<ORIGINAL>

MITSUBISHI ELECTRIC

Hot Water Heat Pump Unit CRHV

Installation/Operation Manual

CRHV-P600YA-HPB

CONTENTS

Thoroughly read this manual prior to use.
Save this manual for future reference.
Some of the items in this manual may not apply to made-to-order units.
Make sure that this manual is passed on to the end users.

Safety Precautions

- Thoroughly read the following safety precautions prior to use.
- Observe these precautions carefully to ensure safety.

⚠ **WARNING**	Indicates a risk of death or serious injury
⚠ **CAUTION**	Indicates a risk of injury or structural damage
⚠ **IMPORTANT**	Indicates a risk of damage to the unit or other components in the system

All electric work must be performed by personnel certified by Mitsubishi Electric.

General

⚠ WARNING

Do not use refrigerant other than the type indicated in the manuals provided with the unit and on the nameplate.

- Doing so may cause the unit or pipes to burst, or result in explosion or fire during use, during repair, or at the time of disposal of the unit.
- It may also be in violation of applicable laws.
- MITSUBISHI ELECTRIC CORPORATION cannot be held responsible for malfunctions or accidents resulting from the use of the wrong type of refrigerant.

Do not install the unit in a place where large amounts of oil, steam, organic solvents, or corrosive gases, such as sulfuric gas, are present or where acidic/alkaline solutions or sprays containing sulfur are used frequently.

These substances can compromise the performance of the unit or cause certain components of the unit to corrode, which can result in refrigerant leakage, water leakage, injury, electric shock, malfunctions, smoke, or fire.

Do not try to defeat the safety features of the unit or make unauthorized setting changes.

Forcing the unit to operate the unit by defeating the safety features of the devices such as the pressure switch or the temperature switch, making unauthorized changes to the switch settings, or using accessories other than the ones recommended by Mitsubishi Electric may result in smoke, fire, or explosion.

To reduce the risk of fire or explosion, do not use volatile or flammable substances as a heat carrier.

To reduce the risk of burns or electric shock, do not touch exposed pipes and wires.

To reduce the risk of shorting, current leakage, electric shock, malfunctions, smoke, or fire, do not splash water on electric parts.

To reduce the risk of electric shock, malfunctions, smoke or fire, do not operate the switches/buttons or touch other electrical parts with wet hands.

To reduce the risk of burns or frost bites, do not touch the refrigerant pipes or refrigerant circuit components with bare hands during and immediately after operation.

Before cleaning the unit, switch off the power. (Unplug the unit, if it is plugged in.)

To reduce the risk of injury, keep children away while installing, inspecting, or repairing the unit.

Children should be supervised to ensure that they do not play with the appliance.

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.

Keep the space well ventilated. Refrigerant can displace air and cause oxygen starvation.

If leaked refrigerant comes in contact with a heat source, toxic gas may be generated.

Always replace a fuse with one with the correct current rating.

The use of improperly rated fuses or a substitution of fuses with steel or copper wire may result in fire or explosion.

If any abnormality (e.g., burning smell) is noticed, stop the operation, turn off the power switch, and consult your dealer.

Continuing the operation may result in electric shock, malfunctions, or fire.

Properly install all required covers and panels on the terminal box and control box to keep moisture and dust out.

Dust accumulation and water may result in electric shock, smoke, or fire.

Consult an authorized agency for the proper disposal of the unit.

Refrigerant oil and refrigerant that may be left in the unit pose a risk of fire, explosion, or environmental pollution.

⚠ CAUTION

To reduce the risk of fire or explosion, do not place flammable materials or use flammable sprays around the unit.

Do not operate the unit without panels and safety guards properly installed.

To reduce the risk of injury, do not sit, stand, or place objects on the unit.

Do not connect the makeup water pipe directly to the potable water pipe. Use a cistern tank between them.

Connecting these pipes directly may cause the water in the unit to migrate into the potable water and cause health problems.

Do not install the unit on or over things that are vulnerable to water damage.

Condensation may drip from the unit.

The model of heat pump unit described in this manual is not intended for use to preserve food, animals, plants, precision instruments, or art work.

Do not place a container filled with water on the unit.

If water spills on the unit, it may result in shorting, current leakage, electric shock, malfunction, smoke, or fire.

Always wear protective gears when touching electrical components on the unit.

Several minutes after the power is switched off, residual voltage may still cause electric shock.

To reduce the risk of injury, wear protective gear when working on the unit.

Do not release refrigerant into the atmosphere. Collect and reuse the refrigerant, or have it properly disposed of by an authorized agency.

Refrigerant poses environmental hazards if released into the air.

To prevent environmental pollution, dispose of brine in the unit and cleaning solutions according to the local regulations.

It is punishable by law not to dispose of them according to the applicable laws.

The water heated by the heat pump is not suitable for use as drinking water or for cooking.

It may cause health problems or degrade food.

In areas where temperature drops to freezing during the periods of non-use, blow the water out of the pipes or fill the pipes with anti-freeze solution.

Not doing so may cause the water to freeze, resulting in burst pipes and damage to the unit or the furnishings.

In areas where temperature drops to freezing, use an anti-freeze circuit and leave the main power turned on to prevent the water in the water circuit from freezing and damaging the unit or causing water leakage and resultant damage to the furnishings.

Use clean tap water.

The use of acidic or alkaline water or water high in chlorine may corrode the unit or the pipes, causing water leakage and resultant damage to the furnishings.

In areas where temperature can drop low enough to cause the water in the pipes to freeze, operate the unit often enough to prevent the water from freezing.

Frozen water in the water circuit may cause the water to freeze, resulting in burst pipes and damage to the unit or the furnishings.

Periodically inspect and clean the water circuit.

Dirty water circuit may compromise the unit's performance or corrodes the unit or cause water leakage and resultant damage to the furnishings.

Ensure that the flow rate of the feed-water is within the permitted range.

If the flow rate exceeds the permitted range, the unit may become damaged due to corrosion.
Furniture may become wet due to water leaks.

Transportation

⚠ WARNING

Lift the unit by placing the slings at designated locations. Support the outdoor unit securely at four points to keep it from slipping and sliding.

If the unit is not properly supported, it may fall and cause personal injury.

⚠ CAUTION

To reduce the risk of injury, do not carry the product by the PP bands that are used on some packages.

To reduce the risk of injury, products weighing 20 kg or more should be carried by two or more people.

Installation

⚠ WARNING

Do not install the unit where there is a risk of leaking flammable gas.

If flammable gas accumulates around the unit, it may ignite and cause a fire or explosion.

Properly dispose of the packing materials.

Plastic bags pose suffocation hazard to children.

The unit should be installed only by personnel certified by Mitsubishi Electric according to the instructions detailed in the Installation/Operation Manual.

Improper installation may result in refrigerant leakage, water leakage, injury, electric shock, or fire.

Periodically check the installation base for damage.

If the unit is left on a damaged base, it may fall and cause injury.

Remove packing materials from the unit before operating the unit. Note that some accessories may be taped to the unit. Properly install all accessories that are required.

Failing to remove the packing materials or failing to install required accessories may result in refrigerant leakage, oxygen starvation, smoke, or fire.

Consult your dealer and take appropriate measures to safeguard against refrigerant leakage and resultant oxygen starvation. An installation of a refrigerant gas detector is recommended.

Any additional parts must be installed by qualified personnel. Only use the parts specified by Mitsubishi Electric.

Take appropriate safety measures against wind gusts and earthquakes to prevent the unit from toppling over and causing injury.

Be sure to install the unit horizontally, using a level.

If the unit is installed at an angle, it may fall and cause injury or cause water leakage.

The unit should be installed on a surface that is strong enough to support its weight.

As an anti-freeze, use ethylene glycol or propylene glycol diluted to the specified concentration.

The use of other types of anti-freeze solution may cause corrosion and resultant water leakage. The use of flammable anti-freeze may cause fire or explosion.

Pipe installation

⚠ WARNING

To prevent explosion, do not heat the unit with refrigerant gas in the refrigerant circuit.

Check for refrigerant leakage at the completion of installation.

If leaked refrigerant comes in contact with a heat source, toxic gas may be generated.

⚠ CAUTION

Check that no substance other than the specified refrigerant (R410A) is present in the refrigerant circuit.

Infiltration of other substances may cause the pressure to rise abnormally high and cause the pipes to explode.

To keep the ceiling and floor from getting wet due to condensation, properly insulate the pipes.

Piping work should be performed by the dealer or qualified personnel according to the instructions detailed in the Installation Manual.

Improper piping work may cause water leakage and damage the furnishings.

To keep the ceiling and floor from getting wet due to condensation, properly insulate the pipes.

Electrical wiring

To reduce the risk of wire breakage, overheating, smoke, and fire, keep undue force from being applied to the wires.

Properly secure the cables in place and provide adequate slack in the cables so as not to stress the terminals.

Improperly connected cables may break, overheat, and cause smoke or fire.

To reduce the risk of injury or electric shock, switch off the main power before performing electrical work.

All electric work must be performed by a qualified electrician according to the local regulations, standards, and the instructions detailed in the Installation Manual.

Capacity shortage to the power supply circuit or improper installation may result in malfunction, electric shock, smoke, or fire.

To reduce the risk of electric shock, smoke, or fire, install an inverter circuit breaker on the power supply to each unit.

Use properly rated breakers and fuses (inverter breaker, Local Switch <Switch + Type-B fuse>, or no-fuse breaker).

The use of improperly rated breakers may result in malfunctions or fire.

To reduce the risk of current leakage, overheating, smoke, or fire, use properly rated cables with adequate current carrying capacity.

Keep the unsheathed part of cables inside the terminal block.

If unsheathed part of the cables come in contact with each other, electric shock, smoke, or fire may result.

Proper grounding must be provided by a licensed electrician. Do not connect the grounding wire to a gas pipe, water pipe, lightning rod, or telephone wire.

Improper grounding may result in electric shock, smoke, fire, or malfunction due to electrical noise interference.

⚠ CAUTION

To reduce the risk of current leakage, wire breakage, smoke, or fire, keep the wiring out of contact with the refrigerant pipes and other parts, especially sharp edges.

To reduce the risk of electric shock, shorting, or malfunctions, keep wire pieces and sheath shavings out of the terminal block.

Transportation and repairs

⚠ WARNING

The unit should be moved, disassembled, or repaired only by qualified personnel. Do not alter or modify the unit.

Improper repair or unauthorized modifications may result in refrigerant leakage, water leakage, injury, electric shock, or fire.

After disassembling the unit or making repairs, replace all components as they were.

Failing to replace all components may result in injury, electric shock, or fire.

If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

⚠ CAUTION

To reduce the risk of shorting, electric shock, fire, or malfunction, do not touch the circuit board with tools or with your hands, and do not allow dust to accumulate on the circuit board.

IMPORTANT

To avoid damage to the unit, use appropriate tools to install, inspect, or repair the unit.

To reduce the risk or malfunction, turn on the power at least 12 hours before starting operation, and leave the power turned on throughout the operating season.

Recover all refrigerant from the unit.

It is punishable by law to release refrigerant into the atmosphere.

Do not unnecessarily change the switch settings or touch other parts in the refrigerant circuit.

Doing so may change the operation mode or damage the unit.

To reduce the risk of malfunctions, use the unit within its operating range.

Do not switch on or off the main power in a cycle of shorter than 10 minutes.

Short-cycling the compressor may damage the compressor.

To maintain optimum performance and reduce the risk of malfunction, keep the air pathway clear.

To reduce the risk of both the breaker on the product side and the upstream breaker from tripping and causing problems, split the power supply system or provide protection coordination between the earth leakage breaker and no-fuse breaker.

When servicing the refrigerant, open and close the check joint using two spanners, as there is the risk of refrigerant leaking due to damaged piping.

Please build the hot water and heat source fluid circuit so that it is a closed system.

Do not use hot water directly for showers or other applications.
Do not allow other heat source liquids to mix with the hot water and heat source fluid circuit.

To ensure proper operation of the unit, periodically check for proper concentration of anti-freeze.

Inadequate concentration of anti-freeze may compromise the performance of the unit or cause the unit to abnormally stop.

Take appropriate measures against electrical noise interference when installing the air conditioners in hospitals or facilities with radio communication capabilities.

Inverter, high-frequency medical, or wireless communication equipment as well as power generators may cause the air conditioning system to malfunction. Air conditioning system may also adversely affect the operation of these types of equipment by creating electrical noise.

Check the water system, using a relevant manual as a reference.

Using the system that does not meet the standards (including water quality and water flow rate) may cause the water pipes to corrode.

To reduce the risk of power capacity shortage, always use a dedicated power supply circuit.

Have a backup system, if failure of the unit has a potential for causing significant problems or damages.

This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.

1. Selecting the Installation Site

[1] Installation Conditions

Select the installation site in consultation with the client.

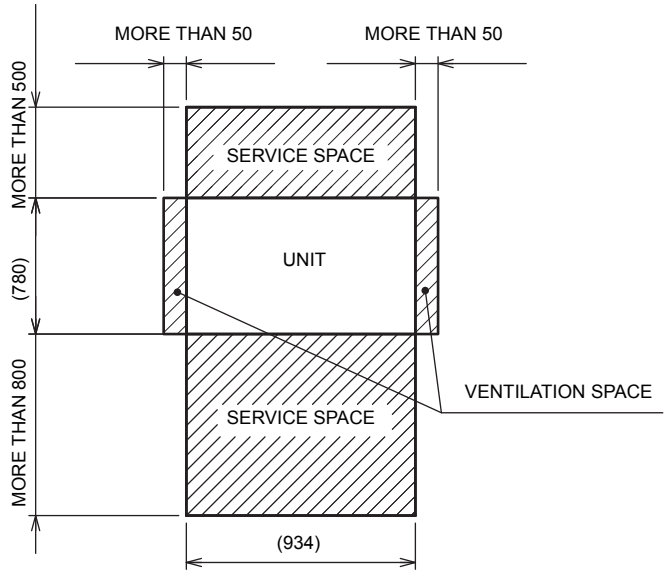
This product is for indoor use only. Do not install it outdoors.

Select a site to install the unit that meets the following conditions:

- The unit will not be subject to heat from other heat sources.
- The noise from the unit will not be a problem.

<PLAN>

SERVICE SPACE

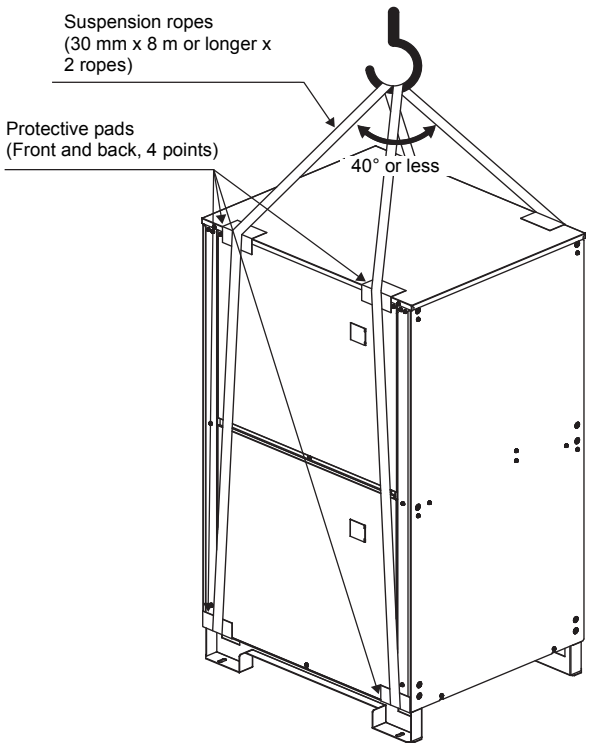


2. Unit Installation

Units should be installed only by personnel certified by Mitsubishi Electric.

[1] Product suspension method

- If transporting the product suspended, feed rope under the unit and use the two suspension sections at the front and rear.
- Always feed rope through the four suspension sections so that the unit is not subjected to shocks.
- Keep the rope angle at 40° or less as shown in the image at right.
- Use two ropes that are 8 m or longer.
- Use suspension equipment that is capable of supporting the weight of the product.
- Always suspend the product in four sections. (do not suspend the product two sections as this is dangerous)
- Use the appropriate protective pads to ensure that the rope does not rub against the outer panel.



⚠ Warning:

- **To reduce the risk of injury, do not carry the product by the PP bands that are used on some packages.**
- **Do not carry products that exceed the specified weight by yourself. Doing so may cause injury.**
- **Lift the unit by placing the slings at designated locations. Support the Hot water Heat pump unit securely at four points to keep it from slipping and sliding. If the unit is not properly supported, it may fall and cause personal injury.**
- **Properly dispose of the packing materials. Tear up the packing materials that potentially pose suffocation hazards.**

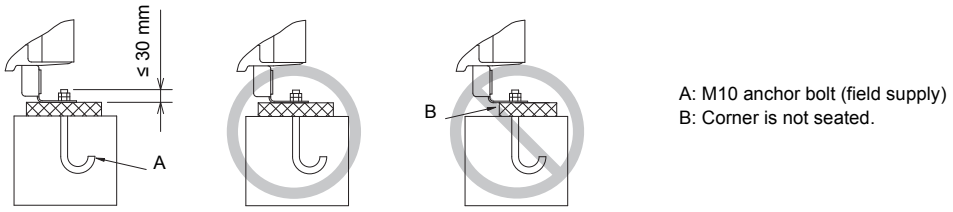
[2] Installation on foundation

- Securely fix the unit with bolts to keep the unit from falling down during earthquakes.
- Install the unit on a foundation made of concrete or iron.
- Noise and vibrations from the unit may be transmitted through the floor and walls. Provide adequate protection against noise and vibration.
- Build the foundation in such way that the corners of the installation legs are securely supported as shown in the figure below. When using rubber vibration isolators, make sure they are large enough to cover the entire width of the unit's legs. If the corners of the legs are not firmly seated, the legs may bend.
- The projecting length of the anchor bolt should be less than 30 mm.
- This unit is not designed to be installed using hole-in anchor bolts unless brackets are used to support the four corners of the unit.

⚠ Warning:

- **Be sure to install the unit on a surface strong enough to withstand its weight to keep the unit from falling down and causing injury.**
- **Provide adequate protection against earthquakes. Improper installation may cause the unit to fall down, resulting in personal injury.**

When building the foundation, take the floor strength, and piping and wiring routes into consideration.

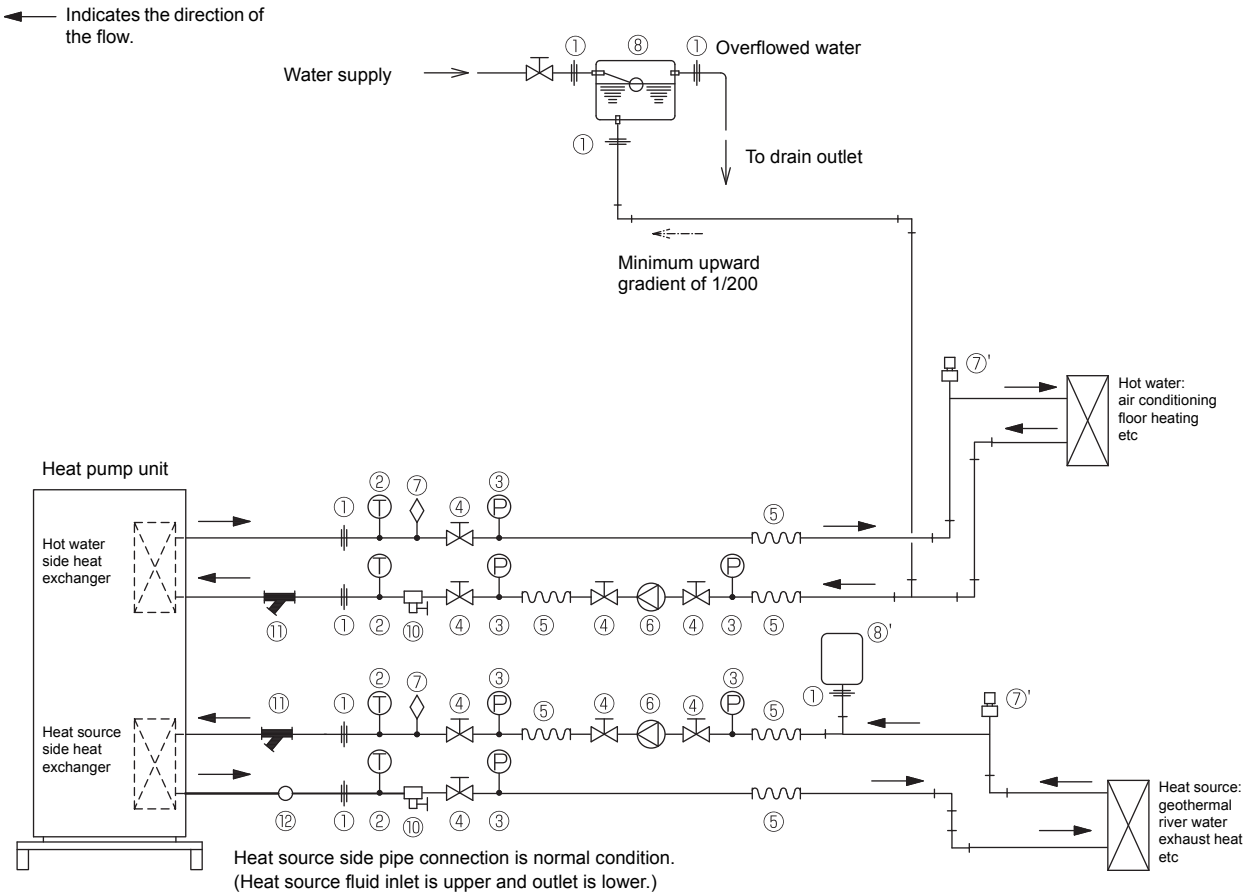


A: M10 anchor bolt (field supply)
B: Corner is not seated.

3. Water Pipe Installation

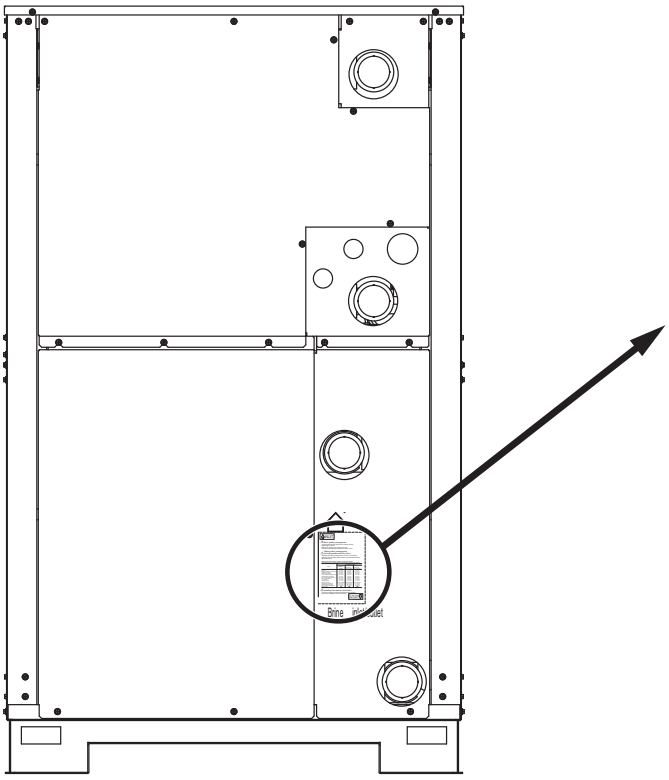
[1] Schematic Piping Diagram and Piping System Components

Please build the hot water and heat source fluid circuit so that it is a closed system.
Do not use hot water directly for showers or other applications. Do not allow other heat source liquids to mix with the hot water and heat source fluid circuit.

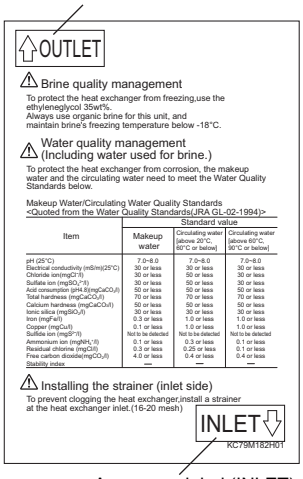


①	Union joints/flange joints	Required to allow for a replacement of equipment.
②	Thermometer	Required to check the performance and monitor the operation of the units.
③	Water pressure gauge	Recommended for checking the operation status.
④	Valve	Required to allow for a replacement or cleaning of the flow adjuster.
⑤	Flexible joint	Recommended to prevent the noise and vibration from the pump from being transmitted.
⑥	Pump	Use a pump that is large enough to compensate for the total water pressure loss and supply sufficient water to the unit.
⑦	Air vent valve	Install air venting valves to the places where air can accumulate. Automatic air vent valves (such as ⑦') are effective.
⑧	Expansion tank	Install an expansion tank to accommodate expanded water and to supply water.
⑧'	Closed expansion tank	Use a closed expansion tank to help manage the concentration of brine.
⑨	Water pipe	Use pipes that allow for easy air purging, and provide adequate insulation.
⑩	Drain valve	Install drain valves so that water can be drained for servicing.
⑪	Strainer	Install a strainer near the unit to keep foreign materials from entering the water-side head exchanger (supplied).
⑫	Flow switch	Required to protect the unit.

* Connect the heat source piping in reverse if the inlet temperature of heat source fluid is 27 °C or more.
(heat source fluid inlet is lower side, outlet is upper side) Install the attached label as shown below if the heat source fluid is connected in reverse.



Accessory label (OUTLET)



Accessory label (INLET)

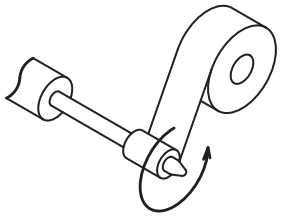
[2] Water piping attachment method

Applying sealant

Apply some sealant to the coupling screws.

When applying liquid sealant, use a brush.

Do not let the liquid sealant peel off and reach into the water circuit during installation or operation.

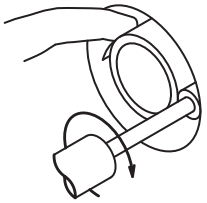


When using sealing tape, wrap the sealing tape around the coupling screws by following the procedures below.

① Wrap sealing tape around the tip of a screwdriver approximately 23 times*, then cut the tape.
(*equivalent to the length sufficient to wrap around the coupling screws three times)

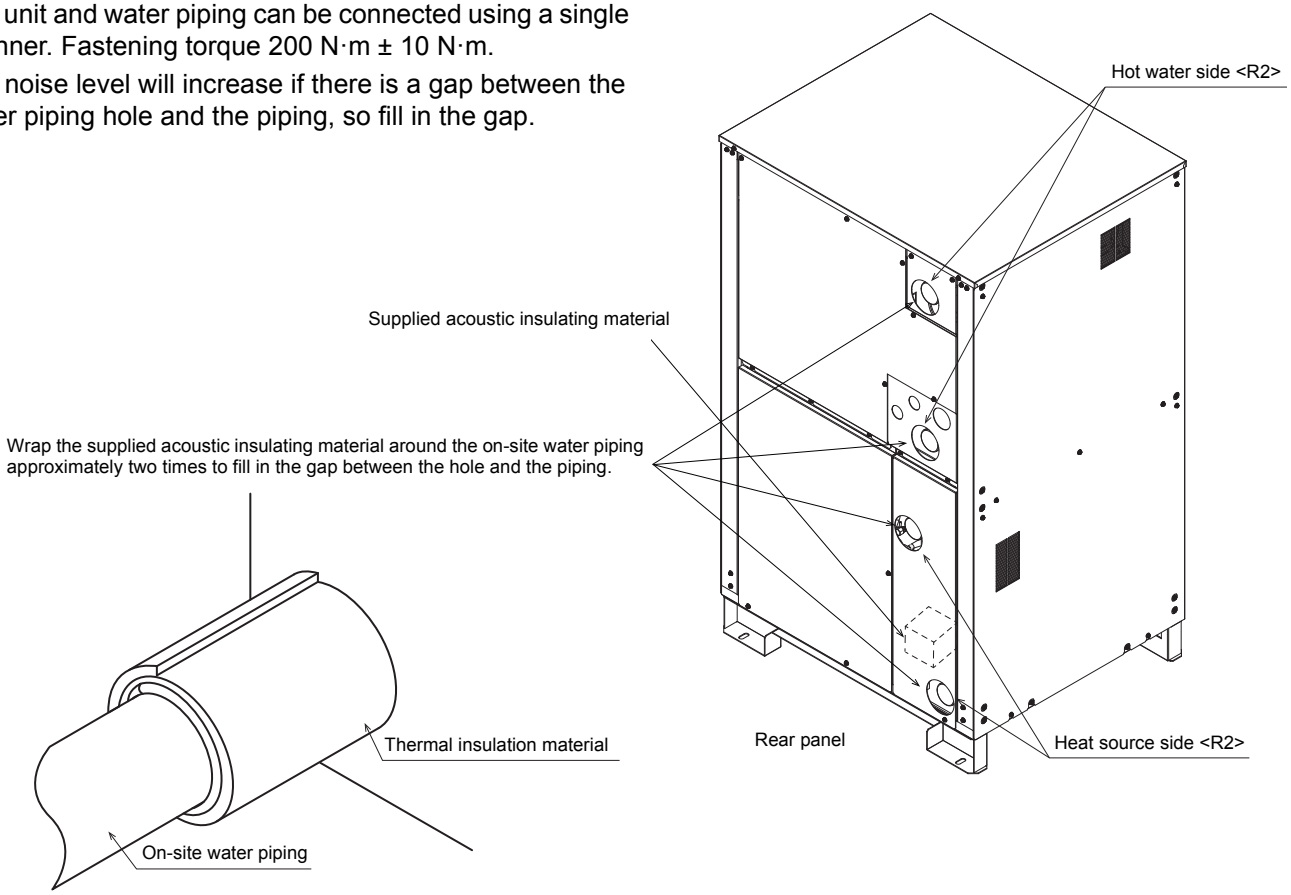
② Attach the end of the sealing tape to the coupling screws, hold it with a finger, and wrap the sealing tape around the coupling screws, gradually turning the screwdriver to unwrap the tape from the screwdriver.

⚠ Wear protective gloves



To reduce the risk of injury from metal sheet edges, wear protective gloves.

- The unit and water piping can be connected using a single spanner. Fastening torque 200 N·m ± 10 N·m.
- The noise level will increase if there is a gap between the water piping hole and the piping, so fill in the gap.



[3] Notes on Pipe Corrosion

Water treatment and water quality control

Poor-quality circulating water can cause the water-side heat exchanger to scale up or corrode, reducing heat-exchange performance. Properly control the quality of the circulating water.

- Removing foreign objects and impurities in the pipes
  During installation, keep foreign objects, such as welding and sealant fragments and rust, out of the pipes.

- Water Quality Control

(1) Poor-quality water can corrode or scale up the heat exchanger. Regular water treatment is recommended.
Water circulation systems using open heat storage tanks are particularly prone to corrosion.
When using an open heat storage tank, install a water-to-water heat exchanger, and use a closed-loop circuit. If a water supply tank is installed, keep contact with air to a minimum, and keep the level of dissolved oxygen in the water no higher than 1 mg/ℓ.

(2) Water quality standard

Items			Lower mid-range temperature water system Water Temp. ≤ 60ºC		Higher mid-range temperature water system Water Temp. > 60ºC		Tendency	
			Recirculating water	Make-up water	Recirculating water	Make-up water	Corrosive	Scale-forming
Standard items	pH (25˚C)		7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	○	○
	Electric conductivity	(mS/m) (25˚C)	30 or less	30 or less	30 or less	30 or less	○	○
		(μs/cm) (25˚C)	[300 or less]	[300 or less]	[300 or less]	[300 or less]		
	Chloride ion	(mg Cl^-/ℓ)	50 or less	50 or less	30 or less	30 or less	○	
	Sulfate ion	(mg $SO4^{2-}$/ℓ)	50 or less	50 or less	30 or less	30 or less	○	
	Acid consumption (pH4.8)	(mg $CaCO_3$/ℓ)	50 or less	50 or less	50 or less	50 or less		○
	Total hardness	(mg $CaCO_3$/ℓ)	70 or less	70 or less	70 or less	70 or less		○
	Calcium hardness	(mg $CaCO_3$/ℓ)	50 or less	50 or less	50 or less	50 or less		○
	Ionic silica	(mg SiO_2/ℓ)	30 or less	30 or less	30 or less	30 or less		○
Reference items	Iron	(mg Fe/ℓ)	1.0 or less	0.3 or less	1.0 or less	0.3 or less	○	○
	Copper	(mg Cu/ℓ)	1.0 or less	1.0 or less	1.0 or less	1.0 or less	○	
	Sulfide ion	(mg S^{2-}/ℓ)	Not to be detected	Not to be detected	Not to be detected	Not to be detected	○	
	Ammonium ion	(mg NH_4^+/ℓ)	0.3 or less	0.1 or less	0.1 or less	0.1 or less	○	
	Residual chlorine	(mg Cl/ℓ)	0.25 or less	0.3 or less	0.1 or less	0.3 or less	○	
	Free carbon dioxide	(mg CO_2/ℓ)	0.4 or less	4.0 or less	0.4 or less	4.0 or less	○	
	Ryzner stability index		—	—	—	—	○	○

Reference: Guideline of Water Quality for Refrigeration and Air Conditioning Equipment. (JRA GL02E-1994)

(3) Please consult with a water quality control specialist about water quality control methods and water quality calculations before using anti-corrosive solutions for water quality management.

(4) When replacing an air conditioner (including when only the heat exchanger is replaced), first analyze the water quality and check for possible corrosion.
Corrosion can occur in water systems in which there has been no signs of corrosion. If the water quality level has dropped, adjust the water quality before replacing the unit.

- Brine Quality Control

To protect the heat exchanger from freezing, use the ethylene glycol 35 wt%.
Always use organic brine for this unit, and maintain brine's freezing temperature below -18˚C.

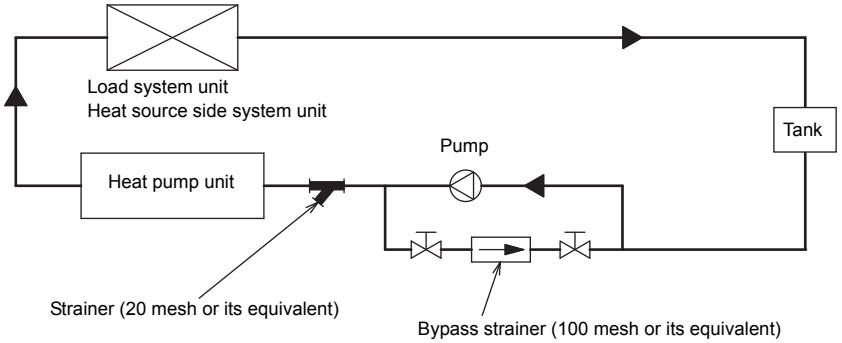
(5) Suspended solids in the water

Sand, pebbles, suspended solids, and corrosion products in water can damage the heating surface of the heat exchanger and cause corrosion. Install a good quality strainer (20 mesh or better) at the inlet of the unit to filter out suspended solids.

Removing foreign substances from the water system

Consider installing a settlement tank or a bypass strainer to remove foreign substances from the water system.

Select a strainer capable of handling two to three percent of the circulating water. The figure below shows a sample system with a bypass strainer.



(6) Connecting pipes made from different materials

If different types of metals are placed in direct contact with each other, the contact surface will corrode.

Install an insulating material between pipes that are made of different materials to keep them out of direct contact with each other.

(7) Piping material

Use hot water output piping material that can withstand heat of 70°C or more. Use hot water input piping material that can withstand the maximum input water temperature. Use heat source piping material that can withstand the minimum temperature. All piping must be made of SUS or similar material to withstand corrosion.

[4] Installing the Strainer and Flow Switch

<1> Installing the strainer

Install a strainer on the inlet pipe near the unit to filter out suspended solids and prevent clogging or corrosion of the heat exchanger.

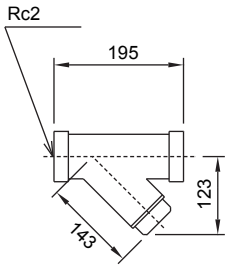
Install a strainer in a way that allows for easy access for cleaning, and instruct the user to clean it regularly.

Operating the units with a clogged strainer may cause the units to make an abnormal stop.

Select a location to install a strainer, taking into consideration the installation angle, insulation thickness, and maintenance space.

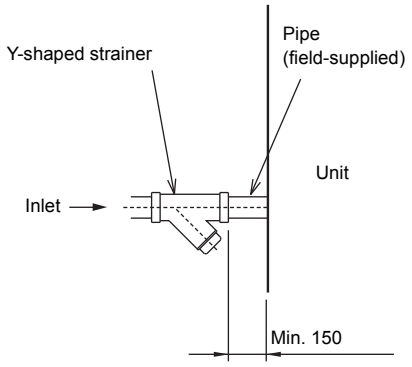
* The dimensions given below indicate the amount of space necessary when screwing in a Y-shaped strainer.

<Unit: mm>



Recommended torque : 200±20 (N·m)

Option Parts : YS-50A



Sample installation

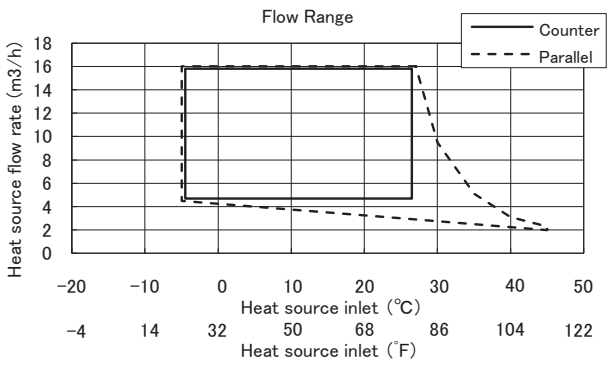
<2> Installing a flow switch

Install a flow switch that meets the following specifications on the heat source fluid pipe.

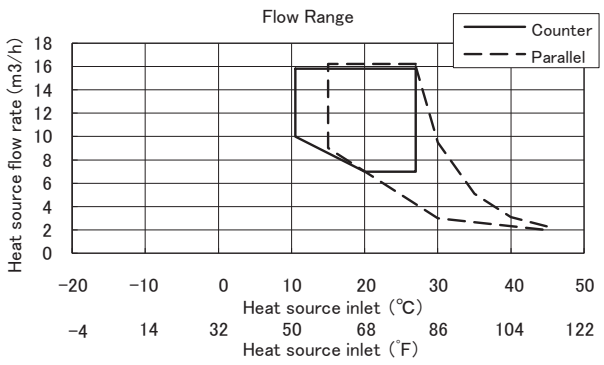
Connect the flow switch to the flow switch contact on the unit.

Minimum flow rate= 2.0 m³/h (33.3 L/min)

Unit usage range (water flow rate): 2.0 - 16.0 m³/h

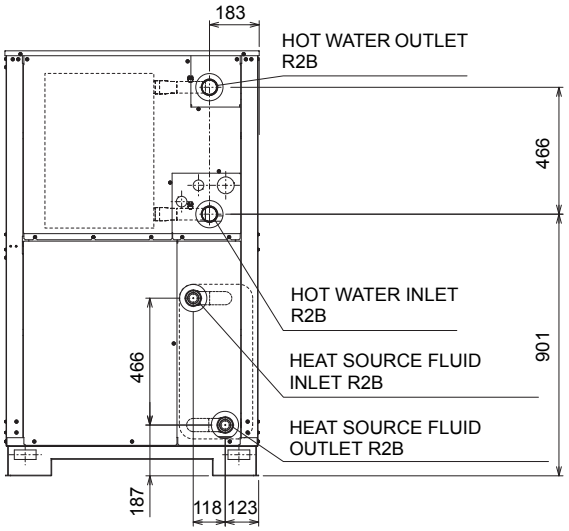


When using brine as heat source fluid



When using water as heat source fluid

[5] Water Pipe Hole Size and Location



Heat source side pipe connection is nomal condition.
(Heat source fluid inlet is upper and outlet is lower.)

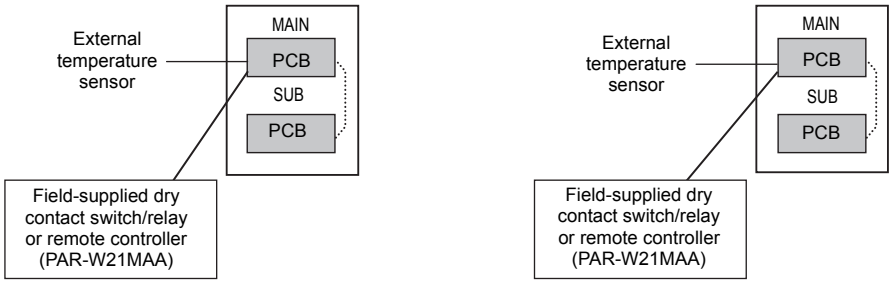
4. System Configurations

The system must be configured only by personnel certified by Mitsubishi Electric.

[1] Schematic Diagrams of Individual and Multiple Systems

(1) Individual system

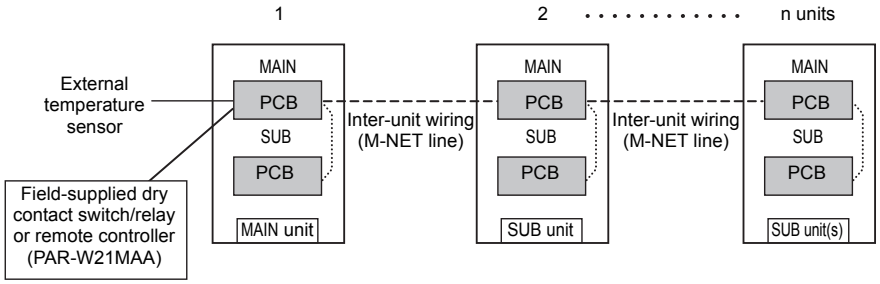
* Each unit is operated individually by connecting a dry contact switch/relay to each unit.



Refer to the sections "Switch Types and the Factory Settings" on the next page and "System configuration procedures: Individual system" (page 21) for further details.

(2) Multiple system (2-16 units)

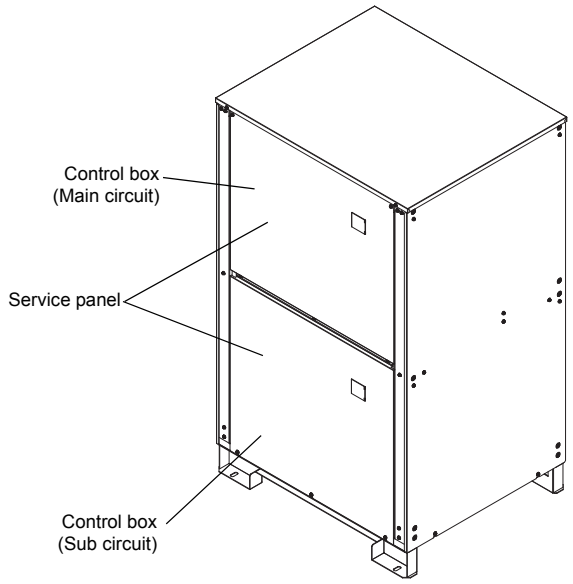
* A group of unit that consists of one main unit and up to 15 sub units is operated collectively by connecting an external water temperature sensor and a dry contact switch/relay to the main unit.



Refer to the sections "Switch Types and the Factory Settings" on the next page and "System configuration procedures: Multiple system" (page 22) for further details.

[2] Switch Types and the Factory Settings

(1) Switch names and functions



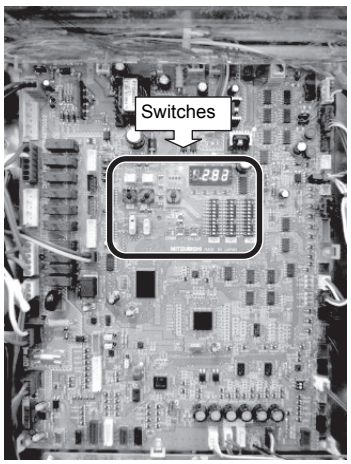
There are four main ways to set the settings as follows:

①Dip switches (SW1 - SW3)
②Dip switches used in combination with the push switches
③Rotary switches
④Slide switches

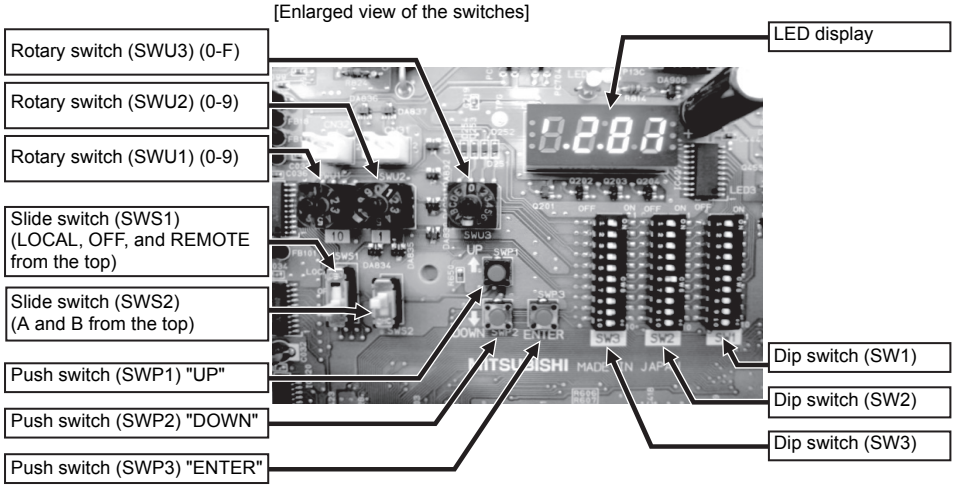
See below for how these switches are used to set certain items.

Different types of switches on the PCB

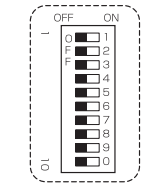
[Entire view of a PCB]

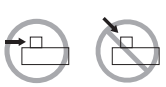


[Enlarged view of the switches]



			Initial Setting	
			MAIN circuit	SUB circuit
Rotary switch (SWU1)	Sets the 10's digit of the unit address (Multiple system).		"0"	"5"
Rotary switch (SWU2)	Sets the 1's digit of the unit address (Multiple system).		"1"	"1"
Rotary switch (SWU3)	Starts up or resets the system (when set to F).		"0"	"0"
Slide switch (SWS1)	LOCAL OFF REMOTE	The action that the switch takes when set to a certain position depends on the type of system configuration (e.g., individual or multiple system)	REMOTE	REMOTE
Slide switch (SWS2)	Unused		A	A
Push switch (SWP1)	Switches the display between the item code and the current value for a specific item. Increases value.		-	-
Push switch (SWP2)	Switches the display between the item code and the current value for a specific item. Decreases value.		-	-
Push switch (SWP3)	Advances the item code. Saves the changed value.		-	-
Dip switches (SW1-3)	Switches the LED display contents.		Refer to page 37.	





Slide the dip switches; do not push down the switches.

(2) Factory Switch Settings (Dip switch settings table)

SW		Function	Usage	Factory setting MAIN circuit	Factory setting SUB circuit	OFF setting	ON setting	Setting timing
SW1	1	Model setting		Depends on the unit	-	Leave the setting as it is.		At a reset
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
	10	Model setting		OFF	-	Leave the setting as it is.		At a reset
SW2	1	Freeze-up protection setting		OFF	-	Starts the pump when both the outside and water temperatures drop to prevent water pipe freeze up.	Same as when set to OFF	At a reset
	2	Model setting		OFF	-	Leave the setting as it is.		At a reset
	3							
	4	Model setting		OFF	OFF	Leave the setting as it is.		At a reset
	5	Recovery conditions after forced stoppage	Selects what the operation restoration condition will be based on after the unit was forced to stop based on the external thermistor reading (water outlet temperature).	OFF	-	External thermistor	Built-in thermistor	At a reset
	6	Power supply option to the communication circuit	Switches between supplying or not supplying power to the communication circuit.	-	ON	Does not supply power to the communication circuit.	Supplies power to the communication circuit.	Any time
	7	Remote water-temperature setting	Allows or disallows the water temperature to be set using analog signals from a remote location.	OFF	-	Disallows the water temperature to be set using external analog signals.	Allows the water temperature to be set using external analog signals.	At a reset
	8	Water-temperature control option	Selects either the external water temperature sensor or the built-in sensor to be used to control water temperature.	OFF	-	Built-in sensor on the unit	External water temperature sensor	At a reset
	9	Individual/Multiple system	Selects between individual and Multiple system	OFF	-	Individual system	Multiple system	At a reset
	10	Display mode switch 7	This switch is used in combination with dip switches SW3-5 through 3-10 and push switches SWP 1, 2, and 3 to configure or view the settings when performing a test run or changing the system configuration.	OFF	OFF	Changes the 7-segment LED display mode.		Any time
SW3	1	Remote reset	Enables or disables the error to be reset from a remote location.	ON	-	Disables the error to be reset from a remote location.	Enables the error to be reset from a remote location.	At a reset
	2	Auto restart after power failure	Enables or disables the automatic restoration of operation after power failure (in the same mode as the unit was in before a power failure).	ON	-	An alarm will be issued when power is restored after a power outage. The alarm will be reset when the power is turned off and then turned back on.	Automatically restores operation after power failure.	At a reset
	3	Water-temperature control	Switches between inlet-water-temperature-based control and outlet-water-temperature-based control.	OFF	-	Outlet-water-temperature-based control	Inlet-water-temperature-based control	At a reset
	4	Pump-thermistor interlock setting	Interlocks or does not interlock the operation of the pump with the external thermistor. (Effective only when SW2-8 is set to ON.)	OFF	-	The pump turns on when the operation switch is turned on regardless of the Thermo-ON/Thermo-OFF status.	Interlocks the operation of the pump with the Thermo-ON/Thermo-OFF status.	At a reset
	5	Display mode switch 1	These switches are used in combination with dip switches SW2-5 and push switches SWP 1, 2, and 3 to configure or view the settings when performing a test run or changing the system configuration.	OFF	OFF	Changes the 7-segment LED display mode.		Any time
	6	Display mode switch 2		OFF	OFF	Changes the 7-segment LED display mode.		Any time
	7	Display mode switch 3		OFF	OFF	Changes the 7-segment LED display mode.		Any time
	8	Display mode switch 4		OFF	OFF	Changes the 7-segment LED display mode.		Any time
	9	Display mode switch 5		OFF	OFF	Changes the 7-segment LED display mode.		Any time
	10	Display mode switch 6		OFF	OFF	Changes the 7-segment LED display mode.		Any time

"-" in the table indicates that the function in the corresponding row will be disabled regardless of the actual switch setting.
The factory setting for these items is OFF.
Refer to page 26 for how to reset errors.

[3] Configuring the Settings

The settings must be set only by a qualified personnel.

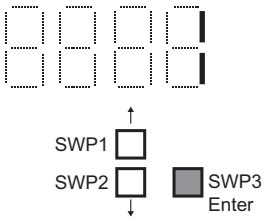
<1> Making the settings

Use the LED display and the three push switches (SWP1 (↑), SWP2 (↓), and SWP3 (Enter)) to change the current settings on the circuit board and to monitor various monitored values.

(1) Setting procedures

Take the following steps to set the push switches SWP1 through SWP3. These switches must be set after the dip switches SW2 and SW3 have been set.

①



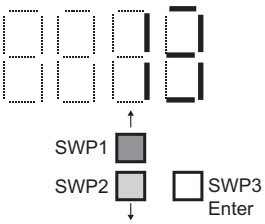
Normally an item code appears on the display.

(The figure at left shows the case where item code 1 is displayed.) Press SWP3 (Enter) to advance the item code.

↓

Press SWP3 (Enter) until the item code appears that corresponds to the item to change or monitor its value.

②

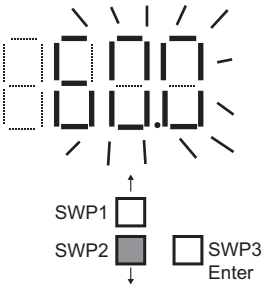


The left figure shows a display example (Code 13 Built-in thermistor temperature setting 2).

↓

Press either SWP1 (↑) or SWP2 (↓) to display the value that corresponds to the selected item.

③



The current setting value will blink.

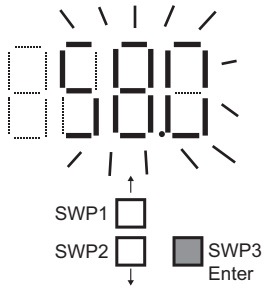
↓

The left figure shows that the current setting value is "60.0."

To decrease this value to 58.0, for example, press SWP2 (↓).

Press SWP1 (↑) to increase the value.

④



<To change the settings>

When the desired value is displayed (58.0 in the example at left), press SWP3 (Enter).

↓

The displayed value will stop blinking and stay lit.

A lit LED indicates that the new setting has been saved.

* Pressing SWP1 (↑) or SWP2 (↓) will change the blinking setting value, but the change will not be saved until SWP3 (Enter) is pressed.
  If SWP3 is not pressed within one minute, the change will not be saved and the display will return to the item code display mode.
  Press and hold SWP1 (↑) or SWP2 (↓) for one second or longer to fast forward through the numbers.

<To view the monitored data>

Press SWP3 (Enter) while the LED display is blinking (see step 3 above) to stop the blinking.

* The values of the items that can only be monitored will not change when SWP1 (↑) or SWP2 (↓) is pressed.

The display will stop blinking and stay lit after a minute, and the display will automatically return to the item code display regardless of the type of values displayed.

To change the values of other items, repeat the steps from step 2 above.

(2) Table of settings items

Set the dip switches SW2 and SW3 as shown in the table below to set the value for the items in the "Setting item" column.

SW2 and SW3 settings				Setting Item	Item Code	Default	Notes
SW2-10	SW3-8	SW3-9	SW3-10				
OFF	OFF	ON	OFF	Maximum peak-demand capacity	2	100%	
				Peak-demand control start time	3	13:00	
				Peak-demand control end time	4	13:00	
				Remote water temperature input signal type	21	0	0: 4-20 mA; 1: 0-10V; 2: 1-5 V; 3: 2-10V
				Setting temp D,E for analog input	11 13	D=35ºC, E=65ºC	When SW2-7 is set to ON
				Setting temp A (Heating mode)	11	35ºC	Range 30-65
				Setting temp B (Hot water mode)	13	65ºC	Range 30-65
				Setting temp C1,C2,C3,C4,C5,C6 for Setting temp C for Heating Eco mode	22-27	C1=60ºC, C2=0ºC C3=35ºC, C4=25ºC, C5=45ºC, C6=15ºC	
				Outdoor temp. input setting value (Upper limit)	28	25	Range -30-50 When item code "1080" is set to "1".
				Outdoor temp. input setting value (Lower limit)	29	-10	Range -30-50 When item code "1080" is set to "1".
				Enable/disable schedule setting	5	0	Set to "1" to enable scheduled operation.
				ON-time 1 (schedule mode without remote)	6	0:00	
				OFF-time 1 (schedule mode without remote)	7	0:00	
				ON-time 2 (schedule mode without remote)	8	0:00	
				OFF-time 2 (schedule mode without remote)	9	0:00	
				ON-time 3 (schedule mode without remote)	18	0:00	
				OFF-time 3 (schedule mode without remote)	19	0:00	
				Current time	1300	-	
				Month/Date setting	1301	-	
				Year setting	1302	-	
				TWL1	1057	40	Water temperature 1 for emergency signal 1
				TAL1	1058	-10	Outside temperature 1 for emergency signal 1
				Analog input format	1051	0	0: Water temperature input 4-20mA 1: Capacity control input 4-20mA 2: Water temperature input IT terminal 3: Capacity control input IT terminal
OFF	ON	OFF	OFF	Setting temp selection 1 (ON-time 1-OFF-time 1)	1218	1	A=1; B=2; C=3
				Setting temp selection 2 (ON-time 2-OFF-time 2)	1219	1	A=1; B=2; C=3
				Setting temp selection 3 (ON-time 3-OFF-time 3)	1220	1	A=1; B=2; C=3
				Control Sensor selection (Target Setting temp A)	1215	TH15	Selectable from TH15 or TH16
				Control Sensor selection (Target Setting temp B)	1216	TH15	Selectable from TH15 or TH16
				Control Sensor selection (Target Setting temp C)	1217	TH15	Selectable from TH15 or TH16
				Thermo differential 1	1015	2.0	Range 0-8
				Thermo differential 2	1016	2.0	Range 0-8
				Multiple System Thermo-ON/OFF prohibition periods	1020	1	Range 1-5
				Outdoor temperature input source selection	1080	0	0: No outdoor temperature 1: Outdoor temp. analog input 4-20mA 2: IT terminal 3: Outdoor temp. input TH9*

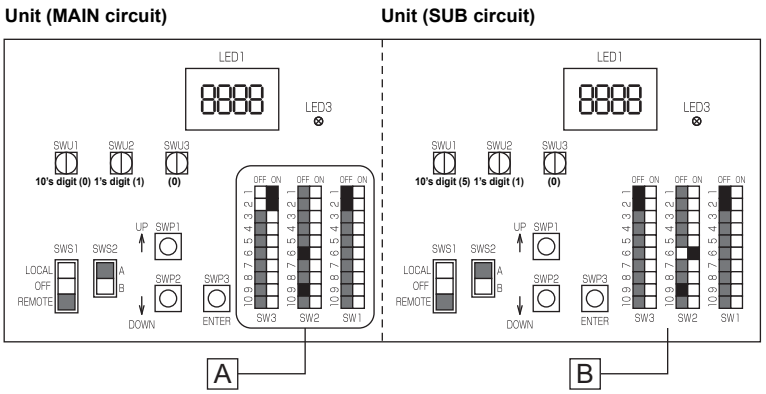
* Use the following recommended products or similar products for the outdoor temperature thermistor.
Recommended product t-mac 500-51791
Relationship between resistance value Rt (kΩ) and temperature t (°C)

$$Rt = 1.07 \exp\{3978(\frac{1}{273 + t} - \frac{1}{358})\}$$

- Select the thermistor taking note of the tolerance in the resistance values.
- Use shielded cable for the wiring.

(3) System configuration procedures: Individual system

1. Set the dip switches on the MAIN circuit board.



Switch settings on the MAIN circuit

Set the dip switches (labeled A in the figure at right) that correspond to the items below, according to the local system.

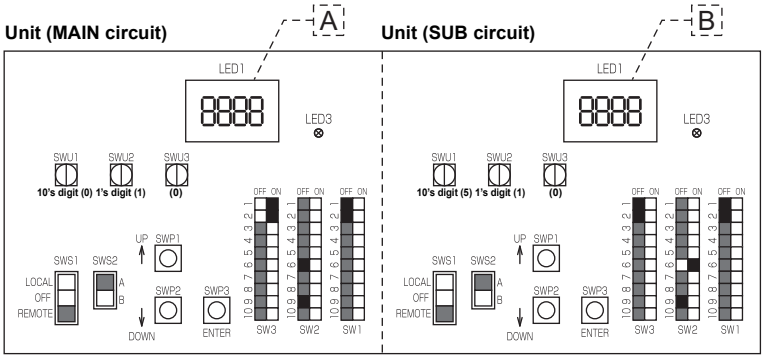
- Water temperature control based on the external water temperature reading
- Water temperature control based on the inlet water temperature

Refer to "Dip switch settings table" (page 18) for further details.

2. Set the connector CN142D 1-3 on the MAIN circuit board.

If using water as heat source, cut CN142D 1-3 (short circuit wire).

3. Switch on the power to the unit.

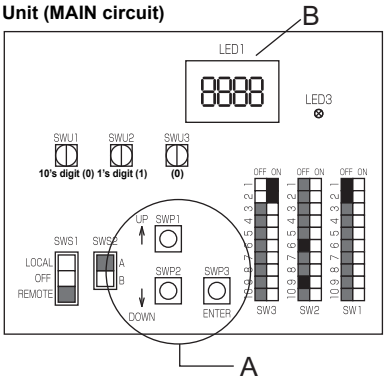


Check for loose or incorrect wiring, and then switch on the power to the unit.

When the power is switched on, the following codes will appear on the LED:

- [EEEE] will appear on LED1 in the MAIN circuit board (labeled A in the figure at right).
- [9999] will appear on LED1 in the SUB circuit board (labeled B in the figure at right).

4. Set the preset values with the switches on the MAIN circuit board.



(1) Press either one of the push switches SWP1, 2, or 3 (labeled A in the figure at right) on the MAIN circuit board.
   * [EEEE] will disappear, and an item code ([101]) will appear on LED1 (labeled B in the figure at right).

(2) Use SWP3 to toggle through the item codes and select an item code to change its current value. (The item codes will appear in the following order: [101]→[102]→[104]→[107]→[101] (back to the beginning).)

(3) Use SWP1 to increase the value and SWP2 to decrease the value.

(4) Press SWP3 to save the changed value.

Following the steps above, set the value for the following items as necessary.

[101] Not used

[102] Not used

[104] Not used

[107] Total number of units in the system (Default = 1) (Leave it as it is.)

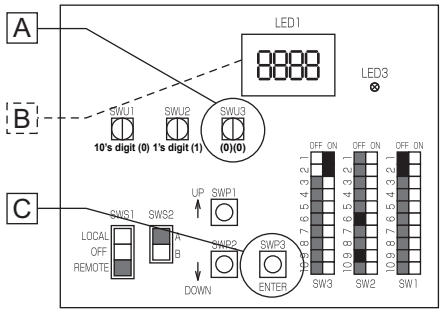
5. Perform an initial setup. (MAIN circuit side)

(1) Set the rotary switch SWU3 (labeled A in the figure at right) to "F." [EEEE] will appear in LED1 (labeled B in the figure at right). *1

(2) Press and hold the push switch (SWP3) (labeled C in the figure at right) for one second or longer.
- While the system is starting up [9999] will appear on LED1 (labeled B in the figure at right).
- When start-up is complete, a control property [0002] will appear.
- Then five seconds later [FFFF] will appear.

(3) Set the rotary switch SWU3 (labeled A in the figure at right) back to "0." The start-up process is complete, and the settings for such items as clock, peak-demand control, schedule, and thermistor settings can now be made.

Unit (MAIN circuit)

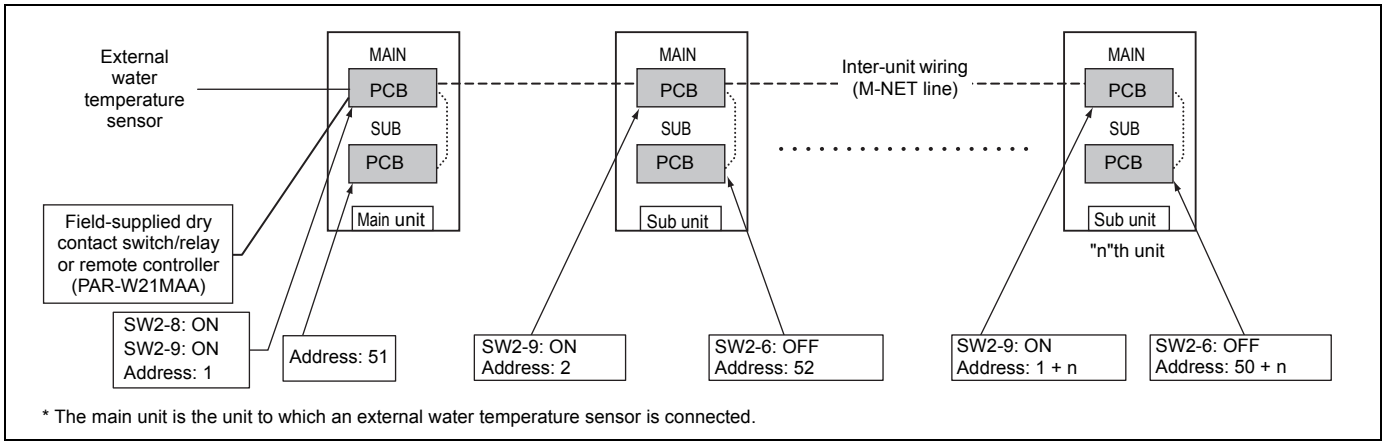


*1 If the start-up process has already been completed, [FFFF] (instead of [EEEE]) will appear when the rotary switch SWU3 is set to "F."

(4) System configuration procedures : Multiple system

1. Set the dip switches and rotary switches.
(Switches on the MAIN circuit on the main unit* AND the MAIN and SUB circuits on all sub units)

System configuration diagram



* The main unit is the unit to which an external water temperature sensor is connected.

Setting the switches on the main unit

MAIN circuit

(1) Set the dip switch SW2-8 to ON. (an external water temperature sensor) (labeled A in the figure at right)

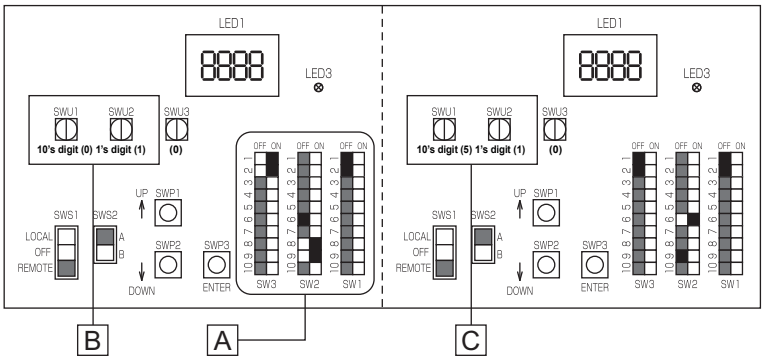
(2) Set the dip switch SW2-9 to ON. (multiple unit control)(labeled A in the figure at right)

SUB circuit

Nothing needs to be changed.

Refer to "Dip switch settings table" (page 18) for further details.

Main unit (MAIN circuit) **Main unit (SUB circuit)**



Make sure the address of the MAIN circuit on the main unit is set to "1" (labeled B in the figure above) and that the address of the SUB circuit on the main unit is set to "51" (labeled C in the figure above).

The address of each SUB circuit should equal the sum of the MAIN circuit address on the same unit and 50.

Setting the switches on all sub units

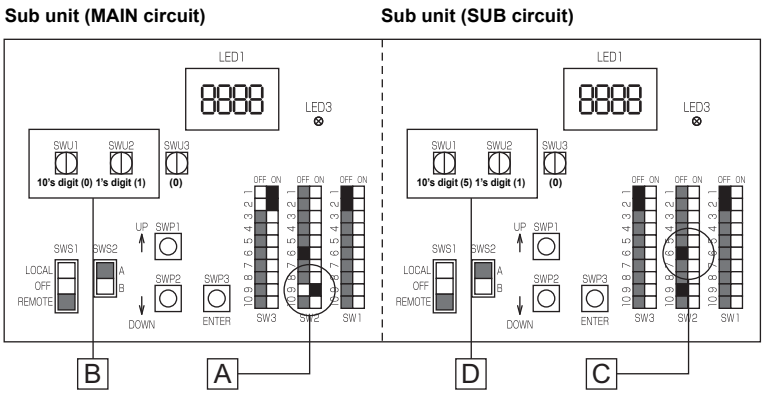
MAIN circuit

(1) Set the dip switch SW2-9 to ON. (multiple unit control) (labeled A in the figure at right)

(2) Set the MAIN circuit addresses with the rotary switches. (labeled B in the figure at right). Set the 10's digit with SWU1, and set the 1's digit with SWU2. Assign sequential addresses to the MAIN circuit on all sub units starting with 2.

SUB circuit

(3) Set the dip switch SW2-6 to OFF. (power supply to communication circuit) (labeled C in the figure at right)



(4) Set the SUB circuit addresses with the rotary switches (labeled D in the figure above). Set the 10's digit with SWU1, and set the 1's digit with SWU2. Assign sequential addresses to the SUB circuit on all sub units starting with 52.

2. Set the connector CN142D 1-3 on the MAIN circuit board.

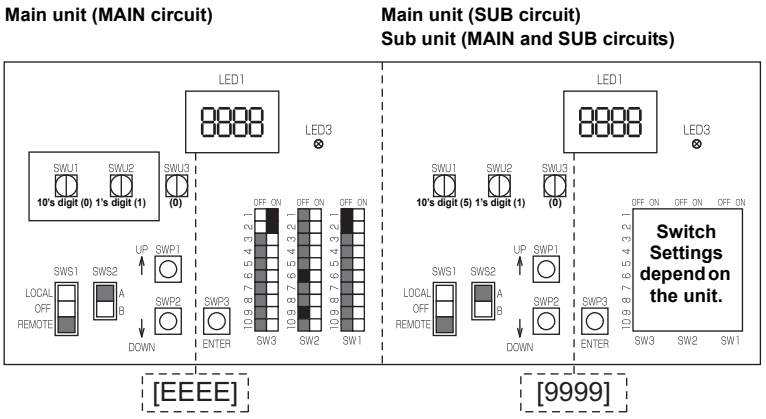
If using water as heat source, cut CN142D 1-3 (short circuit wire).

3. Switch on the power to the unit.

Check for loose or incorrect wiring, and then switch on the power to all units.

When the power is switched on, the following codes will appear on the LED:

- [EEEE] will appear on LED1 in the MAIN circuit board.
- [9999] will appear on LED1 in the SUB circuit board on the main unit and both MAIN and SUB circuits on the sub units.



4. Set the preset values with the switches on the MAIN circuit board.

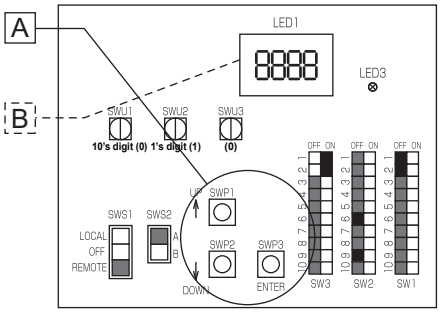
(1) Press either one of the push switches SWP1, 2, or 3 (labeled A in the figure at right) on the MAIN circuit board.

* [EEEE] will disappear, and an item code ([101]) will appear on LED1 (labeled B in the figure at right).

(2) Use SWP3 to toggle through the item codes, and select an item code to change its current value. (The item codes will appear in the following order: [101] →[102]→[104]→[107]→[101] (back to the beginning).)

(3) Use SWP1 to increase the value and SWP2 to decrease the value.

(4) Press SWP3 to save the changed value.



Following the steps above, set the value for the following items with the switches on the MAIN circuit as necessary. Item [107] must be set when multiple units are connected to a system.

[101] Not used

[102] Not used

[104] Not used

[107] Total number of the main and sub units in the system

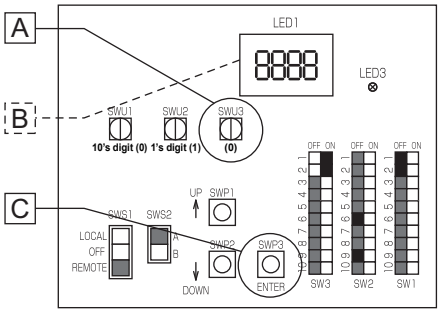
5. Perform an initial setup on the MAIN circuit on the main unit

(1) Set the rotary switch SWU3 on the MAIN circuit on the main unit (labeled A in the figure at right) to "F."
[EEEE] will appear in LED1 (labeled B in the figure at right). *1

(2) Press and hold the push switch (SWP3) (labeled C in the figure at right) for one second or longer.
- While the system is starting up [9999] will appear on LED1 (labeled B in the figure at right).
- When start-up is complete, a control property [0002] will appear.
- Then, five seconds later, [FFFF] will appear.

(3) Set the rotary switch SWU3 (labeled A in the figure at right) back to "0."
The start-up process is complete, and the settings for such items as clock, peak-demand control, schedule, and thermistor settings can now be made.

Main unit (MAIN circuit)



*1 If the start-up process has already been completed, [FFFF] (instead of [EEEE]) will appear when the rotary switch SWU3 is set to "F."

Slide switch (SWS1) settings

Individual system

SWS1 Setting		Unit Operation	
MAIN circuit	SUB circuit	MAIN circuit	SUB circuit
LOCAL	LOCAL	Follows the input signal of the MAIN circuit	Follows the input signal of the sub circuit
	OFF		Ignores the signal input
	REMOTE		Follows the input signal of the sub circuit
OFF	LOCAL	Ignores the signal input	Ignores the signal input
	OFF		
	REMOTE		
REMOTE	LOCAL	Follows the input signal fed through a dry contact interface	Follows the input signal of the MAIN circuit
	OFF		Ignores the signal input
	REMOTE		Follows the input signal of the MAIN circuit

Multiple system (SWS1 in the SUB circuit on both the main and sub units will be ineffective.)

SWS1 Setting		Unit Operation			
Main unit MAIN circuit	Sub unit MAIN circuit	Main unit MAIN circuit	Main unit SUB circuit	Sub unit MAIN circuit	Sub unit SUB circuit
LOCAL	LOCAL	Follows the input signal of the MAIN circuit on the Main unit	Follows the input signal of the MAIN circuit on the Main unit	Follows the input signal of the MAIN circuit on the Sub unit	Follows the input signal of the MAIN circuit on the Sub unit
	OFF			Ignores the signal input	
	REMOTE			Follows the input signal of the MAIN circuit on the Sub unit	
OFF	LOCAL	Ignores the signal input		Ignores the signal input	
	OFF				
	REMOTE				
REMOTE	LOCAL	Follows the input signal fed through a dry contact interface		Follows the input signal of the MAIN circuit on the Main unit	
	OFF			Ignores the signal input	
	REMOTE			Follows the input signal of the MAIN circuit on the Main unit	

(5) Re-initializing the system

When the settings for the items below have been changed, the system will require re-initialization.

- Dip switch SW2-8 (use or non-use of an external water temperature sensor) (Re-initialization is required only for the Multiple system.)
- Dip switch SW2-9 (multiple unit control)
- Dip switch SW3-3 (water temperature control method)
- External signal input setting [107] (total number of units in the system)
- Rotary switches (SWU1 and SWU2) (unit address)

Take the following steps to re-initialize the system:

(1) Set the rotary switch SWU3 to "F."
[FFFF] will appear in the LED1.

(2) Press and hold the push switch SWP3 for one second or longer.

- While the system is starting up [9999] will appear on LED1.
- When start-up is complete, a control property [0002] will appear.
- Then, five seconds later, [FFFF] will appear.

(3) Press and hold the push switch SWP3 again for one second or longer.

- While the system is starting up [9999] will appear on LED1.
- When start-up is complete, a control property [0002] will appear.
- Then, five seconds later, [FFFF] will appear.

(4) Set the rotary switch SWU3 back to "0."

(6) Resetting the system (MAIN and SUB circuits)

Take the following steps to reset the system. An error can also be reset by taking the steps below.
Note that the errors on the MAIN unit must be reset through the MAIN circuit, and the errors on the sub unit must be reset through the SUB circuit.
When an error on the MAIN unit is reset, all sub units will stop.

(1) Set the rotary switch SWU3 to "F."
[FFFF] will appear in the LED1.

(2) Press and hold the push switch SWP3 for one second or longer.

- While the system is starting up [9999] will appear on LED1.
- When start-up is complete, a control property [0002] will appear.
- Then, five seconds later, [FFFF] will appear.

(3) Set the rotary switch SWU3 back to "0."

Priority order of the water-temperature-setting-input-signal sources

Water temperature can be controlled by using the signals from the four types of input sources listed below. The setting for the item with higher priority will override the settings for the items with lower priorities. The water temperature will be controlled according to the temperature setting in the "Target water temperature" column that corresponds to a specific combination of the settings for the four items.

Priority 1	Priority 2	Priority 3		Priority 4			Target water temperature	Sensor that becomes active (when SW2-8 is set to ON)(*1)
Analog input	Main board on the unit	Dry contact input		Centralized controller AG-150A Remote controller PAR-W21MAA IT terminal				
	Schedule setting	Mode Change 1	Mode Change 2	No remote controller	Manual setting	Schedule setting		
SW2-7: ON	Ineffective	Ineffective	Ineffective	-	Ineffective	Ineffective	Temperature setting for the analog signal input	TH15
SW2-7: OFF	When schedule has been set	Ineffective	Ineffective	-	Ineffective	Ineffective	Selectable from temperature settings A through C	Selectable from TH15 or TH16
	When no schedule has been set	ON (Heating Eco)	ON (Hot water)	-	Ineffective	Ineffective	Temperature setting B (Hot water mode)	Selectable from TH15 or TH16
		ON (Heating Eco)	OFF (Heating)	-	Ineffective	Ineffective	Temperature setting C (Heating Eco mode)	Selectable from TH15 or TH16
		OFF (Heating)	ON (Hot water)	-	Ineffective	Ineffective	Temperature setting B (Hot water mode)	Selectable from TH15 or TH16
		OFF (Heating)	OFF (Heating)	When no RC is used	-	-	Temperature setting A (Heating mode)	Selectable from TH15 or TH16
				-	Hot water mode	-	Temperature setting B (Hot water mode)	Selectable from TH15 or TH16
				-	Heating ECO mode(*2)	-	Temperature setting C (Heating Eco mode)	Selectable from TH15 or TH16
				-	Heating	-	Temperature setting A (Heating mode)	Selectable from TH15 or TH16
				-	-	When schedule has been set	Target water temp is controlled according to the setting on the remote controller.	TH15

*1 If SW2-8 is set to OFF, water temperature will be controlled by the built-in thermistors TH12 and TH18 on the unit.
*2 Can be set when item code 1080 is a value other than “0”.

Water-temperature setting

Different water temperature settings can be set for different modes. Use item codes 11, 13, 22, 23, 24, 25, 26, or 27 to set the water temperatures.

(1) Setting procedures

Set the dip switches on the circuit board as follows before making the settings for the items described in this section.

* Input of the outside air temperature (CN422 2(+)-3(-) or TB5 28-29) is required for control of Heating ECO.

Step 0
Set the ON/OFF switch (SWS1) to OFF.

Set SWS1 to OFF from the remote controller or with the local switch.
Most settings (other than item codes 11 and 13 (water temperature setting)) cannot be changed unless the ON/OFF setting is set to OFF. *

* Settings can be changed from the optional remote controller, regardless of the ON/OFF status of the operation switch.

Step 1
Outdoor temperature input source selection

SW2	SW3					
-10	5	6	7	8	9	10
OFF	OFF	OFF	OFF	ON	OFF	OFF

Items that can be set	Item code	Initial value	Unit	Setting			Setting change from an optional remote controller
				Increments	Lower limit	Upper limit	
Outdoor temperature input source selection	1080	0		1	0	3	Not possible

0: No outdoor temperature → Heating Eco mode cannot be used.
1: Outdoor temp. analog input 4-20 mA(*1) → Go to STEP 2.
2: IT terminal → Go to STEP 3.
3: Outdoor temp. input TH9(*1) → Go to STEP 3.

*1 Use the following recommended products or similar products for the outdoor temperature thermistor.
Recommended product t-mac 500-51791
Relationship between resistance value Rt (kΩ) and temperature t (ºC)

$$Rt = 1.07 \exp\{3978 \left(\frac{1}{273 + t} - \frac{1}{358}\right)\}$$

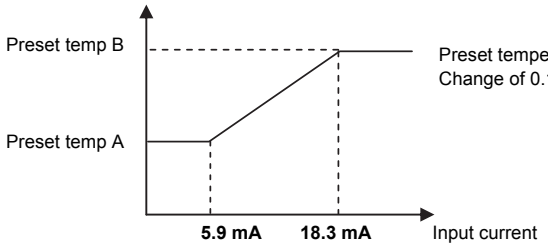
- Select the thermistor taking note of the tolerance in the resistance values.
- Use shielded cable for the wiring.

Step 2
Set the point

SW2	SW3					
-10	5	6	7	8	9	10
OFF	OFF	OFF	OFF	OFF	ON	OFF

Items that can be set	Item code	Initial value	Unit	Setting			Setting change from an optional remote controller (PAR-W21MAA)
				Increments	Lower limit	Upper limit	
Outdoor setting Upper limit (18 mA)	28	25	ºC	0.5ºC	-30	50	Not possible
Outdoor setting Lower limit (6 mA)	29	-10	ºC	0.5ºC	-30	50	Not possible

* External analog input signal of 18.3 mA: Preset temp. B (Item code 28)
* External analog input signal of 5.9 mA: Preset temp. A (Item code 29)
* External analog input signal of between 5.9 and 18.3 mA: the preset temperature will be linearly interpolated.



Preset temperature = (B - A) × (Input current - 5.9 mA) / 12.4 mA + A
Change of 0.12 mA or less is not recognized.

Step 3
Set the dip switches SW2 and SW3.

SW2	SW3					
-10	5	6	7	8	9	10
OFF	OFF	OFF	OFF	OFF	ON	OFF

Step 4
Select the desired item with the push switch SWP3.

Item codes 11, 13, 22, 23, 24, 25, 26, and 27 relate to water-temperature setting.
Press the push switch SWP3 to select an item code.
Press the push switches SWP1 and SWP2 to change the value of the selected item.
The value will keep blinking while it is being changed.

Step 5

Press the push switches SWP1 (↑) or SWP2 (↓) to increase or decrease the value.

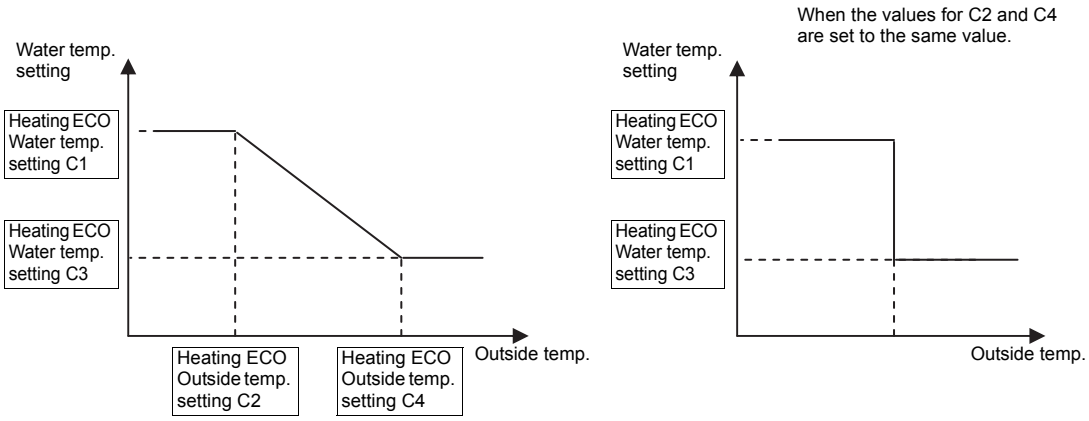
Settings table

Settable item	Item code	Initial value	
Heating ECO mode/ 2-point system or Curve	20	1	2-point system: 0 Curve: 1

Items that can be set	Item code	Initial value	Unit	Setting			Setting change from an optional remote controller (PAR-W21MAA)
				Increments	Lower limit	Upper limit	
Water temp. setting A (Heating mode)	11	35	°C	0.1°C	30	65	Possible*3
Water temp. setting B *1 (Hot water mode)	13	55	°C	0.1°C	30	65	Possible*4
Heating ECO mode/ Water temp. setting C1 *2	22	60	°C	0.1°C	30	65	Not possible
Heating ECO mode/ Outside temp. setting C2 *2	23	0	°C	0.1°C	-30	50	Not possible
Heating ECO mode/ Water temp. setting C3 *2	24	35	°C	0.1°C	30	65	Not possible
Heating ECO mode/ Outside temp. setting C4 *2	25	25	°C	0.1°C	-30	50	Not possible
Heating ECO mode/ Water temp. setting C5	26	45	°C	0.1°C	30	65	Not possible
Heating ECO mode/ Outside temp. setting C6	27	15	°C	0.1°C	-30	50	Not possible

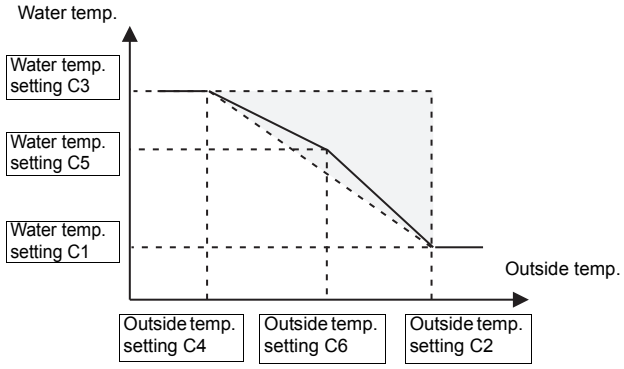
*1 Only in hot water mode will the main unit three way valve output X09 turn ON.
*2 These items need not be set when only a single water temperature setting is used.
These items require an outdoor temperature input. (Item code 1080 1-3)
*3 Increments: 1.0ºC, Setting range: 30-55ºC
*4 Increments: 1.0ºC, Setting range: 30-65ºC

Heating ECO (2-point system)



* C5 and C6 cannot be used.

Heating ECO (Curve)



* Always use a value for setting C6 that is between setting value C2 and setting value C4, and for setting C5 between setting value C1 and setting value C3.

Step 6 Press the push switch SWP3 to save the change.	Press SWP3 once within one minute of changing the setting with SWP1 or SWP2 to save the setting. Once the new setting is saved, the display will stop blinking and stay lit. The display will, then, return to the item code display mode. If SWP3 is not pressed within one minute, the change will not be saved and the display will return to the item code display mode.

(2) Scheduled operation

Up to three sets of start/end times can be assigned for each day.

To operate the units according to the schedule, set the item code 5 to "1", and set the time for item codes 6 through 9 and 1300 through 1302.

Note **The operation schedule function will operate only when SWS1 is set to "REMOTE."**

Setting procedures

Step 0
Set the ON/OFF switch (SWS1) to OFF.

Set SWS1 to OFF from the remote controller or with the local switch.
Settings cannot be changed unless the ON/OFF setting is set to OFF. *

Step 1
Set the dip switches SW2 and SW3.

Set the dip switches on the circuit board as follows before making the settings for the items described in this section.

SW2	SW3					
-10	5	6	7	8	9	10
OFF	OFF	OFF	OFF	OFF	ON	OFF

Step 2
Select the desired item with the push switch SWP3.

Item codes 5 through 9, 18, 19, and 1300 through 1302 relate to scheduled operation setting.
Set the item code 5 to "1", and set the time for each of the relevant items.
Press the push switch SWP3 to select an item code.
Use the push switches SWP1 and SWP2 to change the value of the selected item.
The value will keep blinking while it is being changed.

Step 3
Press the push switches SWP1 (↑) or SWP2 (↓) to increase or decrease the value.

Settings table

Settable item	Item code	Initial value	Unit	Limits and increments		
				Increments	Lower limit	Upper limit
Enable or disable scheduled operation (ON/OFF)	5	0	Enable: 1 Disable: 0	1	0	1
Operation start time 1	6	0000	Hour: minute	1 minute	0000	2359
Operation end time 1	7	0000	Hour: minute	1 minute	0000	2359
Operation start time 2	8	0000	Hour: minute	1 minute	0000	2359
Operation end time 2	9	0000	Hour: minute	1 minute	0000	2359
Operation start time 3	18	0000	Hour: minute	1 minute	0000	2359
Operation end time 3	19	0000	Hour: minute	1 minute	0000	2359
Current time	1300	-	Hour: minute	1 minute	0000	2359
Month/Date setting	1301	-	Month: day	1 day	0101	1231
Year setting	1302	-	Year	1 year	2000	2099

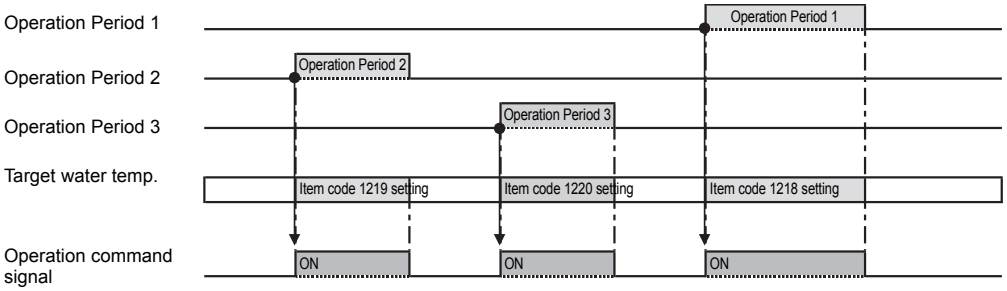
Step 4
Press the push switch SWP3 to save the change.

Press SWP3 once within one minute of changing the setting with SWP1 or SWP2 to save the setting.
Once the new setting is saved, the display will stop blinking and stay lit. The display will, then, return to the item code display mode.
If SWP3 is not pressed within one minute, the change will not be saved and the display will return to the item code display mode.

Note **A mode (preset temperatures) can be selected for each operation time period. See the next page for how to make the settings.**

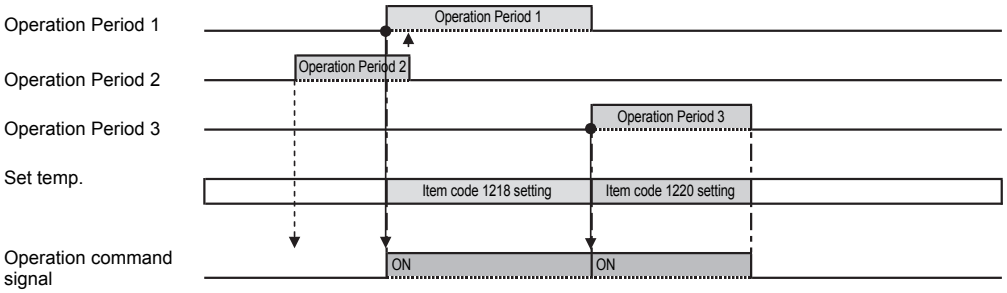
Note **If Code 5 is set to "1," lock the remote controller's schedule function.**

[When the operation Start/End times do not overlap]



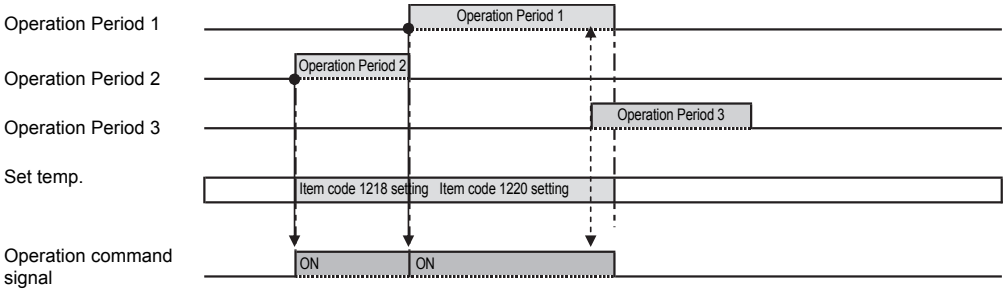
If "Start time1 - End time 1", "Start time 2 - End time 2", "Start time 3 - End time 3" overlap, the settings for the period with a larger number will be ineffective.

[When operation period 1 and 2 overlap]

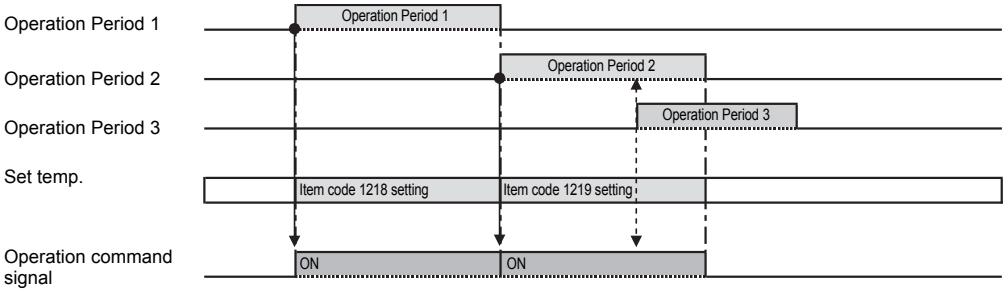


If two or more operation periods overlap, the settings for the period with a larger number will be ineffective.
If Start time 1 and start time 3 are set to the same value, the setting for Start time 3 will be ineffective.
Set the setting for Start time 3 to a time at least one minute after End time 1.
(Once the compressor stops when End time 1 comes, the 3-minute restart delay function will keep the compressor from restarting for three minutes. Because of this, even if Start 3 time is set to a time within three minutes after End time 1, the compressor will not start right away.)

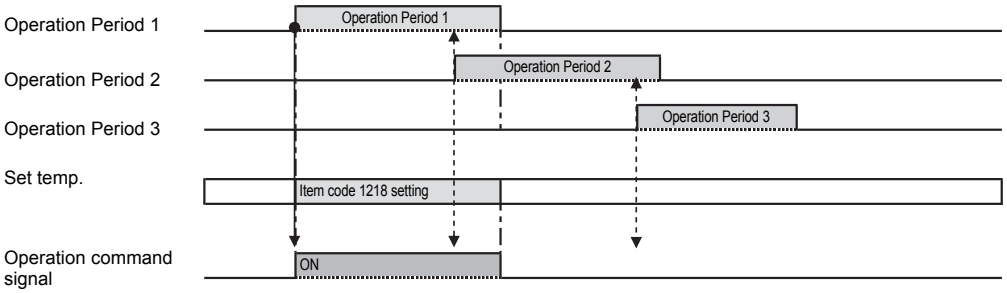
[When operation periods 1 and 3 overlap]



[When operation periods 2 and 3 overlap]



[When operation periods 2 and 3 overlap]



(*) Refer to the section on how to select the preset water temperatures on the next page.

(3) Selecting the preset temperature for different operation periods

Setting procedures

Step 0
Set the ON/OFF switch (SWS1) to OFF.

Set SWS1 to OFF from the remote controller or with the local switch.
Settings cannot be changed unless the ON/OFF setting is set to OFF. *

Step 1
Set the dip switches SW2 and SW3.

Set the dip switches on the circuit board as follows before making the settings for the items described in this section.

SW2	SW3					
-10	5	6	7	8	9	10
OFF	OFF	OFF	OFF	ON	OFF	OFF

Step 2
Select the desired item with the push switch SWP3.

Item codes 1215 through 1220 relate to selecting the preset temperature setting.
Press the push switch SWP3 to select an item code.
Use the push switches SWP1 and SWP2 to change the value of the selected item.
The value will keep blinking while it is being changed.

Step 3
Press the push switches SWP1 (↑) or SWP2 (↓) to increase or decrease the value.

Settings table

Items that can be set	Item code	Initial value	Unit	Setting			Note	Setting change from an optional remote controller
				Increments	Lower limit	Upper limit		
Preset temp. 1 (Heating)	1215	15	TH	1	15	16		Possible
Preset temp. 1 (Hot Water)	1216	15	TH	1	15	16		Possible
Preset temp. 1 (Heating ECO)	1217	15	TH	1	15	16		Not possible
Start/End time setting 1 (ON/OFF) water temp. setting	1218	1		1	1	3	*	Not possible
Start/End time setting 2 (ON/OFF) water temp. setting	1219	1		1	1	3	*	Not possible
Start/End time setting 3 (ON/OFF) water temp. setting	1220	1		1	1	3	*	Not possible

*1: Preset temp. A (Heating)
2: Preset temp. B (Hot Water)
3: Preset temp. C (Heating ECO)

Step 4
Press the push switch SWP3 to save the change.

Press SWP3 once within one minute of changing the setting with SWP1 or SWP2 to save the setting.
Once the new setting is saved, the display will stop blinking and stay lit. The display will, then, return to the item code display mode.
If SWP3 is not pressed within one minute, the change will not be saved and the display will return to the item code display mode.

Selecting the preset temperature for different operation periods

When operating the units on schedule, preset temperatures can be selected from A, B, or C for time periods 1 through 3.

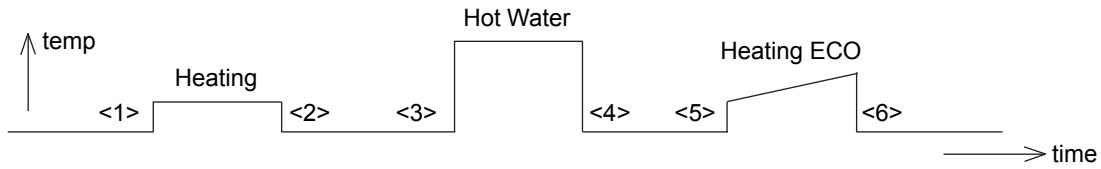
Item code 1218: Operation time setting 1
Item code 1219: Operation time setting 2
Item code 1220: Operation time setting 3

→ Item code 1215: Preset temp. 1 (Item code 11: Heating)
→ Item code 1216: Preset temp. 2 (Item code 13: Hot Water)
→ Item code 1217: Preset temp. 3 (Item codes: 22-27: Heating ECO)

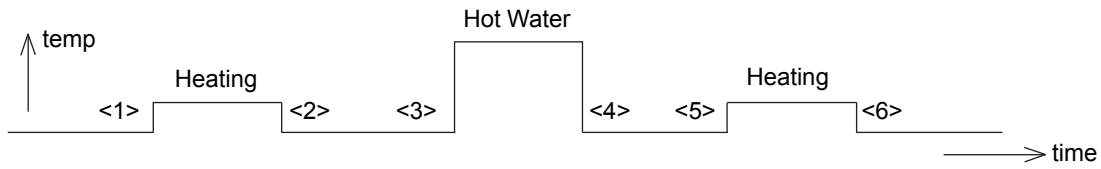
Preset temperature selection for different time periods

			Example 1	Example 2	Example 3
<1> <2>	Start time 1 End time 1	Operation 1 (Preset temperature is selectable from A, B, or C.)	Heating	Heating	Hot Water
<3> <4>	Start time 2 End time 2	Operation 2 (Preset temperature is selectable from A, B, or C.)	Hot Water	Hot Water	Heating ECO
<5> <6>	Start time 3 End time 3	Operation 3 (Preset temperature is selectable from A, B, or C.)	Heating ECO	Heating	Hot Water

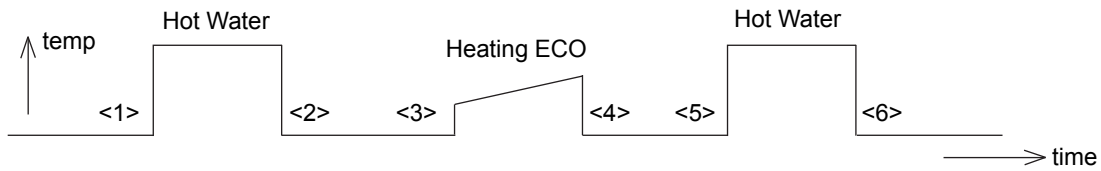
Example 1



Example 2



Example 3



(4) Peak-demand control operation

Peak-demand control is a function used to control the power consumptions of the units during peak-demand hours.

The number of units in operation and the compressor's maximum operating frequency will be controlled according to the peak-demand control signal.

Individual system control	Multiple system control
Individual unit control Maximum frequency = Maximum capacity under peak-demand control	Depending on the peak-demand control setting that is made on the main unit, the number of units in operation and the maximum operating frequency of the units in operation will be adjusted.

Setting procedures

Set the maximum capacity setting on the circuit board.

Step 0
Set the ON/OFF switch (SWS1) to OFF.

Set SWS1 to OFF from the remote controller or with the local switch.
Settings cannot be changed unless the ON/OFF setting is set to OFF. *

Step 1
Set the dip switches SW2 and SW3.

Set the dip switches on the circuit board as follows before making the settings for the items described in this section.

SW2	SW3					
-10	5	6	7	8	9	10
OFF	OFF	OFF	OFF	OFF	ON	OFF

Step 2
Select the desired item with the push switch SWP3.

Press the push switch SWP3 to select item code 2.
Press the push switches SWP1 or SWP2 to change the value of the selected item.
The value will keep blinking while it is being changed.

Step 3
Press the push switches SWP1 (↑) or SWP2 (↓) to increase or decrease the value.

Settings table

Items that can be set	Item code	Initial value	Unit	Setting			Setting change from an optional remote controller
				Increments	Lower limit	Upper limit	
Maximum capacity setting	2	100	%	5%	0	100	Not possible
Peak-demand control start time	3	1300	Hour: minute	1	0000	2359	Not possible
Peak-demand control end time	4	1300	Hour: minute	1	0000	2359	Not possible

Step 4
Press the push switch SWP3 to save the change.

Press SWP3 once within one minute of changing the setting with SWP1 or SWP2 to save the setting.
Once the new setting is saved, the display will stop blinking and stay lit. The display will, then, return to the item code display mode.
If SWP3 is not pressed within one minute, the change will not be saved and the display will return to the item code display mode.
(*) If the peak-demand control contact is ON, units will operate at the maximum capacity that was set in the steps above.

(5) Setting the total number of units for a multiple system

Step 0
Set the ON/OFF switch (SWS1) to OFF.

Set SWS1 to OFF from the remote controller or with the local switch.
Settings cannot be changed unless the ON/OFF switch is set to OFF.

Step 1
Set the dip switches SW2 and SW3.

Set the dip switches on the circuit board as follows to select how external inputs are received.

SW2	SW3					
-10	5	6	7	8	9	10
OFF	OFF	OFF	OFF	ON	ON	ON

Step 2
Select the desired item with the push switch SWP3.

The item codes shown in the table below will appear in order every time the push switch SWP3 is pressed.
Use the push switches SWP1 and SWP2 to change the value of the selected item.
The value will keep blinking while it is being changed.

Step 3
Press the push switches SWP1 (↑) or SWP2 (↓) to increase or decrease the value.

Setting the total number of units

	Item code	Increments	Lower limit	Upper limit	Initial value
Total number of units in the system*1	107	1	1	16	1

*1 Enter the total number of units including the main unit. Applicable only to the main unit.

Step 4
Press the push switch SWP3 to save the change.

Press SWP3 once within one minute of changing the setting with SWP1 or SWP2 to save the setting.
Once the new setting is saved, the display will stop blinking and stay lit. The display will, then, return to the item code display mode.
If SWP3 is not pressed within one minute, the change will not be saved and the display will return to the item code display mode.

Step 5
Turn the power back on.
Reset the system.

After changing the settings, re-initialize the system according to the procedures detailed on page 26.

Note **The new setting will not be saved unless a reset is performed.**

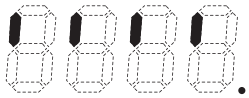
Setting the unit addresses

Refer to "System configuration procedures: Multiple system" (page 22).

(6) Selecting the item that normally appears on the LED

SW2	SW3						Display content
-10	5	6	7	8	9	10	
OFF	OFF	OFF	ON	OFF	OFF	OFF	Displays the operation mode.(*1)
OFF	OFF	ON	ON	OFF	OFF	OFF	Displays the operation mode.(*2)
OFF	ON	ON	OFF	OFF	OFF	OFF	Displays the current water temperature.
OFF	ON	OFF	OFF	OFF	OFF	OFF	Displays the water-temperature setting.
OFF	OFF	OFF	OFF	OFF	OFF	OFF	Displays the high and low refrigerant pressures.

(*1)



The dot lights up when the operation signal is on.
The dot lights off when the operation signal is off.

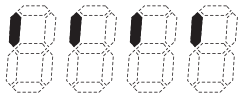
"A" will be displayed while the compressor is in operation.
"S" will be displayed while the compressor is stopped.

"S" will be displayed while the fan is forced to operate.
"-" will be displayed when this function is disabled.

"d" will be displayed when the peak-demand control function is enabled.
"-" will be displayed when this function is disabled.

Displays the operation mode.
"H" will be displayed during water-heating operation.
"d" will be displayed during a defrost cycle.
"F" will be displayed while the pump is being operated to prevent freeze-up.
"A" will be displayed during anti-freeze operation.

(*2)



Displays the system control mode.
"S" will be displayed when the multiple system control option is used.
"A" will be displayed when the individual system control option is used.

(7) Remote water temperature setting input signal type

When item code 1051 is "0," by setting SW2-7 to ON, external analog signals can be used to set the water temperatures.

Analog input type can be selected from the following four types:

"0": 4-20 mA

"1": 0-10 V

"2": 1-5 V

"3": 2-10 V

* To make water temperature settings and to use capacity control, an input to CN421 2(+)-3(-) is required.

Select item code 21 to set the type of analog input signal to be used to set the water temperature from a remote location.

Setting procedures

Set the dip switches on the circuit board as follows to change the settings.

Step 1
Select the analog input format

	SW2	SW3					
	-10	5	6	7	8	9	10
Switch settings	OFF	OFF	OFF	OFF	OFF	ON	OFF

Items that can be set	Item code	Initial value	Unit	Setting			Note	Setting change from an optional remote controller
				Incre-ments	Lower limit	Upper limit		
Select the analog input format	1051	0		1	0	3		Not possible

Select "0."

0: Water temperature input 4-20 mA
1: Capacity control input 4-20 mA
2: Water temperature input IT terminal
3: Capacity control input IT terminal

Step 2
Set dip switches SW2, SW3, SW421-1, and SW421-2.

* Incorrectly setting SW421 may cause damage to the circuit board.

	SW421-1	SW421-2	ITEM CODE 21
4-20 mA	ON	ON	0
0-10 V	OFF	OFF	1
1-5 V	OFF	ON	2
2-10 V	OFF	OFF	3

	SW2	SW3					
	-10	5	6	7	8	9	10
Switch settings	OFF	OFF	OFF	OFF	OFF	ON	OFF

Step 3
Select the item to be set with push switch SWP3.

Select the type of analog input signal to be used to set the water temperature from a remote location.

Step 4
Change the values with push switches SWP1 (↑) or SWP2 (↓).

Press push switch SWP3 to select the item code.

Change the values with push switches SWP1 and SWP2.

Until the changed values are saved, the values will blink.

Items that can be set	Item code	Initial value	Unit	Setting			Note	Setting change from an optional remote controller
				Incre-ments	Lower limit	Upper limit		
Water temperature setting input signal type	21	0		1	0	3		Not possible

Step 5
Press push switch SWP3 to save the changed value.

Press SWP3 once within one minute of changing the settings to save the change.

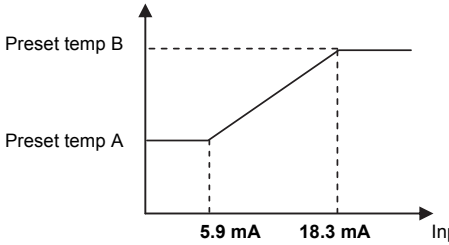
When the new setting is saved, the display will stop blinking and stay lit. The display will, then, return to the item code display mode.

If SWP3 is not pressed within one minute, the change will not be saved, and the display will return to the item code display mode.

(8) Setting the water temperature using analog signal input

- When dip switch SW2-7 is set to ON (Enable external input) and item code 1051 is set to "0", the target water temperature varies with the preset temperatures A and B and the type of analog input signal.
  - When the water temperature setting input signal type is set to 0 (4-20 mA)

    - External analog input signal of 5.9 mA: Preset temp. A (Item code 11)
    - External analog input signal of 18.3 mA: Preset temp. B (Item code 13)
    - External analog input signal of between 5.9 and 18.3 mA: the preset temperature will be linearly interpolated.



Preset temperature = (B - A) × (Input current - 5.9 mA) / 12.4 mA + A
Change of 0.12 mA or less is not recognized.

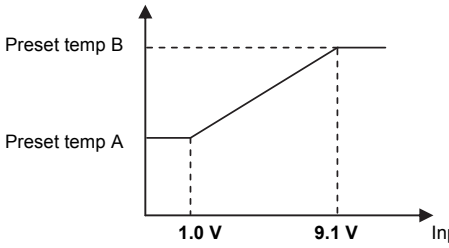
* Due to the resistance of the wire that is connected to the 4-20 mA analog input, the preset temperature may not properly be sent. If this is the case, check the current value of the analog input, and adjust the output current value of the connected 4-20 mA signal output device.
Refer to the tables below for how to display the current value of the analog input.

	SW2	SW3					
	-10	5	6	7	8	9	10
Switch settings	OFF	OFF	OFF	OFF	OFF	ON	ON

Item that can monitor	Item code	Unit
Current value of analog signal input	c15	mA

- When the water temperature setting input signal type is set to 1 (0-10 V)

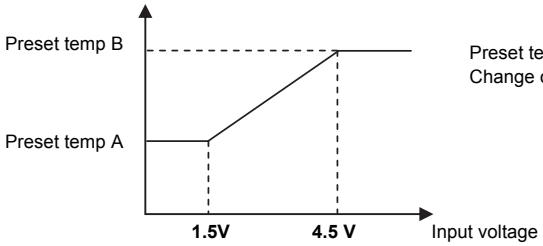
    - External analog input signal of 1.0 V: Preset temp. A (Item code 11)
    - External analog input signal of 9.1 V: Preset temp. B (Item code 13)
    - External analog input signal of between 1.0 and 9.1 V: the preset temperature will be linearly interpolated.



Preset temperature = (B - A) × (Input voltage - 1.0 V) / 8.1 V + A
Change of 59 mV or less is not recognized.

- When the water temperature setting input signal type is set to 2 (1-5 V)

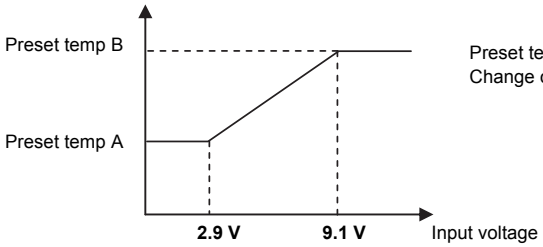
  - External analog input signal of 1.5 V: Preset temp. A (Item code 11)
  - External analog input signal of 4.5 V: Preset temp. B (Item code 13)
  - External analog input signal of between 1.5 and 4.5 V: the preset temperature will be linearly interpolated.



Preset temperature = (B - A) × (Input voltage - 1.5 V) / 3.0 V + A
Change of 29 mV or less is not recognized.

- When the water temperature setting input signal type is set to 3 (2-10 V)

  - External analog input signal of 2.9 V: Preset temp. A (Item code 11)
  - External analog input signal of 9.1 V: Preset temp. B (Item code 13)
  - External analog input signal of between 2.9 and 9.1 V: the preset temperature will be linearly interpolated.

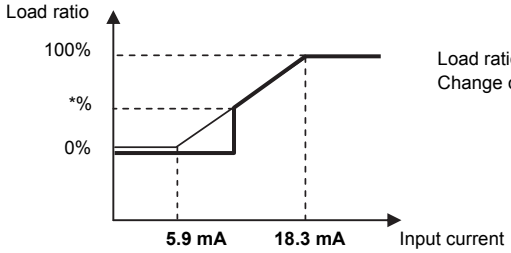


Preset temperature = (B - A) × (Input voltage - 2.9 V) / 6.2 V + A
Change of 59 mV or less is not recognized.

(9) Setting the capacity control ratio using analog signal input

- When dip switch SW2-7 is set to ON (Enable external input) and item code 1051 is set to "1", the capacity control ratio varies with the type of analog input signal.
  - When the water temperature setting input signal type is set to 0 (4-20 mA)

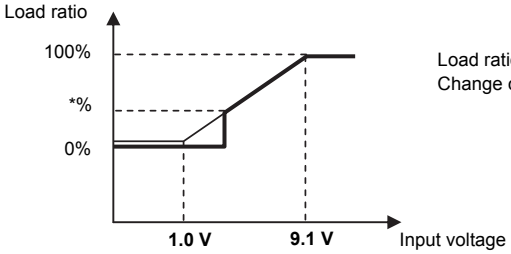
    - External analog input signal of 5.9 mA: 0%
    - External analog input signal of 18.3 mA: 100%
    - External analog input signal of between 5.9 and 18.3 mA: the percent will be linearly interpolated.



Load ratio = 100% × (Input current - 5.9 mA) / 12.4mA
Change of 0.12 mA or less is not recognized.

  - When the water temperature setting input signal type is set to 1 (0-10 V)

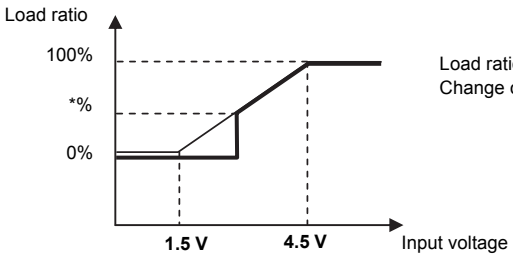
    - External analog input signal of 1.0 V: 0%
    - External analog input signal of 9.1 V: 100%
    - External analog input signal of between 1.0 and 9.1 V: the percent will be linearly interpolated.



Load ratio = 100% × (Input voltage - 1.0 V) / 8.1 V
Change of 59 mV or less is not recognized.

- When the water temperature setting input signal type is set to 2 (1-5 V)

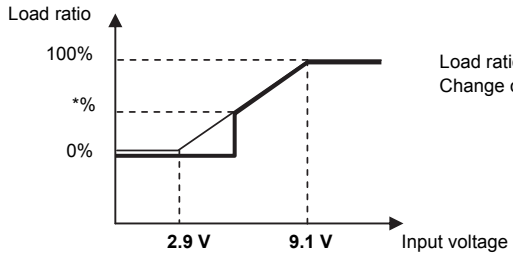
  - External analog input signal of 1.5 V: 0%
  - External analog input signal of 4.5 V: 100%
  - External analog input signal of between 1.5 and 4.5 V: the percent will be linearly interpolated.



Load ratio = 100% × (Input voltage - 1.5 V) / 3.0 V
Change of 29 mV or less is not recognized.

- When the water temperature setting input signal type is set to 3 (2-10 V)

  - External analog input signal of 2.9 V: 0%
  - External analog input signal of 9.1 V: 100%
  - External analog input signal of between 2.9 and 9.1 V: the percent will be linearly interpolated.



Load ratio = 100% × (Input voltage - 2.9 V) / 6.2 V
Change of 59 mV or less is not recognized.

*%: When the compressor frequency drops below 30 Hz, the compressor stops.
The frequency value that causes the compressor to stop varies depending on the outside temperature and water temperature.

(10) Setting the booster heater 1 operation conditions

A temperature at which the booster heater 1 will go into operation (TWL) can be selected.

Select item code 1057 and 1058 to set the threshold temperature (TWL1 and TAL1) for booster heater operation.

Booster heater 1 operation conditions

- **Individual system**

The operation command signal is ON and at least one of the following two conditions is met.

1 Water-temperature control option is set to OFF, the water temperature drops below TWL1, and the outside temperature drops below TAL1.
2 Water-temperature control option is set to ON, the external water temperature sensor reading drops below TWL1, and the outside temperature drops below TAL1.

The booster heater 1 signal of the MAIN circuit comes on.

- **Multiple system**

The operation command signal is ON and the following condition is met.

External water temperature sensor readings (TH15 and TH16) drop below TWL1, and the reading of the outside temperature sensor connected to the MAIN circuit of the main unit drops below TWL1.

The booster heater 1 signal of the MAIN circuit comes on.

Booster heater 1 operation-stop conditions

The operation command signal is OFF or all of the following two conditions are met.

1 The water temperature is at or above TWL1+2°C or the outside temperature is at or above TAL1+2°C.
2 External water temperature sensor readings (TH15 and TH16) are at or above TWL1+2°C.

(*) Unit's inlet water temperature: Average value between the water temperature settings of the MAIN and SUB circuits

Setting procedures

Set the dip switches on the circuit board as follows to change the settings.

Step 1 Outdoor temperature input source selection

	SW2	SW3					
	-10	5	6	7	8	9	10
Switch settings	OFF	OFF	OFF	OFF	ON	OFF	OFF

Items that can be set	Item code	Initial value	Unit	Setting			Note	Setting change from an optional remote controller
				Incre-ments	Lower limit	Upper limit		
Outdoor temperature input source selection	1080	0		1	0	3		Not possible

0: No outdoor temperature → Booster heater can only be operated based on the water temperature. (Outdoor temperature condition becomes ineffective.)

1: Outdoor temp. analog input 4-20mA(*1) → Go to STEP 2.

2: IT terminal → Go to STEP 3.

3: Outdoor temp. input TH9(*1) → Go to STEP 3.

*1 Use the following recommended products or similar products for the outdoor temperature thermistor.
Recommended product t-mac 500-51791
Relationship between resistance value Rt (kΩ) and temperature t (ºC)

$$Rt = 1.07 \exp\{3978 \left(\frac{1}{273 + t} - \frac{1}{358}\right)\}$$

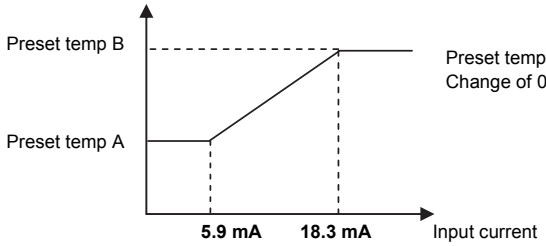
- Select the thermistor taking note of the tolerance in the resistance values.
- Use shielded cable for the wiring.

Step 2
Set the point

	SW2	SW3					
	-10	5	6	7	8	9	10
Switch settings	OFF	OFF	OFF	OFF	OFF	ON	OFF

Items that can be set	Item code	Initial value	Unit	Setting			Setting change from an optional remote controller (PAR-W21MAA)
				Incre-ments	Lower limit	Upper limit	
Outdoor setting Upper limit (18 mA)	28	25	ºC	0.5ºC	-30	50	Not possible
Outdoor setting Lower limit (6 mA)	29	-10	ºC	0.5ºC	-30	50	Not possible

* External analog input signal of 18.3 mA: Preset temp. B (Item code 28)
* External analog input signal of 5.9 mA: Preset temp. A (Item code 29)
* External analog input signal of between 5.9 and 18.3 mA: the preset temperature will be linearly interpolated.



Preset temperature = (B - A) × (Input current - 5.9 mA) / 12.4 mA + A
Change of 0.12 mA or less is not recognized.

Step 3
Set dip switches SW2 and SW3.

	SW2	SW3					
	-10	5	6	7	8	9	10
Switch settings	OFF	OFF	OFF	OFF	OFF	ON	OFF

Step 4
Select the item to be set with push switch SWP3.

Step 5
Change the values with push switches SWP1 (↑) or SWP2 (↓).

Select item code 1057 and 1058 to set the operation temperature (TWL1 and TAL1) for the booster heater 1.
Press push switch SWP3 to select the item code.
Change the values with push switches SWP1 and SWP2.
Until the changed values are saved, the values will blink.

Items that can be set	Item code	Initial value	Unit	Setting			Note	Setting change from an optional remote controller
				Increm-ents	Lower limit	Upper limit		
Booster heater 1 operation water temperature (TWL1)	1057	40	°C	0.1	0	70		Not possible
Booster heater 1 operation outside temperature (TAL1)	1058	-10		0.1	-30	50		

Press and hold push switches SWP1 and SWP2 to fast forward the numbers.

Step 6
Press push switch SWP3 to save the changed value.

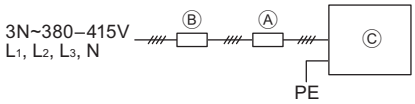
Press SWP3 once within one minute of changing the settings to save the change.
When the new setting is saved, the display will stop blinking and stay lit. The display will, then, return to the item code display mode.
If SWP3 is not pressed within one minute, the change will not be saved, and the display will return to the item code display mode.

5. Electrical Wiring Installation

[1] Main Power Supply Wiring and Switch Capacity

Schematic Drawing of Wiring (Example)

Ⓐ: Switch (with current breaking capability)
Ⓑ: Current leakage breaker
Ⓒ: Unit



Main power supply wire size, switch capacities, and system impedance

Model	Minimum wire thickness (mm^2)			Current leakage breaker	Local swtich (A)		No-fuse breaker (A)	Max. Permissive System Impedance
	Main cable	Branch	Ground		Capacity	Fuse		
CRHV-P600YA-HPB	25	-	25	75 A 100 mA 0.1 sec. or less	75	75	75	0.18 Ω

1. **Use a dedicated power supply for each unit. Ensure that each unit is wired individually.**
2. **When installing wiring, consider ambient conditions (e.g., temperature).**
3. **The wire size is the minimum value for metal conduit wiring. If voltage drop is a problem, use a wire that is one size thicker.**
   Make sure the power-supply voltage does not drop more than 10%.
4. **Specific wiring requirements should adhere to the wiring regulations of the region.**
5. **Power supply cords of appliances shall not be lighter than polychloroprene sheathed flexible cord (design 60245 IEC57).**
6. **A switch with at least 3 mm contact separation in each pole shall be provided by the Air Conditioner installer.**
7. **Do not install a phase advancing capacitor on the motor. Doing so may damage the capacitor and result in fire.**

⚠ Warning:

- **Be sure to use specified wires and ensure no external force is imparted to terminal connections. Loose connections may cause overheating and fire.**
- **Be sure to use the appropriate type of overcurrent protection switch. Note that overcurrent may include direct current.**

⚠ Caution:

- **Some installation sites may require an installation of an earth leakage breaker for the inverter. If no earth leakage breaker is installed, there is a danger of electric shock.**
- **Only use properly rated breakers and fuses. Using a fuse or wire of the wrong capacity may cause malfunction or fire.**

Note:

- **This device is intended for the connection to a power supply system with a maximum permissible system impedance shown in the above table at the interface point (power service box) of the user's supply.**
- **Ensure that this device is connected only to a power supply system that fulfills the requirements above. If necessary, consult the public power supply company for the system impedance at the interface point.**
- **This equipment complies with IEC 61000-3-12 provided that the short-circuit power S_{SC} is greater than or equal to S_{SC} (*2) at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, in consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{SC} greater than or equal to S_{SC} (*2).**

S_{SC} (*2)

S_{SC} (MVA)
3.42

Control cable specifications

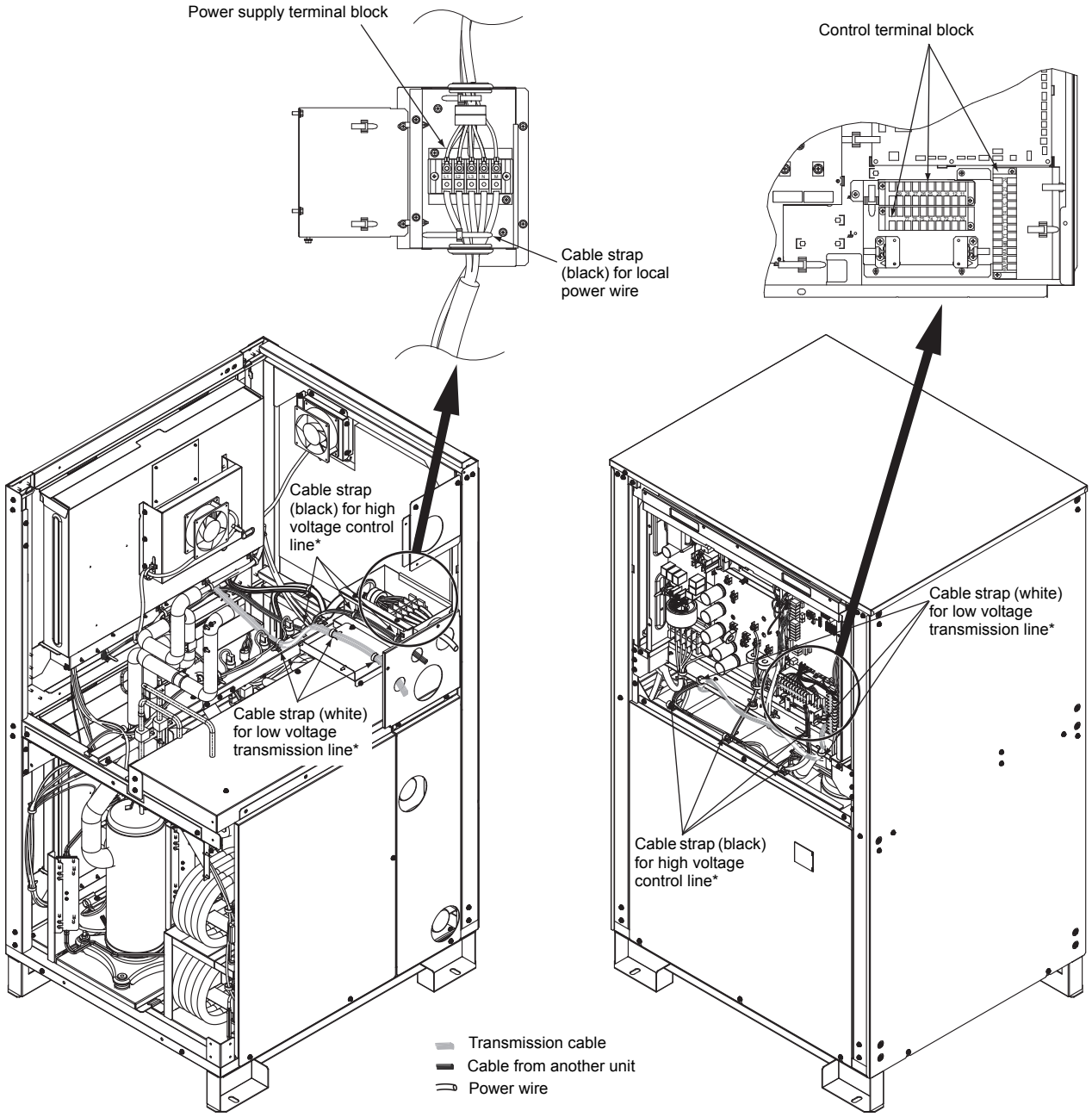
Remote controller cable	Size	0.3 - 1.25 mm² (Max. 200 m total)
	Recommended cable types	CVV
M-NET cable between units *1	Size	Min. 1.25 mm² (Max. 120 m total)
	Recommended cable types	Shielded cable CVVS, CPEVS or MVVS
External input wire size		Min. 0.3 mm²
External output wire size		1.25 mm²

*1 Use a CVVS or CPEVS cable (Max. total length of 200 m) if there is a source of electrical interference near by (e.g., factory) or the total length of control wiring exceeds 120 m.

[2] Cable Connections

<1> Schematic Diagram of a Unit and Terminal Block Arrangement

To remove the front panel of the control box, unscrew the four screws and pull the panel forward and then down.



* When connecting the cables, first temporarily fasten the cables, and then fasten them properly after the cables have been connected to the terminal blocks within the control box.

<2> Precautions when fastening screws

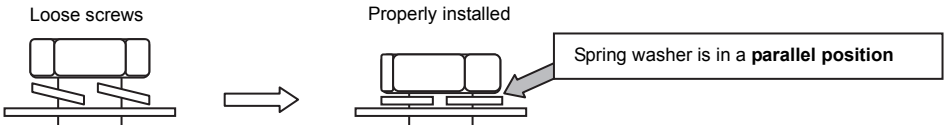
* Faulty contacts due to loose screws may cause overheating and fire.
* Using the circuit board while it is damaged may cause overheating and fire.

① Screw fastening torque

Power supply terminal block (TB2)...M8 screw: **10 to 13.5 N·m**

Use the following methods to check that the screws have been fastened.

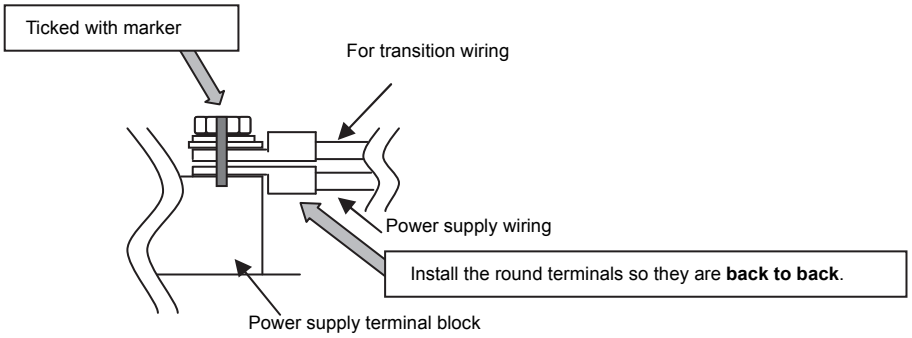
1. Check that the spring washer is in a parallel position.
   * If the screw is biting into the washer, simply fastening the screw to the specified torque cannot determine whether it has been installed properly.



2. Check that the wiring does not move at the screw terminal.

② Take extra care not to ruin the screw thread due to fastening the screw at an angle.
   * To prevent fastening the screw at an angle, install the round terminals so they are back to back.

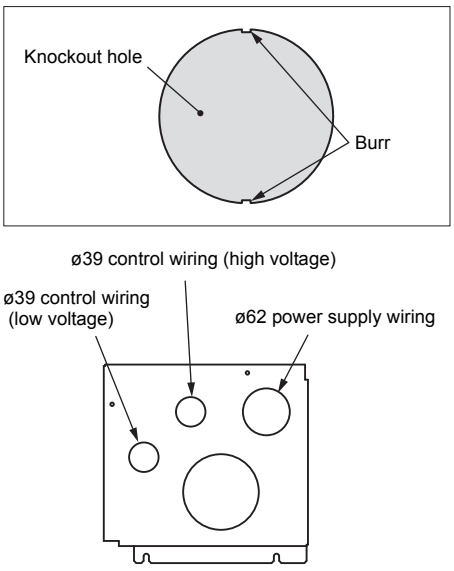
③ After fastening the screw, use a permanent marker to tick off the screw head, washer and terminal.



Important: Power supply cables larger than 25 mm^2 in diameter are not connectable to the power supply terminal block (TB2). Use a pull box to connect them.

<3> Installing the conduit tube

- Punch out the knockout hole for wire routing at the bottom of the front panel with a hammer.
- When putting wires through knockout holes without protecting them with a conduit tube, deburr the holes and protect the wires with protective tape.
- If damage from animals is a concern, use a conduit tube to narrow the opening.
- Always use a conduit to run the power supply wiring.
- Select the conduit size based on the knockout hole.



CRHV-P600YA-HPB ELECTRICAL WIRING DIAGRAM

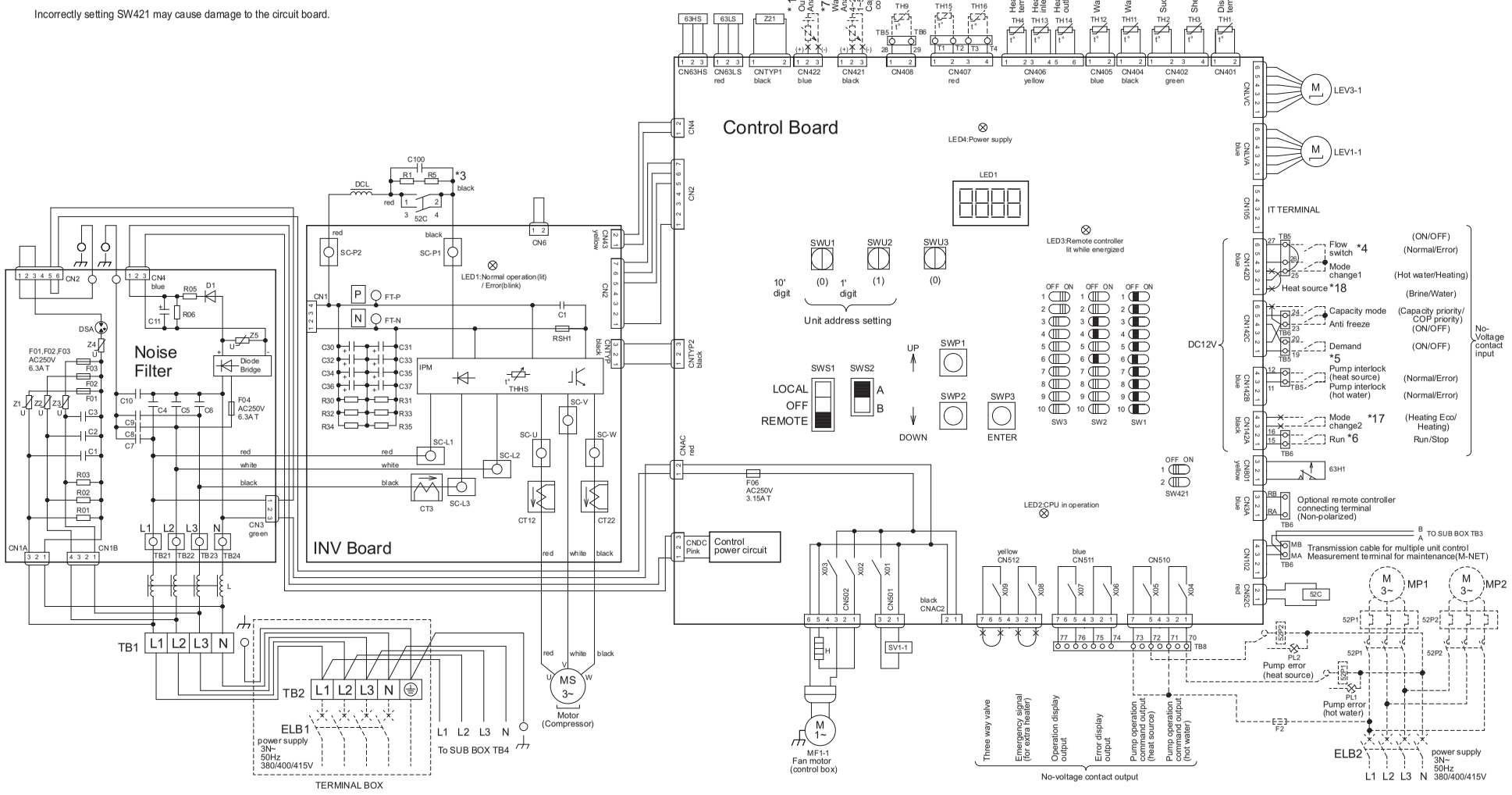
Note 1. Single-dotted lines indicate field wiring.
Note 2. The symbols of the field connecting terminals are as follows.
○:Terminal block ×:Connection by cutting the short circuit wire
Note 3. Faston terminals have a locking function.
Press the tab in the middle of the terminals to remove them.
Check that the terminals are securely locked in place after insertion.
Note 4. Remove the short circuit wire between the terminals 25 and 27 to connect a flow switch.
Note 5. Be sure to connect the wires from Terminals 11 and Terminals 12 to the interlock contact on the pump.
A short-circuit may cause abnormal stop or malfunctions.
Note 6. Operation signals can be received from through the dry contact.
Note 7. Need to selects either Water temperature setting input signal or Capacity control input signal.
Set the SW421 and input the Item code 21, 1051 (by SW2 and SW3) corresponding to the input signal as shown in the table below.

	SW421-1	SW421-2	ITEM CODE 21	ITEM CODE 1051
4~20mA	ON	ON	0	0 : Water temperature setting input
0~10V	OFF	OFF	1	
1~ 5V	OFF	ON	2	1 : Capacity control input
2~10V	OFF	OFF	3	

Incorrectly setting SW421 may cause damage to the circuit board.

Note 8. The broken lines indicate the optional parts,field-supplied parts,and field work.
Note 9. Make sure to connect a pump interlock contact.
A short-circuit may cause abnormal stop or malfunctions.
Note10. The preset temperature setting can be switched from the no-voltage contact or by setting time ranges.
Note11. Leave a space of at least 5 cm between the low voltage external wiring(no-voltage contact input and remote controller wiring) and wiring of 100V or greater.
Do not place them in the same conduit tube or cabtyre cable as this will damage the circuit board.
Note12. When cabtyre cable is used for the control cable wiring, use a separate cabtyre cable for the following wiring.
Using the same cabtyre cable may cause malfunctions and damage to the unit.
(a) Optional remote controller wiring
(b) No-voltage contact input wiring
(c) No-voltage contact output wiring
(d) Analog input wiring
Note13. Use a contact that takes 12VDC 5mA for no-voltage contact input.
Note14. The SW1-SW3 switches indicated with ▭ can be set on site.
Do not change the other SW1-SW3 switch settings.
Note15. Make sure that on site terminal connection is correct.
With wrong connection, operation error may occur.

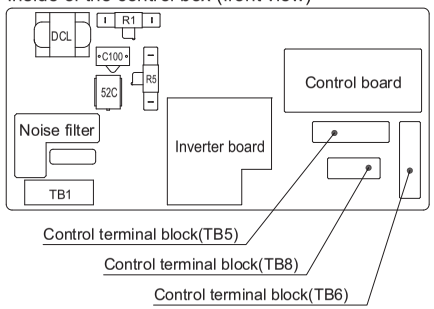
Note16. Use a 4-20mA signal output device with insulation.
Feeding 30mA or more current may damage the circuit board.
Note17. If CN142A 3-4 is ON (CLOSE), the operation mode cannot be changed from the remote controller.
Note18. If using water as heat source, cut CN142D 1-3 (short circuit wire). After cutting CN142D 1-3, the power reset function is enabled. To prevent the heat exchanger from freezing, make sure to check that the CN142D 1-3 is cut if using water as heat source.



Symbol explanation

	Symbol	Explanation
MAIN BOX and SUB BOX	CT12	Ac current sensor
	CT22	
	CT3	
	C100	Capacitor(Electrolysis)
	DCL	DC reactor
	F01	Fuse
	F02	
	F03	
	F04	
	F06	Fuse(Control Board)
	H	Crankcase heater(for heating the compressor)
	R1	Electrical resistance
	R5	
	THHS	IPM temperature
	Z21	Function setting connector
	52C	Electromagnetic relay(Inverter main circuit)
	63HS	High pressure sensor
	63LS	Low pressure sensor
MAIN BOX	LEV1-1	Electronic expansion valve(Main circuit)
	LEV3-1	Electronic expansion valve(Main injection circuit)
	SV1-1	Solenoid valve(Injection circuit)
	TH1~4	Thermistor
	TH11~16	
	63H1	High pressure switch(Main circuit)
Field-supplied	<ELB1,2>	Earth leakage breaker
	<F2>	Fuse
	<TH9>	Thermistor
	<MP1,2>	Pump motor
	<PL1,2>	Pilot lamp(Pump)
	<51P1,2>	Overcurrent relay(Pump)
	<52P1,2>	Electromagnetic contactor(Pump)

Inside of the control box (front view)



Display setting

Control board display	Control board SW setting ※1	
Preset water temperature	SW3-5 :ON	SW3-6 :OFF
Current water temperature ※2	SW3-5 :ON	SW3-6 :ON
High pressure / Low pressure	SW2-10 :OFF SW3-5 :OFF SW3-6 :OFF SW3-7 :OFF	SW3-8 :OFF SW3-9 :OFF SW3-10 :OFF

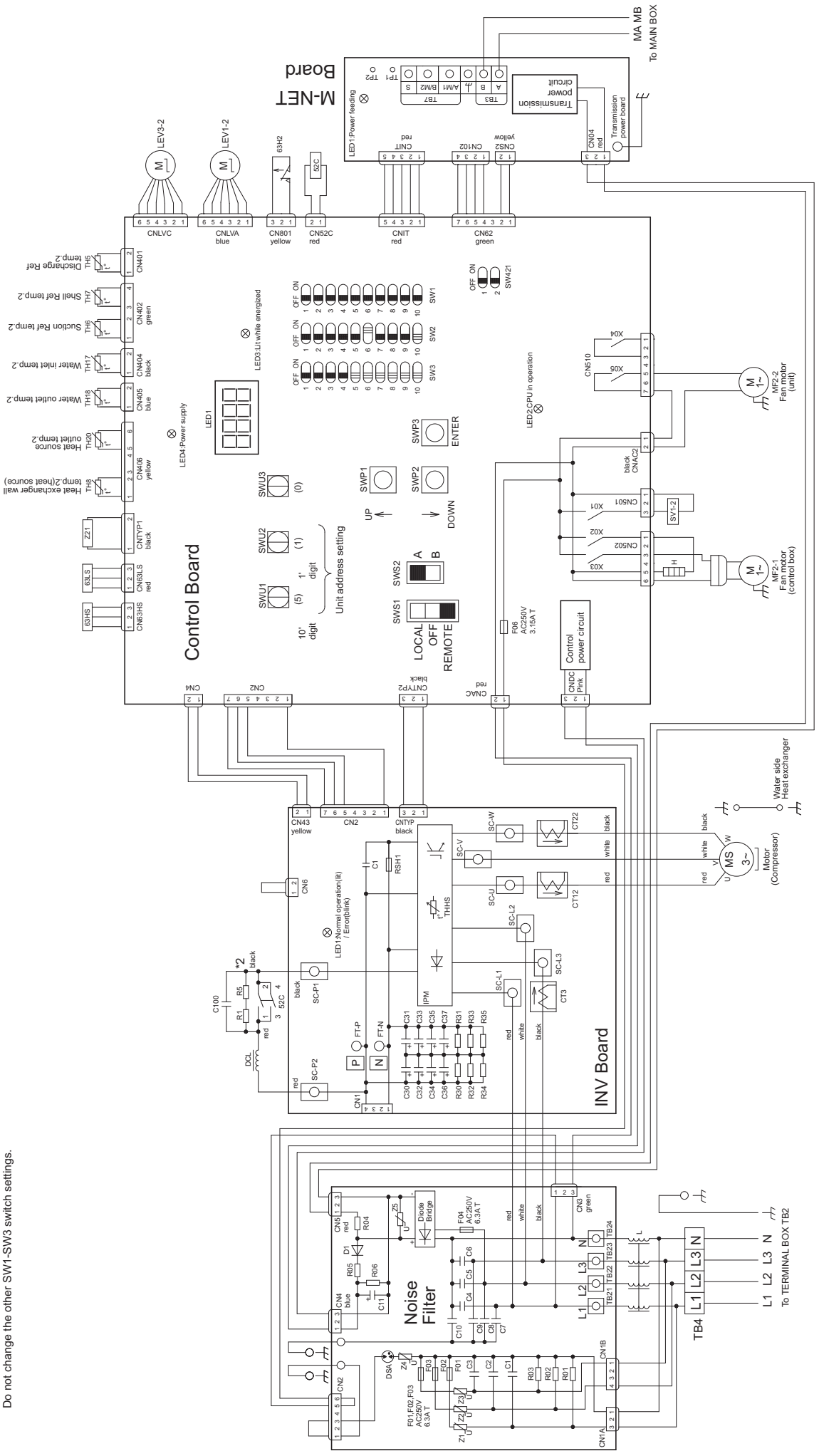
※1. Select a display by setting the switches.
※2. The current water temperature is displayed according to the preset water temperature method.
※3. If an error occurs, a 4-digit error code, as explained in the table below, will blink on the board and remote controller display. ([Error code] and [Error source address]appear alternately on the remote controller display.)
※4. Definition of symbols in the "Error reset" column
◎ ··· Errors that can be reset regardless of the switch settings
○ ··· Errors that can be reset if the remote reset setting on the unit is set to "Enable" (factory setting)
Errors that cannot be reset if the remote reset setting on the unit is set to "Disable"
× ··· Errors that cannot be reset
— ··· Errors that will be automatically reset after the cause of the error is removed
※5. Power failure can be detected only when the switch setting "Automatic recovery after power failure" on the unit is set to "Disable."
(The default setting is "Enable.")
※6. Depending on the system configuration, the unit may come to an abnormal stop when the communication error lasts for 10 minutes or longer. In this case, the error needs to be reset by setting either SWS1 on the unit (PCB) or remote operation switch.
※7. This error code will appear when multiple errors occur that are reset in different ways and when one or more of these errors have not been reset.
This error can be reset by turning off and then back on the unit's power.
※8. Remove the cause of the error before resetting the error.
Resuming operation without removing the cause may burst the heat exchanger.
※9. [Error code] and [Detail code] appear alternately.
Refer to the installation Manual for detail codes.
※10. Under the standard pipe connection of the heat source.

Error Codes

No.	Error code (PCB ※3)	Error type	Error reset ※4	
			Unit side(PCB)	Remote
			SWS1	Operation SW
1	A000	Unreset errors ※7	×	×
2	4106	Power failure ※5	◎	◎
3	1101	Suction temperature fault	○	○
4	1102	Discharge temperature fault	○	○
5	1103	Shell temperature fault	○	○
6	1512	Low evaporation temperature fault	○	○
7	1502	Compressor flooding	○	○
8	2501	Water supply cutoff (Flow switch)	○	○
9	1302	High pressure fault	○	○
10	0403	Serial communication error	○	○
11	1503	Heat exchanger freeze up ※8	○	○
12	1303	Vacuum protection fault	○	○
13	4102	Open phase	×	×
14	4106	Power supply fault ※9	—	—
15	4115	Power supply frequency fault	×	×
16	4220,4225	Inverter bus voltage fault ※9	○	○
17	4230,4235	Inverter overheat protection fault	○	○
18	4240,4245	Inverter overload protection fault	○	○
19	4250,4255	IPM error(inclusive)/overcurrent relay trip ※9	○	○
20	4260,4265	Cooling fan fault	○	○
21	5101	Discharge temperature thermistor error(TH1 MAIN Circuit)	○	○
22	5102	Compressor inlet temperature thermistor error(TH2 MAIN Circuit)	○	○
23	5103	Shell temperature thermistor error(TH3 MAIN Circuit)	○	○
24	5104	Evaporator wall temperature thermistor error(TH4 MAIN Circuit)	○	○
25	5105	Discharge temperature thermistor error(TH5 SUB Circuit)	○	○
26	5106	Compressor inlet temperature thermistor error(TH6 SUB Circuit)	○	○
27	5107	Shell temperature thermistor error(TH7 SUB Circuit)	○	○

No.	Error code (PCB ※3)	Error type	Error reset ※4	
			Unit side(PCB)	Remote
			SWS1	Operation SW
28	5108	Evaporator wall temperature thermistor error (TH8 SUB Circuit)	○	○
29	5109	Outside temperature thermistor error(TH9)	○	○
30	5110	THHS sensor/Circuit fault ※9	○	○
31	5111	Inlet water temperature thermistor error(MAIN Circuit)	○	○
32	5112	Outlet water temperature thermistor error(MAIN Circuit)	○	○
33	5117	Inlet water temperature thermistor error(SUB Circuit)	○	○
34	5118	Outlet water temperature thermistor error(SUB Circuit)	○	○
35	5115,5116	Representative water temperature thermistor error(TH15,TH16)	○	○
36	5113	Heat source inlet temperature thermistor error (TH13) ※10	○	○
37	5114	Heat source outlet temperature thermistor error (TH14 MAIN) ※10	○	○
38	5120	Heat source outlet temperature thermistor error (TH20 SUB) ※10	○	○
39	5201	High-pressure sensor fault	○	○
40	5202	Low-pressure sensor fault	○	○
41	5301,5305	ACCT·DCCT sensor fault/Circuit fault ※9	○	○
42	6500	Communication error between the MAIN and SUB units	—	—
43	6600	Communication error between the MAIN and SUB units (Simple multiple unit control)	×	×
44	6603		—	—
45	6606		—	—
46	6607 ※6		—	—
47	6608 ※6		—	—
48	6831	Remote controller signal reception error 1	−(○)	−(○)
49	6832	Remote controller signal transmission error	−(○)	−(○)
50	6834	Remote controller signal reception error 2	−(○)	−(○)
51	7102	Incorrect setting of number of connected unit ※9	×	×
52	7105	Discrete address,system error	×	×
53	7113,7117	Model setting error	×	×
54	7130	Incompatible combination of units	×	×

CRHV-P600YA-HPB ELECTRICAL WIRING DIAGRAM

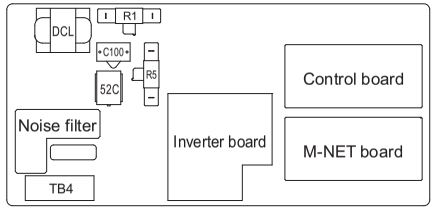


Note 1. Single-dotted lines indicate field wiring.
Note 2. Faston terminals have a locking function.
Press the tab in the middle of the terminals to remove them.
Check that the terminals are securely locked in place after insertion.
Note 3. The SW1-SW3 switches indicated with ⓓ can be set on site.
Do not change the other SW1-SW3 switch settings.

Symbol explanation

	Symbol	Explanation
MAIN BOX and SUB BOX	CT12	Ac current sensor
	CT22	
	CT3	
	C100	Capacitor(Electrolysis)
	DCL	DC reactor
	F01	Fuse
	F02	
	F03	
	F04	
	F06	Fuse(Control Board)
	H	Crankcase heater(for heating the compressor)
	R1	Electrical resistance
	R5	
	THHS	IPM temperature
	Z21	Function setting connector
	52C	Electromagnetic relay(Inverter main circuit)
	63HS	High pressure sensor
	63LS	Low pressure sensor
SUB BOX	LEV1-2	Electronic expansion valve(Sub circuit)
	LEV3-2	Electronic expansion valve(Sub injection circuit)
	SV1-2	Solenoid valve(Injection circuit)
	TH5~8	Thermistor
	TH17,18	
	TH20	
	63H2	High pressure switch(Sub circuit)
Field-supplied	<ELB1,2>	Earth leakage breaker
	<F2>	Fuse
	<MP1,2>	Pump motor
	<PL1,2>	Pilot lamp(Pump)
	<51P1,2>	Overcurrent relay(Pump)
	<52P1,2>	Electromagnetic contactor(Pump)

Inside of the control box (front view)



Display setting

Control board display	Control board SW setting ※1	
Preset water temperature	SW3-5 :ON	SW3-6 :OFF
Current water temperature ※2	SW3-5 :ON	SW3-6 :ON
High pressure / Low pressure	SW2-10 :OFF SW3-5 :OFF SW3-6 :OFF SW3-7 :OFF	SW3-8 :OFF SW3-9 :OFF SW3-10 :OFF

※1. Select a display by setting the switches.
※2. The current water temperature is displayed according to the preset water temperature method.
※3. If an error occurs, a 4-digit error code, as explained in the table below, will blink on the board and remote controller display. ([Error code] and [Error source address]appear alternately on the remote controller display.)
※4. Definition of symbols in the "Error reset" column
◎… Errors that can be reset regardless of the switch settings
○… Errors that can be reset if the remote reset setting on the unit is set to "Enable" (factory setting)
Errors that cannot be reset if the remote reset setting on the unit is set to "Disable"
×… Errors that cannot be reset
—… Errors that will be automatically reset after the cause of the error is removed
※5. Power failure can be detected only when the switch setting "Automatic recovery after power failure" on the unit is set to "Disable." (The default setting is "Enable.")
※6. Depending on the system configuration, the unit may come to an abnormal stop when the communication error lasts for 10 minutes or longer. In this case, the error needs to be reset by setting either SWS1 on the unit (PCB) or remote operation switch.
※7. This error code will appear when multiple errors occur that are reset in different ways and when one or more of these errors have not been reset. This error can be reset by turning off and then back on the unit's power.
※8. Remove the cause of the error before resetting the error. Resuming operation without removing the cause may burst the heat exchanger.
※9. [Error code] and [Detail code] appear alternately. Refer to the installation Manual for detail codes.
※10. Under the standard pipe connection of the heat source.

Error Codes

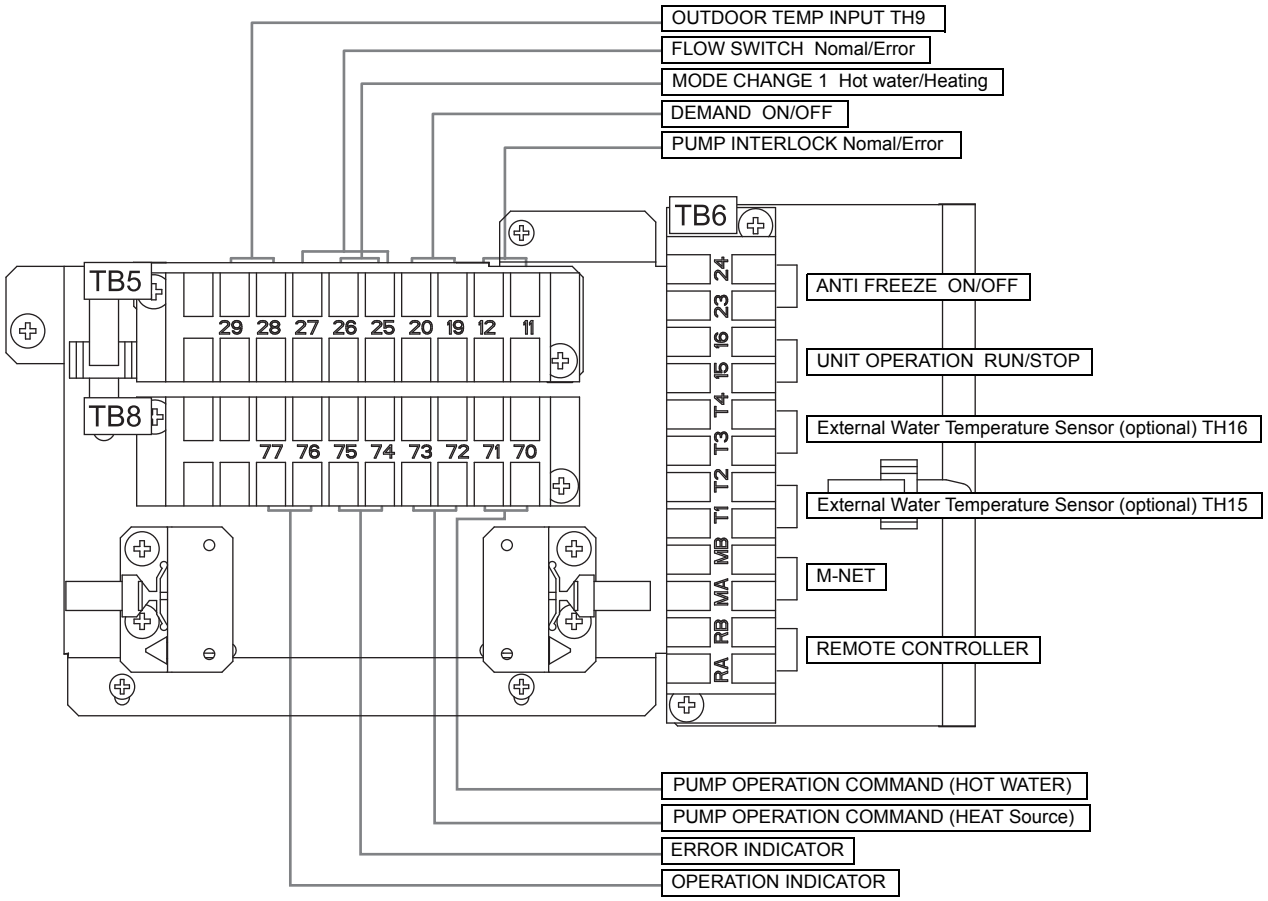
No.	Error code (PCB ※3)	Error type	Error reset ※4	
			Unit side(PCB)	Remote
			SWS1	Operation SW
1	R000	Unreset errors ※7	×	×
2	4 106	Power failure ※5	◎	◎
3	1 101	Suction temperature fault	○	○
4	1 102	Discharge temperature fault	○	○
5	1 103	Shell temperature fault	○	○
6	15 12	Low evaporation temperature fault	○	○
7	1502	Compressor flooding	○	○
8	2501	Water supply cutoff (Flow switch)	○	○
9	1302	High pressure fault	○	○
10	0403	Serial communication error	○	○
11	1503	Heat exchanger freeze up ※8	○	○
12	1303	Vacuum protection fault	○	○
13	4 102	Open phase	×	×
14	4 106	Power supply fault ※9	—	—
15	4 115	Power supply frequency fault	×	×
16	4220,4225	Inverter bus voltage fault ※9	○	○
17	4230,4235	Inverter overheat protection fault	○	○
18	4240,4245	Inverter overload protection fault	○	○
19	4250,4255	IPM error(inclusive)/overcurrent relay trip ※9	○	○
20	4260,4265	Cooling fan fault	○	○
21	5 101	Discharge temperature thermistor error(TH1 MAIN Circuit)	○	○
22	5 102	Compressor inlet temperature thermistor error(TH2 MAIN Circuit)	○	○
23	5 103	Shell temperature thermistor error(TH3 MAIN Circuit)	○	○
24	5 104	Evaporator wall temperature thermistor error(TH4 MAIN Circuit)	○	○
25	5 105	Discharge temperature thermistor error(TH5 SUB Circuit)	○	○
26	5 106	Compressor inlet temperature thermistor error(TH6 SUB Circuit)	○	○
27	5 107	Shell temperature thermistor error(TH7 SUB Circuit)	○	○

No.	Error code (PCB ※3)	Error type	Error reset ※4	
			Unit side(PCB)	Remote
			SWS1	Operation SW
28	5 108	Evaporator wall temperature thermistor error (TH8 SUB Circuit)	○	○
29	5 109	Outside temperature thermistor error(TH9)	○	○
30	5 110	THHS sensor/Circuit fault ※9	○	○
31	5 111	Inlet water temperature thermistor error(MAIN Circuit)	○	○
32	5 112	Outlet water temperature thermistor error(MAIN Circuit)	○	○
33	5 117	Inlet water temperature thermistor error(SUB Circuit)	○	○
34	5 118	Outlet water temperature thermistor error(SUB Circuit)	○	○
35	5 115,5 116	Representative water temperature thermistor error(TH15,TH16)	○	○
36	5 113	Heat source inlet temperature thermistor error (TH13) ※10	○	○
37	5 114	Heat source outlet temperature thermistor error (TH14 MAIN) ※10	○	○
38	5 120	Heat source outlet temperature thermistor error (TH20 SUB) ※10	○	○
39	5201	High-pressure sensor fault	○	○
40	5202	Low-pressure sensor fault	○	○
41	5301,5305	ACCT·DCCT sensor fault/Circuit fault ※9	○	○
42	6600	Communication error between the MAIN and SUB units	—	—
43	6602	Communication error between the MAIN and SUB units (Simple multiple unit control)	×	×
44	6603		—	—
45	6606		—	—
46	6607 ※6		—	—
47	6608 ※6		—	—
48	6831	Remote controller signal reception error 1	−(○)	−(○)
49	6832	Remote controller signal transmission error	−(○)	−(○)
50	6834	Remote controller signal reception error 2	−(○)	−(○)
51	7102	Incorrect setting of number of connected unit ※9	×	×
52	7105	Discrete address,system error	×	×
53	7113,7117	Model setting error	×	×
54	7130	Incompatible combination of units	×	×

When using a local controller, refer to the table below for the types of input/output signals that are available and the operations that correspond to the signals.

External Input/Output

Input type	**Dry contact**		**ON (Close)**	**OFF (Open)**	**Terminal block/connector**
	(a) UNIT OPERATION	Run/Stop	The unit will go into operation when the water temperature drops below the preset temperature.	The unit will stop except when the unit is in the Anti-Freeze mode.	TB6 15-16
	(b) MODE CHANGE 2 * When item code 1080 is a value other than "0".	Heating Eco/Heating	The unit will go into operation when the water temperature drops below the temperature setting for "Water Temp Setting C." (Heating ECO mode) * The operation mode cannot be changed from the remote controller.	The unit will go into operation when the water temperature drops below the temperature setting for "Water Temp Setting A." (Heating mode)	CN142A 3-4
	(c) PRIORITY MODE	COP/Capacity	The unit will operate at the maximum capacity setting (Capacity priority mode).	The unit will operate in the energy-efficient mode (COP priority mode). * Enabled when the heat source inlet temperature is 27 ºC or less.	CN142C 2-6
	(d) MODE CHANGE 1	Hot water/Heating	The unit will go into operation when the water temperature drops below the temperature setting for "Water Temp Setting B." (Hot water mode)	The unit will go into operation when the water temperature drops below the temperature setting for "Water Temp Setting A." (Heating mode)	TB5 25-26
	(e) ANTI FREEZE	On/Off	The unit will operate in the Anti-Freeze mode (with the target temperature 30ºC) when the contact status of (a) "UNIT OPERATION" is "Stop" OR the ON/OFF button on the remote controller is turned off.	The unit will operate according to the status of the "UNIT OPERATION" contact (item (a) above) or the ON/OFF command from the remote controller.	TB6 23-24
	(f) FLOW SWITCH	Normal/Error	The unit is allowed to operate.	The unit will not operate.	TB5 25-27
	(g) PUMP INTERLOCK	Normal/Error	The unit is allowed to operate.	The unit will not operate.	TB5 11-12
	(h) PEAK-DEMAND CONTROL	On/Off	The unit will operate at or below the maximum capacity level that was set for the Peak-demand control setting. (If the maximum capacity setting for item (c) above "PRIORITY MODE" is below the setting for the Peak-demand control setting, the unit will operate at whichever capacity is the smaller.)	The unit will operate at or below the maximum capacity setting for either "Capacity Priority Mode" or "COP Priority Mode" that was selected for item (c) "PRIORITY MODE" above.	TB5 19-20
	(i) HEAT SOURCE * Enabled at power reset after switching ON-OFF.	Brine/Water	Safeguard the unit to prevent the heat source freezing temperature to attain -18 ºC.	Safeguard the unit to prevent the heat source freezing temperature to attain 0 ºC.	CN142D 1-3
	Analog				**Terminal block/connector**
	Input type		**Action**		
	(j) WATER TEMP SETTING/CAPACITY CONTROL		Water temperature or capacity control can be set by using the external analog input to the CN421 on the MAIN circuit board. One analog input type can be selected from the following types: 4-20 mA, 1-5 V, 0-10 V, or 2-10 V.		CN421 2(+)-3(-)
	(k) OUTDOOR TEMP (4-20 mA or TH9)		Input 4-20 mA		CN422 2(+)-3(-)
			Input TH9		TB5 28-29
	(l) EXTERNAL WATER SENSOR 1 (optional)		-		TB6 T1-T2
	(m)EXTERNAL WATER SENSOR 2 (optional)		-		TB6 T3-T4
Output type	**Contact type**		**Conditions in which the contact closes (turns on)**	**Conditions in which the contact opens (turns off)**	**Terminal block/connector**
	(n) ERROR INDICATOR	Close/Open	The unit has made an abnormal stop.	During normal operation	TB8 74-75
	(o) OPERATION INDICATOR	Close/Open	The "UNIT OPERATION" contact (item (a) above) or the ON/OFF button on the remote controller is ON.	The "UNIT OPERATION" contact (item (a) above) or the ON/OFF button on the remote controller is OFF.	TB8 76-77
	(p) PUMP OPERATION COMMAND	Close/Open	(1) When SW2-8 is set to ON The pump will operate according to the Thermo-ON/OFF status of the unit. (2) When SW2-8 is set to OFF The pump will operate according to the status of the "UNIT OPERATION" contact or the ON/OFF button on the remote controller button.	Under all conditions other than the ones listed on the left	Hot water side TB8 70-71 Heat source side TB8 72-73
	(q) EMERGENCY SIGNAL	Close/Open	Water temperature has dropped below the Booster Heater Operation Water Temperature (TWL1 value)(Item code 1057) and the outside temperature (TAL1 value)(Item code 1058).	Water temperature is at or above "TWL1+2ºC" or the outside temperature is at or above "TAL1+2ºC".	MAIN circuit CN512 1-3
	(r) THREE WAY VALUE	Close/Open	Turns ON only when the operation mode is Hot water.	Turns OFF only when the operation mode is other than Hot water.	MAIN circuit CN512 5-7
RC/M-NET	REMOTE CONTROLLER	PAR-W21MAA			TB6 RA-RB
	M-NET	-			TB6 MA-MB


OUTDOOR TEMP INPUT TH9
FLOW SWITCH Nomal/Error
MODE CHANGE 1 Hot water/Heating
DEMAND ON/OFF
PUMP INTERLOCK Nomal/Error
TB6
TB5
29 28 27 26 25 20 19 12 11
TB8
77 76 75 74 73 72 71 70
24
23
16
15
T4
T3
T2
T1
MB
MA
RB
RA
ANTI FREEZE ON/OFF
UNIT OPERATION RUN/STOP
External Water Temperature Sensor (optional) TH16
External Water Temperature Sensor (optional) TH15
M-NET
REMOTE CONTROLLER
PUMP OPERATION COMMAND (HOT WATER)
PUMP OPERATION COMMAND (HEAT Source)
ERROR INDICATOR
OPERATION INDICATOR

6. Troubleshooting

Troubleshooting must be performed only by personnel certified by Mitsubishi Electric.

[1] Diagnosing Problems for which No Error Codes Are Available

If a problem occurs, please check the following. If a protection device has tripped and brought the unit to stop, resolve the cause of the error before resuming operation.

Resuming operation without removing the causes of an error may damage the unit and its components.

Problem	Check item		Cause	Solution
The unit does not operate.	The fuse in the control box is not blown.	The power lamp on the circuit board is not lit.	The main power is not turned on.	Switch on the power.
		The power lamp on the circuit board is lit.	The pump interlock circuit is not connected.	Connect the pump interlock circuit wiring to the system.
			The flow switch wiring is not connected.	Connect the flow switch wiring to the system.
	The fuse in the control box is blown.	Measure the circuit resistance and the earth resistance.	Short-circuited circuit or ground fault	Resolve the cause, and replace the fuse.
	Automatic Start/Stop thermistor has tripped.	Water temperature is high.		Normal
		Water temperature is low.	The setting for the automatic Start/Stop thermistor is too low.	Change the setting for the automatic Start/Stop thermistor.
	Water temperature is high.	The water outlet temperature is high.	Water flow rate is too low.	Increase the water flow rate.
			Water outlet temperature is above the specification range.	Decrease the water temperature.
		The water inlet temperature is high.	Water flow rate is too high.	Decrease the water flow rate.
			Water inlet temperature is above the specification range.	Decrease the water temperature.
	Heat source temperature is low.	The heat source outlet temperature is low.	Heat-source water flow rate is too low.	Increase the heat-source water flow rate.
			Heat-source water outlet temperature is below the specification range.	Increase the heat-source water temperature.
		The heat source inlet temperature is low.	Heat-source water inlet temperature is below the specification range.	Increase the heat-source water temperature.
The unit is in operation, but the water does not heat up.	Water temperature is low.	The water inlet/outlet temperature differential is normal.	The water-heating load is too high.	Install more units.
			Low refrigerant charge due to a leak.	Perform a leakage test, repair the leaks, evacuate the system, and charge the refrigerant circuit with refrigerant.
		The water inlet/outlet temperature differential is small.	LEV fault in the main circuit	Replace the LEV in the main circuit.
			Compressor failure	Replace the compressor.
			High pressure is too high, or low pressure is too low.	Operate the units within the specified pressure range.
	Water temperature is high.		Water flow shortage	Increase the water flow rate.
			Problem with the external devices	Repair the devices.
The unit does not operate according to the IT communication settings.	The IT communication settings and the settings on the unit's circuit board do not match.		Either the IT communication settings or the settings on the unit's circuit board are incorrect.	Make sure the IT communication settings and the settings on the unit's circuit board match.

[2] Diagnosing Problems Using Error Codes

If a problem occurs, please check the following before calling for service.

(1) Check the error code against the table below.

(2) Check for possible causes of problems listed in the "Cause" column that correspond to the error code.

(3) If the error codes that appear on the display are not listed in the table below, or no problems were found with the items listed in the "Cause" column, please consult your dealer or servicer.

Diagnosing Problems Using Error Codes

Error code *1 (PCB *2)	Error type		Cause (Installation/Setting error)	Cause (Parts problems)	Error reset *3	
					Unit side (PCB)	Remote
					SWS1	Operation SW
8000	Unreset errors *5		Some of the errors have not been reset.		—	—
4106	Power failure		Power failure occurred when the operation switch is switched on.		◎	◎
2501	Water supply cutoff (Flow switch has been triggered.)		The water flow rate dropped below the flow switch threshold. Water supply cutoff	• Open-circuited flow switch • Broken flow switch wiring	○	○
1302	High pressure fault		No water Water supply cutoff	• Linear expansion valve fault • High-pressure sensor fault	○	○
1502	Compressor flooding			• Low-pressure sensor fault • Shell temperature thermistor fault • High-pressure sensor fault • Discharge refrigerant temperature thermistor fault • Linear expansion valve fault	○	○
1303	Vacuum protection fault		The heat source temperature was below the operating range.	• Low-pressure sensor fault • Suction refrigerant temperature thermistor fault • Linear expansion valve fault • Refrigerant deficiency (refrigerant gas leak)	○	○
1103	Shell temperature fault		The heat source temperature was above the upper limit of the operating range. Excessive oil flow	• Shell temperature thermistor fault • Linear expansion valve fault	○	○
5109	Ther-mistor fault	Outside temperature (TH9)		• Broken or shorted thermistor wiring	○	○
5111 5117		Inlet water temperature (TH11 MAIN Circuit) Inlet water temperature (TH17 SUB Circuit)		• Broken or shorted thermistor wiring	○	○
5112 5118		Outlet water temperature (TH12 MAIN Circuit) Outlet water temperature (TH18 SUB Circuit)		• Broken or shorted thermistor wiring	○	○
5113		Inlet heat source temperature (TH13) *Under the standard pipe connection of the heat source.		• Broken or shorted thermistor wiring	○	○
5114 5120		Outlet heat source temperature (TH14 MAIN Circuit) Outlet heat source temperature (TH20 SUB Circuit) *Under the standard pipe connection of the heat source.		• Broken or shorted thermistor wiring	○	○
5103 5107		Shell temperature (TH3 MAIN Circuit) Shell temperature (TH7 SUB Circuit)		• Broken or shorted thermistor wiring	○	○
5101 5105		Discharge temperature (TH1 MAIN Circuit) Discharge temperature (TH5 SUB Circuit)		• Broken or shorted thermistor wiring	○	○
5102 5106		Suction temperature (TH2 MAIN Circuit) Suction temperature (TH6 SUB Circuit)		• Broken or shorted thermistor wiring	○	○
5104 5108		Evaporator wall temperature (TH4 MAIN Circuit) Evaporator wall temperature (TH8 SUB Circuit)		• Broken or shorted thermistor wiring	○	○
5115		External water temperature (TH15)		• Broken or shorted thermistor wiring	○	○
5116		External water temperature (TH16)		• Broken or shorted thermistor wiring	○	○
5201	High-pressure sensor fault/high-pressure fault			• Broken or shorted pressure sensor wiring	○	○
5202	Low-pressure sensor fault/low-pressure fault			• Broken or shorted pressure sensor wiring	○	○
7113	Model setting error 1		Dip switches on the PCB were set incorrectly during maintenance.		×	×
7117	Model setting error 2			• Resistor R21 fault (connected to the Main control board)	×	×
4115	Power supply frequency fault		Power supply frequency is a frequency other than 50 Hz or 60 Hz.		×	×

Error code *1 (PCB *2)	Error type			Cause (Installation/Setting error)	Cause (Parts problems)	Error reset *3	
						Unit side (PCB)	Remote
						SWS1	Operation SW
4102	Open phase			There is an open phase.	• Circuit board fault	×	×
4106 (255)	Power supply fault				• Transmission power supply PCB fault	–	–
1101	Suction temperature fault			The heat source temperature was above the upper limit of the operating range.	• Suction refrigerant temperature thermistor fault	○	○
1102	Discharge temperature fault (A discharge refrigerant temperature of 120ºC or above is detected for 30 seconds while the compressor is in operation.) (A discharge refrigerant temperature of 125ºC or above is detected momentarily while the compressor is in operation.)			No water Abrupt change in water temperature (5K/min. or greater) Pump failure	• High-pressure sensor fault • Linear expansion valve fault (Main circuit LEV, injection LEV) • Injection solenoid valve fault • Refrigerant deficiency (refrigerant gas leak)	○	○
1503	Heat exchanger freeze up *4			Drop in heat source flow or heat source supply cutoff Heat source temperature drop		○	○
1512	Low evaporation temperature fault			Drop in heat source flow Heat source temperature drop		○	○
4250 (101)	Inverter error	Electric current related errors during operation	IPM error		• INV board fault • Ground fault of the compressor • Coil problem • IPM error (loose terminal screws, cracked due to swelling) • Items listed under "Heatsink overheat protection" below	○	○
4250 (102)			ACCT overcurrent		• INV board fault • Ground fault of the compressor • Coil problem • IPM error (loose terminal screws, cracked due to swelling)	○	○
4250 (103)			DCCT overcurrent			○	○
4250 (107)			Overcurrent relay trip (effective value) (During operation)			○	○
4250 (106)			Overcurrent relay trip (momentary value) (During operation)			○	○
4250 (104)			Short-circuited IPM/ground fault (During operation)		• Ground fault of the compressor • IPM error (loose terminal screws, cracked due to swelling)	○	○
4250 (105)			Overcurrent error due to a short-circuited (During operation)	Inter-phase voltage drop (Inter-phase voltage at or below 180 V)	• Ground fault of the compressor • Shorted output wiring	○	○
4250 (101)		Current related prob-lems at start up	IPM error (At startup)		• INV board fault • Ground fault of the compressor • Coil problem • IPM error (loose terminal screws, cracked due to swelling) • Items listed under "Heatsink overheat protection" below	○	○
4250 (102)			ACCT overcurrent (At startup)		• INV board fault • Ground fault of the compressor • Coil problem • IPM error (loose terminal screws, cracked due to swelling)	○	○
4250 (103)			DCCT overcurrent (At startup)			○	○
4250 (107)			Overcurrent relay trip (effective value) (At startup)			○	○
4250 (106)			Overcurrent relay trip (momentary value) (At startup)			○	○

Error code *1 (PCB *2)	Error type			Cause (Installation/Setting error)	Cause (Parts problems)	Error reset *3	
						Unit side (PCB)	Remote
						SWS1	Operation SW
4220 (108)	Inverter error	Voltage related problems during operation	Bus voltage drop protection	Momentary power failure/power failure Power supply voltage drop (Inter-phase voltage is 180 V or below.) Voltage drop	• INV board CNDC2 wiring fault • INV board fault • 52C fault • Diode stack failure	○	○
4220 (109)			Bus voltage rise protection	Incorrect power supply voltage	• INV board fault	○	○
4220 (111)			Logic error	Malfunction due to external noise interference • Faulty grounding • Improper transmission and external wiring installation (Shielded cable is not used.) • Low-voltage signal wire and high-voltage wire are in contact. (Placing the signal wire and power wire in the same conduit)	• INV board fault	○	○
4220 (131)		Voltage meter error at start up (Bus voltage drop protection at start up (detected by the Main unit side))		Power supply voltage drop	• PCB fault	○	○
4230		Heatsink fault (Heatsink overheat protection)		Power supply voltage drop (Inter-phase voltage is 180 V or below.) Clogged heatsink cooling air passage	• Fan motor fault • THHS sensor fault • IPM error (loose terminal screws, cracked due to swelling)	○	○
4240		Overload protection		Clogged heatsink cooling air passage Power supply voltage drop (Inter-phase voltage is 180 V or below.)	• THHS sensor fault • Current sensor fault • INV circuit fault • Compressor fault	○	○
5301 (115)		ACCT sensor fault			• INV board fault • Ground fault of the compressor and IPM error	○	○
5301 (116)		DCCT sensor			• Poor contact at the INV board connector CNCT • Poor contact at the INV board connector DCCT • Ground fault of the compressor and IPM error	○	○
5301 (117)		ACCT sensor/circuit fault			• Poor contact at the INV board connector CNCT2 (ACCT) • ACCT sensor fault	○	○
5301 (118)		DCCT sensor/circuit fault			• Poor contact at the INV board connector CNCT • Poor contact at the INV board connector DCCT • DCCT sensor fault • INV board fault	○	○
5301 (119)		Open-circuited IPM/loose ACCT sensor			• Disconnected ACCT sensor (CNCT2) • ACCT sensor fault • Broken compressor wiring • INV circuit fault (IPM error etc.)	○	○
5301 (120)		Faulty wiring			• ACCT sensor is connected in the wrong phase. • ACCT sensor is connected in the wrong orientation.	○	○
5110		THHS sensor/circuit fault			• THHS sensor contact failure • THHS sensor fault • INV board fault	○	○
0403		Serial communication error			• Communication error between control board and INV board (noise interference, broken wiring)	○	○
—		IPM system error		INV board switch setting error	• Wiring or connector connection between connectors on IPM-driven power supply circuit • INV board fault	○	○
6831	Remote controller error (incl. remote controller wiring fault)	Remote controller signal reception error 1		Remote controller cable is not connected. Broken wiring	• Broken remote controller wiring • Main control board communication circuit fault	—	—
6832		Remote controller signal transmission error		Communication error due to external noise interference	• Main control board communication circuit fault	—	—
6834		Remote controller signal reception error 2		Communication error due to external noise interference	• Main control board communication circuit fault	—	—
6833		Remote controller over current		Remote controller cable short circuit Remote controller malfunction	• Broken remote controller wiring	×	×

Error code *1 (PCB *2)	Error type		Cause (Installation/Setting error)	Cause (Parts problems)	Error reset *3	
					Unit side (PCB)	Remote
					SWS1	Operation SW
7105	Multiple system error	Address setting error	Address setting error (Non-consecutive address)		×	×
7130		Incompatible combination of units	Different types of units are connected to the same system.		×	×
7102		No.-of-connected-unit setting is incorrect.	No.-of-connected-unit setting is incorrect (Main unit).		×	×
4126 (001)	Analog input error (Control board (MAIN) CN421)		Analog input type fault (Set with item code 21)	• Broken or shorted 4-20 mA signal output device wiring (CN421)	○	○
4126 (002)	Analog input error (Control board (MAIN) CN422)			• Broken or shorted 4-20 mA signal output device wiring (CN422)	○	○
6500	Communication error between the main and sub units Communication error between the MAIN and SUB circuits				—	—
6600	Transmission line power supply PCB fault Communication error between the main and sub units (Simple multiple unit control mode)		Communication error due to external noise interference	• Broken wiring to the transmission power supply circuit board (between the main and sub units) • Transmission power supply PCB communication circuit fault	×	×
6602 6603 6606 6607 6608					—	—

*1: The codes in the parentheses in the "Error code" column indicate error detail codes.
*2: If an error occurs, error codes shown above will appear in the 4-digit digital display on the PCB.
*3: Definition of symbols in the "Error reset" column.
◎: Errors that can be reset regardless of the switch settings
○: Errors that can be reset if the remote reset setting on the unit is set to "Enable" (factory setting)
Errors that cannot be reset if the remote reset setting on the unit is set to "Disable"
×: Errors that cannot be reset
—: Errors that will be automatically cancelled once its cause is removed
*4: This error code will appear when multiple errors occur that are reset in different ways and when one or more of these errors have not been reset. This error can be reset by turning off and then back on the unit's power.
*5: Power failure will be detected as an error only when the "Automatic recovery after power failure" setting on the unit is set to "Disable."
(The default setting for the "Automatic recovery after power failure" setting is "Enable.")
*6: Before resetting this error, remove its causes. Resuming operation without removing the causes of heat exchanger freeze up will cause heat exchanger damage.

[3] Calling for Service

If the problem cannot be solved by following the instructions provided in the table above, please contact your dealer or servicer along with the types of information listed below.

(1) Model name

The model name is a string that starts with "CRHV" and is found on the lower part of the left side of the unit.

(2) Serial number

Example: 75W00001

(3) Error code

(4) Nature of the problem in detail

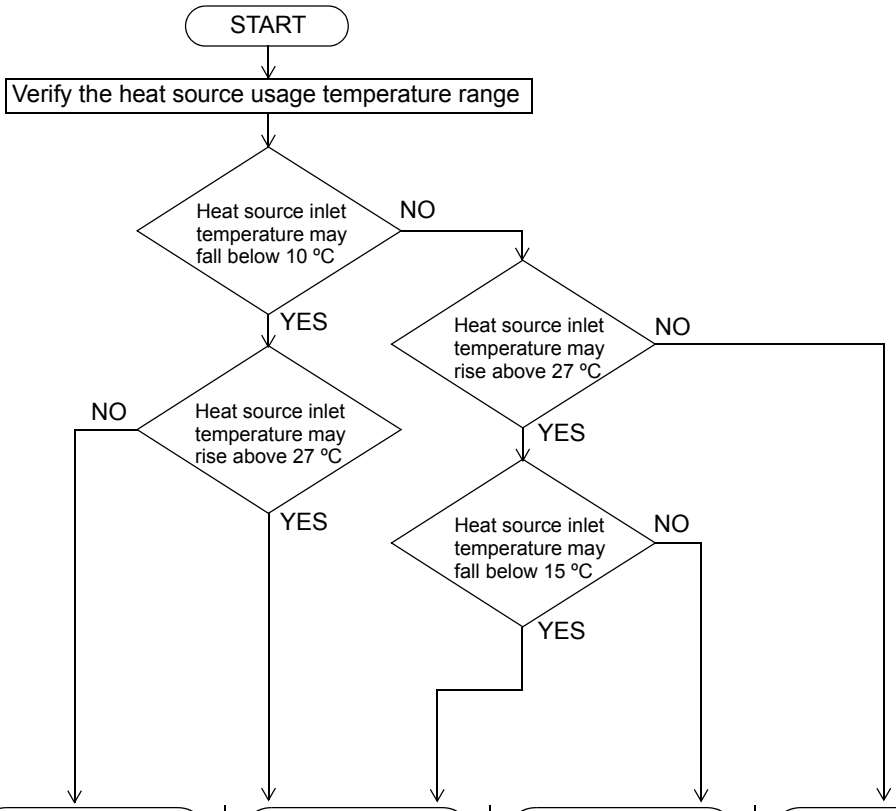
Example: The unit stops approximately one minute after it was started.

7. Operating the Unit

[1] Initial Operation

1. Make sure the Run/Stop switch that controls the unit on the local control panel is switched off.
2. Verify with the following checklist whether the heat source was properly selected.*
3. Switch on the main power.
4. Leave the main power switched on for at least 12 hours before turning on the Run/Stop switch that controls the unit on the on-site control panel to warm up the compressor.
5. Switch on the Run/Stop switch that controls the unit on the on-site control panel.

* Heat source selection checklist



	Brine counter flow (upper side of inlet)	Brine parallel flow (lower side of inlet)	Water parallel flow (lower side of inlet)	Water counter flow (upper side of inlet)
Heat source fluid	Brine ☐ Below -18°C freezing temp. *1 ☐	Brine ☐ Below -18°C freezing temp. *1 ☐	Water *2 ☐	Water *2 ☐
Heat source fluid inlet	Upper Side ☐	Lower Side ☐ Install the attached inlet/ outlet labels *3 ☐	Lower Side ☐ Install the attached inlet/ outlet labels *3 ☐	Upper Side ☐
Heat source flow range *4	4.5 - 16.0 m^3/h ☐	2.0 - 16.0 m^3/h ☐	2.0 - 16.0 m^3/h ☐	7.0 - 16.0 m^3/h ☐
Connector CN142D 1-3 *5	ON (Close) ☐	ON (Close) ☐	OFF (Open) ☐	OFF (Open) ☐

*1 To prevent the heat exchanger from freezing, check that the concentration of brine is such that the freezing temperature is -18°C or less before operation.

*2 Either water or brine can be used.

*3 Refer to page 10 for the installment position.

*4 Refer to page 71 and page 73 for details on heat source flow range.

*5 If using water as heat source, cut CN142D 1-3 (short circuit wire). After cutting CN142D 1-3, the power reset function is enabled. To prevent the heat exchanger from freezing, make sure to check that the CN142D 1-3 is cut if using water as heat source.

[2] Daily Operation

To start an operation

Switch on the Run/Stop switch that controls the unit on the local control panel, or press the ON/OFF button on the remote controller. (*1)

Note

The unit described in this manual features a circuit that protects the compressor from short-cycling. Once the compressor stops, it will not start up again for up to 10 minutes. If the unit does not start when the ON/OFF switch is turned on, leave the switch turned on for 10 minutes. The unit will automatically start up within 10 minutes.

To stop an operation

Switch off the Run/Stop switch that controls the unit on the on-site control panel, or press the ON/OFF button on the remote controller. (*1)

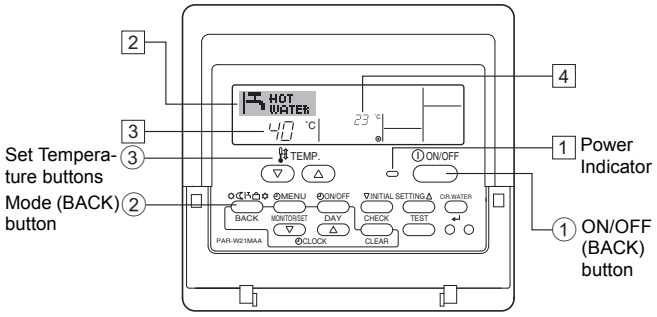
*1 Refer to the following pages for how to use the remote controller.

IMPORTANT

- Keep the main power turned on throughout the operating season, in which the unit is stopped for three days or shorter (e.g., during the night and on weekends).
- Unless in areas where the outside temperature drops to freezing, switch off the main power when the unit will not be operated for four days or longer. (Switch off the water circulating pump if the pump is connected to a separate circuit.)
- When resuming operation after the main power has been turned off for a full day or longer, follow the steps under “Initial Operation” on the previous page.
- If the main power was turned off for six days or longer, make sure that the clock on the unit is correct.

[3] Using the Remote Controller

<1> Starting and Stopping Operation and Changing the Operation Mode



To Start Operation

1. Press the ON/OFF (BACK) button ①.
   The power indicator 1 and the display will light up.

To Stop Operation

1. Press the ON/OFF (BACK) button ① while the unit is in operation.
   The power indicator 1 and the display will light off.
   The remote controller will remember the last mode and temperature settings when turned off.

To select the Mode

1. With the power turned on, press the Mode (BACK) button ② until the desired mode appears.
   - Each press changes the operation mode in the following sequence (see notes *1 and *2 below):
     Heating→Heating ECO→Hot water→Anti-freeze→Back to Heating.
     The currently selected mode will appear in the area labeled 2.

*1 If CN142A 3-4 is ON (CLOSE), the operation mode cannot be changed from the remote controller.

*2 The available modes vary depending on the model.

*3 Refer to section [4] "Function Settings" [4]-2. (2) for how to change the settings for a specific function.

<2> Setting the Water Temperature

The current water temperature will appear in the area labeled 3.

How to Change the Temperature Setting

1. To lower the water temperature setting
   Press the (▽) Set Temperature button ③.
2. To raise the water temperature setting
   Press the (△) Set Temperature button ③.
   - Each press increases or decreases the temperature by 1 °C (1 °F).
     The current setting will appear in the area labeled 3 in the figure on the previous page.
   - The settable ranges for the “Hot Water” and “Heating” modes are as follows. *1, *2

Hot Water	Heating
30 °C - 65 °C 86 °F - 149 °F *3	30 °C - 55 °C 86 °F - 131 °F *3

Note:

*1 Available ranges vary depending on the type of unit connected.

*2 If the temperature ranges are restricted from the remote controller, the settable ranges may be narrower than shown above. If an attempt is made to set a value outside of the restricted range, the display will show a message indicating that the range is currently restricted.
For information about how to set and clear the restrictions, refer to section [4], item [4]–2. (3).

*3 Temperatures can be displayed in Celsius or Fahrenheit (factory setting: Fahrenheit). For information about how to select °C or °F , refer to section [4], item [4]–4. (1).

*4 If the target water temperature setting for the Heating mode has been set to a temperature outside of the remote controller’s setting range (above 55°C) from the circuit board, any signal from the remote controller to change the temperature setting will be ignored. If this happens, disconnect the remote controller, set the target temperature to 55°C or below from the circuit board, reconnect the remote controller, and then change the temperature setting from the remote controller.

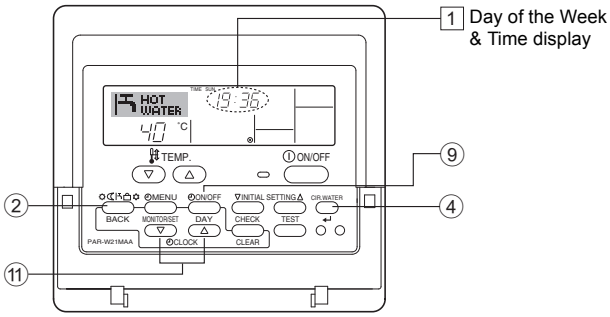
- Water temperature can be controlled based on the inlet or outlet temperature.

* The water temperature range that can be displayed is between 0 °C to 100 °C. Outside this range, the display flashes either 0 °C or 100 °C.

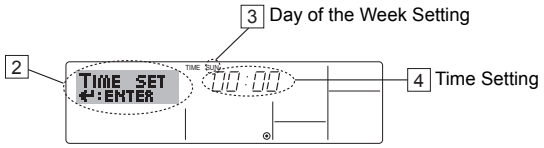
<3> Setting the Day of the Week and Time

Use this screen to set and change the current day of the week and time settings.

Note:
The day and time will not appear if the clock display is disabled from the remote controller on the Function Selection menu.



How to Set the Day of the Week and Time



1. Press the (▽) or (△) Set Time button ⑪ to bring up TIME SET ↵:ENTER in the area labeled 2.
2. Press the TIMER ON/OFF (SET DAY) button ⑨ to set the day (labeled 3 in the figure).
   * Each press advances the day.
3. Press the Set Time button ⑪ as necessary to set the time.
   * When the button is held down, the time (at 4) will increment first in one-minute intervals, then in ten-minute intervals, and then in one-hour intervals.
4. After making the appropriate settings in Steps 2 and 3, press the CIR.WATER ↵ button ④ to save the values.

Note:
The changes will be lost unless the Mode (BACK) button ② is pressed before the CIR.WATER ↵ button ④ is pressed.

5. Press the Mode (BACK) button ② to complete the setting procedure and return the display to the normal operation screen. The new day and time will appear in the area labeled 3.

<4> Using the Timer

Three types of timers are available as follows: ① Weekly timer, ② Simple timer, or ③ Auto-Off timer. The timer type can be selected from the remote controller on the Function Selection menu.
For information about how to use the Function Selection menu on the remote controller, refer to section [4], item [4]–3. (3).

Using the Weekly Timer

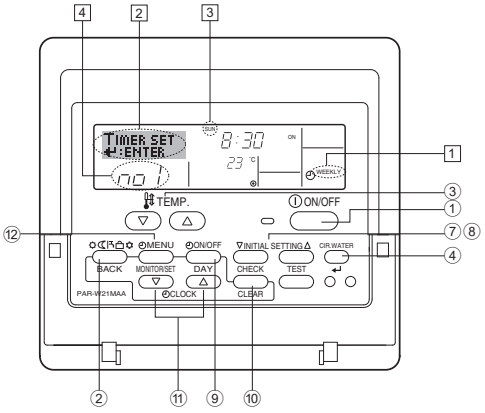
1. The weekly timer can be used to schedule up to six events for each day of the week.
   - Each operation event can consist of any of the following: ON/OFF time together with a temperature setting, ON/OFF time only, or temperature setting only.
   - When the timer reaches the preset time, the schedule event will take place.
2. The time can be set to the nearest minute.

Note:

*1 The Weekly, Simple, and Auto-Off timers cannot be used concurrently.

*2 The weekly timer will not operate when any of the following conditions is met.
The timer is off; the system is in error; a test run is in progress; the remote controller is performing self-check or remote controller check; the timer, function, day, or time is being set. If the ON/OFF status and/or the temperature setting is centrally controlled, their settings cannot be changed according to a schedule that was set from the remote controller.

Operation No.



How to Set the Weekly Timer

1. On the Normal Operation screen, make sure that the weekly timer icon [1] is displayed.
2. Press the TIMER MENU button ⑫, so that the “Set Up” appears on the screen ([2]). (Each press toggles between “Set Up” and “Monitor”.)
3. Press the TIMER ON/OFF (SET DAY) button ⑨ to set the day. Each press advances the day, which appears in the area labeled [3].
4. Press the ▽ or △ INITIAL SETTING button (⑦ or ⑧) to select a desired operation pattern number (1 through 6) [4].
   * (The remote-controller display on the previous page shows how the display would appear if operation No. 1 for Sunday were set to the values shown below.)

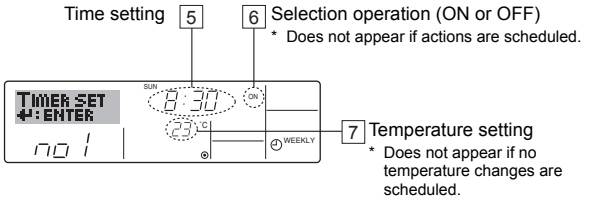
Setup Matrix

Op No.	Sunday	Monday	···	Saturday
No. 1	• 8:30 • ON • 23 °C (73 °F)			
No. 2	• 10:00 • OFF	• 10:00 • OFF	• 10:00 • OFF	• 10:00 • OFF
···				
No. 6				

<Operation 1 settings for Sunday>
Start the unit at 8:30, with the temperature set to 23 °C (73 °F).

<Operation 2 settings for every day>
Turn off the unit at 10:00.

Note:
By selecting the day to “Sun Mon Tues Wed Thurs Fri Sat”, the same action can be carried out at the same time every day.
(Example: In Operation No. 2 above, the unit is scheduled to be turned off at 10:00 every day.)

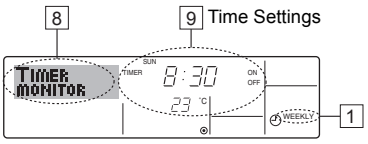


5. Press the Set Time button ⑪ to set the time ([5]).
   * Time will first increment in one-minute intervals, then in ten-minute intervals, and then in one-hour intervals.
6. Press the ON/OFF button ① to select the desired operation (ON or OFF), at [6].
   * Each press toggles through the following options:
     No display (no setting) → “ON” → “OFF”
7. Press the Set Temperature button ③ to set the temperature ([7]).
   * Each press:
     No display (no setting) ↔ 5 (41) ↔ 6 (43) ↔ ... ↔ 89 (192) ↔ 90 (194) ↔ No display. (Available temperature range: The temperature display range is between 5 °C (41 °F) and 90 °C (194 °F). The actual range which the temperature can be controlled will vary according to the type of the connected unit.)
8. To clear the current values for the selected operation, press and quickly release the CHECK (CLEAR) button ⑩ once.
   * The displayed time setting will change to “—:—”, and the ON/OFF and temperature settings will disappear.
     (To clear all weekly timer settings at once, hold down the CHECK (CLEAR) button ⑩ for two seconds or more. The display will begin flashing, indicating that all settings have been cleared.)
9. After making the appropriate settings in Steps 5, 6. and 7, press the CIR.WATER ↵ button ④ to save the values.

Note:
The changes will not be saved unless the Mode (BACK) button ② is pressed before the CIR.WATER ↵ button ④ is pressed.
If two or more different operation patterns have been scheduled for exactly the same time, only the operation with the highest Operation No. will be carried out.

10. Repeat Steps 3 through 9 as necessary to add more settings.
11. Press the Mode (BACK) button ② to return to complete the setting procedure and return to the Normal Operation screen.
12. To activate the timer, press the TIMER ON/OFF button ⑨, so that the “Timer Off” icon ([10]) disappears.
    * If no timer settings have been made, the “Timer Off” icon will flash on the screen.

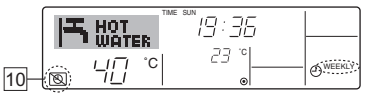
How to View the Weekly Timer Settings



1. Make sure that “WEEKLY” is displayed ([1]).
2. Press the TIMER MENU button ⑫ so that “Monitor” appears on the screen ([8]).
3. Press the TIMER ON/OFF (SET DAY) button ⑨ to select the desired day.
4. Press the ▽ or △ INITIAL SETTING (⑦ or ⑧) to toggle through the settings ([9]).
   * Each press will advance the display to the next timer operation in order of time.
5. To close the monitor display and return to the Normal Operation screen, press the Mode (BACK) button ②.

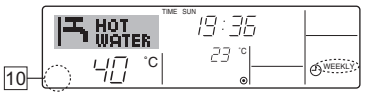
To Turn Off the Weekly Timer

Press the TIMER ON/OFF button ⑨ so that “Timer Off” appears at [10].



To Turn On the Weekly Timer

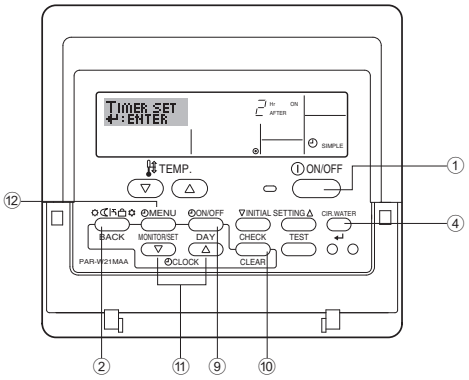
Press the TIMER ON/OFF button ⑨ so that the “Timer Off” icon ([10]) disappears.



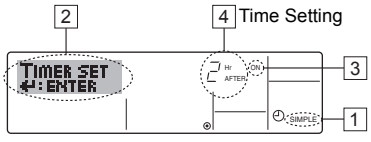
Using the Simple Timer

1. The simple timer can be set in any of the following three ways.
   - Start time only — The unit starts when the set time has elapsed.
   - Stop time only — The unit stops when the set time has elapsed.
   - Start & stop times — The unit starts and stops at the respective elapsed times.
2. The simple timer can be set to start and stop the unit only once each within a 72-hour period.
   The time setting can be made in one-hour increments.

Note:
*1 Weekly, Simple, and AUTO-off timers cannot be used concurrently.
*2 The simple timer will not operate when any of the following conditions is met. The timer is disabled; the system is in error; a test run is in progress; the remote controller is performing self-check or remote controller check; or a function or the timer is being set. If the ON/OFF status and/or the temperature setting is centrally controlled, their settings cannot be changed according to the schedule that was set from the remote controller.



How to Set the Simple Timer

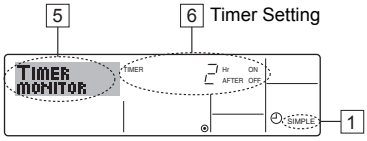


1. On the normal operation screen, make sure that the simple timer icon is displayed (1). If anything other than "SIMPLE" is displayed, select the SIMPLE TIMER by referring to section [4], item [4]-3. (3).
2. Press the TIMER MENU button ⑫, so that "Set Up" appears (2). (Each press toggles between "Set Up" and "Monitor".)
3. Press the ON/OFF button ① to display the current ON or OFF setting. Each press toggles between the time remaining until the unit turns on or off. ("ON" or "OFF" will appear in the area labeled 3.)
   - ON timer The unit will start operation when the specified hours have elapsed.
   - OFF timer The unit will stop operation when the specified hours have elapsed.
4. With "ON" or "OFF" displayed on the screen (3), press the Set Time button ⑪ to set the hours until the unit turns on or off (4).
   - Available Range: 1 to 72 hours
5. To set both the ON and OFF times, repeat Steps 3 and 4.
   * Note that ON and OFF times cannot be set to the same value.
6. To clear the current ON or OFF setting: Display the ON or OFF setting (see step 3) and then press the CHECK (CLEAR) button ⑩ so that "-" appears where the remaining time was. To use only the ON-timer or the OFF-timer, make sure that the time setting for the timer that will not be used is set to "-".
7. After completing steps 3 through 6 above, press the CIR.WATER ↵ button ④ to save the value.

Note:
The changes will not be saved unless the Mode (BACK) button ② is pressed before the CIR.WATER ↵ button ④ is pressed.

8. Press the Mode (BACK) button ② to return to the Normal Operation screen.
9. Press the TIMER ON/OFF button ⑨ to start the timer countdown. When the timer is running, the remaining time should appear on the screen. **Make sure that the remaining time is displayed on the screen and that it is correct.**

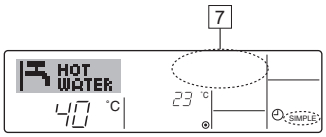
Viewing the Current Simple Timer Settings



1. Make sure that "SIMPLE" is displayed (1).
2. Press the TIMER MENU button ⑫, so that "Monitor" appears on the screen (5).
   - If the ON or OFF simple timer is running, the current timer value will appear in the area labeled 6.
   - If ON and OFF values have both been set, the two values will appear alternately.
3. Press the Mode (BACK) button ② to close the monitor display and return to the Normal Operation screen.

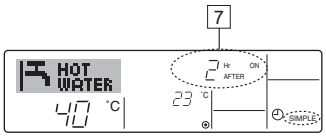
To Turn Off the Simple Timer

Press the TIMER ON/OFF button ⑨ so that the timer setting no longer appears on the screen (at 7).



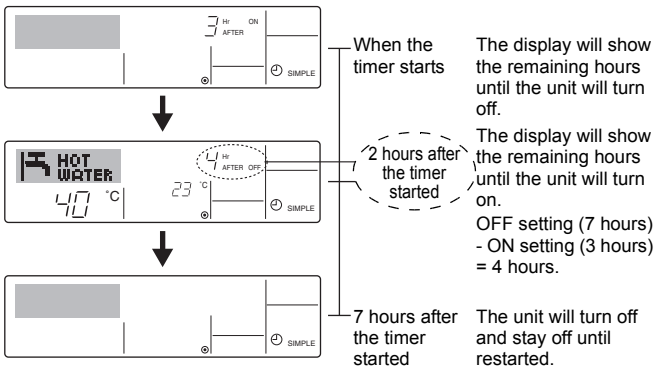
To Turn On the Simple Timer

Press the TIMER ON/OFF button ⑨ so that the timer setting appears in the area labeled 7.

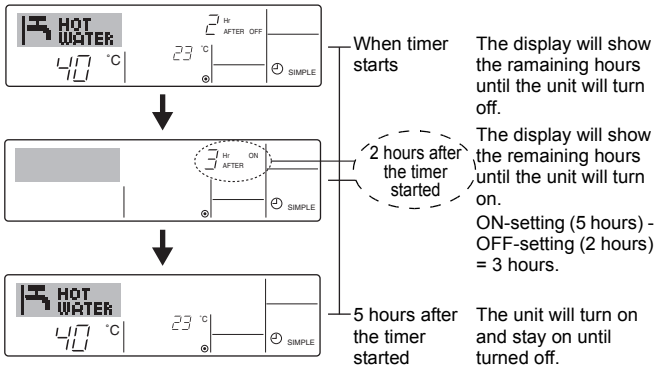


Examples
The two examples below show how the screen will appear when both the ON- and Off- timers have been set.

Example 1:
The ON-timer is set to 3 hours, and the OFF-timer is set to 7 hours.



Example 2:
The ON-timer is set to 5 hours, and the OFF-timer is set to 2 hours.



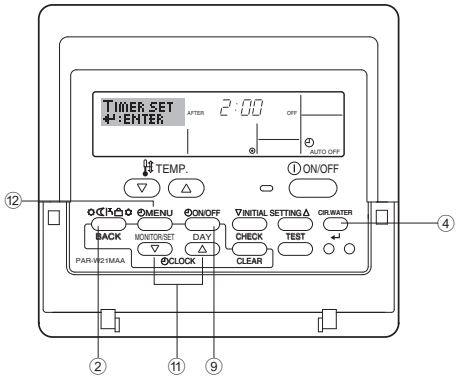
Using the Auto-Off Timer

1. This timer begins countdown when the unit starts, and shuts the unit off when the set time has elapsed.
2. Available settings range from 30 minutes to 4 hours in 30-minute intervals.

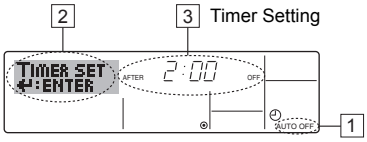
Note:

*1 Weekly Timer/Simple Timer/Auto Off Timer cannot be used at the same time.

*2 The Auto Off timer will not operate when any of the following conditions is in effect.
The timer is off; the system is in error; a test run is in progress; the remote controller is performing self-check or remote controller check; or a function or the timer is being set. If the ON/OFF status and/or the temperature setting is centrally controlled, their settings cannot be changed according to the schedule that was set from the remote controller.



How to Set the Auto-Off TIMER

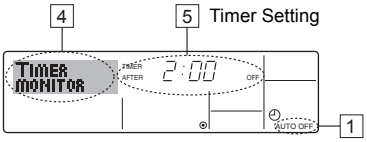


1. On the Normal Operation screen, make sure that “AUTO OFF” is displayed (1).
   If anything other than “AUTO OFF” is displayed, select the AUTO-OFF TIMER by referring to section [4], item [4]-3. (3).
2. Press and hold the TIMER MENU button ⑫ for **3 seconds**, so that “Set Up” appears on the screen (2).
   (Each press toggles between “Set Up” and “Monitor”.)
3. Press the Set Time button ⑪ to set the OFF time (3).
4. Press the CIR.WATER ↵ button ④ to save the setting.

Note:
The changes will not be saved unless the Mode (BACK) button ② is pressed before the CIR.WATER ↵ button ④ is pressed.

5. Press the Mode (BACK) button ② to complete the setting procedure and return to the Normal Operation screen.
6. If the unit is already running, the timer will start counting down immediately. **Make sure that the remaining time is displayed on the screen and that it is correct.**

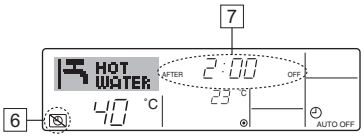
Checking the Current Auto-Off Timer Setting



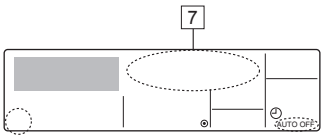
1. Make sure that “AUTO OFF” is displayed (1).
2. Press and hold the TIMER MENU button ⑫ for **3 seconds** so that “Monitor” appears (4).
   - The time remaining until the unit will turn off will appear in the area labeled 5.
3. To close the monitor display and return to the Normal Operation screen, press the Mode (BACK) button ②.

To Turn Off the Auto-Off Timer

- Press and hold the TIMER ON/OFF button ⑨ for **3 seconds** so that “Timer Off” appears (6) and the timer value (7) disappears.

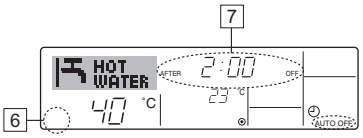


- Alternatively, turn off the unit itself. The timer value (7) will disappear from the screen.



To Turn On the Auto-Off Timer

- Press and hold the TIMER ON/OFF button ⑨ for **3 seconds**. The “Timer Off” will disappear (6), and the timer setting will appear on the display (7).
- Alternatively, turn on the unit. The timer value will appear in the area labeled 7.



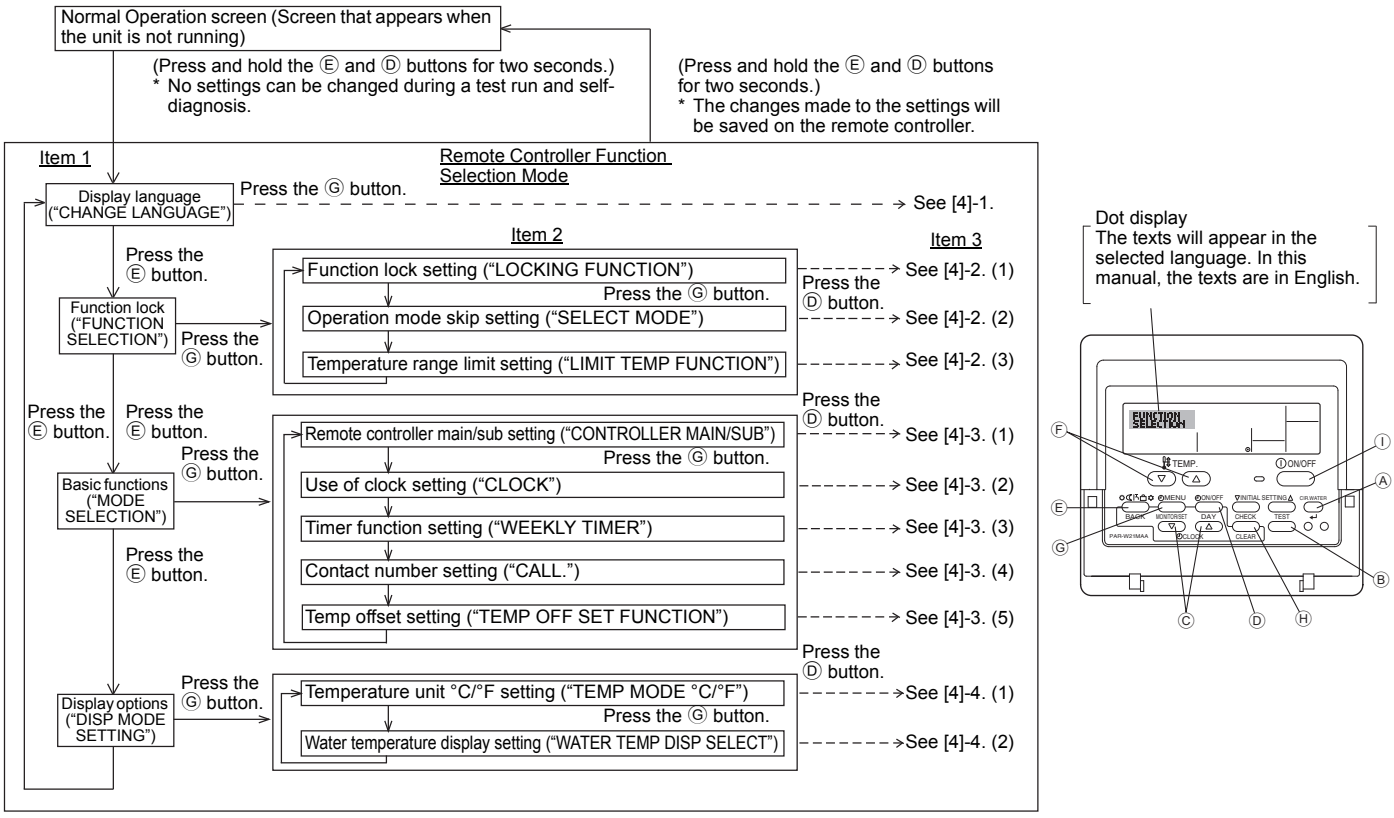
[4] Function Settings

The settings for the following remote controller functions can be changed using the remote controller function selection mode. Change the settings as necessary.

Item 1	Item 2	Item 3 (Setting content)
1. Display language setting (“CHANGE LANGUAGE”)	Display language selection	• Use to select the display language from available languages.
2. Function lock settings (“FUNCTION SELECTION”)	(1) Function lock (“LOCKING FUNCTION”)	• Use to lock functions.
	(2) Operation mode skip setting (“SELECT MODE”)	• Use to show or hide specific modes.
	(3) Temperature range limit setting (“LIMIT TEMP FUNCTION”)	• Use to restrict the temperature range.
3. Basic function settings (“MODE SELECTION”)	(1) Remote controller main/sub setting (“CONTROLLER MAIN/SUB”)	• Use to designate the remote controller as Main or Sub. *When two remote controllers are connected to one group, one controller must be set to sub.
	(2) Use of clock setting (“CLOCK”)	• Use to enable or disable the clock.
	(3) Timer function setting (“WEEKLY TIMER”)	• Use to select a timer type.
	(4) Contact number setting (“CALL.”)	• Use to show or hide, or enter the emergency contact number.
	(5) Temp offset setting (“TEMP OFF SET FUNCTION”)	• Use to show or hide the offset value.
4. Display options (“DISP MODE SETTING”)	(1) Temperature unit °C/°F setting (“TEMP MODE °C/°F”)	• Use to show or hide the temperature unit (°C or °F).
	(2) Water temperature display setting (“WATER TEMP DISP SELECT”)	• Use to show or hide the water temperature.

Function setting flowchart

[1] Stop the unit and go into the remote controller function selection mode. → [2] Select from item 1. → [3] Select from item 2. → [4] Make the setting. → [5] Return to the Normal Operation screen.



Settings details

[4]-1. Display language setting

The display language can be selected from the languages listed below.

- Press the [MENU] button to change the language.
  ① English (GB), ② German (D), ③ Spanish (E), ④ Russian (RU), ⑤ Italian (I), ⑥ French (F), ⑦ Swedish (SW)

[4]-2. Function lock settings

(1) Function lock

- Press the [ON/OFF] button to toggle through the following options.
  ① no1: All buttons except the [ON/OFF] button will be locked.
  ② no2: All buttons will be locked.
  ③ OFF (Default): No buttons will be locked.

* Press and hold the [CIR.WATER] and [ON/OFF] buttons simultaneously for two seconds on the Normal Operation screen to enable the button-lock function.

(2) Operation mode skip setting

The following modes can be made available for selection or can be hidden.

- Press the [ON/OFF] button to toggle through the following options.
  ① Heating mode
  ② Heating ECO mode
  ③ Hot Water mode
  ④ Anti-freeze mode
  ⑤ Cooling mode
  ⑥ OFF (Default): All modes will be available for selection.

* The mode that is not supported on the connected unit will not be available, even if the mode is available for selection on the display.

(3) Temperature range limit setting

The temperature range for the following modes can be restricted. Once the range has been restricted, the preset temperature can only be set to a value within the restricted range.

- Press the [ON/OFF] button to toggle through the following options.
  ① LIMIT TEMP HEATING MODE
  ② LIMIT TEMP HOT WATER MODE
  ③ LIMIT TEMP ANTI-FREEZE MODE
  ④ LIMIT TEMP COOLING MODE
  ⑤ OFF (Default) : The temperature ranges are not active.
- To increase or decrease the temperature, press the [TEMP. ▽ or △] button.
- Settable range

Hot Water mode	:	Lower limit:	30 ~ 65 °C (86 ~ 149 °F)
		Upper limit:	65 ~ 30 °C (149 ~ 86 °F)
Heating mode	:	Lower limit:	30 ~ 55 °C (86 ~ 131 °F)
		Upper limit:	55 ~ 30 °C (131 ~ 86 °F)

* The settable range varies depending on the type of unit to be connected.

[4]-3. Basic functions

(1) Remote controller main/sub setting

- Press the [ON/OFF] button Ⓓ to toggle between the following options.
  ① Main The controller will be designated as the main controller.
  ② Sub The controller will be designated as the sub controller.

(2) Use of clock setting

- Press the [ON/OFF] button Ⓓ to toggle between the following options.
  ① ON The clock function.
  ② OFF The clock function.

(3) Timer function setting

- Press the [ON/OFF] button Ⓓ to toggle through the following options.
  ① WEEKLY TIMER (Default)
  ② AUTO OFF TIMER
  ③ SIMPLE TIMER
  ④ TIMER MODE OFF

* When the use of clock setting is set to OFF, the “WEEKLY TIMER” cannot be used.

(4) Contact number setting

- Press the [ON/OFF] button Ⓓ to toggle through the following options.
  ① CALL OFF The contact number will not be displayed when a problem occurs.
  ② CALL **** *** **** The contact number will be displayed when a problem occurs.
  CALL_ Use this option to enter the contact number.
- Setting the contact number
  To set the contact number, follow the following procedures.
  Press the [TEMP. ▽ or △] button Ⓕ to move the cursor to the right (left). Press the [CLOCK ▽ or △] button Ⓒ to set the contact number.

(5) Temp offset setting

- Press the [ON/OFF] button Ⓓ to toggle between the following options.
  ① ON The offset value will be displayed under the water temperature initial setting mode.
  ② OFF The offset value will not be displayed.

[4]-4. Display options

(1) Temperature unit °C/°F setting

- Press the [ON/OFF] button Ⓓ to toggle between the following options.
  ① °C Celcius
  ② °F Fahrenheit

(2) Water temperature display setting

- Press the [ON/OFF] button Ⓓ to toggle between the following options.
  ① ON The water temperature will be displayed.
  ② OFF The water temperature will not be displayed.

[5] Using the Unit in Sub-freezing

In areas where temperature drops to freezing during the periods of non-use, blow the water out of the pipes or fill the pipes with anti-freeze solution.
Not doing so may cause the water to freeze, resulting in burst pipes and damage to the unit or the furnishings.

In areas where temperature can drop low enough to cause the water in the pipes to freeze, operate the unit often enough to prevent the water from freezing.
Frozen water in the water circuit may cause the water to freeze, resulting in burst pipes and damage to the unit or the furnishings.

In areas where temperature drops to freezing, use an anti-freeze circuit and leave the main power turned on to prevent the water in the water circuit from freezing and damaging the unit or causing water leakage and resultant damage to the furnishings.

- In areas where the air around the unit drops below freezing, leave the main switch turned on even when the unit will not be operated for four days or longer. Leave the switch on the water circulation pump turned on if the pump is connected to a separate circuit.

- If the unit is left turned off for a while (e.g., overnight) when the temperature around the unit drops below freezing, the water in the water circuit will freeze and damage the pipes and the heat exchanger.

- The recommended electric circuit has an anti-freeze circuit. For this circuit to function, the main power must be turned on.

- If the water circulation pump is connected differently from the recommended way, make sure the circuit has some type of anti-freeze function*.
  (* A function that automatically operates the water circulation pump to prevent the water in the circuit from freezing when the water temperature drops.)

8. Main Specifications

When using brine as heat source fluid (set the shipping time)

SPECIFICATIONS			
Model			CRHV-P600YA-HPB
Power source			3-phase 4-wire 380-400-415 V 50 Hz
SCOP(TDesign60kW): EN14825 Average climate conditions	Heat source temp 0/-3, Hot water temp 30/35		4.33
	Heat source temp 0/-3, Hot water temp 47/55		2.86
Capacity1 *1		kW	60.0
		kcal/h	51,600
		BTU/h	204,720
	Power input *2	kW	14.2
	Current input 380-400-415V	A	24.0 – 22.8 – 22.0
	COP (kW/kW)		4.23
	Hot water flow rate	m³/h	10.3
	Heat source flow rate	m³/h	14.7
Capacity2 *1		kW	45.0
		kcal/h	38,700
		BTU/h	153,540
	Power input *2	kW	10.2
	Current input 380-400-415V	A	17.2 – 16.4 – 15.8
	COP (kW/kW)		4.41
	Hot water flow rate	m³/h	7.7
	Heat source flow rate	m³/h	11.2
Maximum current input		A	44
Heat source fluid type			ethylene glycol 35 WT% (freezing point -18 ºC (-0.4 ºF))
Water pressure drop	Hot water side *3	kPa	14
	Heat source side *3	kPa	38
Temp range	Hot water side	ºC	(inlet) less than 55, (outlet) 30 ~ 65 *5
		ºF	(inlet) less than 131, (outlet) 86 ~ 149 *5
	Heat source side *4	ºC	(inlet) less than 45, (outlet) -8 ~ 27
		ºF	(inlet) less than 104, (outlet) 17.6 ~ 80.6
Circulating water volume range	Hot water side	m^3/h	3.2 – 15.0
	Heat source side *6	m^3/h	2.0 – 16.0
Sound pressure level (measured in anechoic room) at 1m *3		dB (A)	50
Sound power level (measured in anechoic room) *3		dB (A)	66
Diameter of water pipe (hot water side)	Inlet	mm (in)	50.8 (R2") screw
	Outlet	mm (in)	50.8 (R2") screw
Diameter of water pipe (heat souce side)	Inlet	mm (in)	50.8 (R2") screw
	Outlet	mm (in)	50.8 (R2") screw
External finish			Unpainted steel plate
External dimensions H x W x D		mm	1561 x 934 x 780
Net weight		kg (lbs)	413 (910)
Design pressure	R410A	MPa	4.15
	Water	MPa	1.0
Drawing	Wiring		WKC94L652
	External		WKC94L810
Heat exchanger	Hot water side		stainless steel plate and copper brazing
	Heat source side		stainless steel plate and copper brazing
Compressor	Type		Inverter scroll hermetic compressor
	Maker		MITSUBISHI ELECTRIC CORPORATION
	Starting method		Inverter
	Case heater	kW	0.035 x 2
	Lubricant		MEL 32
Protection	High pressure protection		High pres.Sensor & High pres.Switch at 4.15 MPa (601 psi)
	Inverter circuit		Over-heat protection, Over current protection
	Compressor		Over-heat protection
Refrigerant	Type x original charge		R410A x 4.5 (kg) x 2
	Contorol		LEV and HIC circuit

*1 Under Normal heating conditions at outlet hot water temp 35 ºC (95 ºF) outlet heat source temp -3 ºC (26.6 ºF) inlet hot water temp 30 ºC (86 ºF) inlet heat source temp 0 ºC (32 ºF).
Heating performance indicates the performance with counter flow of brine and refrigerant at the heat source HEX. (Standard pipe connection)

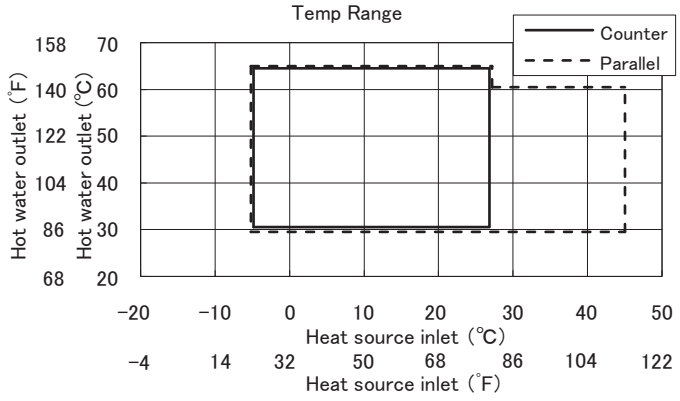
*2 Includes pump input based on EN14511.

*3 Under Normal heating conditions at outlet hot water temp 35 ºC (95 ºF) outlet heat source temp -3 ºC (26.6 ºF) inlet hot water temp 30 ºC (86 ºF) inlet heat source temp 0 ºC (32 ºF) capacity 60 kW hot water flow rate 10.3m^3/h heat source flow rate 14.7m^3/h
Heating performance indicates the performance with counter flow of brine and refrigerant at the heat source HEX. (Standard pipe connection)

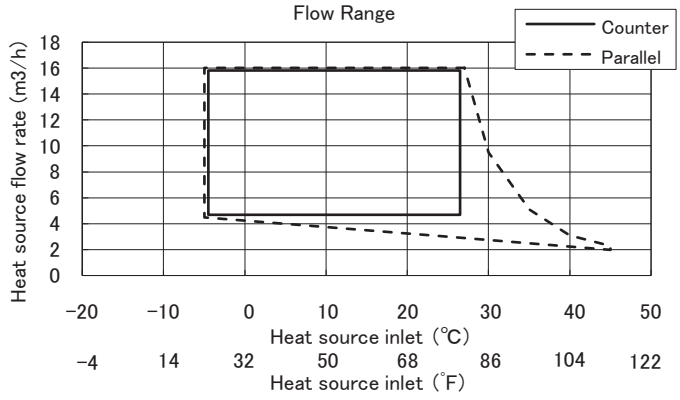
*4 When using in inlet heat source temp is more than 27 ºC, please change to parallel piping at the heat source side.
If the heat source inlet temperature exceeds 45 ºC, the compressor may not function due to over current.

- Please don't use the steel material for the water piping material.
- Please always make water circulate or pull out the circulation water completely when not using it.
- Please do not use groundwater and well water in direct.
- The water circuit must use the closed circuit.
- Due to continuing improvement,the above specifications may be subject to change without notice.

*5



*6



Unit converter

kcal/h = kW x 860

BTU/h = kW x 3,412

lbs = kg/0.4536

When using water as heat source fluid

SPECIFICATIONS			
Model			CRHV-P600YA-HPB
Power source			3-phase 4-wire 380-400-415 V 50 Hz
SCOP(TDesign60kW): EN14825 Average climate conditions	Heat source temp 10/7, Hot water temp 30/35		4.77
	Heat source temp 10/7, Hot water temp 47/55		3.11
Capacity1 *1		kW	60.0
		kcal/h	51,600
		BTU/h	204,720
	Power input *2	kW	11.8
	Current input 380-400-415V	A	19.9 – 18.9 – 18.2
	COP (kW/kW)		5.08
	Hot water flow rate	m³/h	10.3
	Heat source flow rate	m³/h	13.8
Capacity2 *1		kW	45.0
		kcal/h	38,700
		BTU/h	153,540
	Power input *2	kW	8.8
	Current input 380-400-415V	A	14.9 – 14.1 – 13.6
	COP (kW/kW)		5.11
	Hot water flow rate	m³/h	7.7
	Heat source flow rate	m³/h	10.4
Maximum current input		A	44
Heat source fluid type			water (freezing point 0 ºC (32 ºF))
Water pressure drop	Hot water side *3	kPa	14
	Heat source side *3	kPa	24
Temp range	Hot water side	ºC	(inlet) less than 55, (outlet) 30 ~ 65 *5
		ºF	(inlet) less than 131, (outlet) 86 ~ 149 *5
	Heat source side *4	ºC	(inlet) less than 45, (outlet) 7 ~ 27
		ºF	(inlet) less than 104, (outlet) 44.6 ~ 80.6
Circulating water volume range	Hot water side	m^3/h	3.2 – 15.0
	Heat source side *6	m^3/h	2.0 – 16.0
Sound pressure level (measured in anechoic room) at 1m *3		dB (A)	50
Sound power level (measured in anechoic room) *3		dB (A)	66
Diameter of water pipe (hot water side)	Inlet	mm (in)	50.8 (R2") screw
	Outlet	mm (in)	50.8 (R2") screw
Diameter of water pipe (heat souce side)	Inlet	mm (in)	50.8 (R2") screw
	Outlet	mm (in)	50.8 (R2") screw
External finish			Unpainted steel plate
External dimensions H x W x D		mm	1561 x 934 x 780
Net weight		kg (lbs)	413 (910)
Design pressure	R410A	MPa	4.15
	Water	MPa	1.0
Drawing	Wiring		WKC94L652
	External		WKC94L810
Heat exchanger	Hot water side		stainless steel plate and copper brazing
	Heat source side		stainless steel plate and copper brazing
Compressor	Type		Inverter scroll hermetic compressor
	Maker		MITSUBISHI ELECTRIC CORPORATION
	Starting method		Inverter
	Case heater	kW	0.035 x 2
	Lubricant		MEL 32
Protection	High pressure protection		High pres.Sensor & High pres.Switch at 4.15 MPa (601 psi)
	Inverter circuit		Over-heat protection, Over current protection
	Compressor		Over-heat protection
Refrigerant	Type x original charge		R410A x 4.5 (kg) x 2
	Contorol		LEV and HIC circuit

*1 Under Normal heating conditions at outlet hot water temp 35 ºC (95 ºF) outlet heat source temp 7 ºC (44.6 ºF) inlet hot water temp 30 ºC (86 ºF) inlet heat source temp 10 ºC (50 ºF).
Heating performance indicates the performance with counter flow of brine and refrigerant at the heat source HEX. (Standard pipe connection)

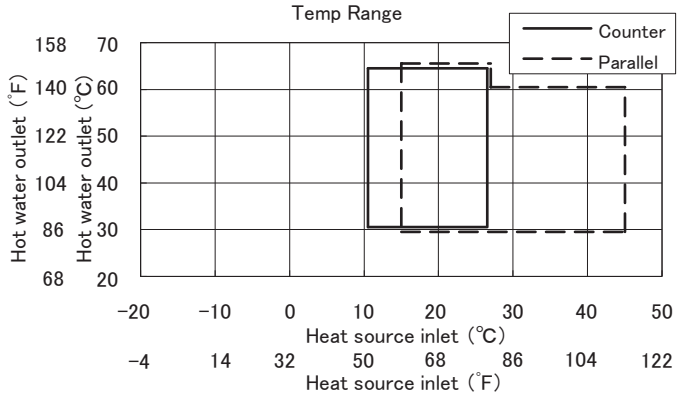
*2 Includes pump input based on EN14511.

*3 Under Normal heating conditions at outlet hot water temp 35 ºC (95 ºF) outlet heat source temp 7 ºC (44.6 ºF) inlet hot water temp 30 ºC (86 ºF) inlet heat source temp 10 ºC (50 ºF) capacity 60 kW hot water flow rate 10.3m^3/h heat source flow rate 13.8m^3/h
Heating performance indicates the performance with counter flow of brine and refrigerant at the heat source HEX. (Standard pipe connection)

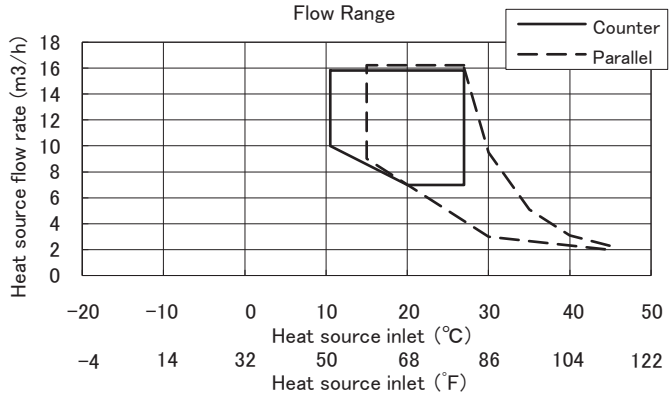
*4 When using in inlet heat source temp is more than 27 ºC, please change to parallel piping at the heat source side.
If the heat source inlet temperature exceeds 45 ºC, the compressor may not function due to over current.

- Please don't use the steel material for the water piping material.
- Please always make water circulate or pull out the circulation water completely when not using it.
- Please do not use groundwater and well water in direct.
- The water circuit must use the closed circuit.
- Due to continuing improvement,the above specifications may be subject to change without notice.

*5



*6



Unit converter

kcal/h = kW x 860

BTU/h = kW x 3,412

lbs = kg/0.4536

This product is designed and intended for use in the residential, commercial and light-industrial environment.

The product at hand is based on the following EU regulations:

- Low Voltage Directive 2014/35/EU
- Electromagnetic Compatibility Directive 2014/30/EU
- Pressure Equipment Directive 2014/68/EU
- Machinery Directive 2006/42/EC

Please be sure to put the contact address/telephone number on this manual before handing it to the customer.

MITSUBISHI ELECTRIC CORPORATION

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