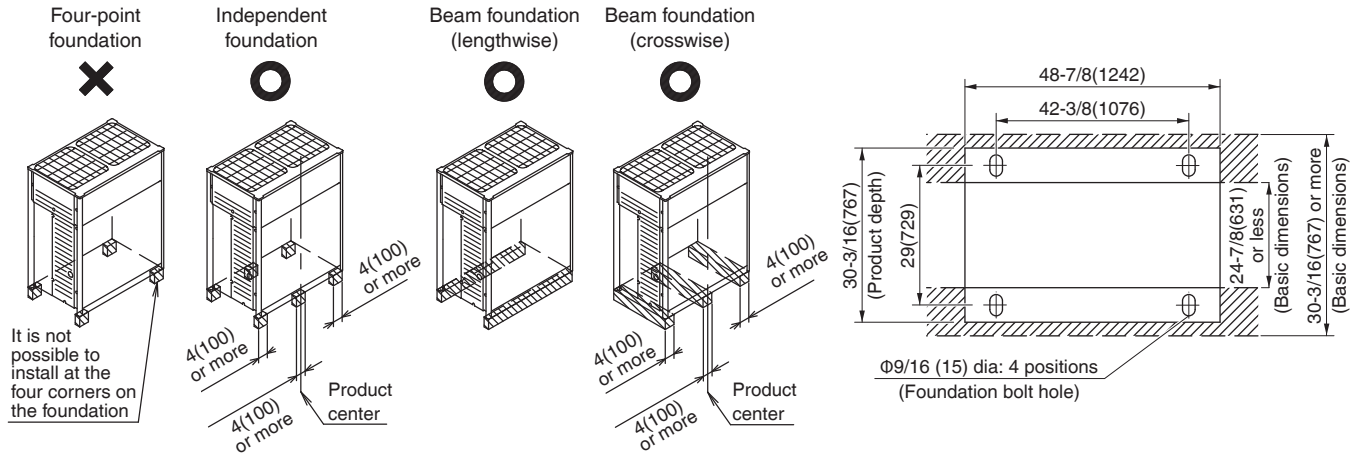
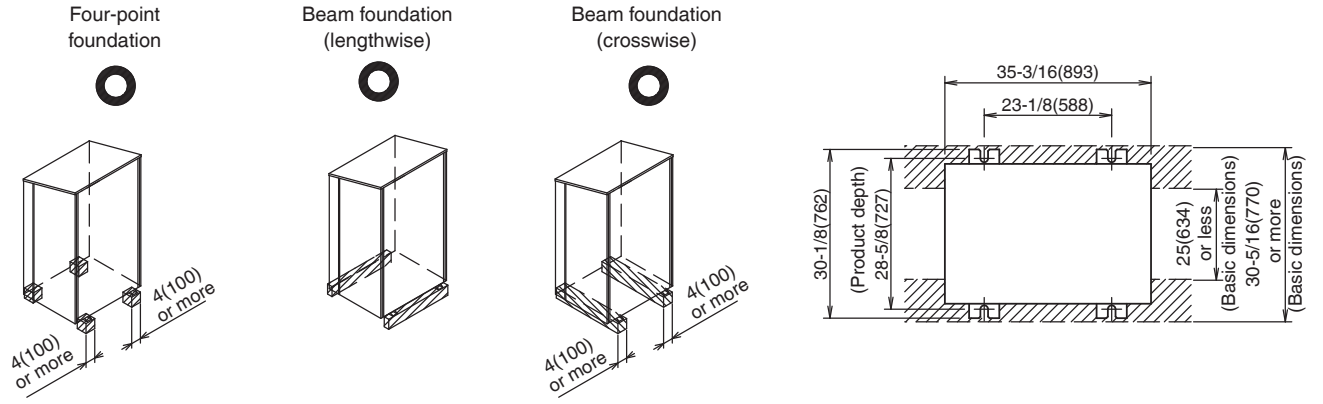


Fig. 5

○ : Allowed
× : Not Allowed



Heat source unit foundation shape and foundation bolt position (Unit: in. (mm))



Cascade unit foundation shape and foundation bolt position (Unit: in. (mm))

Fig. 6

CAUTION

- When installing on a rooftop, the installation spot must be strong enough to support the weight of the unit, and be sure to waterproof the floor in particular.
- Provide a drainage ditch around the foundation and drain the water so that water does not collect around the hot water generation system.
  Drainage may occur during hot water generation system operation.
- It is best to recommend use of resin washers if installing in coastal applications (refer to Fig. 7)

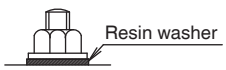
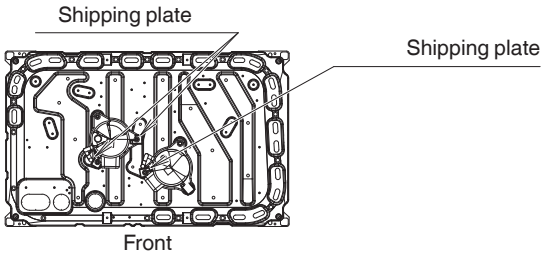
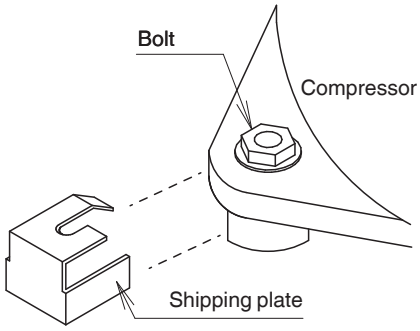


Fig. 7

4-1 Method for removing shipping plate (Heat source unit)

The shipping plate installed over the compressor leg for protecting the unit during transport must be removed.
Proceed as shown in the figure and procedure below.





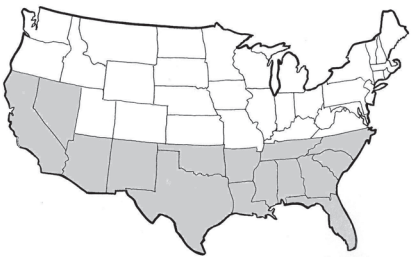
1 Remove shipping plates.

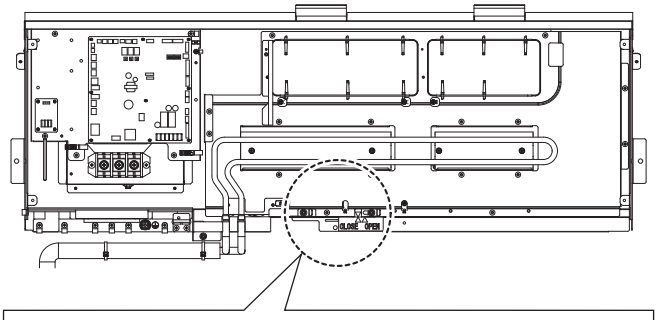
2 Be sure to tighten compressor fixing bolts again. (9.1ft·lbf(12.3 N·m))

NOTE	If the unit is operated with the shipping plate still attached, abnormal vibration or noise may be generated.

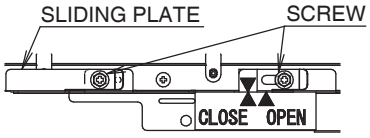
4-2 Method for opening the sliding plate (Heat source unit)

The sliding plate should be moved to the open position in the following regions to minimize temperature rise in the main control box:
CA, NV, AZ, NM, OK, TX, AR, LA, MS, AL, TN, GA, NC, SC, FL and Latin America.

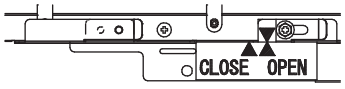




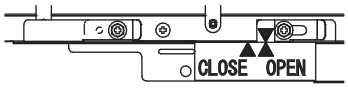
1 Remove the left screw (1 pc.) and loosen the right screw (1 pc.).



2 Move the sliding plate to the right and set the arrow to “OPEN”.



3 Reinstall the left screw and tighten both the left and right screws.



NOTE	Failure to follow the above instructions could lead to premature component failure.

5. Refrigerant piping work

Note for refrigerant piping construction workers

- The refrigerant R410A requires strict cautions for keeping the system clean, dry and tight.
  - Clean and dry: foreign materials (including mineral oils or moisture) should be prevented from getting mixed into the system.
  - Tight: R410A does not contain any chlorine, does not destroy the ozone layer, and does not reduce earth's protection against harmful ultraviolet radiation. R410A can contribute slightly to the greenhouse effect if it is released. Therefore we should take special attention to check the tightness of the installation.
- All refrigerant pipe work performed will be to connect the heat source unit to the cascade unit only must comply with requirements for use with R410A refrigerant.
  The cascade unit ships factory assembled with all internal piping required for R134a circulation.
- Piping and other pressure containing parts shall comply with the applicable legislation and shall be suitable for refrigerant. Use phosphoric acid deoxidized seamless copper for refrigerant.
- All field piping must be installed by a licensed refrigeration technician and must comply with relevant local and national regulations.
- Do not use flux when brazing the refrigerant piping. Use the phosphor copper brazing filler metal (B-Cu93P-710/795 : ISO 3677) which does not require flux. Flux has extremely negative effect on refrigerant piping systems. For instance, if the chlorine based flux is used, it will cause pipe corrosion or, in particular, if the flux contains fluorine, it will damage the refrigerant oil.

5-1 Selection of piping material

- Use the following items for the refrigerant piping.
  Material : Phosphoric acid deoxidized seamless copper
  Size : See Table 3 to determine the correct size.
  Thickness : Select a thickness for the refrigerant piping which complies with national and local laws.

(*) The size of the gas side stop valve of the heat source unit is Ø1 in. (25.4 mm), but it can be reduced to Ø7/8 in. (22.2 mm) using the gas side attached piping (5).

Table 3

	Gas piping	Liquid piping
Pipe size (Outer diameter × minimum thickness)	Ø7/8 in. (22.2 mm) (*)	Ø1/2 in. (12.7 mm)

5-2 Protection of piping

During installation, ensure that moisture and dust does not enter into the piping network. Table 4 below provides recommendations for protecting refrigerant piping during installation process.

Table 4

Working period	Protection method
1 month or more	Pinch
Less than 1 month	Pinch or taping

CAUTION In particular, be careful not to let dust or dirt in when passing the piping through a through hole such as in a wall, or when putting the end of the piping outside.

5-3 Piping connection

- When brazing, be sure to perform nitrogen replacement and nitrogen blowing. (refer to Fig. 8)
  If brazing is performed without replacing the nitrogen or making nitrogen flow into the piping, a large amount of oxide film will form on the inner surface of the piping, adversely affecting various valves and compressors in the refrigerant system, and normal operation will become impossible.
- Use a pressure reducing valve when brazing while nitrogen is flowing.
  An appropriate nitrogen pressure is about 3 psi (0.02 MPa).

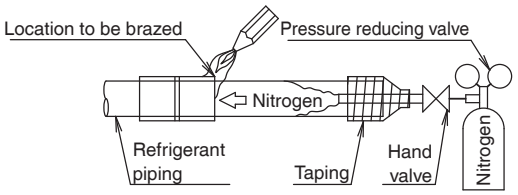


Fig. 8

Prohibited	**Do not use antioxidants when brazing.** Residues may lead to clogging of piping and failure of parts.

5-4 Installation of piping

1. Allowable maximum length and allowable height difference

Install the inter-unit piping between the heat source unit and the cascade unit within the following range.
[The following conditions must be satisfied when installing the cascade unit higher or lower than the heat source unit.]

Allowable maximum length (L):
66 ft. (20 m)
Allowable height difference (H):
66 ft.(20 m)

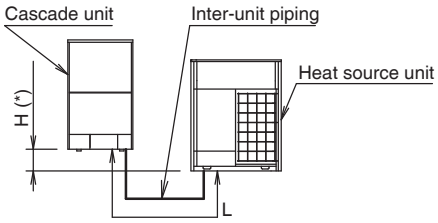


Fig. 9

(*) Fig. 9 shows an example where the cascade unit is placed above and the heat source unit is placed below.

2. Connecting the refrigerant piping between units

The inter-unit piping from the heat source unit to the cascade unit can be piped out of the front or the bottom. (refer to Fig. 10)
Use the knockout hole on the bottom frame for bottom piping out.

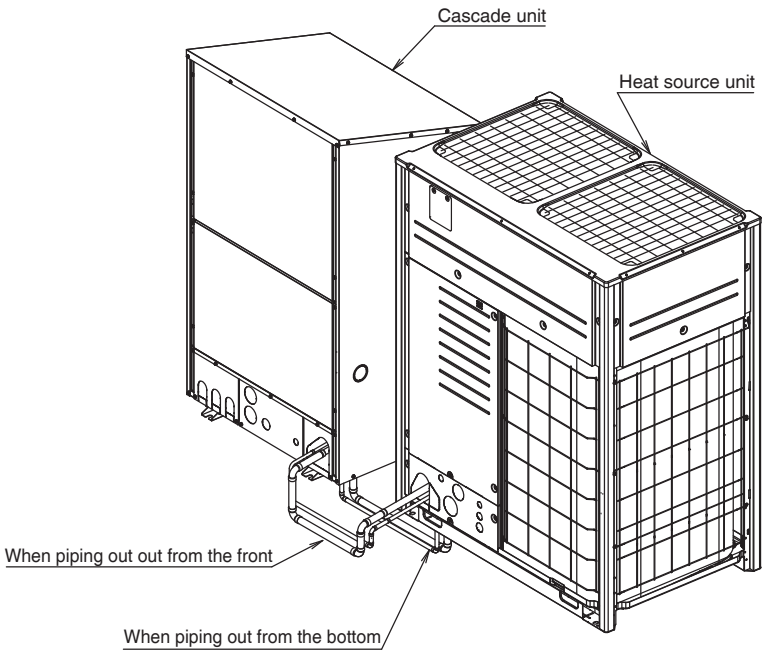


Fig. 10

<Cautions when opening knockout holes>

- Drill a round hole using a drill centering on the concave hole of the bottom frame knockout hole, and open a knockout hole. (refer to Fig. 11)
  (Be careful not to damage the casing.)
- It is recommended to remove burrs from the knockout holes and apply repair paint to the edges and areas surrounding the edges to prevent rust.
- When passing things such as power wiring through the knockout holes, protect it with wiring conduit or bushing to prevent the power wiring from being damaged by the edges.

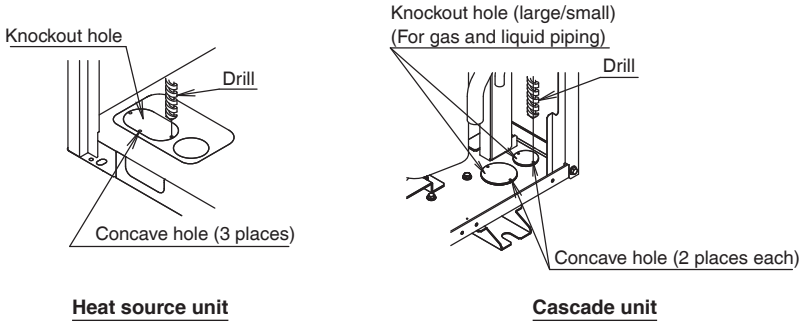


Fig. 11

3. How to remove pinch piping

- When connecting the refrigerant piping to the heat source unit, remove the pinch piping as shown in Fig. 12.
  (For the handling of the stop valve, please refer to **[12-3 How to operate the stop valve]**.)

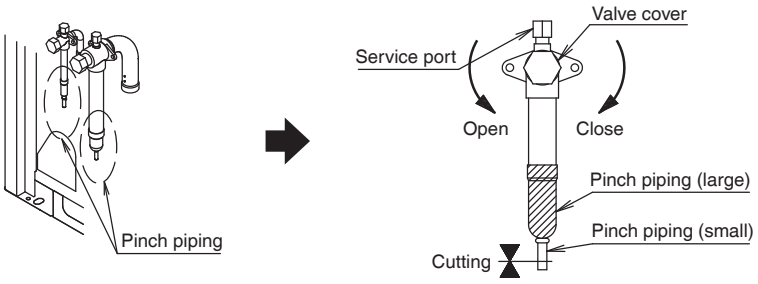


Fig. 12

(1) Remove the valve cover and check that the stop valve is fully closed.
(2) Connect the charge hose (with push rod) to the service port and check that there is no residual pressure.
(3) Cut the pinch piping (small) with a piping cutter or the like so that a cross section opens, and confirm again that there is no residual pressure.

⚠ CAUTION	Leave until the oil runs out.

(4) Remove the pinch piping (large).

⚠ WARNING	**Drain the gas and oil inside the pinch piping of the heat source unit before removing.** If pinch piping is removed with gas or oil remaining inside, the stop valve may rupture or residual oil may catch fire, resulting in injury.

- When connecting refrigerant piping to the cascade unit, remove the vinyl cap at the end of the piping (refer to Fig. 13), and then remove the pinch piping.
  (The pinch piping tip is open.)

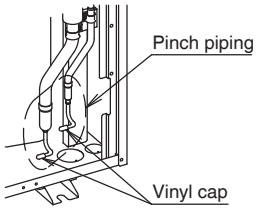
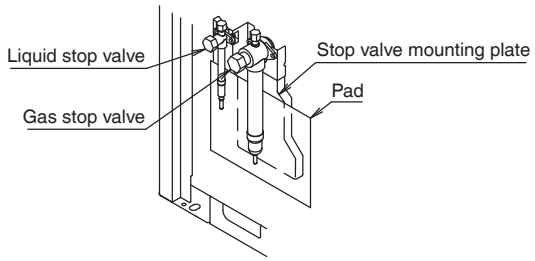


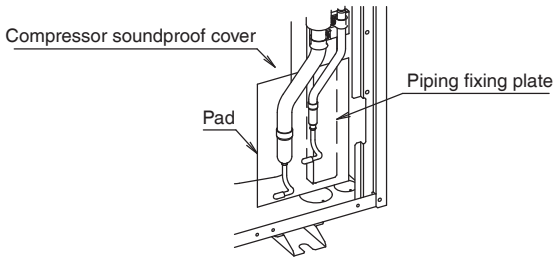
Fig. 13

<Precautions when removing pinch piping and performing internal brazing>

- In the case of a heat source unit, perform brazing while protecting with a nonflammable pad to prevent the burner flame from hitting the stop valve mounting plate.
- In the case of a cascade unit, perform brazing work while protecting with a nonflammable pad to prevent the burner flame from hitting the soundproof cover of the compressor and piping fixing plate.



For heat source unit



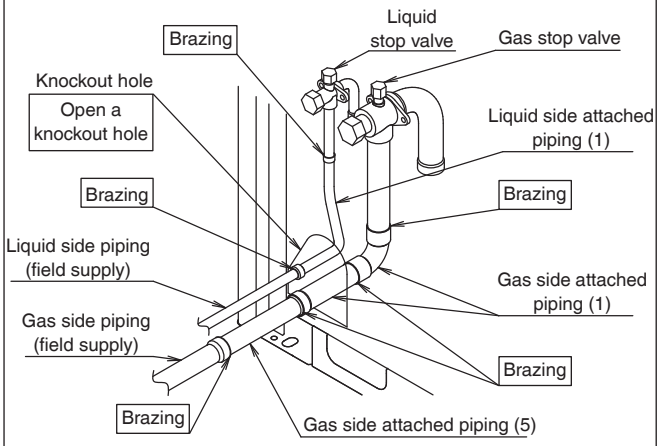
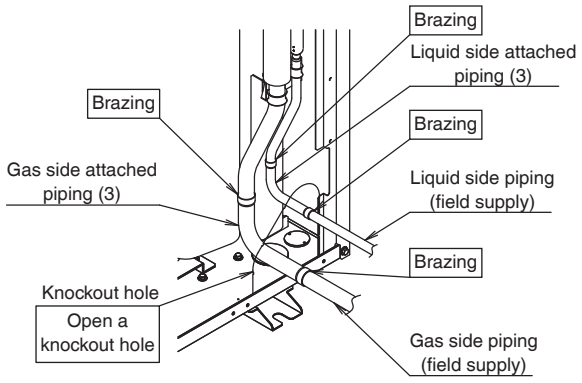
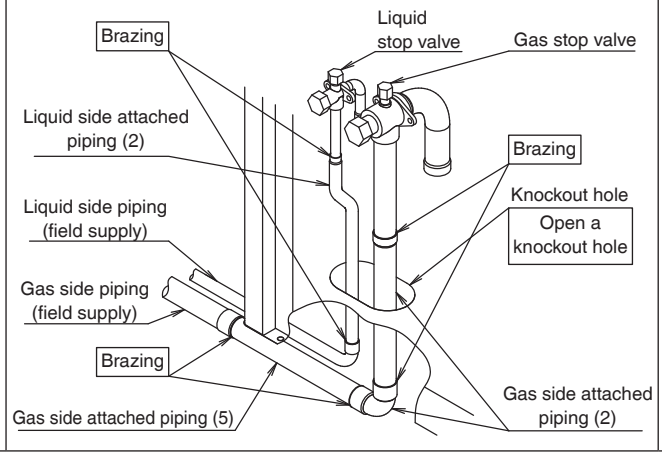
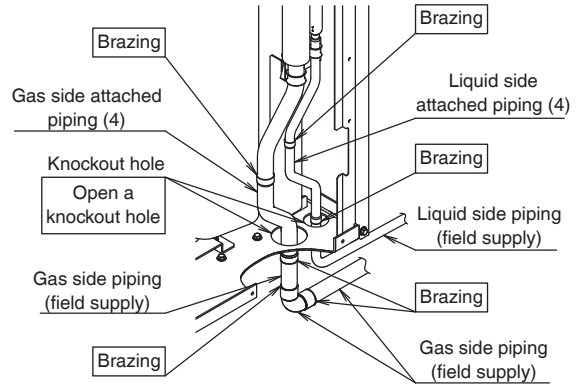
For cascade unit

4. Connection of inter-unit piping to heat source unit/cascade unit

- Table 5 shows an example of connecting the inter-unit piping to the heat source unit and cascade unit.

CAUTION	
	● Use the on-site inter-unit piping (accessory) to connect the on-site piping of the heat source unit and the cascade unit. ● Install piping so that it does not come into contact with other piping or the bottom frame and side plates of the product.

Table 5

	Heat source unit	Cascade unit
When removing out from the front	* Drill a knockout hole at the piping outlet and pass the piping through the piping outlet. 	* Drill a knockout hole at the piping outlet and pass the piping through the piping outlet. 
When removing from the bottom	* Open a knockout hole in the bottom frame and pass the piping under the bottom frame. 	* Open a knockout hole in the bottom frame and pass the piping under the bottom frame. 

6. Water piping work

Note for water piping installer

- The inlet pressure to the cascade unit is 5.8 psi (40 kPa) or more and 72 psi (500 kPa) or less.
- When shutting off the power supply of the hot water generation system, be sure to drain water to prevent freezing.

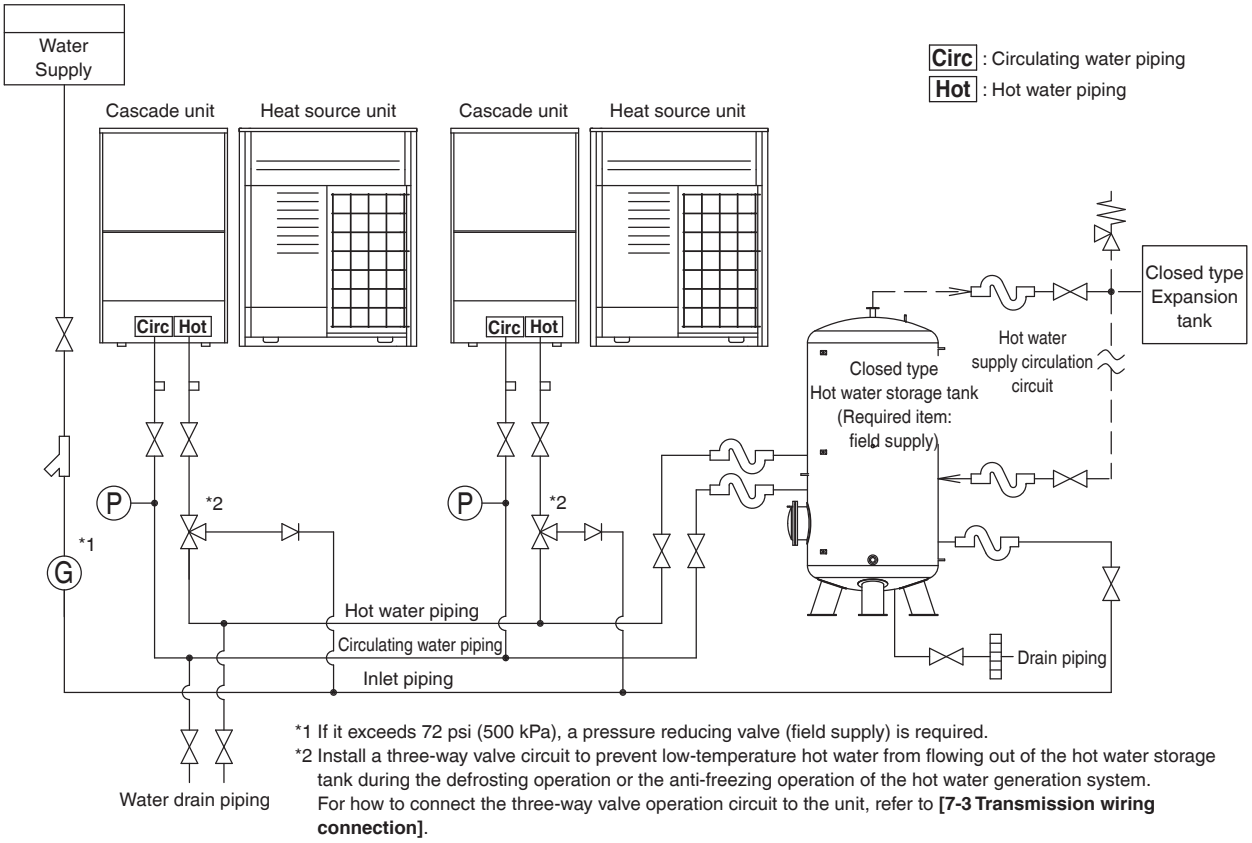
6-1 Water piping layout example

- Fig. 14 shows examples of installation when 2 Mega-Q systems are connected.
- All equipment in the water piping system is field supply. Select and procure appropriate equipment according to the facilities.
- For water piping, install within the allowable maximum length and allowable height difference shown in **[12-1 Piping work]**.
- **So that the cascade unit can be maintained separately, attach a piping connection and gate valve for cleaning to the circulating water piping, and hot water piping.**
- **Be sure to install an air vent valve in places where air can accumulate in the water piping system.**
- **Be sure to attach a strainer (60 mesh or more) to the inlet piping.**
- Be sure to connect the hot water supply circulation circuit via the gate valve and be sure to install a closed expansion tank and safety valve in the hot water supply circulation circuit.
- Perform insulation and anti-freezing work on all water piping.

CAUTION

Do not install equipment that removes residual chlorine.
Chlorine-free water will remain in the entire hot water system, which may cause bacteria to propagate.

WARNING	**Apply anti-freezing measures to all water piping.** The water will freeze and the piping will be damaged. **Install a closed expansion tank and safety valve.** This is to prevent water circuit rupture accidents due to volume fluctuations and water pressure rises due to water temperature changes.



*1 If it exceeds 72 psi (500 kPa), a pressure reducing valve (field supply) is required.
*2 Install a three-way valve circuit to prevent low-temperature hot water from flowing out of the hot water storage tank during the defrosting operation or the anti-freezing operation of the hot water generation system.
For how to connect the three-way valve operation circuit to the unit, refer to **[7-3 Transmission wiring connection]**.

Fig. 14

<Symbol>

Gate valve	Three-way valve	Check valve	Ⓖ	Pressure reducing valve	Flexible tube	Strainer (60 mesh or more)
Safety valve	Piping connection port	Ⓟ	Pressure gauge	Insect net		

6-2 Selection of water piping material

- Use water pipes compiled with the local and national codes.
- Decide on water piping size based on “Water piping size selection procedure” in **[12-1 Piping work]**.

CAUTION	Brass is used for the water piping connection port. If a dissimilar metal material is used for the water piping, the piping may corrode, so take measures such as insulating the connection as necessary.

6-3 Water piping connection

1. Entering and Exiting of water piping

- The water piping can be connected from the front of the cascade unit as shown in Fig. 15.

2. Connecting water piping to the cascade unit

- Fig. 16 shows the connection of the on-site water piping to the cascade unit.
- All water piping is field supply.

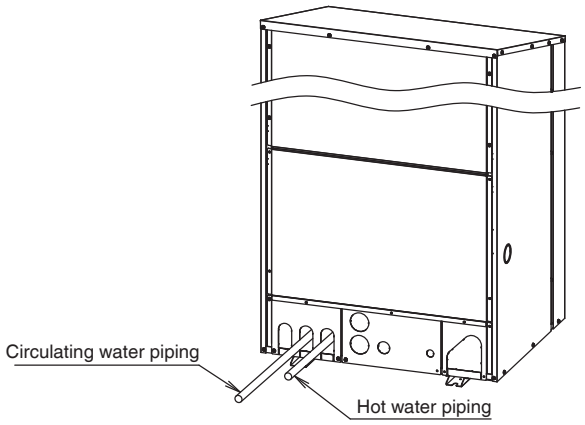


Fig. 15 Entering and Exiting of water piping

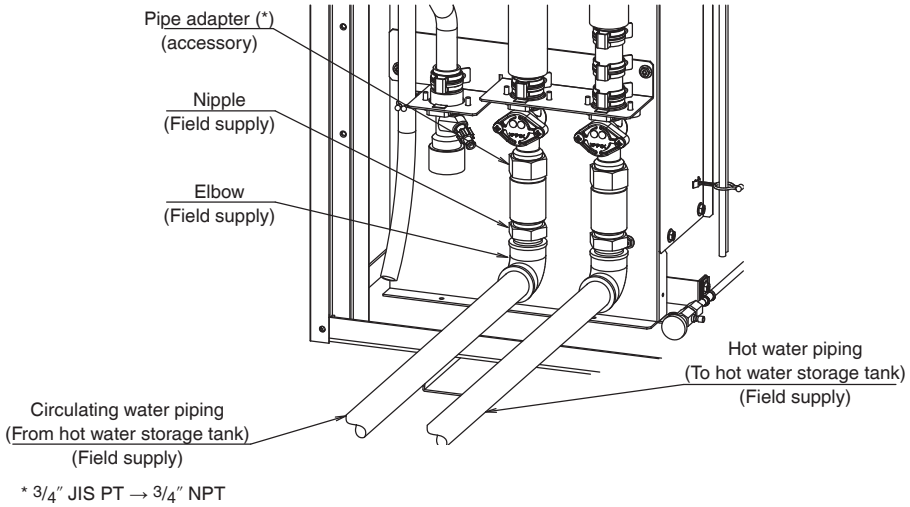


Fig. 16 Connection of water piping

⚠ CAUTION	Do not allow water piping to contact other piping or the bottom frame and side plate of the product.

7. Electrical wiring work

NOTE

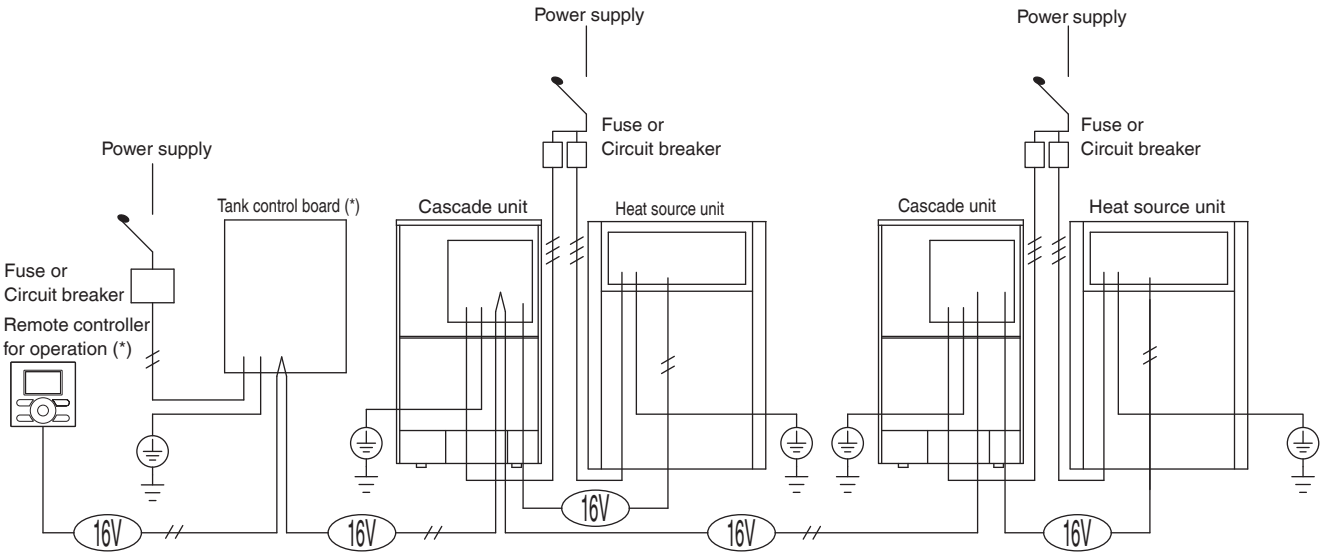
- All field wiring and components must be installed by a licensed electrician and must comply with relevant local and national regulations.
- Be sure to use a dedicated power circuit. Never use a power supply shared by another appliance.
- Never install a phase-advancing capacitor. As this unit is equipped with an inverter, installing a phase-advancing capacitor will not only deteriorate power factor improvement effect, but also may cause capacitor abnormal heating accident due to high-frequency waves.
- A disconnection incorporated in the fixed wiring is to be provided. Use an all-pole disconnection type breaker with at least 1/8 in. (3mm) between the contact point gaps.
- Only proceed with wiring work after blocking off all power.
- Always ground wires in accordance with relevant local and national regulations.
- This machine includes an inverter device. Connect ground and leave charge to eliminate the impact on other devices by reducing noise generated from the inverter device and to prevent leaked current from being charged in the outer shell of the product.
- Do not connect the ground wire to gas pipes, sewage pipes, lightning rods, or telephone ground wires.
  Gas pipes can explode or catch fire if there is a gas leak.
  Sewage pipes: no grounding effect is possible if hard plastic piping is used.
  Telephone ground wires and lightning rods are dangerous when struck by lightning due to abnormal rise in electrical potential in the grounding.
- This equipment can be installed with a Ground-Fault Circuit Breaker (GFCI). Although this is a recognized measure for additional protection, with the grounding system in North America, a dedicated GFCI is not necessary.
- Electrical wiring must be done in accordance with the wiring diagrams and the description herein.
- Do not operate until refrigerant piping work is completed. Operating the unit before completing piping work could cause the compressor to break.
- Never remove a thermistor, sensor or similar parts when connecting power wiring and transmission wiring.
  (If operated with a thermistor, sensor or similar parts removed, the compressor may be broken down.)
- Never connect the power supply in reverse-phase.The unit cannot operate normally in reverse-phase. If you connect in reverse-phase, replace 2 of the 3 phases.
- Make sure the electrical imbalance ratio is no greater than 2%. If it is larger than this, the unit's lifespan will be reduced.
  If the ratio exceeds 4%, the unit will shut down and an malfunction code will be displayed on the remote controller.
- Connect the wire securely using designated wire and fix it with attached clamp without applying external force on the terminal parts (terminal for power wiring, terminal for transmission wiring and ground terminal).
- If there exists the possibility of reverse-phase, lose phase, momentary blackout or the power goes on and off while the product is operating, attach a reverse-phase protection circuit locally.
  Running the product in reverse-phase may break the compressor and other parts.
- The appliance incorporates grounding connections for functional purpose in addition to protective ground.

Table 6

Model name	Phase and frequency	Voltage	Minimum circuit amp.	Maximum overcurrent protective device	Transmission line selection
Heat Source unit RXHWQ120MQTJA	Ø3,60 Hz	208/230 V	55.1A	60A	AWG18 - AWG16
Cascade unit BWLP120TJU	Ø3,60 Hz	208/230 V	43A	50A	AWG18 - AWG16

7-1 Whole system wiring connection example (when 2 Mega-Q systems are connected)

* Included with controller kit (sold separately)



1. Power circuit, safety device and cable requirements

- Make sure to apply the rated voltage of 208/230 V for unit.
- A power circuit (see Table 6) must be provided for connection of the unit. This circuit must be protected with the required safety devices, i.e. a main switch, a slow blow fuse on each phase.
- When using residual current operated circuit breakers, be sure to use a high-speed type (0.1 second or less) 100 mA rated residual operating current.
- Use copper conductors only.
- Use insulated wire for the power cord.
- Select the power supply cable type and size in accordance with relevant local and national regulations.

NOTE	
	● Make sure the low voltage wiring (i.e. for the remote controller, between units) and the power wiring do not pass near each other, keeping them at least 2 in. (50 mm) apart. ● Proximity may cause electrical interference, malfunctions, and breakage. ● Be sure to connect the power wiring to the power wiring terminal block and secure it as described in **[7-4. Power supply wiring and ground wiring connection]** ● Transmission wiring should be secured as described in **[7-3. Transmission wiring connection]**. ● Secure wiring with clamp such as insulation lock ties to avoid contact with piping. ● Shape the wires to prevent the structure such as the control box cover deforming. And close the cover firmly. ● All field wiring is to be procured on site.

7-2 Routing the wiring

- Power line: Remove the wall hole cover as shown below and connect the power line using conduit in Fig 17.

NOTE

- Open the knockout holes with a hammer or similar tool.
- After knocking out the holes, remove any burrs and paint the holes with repair paint to prevent rusting. (Refer to the below figures)
- When passing wiring through the knockout holes, remove burrs around the knockout holes and protect the wiring with protective tape. (Refer to the below figures)
- If small animals might enter the unit, block off any gaps (hatching parts in the below figures) with material (field supply).

Cascade unit

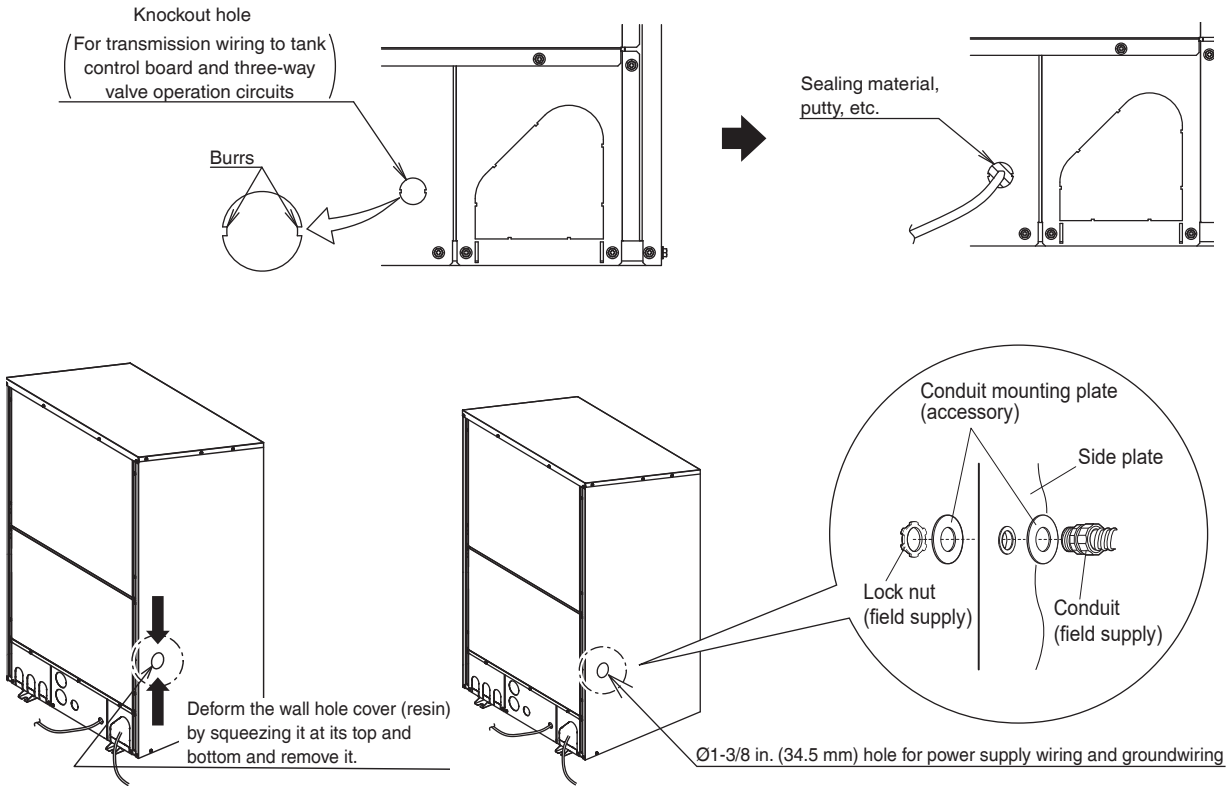
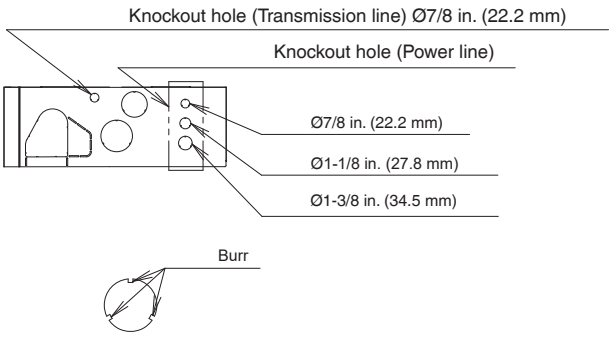


Fig. 17

NOTE

Heat source unit

- Power line: Open a knockout hole as shown below and connect the power line in Fig 18.
  Choose an appropriate knockout hole for conduit size suitable for the power and ground line to be used.
- Transmission line: Connect it using a conduit in the knockout hole on the left.



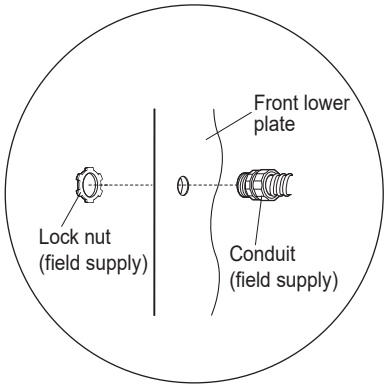
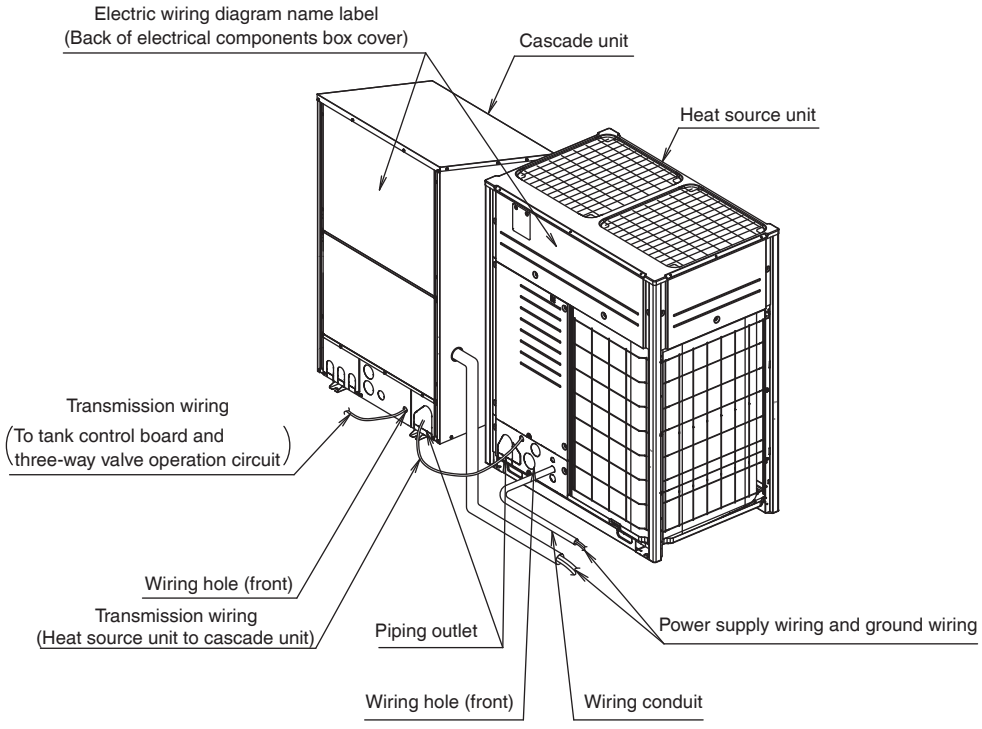


Fig. 18



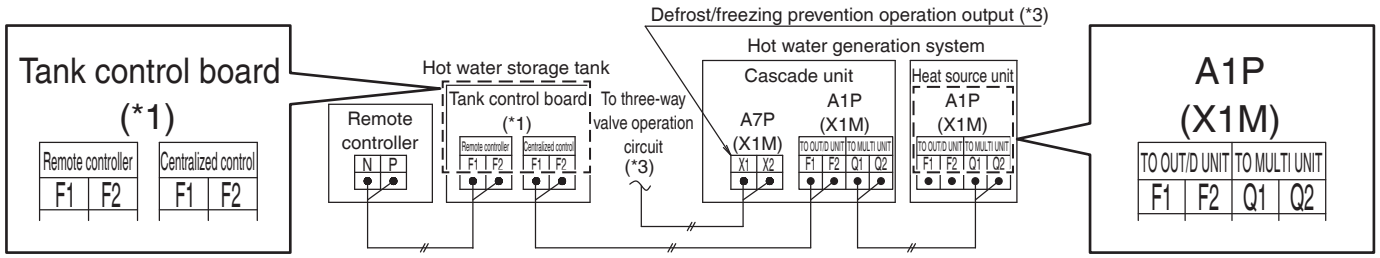
7-3 Transmission wiring connection

Please refer to Fig 19 and follow the connection of transmission wiring.

NOTE	● Up to 6 Mega-Q systems can be connected on one water loop. ● Up to 8 Mega-Q systems can be controlled by one tank controller kit.

Prohibited	Never connect the power supply wiring to the transmission wiring terminal.

Connection example of single unit



Connection example of multiple units (up to eight units)

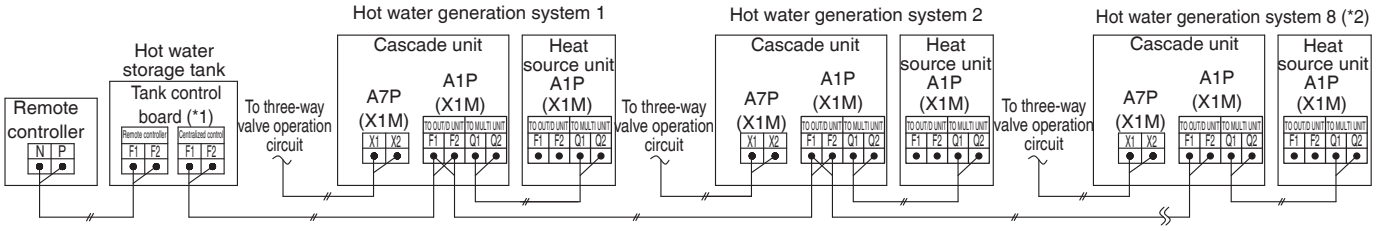


Fig. 19

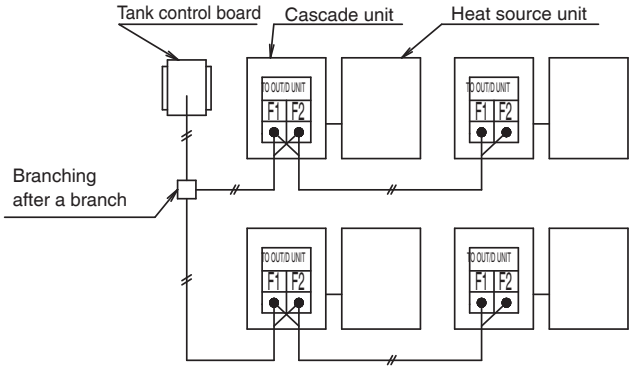
CAUTION	*1. The tank control board is included in the controller kit (sold separately) attached to the hot water storage tank (field supply). *2. Up to eight Mega-Q systems can be connected and controlled by the same tank controller kit. *3. When configuring a three-way valve circuit to prevent low-temperature hot water from flowing out of the hot water storage tank during defrost operation or anti-freezing operation in a closed type hot water storage tank system, connect a three-way valve operation circuit between (X1) and (X2) of the X1M terminal on the printed circuit board A7P of the cascade unit. A defrost/freezing prevention operation signal will be output. (Refer to the “Electrical wiring Diagram” name label attached to the back of the electrical components box cover of the cascade unit.) [Product side contact specifications] No-voltage contact, 208/230 V, 10 mA to 2 A

CAUTION

- Never connect the power supply wiring to the transmission wiring terminal.
  The whole system will be damaged.
- When connecting wiring, if you apply excessive force to the terminal on the printed circuit board or over-tighten it, the board may be damaged.
  Install with care.
  See the table below for the tightening torque of the transmission wiring terminals.

Screw size	Tightening torque (N•m)
M3.5 (A1P)	0.59-0.71 ft•lbf (0.8-0.96 N•m)

- The transmission wiring should be wired using AWG18-16 stranded, nonshielded wiring.
- For transmission wiring, please perform wiring within the scope of the following restrictions.
  Exceeding these limits may cause transmission errors.
  Maximum wiring length: 3280 ft. (1000 m) or less
  Total wiring length: 6560 ft. (2000 m) or less
  Branching after branching is not possible. (refer to Fig. 20)
- In the electrical components box, secure the transmission wiring to the electrical components box with the clamps as in Fig. 21 and Fig. 22. Use the supplied clamps for the heat source unit and separately prepare clamps for the cascade unit.
  Outside the unit, wind the transmission wiring together with the on-site refrigerant piping using finishing tape (field supply). (refer to Fig. 23)



: Not Allowed

Fig. 20

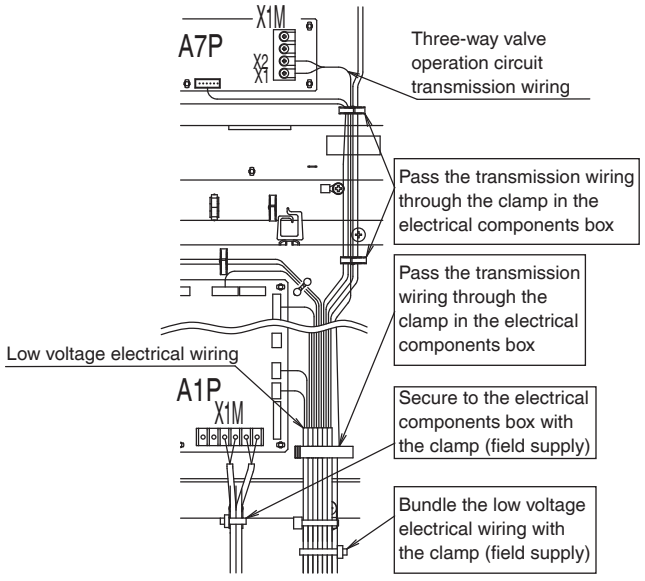


Fig. 21 Secure the transmission wiring (cascade unit)

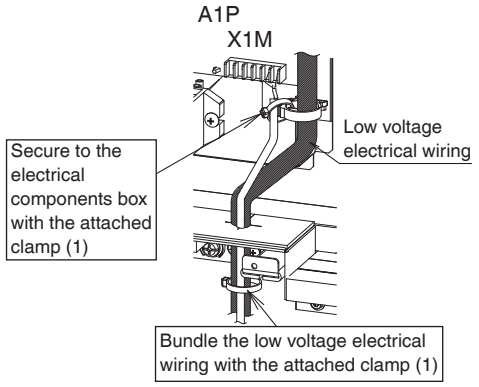


Fig. 22 Secure the transmission wiring (heat source unit)

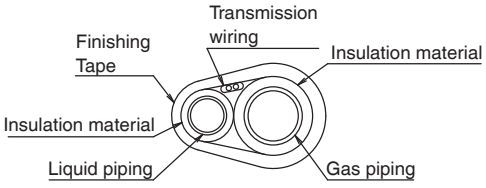


Fig. 23

7-4 Power supply wiring and ground wiring connection

- Install an insulation sleeve to the power supply wiring and connect it to the power supply terminal block.
  After connection, secure it using the clamps as shown in Fig. 24. Use the supplied clamps for the heat source unit and separately prepare clamps for the cascade unit.
- For the ground wiring for the heat source unit, use the attached clamp (1) to bind it to the power supply wiring following the procedure in Fig. 24 so that no external force is applied to the terminal.

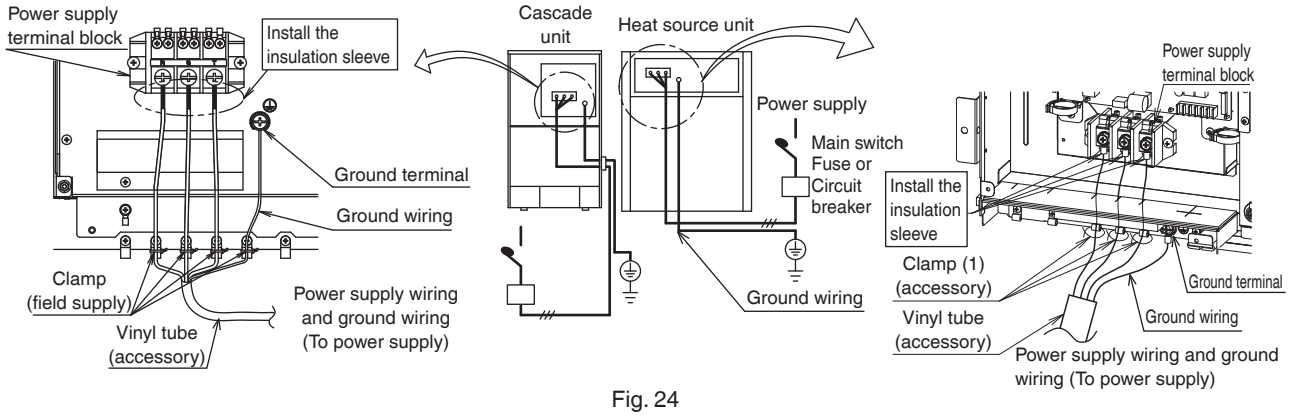


Fig. 24

NOTE

Never connect the power supply to transmission wiring terminal block. Otherwise the entire system may break down.

CAUTION

- When connecting the power supply wiring, the ground wiring must be made before the power supply wiring is connected. When disconnecting the power supply wiring, they must be disconnected before the ground wiring is disconnected. The length of the power supply wiring between the stress relief for them and the terminal block itself must be as such that the power supply wiring are tightened before the ground wire is tightened in case the power supply is pulled loose from the stress relief.
- Be sure to use round type crimp style terminals (field supply) for connection.
  Also, insulate the crimping part by installing an insulation sleeve (field supply). (refer to Fig. 25)
- Securely connect using the specified power wiring, and secure it so that no external force is applied to the terminal.
- Be sure to pull out the ground wiring from the notch in the cup-style washer, and route it so that no other wiring is pinched. (refer to Fig. 26)
  Insufficient ground wiring contact may cause the grounding effect to be lost.
- Tighten the terminal screws using an appropriate screwdriver. A screwdriver with a head of an improper size will strip the screw heads and make proper tightening impossible.
- Over-tightening terminal screws can damage them. Refer to Table 7 for the tightening torque of the power supply terminal screw/ground terminal screw.

Table 7

Screw size	Tightning torque
M8 Power terminal	4.20-5.09 ft·lbf (5.7-6.9 N·m)
M8 Ground terminal	7.15-8.63 ft·lbf (9.7-11.7 N·m)

- Do not solder-finish stranded wire before using.
- When 2 wires are connected to a single terminal, connect them so that the rear sides of the crimp contacts face each other. Also, make sure the thinner wire is on top, securing the 2 wires simultaneously to the resin hook using the clamp.
- Always ground wires in accordance with relevant local and national regulations.

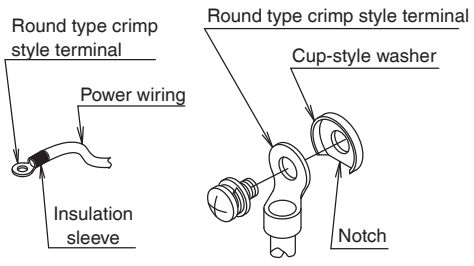
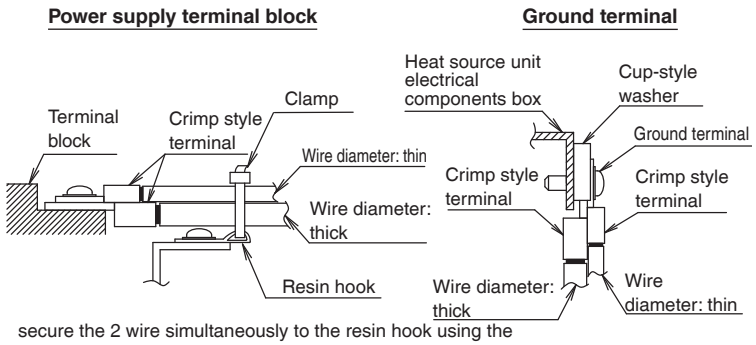


Fig. 25

Fig. 26



secure the 2 wire simultaneously to the resin hook using the clamp (Use the clamp (1) when using the supplied clamps)

7-5 Internal wiring routing

- Refer to Fig. 27 and Fig. 28 for wiring.
  Fix the power supply wiring and ground wiring of the heat source unit to the back of the support with the attached clamp (2).
- Route so that the ground wiring does not come into contact with the compressor lead wiring.
  If it does, electrical noise may adversely affect other devices.
- Route so that wiring does not come into contact with the compressor and high temperature piping (▨ in Fig. 27 and Fig. 28).
- Keep the transmission wiring at least 2 in. (50 mm) away from the power supply wiring and ground wiring.

⚠ CAUTION	After completing the electrical work, make sure that no connectors or terminals are disconnected from each electrical component in the electrical components box.

Cascade unit

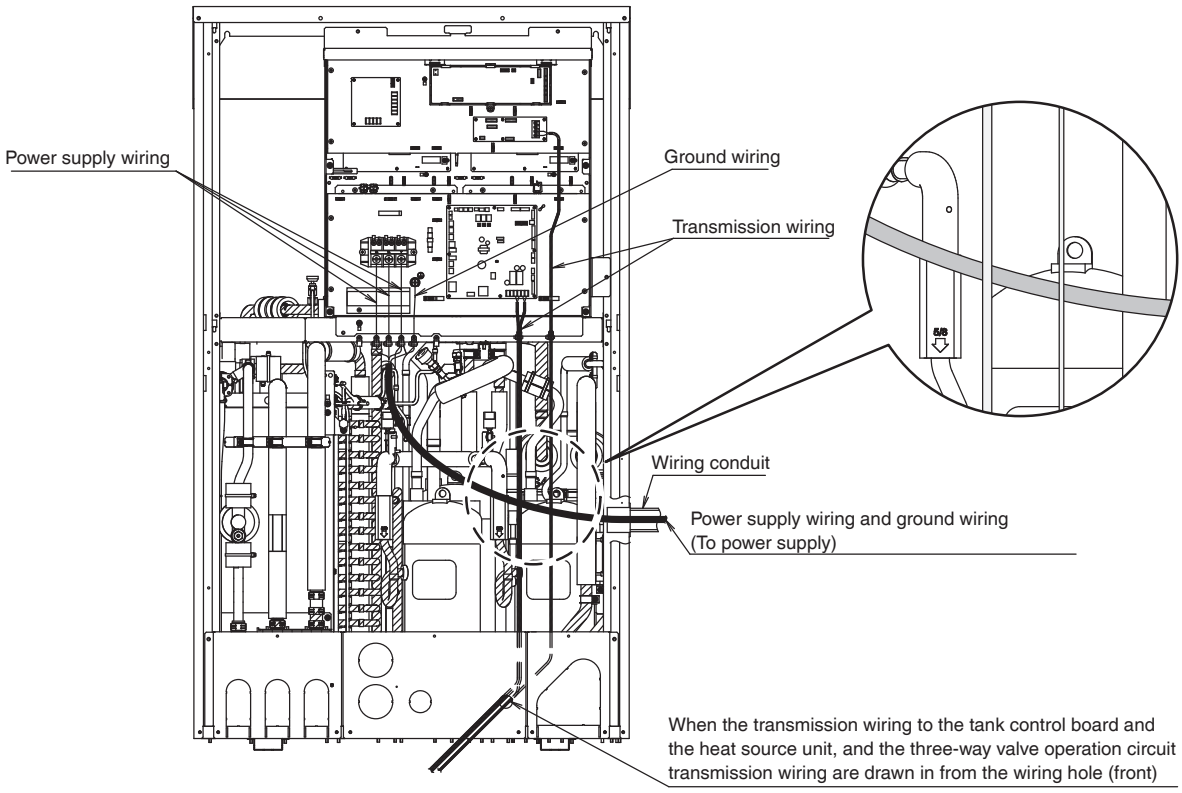


Fig. 27

Heat source unit

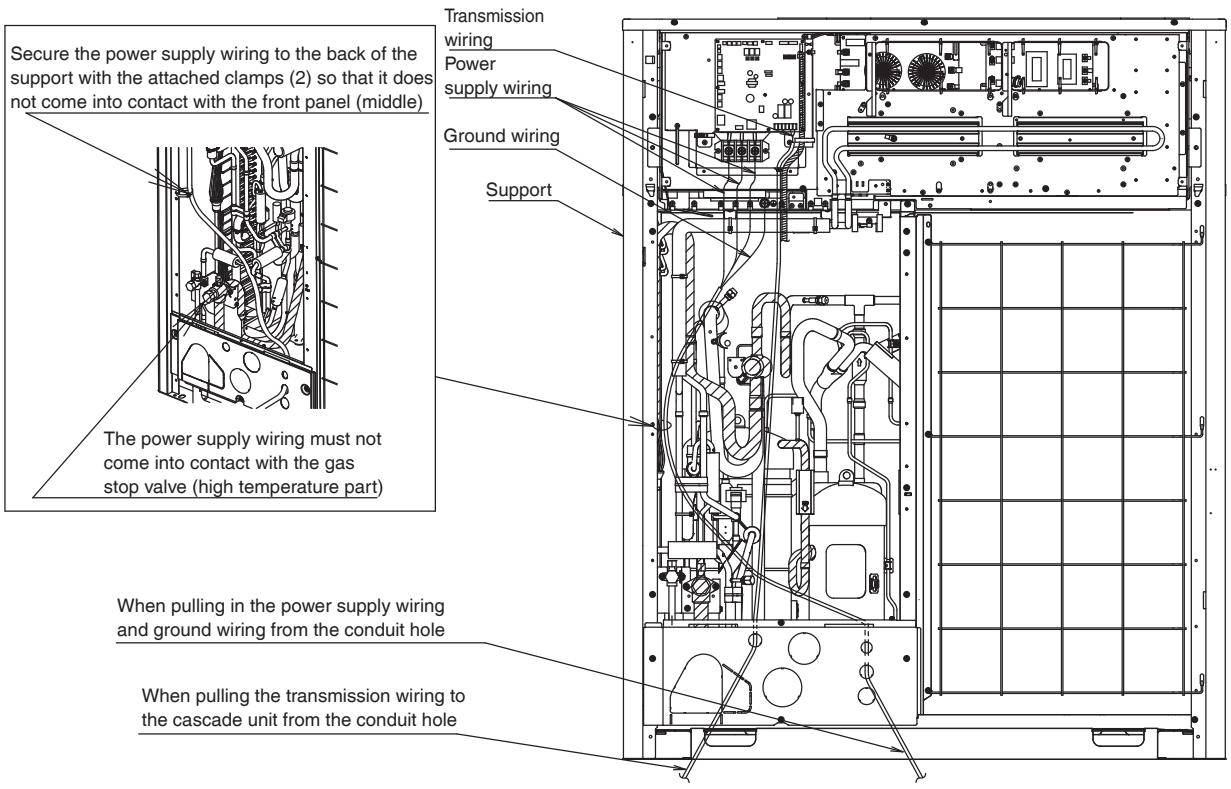


Fig. 28

8. Inspection and insulation work on water and refrigerant piping

Note for piping installers and electricians

- Be sure to use nitrogen gas for the airtight test.

8-1 Airtight test/vacuum drying

After completing the refrigerant piping work, be sure to perform the airtightness test and vacuum drying in the following manner.

NOTE

- Always use nitrogen gas for the airtightness test.

<Necessary tools>

Gauge manifold Charge hose Valve	● To prevent entry of any impurities and insure sufficient pressure resistance, always use the special tools dedicated for R410A. ● Use charge hose that have Schrader valve depressor for connecting to service port of stop valves or refrigerant charge port.
Vacuum pump	● The vacuum pump for vacuum drying should be able to lower the pressure to 500 microns. ● Take care the pump oil never flow backward into the refrigerant pipe during the pump stops..

<The system for airtight test and vacuum drying>

Referring to the Fig.29, connect a nitrogen tank, refrigerant tank, and a vacuum pump to the heat source unit.

The refrigerant tank and the charge hose connection to refrigerant charge port or the valve A in the Fig.29 are needed

in 9. Additional refrigerant charge on page 31.

<Testing for airtightness method>

The test is passed if the pressure is increased to 580 psi (4.0 MPa) (not exceeding 580 psi (4.0 MPa)) from the service port of the liquid/gas stop valve of the heat source unit and there is no pressure drop within 24 hours.
If there is a pressure drop, check the leak location, correct it, and perform the airtight test again.

NOTE

- To conduct the airtight test on the R410A circuit, use the airtight pressure specified in this installation manual instead of the installation manual supplied with the heat source unit.

<Vacuum drying>

Evacuate the system from the liquid pipe and gas pipe stop valve service ports by using a vacuum pump for more than 2 hours and bring the system to 500 microns or less. After keeping the system under that condition for more than 1 hour, check if the vacuum gauge rises or not. If it rises, the system may either contain moisture inside or have leaks.

NOTE

During the rainy season, moisture might enter the piping. If working during a rainy season and the work takes long enough for condensation to form inside the pipes, take the following precautions:
After evacuating the system for 2 hours, pressurize the system to 375,000 microns (vacuum break) with nitrogen gas and evacuate the system again using the vacuum pump for 1 hour to 500 microns or less (vacuum drying).
If the system cannot be evacuated to 500 microns within 2 hours, repeat the operation of vacuum break and vacuum drying. Then, after leaving the system in a vacuum for 1 hour, confirm that the vacuum gauge does not rise.

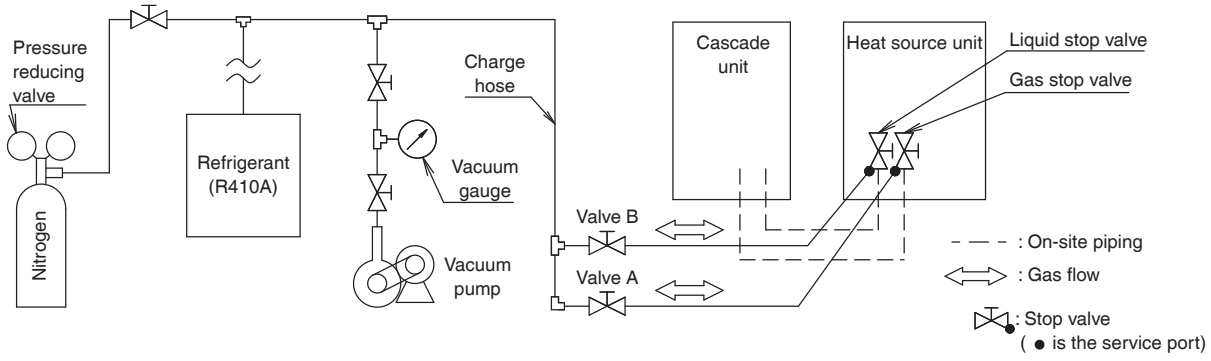
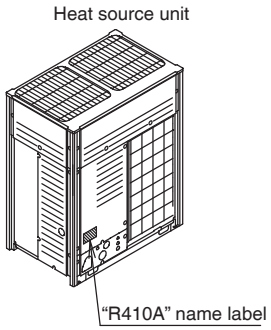


Fig. 29

If the refrigerant liquid piping length is less than 26.2 ft. (8 m), no additional refrigerant (R410A) is necessary.

CAUTION

- Be sure to perform the airtightness test and vacuum drying using the service port of the liquid/gas stop valve of the heat source unit. (Refer to the “R410A” name label attached to the front panel of the heat source unit for the location of the port.)
- For the handling of the stop valve, refer to **[12-3 How to operate the stop valve]**.
- The refrigerant charge port is connected to unit pipe. When shipped, the unit contains the refrigerant, so use caution when attaching the charge hose.
- Be sure to tighten the charge hose by hand.
  If you use a tool, excessive tightening may result in damage to the service port and gas leakage.
  * In the case of a charge hose which leaks gas when tightened by hand, replace a seal or replace it with a new charge hose.
- Do not open the stop valve until the airtightness test and vacuum drying have been completed and additional refrigerant has been charged.



8-2 Insulation work of refrigerant piping

NOTE

- Pipe insulation thickness provided below are guidelines only. Pipes must be insulated with the appropriate thickness of insulation per applicable local/state or national codes.

- Insulation of pipes should be done after performing 8-1 Airtight test/vacuum drying on page 28.
- After completing the airtightness test and vacuum drying, be sure to perform insulation work on the refrigerant piping.
- Insulate all gas and liquid piping and their connections. Failure to insulate may result in water leaks and burns. Be sure to use insulation designed for HVAC equipment. (The maximum temperature of the piping on the gas side is about 248°F (120°C). Use an insulation sufficiently resistant to this temperature.)
- In order to protect the wiring from the gas piping which is a high temperature part, insulate the liquid piping and gas piping on the cascade unit side up to the piping fixture inside the unit. (refer to Fig. 30)
- Reinforce the insulation according to the installation environment. If it is not reinforced, condensation may form on the surface of the insulation. Refer to the following as a guide.
  ◆In the case of 86°F (30°C), and 75% to 80% RH: 0.6 in. (15 mm). or more in thickness
  ◆In the case of over 86°F (30°C), and RH 80%: 0.79 in. (20 mm). or more in thickness
- Open a knockout hole in the piping outlet cover and install, then close the piping outlet with sealing material (field supply) after test operation as a measure against invasion of small animals. (refer to Fig. 31)

8-3 Water piping insulation/freezing prevention work

NOTE

- Pipe insulation thickness provided below are guidelines only. Pipes must be insulated with the appropriate thickness of insulation per applicable local/state or national codes.

- Insulate all water piping and piping connections. Use glass wool (thickness 0.79 in. (20 mm) or more) for heat insulation.
  Failure to insulate may result in water leaks, burns, reduced hot water supply temperature, reduced capacity, and increased power consumption. (The maximum temperature of the circulating water/hot water piping is about 194°F (90°C). Use an insulation sufficiently resistant to this temperature.)
- Insulate the circulating water piping and hot water piping on the cascade unit up to the joint fixture inside the unit. (refer to Fig. 30)
- Take anti-freeze measures on all water piping. Even when insulated, the piping freezes when the ambient temperature drops below 32°F (0°C).
- Open a knockout hole in the piping outlet cover and install, then close the piping outlet with sealing material (field supply) after test operation as a measure against invasion of small animals. (refer to Fig. 31)

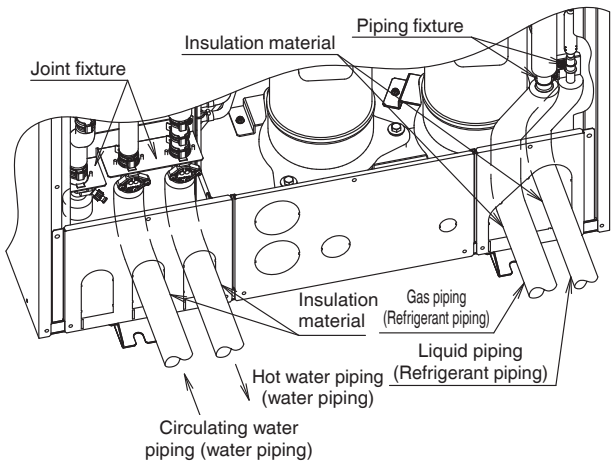


Fig. 30

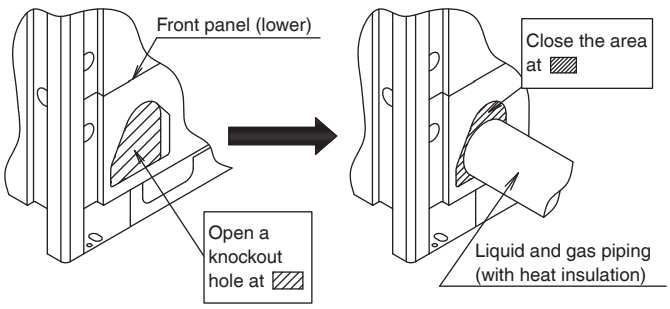


Fig. 31

CAUTION

- Fig. 30 show examples of the outlet of the heat source unit refrigerant piping.
  Perform the same procedure for the refrigerant piping and water piping outlet of the cascade unit.
- After punching through the knockout holes, it is recommended to remove burrs, and apply repair paint to the edges and areas surrounding the edges to prevent rust.

8-4 Checking equipment and installation status

Note for electricians

- Is the transmission wiring mis-wired, or are there any loose screws? → Refer to **[7-3 Transmission wiring connection]**.
- Is the power supply wiring mis-wired, or are there any loose screws? → Refer to **[7-4 Power supply wiring and ground wiring connection]**.
- Is the insulation of the main power supply circuit reduced? → Use a 500 VDC insulation resistance tester for measurement. Check the insulation is above regular value in accordance with relevant local and national regulations.
  - Do not open the stop valve until you have measured the insulation of the power supply circuit.
    If the measurement is performed after opening the stop valve, the insulation may be reduced.

Prohibited Do not use an insulation resistance tester on low voltage circuits (transmission wiring terminal between heat source unit and cascade unit, etc.)

Note for refrigerant piping installer

- Is the refrigerant piping size correct? → Refer to **[5-1 Selection of piping material]**.
- Are there any errors in the refrigerant piping? → Refer to **[5. Refrigerant piping work]**.
- Have the thermal insulation work been completed? → Refer to **[8-2 Insulation work of refrigerant piping]**.

Note for water piping installer

- Is the water piping size correct? → Refer to **[6-2 Selection of water piping material]**.
- Are there any errors in the water piping? → Refer to **[6. Water piping work]**.
- Have the insulation/freezing prevention work been completed? → Refer to **[8-3 Water piping insulation/freezing prevention work]**.

9. Additional refrigerant charge

Note for refrigerant charging workers

- The only additional refrigerant to be charged during the initial installation is R410A.
- When the work of additional charging is completed or interrupted, close the valve of the refrigerant cylinder immediately. Leaving the valve open may cause overcharging.
- If the refrigerant liquid piping length is less than 26.2 ft. (8 m), no additional refrigerant (R410A) is necessary.

NOTE

- Refrigerant cannot be charged until field wiring has been completed.
- Refrigerant may only be charged after performing the leak test and the vacuum drying.
- Charging with an unsuitable substance may cause explosions and accidents, so always ensure that the appropriate refrigerant R410A is charged.
- Refrigerant containers shall be opened slowly.
- When the refrigerant system is to be opened, refrigerant must be treated according to the applicable legislation.
- To avoid compressor breakdown, Do Not charge the refrigerant more than the specified amount.

WARNING

- Use protective equipment (protective gloves, glasses, etc.) when charging the refrigerant.
- When opening the front panel of the heat source unit during operation, always pay attention to the rotation of the fan. (The fan may continue to rotate for a while after the heat source unit stops operating.)

DANGER

See Safety considerations on page i.

1. Check that the following work has been completed according to the installation manual.
   ◆Refrigerant piping work ◆Airtightness test/vacuum drying
2. Calculate the amount of additional charging using the formula for calculating the amount of additional charging (R) on the next page.
3. Open valve B (leave valve A and the liquid/gas stop valve closed) and charge with the amount of refrigerant calculated in step 2 from the liquid stop valve service port. (refer to Fig. 32)
4. After charging the calculated amount of refrigerant, close valve B. If all of the calculated amount of refrigerant cannot be charged, open valve A (leave the liquid/gas stop valve closed) and charge the remaining refrigerant.
5. After additional refrigerant charging is completed, write the amount of the added refrigerant in the additional refrigerant charging label supplied with the unit and attach it to the back of the front panel.

Formula for calculating the additional charging amount (R)

$$R(lbs) = (\text{liquid piping length (ft)} - 26.2) \times 0.074$$

$$(R(kg) = (\text{liquid piping length (m)} - 8) \times 0.11)$$

(Rounded to the first decimal place)

(Note) If the liquid piping length is 26.2 lbs (8 m) or less, R = 0 lbs (kg). No additional charging is required.

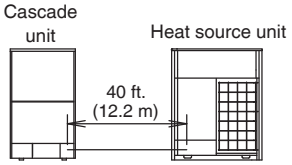
Calculation example

When the liquid piping length between the cascade unit and the heat source unit is 40 ft. (12.2 m), the additional charging amount (R) is

$R(lbs) = (40 - 26.2) \times 0.074 = 1.02 \Rightarrow$ **1.0 lbs**

$(R_{(kg)} = (12.2 - 8) \times 0.11 = 0.46 \Rightarrow$ **0.5 kg**$)$

(Rounded to the first decimal place)



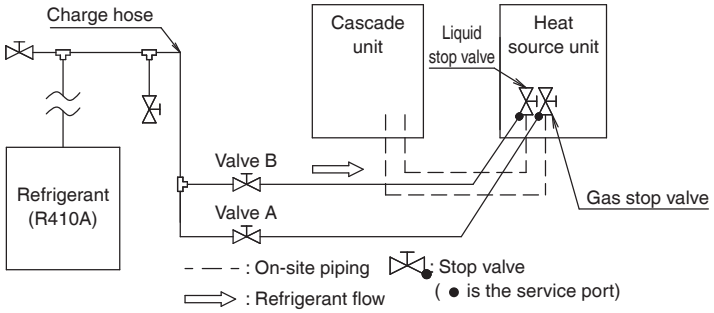


Fig. 32

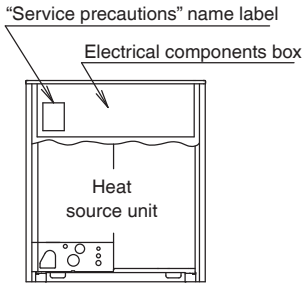


Fig. 33

<Cautions about the R410A refrigerant cylinder>

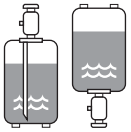
When charging the refrigerant, check whether the cylinder has a siphon piping before charging, and install the cylinder so that the refrigerant is charged in a liquid state.

Since R410A is a mixed refrigerant, when charged in gaseous state, the composition of the refrigerant changes and normal operation may not be possible.

NOTE

- Before charging, check whether the refrigerant cylinder is equipped with a siphon tube or not.

Charge the liquid refrigerant with the cylinder in upright position.



Charge the liquid refrigerant with the cylinder in upsidedown position.

10. Field setting, release of air from water piping and test operation

Before starting work requiring test operation

10-1 Overview: Commissioning

After installation and once the field settings are defined, the installer is obliged to verify correct operation. Therefore a test run must be performed according to the procedures described below.

This chapter describes what you have to do and know to commission the system after it is configured.

Commissioning typically consists of the following stages:

1 Checking the “Checklist before commissioning”.
2 Performing a test run.
3 If necessary, correcting errors after abnormal completion of the test run.
4 Operating the system.

10-2 Precautions when commissioning

DANGER	**RISK OF ELECTROCUTION** **RISK OF BURNING**

CAUTION	**Do not perform the test operation while working on the connected units.** ● When performing the test operation, all connected units will operate as well. Working on the connected units while performing a test operation is dangerous. ● Do not insert fingers, rods or other objects into the air inlet or outlet. Do not remove the fan guard. When the fan is rotating at high speed, it will cause injury.

INFORMATION	During the first running period of the unit, the required power may be higher than stated on the nameplate of the unit. This phenomenon is caused by the compressor, that needs a continuous run time of 50 hours before reaching smooth operation and stable power consumption.

NOTE	Be sure to turn on the power 6 hours before operation in order to have power running to the crankcase heater and to protect the compressor.

During test operation,all connected units will start up. Make sure that the preparations of all units are finished (field piping, electrical wiring, air purge, ...).

10-3 Checklist before commissioning

After the installation of the unit, first check the following items. Once all below checks are fulfilled, the unit must be closed, only then can the unit be powered up.

☐	You read the complete installation and operation instructions, as described in the installation manual.
☐	**Installation** Check that the unit is properly installed, to avoid abnormal noises and vibrations when starting up the unit.
☐	**Field wiring** Be sure that the field wiring has been carried out according to the instructions described in the chapter "7. Electrical wiring work" on page 19, according to the wiring diagrams and according to the applicable legislation.
☐	**Power supply voltage** Check the power supply voltage on the local supply panel. The voltage must correspond to the voltage on the nameplate of the unit.
☐	**Ground wiring** Be sure that the ground wires have been connected properly and that the ground terminals are tightened.
☐	**Insulation test of the main power circuit** Using a megger tester for 500 V, check that the insulation resistance of 2 MΩ or more is attained by applying a voltage of 500 V DC between power terminals and ground. Never use the megger tester for the transmission wiring.
☐	**Fuses, circuit breakers, or protection devices** Check that the fuses, circuit breakers, or the locally installed protection devices are of the size and type specified in the chapter "7. Electrical wiring work" on page 19. Be sure that neither a fuse nor a protection device has been bypassed.
☐	**Pipe size and pipe insulation** Be sure that correct pipe sizes are installed and that the insulation work is properly executed.
☐	**Stop valves** Be sure that the stop valves are open on both liquid and gas side.
☐	**Damaged equipment** Check the inside of the unit on damaged components or squeezed pipes.
☐	**Refrigerant leak** Check the inside of the unit on refrigerant leakage. If there is a refrigerant leak, try to repair the leak. If the repair is unsuccessful, call your local dealer. Do not touch any refrigerant which has leaked out from refrigerant piping connections. This may result in frostbite.
☐	**Oil leak** Check the compressor for oil leakage. If there is an oil leak, try to repair the leak. If the repairing is unsuccessful, call your local dealer.
☐	**Air inlet/outlet** Check that the air inlet and outlet of the unit is not obstructed by paper sheets, cardboard, or any other material.
☐	**Additional refrigerant charge** The amount of refrigerant to be added to the unit shall be written on the included "Added refrigerant" plate and attached to the rear side of the front cover.
☐	**Installation date and field setting** Be sure to keep record of the installation date on the sticker on the rear of the upper front panel and keep record of the contents of the field setting(s).
☐	Inspect the **water strainer** at the inlet piping of the outside unit. Clean if it is dirty.
☐	The **piping work** has been carried out according to this document and the applicable legislation. Make sure that following components are positioned at their correct places: ▪ **water strainer** ▪ **air purge valve** ▪ automatic water supply valve ▪ expansion tank
☐	**Water circuit** Make sure that the water circuit is filled.
☐	**Water flow** Make sure that the calculated water flow rate can be reached.

10-4 Work flow

10-5 Cascade unit settings

- Turn on the power supply of the hot water generation system and tank control board.
- Set the address of the cascade unit using the push button switch.
- Perform for all cascade units.

10-6 Release air from cascade unit and water piping system

- **Release the air from the water piping in the cascade unit.**
- **Operate the pump in the cascade unit with the remote controller to release air from the water piping system between the cascade unit and the hot water storage tank.**

10-7 Test operation

- Perform test operation of the hot water generation system.

Field setting/test operation completed

10-5 Cascade unit settings

- For all units, check that the following construction has been completed according to the installation manual.
  - ◆Refrigerant piping work between heat source unit and cascade unit, airtightness test, vacuum drying, additional charge of refrigerant
  - ◆Hot water storage tank installation work
  - ◆Controller kit installation work
  - ◆Water piping work
- Set the address of the cascade unit according to the following procedure.
  - Address setting is required for all cascade units.
    Address setting is required even when there is only 1 hot water generation system.
  - The address number should be a number between 1, 2, ... 8, and should be set sequentially from 1 in ascending order.
    If the address numbers are skipped without setting them in order, they will not be recognized properly.
  - Setting is not possible from the heat source unit. Be sure to set on the cascade unit.

WARNING

Caution of electric shock

- Before turning on the power supply, securely close the cover of the electrical components box (heat source unit, cascade unit, tank control board).
- Checking the (A1P) settings/7-segment display on the P board of the cascade unit after the power supply is turned on is carried out from the inspection port in the cascade unit electrical components box cover (refer to Fig. 34).
- Be sure to operate the push button switch using an insulating rod from the inspection port of the electrical components box cover.
  (If you touch a charged part by mistake, there is a risk of electric shock.)

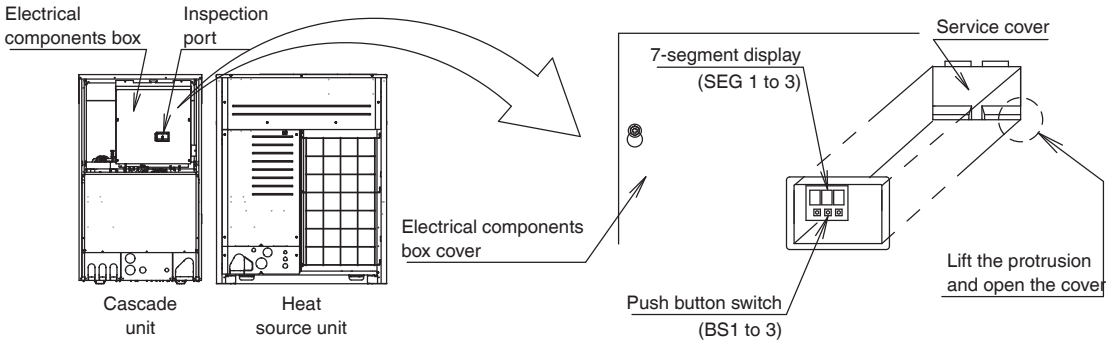


Fig. 34

Address setting procedure

(1) Turn on the power supply of the heat source unit, cascade unit, and tank control board.

(2) Open the front panel (upper) of the cascade unit and open the service cover of the electrical component box. (refer to Fig. 35)

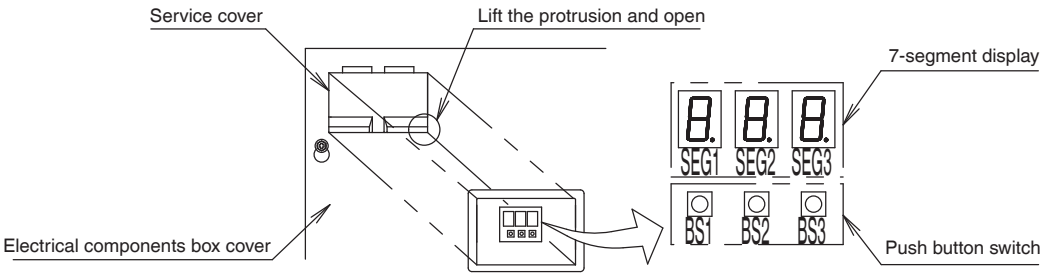


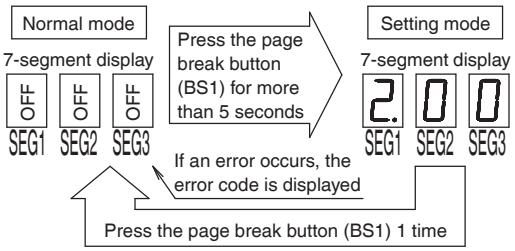
Fig. 35

(3) Setting by push button switch

1. In “Normal mode”, press the page break button (BS1) for more than 5 seconds to enter “Setting mode”.

Function of push button switch

Push button	Button type	Use
BS1	Page break button	Change mode
BS2	Operation button	Change settings
BS3	Confirmation button	



	Follow the steps below from [Setting mode]	7-segment display		
		SEG1	SEG2	SEG3
Setting steps	2. Press the operation button (BS2) 13 times to set the 7-segment display to the table on the right.	2	1	3
	3. Press the confirmation button (BS3). (The current set value is displayed. The initial value is 0.)	One from step 4 is displayed		
	4. Press the operation button (BS2) and set the 7-segment display to the address to be set. (Note) Address numbers should be set sequentially from 1 to 8 in ascending numerical order. Address numbers cannot be duplicated within the same system. If the address is duplicated, a UC error will occur.	OFF	OFF	1
		OFF	OFF	2
		OFF	OFF	3
		OFF	OFF	4
		OFF	OFF	5
		OFF	OFF	6
		OFF	OFF	7
		OFF	OFF	8
	5. Press the confirmation button (BS3) to fix the settings.	The above blinking changes to lighting		
	6. Press the confirmation button (BS3) again.	2	0	0
	7. Press the page break button (BS1) to complete the address setting.	OFF	OFF	OFF

If you become confused during operation, press the page break button (BS1) to return to “Normal mode” and perform from step 1 again.

(4) Close the service cover of the electrical components box.

If there are multiple cascade units, perform steps (1) to (4) to set addresses for all cascade units.

10-6 Release air from cascade unit/water piping system

1. Release air from water piping in cascade unit

(1) Open the front panel (lower).

(2) Open the gate valve of the circulating water piping and hot water piping between the cascade unit and the hot water storage tank to allow water to flow through the machine.

(3) Open both air release valves (refer to Fig. 36) to release air from the water piping in the cascade unit. (If air stops flowing out of the hose and only water comes out, the air release is completed.)

(4) After releasing air, be sure to close the valve.

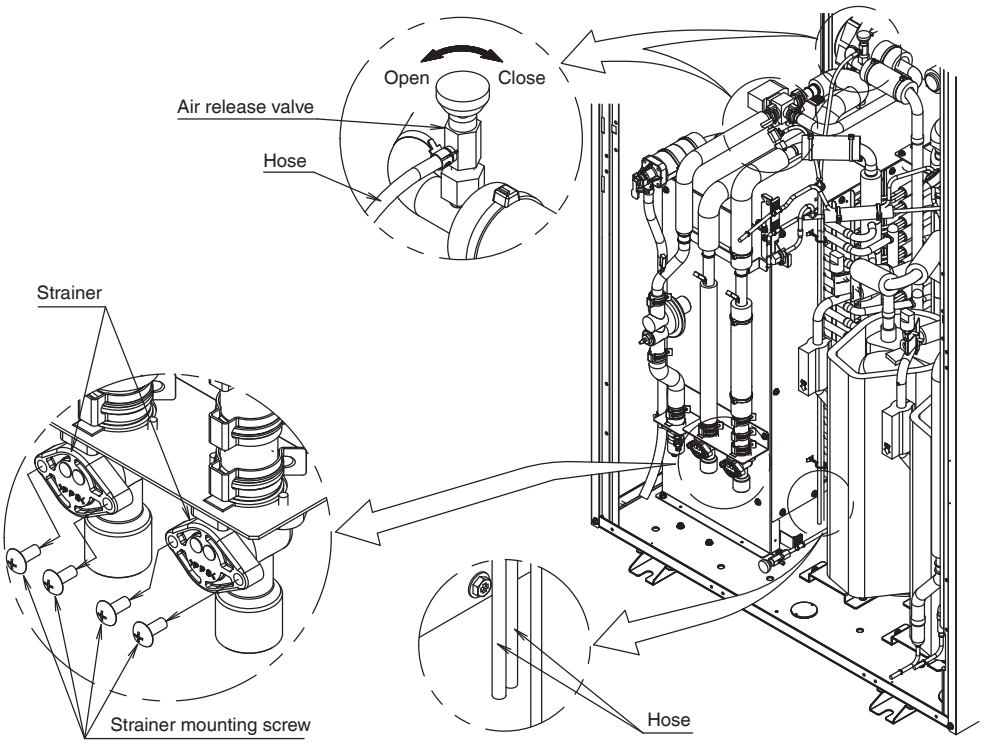


Fig. 36

2. Release air/remove dust from on site piping or cascade unit

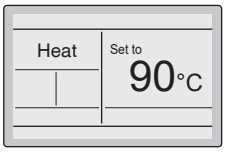
- **Operate the pump in the cascade unit to release air and remove dust from the on site piping or cascade unit.**
- **Dust from the hot water storage tank to the cascade unit collects in the strainer built into the cascade unit.**

STEP 1 Remote controller setting: Set the test operation mode.
Set the mode number “20”, the FIRST CODE NO. to “8” and the SECOND CODE NO. to “02” (setting 1).
(Note) If test operation is performed with SECOND CODE NO. “03” (setting 2), the hot water generation system will operate, and hot water will come out of the air release valve, so be sure to release air at setting 1 (pump operation).

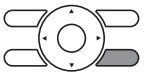
Mode number	FIRST CODE NO.	Setting contents	SECOND CODE NO.								
			01	02	03	04	05	06	07	08	09
20	8	Test operation mode	OFF	Setting 1 (Pump operation)	Setting 2 (Test operation)						

* The thick frame is the factory setting.

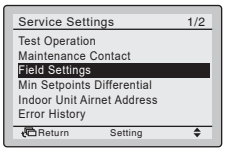
1



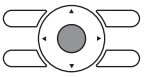
Press and hold Cancel button for 4 seconds or more.
Service settings menu is displayed.



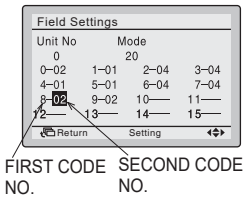
2



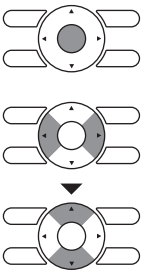
Select Field Settings in the Service Settings menu, and press Menu/OK button.
Field settings screen is displayed.



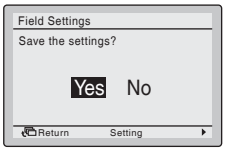
3



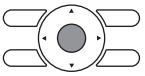
Highlight the mode, and select “20” by using ▲▼ (Up/Down) button.
Highlight the unit No. and select “Unit No.” to be set by using ▲▼ (Up/Down) button.
[Current settings are displayed. And, SECOND CODE NO. “ - ” means no function.]
Highlight SECOND CODE NO. of the FIRST CODE NO. “8”, and select “02” by using ▲▼ (Up/Down) button.



4



Press Menu/OK button. Setting confirmation screen is displayed.
Select Yes and press Menu/OK button. Setting details are determined and field settings screen returns.



STEP 2 Press On/Off button to operate the pump.
STEP 3 Once the air is removed, press On/Off button to stop the pump.
STEP 4 After stopping the pump, clean the strainer built into the cascade unit.
STEP 5 Since air enters when the strainer is cleaned, perform STEPS 1 to 3 again to release air.
STEP 6 Close the front panel (upper and lower) of the cascade unit.

10-7 Test operation

In test operation, hot water supply operation is performed by running all the hot water generation systems, and the following items are automatically checked.

◆Stop valve open check ◆Flow check ◆Hot water temperature check

(1) Check that the following operations have been completed according to the installation manual.
◆Cascade unit settings ◆**Cascade unit/water piping system air release**

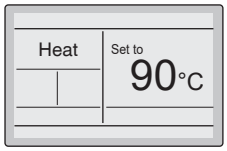
(2) Before starting operation, be sure to open the stop valve of the heat source unit.
For the handling of the stop valve, refer to **[12-3 How to operate the stop valve]**.

(3) Check that the front panel of the heat source unit and cascade unit and the cover of the tank control board are closed, and that all the hot water generation systems and the tank control board power supply is on.

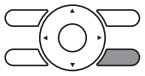
> To protect the machine, turn on the power supply 6 hours before starting operation.

(4) Perform test operation according to the following procedure.
(When changing the hot water temperature of the hot water generation system, change the temperature setting with the remote controller.)

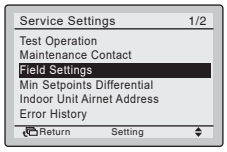
1



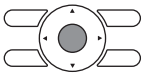
Press and hold Cancel button for 4 seconds or more.
Service settings menu is displayed.



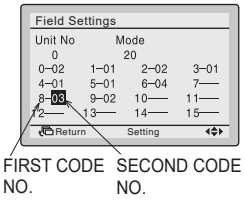
2



Select Field Settings in the Service Settings menu, and press Menu/OK button.
Field settings screen is displayed.

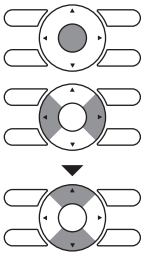


3

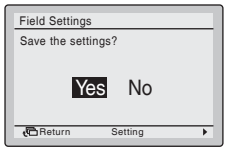


Highlight the mode, and select “20” by using ▲▼ (Up/Down) button.

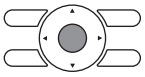
Highlight SECOND CODE NO. of the FIRST CODE NO. “8”to be changed, and select “03” by using ▲▼ (Up/Down) button.



4



Press Menu/OK button. Setting confirmation screen is displayed.
Select Yes and press Menu/OK button. Setting details are determined and field settings screen returns.

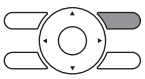


5

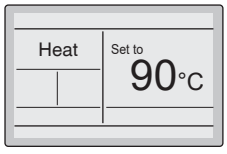
Press On/Off button and operate all the hot water generation systems.

- Operate for about 20 minutes.
- If the operation stops and no error code is displayed on the remote controller, test operation is completed.

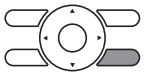
* If an error code is displayed on the remote controller, check the error code, shut off the power supply, and correct the error by referring to **[12-2 Error code + subdivision code and corresponding method]**.
After correcting the problem, perform test operation again.



6



When test operation is completed successfully, press Cancel button to return to the basic screen.



CAUTION Even if the hot water supply is not in operation, a pump in the cascade may run to prevent from getting frozen. This is a normal operation and it is not a malfunction.

11. Test operation of the Mega-Q system

Test operation of the hot water system will be performed after the installation of all equipment such as the heat source unit, cascade unit, hot water storage tank, controller kit, and remote controller is completed.
Operate the remote controller and check that hot water can be supplied.

Note for installer

After installation is complete, check that all electrical components box covers and front panels have been attached before delivery.

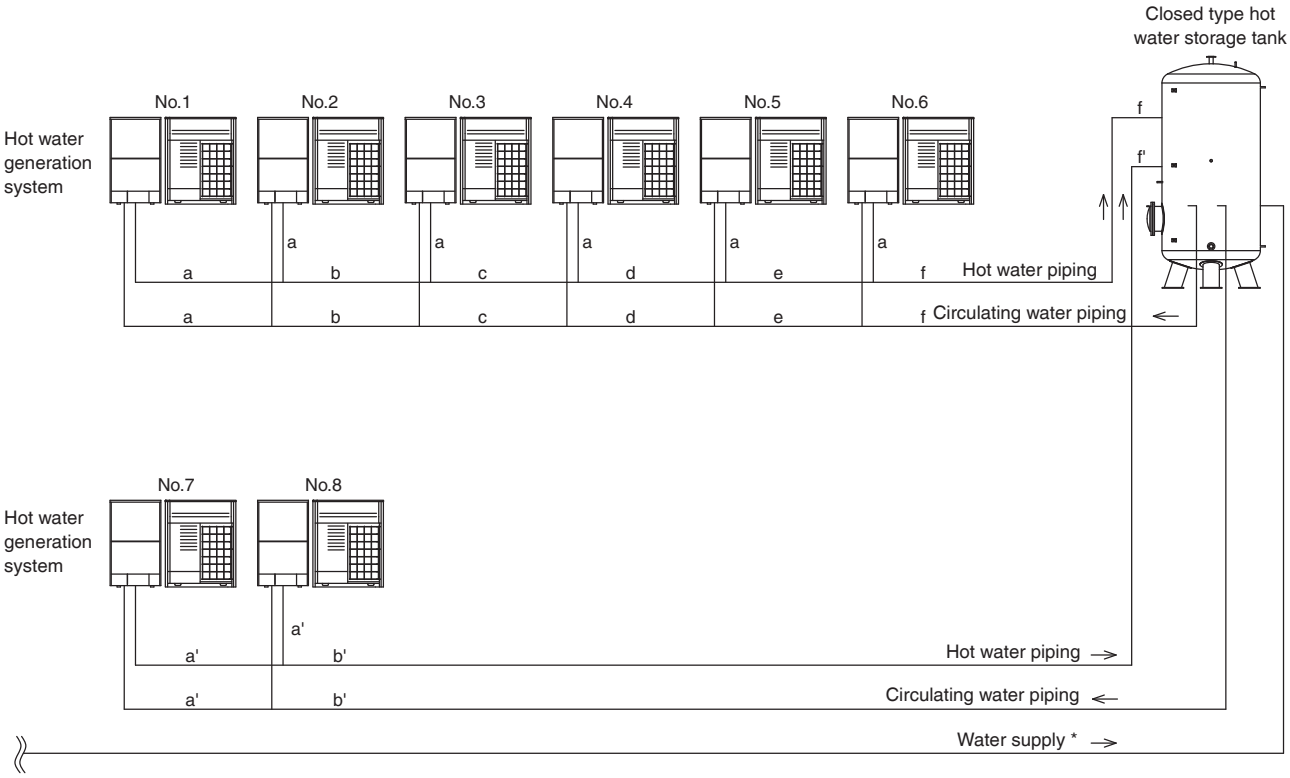
- For remote control, refer to “Basic Operation” and other related sections in the operation manual.
- For how to set the temperatures at the time of starting and stopping supplying hot water and reheating, refer to “How to Change Setting” in the operation manual.

12. Appendix

12-1 Piping work

1. Water piping size selection procedure

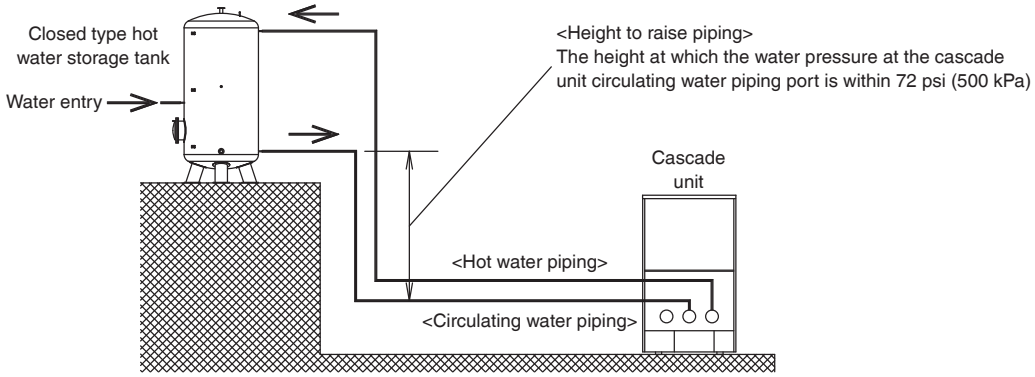
- The piping size is for cases when using stainless steel piping for general piping when multiple units are installed. Determine the piping size and piping length according to the piping material, number of bends, and valves so that the overhead lift is less than the allowable value.
- Up to 6 Mega-Q systems can be connected on one water loop.
- Up to 8 Mega-Q systems can be controlled by one tank controller kit.



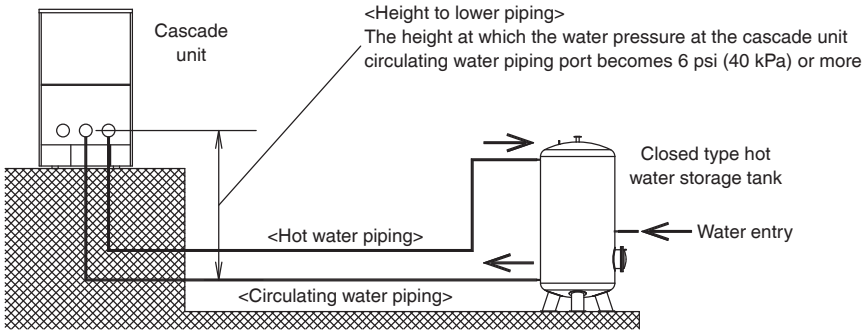
								Separate systems from 7 units, and select the same piping size as used in the preceding 6 units	
Piping location		a	b	c	d	e	f	a'	b'
Number of connected hot water generation systems to a hot water storage tank		1	2	3	4	5	6	7	8
Circulating water piping + hot water piping (nominal diameter Su)	When the equivalent piping length is 260 ft. (80 m)	1/2 in.	3/4 in.	1 in.	1-1/4 in.	1-1/4 in.	1-1/4 in.	1/2 in.	3/4 in.
	When the equivalent piping length is 390 ft. (120 m)	3/4 in.	1 in.	1 in.	1-1/4 in.	1-1/4 in.	1-1/2 in.	3/4 in.	1 in.

2. Water piping (circulating water/hot water)

When the cascade unit is below the tank



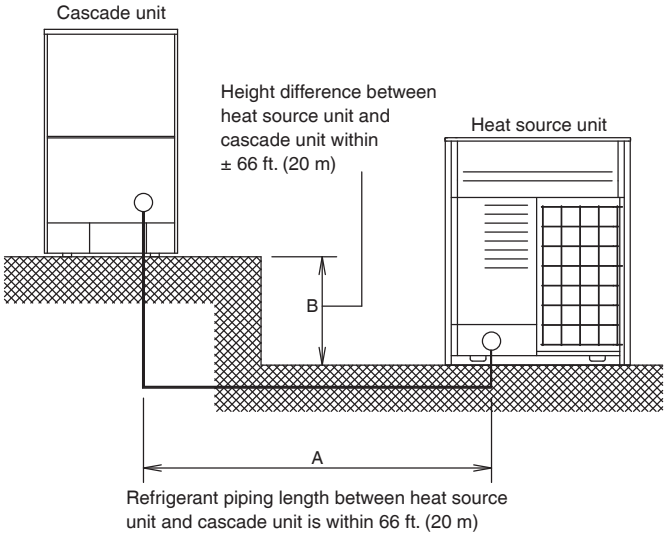
When the cascade unit is above the tank



- Allowable overhead lift for hot water piping and circulating water piping combined must be within 7.0 psi (48 kPa).
- The height difference of the piping to the hot water storage tank is as follows.
  - When the cascade unit is below: The height at which the water pressure at the cascade unit circulating water piping port is within 72 psi (500 kPa)
    (Example) Tank pressure 29 psi (200 kPa) + height 33 ft. (10 m) - piping pressure loss 4.4 psi (30 kPa) =
    39 psi (270 kPa) < 72 psi (500 kPa)
  - When the cascade unit is above: The height at which the water pressure at the cascade unit circulating water piping port is 5.8 psi (40 kPa) or more
    (Example) Tank pressure 29 psi (200 kPa) - height 33 ft. (10 m) - piping pressure loss 4.4 psi (30 kPa) =
    10 psi (70 kPa) > 6 psi (40 kPa)
- The circulating water pressure to the cascade unit should be 6 psi (40 kPa) to 72 psi (500 kPa)
- **Install an air release valve in the water piping system where air may accumulate.**
  If there is air in the water piping, the pump in the cascade unit will catch the air, preventing normal operation.

* The water supply cannot be directly connected to the cascade unit. Supply water from the water receiving tank or supplementary tank.

3. Refrigerant piping



- Refrigerant piping length between heat source unit and cascade unit: within 66 ft. (20 m). (A)
- Height difference between heat source unit and cascade unit: within ±66 ft. (20 m). (B)

* If the refrigerant liquid piping length of R410A between the heat source unit and the cascade unit exceeds 26.2 ft. (8 m), it is necessary to recharge the refrigerant on-site.

12-2 Error code + subdivision code and corresponding method

Error code	Subdivision code	Product	Trouble during installation	Solution
E3	01	Cascade unit	The HPS connectors (X3A, X4A) on the printed circuit board (A1P) are disconnected.	Securely reconnect each connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
	03	Heat source unit	The HPS connectors (X3A, X4A) on the printed circuit board (A1P) are disconnected.	Securely reconnect each connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
			The stop valve of the heat source unit is closed.	Open the stop valve.
E4	02	Heat source unit	The stop valve of the heat source unit is closed.	Open the stop valve.
			There is insufficient refrigerant.	Check that additional charging has been performed. Calculate again based on “Calculation of additional charge amount of refrigerant”, and charge an appropriate amount of refrigerant.
E9	01	Cascade unit	The X23A connector (electric valve coil) on the printed circuit board (A1P) is disconnected.	Securely reconnect the X23A connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
	04		The X21A connector (electric valve coil) on the printed circuit board (A1P) is disconnected.	Securely reconnect the X21A connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
	05	Heat source unit	The X23A connector (electric valve coil) on the printed circuit board (A1P) is disconnected.	Securely reconnect the X23A connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
	07		The X21A connector (electric valve coil) on the printed circuit board (A1P) is disconnected.	Securely reconnect the X21A connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
H9	02	Heat source unit	The X18A connector (thermistor) on the printed circuit board (A1P) is disconnected.	Securely reconnect the X18A connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
F3	01	Cascade unit	There is insufficient refrigerant.	Check that additional charging has been performed. Calculate again based on “Calculation of additional charge amount of refrigerant”, and charge an appropriate amount of refrigerant.
	03	Heat source unit	The stop valve of the heat source unit is closed.	Open the stop valve.
			There is insufficient refrigerant.	Check that additional charging has been performed. Calculate again based on “Calculation of additional charge amount of refrigerant”, and charge an appropriate amount of refrigerant.
J3	16 to 19	Cascade unit	The X29A connector (thermistor) on the printed circuit board (A1P) is disconnected.	Securely reconnect the X29A connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
	22 to 25	Heat source unit	The X29A connector (thermistor) on the printed circuit board (A1P) is disconnected.	Securely reconnect the X29A connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
J7	13, 14	Cascade unit	The X30A connector (thermistor) on the printed circuit board (A1P) is disconnected.	Securely reconnect the X30A connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
J5	03	Heat source unit	The X30A connector (thermistor) on the printed circuit board (A1P) is disconnected.	Securely reconnect the X30A connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
J6	02			
J7	07			
J8	02			
J9	02			

Error code	Subdivision code	Product	Trouble during installation	Solution
JA	06, 07	Cascade unit	The X32A connector (high pressure sensor) on the printed circuit board (A1P) is disconnected.	Securely reconnect the X32A connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
	08, 09	Heat source unit	The X32A connector (high pressure sensor) on the printed circuit board (A1P) is disconnected.	Securely reconnect the X32A connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
JC	06, 07	Cascade unit	The X31A connector (low pressure sensor) on the printed circuit board (A1P) is disconnected.	Securely reconnect the X31A connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
	08, 09	Heat source unit	The X31A connector (low pressure sensor) on the printed circuit board (A1P) is disconnected.	Securely reconnect the X31A connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
LC	14, 30	Cascade unit	The X20A and X28A connectors (transmission with the inverter printed circuit board) on the printed circuit board (A1P) are disconnected.	Securely reconnect the X20A and X28A connectors based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
	7, 20	Heat source unit	The X20A and X28A connectors (transmission with the inverter printed circuit board) on the printed circuit board (A1P) are disconnected.	Securely reconnect the X20A and X28A connectors based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
	15, 25			
P1	01, 07	Cascade unit	Power supply voltage imbalance	Check the power supply voltage and correct the imbalance.
	02, 08	Heat source unit	Power supply voltage imbalance	Check the power supply voltage and correct the imbalance.
U1	01	Cascade unit	The power supply wiring of the cascade unit is reverse phase.	Two phases out of three phases are exchanged and connected in positive phase.
	04		Power is not supplied to the cascade unit. (Including phase loss)	Check that the power supply wiring of the cascade unit is correctly connected, and correct any mistakes.
	05	Heat source unit	The power supply wiring of the heat source unit is reverse phase.	Two phases out of three phases are exchanged and connected in positive phase.
	06		Power is not supplied to the heat source unit. (Including phase loss)	Check that the power supply wiring of the heat source unit is connected correctly, and correct any mistakes.
U2	01	Cascade unit	Power supply voltage error	Check the power supply voltage and correct the voltage.
			Power supply voltage imbalance	Check the power supply voltage and correct the imbalance.
	02	Cascade unit	Power supply phase loss	Two phases out of three phases are exchanged and connected in positive phase.
	22	Cascade unit	Power supply voltage error	Check the power supply voltage and correct the voltage.
			Power supply voltage imbalance	Check the power supply voltage and correct the imbalance.
	23	Cascade unit	Power supply phase loss	Two phases out of three phases are exchanged and connected in positive phase.
	08	Heat source unit	Power supply voltage error	Check the power supply voltage and correct the voltage.
			Power supply voltage imbalance	Check the power supply voltage and correct the imbalance.
	09	Heat source unit	Power supply phase loss	Two phases out of three phases are exchanged and connected in positive phase.
	25	Heat source unit	Power supply voltage error	Check the power supply voltage and correct the voltage.
			Power supply voltage imbalance	Check the power supply voltage and correct the imbalance.
	26	Heat source unit	Power supply phase loss	Two phases out of three phases are exchanged and connected in positive phase.
UF	-	Cascade unit	Incorrect connection of water piping.	Check the piping connections according to **[6 Water piping work]**, and correct any mistakes.
UJ	02	Heat source unit	Active filter error	Check the power supply voltage. Check that the power supply wiring of the active filter is correctly connected, and correct any mistakes.
	03			

Error code	Subdivision code	Product	Trouble during installation	Solution
A6	–	Cascade unit	Water is not flowing in the cascade unit.	Check the following items and correct any problems. ● Check that the gate valves before and after the cascade unit are not closed. ● Check that the strainer is not clogged. ● Check that the water supply pump is operating normally. ● Check that air has been released. ● Confirm that inlet pressure is within the range specified in **[12-1 Piping work]**. ● Confirm that on-site piping is not frozen.
			X40A on the printed circuit board (A7P) or the relay connector X2A is disconnected.	Securely reconnect the X40A connector or the relay connector X2A based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
			X2A on the printed circuit board (A7P) or the relay connector X3A is disconnected.	Securely reconnect the X2A connector or the relay connector X3A based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
HJ	07	Cascade unit	The proper flow rate cannot be adjusted with the cascade unit.	Check the following items and correct any problems. ● Check that the gate valve is completely open. ● Check that the strainer is not clogged. ● Confirm that water piping size and water piping length are in accordance with the selection procedure in **[12-1 Piping work]**. ● Confirm that inlet pressure is within the range specified in **[12-1 Piping work]**. ● Check that air has been released.
42	–	Cascade unit	X3A on the printed circuit board (A7P) or the relay connector X4A is disconnected.	Securely reconnect the X3A connector or the relay connector X4A based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
80	–	Cascade unit	The X17A connector (thermistor) on the printed circuit board (A6P) is disconnected.	Securely reconnect the X17A connector based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
81	–	Cascade unit	The X18A connector (thermistor) on the printed circuit board (A6P) is disconnected.	Securely reconnect the X18A connector based on the “Electrical wiring Diagram” affixed to the electrical components box cover (back).
	–	Controller kit	X13A on the printed circuit board (A1P) or the relay connector X3A (water temperature thermistor 1) is disconnected.	Securely reconnect the X13A connector or the relay connector X3A based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
			X17A on the printed circuit board (A1P) or the relay connector X2A (water temperature thermistor 2) is disconnected.	Securely reconnect the X17A connector or the relay connector X2A based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
			X18A on the printed circuit board (A1P) or the relay connector X1A (water temperature thermistor 3) is disconnected.	Securely reconnect the X18A connector or the relay connector X1A based on the “Electrical wiring diagram” affixed to the electrical components box cover (back).
UC	–	Cascade unit	Address is duplicated.	Refer to **[10 Field setting, release of air from water piping and test operation] [10-5 Cascade unit settings]** and reset the address.
UE	–	Controller kit	Transmission between the cascade unit and the tank control board has not been established.	Check the wiring between the cascade unit and the tank control board based on **[7-3 Transmission wiring connection]**, and correct any problems.
			The cascade central address has not been set.	Refer to **[10 Field setting, release of air from water piping and test operation] [10-5 Cascade unit settings]** and reset the address.
EC	–	Controller kit	Low tank water temperature (This does not affect test operation.)	Alarm occurs when the tank water temperature drops. It does not affect test operation.

* If the error code persists or an error code other than the one shown appears, consult your dealer or our contact center.
* The subdivision code is not displayed on the remote controller.
  Check the subdivision code in the 7-segment display from the inspection port of the cascade unit electrical components box cover.

12-3 How to operate the stop valve

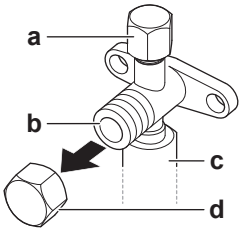
When operating the stop valve, work according to the following.

CAUTION

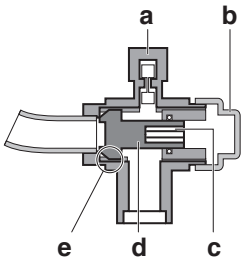
- Do not open the stop valve until all steps in **[8-4 Checking equipment and installation status]** have been completed. If the stop valve is left open without the power supply on, the refrigerant may condense in the compressor and insulation may be reduced.
- Be sure to use a dedicated tool for handling the stop valve. The Ø1/2 in. (12.7 mm) stop valve is not back seal type. Opening with excessive force may break the valve element. The Ø1 in. (25.4 mm) stop valve is a front seal + back seal type.
  When operating the shaft, tighten it with the shaft tightening torque in Table 8 and Table 9 for both opening and closing.
- Always use a charge hose equipped with a valve depressor pin, since the service port is a Schrader type valve.
- After tightening the cap, make sure that there is no leakage of refrigerant gas.

To handle the stop valve

- Make sure to keep all stop valves open during operation.
- The figure below shows the name of each part required in handling the stop valve.
- The stop valve is factory closed.
- When handle the stop valves, be careful not to damage the port pipes around.



a Service port and service port cover
b Stop valve
c Field piping connection
d Stop valve cover



a Service port
b Stop valve cover
c Hexagon hole
d Shaft
e Seal

To open the stop valve

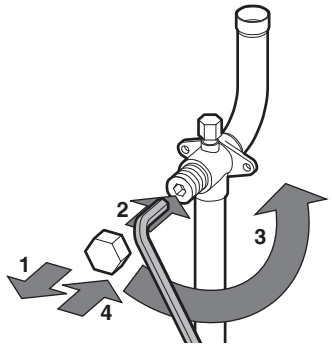
1 Remove the stop valve cover.

2 Insert a hexagon wrench into the stop valve and turn the stop valve counterclockwise.

3 When the stop valve cannot be turned any further, stop turning.
The valve is now open.

- Turn the stop valve (ϕ1/2) until the shaft stops.
  (Opening the valve with excessive force may damage it.)
- Turn the stop valve (ϕ1) until the shaft stops and the designated torque is achieved.

4 Tighten the stop valve cover securely by applying the designated torque.



To close the stop valve

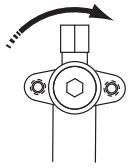
1 Remove the stop valve cover.

2 Insert a hexagon wrench into the stop valve and turn the stop valve clockwise.

3 Turn until the shaft stops by applying the designated torque.
The valve is now closed.

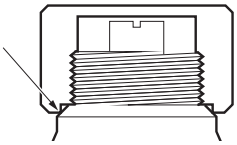
4 Tighten the stop valve cover securely by applying the designated torque.

Closing direction



To handle the stop valve cover

- The stop valve cover is sealed where indicated by the arrow. Do NOT damage it.
- After handling the stop valve, tighten the stop valve cover securely, and check for refrigerant leaks. For the tightening torque, refer to the table below.
- Check for refrigerant leaks after tightening the stop valve cover.



To handle the service port

- Always use a charge hose equipped with a valve depressor pin, since the service port is a Schrader type valve.
- After handling the service port, make sure to tighten the service port cover securely. For the tightening torque, refer to the table below.
- Check for refrigerant leaks after tightening the service port cover.

Table 8: Stop valve size

Model name	RXHWQ120MQTJA
Liquid stop valve	Ø1/2 in. (12.7 mm)
Gas stop valve	Ø1 in. (25.4 mm)

Table 9: Tightening torques

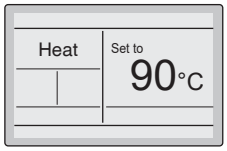
Unit: ft·lbf (N·m)

Stop valve size	Tightening torque (turn clockwise to close)			
	Shaft			
	Valve body	Hexagonal wrench	Cap (valve lid)	Service port
Ø1/2 inch (Ø12.7 mm)	5.97~7.30 (8.1~9.9)	5/32 inch (4 mm)	13.3~16.2 (18.0~22.0)	8.48~10.3 (11.5~13.9)
Ø1 inch (Ø25.4 mm)	19.9~24.3 (27.0~33.0)	5/16 inch (8 mm)	16.6~20.3 (22.5~27.5)	

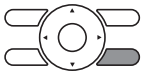
12-4 How to set the maintenance information

From “Service setting” - “Maintenance Contact” on the remote controller, input the contact phone number.

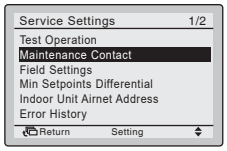
1



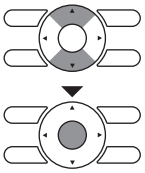
Press and hold Cancel button for 4 seconds or more.
Service settings menu is displayed.



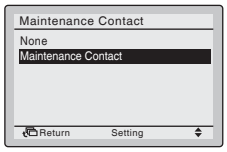
2



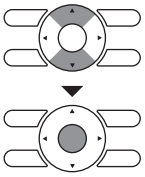
Select Maintenance Contact in the Service Settings menu, and press Menu/OK button.
Maintenance contact screen is displayed.



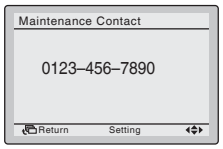
3



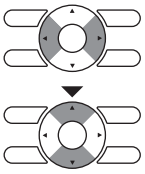
Press ▲▼ (Up/Down) button to select Maintenance Contact and press Menu/OK button.



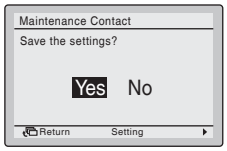
4



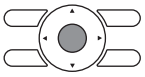
Press ◀▶ buttons to move the highlighted item.
Use ▲▼ (Up/Down) to set the phone number.



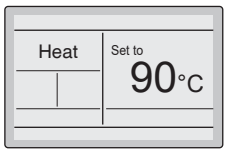
5



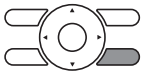
Press Menu/OK button. Setting confirmation screen is displayed.
Select Yes and press Menu/OK button. Setting details are determined and service settings returns.



6



After setting, press Cancel button and return to the basic screen.



Controller kit: BRP26B2VJU

Table of Contents

1. Before installation

This controller kit functions as a hot water storage tank for a hot water generation system by installing it on a hot water storage tank (field supply).

About Mega-Q

Mega-Q is composed of a dedicated heat source unit, cascade unit (RXHWQ120MQTJA, BWLP120TJU) and a controller kit (this kit) to form a hot water generation system. The controller kit cannot be used alone.
For the system configuration, refer to [4-1 Whole system wiring connection example].
This installation manual describes installation of the controller kit.

CAUTION

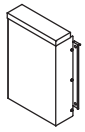
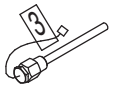
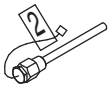
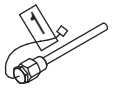
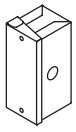
- This document describes the installation of the controller kit.
- For installation of the hot water generation system (heat source unit/cascade unit), refer to the first part of this installation manual.

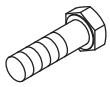
Accessories

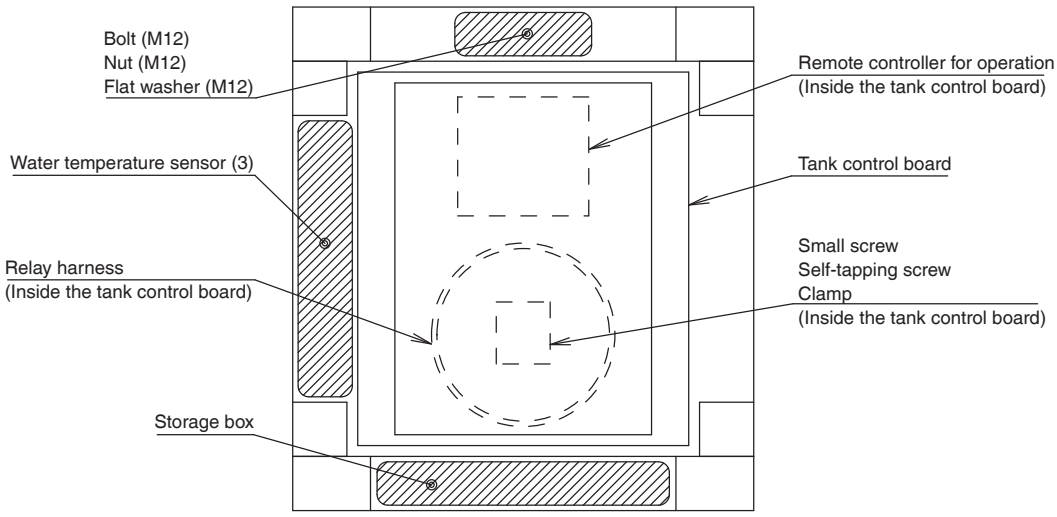
- Check that the required number of the following accessories are included.

NOTE	
⚠	● Accessories are required for installation work. Please keep them safe, and do not lose them. Also, please ask the customer to keep the explanatory documents and the remote controller for operation after the installation work is completed..

<Accessories included in the controller kit>

Name	Tank control board	Water temperature sensor			Storage box	Relay wire harness		
		3 (upper)	2 (middle)	1 (lower)		Water temperature sensor 3 (upper)	Water temperature sensor 2 (middle)	Water temperature sensor 1 (lower)
Quantity	1 pc.	1 pc.	1 pc.	1 pc.	3 pcs.	1 pc.	1 pc.	1 pc.
Shape								

Name	Bolt	Nut	Flat washer	Small screw	Self-tapping screw	Conduit Mounting Plate	Clamps	Remote controller for operation
	M12	M12	M12	M4×8	M4×8	M12		
Quantity	4 pcs.	4 pcs.	4 pcs.	12 pcs.	6 pcs.	2 pcs.	7 pcs.	1 pc.
Shape								



2. Tank control board/water temperature sensor installation position

The hot water storage tank shown in Fig. 1 shows an example of the tank control board and water temperature sensor installation position.
The installation position of the bracket for control board and water temperature sensor depends on the capacity of the hot water storage tank.
* 1 controller kit is required for each 1 hot water storage tank.

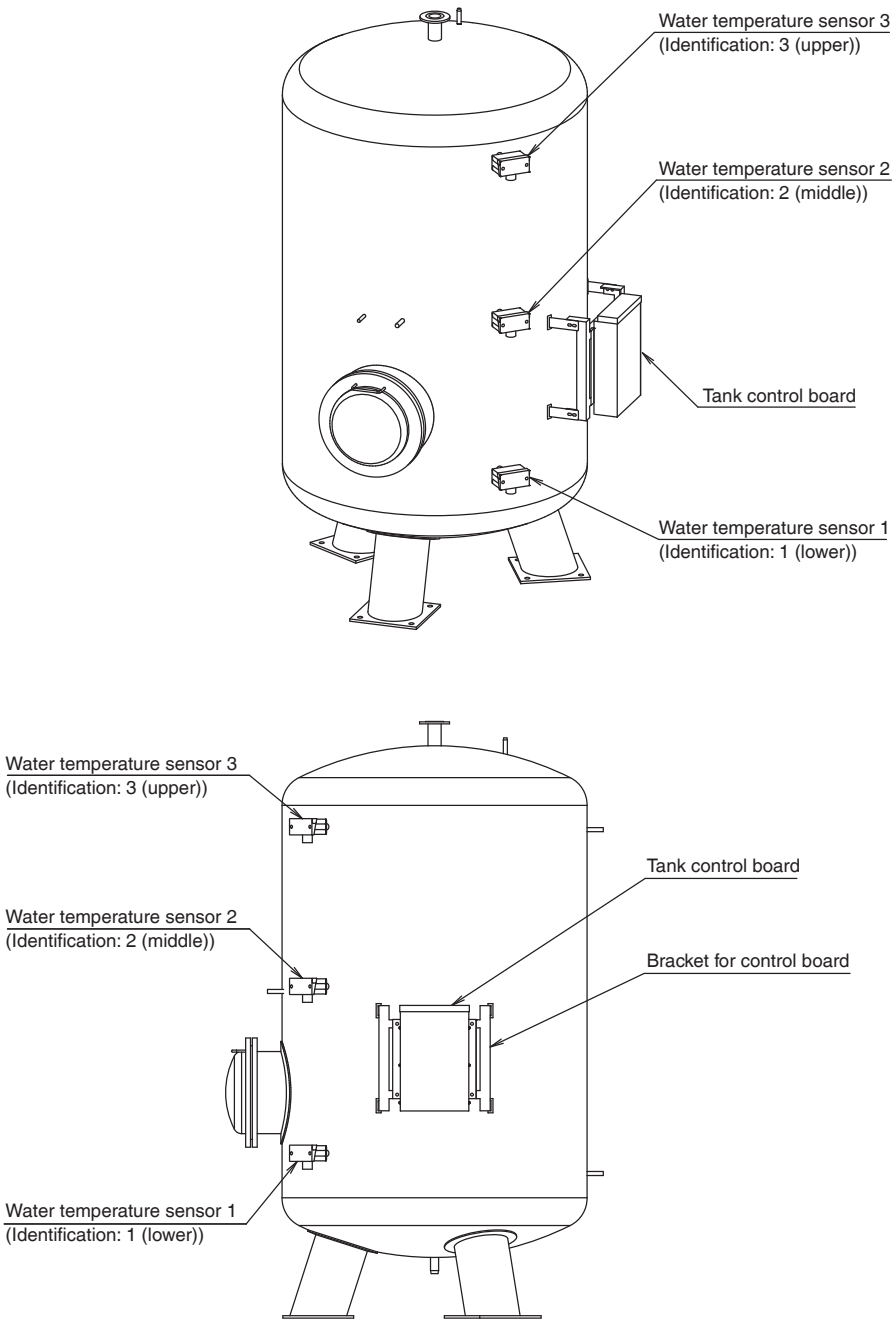
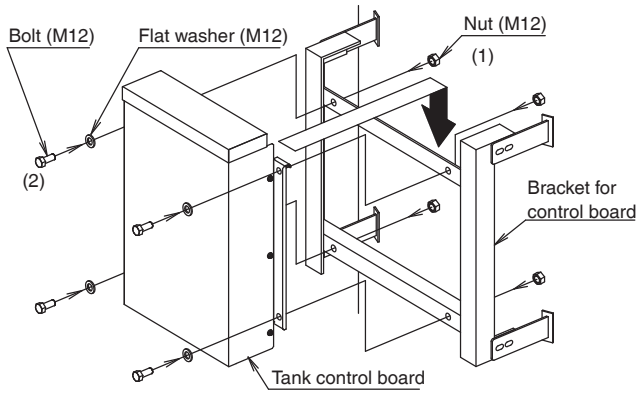


Fig. 1

3. Installation procedure

Installation procedure of tank control board

(1) Secure and install the control kit onto the field supply water storage tank appropriately. (Secure and install the control kit onto the water storage tank appropriately to the field supply tank.)
(2) Install 4 bolts, nuts, and flat washers (M12).



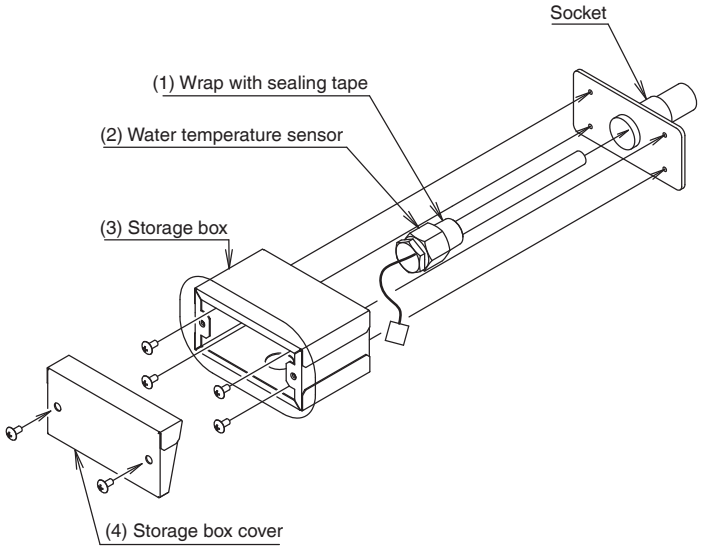
Water temperature sensor and storage box installation procedure

CAUTION

* Be careful with handling these because they are precision instruments. Replace them if they receive a shock such as from dropping.

1. Installing the water temperature sensors inside the hot water storage tank

- Water temperature sensors (3 locations, 1 to 3 (upper, middle, lower))
  (1) Wrap sealing tape around the screw of the water temperature sensor.
  (2) Screw the water temperature sensor into the socket.
  (3) Secure the storage box with screws (M4 × 8, 4 places).
  (4) Secure the storage box cover with screws (self-tapping screw M4 x 8, 2 places).

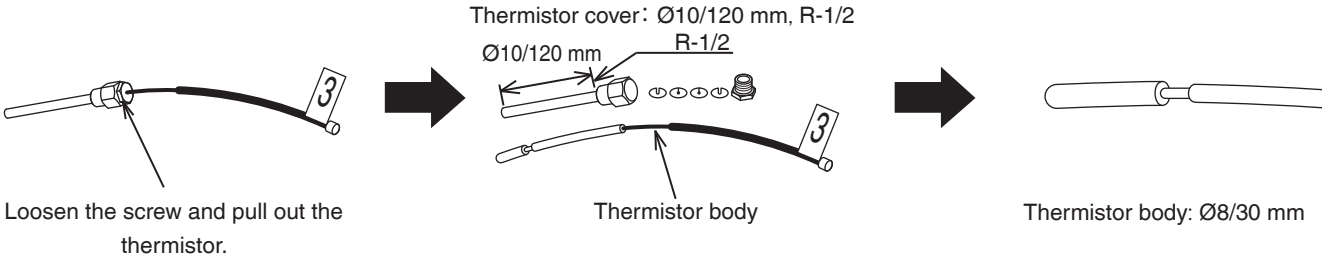


2. Installing the water temperature sensors on the outer wall of the hot water storage tank

⚠ CAUTION	**Precautions when using the thermistor pasted** ● Accurate temperature cannot be detected depending on the wall thickness of the tank. It is necessary to adjust the settings during trial run and after operation. ● Aluminum or SUS tape may come off. It is desirable to insert a thermistor by welding a short pipe to the tank surface.

<Removing the cover from the water temperature sensor>

The thermistor cover is removable so that it can be attached to the outer wall of the tank.



Loosen the screw and pull out the thermistor.

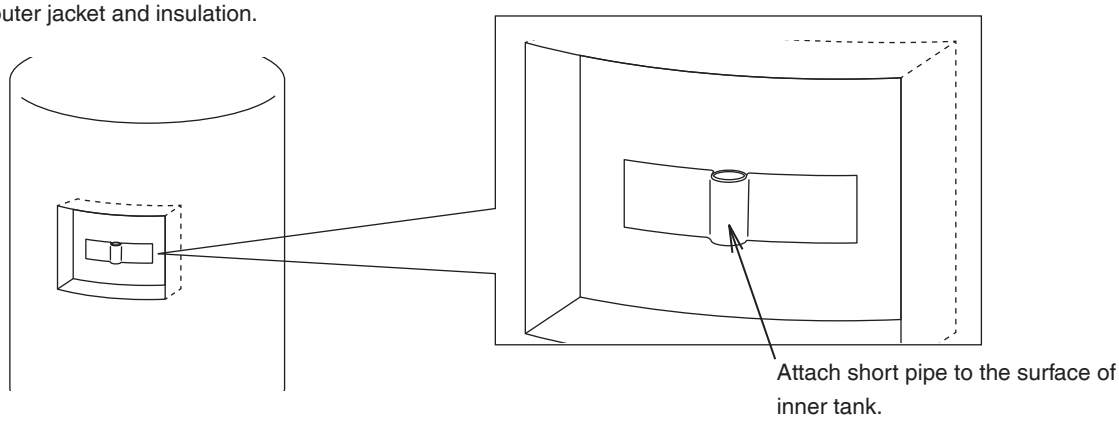
Thermistor body

Thermistor body: Ø8/30 mm

<Attaching the water temperature sensor cover to the wall of the hot water storage tank>

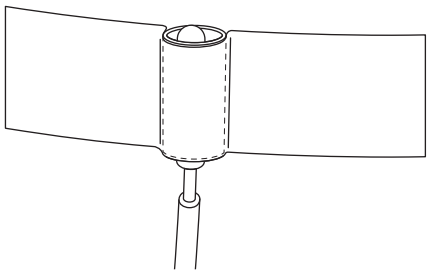
Remove part of insulation material of the hot water storage tank and install the water temperature sensor on the wall of the tank.

1. Cut through outer jacket and insulation.



Attach short pipe to the surface of inner tank.

2. Insert the thermistor to the short pipe.



3. Return the cut outer jacket and insulation material back to the original state.

⚠ CAUTION	● Do not allow the thermistor body to fall. ● Do not allow the attached short pipe to fall. ● Do not allow condensation, entry of water, and adhesion of water to the thermistor body.

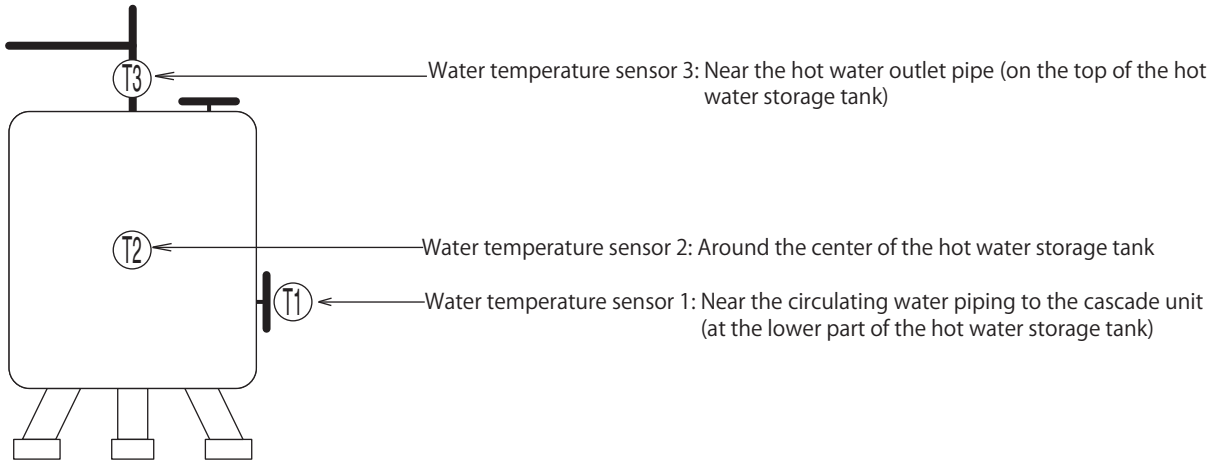
3. Installing the thermister using existing flanges and pipes for fixing water temperature sensor on the hot water storage tank

1. Prepare the thermistor body by removing the cover as described in **Removing the cover from the water temperature sensor** on page 53.

Thermistor body: Ø8/30 mm

2. Attach the thermistor body to an existing flange or pipe.

Thermistor body installation places



Storage Tank

Insulation work

- Pipe insulation thickness provided below are guidelines only. Pipes must be insulated with the appropriate thickness of insulation per applicable local/state or national codes.
- Insulate the hot water storage tank and the water temperature sensor.
  Failure to insulate may cause burns and lower hot water supply temperatures.
- The maximum temperature of the hot water storage tank is about 194°F (90°C).
  Use insulation that is sufficiently heat resistant.
- Be sure to use insulation designed for HVAC equipment.
- In case of outdoor installation in cold regions, use more/stronger insulation.

⚠ CAUTION	● Make sure that no water leaks from the installation part of the socket and water temperature sensor. ● If the water temperature sensor inside the storage box gets wet, it may cause an electric shock/fire.

4. Electrical wiring work

NOTE

- All field wiring and components must be installed by a licensed electrician and must comply with relevant local and national regulations.
- Be sure to use a dedicated power circuit. Never use a power supply shared by another appliance.
- Never install a phase-advancing capacitor. As this unit is equipped with an inverter, installing a phase-advancing capacitor will not only deteriorate power factor improvement effect, but also may cause capacitor abnormal heating accident due to high-frequency waves.
- Only proceed with wiring work after blocking off all power.
- Always ground wires in accordance with relevant local and nationalregulations.
- This machine includes an inverter device. Connect ground and leave charge to eliminate the impact on other devices by reducing noise generated from the inverter device and to prevent leaked current from being charged in the outer shell of the product.
- Do not connect the ground wire to gas pipes, sewage pipes, lightning rods, or telephone ground wires.
  Gas pipes can explode or catch fire if there is a gas leak.
  Sewage pipes: no grounding effect is possible if hard plastic piping is used.
  Telephone ground wires and lightning rods are dangerous when struck by lightning due to abnormal rise in electrical potential in the grounding.
- This equipment can be installed with a Ground-Fault Circuit Breaker (GFCI). Although this is a recognized measure for additional protection, with the grounding system in North America, a dedicated GFCI is not necessary.
- Electrical wiring must be done in accordance with the wiring diagrams attached inside the tank control board and the description herein.
- Do not operate until refrigerant piping work is completed. Operating the unit before completing piping work could cause the compressor to break.
- Never remove a thermistor, sensor or similar parts when connecting power wiring and transmission wiring. (If operated with a thermistor, sensor or similar parts removed, the compressor may be broken down.)
- Never connect the power supply in reverse-phase.The unit cannot operate normally in reverse-phase. If you connect in reverse-phase, replace 2 of the 3 phases.
- Make sure the electrical imbalance ratio is no greater than 2%. If it is larger than this, the unit's lifespan will be reduced. If the ratio exceeds 4%, the unit will shut down and an malfunction code will be displayed on the remote controller.
- Connect the wire securely using designated wire and fix it with attached clamp without applying external pressure on the terminal parts (terminal for power wiring, terminal for transmission wiring and ground terminal).
- If there exists the possibility of reverse-phase, lose phase, momentary blackout or the power goes on and off while the product is operating, attach a reverse-phase protection circuit locally.
  Running the product in reverse-phase may break the compressor and other parts.

4-1 Whole system wiring connection example

Refer to "7. Electrical wiring work" in the "Hot Water Generation System".

4-2 Power circuit, safety device and cable requirements

- Make sure to apply the rated voltage of 208/230 V for unit.
- A power circuit (see Table 1) must be provided for connection of the unit. This circuit must be protected with the required safety devices, i.e. a main switch, a slow blow fuse on each phase.
- When using residual current operated circuit breakers, be sure to use a high-speed type (0.1 second or less) 30 mA rated residual operating current.
- Use copper conductors only.
- Use insulated wire for the power cord.
- Select the power supply cable type and size in accordance with relevant local and national regulations.

NOTE

- Make sure the low voltage wiring (i.e. for the remote controller, between units) and the power wiring do not pass near each other, keeping them at least 2 in. (50 mm) apart.
- Proximity may cause electrical interference, malfunctions, and breakage.
- Be sure to connect the power wiring to the power wiring terminal block and secure it as described in **[4-5 Power supply wiring and ground wiring connection]**.
- Transmission wiring should be secured as described in **[4-4 Transmission wiring connection]**.
- Secure the relay wire harness according to the procedure found in **[4-6 Water temperature sensor connection]**.
- Secure wiring with clamp such as insulation lock ties to avoid contact with piping.
- Shape the wires to prevent the structure such as the control box cover deforming. And close the cover firmly.
- All field wiring is to be procured on site.

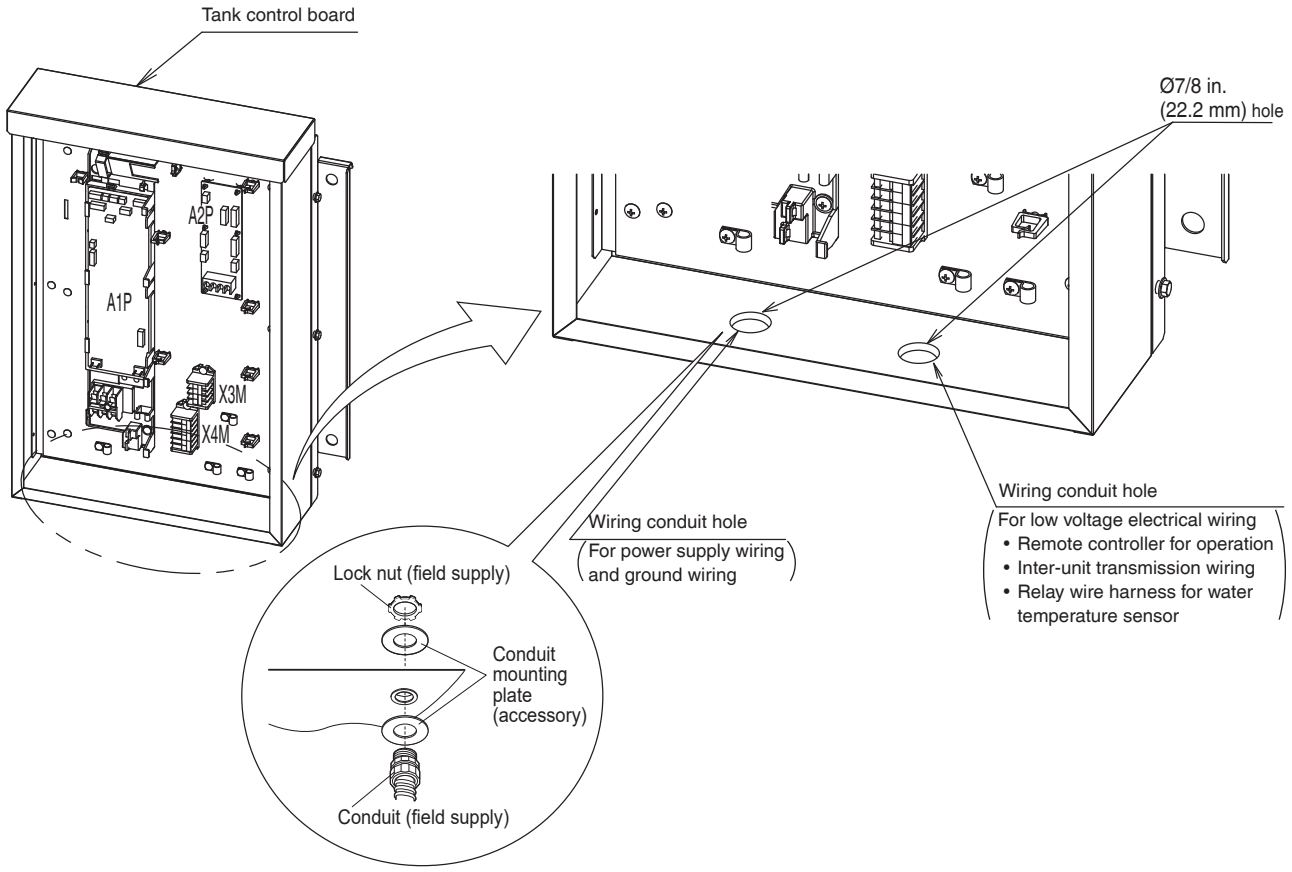
Table 1

Model name	Phase and frequency	Voltage	Minimum circuit amp.	Maximum overcurrent protective device	Transmission line selection
Controller kit BRP26B2VJU	Ø1,60 Hz	208/230 V	5A	15A	AWG18 - AWG16

4-3 Routing the wiring

- Route the power supply wiring, transmission wiring, and sensor relay wire harness to the tank control board.
- When wiring, connect a wiring conduit to the Ø7/8 in. (22.2 mm) hole (for power supply, grounding, and low voltage wiring) at the bottom of the tank control board.
  When working, be careful not to damage the printed circuit board or terminal block inside the tank control board.
- When using residual current operated circuit breakers, be sure to use a high-speed type (0.1 second or less) 30 mA rated residual operating current.
- Make sure to use the specified power wiring when routing, and connect it securely. Also, secure the power wiring to the terminal (local wiring/ground wiring) with the attached clamp so that no external force is applied.

⚠ CAUTION	• When passing the power wiring through the holes, protect it with wiring conduit to prevent the power wiring from being damaged by the edges. • As a measure against invasion by small animals, seal the gap between the tank control board and the wiring conduit with sealing material, putty, etc. (field supply).



4-4 Transmission wiring connection

Referring to Fig. 2, connect the transmission wiring between the cascade unit and the tank control board and between the tank control board and the remote controller for operation.

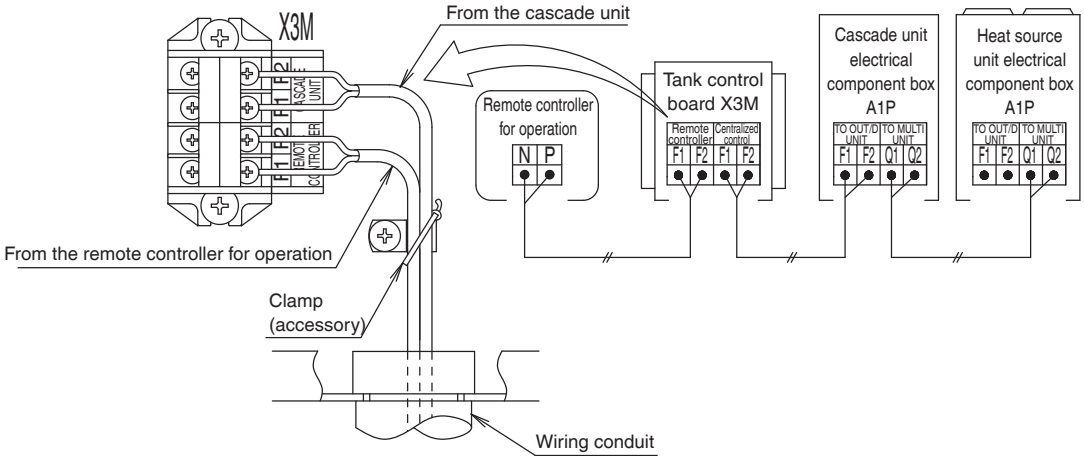


Fig. 2

CAUTION

- The above wiring should be wired using AWG18-16 stranded, nonshielded wiring.
- Never connect the power supply wiring to the transmission wiring terminal. The whole system will be damaged.
- When connecting wires to the terminal block on the printed circuit board, too much heat or tightening could damage the printed circuit board. Attach with care.
  See the table below for the tightening torque of the transmission wiring terminals.

Screw size	Tightening torque (N·m)
M3.5 (A1P)	0.59-0.71 ft·lbf (0.8-0.97 N·m)

- For transmission wiring, please perform wiring within the scope of the following restrictions.
  Exceeding these limits may cause transmission errors.
  Maximum wiring length: 3280 ft. (1000 m) or less
  Total wiring length: 6560 ft. (2000 m) or less
  Maximum number of branches: Up to 8 branches
  Branching after branching is not possible (refer to Fig. 3)

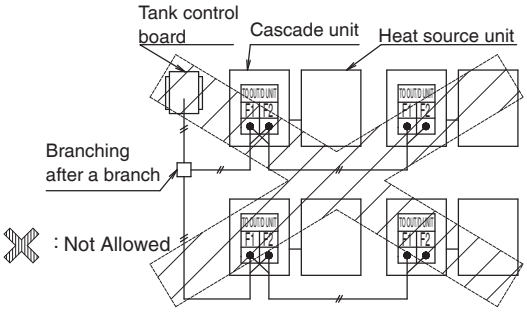


Fig. 3

4-5 Power supply wiring and ground wiring connection

(1) Install an insulation sleeve to the power supply wiring/ground wiring and be sure to connect them to the power supply terminal block.

(2) For the power supply wiring/ground wiring, use the clamp (accessory) to secure them inside the tank control board so that no external force is applied to the terminal, as shown in Fig. 4.

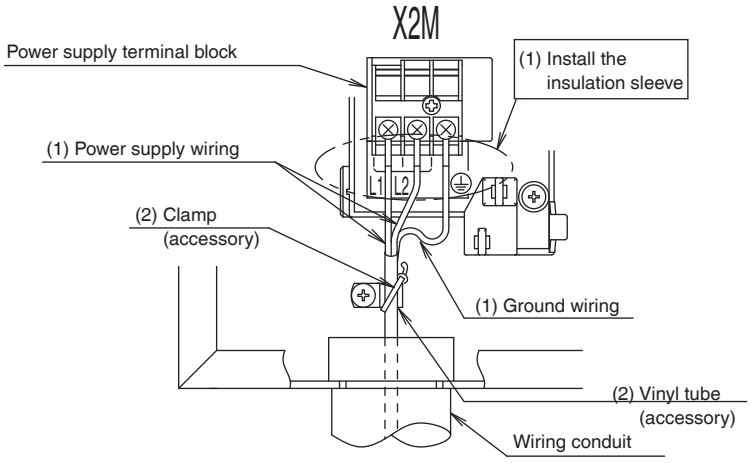


Fig. 4

CAUTION

- Be sure to use ring type crimp style terminals (field supply) for connection. Also, insulate the crimping part by installing an insulation sleeve (field supply). (Refer to Fig. 5)
- Securely connect using the specified power wiring, and secure it so that no external force is applied to the terminal.
- Be sure to perform ground wiring.
  Insufficient ground wiring contact may cause the grounding effect to be lost.
- Tighten the terminal screws using an appropriate screwdriver.
  A screwdriver with a head of an improper size will strip the screw heads and make proper tightening impossible.
- Over-tightening terminal screws can damage them.
  Refer to Table 2 for the tightening torque of the power supply terminal screw/ground terminal screw.

Table 2

Screw size	Tightning torque
M4 Power terminal	4.06-5.38 ft·lbs (5.5-7.3 N·m)
M4 Ground terminal	4.06-5.38 ft·lbs (5.5-7.3 N·m)

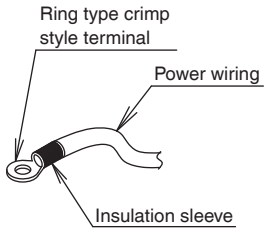


Fig. 5

- Do not solder-finish stranded wire before using.

4-6 Water temperature sensor connection

<Tank control board>

(1) Connect the water temperature sensor relay wire harness (accessory, 3 pcs.) to the printed circuit board (A1P) (3 places) on the tank control board.
Match the printed circuit board and relay wire harness connector colors according to the [Wiring identification table].

[Wiring identification table]

Device number No.	Device name	Tank control board	Relay wire harness		Device (sensor)
		Printed circuit board connector	Printed circuit board side connector	Device side connector	Connector
R1T	Water temperature sensor 1	Color: White (X13A) (A1P)	Color: White	Color: White Identification label: 1 (lower)	Color: White Identification label: 1 (lower)
R2T	Water temperature sensor 2	Color: Yellow (X17A) (A1P)	Color: Yellow	Color: White Identification label: 2 (middle)	Color: White Identification label: 2 (middle)
R3T	Water temperature sensor 3	Color: Red (X18A) (A1P)	Color: Red	Color: White Identification label: 3 (upper)	Color: White Identification label: 3 (upper)

(2) Pass the relay wire harness through the wire clip.

(3) For the relay wire harness, secure the clamp (accessory) as shown in Fig. 6 so that no external force is applied to the connector.

CAUTION

- When installing the tank control board cover, be careful not to pinch any of the wiring.

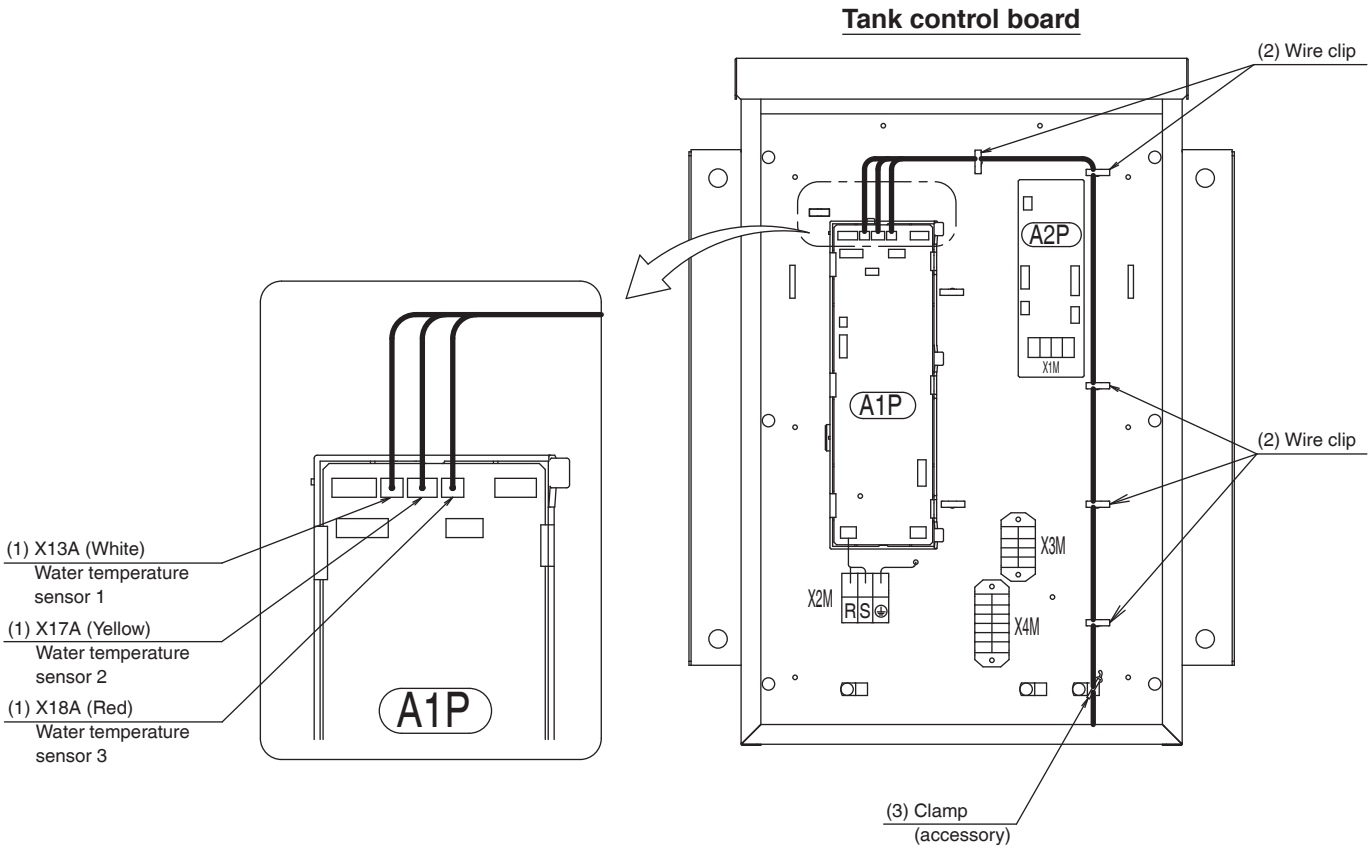


Fig. 6

<Hot water storage tank (field supply)>

(4) Connect the relay wire harness and the water temperature sensor (3 places).

- Match the identification number of the relay wire harness connector with the identification number of the device side connector according to [Wiring identification table].

CAUTION	● When connecting to the relay wire harness, be sure to match the identification label number. If connected incorrectly, hot water supply operation will not be possible. ● Put the connector part of the relay wire harness in the storage box.

(5) Use wiring conduit from the tank control board to the water temperature sensor storage box.

- Refer to Fig. 7 for the layout of the wiring conduit.
- If there is excess wiring, bundle it and put it inside the tank control board or storage box.
- Length of the relay wire harness of the water temperature sensor is as follows.

  For Water temperature sensor 3 (upper): 18.3 ft. (5.6 m)

  For Water temperature sensor 2 (middle): 14.1 ft. (4.3 m)

  For Water temperature sensor 1 (lower): 9.8 ft. (3.0 m)

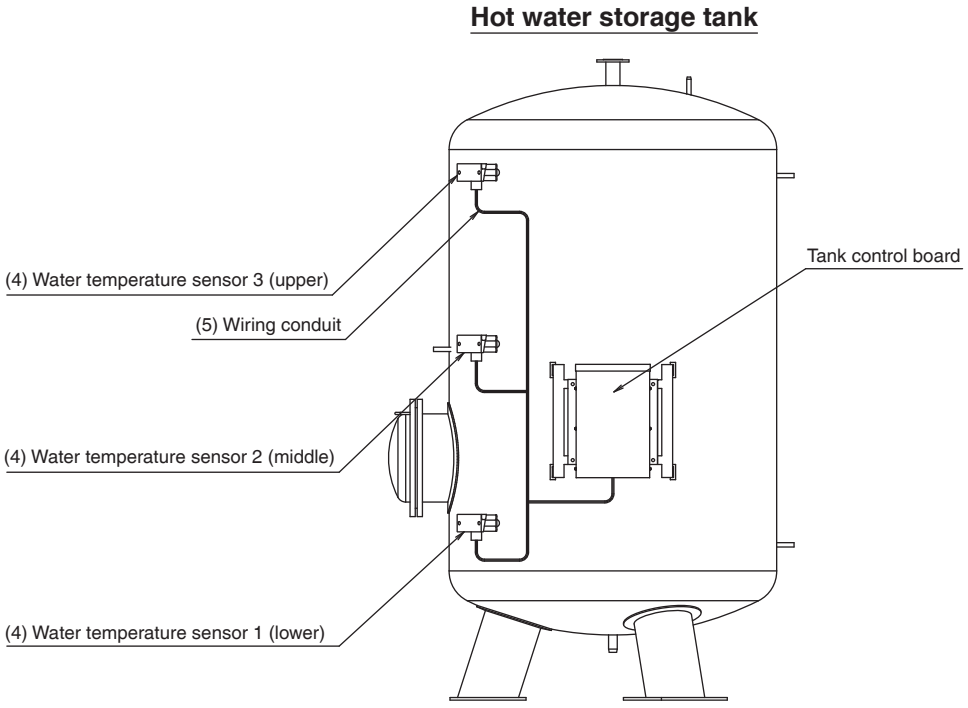


Fig. 7

5. Checking equipment and installation status

To the electrician

- Is there mis-wiring of the transmission wiring, or any loose screws? → Refer to **[4-4 Transmission wiring connection]**.
- Is there mis-wiring of the power supply wiring, or any loose screws? → Refer to **[4-5 Power supply wiring and ground wiring connection]**.
- Is the electrical insulation of the main power supply circuit reduced? → Use a 500V DC insulation resistance tester for measurement.

Prohibited Do not use an insulation resistance tester on low voltage circuits.

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