MITSUBISHI ELECTRIC

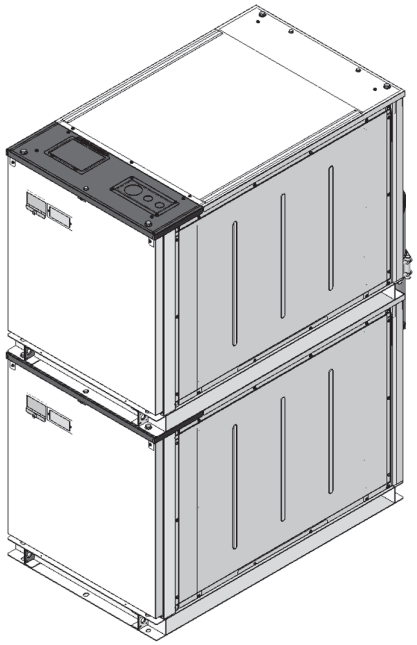
e-series

Water-cooled Chilling Unit
ERCV-M-YA

Installation/Operation Manual

For use with R32

ERCV-M900YA × 2
ERCV-M900YAKR × 2



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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, ammonia, and sulfide 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 electric shock and injury from the fan or other rotating parts, stop the operation and turn off the main power before cleaning, maintaining, or inspecting the unit.

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.

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.)

Do not pierce or burn.

Be aware that refrigerants may not contain an odour.

⚠ 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.

To reduce the risk of adverse effects on plants and animals, do not place them where they are directly exposed to discharge air from the unit.

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.

To reduce the risk of injury, do not touch the heat exchanger fins or sharp edges of components with bare hands.

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, do not insert fingers or foreign objects into air inlet/outlet grills.

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.

Do not install the unit in an enclosed space or a semi-underground space.
- If the refrigerant leaks, a fire may result.
- The unit must be stored where leaking refrigerant will not accumulate.
- Store the unit in a room large enough to allow clearance in the event of refrigerant leakage.

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.

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.

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 water circuit so that it is a closed system.
- Do not use water directly for showers or other applications.
- Do not allow other heat source water to mix with the water 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 unit in hospitals or facilities with radio communication capabilities.
- Inverter, high-frequency medical, or wireless communication equipment as well as power generators may cause the unit to malfunction. The unit 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.

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.

Transportation

⚠ WARNING

Lift the unit by placing the slings at designated locations. Support the 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.

Observe the restrictions on the maximum weight that a person can lift, which is specified in local regulations.

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.

⚠ CAUTION

Do not install the unit on or over things that are vulnerable to water damage.
- When the humidity exceeds 80% or if the drain water outlet becomes clogged, condensation may drip from the unit.

All drainage work should be performed by the dealer or qualified personnel according to the instructions detailed in the Installation Manual.
- Improper drainage work may cause rain water or drain water to enter the buildings and damage the furnishings.

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

Pipe installation

⚠ WARNING

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

Do not pull out the grounding wire coming from the unit during welding work.

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 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.

Do not open the control box cover while charging refrigerant.
- If the refrigerant leaks, a fire may result.

Electrical wiring

⚠ **WARNING**

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 earth leakage breaker on the power supply to each unit.

Use properly rated breakers and fuses (an earth leakage breaker, local switch <a switch + fuse that meets local electrical codes>, or overcurrent breaker).
- The use of improperly rated breakers may result in electric shock, malfunction, smoke, 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 qualified personnel. 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.

Tighten all terminal screws to the specified torque.
- Loose screws and contact failure may result in smoke or fire.

Only use standard power cables of sufficient capacity.
- Failure to do so may result in current leakage, overheating, smoke, or fire.

⚠ **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.

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 overcurrent breaker.

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

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.

Recover all refrigerant from the unit.
- It is punishable by law to release refrigerant into the atmosphere.

⚠ **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.

Do not open the control box cover while charging refrigerant.
- If the refrigerant leaks, a fire may result.

IMPORTANT

This appliance is Electromagnetic Compatibility Directive Class A. When it uses at residential environment, it may cause electromagnetic interference. User may be asked to prepare the properly way.
Other products installed in the same environment have the risk of malfunction.

Depending on the water-temperature conditions at start-up, the unit may come to an abnormal stop. Before the operation, make sure the evaporation side water temperature is 40ºC or below, and the condensation side water temperature is 9ºC or above.

The unit is for exclusive use in a machine room with a ventilation equipment.

1. Selecting the Installation Site

[1] Installation Conditions

Select the installation site in consultation with the client.

This product is for exclusive use in a machine room with a ventilation equipment.

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

- Appliances are not accessible to the general public.
- Limit the installation to a place where the general public cannot touch the product.
- The unit will not be subject to heat from other heat sources.
- A site does not cause a trouble by the noise from the unit.
- Water from the unit can be drained properly.
- The space requirements (specified on page 10) are met.
- Do not install this product in a location where water or dust can enter.

Weight

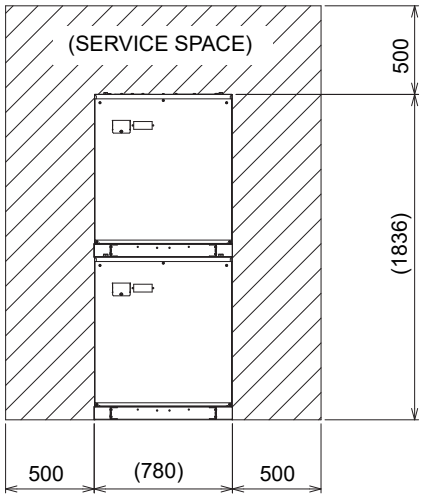
	Net weight (kg)	Operating weight (kg)
ERCV × 2	863	962

[2] Installation Space Requirement

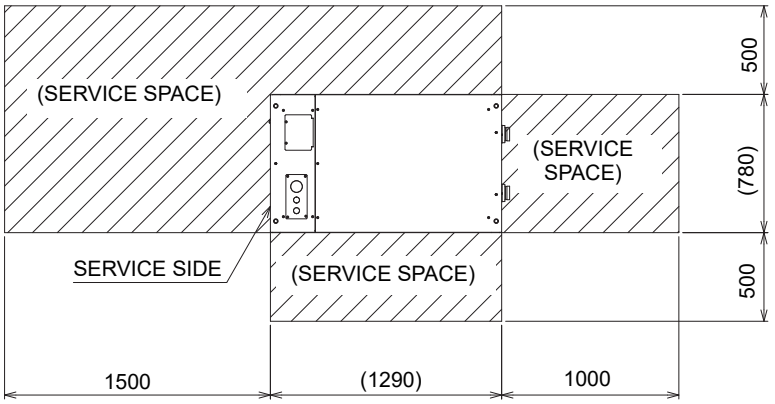
<1> Unit installation

(1) Required space

(Unit: mm)



<FRONT VIEW>

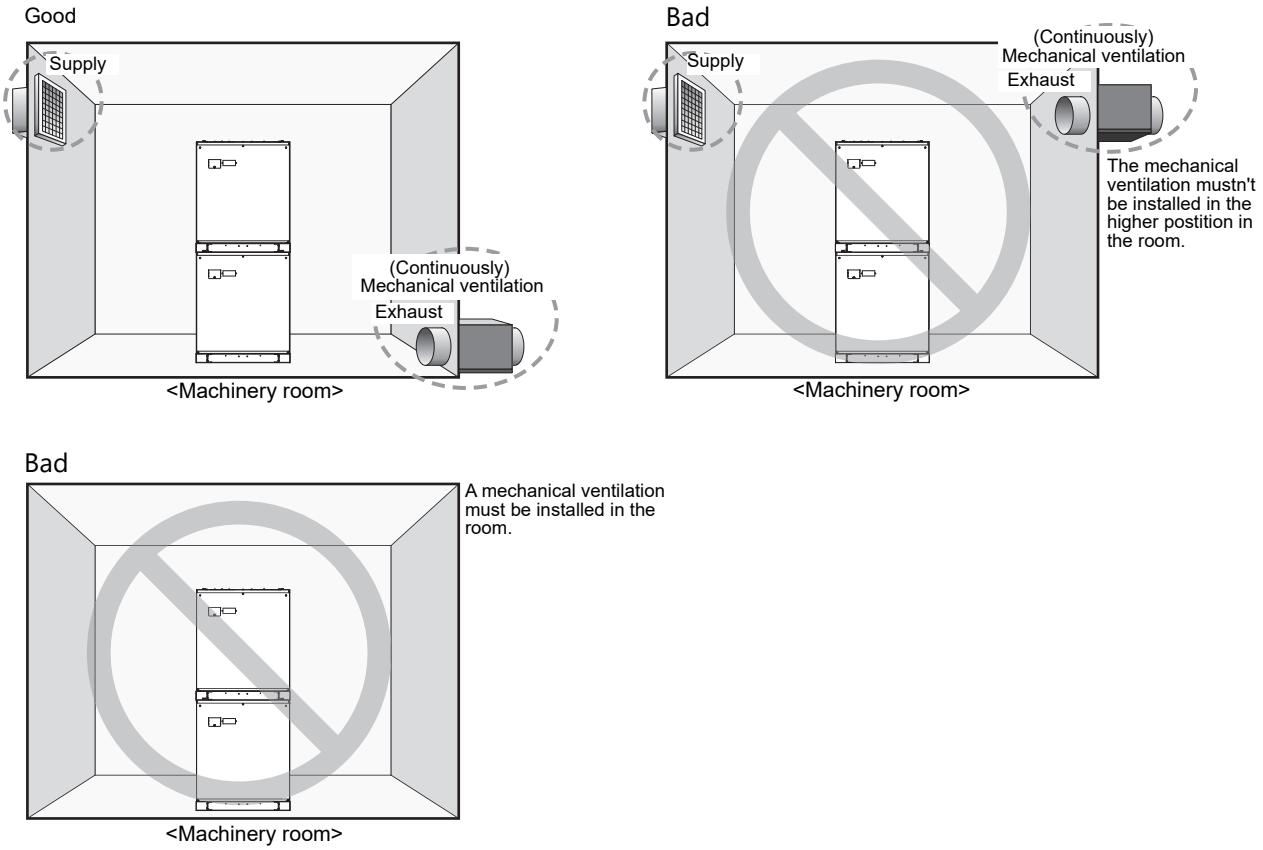


<TOP VIEW>

This unit is for exclusive use in a machine room with ventilation equipment.

As shown in the figure below, install the unit in a machine room with ventilation equipment.

*The requirements listed below were established based on IEC60335-2-40 (ver.6) and ISO5149 (2014).



<Regulatory requirements for mechanical ventilation>

1) Mechanical ventilation shall be operated continuously or be switched on by the refrigerant detection system. <IEC/GG.11.3.4><ISO-3/6.3.3.3>
2) During the continuous operation of the fan, the airflow shall be detected or monitored continuously. If the airflow is reduced, the unit operation shall be stopped, or alarm shall be turned on. <IEC/GG.8.3.1>
3) When the ventilation system is interlocked with the sensor, even if the detcted value of concentration becomes lower than the one for alert, the ventilation system shall continue to operate more than 5 minutes after the detection and air conditioning unit shall stop operation. <IEC/GG.8.3.1>
4) Air volume of ventilation <ISO-3/6.3.3.1>

   Q = 10/RCL (Refrigerant Concentration Limit) ≈ 164 m^3/h
5) The position of the mechanical ventilation openings <IEC/GG.11.3.3><ISO-3/5.13.1><ISO-3/5.13.5> <ISO-3/6.3.3.2>

   The upper edge of the ventilation opening shall be located equal or below the refrigerant release point.

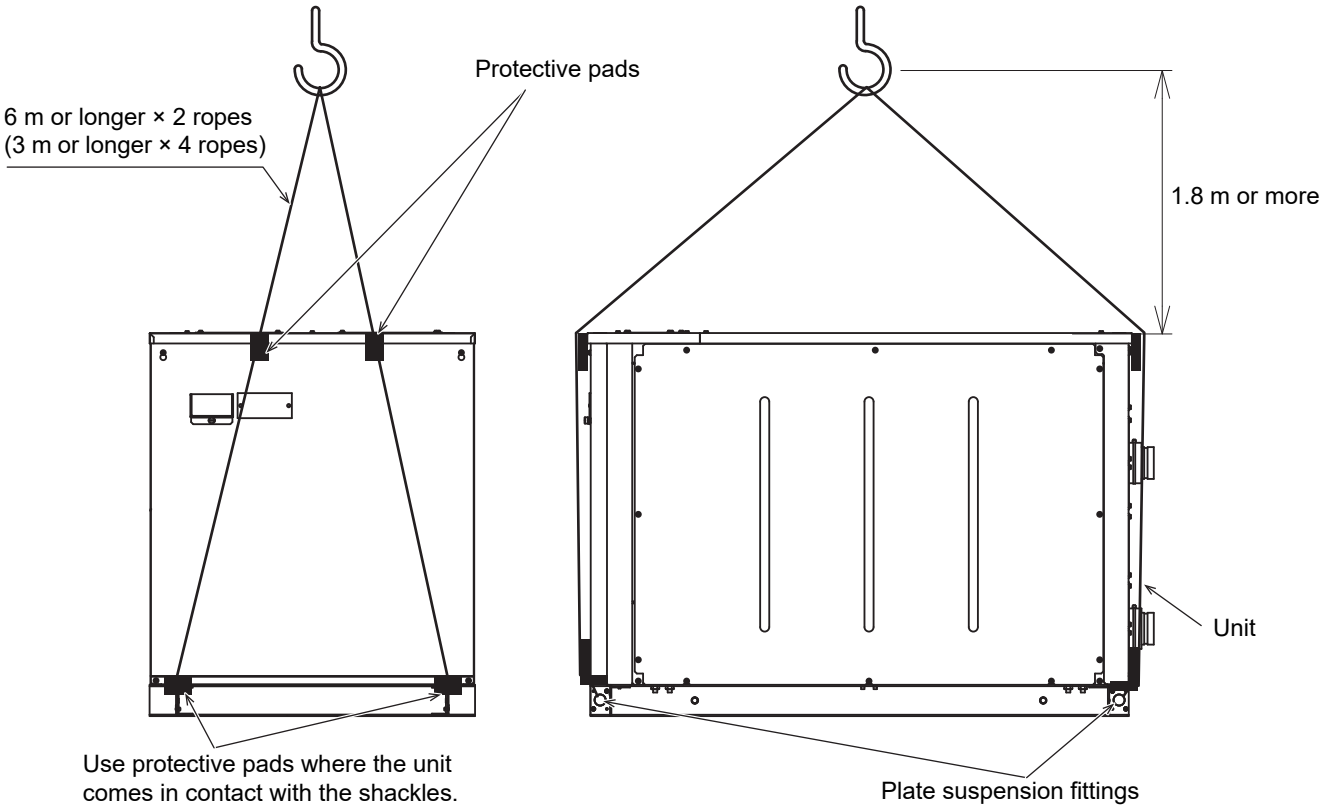
   For floor standing units, the lower edge of the opening shall be more than 100 mm above the floor.

   The exhaust ventilation openings shall be located a sufficient distance from intake openings to prevent re-circulation to the occupied space.
6) (For machinery room) Ventilation route shall be designed to avoid leakage of refrigerant to the neighbouring rooms, corridors and so on. <ISO-3/5.2>
7) (For machinery room) Exterior openings shall not be situated within 2 m of building emergency exit staircases or other building openings, e.g. windows, doors, ventilation inlets, etc. <ISO-3/5.7>
8) (For machinery room) The ventilation system shall be independent of any other ventilation system. <ISO-3/5.13.1>
9) The air conditioner and mechanical ventilation shall use different electrical power supply. <ISO-3/7.2 and 8.2>

2. Unit Installation

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

[1] Product suspension method



- If transporting the product suspended, 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.
- Use two ropes that are 6 m or longer. (Use four ropes that are 3 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.
- Refer to the center of gravity position shown in [2], and suspend the unit while taking care to prevent a deviated center of gravity.

⚠ Warning:

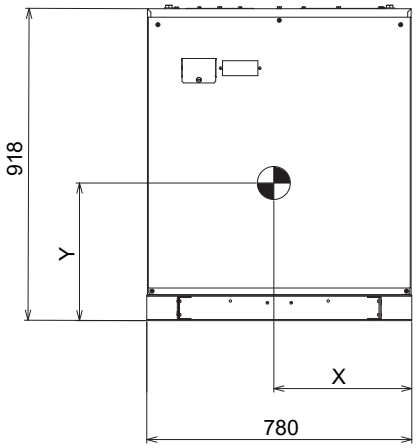
- **Lift the unit by placing the slings at designated locations. Support the unit securely at four points to keep it from slipping and sliding. If the unit is not properly supported, it may fall and cause personal injury.**

[2] Center of gravity position

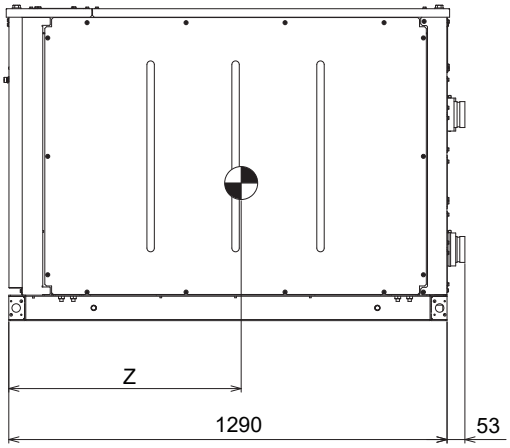
The center of gravity position is shown with the ◓ mark.

ERCV-M900YA(KR)

(Unit: mm)



<Service side>



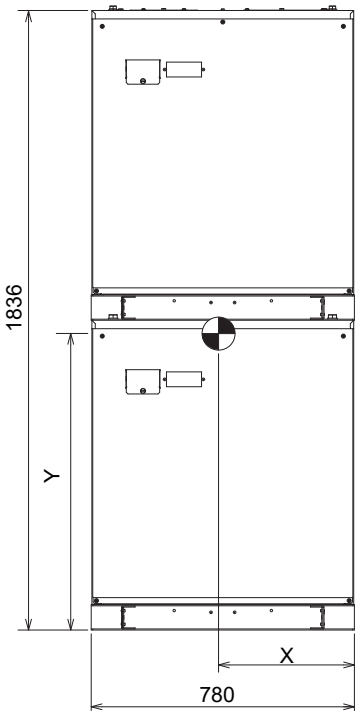
<Right side>

(Unit: mm)

Model	X	Y	Z
ERCV-M900YA(KR)	404	409	671

ERCV-M900YA(KR) × 2

(Unit: mm)



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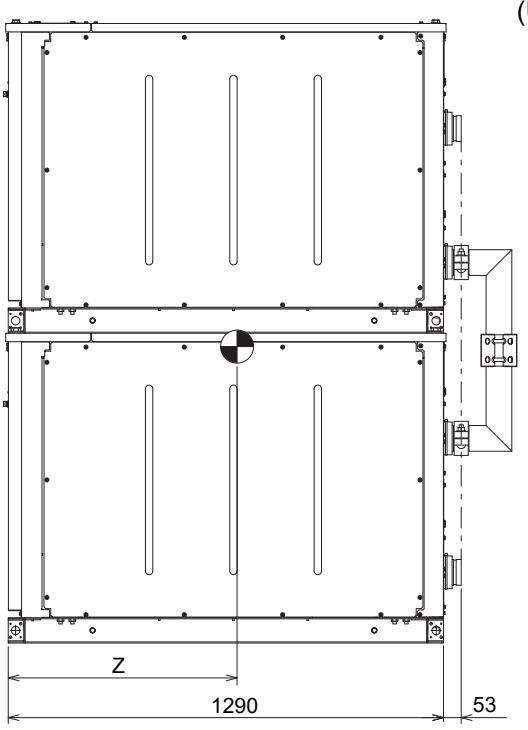


<Right side>

(Unit: mm)

Model	X	Y	Z
ERCV-M900YA(KR) × 2	404	868	684

[3] 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. (Such as using damper pads)

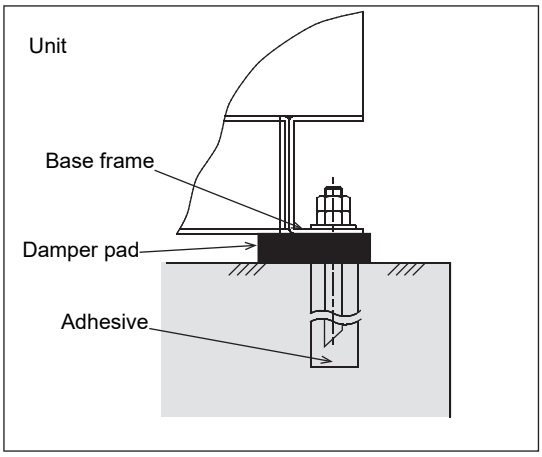
⚠ Warning:

- **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.**

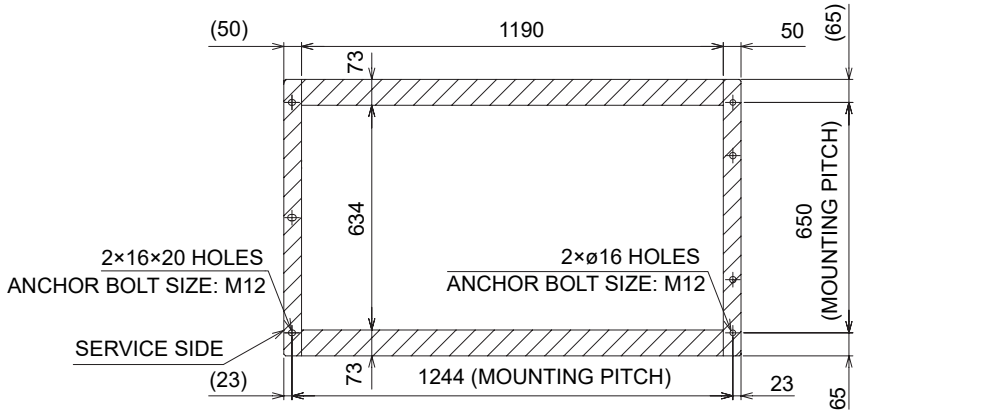
When building the foundation, take the floor strength, and piping and wiring routes into consideration.
When using damper pads, be sure to attach them to all corners of the unit.

Bolt size	Number
M12	4

[Enlarged view]



(Unit: mm)



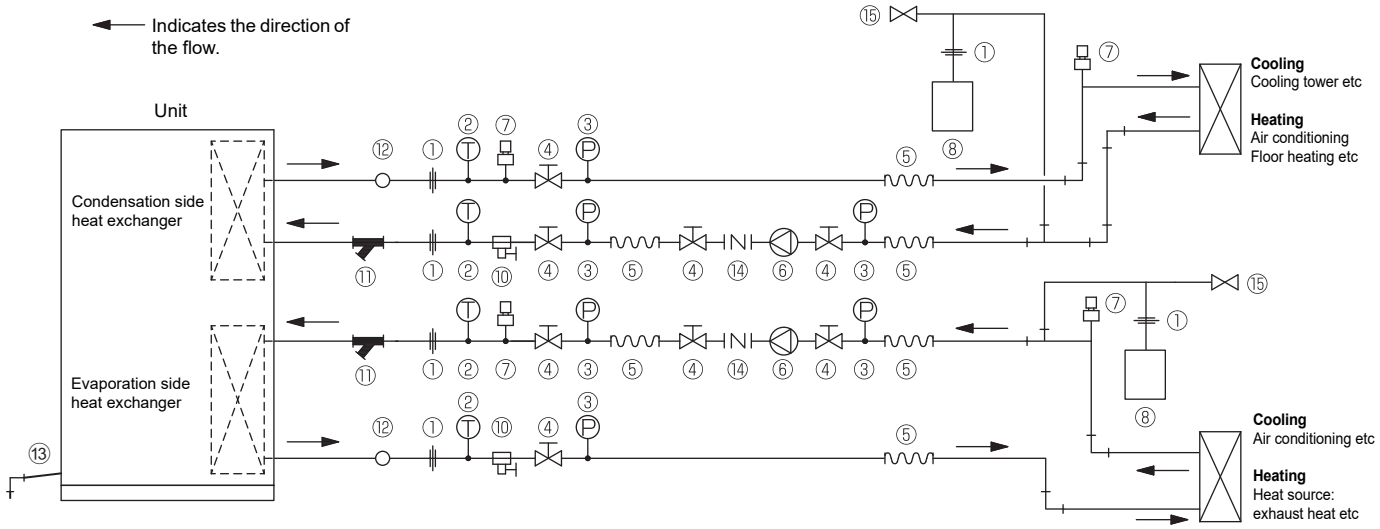
* ▨ SECTION SHOWS THE UNIT SURFACE TOUCHING THE FOUNDATION.

3. Water Pipe Installation

[1] Schematic Piping Diagram and Piping System Components

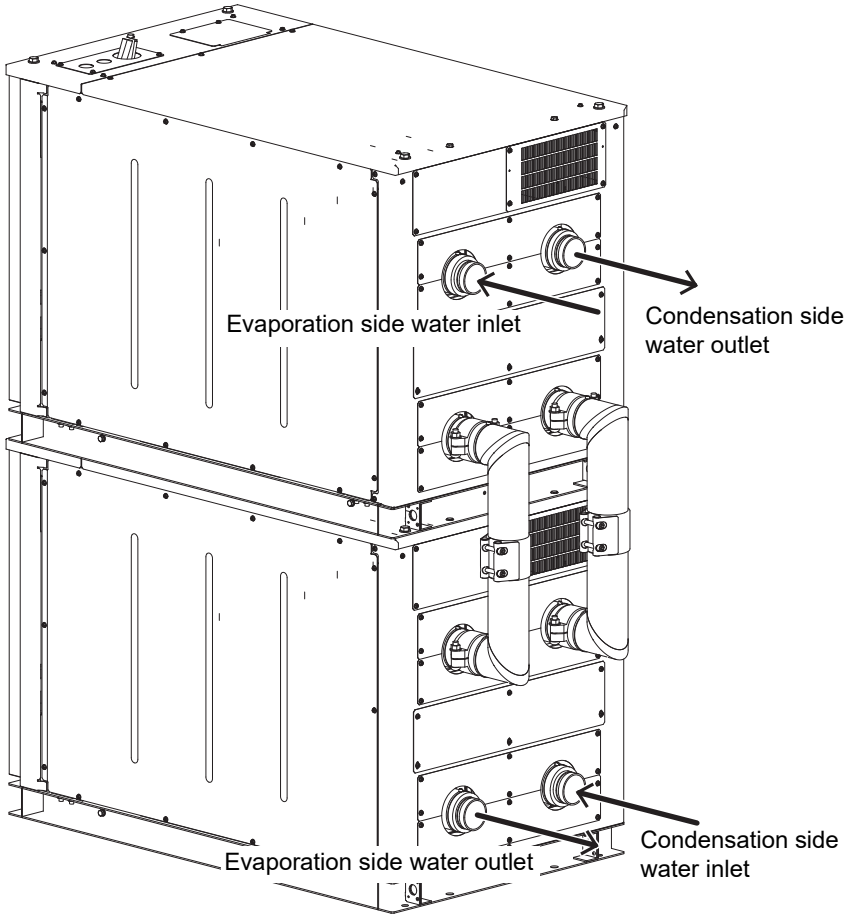
<1> Water circuit

Please build the condensation side and evaporation side water circuits so that it is a closed system.
Do not use water directly for showers or other applications. Do not allow other heat source water to mix with the water circuit. Build a water circuit as inlet water temperature fluctuation is within 5ºC/10 minutes.

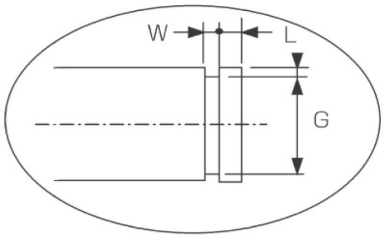


①	Union joints/flange joints	Required to allow for a replacement of equipment.
②	Thermometer	Required to check the performance and monitor the operation of the units.
③	Water pressure gauge	Recommended for checking the operation status.
④	Valve	Required to allow for a replacement or cleaning of the flow 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	Automatic air vent valve	Install automatic air vent valves where air accumulates. Even in the case of a failure of the water-side heat exchanger in the unit, the refrigerant may leak from the automatic air vent valve. To prevent accidents resulted from refrigerant leakage, install the unit where leaked refrigerant will not accumulate, such as outdoors.
⑧	Closed expansion tank	Install a closed expansion tank to accommodate expanded water and to supply water.
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.
⑫	Flow switch	Required to protect the unit.
⑬	Drain pipe	Install the drain pipe with a downward inclination of between 1/100 and 1/200. To prevent drain water from freezing in winter, install the drain pipe as steep an angle as practically possible and minimize the straight line. For cold climate installation, take an appropriate measure (e.g., drain heater) to prevent the drain water from freezing.
⑭	Check valve	Required to prevent the backward flow.
⑮	Safety valve	Install a safety valve near the closed expansion tank. Even in the case of a failure of the water-side heat exchanger in the unit, the refrigerant may leak from the safety valve. To prevent accidents resulted from refrigerant leakage, install the unit where leaked refrigerant will not accumulate, such as outdoors.

[2] Water piping attachment

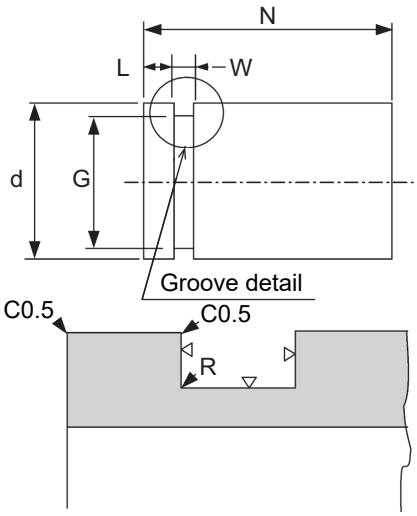


<Opposite side of service side>



The dimension of the groove pipe at the chiller side

Groove specifications



(Unit: mm)

	Pipe size
	2-1/2B (65A)
d	ø76.1
G	ø72.2 $^{+0}_{-0.4}$
W	8.7 $^{+0}_{-0.7}$
L	15.88 $^{+0}_{-0.7}$
N	50
R	1.0

[3] Notes on Pipe Corrosion

Water treatment and water quality control

Poor-quality circulating water can cause scale build-up and corrosion in the water-side heat exchanger, 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) (μs/cm) (25˚C)	30 or less [300 or less]	30 or less [300 or less]	30 or less [300 or less]	30 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	0.1 or less	1.0 or less	0.1 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.

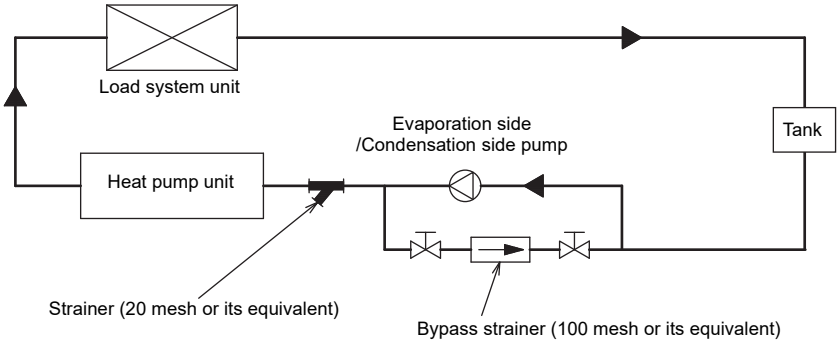
(5) Suspended solids in the water

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 more) 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 65°C or more. Use hot water input piping material that can withstand the maximum input water temperature. All piping must be made of SUS or similar material to withstand corrosion.

When considering reusing the existing piping, check for rust. Replace the piping if it is severely rusted.

[4] Installing the Strainer and Flow Switch

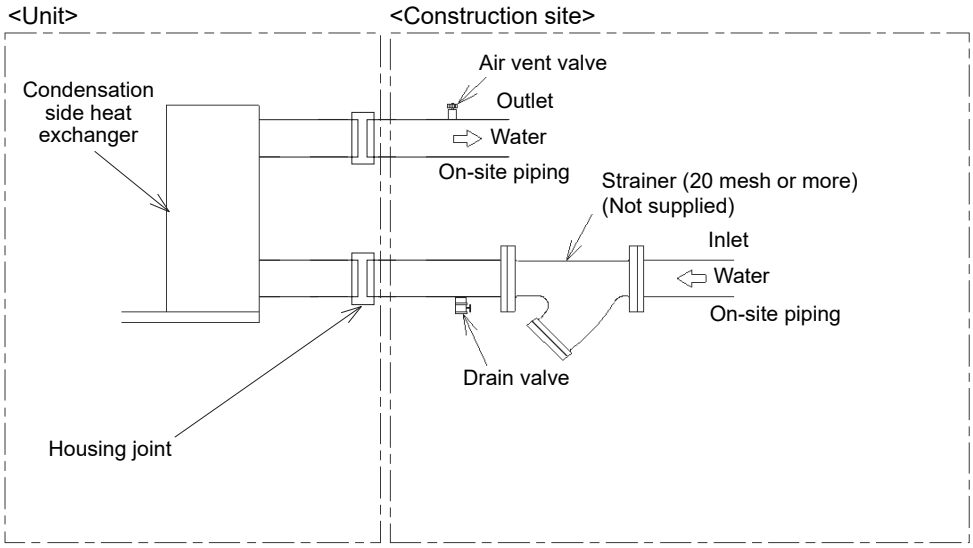
<1> Installing the strainer

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 figure shows an example of strainer installation on the condensation side. Take the same procedure for the evaporation side.

<2> Installing a flow switch

Install a flow switch that meets the following specifications on the water pipe.

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

Evaporation side water

Minimum flow rate = 15.4 m³/h (256 L/min)

Unit usage range (water flow rate): 15.4 - 50.0 m³/h

Condensation side water

Minimum flow rate = 9.0 m³/h (150 L/min)

Unit usage range (water flow rate): 9.0 - 50.0 m³/h

[5] Installing the external water temperature sensor

<1> Parts that are required to install an external water temperature sensor

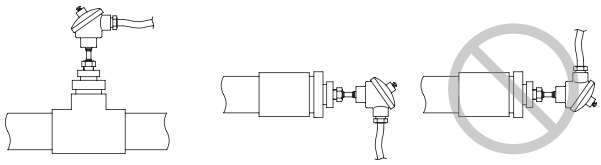
(1) External water temperature sensor
(2) Wiring to connect the sensor and the unit*
(3) Wiring terminals to connect the wiring to the sensor and the terminal block on the unit
(Four for M4 screws)*
*Items (1) and (2) are field supplied.

Wire specifications

Wire size	2-core cable Min. 1.25 mm^2
Type	CVVS or CPEVS
Maximum length	20 m

<2> Installing the external water temperature sensor

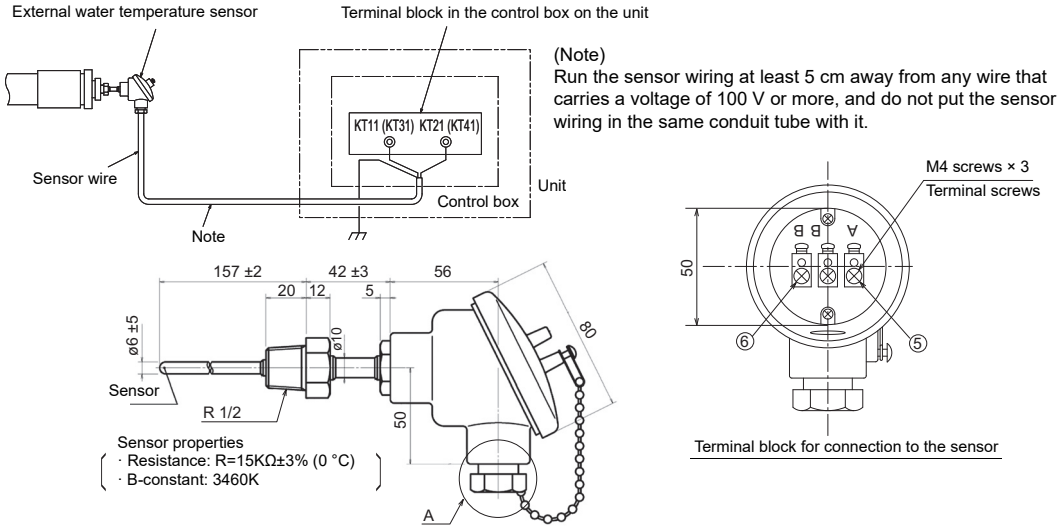
- Install the external water temperature sensor where the water pipes merge or on the load-side tank as shown in the figure at right.
- Install horizontally or vertically on top of the pipe.
- When installing horizontally, make sure the wire faces down.



Vertical installation　　Horizontal installation

<3> Wiring the external water temperature sensor

Connect the external temperature sensor wiring to the terminal block in the control box on the unit as shown in the figure below.



(Note)
Run the sensor wiring at least 5 cm away from any wire that carries a voltage of 100 V or more, and do not put the sensor wiring in the same conduit tube with it.

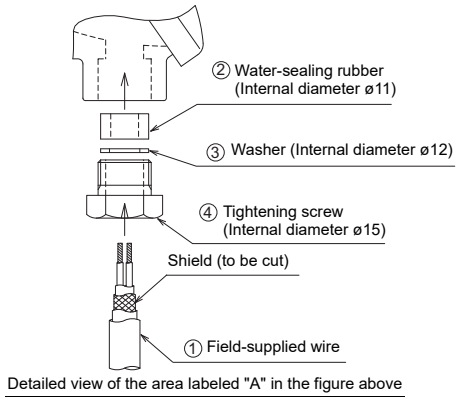
Terminal block for connection to the sensor

Connect the sensor wiring to terminals KT11 and KT21 (or KT31 and KT41) of the terminal block in the control box on the unit.

Connect the shield to the earth terminal.

Thread the wire to the external water temperature sensor through parts ② through ④ as shown in the figure at right. Attach M4 terminals (field-supplied) to the wires, and connect them to ⑤ and ⑥ (terminals A and B).

Cut the shield wire. Do not connect it to the terminal. (Connect the shield on the unit side to the ground terminal.)



Detailed view of the area labeled "A" in the figure above

After the wire is connected, securely tighten the tightening screw ④, and then caulk the gap between the wire ① and the tightening screw to keep water from entering.

*1 In a multiple module connection system, install the temperature sensor where the cold/hot water from each module is sufficiently mixed to provide a representative temperature.
*2 The temperature sensor must be installed on a pipe between the outlet of the unit and the entrance to the load-side system.
*3 Install the sensor at least 5D (D: pipe diameter) away from pipe bends and other areas that can obstruct the normal water flow and so that the sensing probe (protective tube) will not vibrate from the whirl or shock flow.
*4 The sensor is for use at a flow rate of 3 m/sec or below.

[6] Ensuring enough water in the water circuit

<1> Required amount of water (for single unit)

If the amount of water in the water circuit (circulating water circuit) is insufficient, the unit operation hours may become shorter or the amount of water temperature change to be controlled may become extremely large. Refer to the table below for the minimum amount of water required in the circuit. If the water pipe is too short to keep enough amount of water, install a cushion tank in the water pipe to ensure enough amount of water.

Model	Minimum amount of evaporation side water (ℓ)	Minimum amount of condensation side water (ℓ)
ERCV-M900YA(KR) × 2	600	700

(1) Calculating the required amount of water in the water circuit

The required amount of water in the water circuit can be obtained from the following formula.

(Required amount of water in the water circuit) = (Amount of water that can be held in the water pipe) + (Amount of water that can be held in the heat source unit) + (Amount of water that can be held in the load-side unit)

The amount of water that can be held per meter of the water pipe (ℓ/m)

Pipe size					
2 1/2B (65A)	3B (80A)	4B (100A)	5B (125A)	6B (150A)	8B (200A)
3.77	5.16	8.87	13.23	18.91	32.44

The amount of water that can be held in the heat source unit (ℓ)

Model	Evaporation side	Condensation side
ERCV-M900YA(KR) × 2	43	56

(2) Inlet/Outlet pipe connection size and material

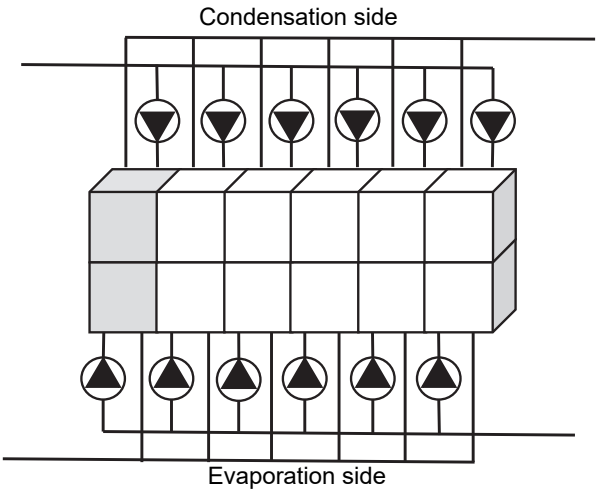
The table below shows the inlet/outlet pipe connection size.

Inlet/Outlet pipe connection size

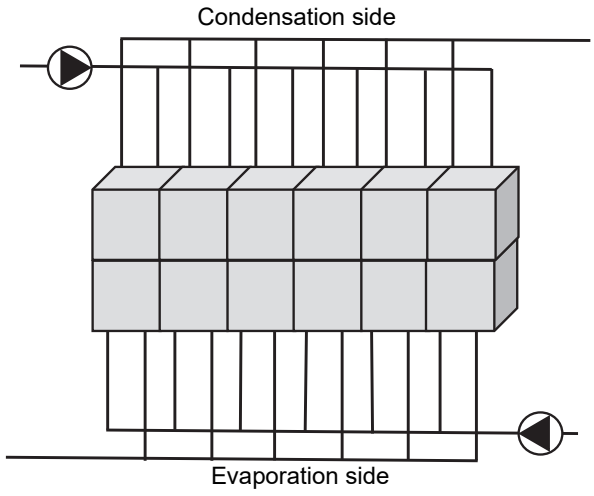
Inlet pipe connection (Evaporation side/Condensation side)	Outlet pipe connection (Evaporation side/Condensation side)
65A housing type joint (Field-supplied housing joint)	65A housing type joint (Field-supplied housing joint)

<2> Required amount of water (for multiple units)

When one unit is in operation during low load by the function to control the number of units in operation
→The total amount of water required by the system is equivalent to the amount for one unit (value for a single unit)

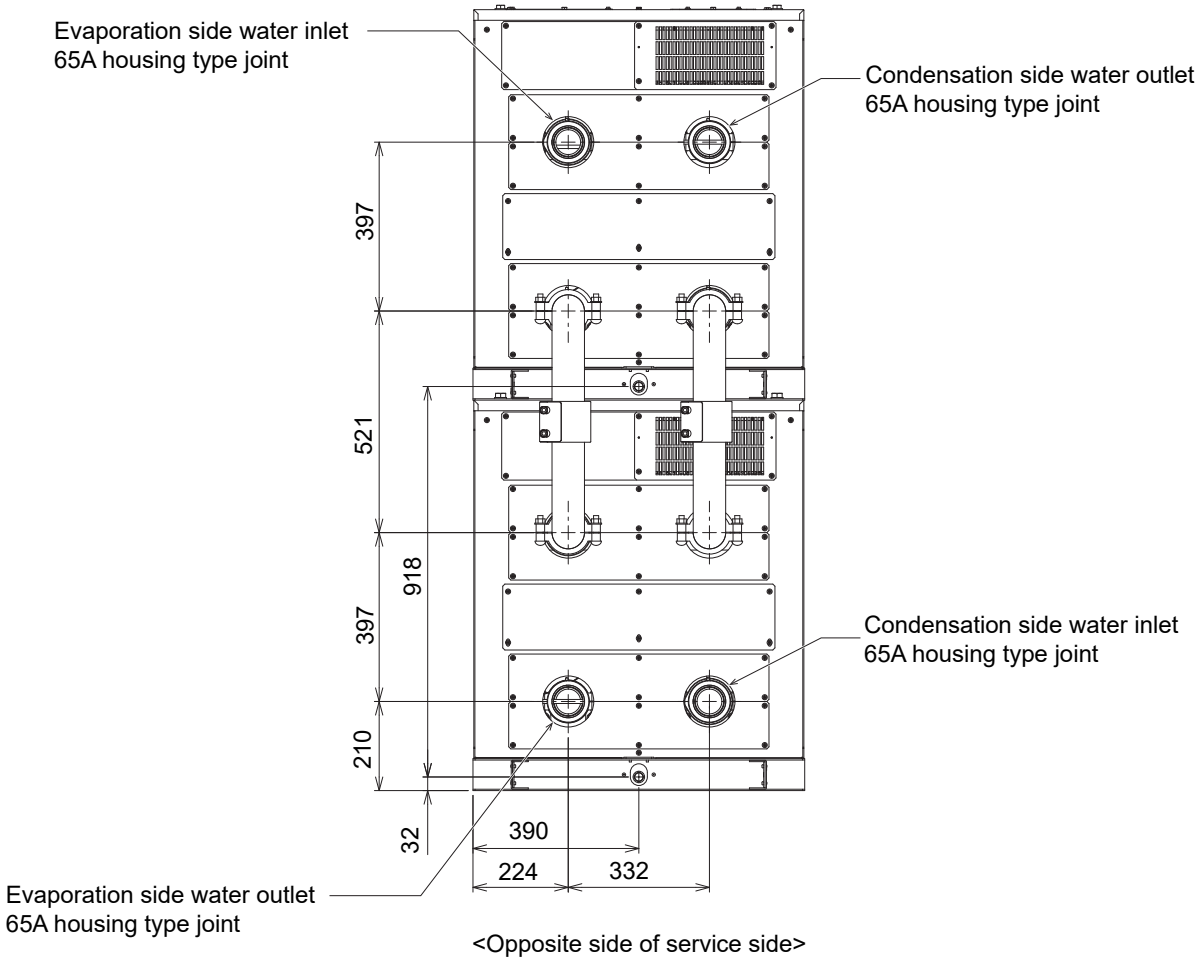


When there are no changes in the number of units in operation during low load by the function to control the number of units in operation (simultaneous operation control)
→The total amount of water required by the system is equivalent to the amount for the total number of units



[7] Water Piping Size and Location

(Unit: mm)



4. Electrical Wiring Installation

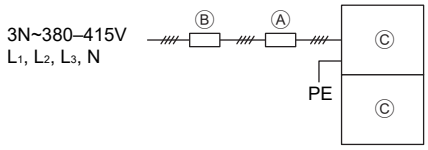
[1] Main Power Supply Wiring and Switch Capacity

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 size (mm^2)			Current leakage breaker	Local switch (A)		No-fuse breaker (A)	Max. Permissive System Impedance
	Main cable	Branch	Ground		Capacity	Fuse		
ERCV-M900YA(KR) × 2	38	-	38	150 A 200 mA 0.1 sec. or less	150	150	150	0.06 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 5%.
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 Chilling Unit 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.**
- **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} (*1).**

*1

S_{SC} (MVA)
10.35

Control cable specifications

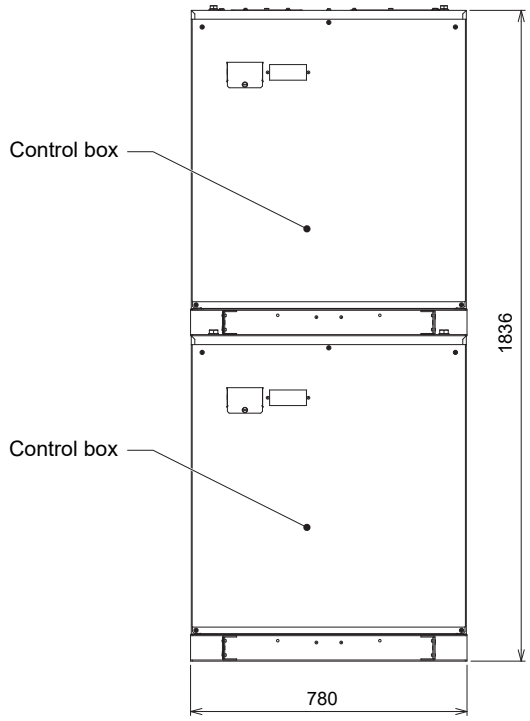
Remote controller cable	Size	0.3 mm² (Max. 250 m total)
	Recommended cable types	2-core sheathed cable
M-NET cable between units *2	Size	Min. 1.25 mm² (Max. 200 m total)
	Recommended cable types	Shielded cable CVVS, CPEVS or MVVS
External input wire size		Min. 0.3 mm²
External output wire size		1.25 mm²

*2 Use a CVVS or CPEVS cable (Max. total length of 250 m) if there is a source of electrical interference nearby (e.g., factory) or the total length of control wiring exceeds 200 m.

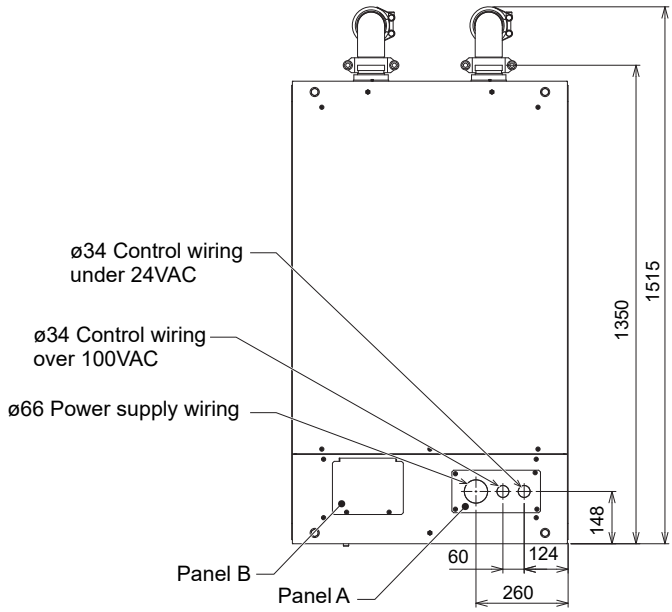
[2] Cable Connections

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

(Unit: mm)

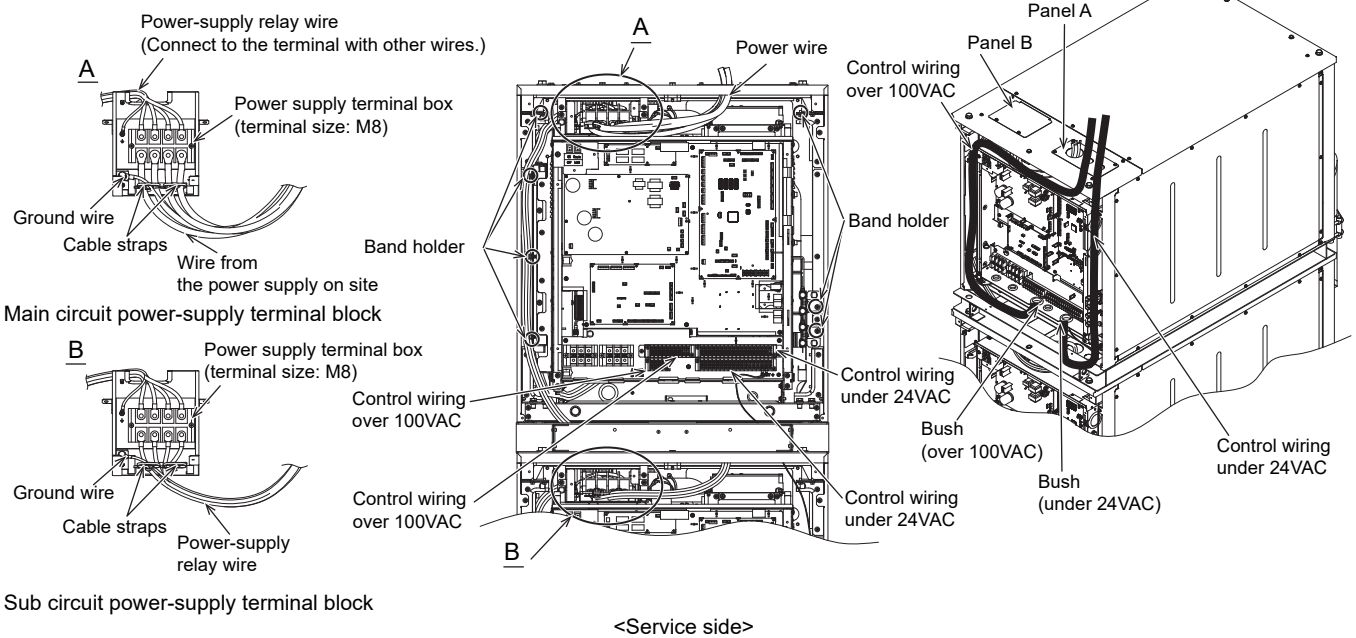


<Service side>



<Unit top>

Detailed drawing



<Service side>

(1) Remove the control box cover and the terminal box cover.
(2) Punch out the knockout hole on panel A, and connect the power wire, ground wire, and control wire.
The ground wire should be longer than the power wire.
*Smooth out the edges of knockouts that have been punched out.
(3) Remove panel B, and connect the power wire to the power-supply terminal block with a screw.
Hold the wires together by using a cable strap.
(4) Separately connect the control wires to 24 VAC and 100 VAC terminals on panel A.
Pass the control wires through the bushes on the control box, and connect them to the terminal block.
Secure the control wires in place using tie bands at the band holders.
(5) Secure the cable conduit, and then waterproof the area around the pipe with silicon, etc.
(6) Re-place the control box cover and the terminal block cover.

<2> Precautions when fastening screws

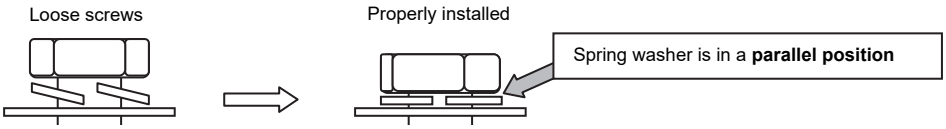
* Faulty contacts due to loose screws may cause overheating and fire.
* Using the circuit board while it is damaged may cause overheating and fire.

① Screw fastening torque

Power supply terminal block, M8 screw: 10 to 13.5 N·m

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

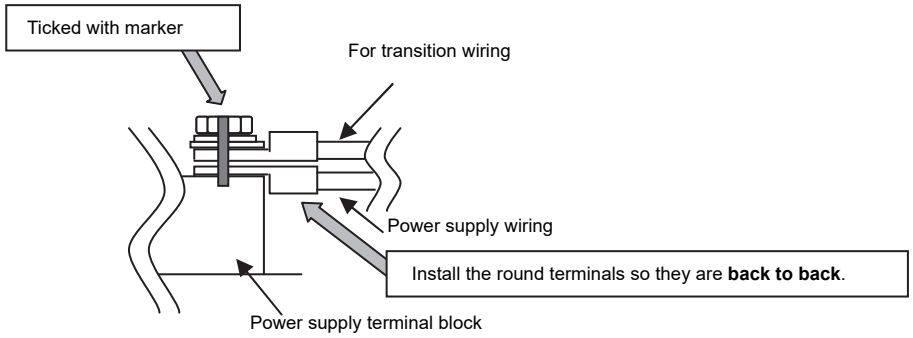
1. Check that the spring washer is in a parallel position.
   * If the screw is biting into the washer, simply fastening the screw to the specified torque cannot determine whether it has been installed properly.



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.

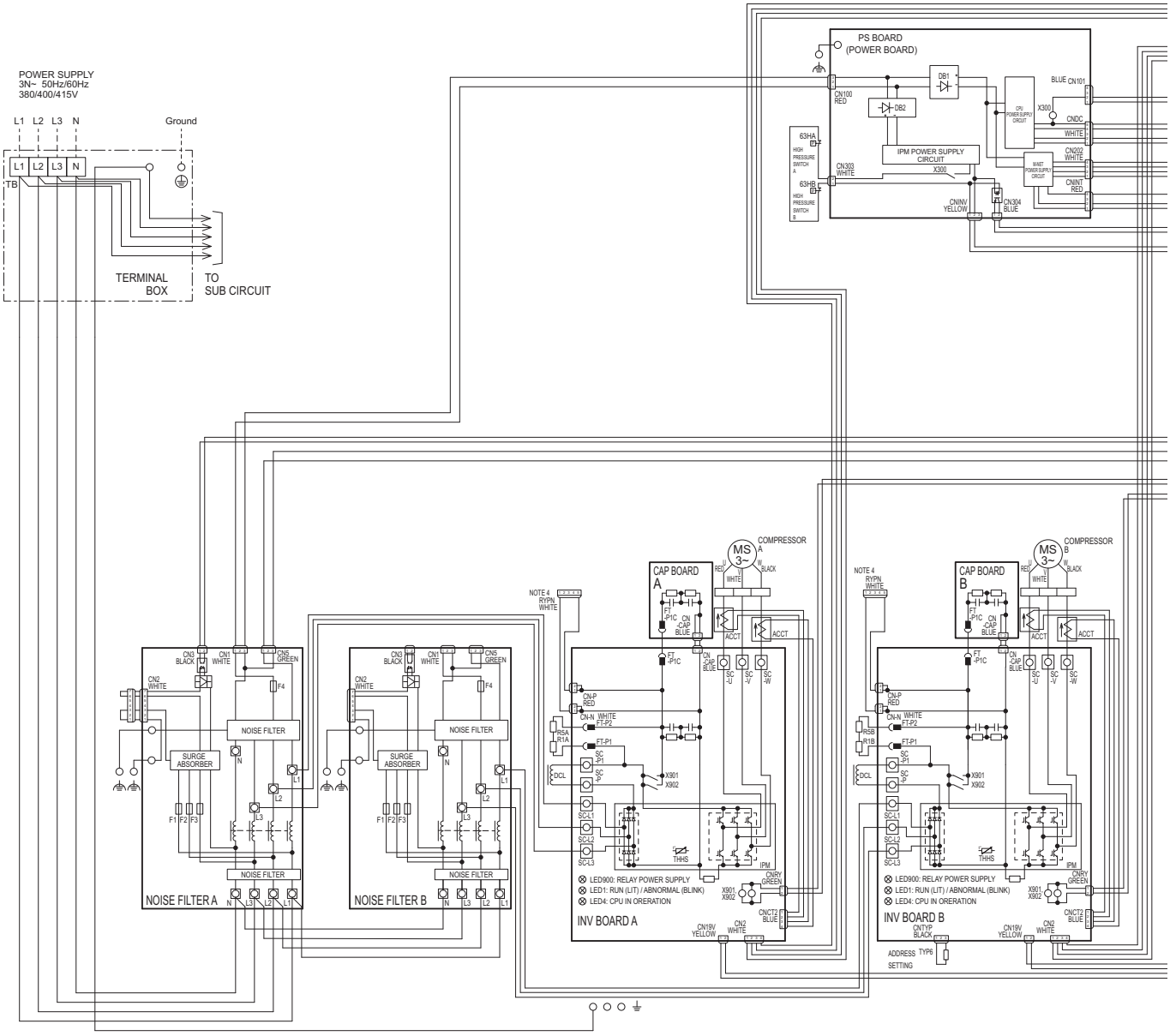


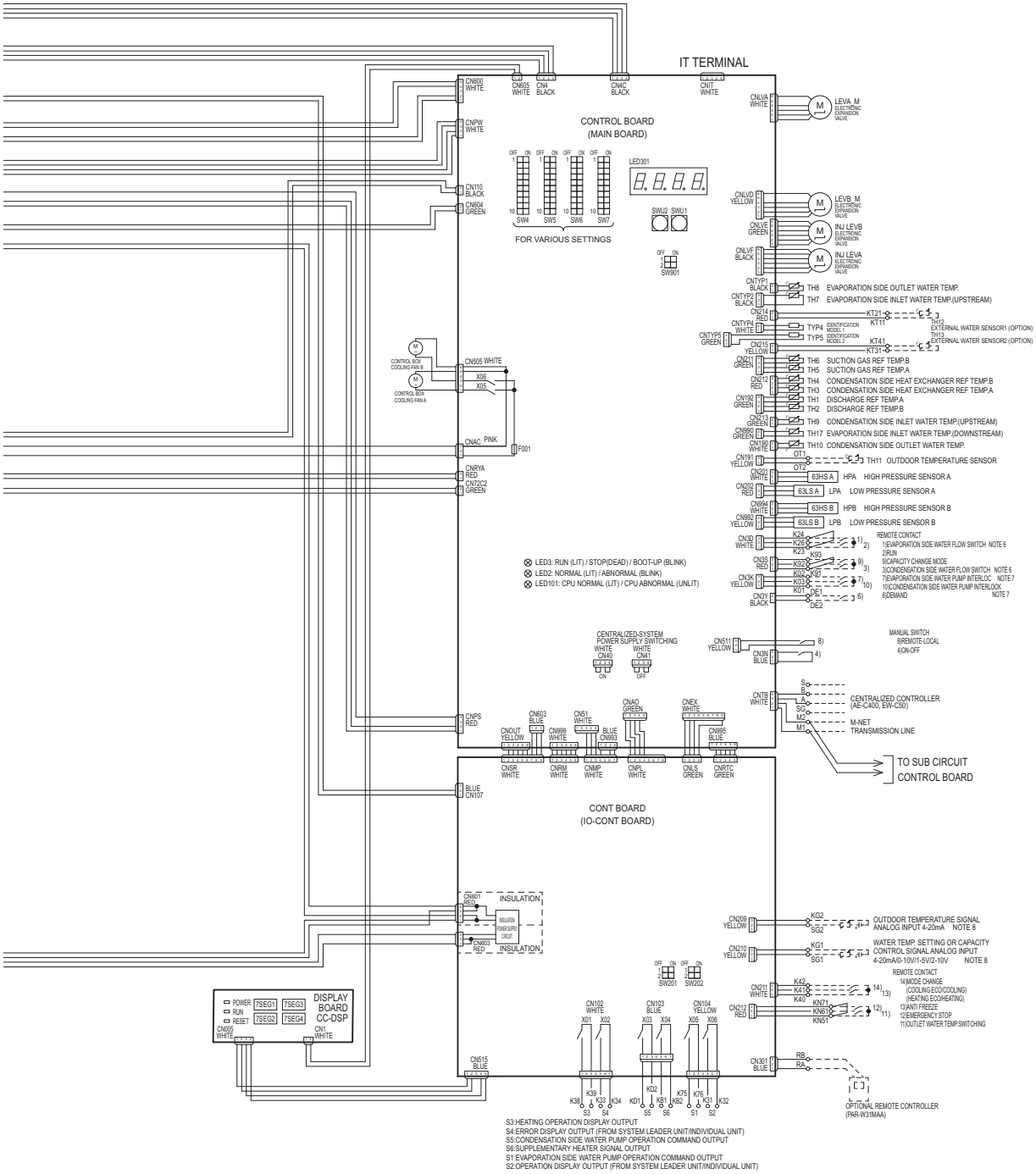
<3> Installing the conduit tube

- Always use a conduit to run the power supply wiring.
- Select the conduit size based on the hole.
- The cable conduits must be prepared locally.
- Do not store the 24VDC or less low-voltage circuit and 100VAC or higher main circuit and control circuit cables in the same multi-core cable, or bundle them together.
- Attach cable conduits securely to the foundation, etc. to ensure that excessive loads are not applied to the power supply terminal box.
- Seal the area around the cable conduit connection to ensure that no water penetrates the cable conduit connection port.

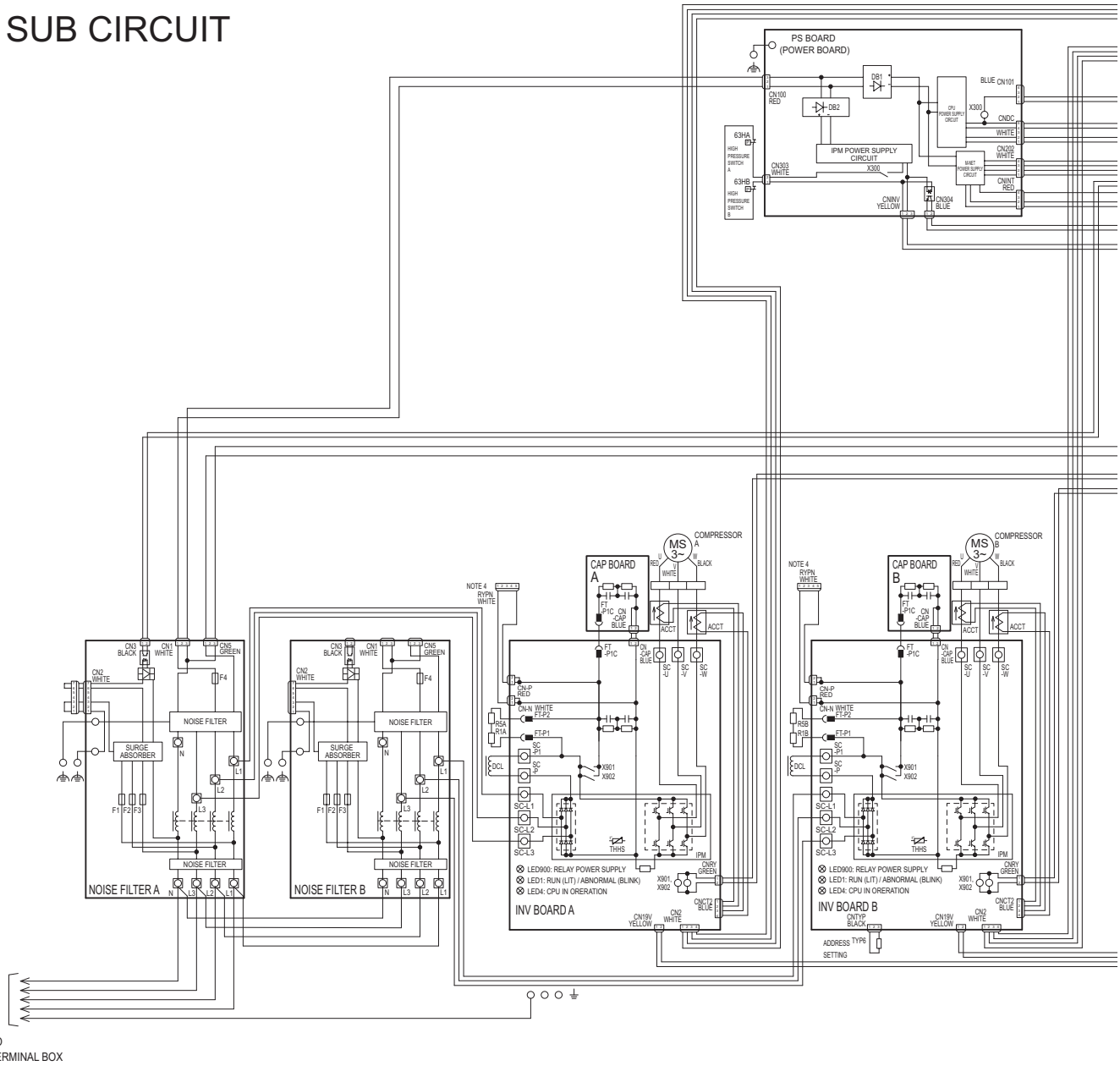
ERCV-M900YA(KR) × 2
ELECTRICAL WIRING DIAGRAM

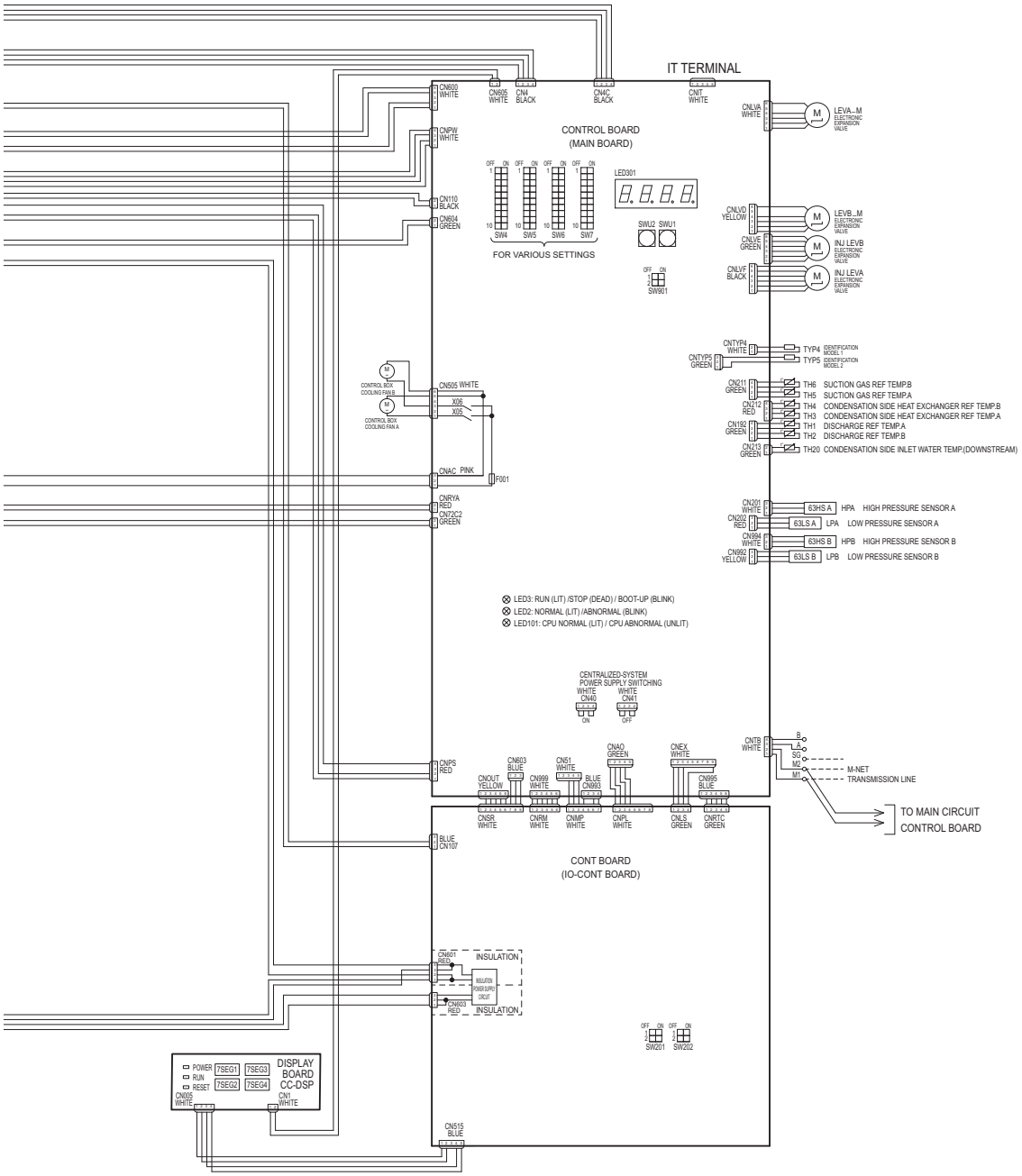
MAIN CIRCUIT




IT TERMINAL
CONTROL BOARD
(MAIN BOARD)
FOR VARIOUS SETTINGS
LED301
SW4
SW5
SW6
SW7
SWU2
SWU1
SW001
CN600 WHITE
CN605 WHITE
CN4 BLACK
CNAC BLACK
CNIT WHITE
CNPW WHITE
CN110 BLACK
CN604 GREEN
CNUA WHITE
LEVA_M ELECTRONIC EXPANSION VALVE
CNUD YELLOW
LEVB_M ELECTRONIC EXPANSION VALVE
CNUE GREEN
INJ LEVB ELECTRONIC EXPANSION VALVE
CNUF BLACK
INJ LEVA ELECTRONIC EXPANSION VALVE
CNTYP1 BLACK
TH8 EVAPORATION SIDE OUTLET WATER TEMP.
CNTYP2 BLACK
TH7 EVAPORATION SIDE INLET WATER TEMP.(UPSTREAM)
CN214 RED
KT21
KT11
CNTYP4 WHITE
TYP4 IDENTIFICATION MODEL 1
TYP5 IDENTIFICATION MODEL 2
CNTYP5 GREEN
TH12 EXTERNAL WATER SENSOR1 (OPTION)
TH13 EXTERNAL WATER SENSOR2 (OPTION)
CN215 YELLOW
KT41
KT31
CN2K GREEN
TH6 SUCTION GAS REF TEMP.B
TH5 SUCTION GAS REF TEMP.A
CN212 RED
TH4 CONDENSATION SIDE HEAT EXCHANGER REF TEMP.B
TH3 CONDENSATION SIDE HEAT EXCHANGER REF TEMP.A
CN192 GREEN
TH1 DISCHARGE REF TEMP.A
TH2 DISCHARGE REF TEMP.B
CN2S1 GREEN
TH9 CONDENSATION SIDE INLET WATER TEMP.(UPSTREAM)
CN2SR GREEN
TH17 EVAPORATION SIDE INLET WATER TEMP.(DOWNSTREAM)
CN190 WHITE
TH10 CONDENSATION SIDE OUTLET WATER TEMP.
CN191 YELLOW
OT1
OT2
TH11 OUTDOOR TEMPERATURE SENSOR
CN001 WHITE
63HS A
HPA HIGH PRESSURE SENSOR A
CN202 RED
63LS A
LPA LOW PRESSURE SENSOR A
CN994 WHITE
63HS B
HPB HIGH PRESSURE SENSOR B
CN992 YELLOW
63LS B
LPB LOW PRESSURE SENSOR B
CN3D WHITE
K24
K26
K23
REMOTE CONTACT
1)EVAPORATION SIDE WATER FLOW SWITCH NOTE 6
2)RUN
9)CAPACITY CHANGE MODE
3)CONDENSATION SIDE WATER FLOW SWITCH NOTE 6
7)EVAPORATION SIDE WATER PUMP INTERLOC NOTE 7
10)CONDENSATION SIDE WATER PUMP INTERLOCK
6)DEMAND NOTE 7
CN3S RED
K93
K92
K22
CN3K YELLOW
K97
K033
K01
CN3Y BLACK
DE1
DE2
CN505 WHITE
X06
X05
CONTROL BOX COOLING FAN B
CONTROL BOX COOLING FAN A
CNAC PINK
F001
CNRYA RED
CN72C2 GREEN
LED3: RUN (LIT) / STOP(DEAD) / BOOT-UP (BLINK)
LED2: NORMAL (LIT) / ABNORMAL (BLINK)
LED101: CPU NORMAL (LIT) / CPU ABNORMAL (UNLIT)
CENTRALIZED-SYSTEM POWER SUPPLY SWITCHING
CN40
CNAT
ON
OFF
CN511 YELLOW
CN3N BLUE
MANUAL SWITCH
8)REMOTE-LOCAL
4)ON-OFF
CNTB WHITE
B
A
SG
M2
M1
CENTRALIZED CONTROLLER (AE-C400, EW-C50)
M-NET TRANSMISSION LINE
TO SUB CIRCUIT CONTROL BOARD
CNPS RED
CN803 BLUE
CN51 WHITE
CNAQ GREEN
CNEX WHITE
CNOUT YELLOW
CN999 WHITE
BLUE CN993
CN995 BLUE
CNSR WHITE
CNRM WHITE
CNMP WHITE
CNPL WHITE
CNLS GREEN
CNRTC GREEN
BLUE CN107
CONT BOARD
(IO-CONT BOARD)
CN601 RED
INSULATION
YELLOW POWER SUPPLY CIRCUIT
CN603 RED
CN209 YELLOW
KG2
SG2
OUTDOOR TEMPERATURE SIGNAL ANALOG INPUT 4-20mA NOTE 8
CN210 YELLOW
KG1
SG1
WATER TEMP. SETTING OR CAPACITY CONTROL SIGNAL ANALOG INPUT 4-20mA/0-10V/1-5V/2-10V NOTE 8
SW201
SW202
CN211 WHITE
K42
K41
K40
REMOTE CONTACT
14)MODE CHANGE (COOLING ECO/COOLING) (HEATING ECO/HEATING)
13)ANTI FREEZE
12)EMERGENCY STOP
11)OUTLET WATER TEMP.SWITCHING
CN212 RED
KN71
KN81
KN51
CN102 WHITE
X01
X02
CN103 BLUE
X03
X04
CN104 YELLOW
X05
X06
CN51E BLUE
CN301 BLUE
RB
RA
OPTIONAL REMOTE CONTROLLER (PAR-W31MAA)
K38
K39
K33
K34
KD1
KD2
K81
K82
K75
K76
K31
K32
S3
S4
S5
S6
S1
S2
POWER
RUN
RESET
7SEG1
7SEG2
7SEG3
7SEG4
DISPLAY BOARD CC-DSP
CN005 WHITE
CN1 WHITE
S3:HEATING OPERATION DISPLAY OUTPUT
S4:ERROR DISPLAY OUTPUT (FROM SYSTEM LEADER UNIT/INDIVIDUAL UNIT)
S5:CONDENSATION SIDE WATER PUMP OPERATION COMMAND OUTPUT
S6:SUPPLEMENTARY HEATER SIGNAL OUTPUT
S1:EVAPORATION SIDE WATER PUMP OPERATION COMMAND OUTPUT
S2:OPERATION DISPLAY OUTPUT (FROM SYSTEM LEADER UNIT/INDIVIDUAL UNIT)

SUB CIRCUIT


PS BOARD
(POWER BOARD)
DB1
DB2
CN100
RED
BLUE
CN101
CPU
POWER SUPPLY
CIRCUIT
X300
CNDC
WHITE
63HA
HIGH
PRESSURE
SWITCH
A
63HB
HIGH
PRESSURE
SWITCH
B
IPM POWER SUPPLY
CIRCUIT
X300
CN303
WHITE
CN202
WHITE
MAGNET
POWER SUPPLY
CIRCUIT
CNMT
RED
CNINV
YELLOW
CN304
BLUE
NOTE 4
RY/PN
WHITE
CAP BOARD
A
CAP BOARD
B
COMPRESSOR
A
COMPRESSOR
B
MS
3~
U
V
W
RED
WHITE
BLACK
FT
-P1C
CN
CAP
BLUE
ACCT
CN-P
RED
CN-N
WHITE
FT-P2
FT-P1
SC
-P1
SC
-P
SC-L1
SC-L2
SC-L3
DCL
R5A
R1A
R5B
R1B
X901
X902
THHS
IPM
CNRY
GREEN
CNCT2
BLUE
CN19V
YELLOW
CN2
WHITE
SC
-U
SC
-V
SC
-W
LED900: RELAY POWER SUPPLY
LED1: RUN (LIT) / ABNORMAL (BLINK)
LED4: CPU IN ORERATION
INV BOARD A
INV BOARD B
CNTYP
BLACK
ADDRESS
SETTING
TYPE
CN3
BLACK
CN1
WHITE
CN5
GREEN
CN2
WHITE
F4
NOISE FILTER
SURGE
ABSORBER
N
L1
L2
L3
F1
F2
F3
NOISE FILTER A
NOISE FILTER B
TO
TERMINAL BOX


IT TERMINAL
CONTROL BOARD
(MAIN BOARD)
CN600 WHITE
CN926 WHITE
CN4 BLACK
CNAC BLACK
CNIT WHITE
CNPW WHITE
CN110 BLACK
CN804 GREEN
LED301
SW4
SW5
SW6
SW7
FOR VARIOUS SETTINGS
SWU2 SWU1
SW901
CNLVA WHITE
LEVA..M ELECTRONIC EXPANSION VALVE
CNLVD YELLOW
LEVB..M ELECTRONIC EXPANSION VALVE
CNLVE GREEN
INJ LEVB ELECTRONIC EXPANSION VALVE
CNLVF BLACK
INJ LEVA ELECTRONIC EXPANSION VALVE
CNTYP4 WHITE
CNTYP5 GREEN
TYP4 IDENTIFICATION MODEL 1
TYP5 IDENTIFICATION MODEL 2
CONTROL BOX COOLING FAN B
CONTROL BOX COOLING FAN A
CN505 WHITE
X06
X05
CN21 GREEN
TH6 SUCTION GAS REF TEMP.B
TH5 SUCTION GAS REF TEMP.A
CN212 RED
TH4 CONDENSATION SIDE HEAT EXCHANGER REF TEMP.B
TH3 CONDENSATION SIDE HEAT EXCHANGER REF TEMP.A
CN192 GREEN
TH1 DISCHARGE REF TEMP.A
TH2 DISCHARGE REF TEMP.B
CN213 GREEN
TH20 CONDENSATION SIDE INLET WATER TEMP.(DOWNSTREAM)
CNAC PINK
F001
CNRYA RED
CN72C2 GREEN
CN201 WHITE
63HS A
HPA HIGH PRESSURE SENSOR A
CN202 RED
63LS A
LPA LOW PRESSURE SENSOR A
CN994 WHITE
63HS B
HPB HIGH PRESSURE SENSOR B
CN992 YELLOW
63LS B
LPB LOW PRESSURE SENSOR B
LED3: RUN (LIT) /STOP (DEAD) / BOOT-UP (BLINK)
LED2: NORMAL (LIT) /ABNORMAL (BLINK)
LED101: CPU NORMAL (LIT) / CPU ABNORMAL (UNLIT)
CENTRALIZED-SYSTEM POWER SUPPLY SWITCHING
WHITE CN40 ON
WHITE CN41 OFF
CNTB WHITE
B
A
S
M2
M1
M-NET TRANSMISSION LINE
TO MAIN CIRCUIT CONTROL BOARD
CNPS RED
CN803 BLUE
CNOUT YELLOW
CN51 WHITE
CN999 WHITE
BLUE CN993
CNAO GREEN
CNEX WHITE
CN995 BLUE
CNSR WHITE
CNRM WHITE
CNMP WHITE
CNPL WHITE
CNLS GREEN
CNRTC GREEN
BLUE CN107
CONT BOARD
(IO-CONT BOARD)
CN607 RED
INSULATION
INSULATION TRANSFORMER CIRCUIT
CN603 RED
INSULATION
SW201
SW202
POWER
RUN
RESET
7SEG1
7SEG2
7SEG3
7SEG4
DISPLAY BOARD CC-DSP
CN005 WHITE
CN1 WHITE
CN515 BLUE

Note1. The broken lines indicate the optional parts, field-supplied parts, and field work.
Note2. Dashed lines indicate terminal box.
Note3. For connected modules, provide daisy-chain wiring between M1, M2 and SG.
Note4. The control box has many parts charged with high voltage in it.
Before inspecting the inside of the control box, be sure to turn off the power supply and leave it alone for at least 10 minutes and then confirm that the voltage connector RYPN declined sufficiently (to 20 VDC or less).
Note5. 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.
Note6. Remove the short circuit wire between the terminals K23-K24 and K91-K92 to connect a flow switch.
Note7. Be sure to connect the wires from terminals K01-K02 and K01-K03 to the interlock contact on the pump.
A short-circuit may cause abnormal stop or malfunctions.
Note8. Use a 4-20 mA signal output device with insulation.
Feeding 30 mA or more current may damage the circuit board.
Note9. Make sure that on site terminal connection is correct.
With wrong connection, operation error may occur.
Note10. 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 100 V or greater.
Do not place them in the same conduit tube or cabtyre cable as this will damage the circuit board.
Note11. 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
Note12. Use a contact that takes 12 VDC 1 mA for No-voltage contact input.
Use No-voltage contact output that takes 200 VAC or lower and 10 VDC or higher 24 VDC or lower (10 mA or higher 1 A (resistive load), 0.6 A (inductive load) or lower).

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 (Main circuit)

Input type	Dry contact		ON (Close)	OFF (Open)	Terminal block
	(a) EVAPORATION SIDE WATER PUMP INTERLOCK	Normal/Error	The unit is allowed to operate.	The unit will not operate.	K01-K02
	(b) CONDENSATION SIDE WATER PUMP INTERLOCK	Normal/Error	The unit is allowed to operate.	The unit will not operate.	K01-K03
	(c) EVAPORATION SIDE WATER FLOW SWITCH	Normal/Error	The unit is allowed to operate.	The unit will not operate.	K23-K24
	(d) CONDENSATION SIDE WATER FLOW SWITCH	Normal/Error	The unit is allowed to operate.	The unit will not operate.	K91-K92
	(e) 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.	K23-K26
	(f) ANTI FREEZE	On/Off	The unit will operate in the Anti-Freeze mode (with the target temperature 25ºC) when the contact status of (e) "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 (e) above) or the ON/OFF command from the remote controller.	K40-K41
	(g) MODE CHANGE*1	Cooling ECO/Cooling	Cooling ECO mode (Refer to page 54)	Cooling mode	K40-K42
		Heating ECO/Heating	Heating ECO mode (Refer to page 54)	Heating mode	
	(h) OUTLET WATER TEMP. SWITCHING	2nd/1st	Setting temp 2 (Refer to page 53 Settings table)	Setting temp 1 (Refer to page 53 Settings table)	KN51-KN61
	(i) CAPACITY CHANGE MODE	Efficiency priority/ Capacity priority	The unit will operate in the energy-efficient mode. (Efficiency priority mode)	The unit will operate at the maximum capacity setting. (Capacity priority mode)	K91-K93
	(j) DEMAND	ON/OFF	The unit will operate at or below the maximum capacity level that was set for the Peak-demand control setting.	The unit will operate at or below the maximum capacity.	DE1-DE2
	(k) EMERGENCY STOP	Release/Stop	The unit will operate according to the status of the "UNIT OPERATION" contact (item (e) above) or the ON/OFF command from the remote controller.	The compressor and pump will stop in an emergency.	KN51-KN71
	Analog				**Terminal block**
	Input type		**Action**		
	(l) WATER TEMP. SETTING/ CAPACITY CONTROLL SIGNAL		Water temperature or capacity control signal 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, 0-10 V, 1-5 V, or 2-10 V. * Use a 4-20 mA signal output devise with insulation.		SG1(+)-KG1(-)
	(m)OUTDOOR TEMPERATURE SIGNAL		For Cooling ECO/Heating ECO Input: 4-20 mA		SG2(+)-KG2(-)
	(n) EXTERNAL WATER SENSOR 1 (option)		For simultaneous operating group Input: TH12		KT11-KT21
	(o) EXTERNAL WATER SENSOR 2 (option)		For identical water system group Input: TH13		KT31-KT41
	(p) OUTDOOR TEMPERATURE SENSOR		For Cooling ECO/Heating ECO Input: TH11		OT1-OT2

Output type	Contact type		Conditions in which the contact closes (turns on)	Conditions in which the contact opens (turns off)	Terminal block
	(q) OPERATION INDICATOR (From system leader unit/Individual unit)	Close/Open	The "UNIT OPERATION" contact (item (e) above) or the ON/OFF button on the remote controller is ON.	The "UNIT OPERATION" contact (item (e) above) or the ON/OFF button on the remote controller is OFF.	K31-K32
	(r) ERROR INDICATOR (From system leader unit/Individual unit)	Close/Open	The unit in the system has made an abnormal stop.	During normal operation	K33-K34
	(s) HEATING OPERATION DISPLAY	Close/Open	The unit is in heating mode.	The unit is in cooling mode.	K38-K39
	(t) EVAPORATION SIDE WATER PUMP OPERATION COMMAND	Close/Open	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	K75-K76
	(u) CONDENSATION SIDE WATER PUMP OPERATION COMMAND	Close/Open	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	KD1-KD2
	(v) SUPPLEMENTARY HEATER SIGNAL	Close/Open	Water and outdoor temperature has dropped below a setting water temperature and a set outdoor temperature.	Water temperature is at or above a set water temperature +2ºC.	KB1-KB2
RC/M-NET	REMOTE CONTROLLER	PAR-W31MAA			RA-RB
	CENTRALIZED CONTROLLER	AE-C400, EW-C50			A-B
	M-NET	-			M1-M2

*1 Cooling: Control the evaporation side water temperature.
Heating: Control the condensation side water temperature.

Input and output correspondence table

When wiring on site, check the operation during the commissioning.

		Terminal block	ON	OFF	System leader unit	Group leader unit	SUB unit
No-voltage contact input	Evaporation side water pump interlock	K01-K02	Normal	Error	○	○	○ *1
	Condensation side water pump interlock	K01-K03	Normal	Error	○	○	○ *1
	Evaporation side water flow switch	K23-K24	Normal	Error	○	○	○ *1
	Condensation side water flow switch	K91-K92	Normal	Error	○	○	○ *1
	Run	K23-K26	Run	Stop	○	—	—
	Anti freeze	K40-K41	ON	OFF	○	—	—
	Mode change	K40-K42	Cooling ECO *3 /Heating ECO	Cooling /Heating	○	—	—
	Outlet water temp. switching	KN51-KN61	2nd	1st	○	—	—
	Capacity change mode *7	K91-K93	Efficiency priority	Capacity priority	○	—	—
	Demand	DE1-DE2	ON	OFF	○	—	—
	Emergency stop *6	KN51-KN71	Release	Stop	○	—	—
Analog input	Water temp. setting / Capacity control signal	SG1(+)-KG1(-)	4-20mA,0-10V,1-5V, 2-10V		○	—	—
	Outdoor temperature signal	SG2(+)-KG2(-)	4-20mA For Cooling ECO/Heating ECO		○	—	—
	External water sensor 1 (Option) TH12	KT11-KT21	For simultaneous operating group		○	○	—
	External water sensor 2 (Option) TH13	KT31-KT41	For identical water system group		○	—	—
	Outdoor temperature sensor TH11	OT1-OT2	For Cooling ECO/Heating ECO		○	—	—
No-voltage contact output	Operation display output *4 (From system leader unit/ Individual unit)	K31-K32	ON while the unit is operating		○	— / ○ *2	— / ○ *2
	Error display output *5 (From system leader unit/ Individual unit)	K33-K34	While abnormally stop is ON.		○	— / ○ *2	— / ○ *2
	Heating operation display output	K38-K39	Heating	Cooling	○	○	○
	Evaporation side water pump operation command output	K75-K76	ON while the unit is operating		○	○	○ *1
	Condensation side water pump operation command output	KD1-KD2	ON while the unit is operating		○	○	○ *1
	Supplementary heater signal output	KB1-KB2	During the low outdoor and water temperature is ON.		○	○	○
RC	Remote controller	RA-RB	PAR-W31MAA		○	—	—
	Centralized controller	A-B	AE-C400, EW-C50		○	—	—

○: Input and output signal is enabled.

—: Invalid

*1 Invalid when the one pump system

*2 System leader unit/Individual unit

*3 Refer to the following page for information about the settings of Cooling ECO and Heating ECO. (page 54)

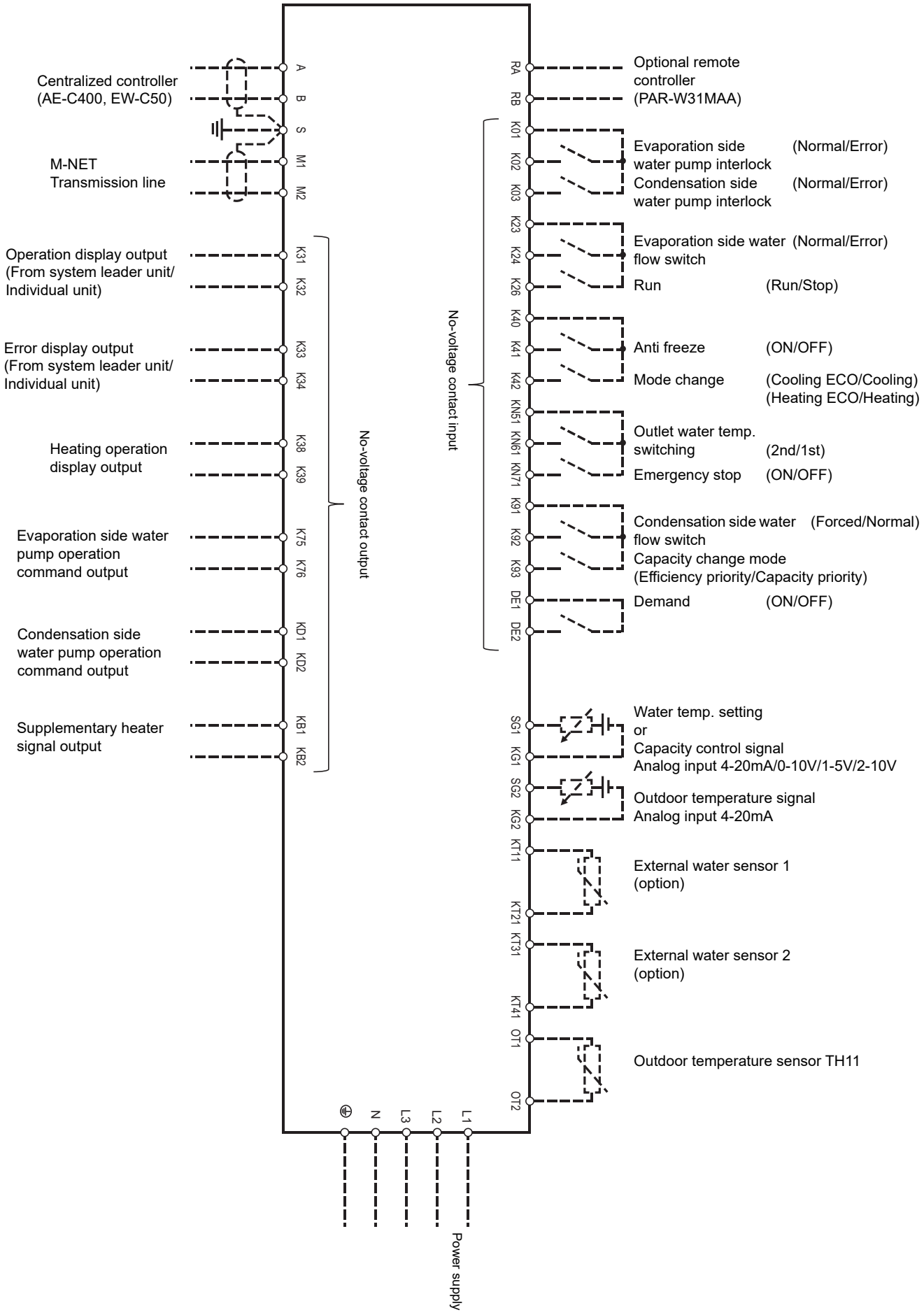
*4 Refer to the following page for information about the settings of Operation display output. (page 63)

*5 Refer to the following page for information about the settings of Error display output. (page 63)

*6 Always use a ventilation system on site in conjunction with the unit.
If the ventilation system in the machine room fails, stop the unit.
Remove the short circuit wire between the terminals KN51-KN71 to connect.
Refer to the following page information about ventilation equipment. (page 11)

*7 The capacity change mode is available only when SW6-10 is turned OFF (water setting).

External signal interface (Main circuit)

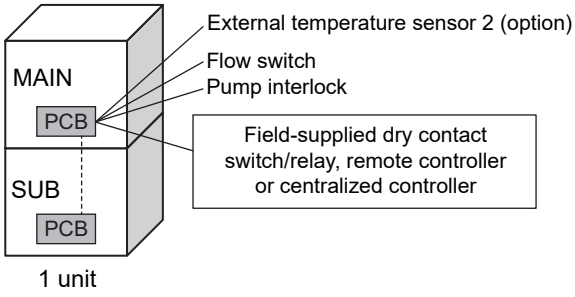


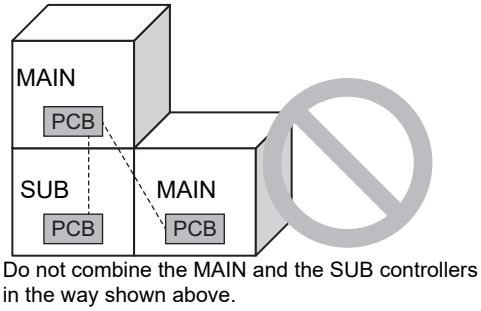
5. System Configurations

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

[1] Schematic Diagrams of Individual and Multiple Units Connection Systems

(1) Individual system



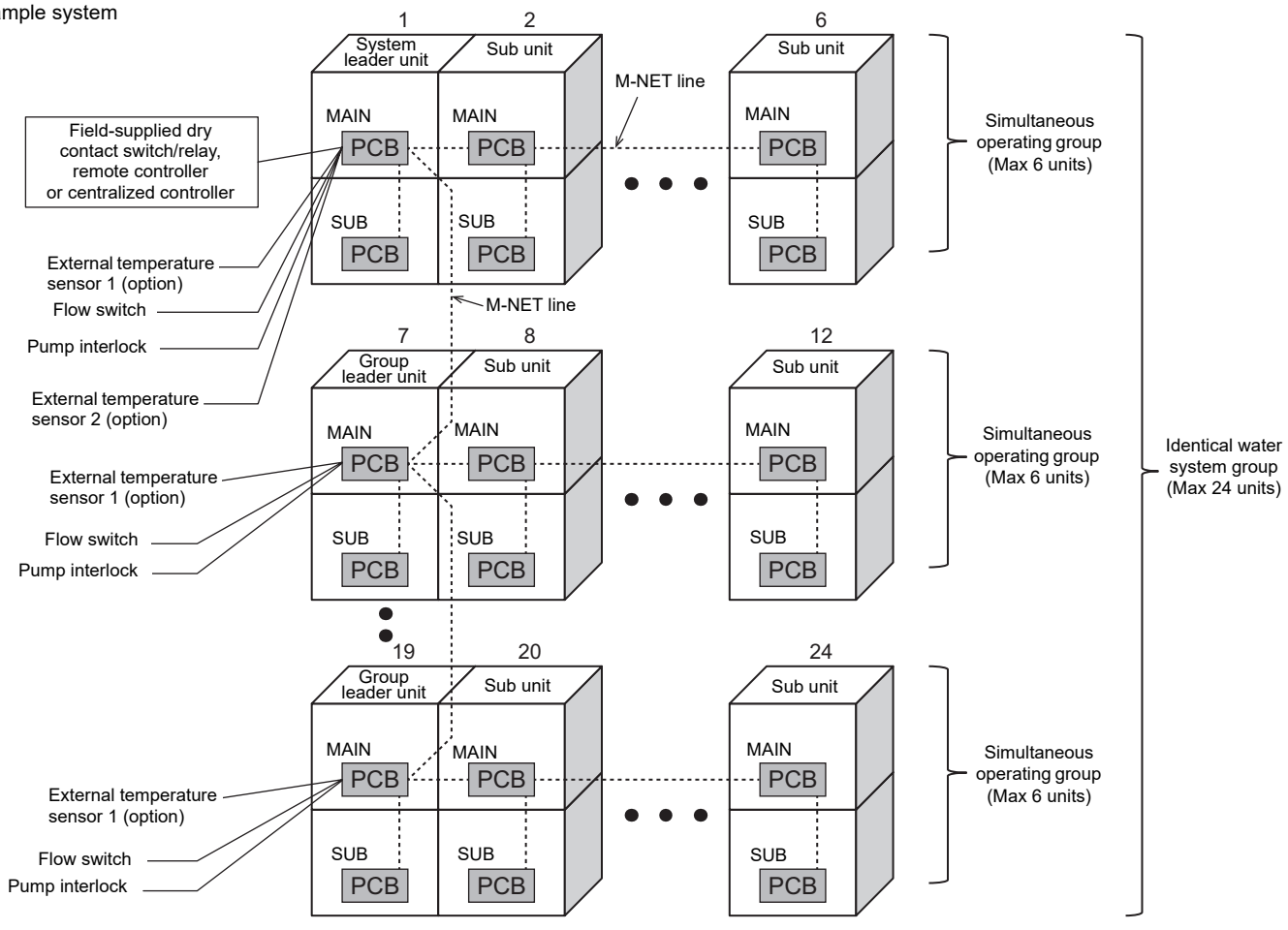


Refer to the sections "Switch Types and the Factory Settings" on the next page and "Configuring the Settings" (page 39) for further details.

(2) Multiple units connection system (Max 24 units)

System leader unit	The unit controls the identical water system group.
Group leader unit	The unit transmits the command from the system leader unit to the sub unit.
Sub unit	The unit is other than leader unit.

Example system



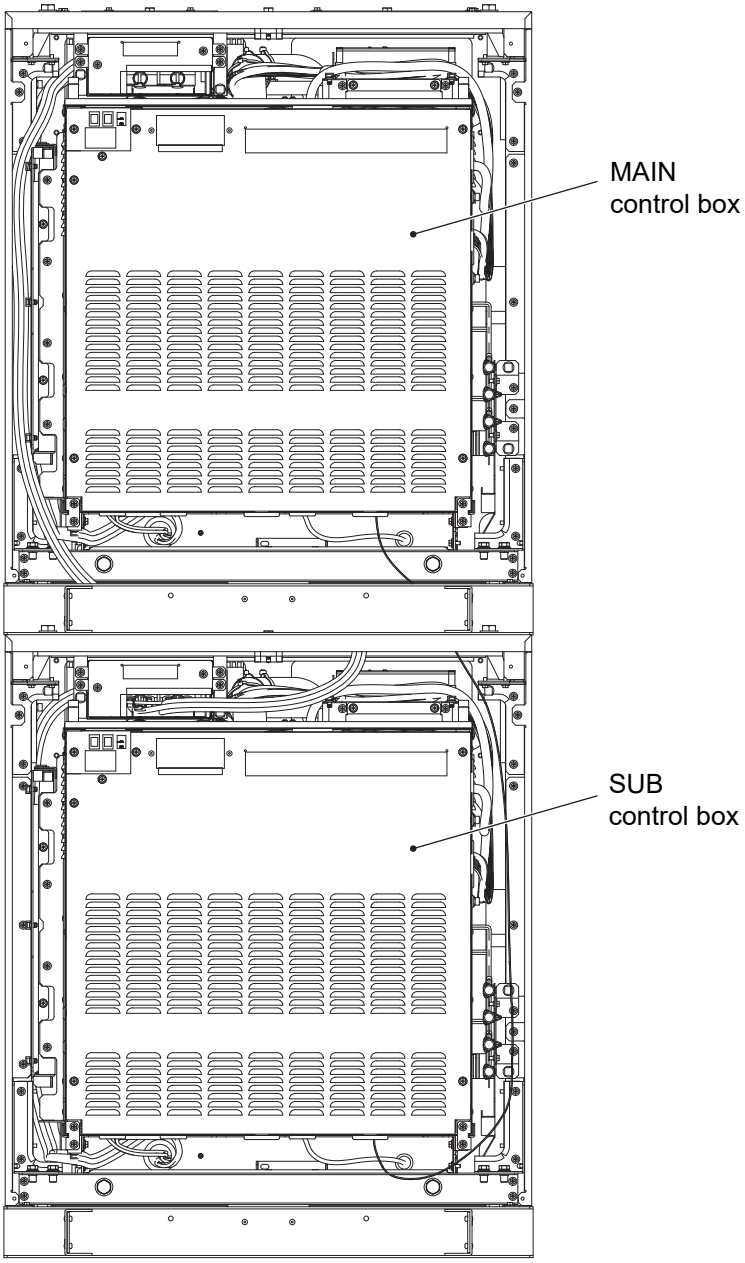
Refer to the sections "Switch Types and the Factory Settings" on the next page and "Configuring the Settings" (page 39) for further details.

*ERCV-M900YA and ERCV-M900YA×2 cannot be included in the same system.

*Refer to page 52 for the flow switch and pump connections. (The example system shows Pattern 1.)

[2] Switch Types and the Factory Settings

(1) Switch names and functions



<Service side>

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

①Dip switches (SW4 - SW7)

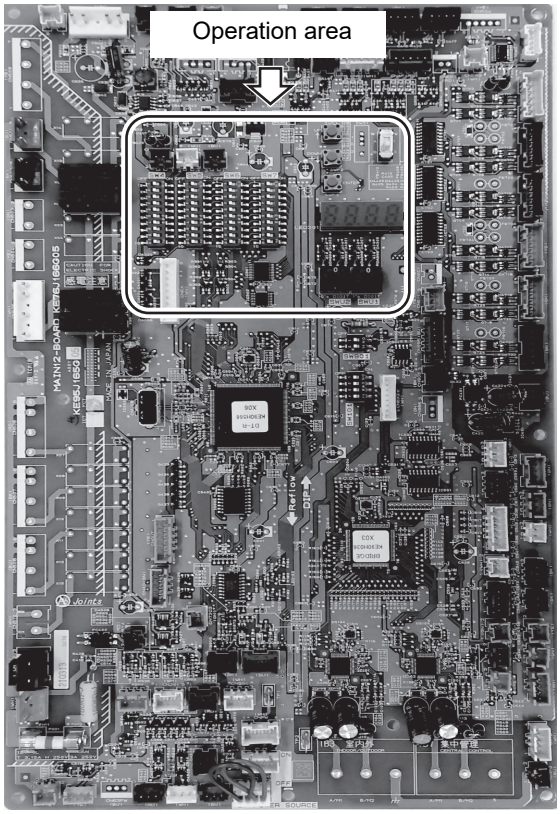
②Dip switches used in combination with the push switches

③Rotary switches

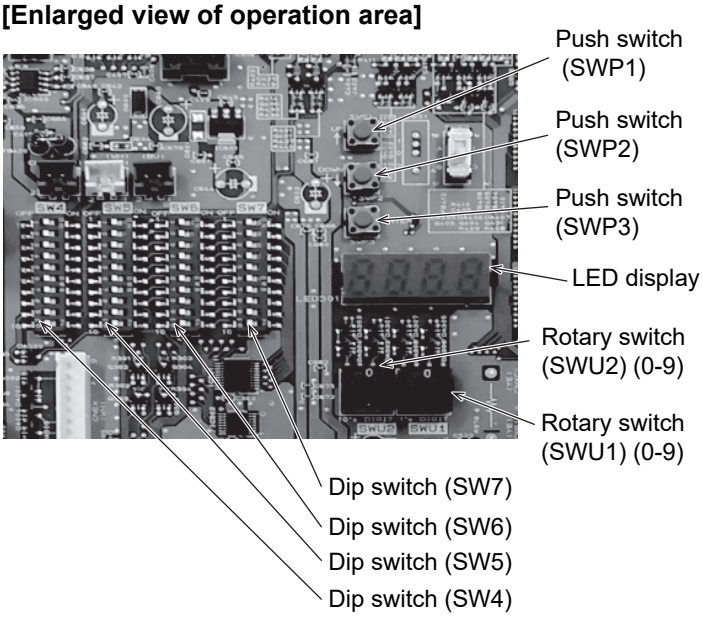
See below for how these switches are used to set certain items.

Different types of switches on the PCB

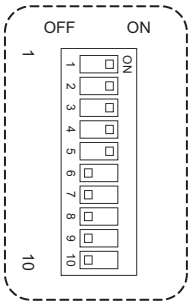
[Control board]



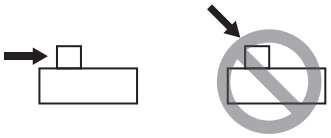
[Enlarged view of operation area]



			Initial Setting
			MAIN/SUB circuit
Rotary switch	SWU1	Sets the 1's digit of the unit address.	"1"
	SWU2	Sets the 10's digit of the unit address.	"0"
Push switch	SWP1	Use for increasing the setting value.	-
	SWP2	Use for decreasing the setting value.	-
	SWP3	Use for changing and deciding the setting value.	-
Dip switch	SW4-7	Select a setting which is decided with a combination of switch numbers.	-



Example: on the upper figure.
1 to 5 are “ON” and 6 to10 are “OFF”.



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

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

SW		Function	Usage	Factory setting MAIN/SUB circuit	OFF setting	ON setting	System leader unit	Group leader unit	SUB unit	Setting timing
SW4	1 2 3 4 5 6 7 8 9 10	Settings change or view the settings	These switches are used for setting change with push switch SWP 1, 2 and 3.	OFF	The 7-segment LED display is changed.		Depends on the setting	Depends on the setting	Depends on the setting	Depends on the setting
SW5	1	Model setting	Set the operation mode cooling or heating mode.	OFF *3	Cooling mode	Heating mode	Required	Required	Required	At a reset
	2 3	System setting	Set the duties to each unit.	OFF	2 / 3 System leader unit : ON ON Group leader unit : ON OFF Sub unit : OFF OFF		Required	Required	Required	At a reset
	4	Water-temperature control 1 (option)	Selects either the external water temperature sensor or the built-in sensor to be used to control water temperature. (Simultaneous operating group)	OFF	Built-in sensor on the unit	External water temperature sensor 1 TH12	Required	Required	Required	At a reset
	5	Water-temperature control 2 (option)	Selects target temperature correction control. (Identical water system group) (Disabled when SW5-7 and SW5-8 are set to ON)	OFF	OFF	ON (External water sensor 2 TH13 is required.)	Required	Fixed OFF	Fixed OFF	At a reset
	6	Multiple unit control	Selects optimum control of number of operating units.	OFF	Ineffective	Effective	Required	Fixed OFF	Fixed OFF	At a reset
	7	Analog input setting	Allows or disallows the analog signals from a remote location.	OFF	Disallows the external analog signals.	Allows the external analog signals.	Required	Fixed OFF	Fixed OFF	At a reset
	8	Analog input signal switching	Selects either the water temperature or the capacity control ratio. (Effective only when SW5-7 is set to ON.)	OFF	Water temperature	Capacity control ratio	Required	Fixed OFF	Fixed OFF	At a reset
	9	BMS setting *1		OFF	No input from BMS	Input from BMS	Required	Fixed OFF	Fixed OFF	At a reset
	10	BMS Group setting		OFF	Leader units	Simultaneous operating group units	Fixed OFF	Fixed OFF	Fixed OFF	Any time
SW6	1 2	Analog input type setting	Selects analog input 4-20mA/ 0-10V/1-5V/2-10V. (Effective only when SW5-7 is set to ON and SW5-9 is set to OFF.)	OFF	1 / 2 4-20mA : OFF OFF 1-5V : ON OFF 0-10V : OFF ON 2-10V : ON ON		Required	Fixed OFF	Fixed OFF	At a reset
	3 4	Outdoor temperature input	Selects when using Cooling ECO or Heating ECO function.	OFF	3 / 4 No outdoor temperature : OFF OFF Outdoor temp. analog input 4-20mA input : ON OFF It terminal : OFF ON Outdoor temp. input TH11 *2 : ON ON		Required	Fixed OFF	Fixed OFF	At a reset
	5	Model setting	Selects ERCV-M900YA(KR) or ERCV-M900YA(KR) × 2	OFF *3	ERCV-M900YA(KR)	ERCV-M900YA(KR) × 2	Required	Required	Required	At a reset
	6 7 8	Model setting		OFF	Leave the setting as it is.		Fixed OFF	Fixed OFF	Fixed OFF	Any time
	9	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 *3	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.	Required	Required	Required	Any time
	10	Water/Brine setting		OFF *3	Water	Brine	Required	Required	Required	At a reset

*1 Connection to a BMS requires an installation of Procon A1M/A1M+ (MODBUS® interface), which is available from MITSUBISHI ELECTRIC UK. Use a BMS with insulation.

*2 Use the following recommended products or similar products for the outdoor temperature thermistor.

*3 When changing the settings, ensure they are applied to both the MAIN circuit and the SUB circuit.

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.

SW5-7	SW5-8	SW5-9	Input from BMS
ON	OFF	ON	Target temperature
ON	ON	ON	Capacity

[3] Configuring the Settings

The settings must be set only by a qualified personnel.

<1> System configuration

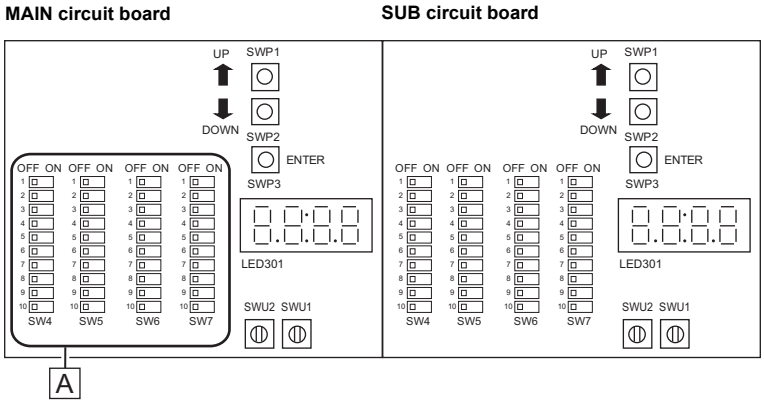
(1) Set the dip switches.

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.

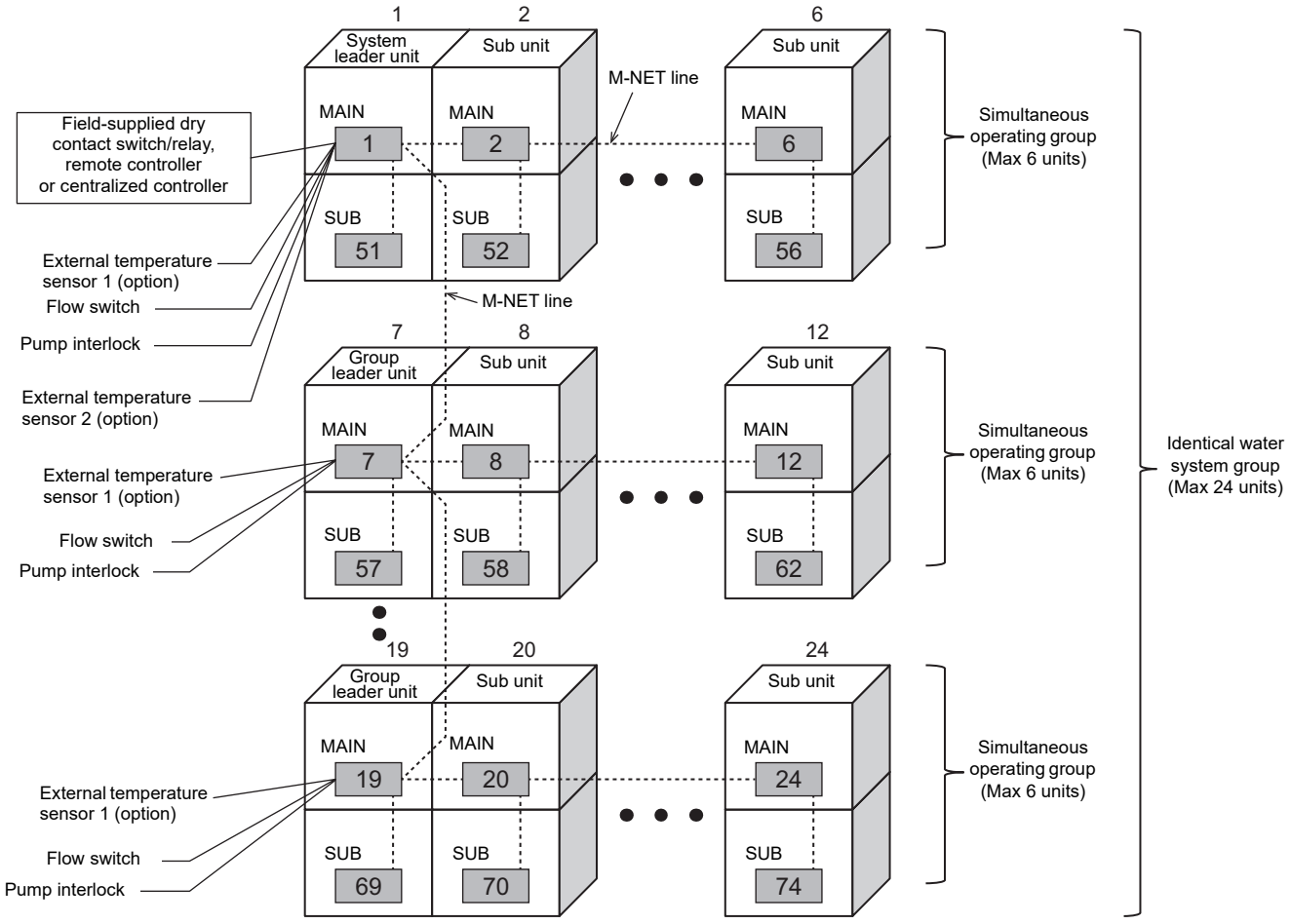
- Water temperature control based on the external water temperature reading
- Analog signals from a remote location

Refer to "Dip switch settings table" (page 38) for further details.



(2) Set the rotary switches. (Address setting)

Example of address setting



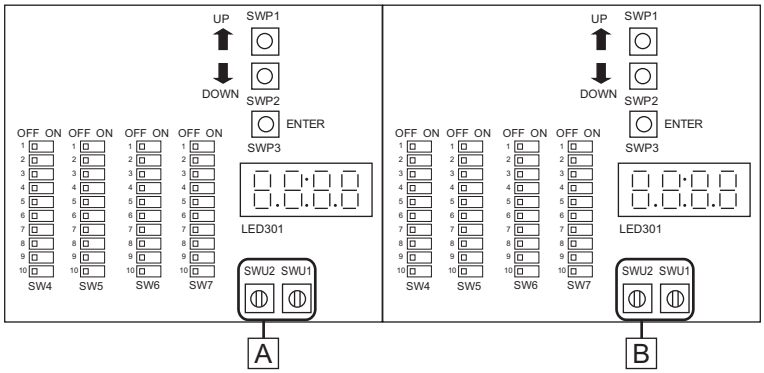
*Refer to page 52 for the flow switch and pump connections. (The example system shows Pattern 1.)

Setting the switches on the system leader unit

Make sure the address of the MAIN circuit on the main module is set to "1" (labeled A in the figure at right) and that the address of the SUB circuit on the main module is set to "51" (labeled B in the figure at right).

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

Main circuit board **SUB circuit board**



Setting the switches on the group leader unit

MAIN circuit

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

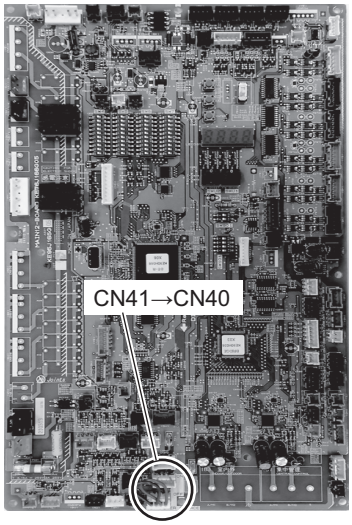
SUB circuit

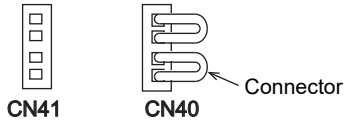
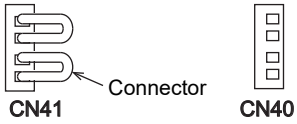
Set the SUB circuit addresses with the rotary switches (labeled B in the figure). Set the 10's digit with SWU2, and set the 1's digit with SWU1. Assign sequential addresses to the SUB circuit on all sub modules starting with 52.

(3) Set the M-NET power supply.

When connecting a system leader unit and a group leader unit to a multiple units connection system, the connector connected to CN41 on the MAIN circuit board (Address 1) must be disconnected and then connected to CN40.

*Leave the connector connected to CN41 when using an AE-C400, EW-C50 as the centralized controller.

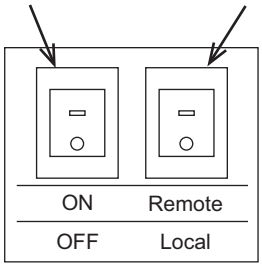


Address 1	All addresses other than Address 1
Move the connector from CN41 to CN40.	Leave the connector connected to CN41.
	

Selector switch settings

[ON] Unit operation
[OFF] Unit stop

[Remote] Controller operation
[Local] Local operation

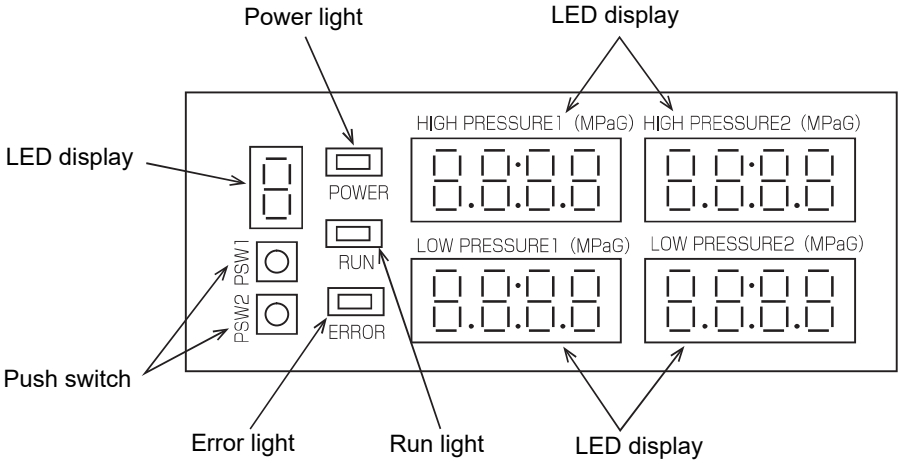


*Applicable only to the MAIN side

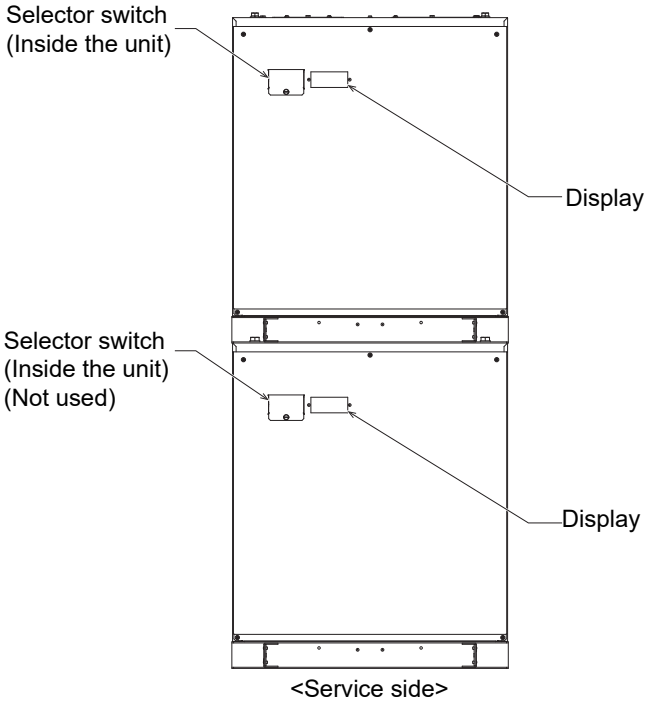
⚠ CAUTION

- Do not open the terminal cover, when selector switches are operated.

Display



The positions of the selector switch and the display



<Service side>

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.

Dip switch setting SW5-1 OFF: Cooling *1

Priority 1	Priority 2	Priority 3			Target water temperature
Analog input or BMS (SW5-9: ON)	No-voltage contact input K40-42	Remote controller PAR-W31MAA Input from centralized controller AE-C400, EW-C50 or BMS (*2)			
	Mode Change	No remote controller	Manual setting	Schedule setting	
SW5-7: ON	Ineffective	-	Ineffective	Ineffective	Temperature setting for the analog signal input
SW5-7: OFF	ON (Cooling ECO)	-	Ineffective	Ineffective	Cooling ECO
	OFF (Cooling)	When no RC is used	-	-	Cooling
		-	Cooling	-	Cooling
		-	-	When schedule has been set	Target water temp is controlled according to the setting on the remote controller.

*1 Control the evaporation side water temperature.
*2 AE-C400, EW-C50 and BMS cannot both be simultaneously connected. Only connect one or the other.

Dip switch setting SW5-1 ON: Heating *1

Priority 1	Priority 2	Priority 3	Priority 4			Target water temperature
No-voltage contact input K40-K41	Analog input or BMS (SW 5-9: ON)	No-voltage contact input K40-42	Remote controller PAR-W31MAA Input from centralized controller AE-C400, EW-C50 or BMS (*2)			
Anti-freeze		Mode change	No remote controller	Manual setting	Schedule setting	
ON	Ineffective	Ineffective	-	Ineffective	Ineffective	25ºC
OFF	SW5-7: ON	Ineffective	-	Ineffective	Ineffective	Temperature setting for the analog signal input
	SW5-7: OFF	ON (Heating ECO)	-	Ineffective	Ineffective	Heating ECO
		OFF (Heating)	When no RC is used	-	-	Heating
			-	Anti-freeze	-	25ºC
			-	Heating ECO	-	Heating ECO
			-	Heating	-	Heating
			-	-	When schedule has been set	Target water temp is controlled according to the setting on the remote controller.

*1 Control the condensation side water temperature.
*2 AE-C400, EW-C50 and BMS cannot both be simultaneously connected. Only connect one or the other.

Priority order of the operation signal sources

<table>
<tr><th colspan="2"></th><th>No-voltage contact</th><th>Remote controller
PAR-W31MAA</th><th>Input from centralized controller
AE-C400, EW-C50 or BMS</th></tr>
<tr><td colspan="2">Unit operation (Run/Stop)</td><td colspan="3">The last setting has priority.</td></tr>
<tr><td rowspan="7">Operation mode</td><td>Cooling *1</td><td colspan="3">The last setting has priority.</td></tr>
<tr><td rowspan="2">Cooling ECO *1*2</td><td>OFF</td><td colspan="2" rowspan="2">Cooling ECO can not be set from the remote controller or the centralized controller.</td></tr>
<tr><td>ON</td></tr>
<tr><td>Heating *1</td><td colspan="3">The last setting has priority.</td></tr>
<tr><td rowspan="2">Heating ECO *1*3</td><td>OFF</td><td colspan="2">The last setting has priority.</td></tr>
<tr><td>ON</td><td colspan="2">Ineffective</td></tr>
<tr><td rowspan="2">Anti-freeze *3</td><td>OFF</td><td colspan="2">The last setting has priority.</td></tr>
<tr><td>ON</td><td colspan="2">Ineffective</td></tr>
<tr><td colspan="2" rowspan="2">ECO mode
(The contact ON has priority)</td><td>OFF</td><td rowspan="2">-</td><td>Effective*4</td></tr>
<tr><td>ON</td><td>Ineffective</td></tr>
</table>

*1 When the Anti-freeze contact is ON during heating operation, the setting change is ineffective.
*2 Changing by contact is effective during cooling operation.
*3 Changing by contact is effective during heating operation.
*4 ECO mode cannot be set from centralized controller.

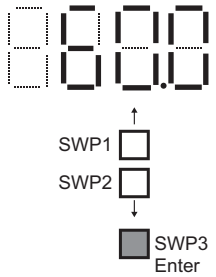
<2> Making the settings

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 switch SW4 has been set.

①

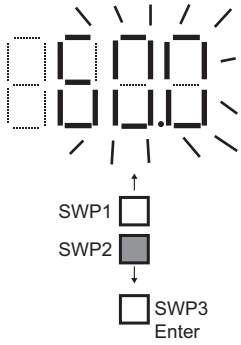


Normally a value of setting item appears on the display.

↓

Press SWP3 (Enter) to enable the configuration changes.

②



The current setting value will blink.

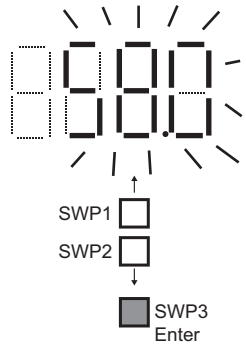
↓

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.

③



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

↓

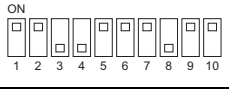
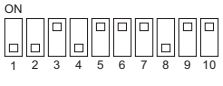
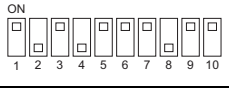
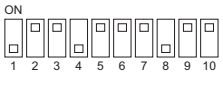
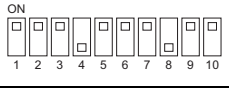
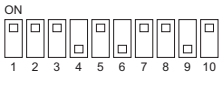
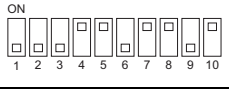
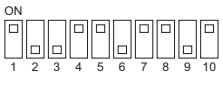
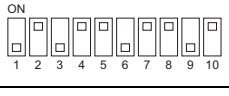
The displayed value will stop blinking and stay lit.

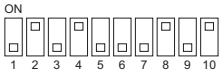
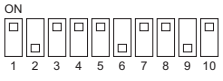
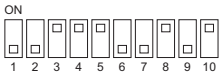
A lit LED indicates that the new setting has been saved.

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

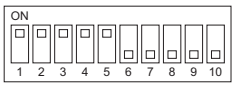
(2) Table of settings items

Set dip switches SW7-1, SW7-2, and SW4 as shown in the table below to set the value for the items in the "Setting item" column.

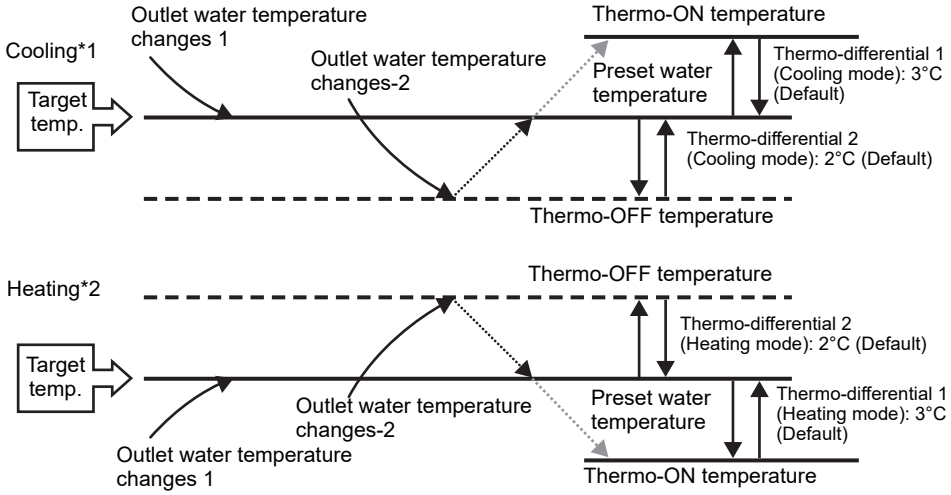
No.	Dip switch setting *1	Dip switch setting (SW4) *2	Setting Item	Default	Need or non-need to set the setting *5						Notes
					System		Group		Sub		
					M	S	M	S	M	S	
1	SW7-1 ON		Setting temp. 1 (Cooling mode) *3	7ºC	○	—	—	—	—	—	Range 4–30ºC (-10–30°C) *7
2	SW7-1 ON		Setting temp. 2 (Cooling mode) *3	7ºC	○	—	—	—	—	—	Range 4–30ºC (-10–30°C) *7
3	SW7-1 ON		Setting temp. 1 (Heating mode) *4	45ºC	○	—	—	—	—	—	Range 20–55ºC
4	SW7-1 ON		Setting temp. 2 (Heating mode) *4	45ºC	○	—	—	—	—	—	Range 20–55ºC
5	SW7-2 ON		Setting water temp. A at Cooling ECO mode *3	11.5ºC	○	—	—	—	—	—	Range 4–30ºC (-10–30°C) *7
6	SW7-2 ON		Setting outdoor temp. A at Cooling ECO mode *3	20ºC	○	—	—	—	—	—	Range -20–55ºC
7	SW7-2 ON		Setting water temp. B at Cooling ECO mode *3	7ºC	○	—	—	—	—	—	Range 4–30ºC (-10–30°C) *7
8	SW7-2 ON		Setting outdoor temp. B at Cooling ECO mode *3	35ºC	○	—	—	—	—	—	Range -20–55ºC
9	SW7-2 ON		Setting water temp. C at Cooling ECO mode *3	10ºC	○	—	—	—	—	—	Range 4–30ºC (-10–30°C) *7
10	SW7-2 ON		Setting outdoor temp. C at Cooling ECO mode *3	25ºC	○	—	—	—	—	—	Range -20–55ºC
11	SW7-1 ON		Setting water temp. D at Heating ECO mode *4	52ºC	○	—	—	—	—	—	Range 20–55ºC
12	SW7-1 ON		Setting outdoor temp. D at Heating ECO mode *4	-7ºC	○	—	—	—	—	—	Range -30–50ºC
13	SW7-1 ON		Setting water temp. E at Heating ECO mode *4	30ºC	○	—	—	—	—	—	Range 20–55ºC
14	SW7-1 ON		Setting outdoor temp. E at Heating ECO mode *4	12ºC	○	—	—	—	—	—	Range -30–50ºC
15	SW7-1 ON		Setting water temp. F at Heating ECO mode *4	42ºC	○	—	—	—	—	—	Range 20–55ºC
16	SW7-1 ON		Setting outdoor temp. F at Heating ECO mode *4	2ºC	○	—	—	—	—	—	Range -30–50ºC
17	SW7-1 ON		Peak-demand control signal input source	0	○	—	—	—	—	—	0: Dry contact 1: PAR-W31MAA
18	SW7-1 ON		Maximum peak-demand capacity	100%	○	—	—	—	—	—	Range 60–100%

No.	Dip switch setting *1	Dip switch setting (SW4) *2	Setting Item	Default	Need or non-need to set the setting *5						Notes
					System		Group		Sub		
					M	S	M	S	M	S	
19	SW7-1 ON		Preset temp. A (Cooling) *3	4ºC	○	—	—	—	—	—	Range 4–30ºC (-10–30°C) *7
20	SW7-1 ON		Preset temp. B (Cooling) *3	30ºC	○	—	—	—	—	—	Range 4–30ºC (-10–30°C) *7
21	SW7-1 ON		Preset temp. A (Heating) *4	25ºC	○	—	—	—	—	—	Range 20–55ºC
22	SW7-1 ON		Preset temp. B (Heating) *4	55ºC	○	—	—	—	—	—	Range 20–55ºC
23	SW7-1 ON		Supplementary heater operation water temp. *4	15ºC	○	—	○	—	○	—	Range 0–55ºC
24	SW7-1 ON		Thermo differential 1 (Cooling mode) *3, *6	3ºC	○	—	○	—	○	—	Range 0.2–5ºC
25	SW7-1 ON		Thermo differential 2 (Cooling mode) *3, *6	2ºC	○	—	○	—	○	—	Range 0.2–5ºC
26	SW7-1 ON		Thermo differential 1 (Heating mode) *4, *6	3ºC	○	—	○	—	○	—	Range 0.2–5ºC
27	SW7-1 ON		Thermo differential 2 (Heating mode) *4, *6	2ºC	○	—	○	—	○	—	Range 0.2–5ºC
28	SW7-1 ON		Year setting	-	○	—	—	—	—	—	
29	SW7-1 ON		Month/Date setting	-	○	—	—	—	—	—	
30	SW7-1 ON		Current time	-	○	—	—	—	—	—	

*1: Only the switches designated in the table must be set to ON. (The other switches must be OFF.)
*2: Do not apply undue force when changing the Dip switch settings as this may cause malfunctions.
*3: They are enabled during the cooling.
*4: They are enabled during the heating.
*5: System: System leader unit
Group: Group leader unit
Sub: Sub unit
M: MAIN circuit
S: SUB circuit
*6: Thermo - ON/OFF temperature conditions. (water temperature control)
*7: Applicable only when SW6-10 is set to ON. (Brine setting)



The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.



When the water temperature is controlled based on the outlet water temperature, compressor frequency will be controlled in the way that the target water temperature will be maintained.

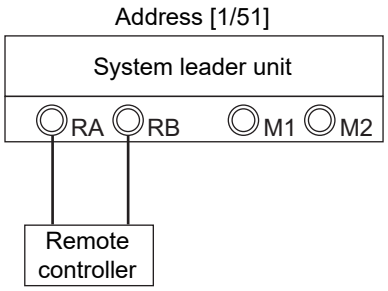
*1 Control the evaporation side water temperature.
*2 Control the condensation side water temperature.

<3> Setting procedures

(1) System setting

1. Making the settings for the initial start-up process

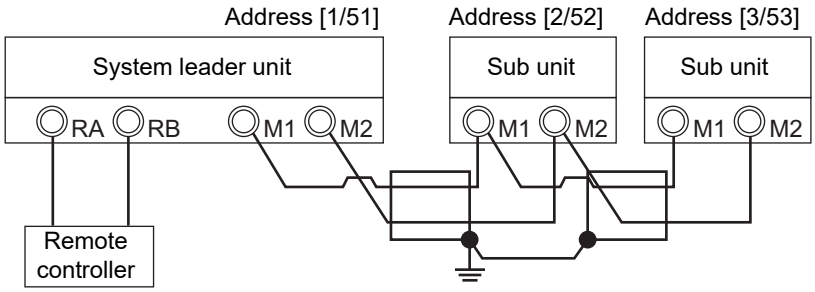
(A) Single unit



Setting address 1

1) Turn off the power.
2) System leader unit (Address 1 SW5-2, 5-3: ON)
3) Turn the power back on.
   Address 1 → LED display [EEEE]
   Address 51 → LED display [9999]
4) SW7: 1, 2, 3, 4 ON and ENTER for 5 seconds. (Initializes the system)
   Address 1 → LED display [9999]→[FFFF]
   Address 51 → LED display [9999]→[____||_|]
5) SW7: 1, 2, 3, 4 OFF
   Start-up process complete
   Address 1 → LED display [____||_|]
   Address 51 → LED display [____||_|]

(B) One system leader unit and two sub units (1 group, 3 units in the group)



Setting address 1

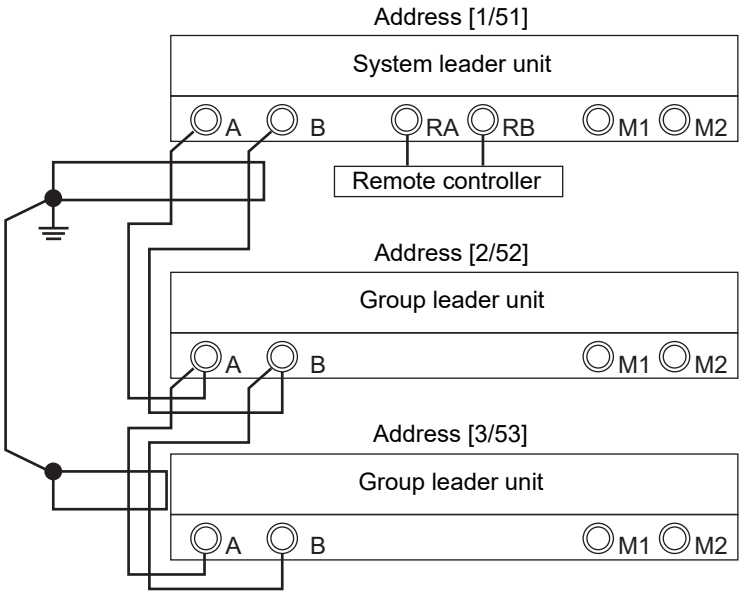
1) Turn off the power.
2) System leader unit (Address 1 SW5-2, 5-3: ON)
3) Turn the power back on.
   Address 1 → LED display [EEEE]
   Address 51 → LED display [EEEE]
4) Setting the number of units for the group
   SW7: 1 ON
   SW4: 1, 2, 3, 4, 8, 10 ON
   Press ENTER once.
   ↓
   Address 1 → LED display [1]
   ↓
   Press UP twice.
   ↓
   Address 1 → LED display [3]
   ↓
   Press ENTER once.
   SW4: 1, 2, 3, 4, 8, 10 OFF

*The default setting for the number of units in a group is 1.
The maximum number of units per group is 6.

5) SW7: 1, 2, 3, 4 ON and ENTER for 5 seconds.
   (Initializes the system)
   Address 1 → LED display [9999]→[FFFF]
   Address 51 → LED display [9999]→[____||_|]
6) SW7: 1, 2, 3, 4 OFF
   Start-up process complete
   Address 1 → LED display [____||_|]
   Address 51 → LED display [____||_|]

*No settings are required for any address other than for address 1.

(C) System leader unit and group leader unit (3 groups, 1 unit in each group)



① Setting address 1

1) Turn off the power.
2) System leader unit (Address 1 SW5-2, 5-3: ON)
3) Turn the power back on.
   Address 1 → LED display [EEEE]
   Address 51 → LED display [9999]
4) Setting the number of units for each group
   *The default setting for the number of units in a group is 1.
5) Setting the number of groups
   SW7: 1 ON
   Press ENTER once.
   SW4: 5, 8, 10 ON
   ↓
   Address 1 → LED display [1]
   ↓
   Press UP twice.
   ↓
   Address 1 → LED display [3]
   ↓
   Press ENTER once.
   SW4: 5, 8, 10 OFF

*The default setting for the number of units in a group is 1. The maximum number of groups is 24.

Press ENTER once.

② Setting address 2

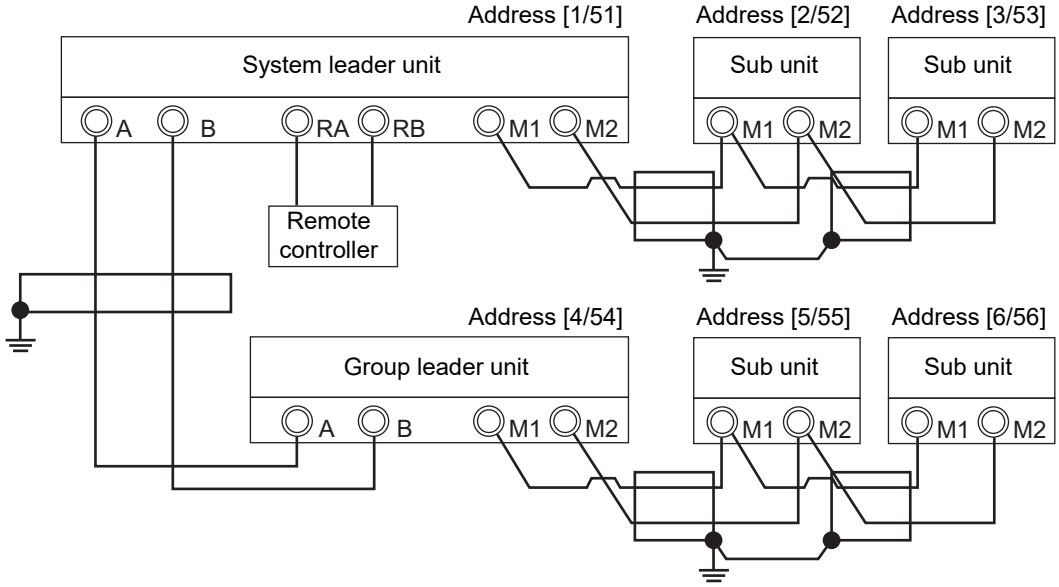
1) Turn off the power.
2) Group leader unit (SW5-2: ON)
3) Turn the power back on.
   Address 2 → LED display [EEEE]
   Address 52 → LED display [9999]
4) Setting the number of units for each group
   *The default setting for the number of units in a group is 1.
5) SW7: 1, 2, 3, 4 ON and ENTER for 5 seconds.
   (Initializes the system)
   Address 2 → LED display [9999]→[FFFF]
   Address 52 → LED display [9999]→[____||_|]
6) SW7: 1, 2, 3, 4 OFF
   Start-up process complete
   Address 2 → LED display [____||_|]
   Address 52 → LED display [____||_|]

*Address 3 (Group leader unit) is set in the same way as above.)

③ Setting address 1 (second time)

1) SW7: 1, 2, 3, 4 ON and ENTER for 5 seconds.
   (Initializes the system. System leader unit initialized last)
   Address 1 → LED display [9999]→[FFFF]
   Address 51 → LED display [9999]→ [____||_|]
2) SW7: 1, 2, 3, 4 OFF
   Start-up process complete
   Address 1 → LED display [____||_|]
   Address 51 → LED display [____||_|]

(D) System leader unit, Group leader unit and Sub unit (2 groups, 3 units in each group)



① Setting address 1

1) Turn off the power.
2) System leader unit (Address 1 SW5-2, 5-3: ON)
3) Turn the power back on.

   Address 1 → LED display [EEEE]

   Address 51 → LED display [9999]

4) Setting the number of units for each group

   SW7: 1 ON
   Press ENTER once.
   SW4: 1, 2, 3, 4, 8, 10 ON
   ↓
   Address 1 → LED display [1]
   ↓
   Press UP twice.
   ↓
   Address 1 → LED display [3]
   ↓
   Press ENTER once.
   SW4: 1, 2, 3, 4, 8, 10 OFF

   *The default setting for the number of units in a group is 1. The maximum number of units per group is 6.

5) Setting the number of groups

   SW7: 1 ON

   Press ENTER once.
   SW4: 5, 8, 10 ON

   ↓

   Address 1 → LED display [1]

   ↓

   Press UP twice.

   ↓

   Address 1 → LED display [2]

   Press ENTER once.
   SW4: 5, 8, 10 OFF

   *The default setting for the number of units in a group is 1. The maximum number of units per group is 24.

② Setting address 4

1) Turn off the power.
2) Group leader unit (SW5-2: ON)
3) Turn the power back on.

   Address 4 → LED display [EEEE]

   Address 54 → LED display [9999]

4) Setting the number of units for each group

   SW7: 1 ON
   Press ENTER once.
   SW4: 1, 2, 3, 4, 8, 10 ON
   ↓
   Address 4 → LED display [1]
   ↓
   Press UP twice.
   ↓
   Address 4 → LED display [3]
   ↓
   Press ENTER once.
   SW4: 1, 2, 3, 4, 8, 10 OFF

   *No group number settings are required for address 4 (Group leader unit).

5) SW7: 1, 2, 3, 4 ON and ENTER for 5 seconds.

   (Initializes the system)

   Address 4 → LED display [9999]→[FFFF]

   Address 54 → LED display [9999]→[____||_|]

6) SW7: 1, 2, 3, 4 OFF

   Start-up process complete

   Address 4 → LED display [____||_|]

   Address 54 → LED display [____||_|]

③ Setting address 1 (second time)

1) SW7: 1, 2, 3, 4 ON and ENTER for 5 seconds.
   (Initializes the system. System leader unit initialized last)

   Address 1 → LED display [9999]→[FFFF]

   Address 51 → LED display [9999]→[____||_|]

2) SW7: 1, 2, 3, 4 OFF

   Start-up process complete

   Address 1 → LED display [____||_|]

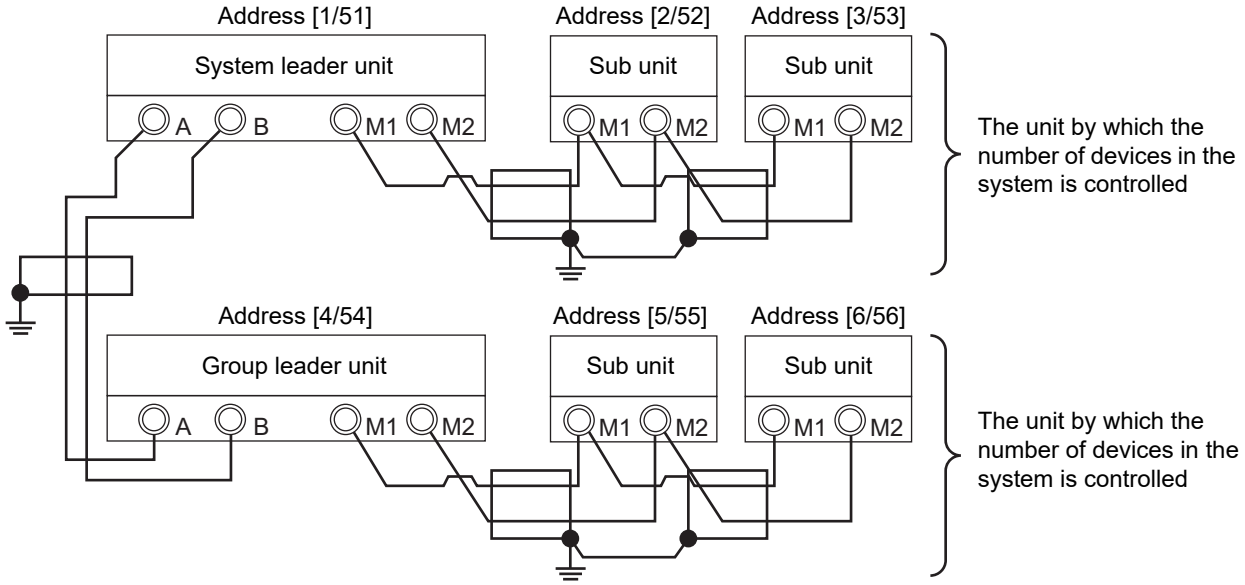
   Address 51 → LED display [____||_|]

   *No settings are required for any address other than for addresses 1 and 4.

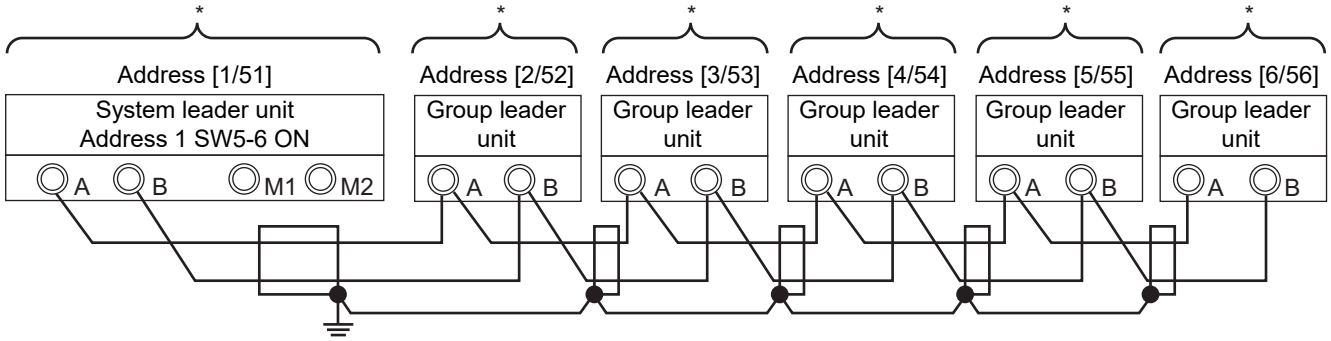
2. Multiple unit control

By setting SW5-6 to ON for address 1, optimum control of number of operating units will be performed.
All units will simultaneously operate when SW5-6 is set to OFF.

(A) System leader unit, group leader unit, and sub unit



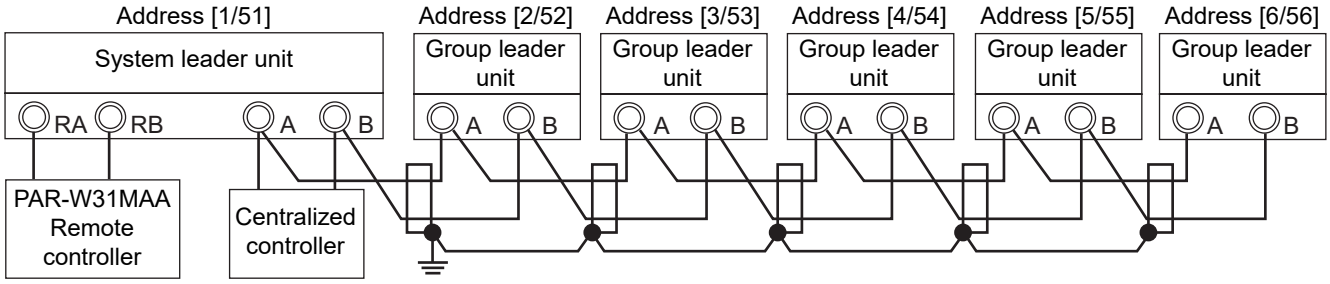
(B) System leader unit and group leader unit



*The unit by which the number of devices in the system is controlled

3. Example of system configuration

Optimum control of number of operating units



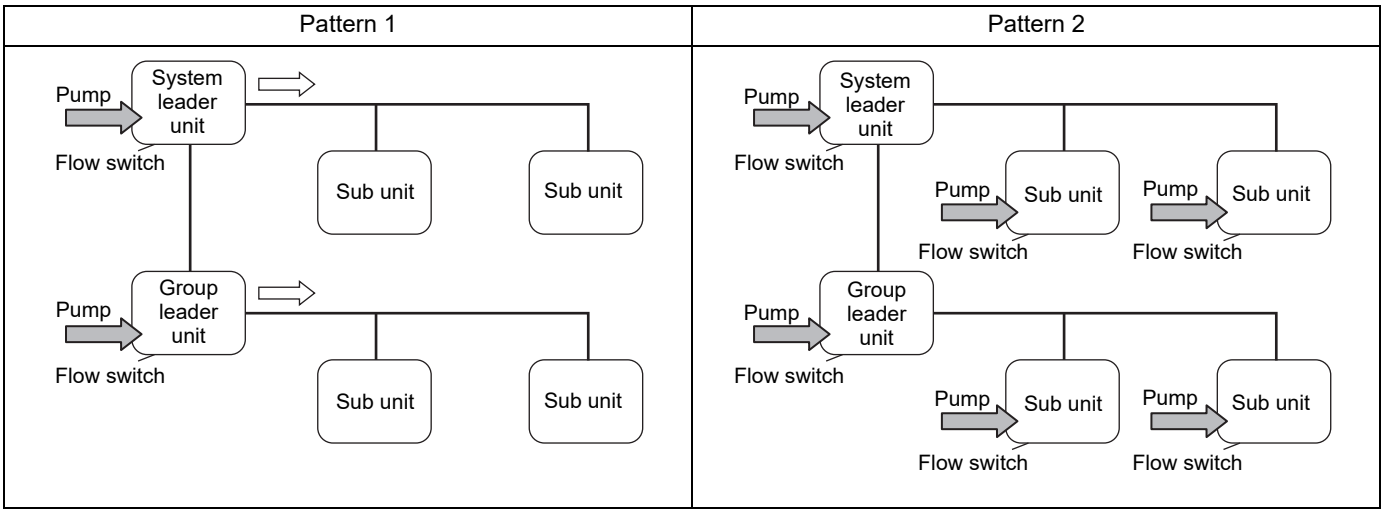
Setting item	SW7-1	DIP SW	SW4	Setting timing	System leader unit		Simultaneous operation Group leader unit		Simultaneous operation Group leader unit		Simultaneous operation Group leader unit		Simultaneous operation Group leader unit		Simultaneous operation Group leader unit	
					1		2		3		4		5		6	
					MAIN	SUB	MAIN	SUB	MAIN	SUB	MAIN	SUB	MAIN	SUB	MAIN	SUB
M-NET address	-	-	-	At a reset	1	51	2	52	3	53	4	54	5	55	6	56
M-NET power supply	-	-	-	-	CN40	CN41	CN41	CN41	CN41	CN41	CN41	CN41	CN41	CN41	CN41	CN41
System settings	-	5-2	-	At a reset	ON	-	ON	-	ON	-	ON	-	ON	-	ON	-
	-	5-3	-	At a reset	ON	-	OFF	-	OFF	-	OFF	-	OFF	-	OFF	-
Number of groups	ON	-		At a reset	6	-	1	-	1	-	1	-	1	-	1	-
Number of units per group	ON	-		At a reset	1	-	1	-	1	-	1	-	1	-	1	-
Multiple unit control	-	5-6	-	At a reset	ON	-	OFF	-	OFF	-	OFF	-	OFF	-	OFF	-

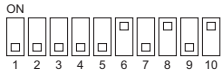
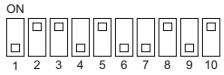
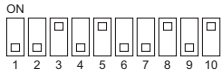
*The shaded cells indicate the settings that requires changes from the default settings.

*Some settings require the following after the settings were changed: A power reset, or setting SW7: 1, 2, 3, 4 ON, and pressing and holding ENTER for 5 seconds.

*When using an AE-C400, EW-C50 as the centralized controller, leave the M-NET power supply connector as it is.

4. Setting the pump system



Setting item	SW7-1	DIPSW	SW4	Factory setting		Note
				MAIN	SUB	
Pump setting	ON	-		0	-	0: Pattern 1, 1: Pattern 2
Evaporation side flow switch settings	ON	-		0	-	0: Pattern 1, 1: Pattern 2
Condensation side flow switch settings	ON	-		0	-	0: Pattern 1, 1: Pattern 2

*1: Pump settings must be made on the MAIN circuit on all units.

*2: Flow switch settings must be made on the MAIN circuit on all units.

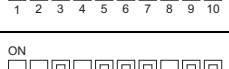
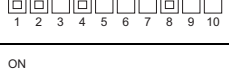
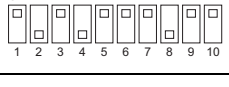
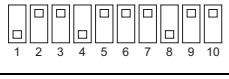
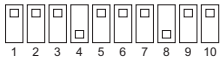
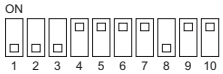
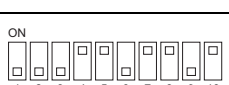
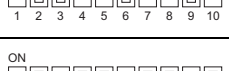
(2) Water-temperature setting

Different water temperature settings can be set for different modes.

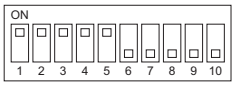
Set the dip switches on the circuit board as follows to make the settings for the items described in this section.

Press the push switch SWP3 to enable the configuration changes.
Press the push switches SWP1 (↑) or SWP2 (↓) to increase or decrease the value.
When the desired value is displayed, press SWP3 to save the setting value.

Settings table

No.	Dip switch setting *1	Dip switch setting (SW4)	Setting Item	Initial value	Unit	Setting			Setting change from an optional remote controller (PAR-W31MAA) *2
						Increments	Lower limit	Upper limit	
1	SW7-1 ON		Setting temp. 1 (Cooling mode) *3	7	ºC	0.1°C	4 (-10) *5	30	Possible
2	SW7-1 ON		Setting temp. 2 (Cooling mode) *4	7	ºC	0.1°C	4 (-10) *5	30	Possible
3	SW7-1 ON		Setting temp. 1 (Heating mode) *3	45	ºC	0.1°C	20	55	Possible
4	SW7-1 ON		Setting temp. 2 (Heating mode) *4	45	ºC	0.1°C	20	55	Possible
5	SW7-2 ON		Setting water temp. A at Cooling ECO mode	11.5	ºC	0.1°C	4 (-10) *5	30	Not possible
6	SW7-2 ON		Setting outdoor temp. A at Cooling ECO mode	20	ºC	0.1°C	-20	55	Not possible
7	SW7-2 ON		Setting water temp. B at Cooling ECO mode	7	ºC	0.1°C	4 (-10) *5	30	Not possible
8	SW7-2 ON		Setting outdoor temp. B at Cooling ECO mode	35	ºC	0.1°C	-20	55	Not possible
9	SW7-2 ON		Setting water temp. C at Cooling ECO mode	10	ºC	0.1°C	4 (-10) *5	30	Not possible
10	SW7-2 ON		Setting outdoor temp. C at Cooling ECO mode	25	ºC	0.1°C	-20	55	Not possible
11	SW7-1 ON		Setting water temp. D at Heating ECO mode	52	ºC	0.1°C	20	55	Not possible
12	SW7-1 ON		Setting outdoor temp. D at Heating ECO mode	-7	ºC	0.1°C	-30	50	Not possible
13	SW7-1 ON		Setting water temp. E at Heating ECO mode	30	ºC	0.1°C	20	55	Not possible
14	SW7-1 ON		Setting outdoor temp. E at Heating ECO mode	12	ºC	0.1°C	-30	50	Not possible
15	SW7-1 ON		Setting water temp. F at Heating ECO mode	42	ºC	0.1°C	20	55	Not possible
16	SW7-1 ON		Setting outdoor temp. F at Heating ECO mode	2	ºC	0.1°C	-30	50	Not possible

*1 Only the switches designated in the table must be set to ON. (The other switches must be OFF.)
*2 Temperature setting increments: 0.5ºC
*3 No-voltage contact KN51-KN61: OFF
*4 No-voltage contact KN51-KN61: ON
*5 Applicable only when SW6-10 is set to ON. (Brine setting)



The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

• Check the operation mode suitable for the application.

Setting item	SW5-1*3
Cooling mode*1	OFF
Heating mode*2	ON

*1 Control the evaporation side water temperature.
*2 Control the condensation side water temperature.
*3 Ensure the settings are applied to both the MAIN circuit and the SUB circuit.

• Select the outdoor temperature input source selection.

Setting item	SW6-3	SW6-4
No outdoor temperature*1	OFF	OFF
Outdoor temp. analog input 4-20mA input	ON	OFF
It terminal*2	OFF	ON
Outdoor temp. input TH11*3	ON	ON

*1 Cooling ECO/Heating ECO mode cannot be used.
*2 Connection to a BMS requires an installation of Procon A1M/A1M+ (MODBUS® interface), which is available from MITSUBISHI ELECTRIC UK. Use a BMS with insulation.
*3 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)

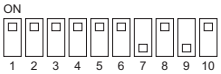
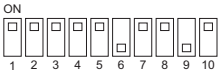
$$Rt = 1.07 \exp \{3978 \left(\frac{1}{273+t} - \frac{1}{358} \right)\}$$

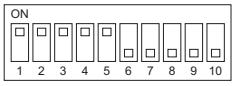
- Select the thermistor taking note of the tolerance in the resistance values.
- Use shielded cable for the wiring.

• When the outdoor temperature setting input is 4-20mA

Press the push switch SWP3 to enable the configuration changes.
Press the push switches SWP1 (↑) or SWP2 (↓) to increase or decrease the value.
When the desired value is displayed, press SWP3 to save the setting value.

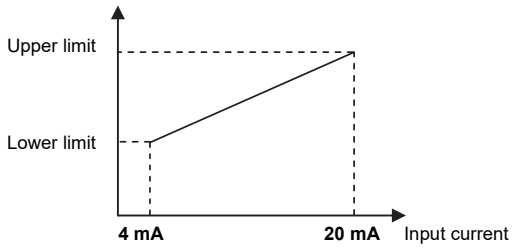
Settings table

No.	Dip switch setting (SW7-1)	Dip switch setting (SW4)	Setting Item	Initial value	Unit	Setting			Setting change from an optional remote controller (PAR-W31MAA)
						Increments	Lower limit	Upper limit	
1	ON		Outdoor setting Upper limit	40	ºC	0.1	-20	55	Not possible
2	ON		Outdoor setting Lower limit	-10	ºC	0.1	-20	55	Not possible



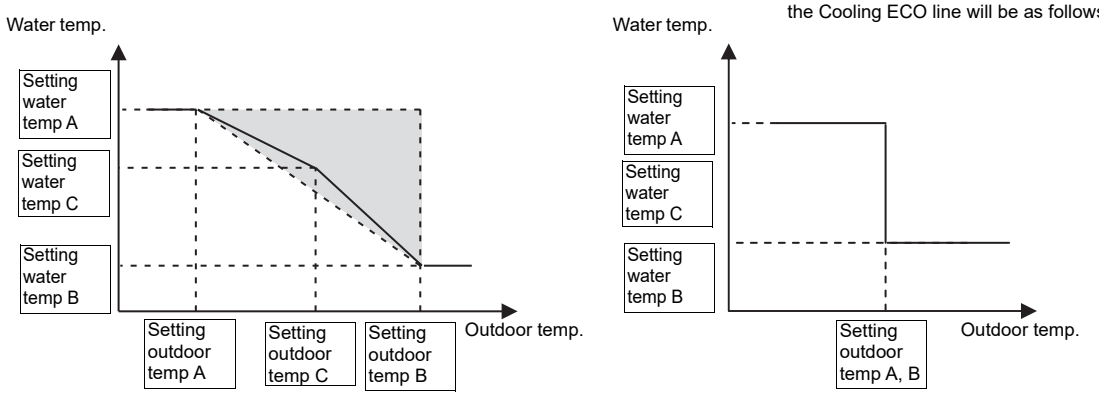
The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

• External analog input signal of 4 mA: Lower limit
• External analog input signal of 20 mA: Upper limit
• External analog input signal of between 4 and 20 mA: the preset temperature will be linearly interpolated.



Cooling ECO

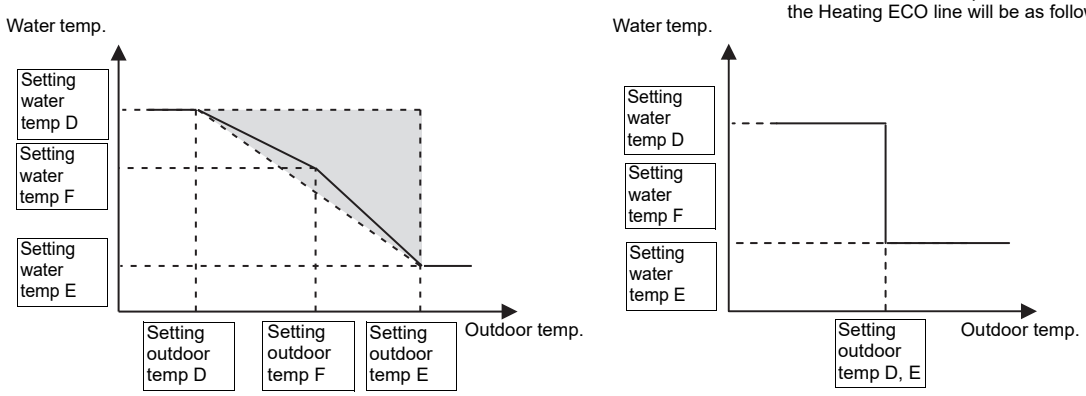
When the outdoor temp A and B are set to the same value, the Cooling ECO line will be as follows.



* Always use a value for setting C that is between setting value A and setting value B.

Heating ECO

When the outdoor temp D and E are set to the same value, the Heating ECO line will be as follows.



* Always use a value for setting F that is between setting value D and setting value E.

(3) Peak-demand control operation

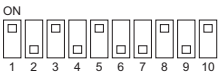
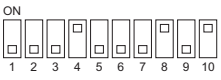
Peak-demand control is a function used to control the power consumptions of the units.

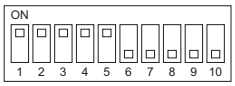
The compressor's maximum operating frequency will be controlled according to the peak-demand control signal.

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

Press the push switch SWP3 to enable the configuration changes.
Press the push switches SWP1 (↑) or SWP2 (↓) to increase or decrease the value.
When the desired value is displayed, press SWP3 to save the setting value.

Settings table

No.	Dip switch setting (SW7-1)	Dip switch setting (SW4)	Setting Item	Initial value	Unit	Setting			Setting change from an optional remote controller (PAR-W31MAA)
						Increments	Lower limit	Upper limit	
1	ON		Peak-demand control signal input source	0	-	1	0	1	Not possible
2	ON		Maximum peak-demand capacity	100	%	1%	60	100	Possible



The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

(4) Remote water temperature or capacity control ratio setting input signal type

When SW5-7 is ON, SW5-8 is OFF, and SW5-9 is OFF, external analog signals can be used to set the water temperatures.

When SW5-7 and SW5-8 are ON, external analog signals can be used to set the capacity control ratio.

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

4-20 mA
1-5 V
0-10 V
2-10 V

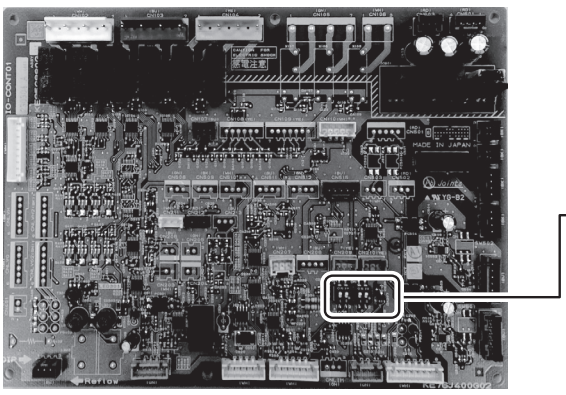
Select SW6-1 and SW6-2 to set the type of analog input signal from a remote location.

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

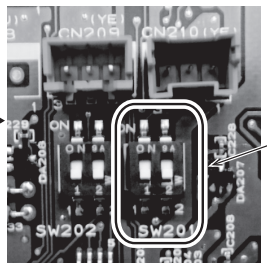
	SW201-1	SW201-2	SW6-1	SW6-2
4-20 mA	ON	ON	OFF	OFF
1-5 V	OFF	ON	ON	OFF
0-10 V	OFF	OFF	OFF	ON
2-10 V	OFF	OFF	ON	ON

* Incorrectly setting SW201 may cause damage to the circuit board.

[IO cont board]



[Enlarged view of operation area]



Dip switch (SW201)

(5) Setting the water temperature using analog signal input

When dip switch SW5-7 is set to ON (Enable external input), SW5-8 is set to OFF, and SW5-9 is set to OFF, the target water temperature varies with the preset temperatures A and B and the type of analog input signal.

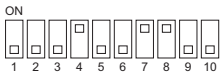
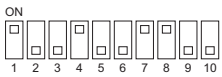
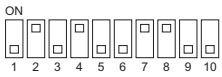
Set the dip switches on the circuit board as follows to make the settings for the items described in this section.

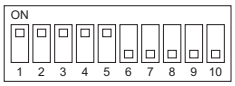
Press the push switch SWP3 to enable the configuration changes.
Press the push switches SWP1 (↑) or SWP2 (↓) to increase or decrease the value.
When the desired value is displayed, press SWP3 to save the setting value.

Settings table

No.	Dip switch setting (SW7-1)	Dip switch setting (SW4)	Setting Item	Initial value	Unit	Setting			Setting change from an optional remote controller (PAR-W31MAA)
						Increments	Lower limit	Upper limit	
1	ON		Preset temp. A (Cooling)	4	ºC	1ºC	4 (-10) *2	30	Not possible
2	ON		Preset temp. B (Cooling)	30	ºC	1ºC	4 (-10) *2	30	Not possible
3	ON		Preset temp. A (Heating)	25	ºC	1ºC	20	55	Not possible
4	ON		Preset temp. B (Heating)	55	ºC	1ºC	20	55	Not possible

*1 Due to the resistance of the wire that is connected to the 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 value of the connected signal output device. Refer to the table below for how to display the value of the analog input.
*2 Applicable only when SW6-10 is set to ON. (Brine setting)

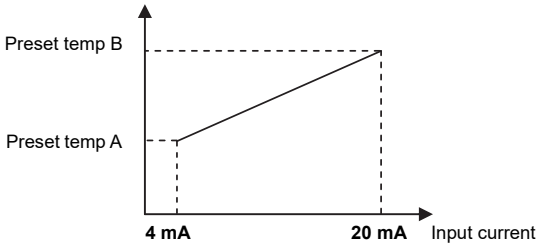
No.	Dip switch setting (SW7-1)	Dip switch setting (SW4)	Monitorable items	Unit
1	OFF		Current value (4-20 mA)	mA
2	OFF		5V voltage value (1-5 V)	V
3	OFF		10V voltage value (0-10 V or 2-10 V)	V



The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

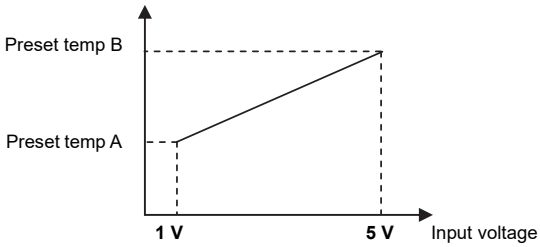
- When the water temperature setting input signal type is 4-20 mA

  - External analog input signal of 4 mA: Preset temp. A
  - External analog input signal of 20 mA: Preset temp. B
  - External analog input signal of between 4 and 20 mA: the preset temperature will be linearly interpolated.



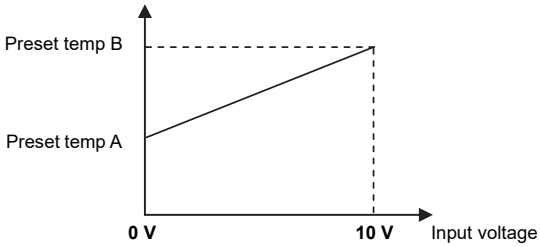
- When the water temperature setting input signal type is 1-5 V

  - External analog input signal of 1 V: Preset temp. A
  - External analog input signal of 5 V: Preset temp. B
  - External analog input signal of between 1 and 5 V: the preset temperature will be linearly interpolated.



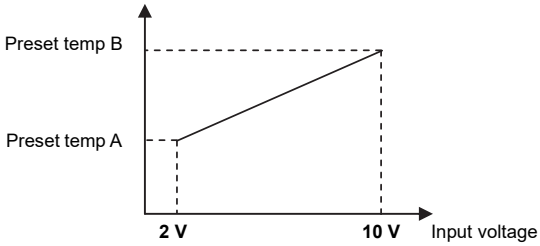
- When the water temperature setting input signal type is 0-10 V

  - External analog input signal of 0 V: Preset temp. A
  - External analog input signal of 10 V: Preset temp. B
  - External analog input signal of between 0 and 10 V: the preset temperature will be linearly interpolated.



- When the water temperature setting input signal type is 2-10 V

  - External analog input signal of 2 V: Preset temp. A
  - External analog input signal of 10 V: Preset temp. B
  - External analog input signal of between 2 and 10 V: the preset temperature will be linearly interpolated.

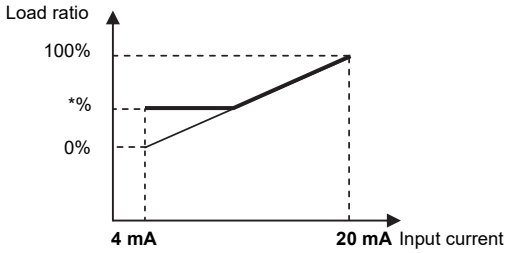


(6) Setting the capacity control ratio using analog signal input

When dip switch SW5-7 is set to ON (Enable external input), SW5-8 is set to ON, and SW5-9 is set to OFF, the capacity control ratio varies with the type of analog input signal.

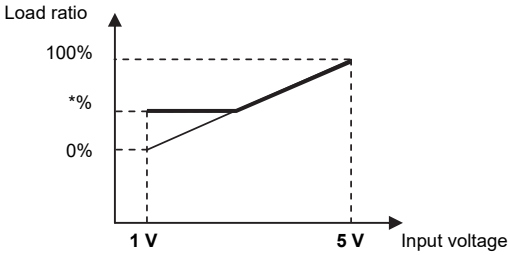
- When the capacity control setting input signal type is 4-20 mA

  - External analog input signal of 4 mA: 0%
  - External analog input signal of 20 mA: 100%
  - External analog input signal of between 4 and 20 mA: the percent will be linearly interpolated.



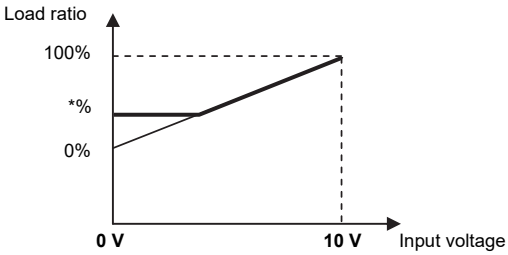
- When the capacity control setting input signal type is 1-5 V

  - External analog input signal of 1 V: 0%
  - External analog input signal of 5 V: 100%
  - External analog input signal of between 1 and 5 V: the percent will be linearly interpolated.



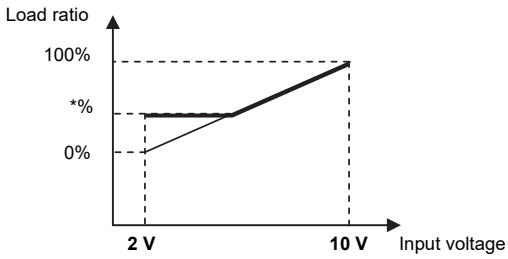
- When the capacity control setting input signal type is 0-10 V

  - External analog input signal of 0 V: 0%
  - External analog input signal of 10 V: 100%
  - External analog input signal of between 0 and 10 V: the percent will be linearly interpolated.



• When the capacity control setting input signal type is 2-10 V

• External analog input signal of 2 V: 0%
• External analog input signal of 10 V: 100%
• External analog input signal of between 2 and 10 V: the percent will be linearly interpolated.



* %:The compressor runs at the lowest frequency.
* SW5-6 Multiple unit control will be disabled when this setting is enabled

(7) Setting the supplementary heater signal output conditions

A temperature at which the signal output to operate supplementary heaters can be selected.

Supplementary heater signal output conditions

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

1 Water-temperature control option (SW5-4) is set to OFF, the inlet water temperature drops below a set water temperature.
2 Water-temperature control option (SW5-4) is set to ON, the external water temperature sensor reading (TH12) drops below a set water temperature.

The supplementary heater signal is output from KB1-KB2.

Supplementary heater signal output stop conditions

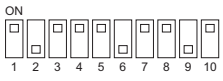
The operation command signal is OFF or at least one of the following two conditions is met.

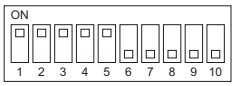
1 The inlet water temperature is at or above a set water temperature +2°C.
2 External water temperature sensor reading (TH12) is at or above a set water temperature +2°C.

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

Press the push switch SWP3 to enable the configuration changes.
Press the push switches SWP1 (↑) or SWP2 (↓) to increase or decrease the value.
When the desired value is displayed, press SWP3 to save the setting value.

Settings table

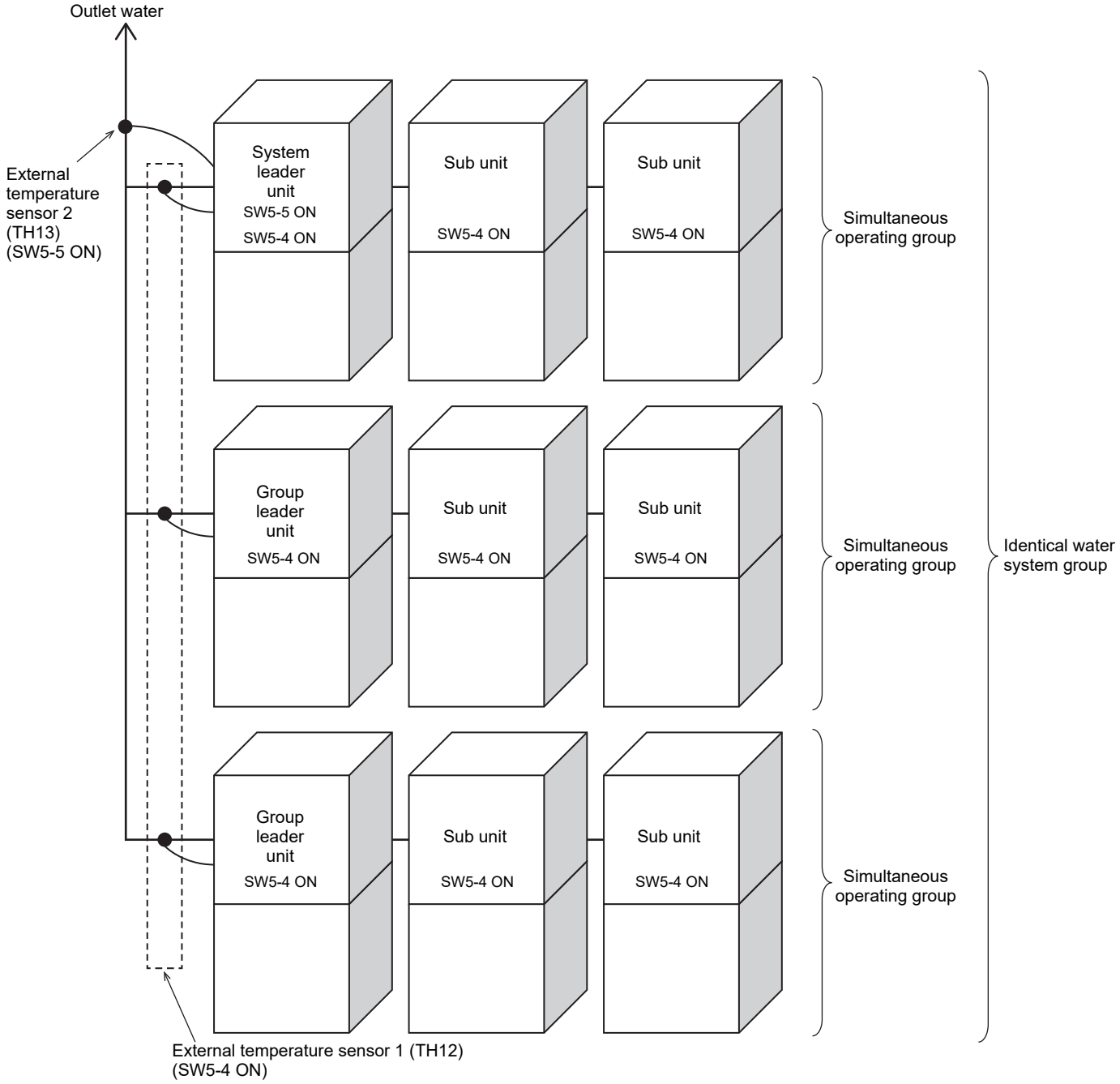
No.	Dip switch setting (SW7-1)	Dip switch setting (SW4)	Setting Item	Initial value	Unit	Setting			Setting change from an optional remote controller (PAR-W31MAA)
						Increments	Lower limit	Upper limit	
1	ON		Supplementary heater operation water temp.	15	ºC	0.1ºC	0	55	Not possible



The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

(8) External temperature sensor control

An optional External temperature sensor (TW-TH16) is required.



*Set SW5-4 and 5-5 on the circuit board of the Main unit.

External temperature sensor 1 (Enable only TH12)

When only TH12 is enabled, the Simultaneous operating group is controlled so that the TH12 will reach the target water temperature.

External temperature sensor 2 (Enable only TH13)

When only TH13 is enabled, the target outlet water temperature of each unit will be corrected to approximate TH13 to the target water temperature.

External temperature sensor 1 and 2 (Enable TH12 and TH13)

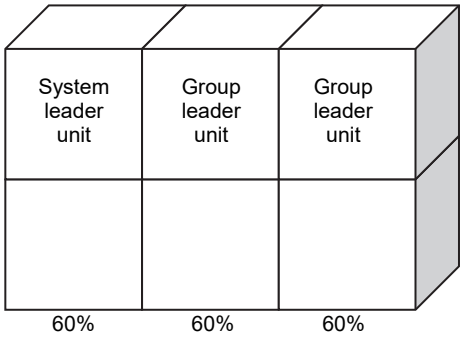
When both TH12 and TH13 are enabled, the target water temperature of TH12 will be corrected to approximate TH13 to the target water temperature. Simultaneous operating group will be controlled to meet the corrected TH12.

(9) Demand operation

The demand function can reduce the power consumption.

Single unit control

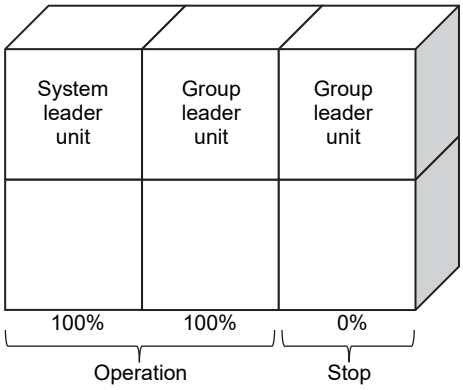
In the case of single unit control, the unit is operated up to the specified demand limit.



Multiple unit control

In the case of multiple unit control, the number of operating units are limited by demand value.
When the demand value is 70%, the group operate such as below figure.

3 groups x demand 70% => 2 groups operation
(=2.1 (-> round down to the decimal point ->) ≈2)



*In the case of multiple unit control, the demand capacity may not actually be the capacity because it sets the number of operable units.

Other examples)

Even if you set demand capacity to 90% in the case of 2 sets, the number of operable units will be only 1 (round down to the decimal point).

The operating capacity of one group is 50%.

(In the case of multiple unit control, the frequency of each unit is controlled within the range of 0 to 100% regardless of the demand capacity.)

(10) Operation display output

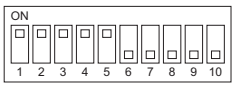
When using the Operation display output (System leader unit), change the setting of the System leader unit shown below from "0 (Individual unit)" to "1 (System leader unit)."

No.	Dip switch setting (SW7-1)	Dip switch setting (SW4)	Setting Item	Initial value	Unit	Setting			Setting change from an optional remote controller (PAR-W31MAA)
						Increments	Lower limit	Upper limit	
1	OFF	ON 1 2 3 4 5 6 7 8 9 10	Operation display output	0	−	1	0	1	Not possible

(11) Error display output

When using the Error display output (System leader unit), change the setting of the System leader unit shown below from "0 (Individual unit)" to "1 (System leader unit)."

No.	Dip switch setting (SW7-1)	Dip switch setting (SW4)	Setting Item	Initial value	Unit	Setting			Setting change from an optional remote controller (PAR-W31MAA)
						Increments	Lower limit	Upper limit	
1	OFF	ON 1 2 3 4 5 6 7 8 9 10	Error display output	0	−	1	0	1	Not possible



The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

(12) Water/Brine setting

Check the operating temperature on the evaporation side before initial operation.
Turn SW6-10 ON when using the brine temperature range.
Note that incorrect settings may cause the evaporation side heat exchanger to freeze.

		SW6-10[*3]	
		OFF (Water setting)	ON (Brine setting)
Evaporation side	Cooling mode (SW5-1: OFF)[*3]	Fluid: Water[*1] Outlet temp. range: 4−30°C	Fluid: Brine[*2] Outlet temp. range: -10−30°C
	Heating mode (SW5-1: ON)[*3]	Fluid: Water[*1] Inlet temp. range: 9−35°C	Fluid: Brine[*2] Inlet temp. range: -7−35°C

*1 Either water or brine can be used.
*2 To prevent the heat exchanger from freezing, check that the connection of brine as such that the freezing temperature is -18°C or less before operation.
*3 Ensure the settings are applied to both the MAIN circuit and the SUB circuit.

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. (Cooling)	The setting for the automatic Start/Stop thermistor is too high.	Change the setting for the automatic Start/Stop thermistor.
		Water temperature is low. (Heating)	The setting for the automatic Start/Stop thermistor is too low.	Change the setting for the automatic Start/Stop thermistor.
The unit is in operation, but the water does not heat up. (Cooling)	Evaporation side water temperature is low.	-	Water flow shortage	Increase the water flow rate.
			Problem with the external devices	Repair the devices.
	Evaporation side water temperature is high.	The water inlet/outlet temperature differential is normal.	The water-cooling 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.
The unit is in operation, but the water does not heat up. (Heating)	Condensation side 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.
	Condensation side water temperature is high.	-	Water flow shortage	Increase the water flow rate.
			Problem with the external devices	Repair the devices.

[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	Error type		Cause (Installation/Setting error)	Cause (Parts problems)	Error reset *2	
					Operation SW	
					Selector switch	Remote controller
4106	Power supply fault *3		Power supply fault occurred when the operation switch is switched on.	-	○	○
2503	Water supply cutoff (Flow switch has been triggered.) 101: Evaporation side water 102: Condensation side water		The water flow rate dropped below the flow switch threshold. Water supply cutoff	• Open-circuited flow switch • Broken flow switch wiring	○	○
2501	Water supply cutoff (detection by sensor) 101, 201: Upstream side 102, 202: Downstream side 203: Inlet/outlet of unit		No water Water supply cutoff	• Inlet water thermistor fault • Outlet water thermistor fault	×	×
2000	Pump interlock fault 101: Evaporation side water 102: Condensation side water		Pump interlock connection failure	-	—	—
1302 1303	High pressure fault 101: A circuit 102: B circuit		No water Water supply cutoff	• Linear expansion valve fault • High-pressure sensor fault	○	○
1176	Discharge SH fault 101: A circuit 102: B circuit		-	• Low-pressure sensor fault • Suction gas refrigerant temperature thermistor fault • High-pressure sensor fault • Discharge refrigerant temperature thermistor fault • Linear expansion valve fault	○	○
1301	Low pressure fault 101: A circuit 102: B circuit		Evaporation side water temperature was below the operating range.	• Low-pressure sensor fault • Linear expansion valve fault • Refrigerant deficiency (refrigerant gas leak)	○	○
1189	Suction gas SH fault 101: MAIN circuit 102: SUB circuit		-	• Compressor suction gas refrigerant temperature thermistor fault • Linear expansion valve fault • Low-pressure sensor fault	○	○
5109	Ther-mistor fault	Condensation side inlet temperature (Upstream) (TH9)	-	• Broken or shorted thermistor wiring	○	○
5120		Condensation side inlet water temperature (Downstream) (TH20)	-	• Broken or shorted thermistor wiring	○	○
5110		Condensation side outlet temperature (TH10)	-	• Broken or shorted thermistor wiring	○	○
5111		Outdoor temperature (TH11)	-	• Broken or shorted thermistor wiring	○	○
5112		External water sensor 1 fault (TH12)	-	• Broken or shorted thermistor wiring	○	○
5113		External water sensor 2 fault (TH13)	-	• Broken or shorted thermistor wiring	○	○
5107		Evaporation side inlet water temperature (Upstream) (TH7)	-	• Broken or shorted thermistor wiring	○	○
5117		Evaporation side inlet water temperature (Downstream) (TH17)	-	• Broken or shorted thermistor wiring	○	○
5108		Evaporation side outlet water temperature (TH8)	-	• Broken or shorted thermistor wiring	○	○
5101 5102		Discharge refrigerant temperature (TH1/TH2) 101: Sensor error 103: Installation error	-	• Broken or shorted thermistor wiring	○	○
5103 5104		Condensation side heat exchanger refrigerant temperature (TH3/TH4)	-	• Broken or shorted thermistor wiring	○	○
5105 5106		Suction gas refrigerant temperature (TH5/TH6)	-	• Broken or shorted thermistor wiring	○	○
5201	High-pressure sensor fault/high-pressure fault 101: A circuit 102: B circuit		-	• Broken or shorted pressure sensor wiring	○	○
5202	Low-pressure sensor fault/low-pressure fault 101: A circuit 102: B circuit		-	• Broken or shorted pressure sensor wiring	○	○
7102	Connection count error		-	• Setting of connection count fault	×	×

Error code *1	Error type			Cause (Installation/Setting error)	Cause (Parts problems)	Error reset *2	
						Operation SW	
						Selector switch	Remote controller
7113	Model setting error 1			Dip switches on the PCB were set incorrectly during maintenance.	-	○	○
7117	Model setting error 2			-	• CNTYP1 resistor fault (connected to the Main control board)	○	○
4102	Open phase			There is an open phase.	• Circuit board fault	×	×
1102	Discharge temperature fault (A discharge refrigerant temperature of 120ºC or above is detected momentarily while the compressor is in operation.) 101: A circuit 102: B circuit			No water Abrupt change in water temperature (5K/min. or greater) Pump failure	• High-pressure sensor fault • Linear expansion valve fault • Refrigerant deficiency (refrigerant gas leak)	○	○
1138	Condensation side water abnormal rise			Drop in water flow or water supply cutoff Water temperature rise	-	○	○
1503	Evaporation side water abnormal drop *4			Drop in water flow or water supply cutoff Water temperature drop	-	×	×
1510	Gas leak fault			-	• High pressure sensor fault • Refrigerant deficiency (refrigerant gas leak)	○	○
1512	Low evaporation temperature fault			Drop in water flow Water temperature drop	-	×	×
426*	Cooling fan fault			-	• Cooling fan fault	○	○
425* (1101)	Inverter error	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	○	○
425* (1102)		ACCT overcurrent		-	• INV board fault • Ground fault of the compressor • Coil problem • IPM error (loose terminal screws, cracked due to swelling)	○	○
425* (1107)		Overcurrent relay trip (effective value) (During operation)		-		○	○
425* (1106)		Overcurrent relay trip (momentary value) (During operation)		-		○	○
425* (1104)		Short-circuited IPM/ground fault (During operation)		-	• INV board fault • Ground fault of the compressor • IPM error (loose terminal screws, cracked due to swelling)	○	○
425* (1105)		Overcurrent error due to a short-circuited (During operation)		Inter-phase voltage drop	• INV board fault • Ground fault of the compressor • Shorted output wiring	○	○
422* (1108)		Voltage related problems during operation	Bus voltage drop protection	Momentary power failure/power failure Power supply voltage drop	• INV board fault • 72C fault • R1, R5 fault	○	○
422* (1109)			Bus voltage rise protection	Incorrect power supply voltage	• INV board fault	○	○
422* (1111)			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	○	○
422* (1129)			Control power supply error	Control power supply failure	• INV board, main board fault • Broken wiring between INV and main control board	○	○
422* (1131)			Inverter bus voltage fault	Power supply voltage drop	• MAIN board fault • Power supply voltage drop	○	○

Error code *1	Error type		Cause (Installation/Setting error)	Cause (Parts problems)	Error reset *2	
					Operation SW	
					Selector switch	Remote controller
423* (125)	Inverter error	Heatsink fault (Heatsink overheat protection)	Power supply voltage drop Clogged heatsink cooling air passage	• Cooling fan fault • INV board fault • IPM error (loose terminal screws, cracked due to swelling)	○	○
424*		Overload protection	Clogged heatsink cooling air passage Power supply voltage drop	• Cooling fan fault • Current sensor fault • INV circuit fault • Compressor fault	○	○
530* (115)		ACCT sensor fault	-	• INV board fault • Ground fault of the compressor and IPM error	○	○
530* (117)		ACCT sensor/circuit fault	-	• INV board fault	○	○
530* (119)		Open-circuited IPM/loose ACCT sensor	-	• ACCT sensor fault • Broken compressor wiring • INV circuit fault (IPM error etc.)	○	○
530* (120)		Faulty wiring	-	• INV board fault	○	○
5114 (0*)		THHS sensor/circuit fault	-	• INV board fault	○	○
0403 (0*)		Serial communication error	-	• Communication error between control board and INV board (noise interference, broken wiring)	○	○
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	—	—
4126	Analog input error (Control board CN210)		Analog input type fault (SW6-1, SW6-2)	• Broken or open analog signal output device wiring (CN210)	—	—
6107	Emergency stop		KN51-KN71: OFF	• Broken wiring • Ventilation system in the machine room fails or stops.	×	×
6500	Communication error		-	-	—	—
6600	Transmission line power supply PCB fault		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	Communication error (Simple multiple unit control mode)				—	—
0206	Expansion board error		Control failure	• Wiring, connector fault between expansion and main control board • Expansion board, main control board fault	×	×
7100	Capacity code error		Other capacity units in a group	• Group setting fault	—	—
7105	Address setting error		Address setting except for 01 - 50	• Main control board fault	○	○
7109	Prevention error of malfunction		Change setting value that requires power supply reset	• System and switch setting check	○	○
7130	Combination error		Different model in system	• Different model check • Main control board fault	○	○
8000	Normal		-	-	—	—

*1: If an error occurs, error codes shown above will appear in the 4-digit digital display on the PCB and the remote controller.

*2: Definition of symbols in the "Error reset" column.

○: 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

*3: 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.")

*4: Before resetting this error, remove its causes. Resuming operation without removing the causes of heat exchanger freeze up will cause heat exchanger damage.

5: "" shows types of components. (0/1: COMP A, 2: COMP B)

Abnormal stop condition table

Error code	Error type	Preliminary error code	One side circuit can be operated	Another unit can be operated in the group
1102	Discharge temperature fault	1202	○	◎
1138	Condensation side water abnormal rise	1238	×	◎
1176	Discharge SH fault	1276	○	◎
1189	Suction gas SH fault	1289	○	◎
1301	Low pressure fault	1401	○	◎
1302 1303	High pressure fault	1402	○	◎
1503	Evaporation side water abnormal drop	1603	×	◎
1510	Gas leak fault	-	×	◎
1512	Low evaporation temperature fault	1612 or none	○	◎
2503	Water supply cutoff (Flow switch)	-	×	×*1
2501	Water supply cutoff (Sensor)	-	×	◎
2000	Pump interlock fault	-	×	◎
4102	Open phase	-	×	◎
4106	Power supply fault	-	×	◎
4126	Analog input error	-	—	—
422*	Inverter bus voltage fault	432*	○	◎
423*	Inverter overheat protection fault	433*	○	◎
424*	Inverter overload protection	434*	○	◎
425*	IPM error (inclusive)/overcurrent relay	435*	○	◎
426*	Cooling fan fault	-	○	◎
5101	Discharge refrigerant temp. (TH1)	-	○	◎
5102	Discharge refrigerant temp. (TH2)	-	○	◎
5103	Condensation side heat exchanger refrigerant temp. (TH3)	-	○	◎
5104	Condensation side heat exchanger refrigerant temp. (TH4)	-	○	◎
5105	Suction gas refrigerant temp. (TH5)	-	○	◎
5106	Suction gas refrigerant temp. (TH6)	-	○	◎
5107	Evaporation side inlet water temp. (Upstream) (TH7)	-	×	◎
5117	Evaporation side inlet water temp. (Downstream) (TH17)	-	×	◎
5108	Evaporation side outlet water temp. (TH8)	-	×	◎
5109	Condensation side inlet water temp. (Upstream) (TH9)	-	×	◎
5120	Condensation side inlet water temp. (Downstream) (TH20)	-	×	◎
5110	Condensation side outlet water temp. (TH10)	-	×	◎
5111	Outdoor temp. (TH11)	-	—	◎
5112	External water sensor 1 fault (TH12)	-	—	◎
5113	External water sensor 2 fault (TH13)	-	—	◎
5114	THHS sensor/Circuit fault	1214	○	◎
5201	High pressure sensor fault	-	×	◎
5202	Low pressure sensor fault	-	×	◎
530*	ACCT sensor fault/Circuit fault	430*	○	◎
0403	Serial communication error	430*	○	◎
6107	Emergency stop	-	×	×
6500	Communication error the MAIN and SUB units	-	×	◎
6600	Communication error the MAIN and SUB units	-	×	◎
6602	Communication error the MAIN and SUB units	-	×	◎
6603	Communication error the MAIN and SUB units	-	×	◎
6606	Communication error the MAIN and SUB units	-	×	◎
6607	Communication error the MAIN and SUB units	-	×	◎
6608	Communication error the MAIN and SUB units	-	×	◎
6831	Remote controller signal reception error 1	-	—	—
6832	Remote controller signal transmission error	-	—	—
6834	Remote controller signal reception error 2	-	—	—
6833	Remote controller over current	-	×	◎
0206	Expansion board error	-	×	◎
7100	Capacity code error	-	×	×
7102	Connection count error	-	×	◎
7105	Address setting error	-	×	◎
7109	Prevention error of malfunction	-	×	◎
7113 7117	Model setting error	-	×	◎
7130	Combination error	-	×	◎

○: One side circuit can be operated.
◎: Another module can be operated.
×: Operation impossible
—: Not abnormal stop
*1: Case of the one pump system
2: "" shows types of components. (0/1: COMP A, 2: COMP B)

[3] Calling for Service

If the problem cannot be solved by following the instructions provided in the table on the previous pages, 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 "ERCV" and is found on the lower part of the unit.

(2) Serial number

Example: 34W00001/34W00002
*Provide the serial numbers of both the Main and Sub units.

(3) Error code

(4) Nature of the problem in detail

Example: The unit stops approximately one minute after it was started.
*Provide the information about both the Main and Sub units.

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. Switch on the main power.
3. 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.
4. Switch on the Run/Stop switch that controls the unit on the on-site control panel.

[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 12 minutes. If the unit does not start when the ON/OFF switch is turned on, leave the switch turned on for 12 minutes. The unit will automatically start up within 12 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 outdoor 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”.
- 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 Unit in Sub-freezing

⚠ CAUTION

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.

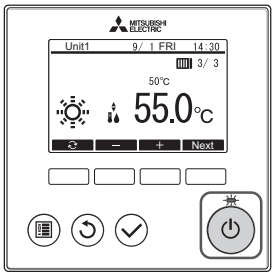
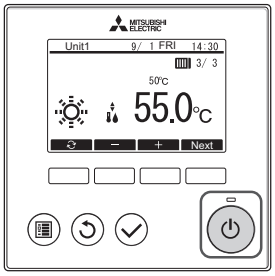
- If the unit is left turned off for a while (e.g., overnight) when the temperature around the unit drops below freezing, the water in the water circuit will freeze and damage the pipes and the heat exchanger.

- 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.)

[4] Using the Remote Controller (PAR-W31MAA)

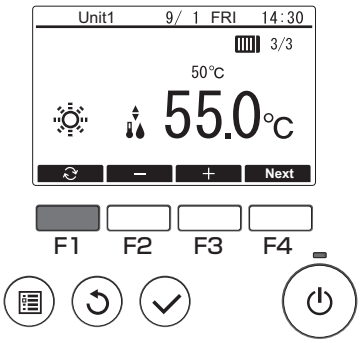
<1> Power ON/OFF

During operation		Press the [ON/OFF] button. The ON/OFF lamp will light up in green, and the operation will start.
During stoppage		Pressing the [ON/OFF] button brings up a confirmation screen. When it appears, press the [F3] button. The ON/OFF lamp will come off, and the operation will stop.

<2> Operation mode and set temperature settings

Operation mode setting

Button operation



Press the [F1] button to go through the operation modes in the order of "Heating, Anti-Freeze, Cooling and Heating-ECO."
Select the desired operation mode.

 **Heating**

 **Anti-Freeze**

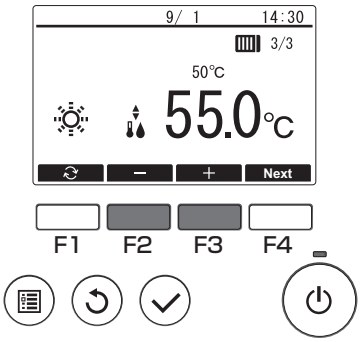
 **Cooling**

 **Heating-ECO**

*SW5-1 OFF: Heating, Anti-Freeze, or Heating ECO is not available when set to Cooling.
*SW5-1 OFF: Cooling is not available when set to Heating.

Set temperature setting

Button operation



Press the [F2] button to decrease the set temperature, and press the [F3] button to increase.

<3> Using Weekly timer

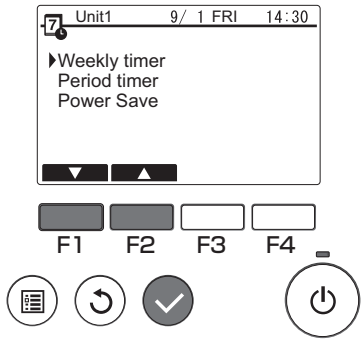
Function description

Following settings can be used to change the operating schedule according to the day of the week.

- Set the schedule for ON/OFF, operation mode and set temperature for each day of the week.

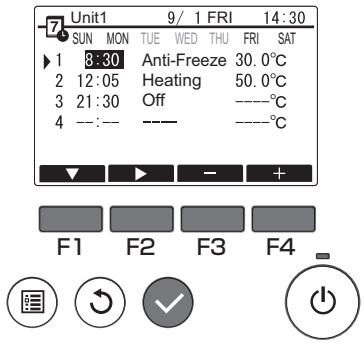
Button operation

1



Select "Weekly timer" from the Schedule menu, and press the [Select] button.

2

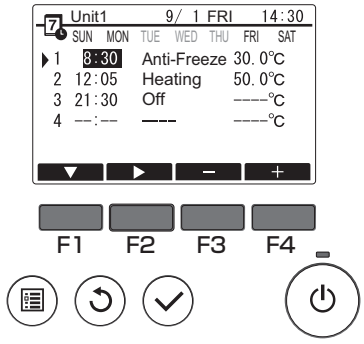


The Weekly timer screen will be displayed.

To check the operation settings:
Press the [F1] or [F2] button to check the settings from Monday to Sunday.
The [F4] button displays the following page.

To change the operation settings:
Press the [F1] or [F2] button to select a day and then press the [F3] button to confirm the day to be set. (Multiple days can be selected.)
After selecting the desired day, press the [Select] button.

3



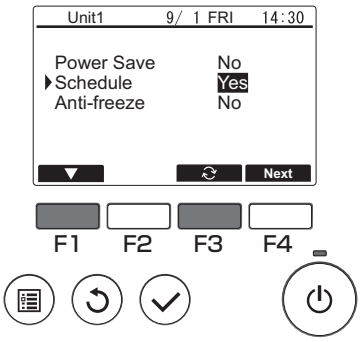
The pattern setting screen will be displayed.
Press the [F1] button to select a pattern.
Press the [F2] button to select the item you want to change.
Press the [F3] or [F4] button to switch to the desired setting.

Time	Set in 5-minute increments. * Hold down the button to change the value continuously.
Operation mode, Off	The options available vary depending on the connected unit. * If you select an operation mode other than Off, the connected unit will operate.
Set temperature	You can change the set temperature (in 0.5°C increments).

Weekly timer operation is disabled in the following situations:
- When Schedule is disabled
- On days when the period timer is also enabled

Weekly timer operation may not be executed depending on the system configuration.

Navigating through the screens
■ To save the settings ..... [Select] button
■ To return to the Main display ..... [Menu] button
■ To return to the previous screen ..... [Return] button



In the Operation setting screen, press the [F1] button to move the cursor to "Schedule".
Press the [F3] button to select "Yes".

<4> Using Period timer

Function description

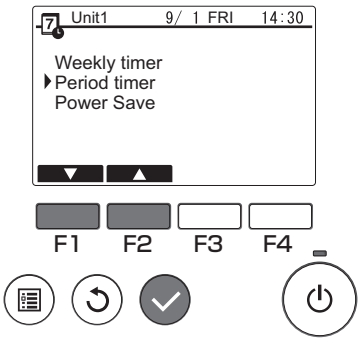
Following settings can be made to change the specified period and daily operating schedule.

- Set the schedule for ON/OFF, operation mode and set temperature.

* If the periods specified in 1 and 2 overlap, only the period specified in 1 will be implemented.

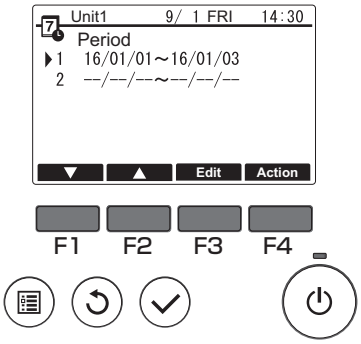
Button operation

1



Select "Period timer" from the Schedule menu, and press the [Select] button.

2

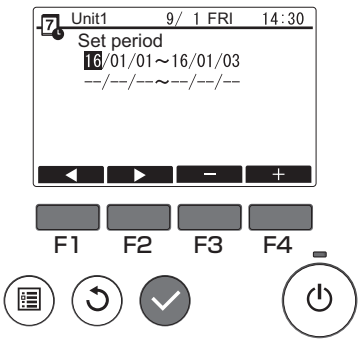


The suitable periods for the period timer will be displayed.

To set the period:
Press the [F1] or [F2] button to select the specified date and then press the [F3] button. ... Move to **3**.

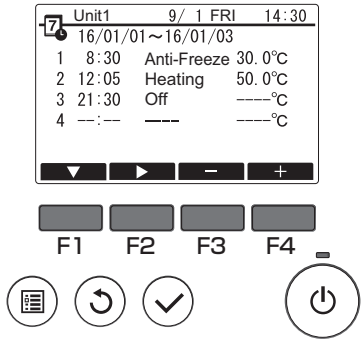
To set the operation:
Press the [F1] or [F2] button to select the specified date and then press the [F4] button. … Move to **4**.

3



The period setting screen will be displayed.
Press the [F1] or [F2] button to move to the item you want to change.
Press the [F3] or [F4] button to change the start date and end date for the period timer and then press the [Select] button to update the setting.

4



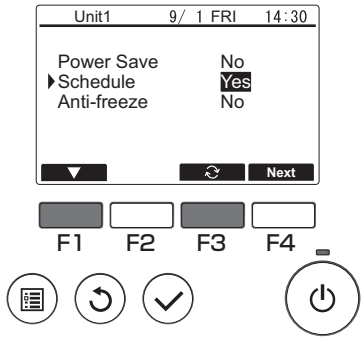
The pattern setting screen will be displayed.
* Refer to the section on Weekly timer for details on using the pattern setting screen.

Weekly timer operation will be disabled in the following situations:
- When Schedule is disabled

When Schedule is disabled with the centralized controller or the connected unit, Schedule settings cannot be made with the remote controller.

After switching to the desired setting, press the [Select] button.
A setting confirmation screen will appear.

Navigating through the screens
■ To save the settings ..... [Select] button
■ To return to the Main display ..... [Menu] button
■ To return to the previous screen ..... [Return] button



In the Operation setting screen, press the [F1] button to move the cursor to "Schedule".
Press the [F3] button to select "Yes".

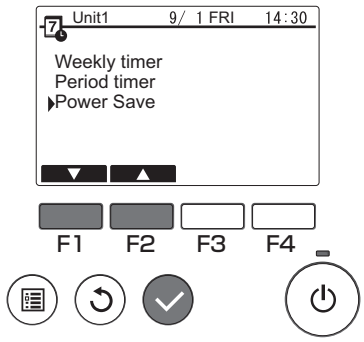
<5> Using power save

Function description

Power Save is a function that regulates the compressor rotation count either daily or according to a specified period and according to a preset time interval or regulated capacity. Use this function when you want to inhibit electric power use.
A typical scenario where Power Save can be used to inhibit the power consumption for water heating would be periods of particularly heavy operating loads for air conditioning and other equipment, such as periods when large numbers of people check in at a hotel or similar accommodation facility.

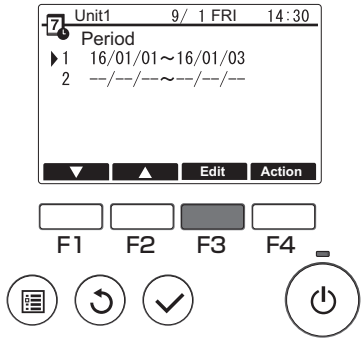
Button operation

1



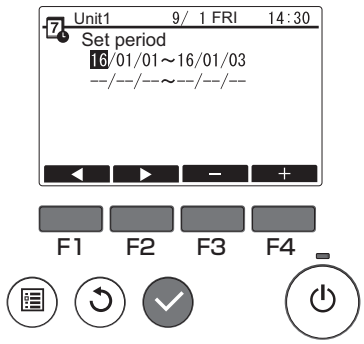
From the Main menu, select "Schedule" > "Power Save" and press the [Select] button.

2



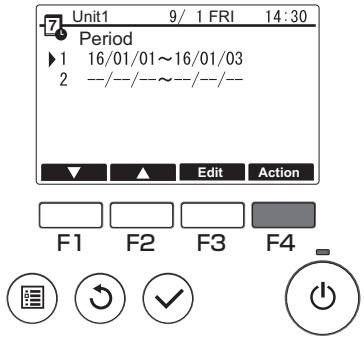
Press the [F3] button to proceed to the settings screen.
You can set 2 types of pattern, as necessary.

* If the periods specified in 1 and 2 overlap, only period specified in 1 will be implemented.



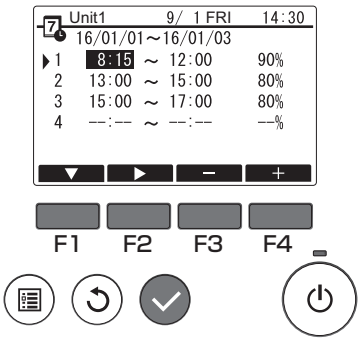
Press the [F1] to [F4] buttons to set the period and then press the [Select] button.

3



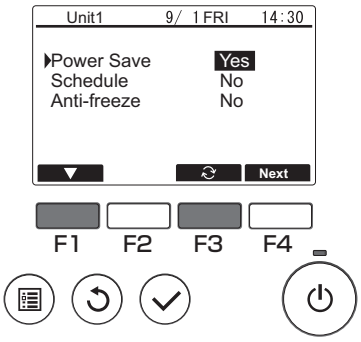
The Power Save screen will be displayed.
Press the [F4] button.

4



Press the [F1] to [F4] buttons to set the Power Save start time, end time and control value.

5



In the Operation setting screen, press the [F1] button to move the cursor to Power Save.
Press the [F3] button to select "Yes".

8. Main Specifications

[1] Specifications

When using water as evaporation side fluid (SW6-10: OFF Water setting)

Model			ERCV-M900YA(KR) × 2	
Capacity change mode			Capacity priority	Efficiency priority
Power source			3-phase 4-wire 380-400-415V 50/60Hz	
Cooling capacity [*1]		kW	180.00	90.00
		kcal/h	154,800	77,400
		BTU/h	614,160	307,080
	Power input	kW	33.07	15.24
	EER		5.44	5.91
	IPLV [*5]		8.61	-
	Evaporation side water flow rate	m³/h	31.0	15.5
	Condensation side water flow rate	m³/h	35.9	17.5
Cooling capacity (EN14511) [*2]		kW	178.71	89.66
		kcal/h	153,691	77,108
		BTU/h	609,759	305,920
	Power input	kW	35.54	15.87
	EER		5.03	5.65
	Evaporation side water flow rate	m³/h	31.0	15.5
	Condensation side water flow rate	m³/h	35.9	17.5
Heating capacity [*3]		kW	180.00	90.00
		kcal/h	154,800	77,400
		BTU/h	614,160	307,080
	Power input	kW	37.22	18.39
	COP		4.84	4.89
	Condensation side water flow rate	m³/h	31.0	15.5
	Evaporation side water flow rate	m³/h	42.7	21.7
Heating capacity (EN14511) [*4]		kW	180.87	90.23
		kcal/h	155,548	77,598
		BTU/h	617,128	307,865
	Power input	kW	40.90	19.26
	COP		4.42	4.68
	Condensation side water flow rate	m³/h	31.0	15.5
	Evaporation side water flow rate	m³/h	42.7	21.7
Current input	Cooling current 380-400-415V [*1]	A	54 - 51 - 49	25 - 24 - 23
	Heating current 380-400-415V [*3]	A	61 - 58 - 56	30 - 29 - 28
	Maximum current	A	120	
Water pressure drop [*1]	Evaporation side	kPa	85	25
	Condensation side	kPa	66	18
Temperature range (Cooling) [*6]	Evaporation side water outlet	ºC	4~30	
		ºF	39~86	
	Condensation side water inlet	ºC	9~50	
		ºF	48~122	
Temperature range (Heating) [*7]	Condensation side water outlet	ºC	20~55	
		ºF	68~131	
	Evaporation side water inlet	ºC	9~35	
		ºF	48~95	
Circulating water volume range	Evaporation side	m^3/h	15.4~50.0	
	Condensation side	m^3/h	9.0~50.0 [*8]	
Sound pressure level (measured in anechoic room) at 1m [*1]		dB (A)	56	51
Sound power level (measured in anechoic room) [*1]		dB (A)	75	69
Diameter of water pipe (Evaporation side)	Inlet	mm (in)	65A (2 1/2B) housing type joint	
	Outlet	mm (in)	65A (2 1/2B) housing type joint	
Diameter of water pipe (Condensation side)	Inlet	mm (in)	65A (2 1/2B) housing type joint	
	Outlet	mm (in)	65A (2 1/2B) housing type joint	
External finish			Polyester powder coating steel plate	
External dimensions H x W x D		mm	1836 × 780 × 1350	
Net weight		kg (lbs)	863 (1903)	
Design pressure	R32	MPa	4.15	
	Water	MPa	1.0	
Heat exchanger	Evaporation side		Stainless steel plate and copper brazing	
	Condensation side		Stainless steel plate and copper brazing	
Compressor	Type		Inverter scroll hermetic compressor	
	Maker		MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	
	Quantity		4	
	Motor output	kW	8.3 × 4	
	Lubricant		MEL46EH	
Protection	High pressure protection		High pressure switch at 4.15MPa (601psi)	
	Inverter circuit		Over-heat protection, Over current protection	
	Compressor		Over-heat protection	
Refrigerant	Type x charge		R32 × 5.2(kg) × 4	
	Control		LEV	

*1 Under normal cooling conditions at evaporation side water inlet temp. 12ºC (53.6ºF) outlet temp. 7ºC (44.6ºF) condensation side water inlet temp. 30ºC (86ºF) outlet temp. 35ºC (95ºF). Pump input is not included in cooling capacity and power input.

*2 Under normal cooling conditions at evaporation side water inlet temp. 12ºC (53.6ºF) outlet temp. 7ºC (44.6ºF) condensation side water inlet temp. 30ºC (86ºF) outlet temp. 35ºC (95ºF). Pump input is included in cooling capacity and power input based on EN14511.

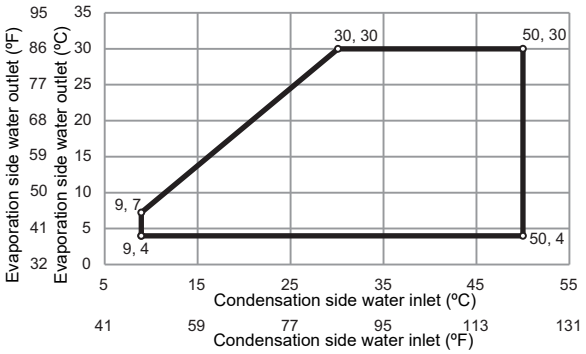
*3 Under normal heating conditions at condensation side water inlet temp. 40ºC (104ºF) outlet temp. 45ºC (113ºF) evaporation side water inlet temp. 10ºC (50ºF) outlet temp. 7ºC (44.6ºF). Pump input is not included in cooling capacity and power input.

*4 Under normal heating conditions at condensation side water inlet temp. 40ºC (104ºF) outlet temp. 45ºC (113ºF) evaporation side water inlet temp. 10ºC (50ºF) outlet temp. 7ºC (44.6ºF). Pump input is included in cooling capacity and power input based on EN14511.

*5 IPLV is calculated in accordance with AHRI 551-591.

- Please don't use the steel material for the water piping.
- Please always make water circulate, or pull the circulation water out completely when not in use.
- Please do not use groundwater or well water in direct.
- The water circuit must be closed circuit.
- Due to continuous improvement, the above specifications may be subject to change without notice.
- This model doesn't equip with a pump.

*6



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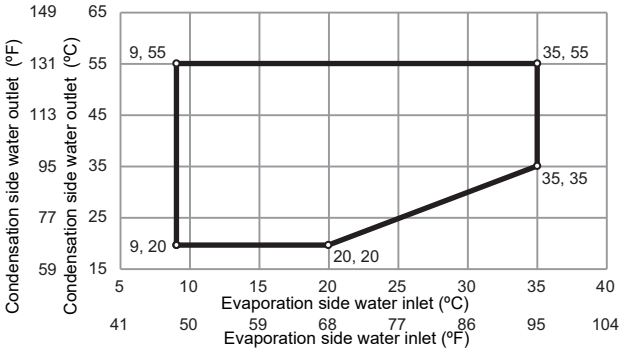


*8 Set the minimum water flow rate on the condensation side water to 16.0 m^3/h when the evaporation side water inlet temperature during operation is 15ºC (59ºF) or higher.

When using brine as evaporation side fluid (SW6-10: ON Brine setting)

Model			ERCV-M900YA(KR) × 2
Power source			3-phase 4-wire 380-400-415V 50/60Hz
Cooling capacity *1*5		kW	180.00
		kcal/h	154,800
		BTU/h	614,160
	Power input	kW	33.07
	EER		5.44
	Evaporation side brine flow rate	m³/h	34.5
	Condensation side water flow rate	m³/h	35.9
Cooling capacity (EN14511) *2*5		kW	177.72
		kcal/h	152,839
		BTU/h	606,381
	Power input	kW	36.53
	EER		4.87
	Evaporation side brine flow rate	m³/h	34.5
	Condensation side water flow rate	m³/h	35.9
Heating capacity *3*5		kW	160.00
		kcal/h	137,600
		BTU/h	545,920
	Power input	kW	43.39
	COP		3.69
	Condensation side water flow rate	m³/h	27.5
	Evaporation side brine flow rate	m³/h	38.4
Heating capacity (EN14511) *4*5		kW	160.69
		kcal/h	138,193
		BTU/h	548,274
	Power input	kW	47.29
	COP		3.40
	Condensation side water flow rate	m³/h	27.5
	Evaporation side brine flow rate	m³/h	38.4
Current input *5	Cooling current 380-400-415V *1	A	54 - 51 - 49
	Heating current 380-400-415V *3	A	71 - 67 - 65
	Maximum current	A	120
Brine/Water pressure drop *1*5	Evaporation side brine	kPa	149
	Condensation side water	kPa	66
Temperature range (Cooling) *5*6	Evaporation side brine outlet	ºC	-10~30
		ºF	14~86
	Condensation side water inlet	ºC	9~50
		ºF	48~122
Temperature range (Heating) *5*7	Condensation side water outlet	ºC	20~55
		ºF	68~131
	Evaporation side brine inlet	ºC	-7~35
		ºF	19~95
Circulating brine/water volume range	Evaporation side brine	m^3/h	15.4~50.0
	Condensation side water	m^3/h	9.0~50.0 *8
Sound pressure level (measured in anechoic room) at 1m *1		dB (A)	56
Sound power level (measured in anechoic room) *1		dB (A)	75
Diameter of water pipe (Evaporation side)	Inlet	mm (in)	65A (2 1/2B) housing type joint
	Outlet	mm (in)	65A (2 1/2B) housing type joint
Diameter of water pipe (Condensation side)	Inlet	mm (in)	65A (2 1/2B) housing type joint
	Outlet	mm (in)	65A (2 1/2B) housing type joint
External finish			Polyester powder coating steel plate
External dimensions H x W x D		mm	1836 × 780 × 1350
Net weight		kg (lbs)	863 (1903)
Design pressure	R32	MPa	4.15
	Water	MPa	1.0
Heat exchanger	Evaporation side		Stainless steel plate and copper brazing
	Condensation side		Stainless steel plate and copper brazing
Compressor	Type		Inverter scroll hermetic compressor
	Maker		MITSUBISHI ELECTRIC CORPORATION
	Starting method		Inverter
	Quantity		4
	Motor output	kW	8.3 × 4
	Lubricant		MEL46EH
Protection	High pressure protection		High pressure switch at 4.15MPa (601psi)
	Inverter circuit		Over-heat protection, Over current protection
	Compressor		Over-heat protection
Refrigerant	Type x charge		R32 × 5.2(kg) × 4
	Control		LEV

*1 Under normal cooling conditions at evaporation side brine inlet temp. 12°C (53.6°F) outlet temp. 7°C (44.6°F) condensation side water inlet temp. 30°C (86°F) outlet temp. 35°C (95°F). Pump input is not included in cooling capacity and power input.

*2 Under normal cooling conditions at evaporation side brine inlet temp. 12°C (53.6°F) outlet temp. 7°C (44.6°F) condensation side water inlet temp. 30°C (86°F) outlet temp. 35°C (95°F). Pump input is included in cooling capacity and power input based on EN14511.

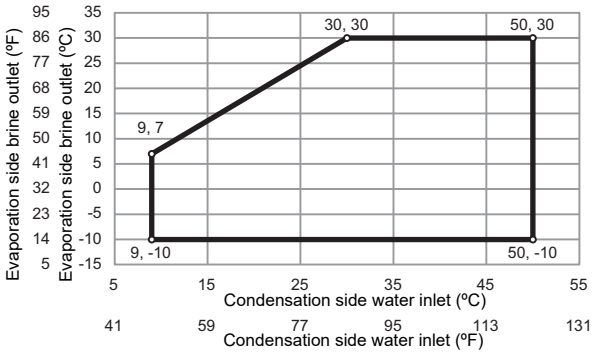
*3 Under normal heating conditions at condensation side water inlet temp. 40°C (104°F) outlet temp. 45°C (113°F) evaporation side brine inlet temp. 0°C (32°F) outlet temp. -3°C (26.6°F). Pump input is not included in cooling capacity and power input.

*4 Under normal heating conditions at condensation side water inlet temp. 40°C (104°F) outlet temp. 45°C (113°F) evaporation side brine inlet temp. 0°C (32°F) outlet temp. -3°C (26.6°F). Pump input is included in cooling capacity and power input based on EN14511.

*5 When using brine (ethylene glycol 35wt%) as evaporation side fluid.

- Please don't use the steel material for the water piping.
- Please always make water circulate, or pull the circulation water out completely when not in use.
- Please do not use groundwater or well water in direct.
- The water circuit must be closed circuit.
- Due to continuous improvement, the above specifications may be subject to change without notice.
- This model doesn't equip with a pump.

*6



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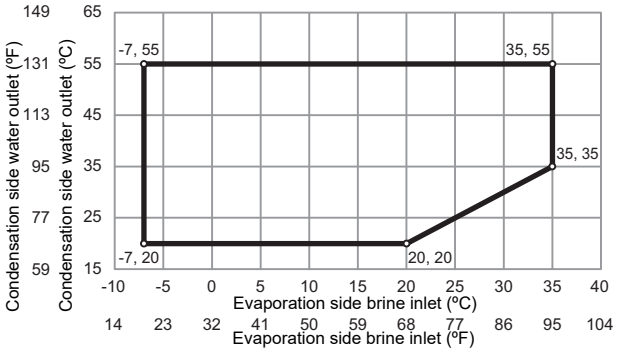


*8 Set the minimum water flow rate on the condensation side water to 16.0 m^3/h when the evaporation side brine inlet temperature during operation is 15°C (59°F) or higher.

9. Maintenance

[1] Operation status check

Operate the unit for at least 30 minutes until the operation is stabilized before checking the operation status.

<1> Voltage

Ensure that the power-supply voltage is normal.

- Ensure that the terminal voltage is within the range between -5% and +5% of the rated voltage at the rated frequency.

<2> Current

Ensure that the operation current <total current of the fan and compressor system> is normal.

Operation current varies with operation conditions. Approximate normal values at 400 V are summarized in the table below.

Model	Cooling	Heating
ERCV-M900YA(KR) × 2	51A	58A

*1 Under normal cooling conditions
Condensation side water outlet temperature 35ºC (95.0ºF)
Condensation side water inlet temperature 30ºC (86.0ºF)
Evaporation side water outlet temperature 7ºC (44.6ºF)
Evaporation side water inlet temperature 12ºC (53.6ºF)

*2 Under normal heating conditions
Condensation side water outlet temperature 45ºC (113.0ºF)
Condensation side water inlet temperature 40ºC (104.0ºF)
Evaporation side water outlet temperature 7ºC (44.6ºF)
Evaporation side water inlet temperature 10ºC (50.0ºF)

<3> Pressure

Approximate normal high and low pressures are summarized in the table below.

Pressure varies with operation status and conditions.

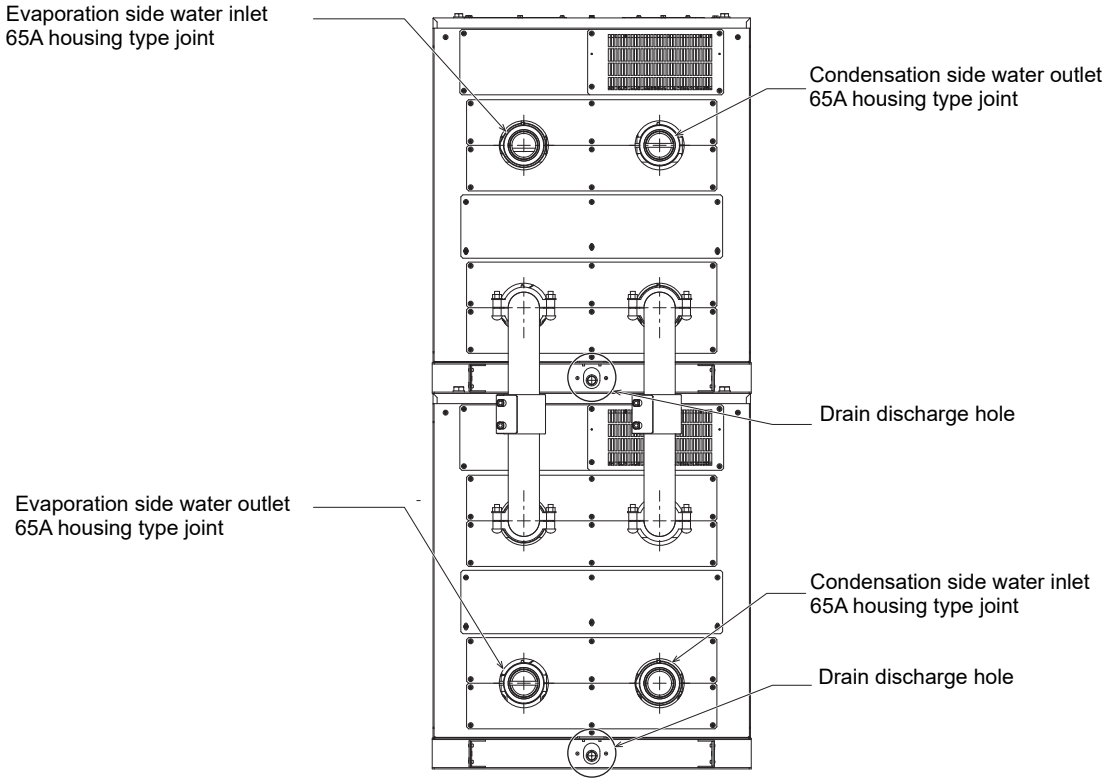
Pressure	Operation pressure
High pressure <MPa>	1.0 – 3.7
Low pressure <MPa>	0.7 – 1.4

<4> Water temperature

Ensure that the inlet/outlet water temperatures match the set temperatures.

When a standard piping type is shared by two or more modules, make sure that the temperatures at the inlet/outlet of each module are approximately equal.

* Ensure that the water-flows are well-balanced. Adjust the flows with valves.
* Note that the water temperature may abnormally rise from heat generation from the pump if the pump is operated alone for a long time with the unit operation command being set to OFF (operation stop).



<Opposite side of service side>

<5> Others

- Check for abnormal operation noise or vibration.
- Ensure that the drainage of machine compartment is not clogged.

[2] Long period of non-use

<1> After the season or during summer

When the units remain turned off for an extended period such as after the season or during summer, turn off the power switch. (Turn off the power switch on the circulation pump if it is connected to a separate circuit.)

- If the power remained turned off for two days or longer, make sure to check that the clock is set correctly when the power is turned on, and re-set the clock as necessary.

<2> When the units remain stopped in winter

When units remain stopped in cold temperatures, leave the power switch turned on.

- The circulation-water freeze-up-protection circuit will not operate if the power switch is turned off. (If the circulation pump is connected to a separate circuit, leave the power of the circulation pump on.)
- Drain the cold/hot water from the water drain valve (installed on site).

[3] Maintenance

The table below shows regular inspection items, schedule, and parts replacement criteria under normal use condition. The "Inspection schedule" column under the "Preventive maintenance" column indicates the regular inspection schedule, and the "Maintenance schedule" column indicates an estimation of the time when the parts need to be cleaned or adjusted or when old parts need to be replaced or repaired. The cleaning/adjustment schedule is provided in order to take proper measure to protect the parts from deterioration or performance drop, and the estimated operating time or use period when each part goes into the wear-out failure period is provided so that replacement of the parts can be made at the right timing after the inspection.

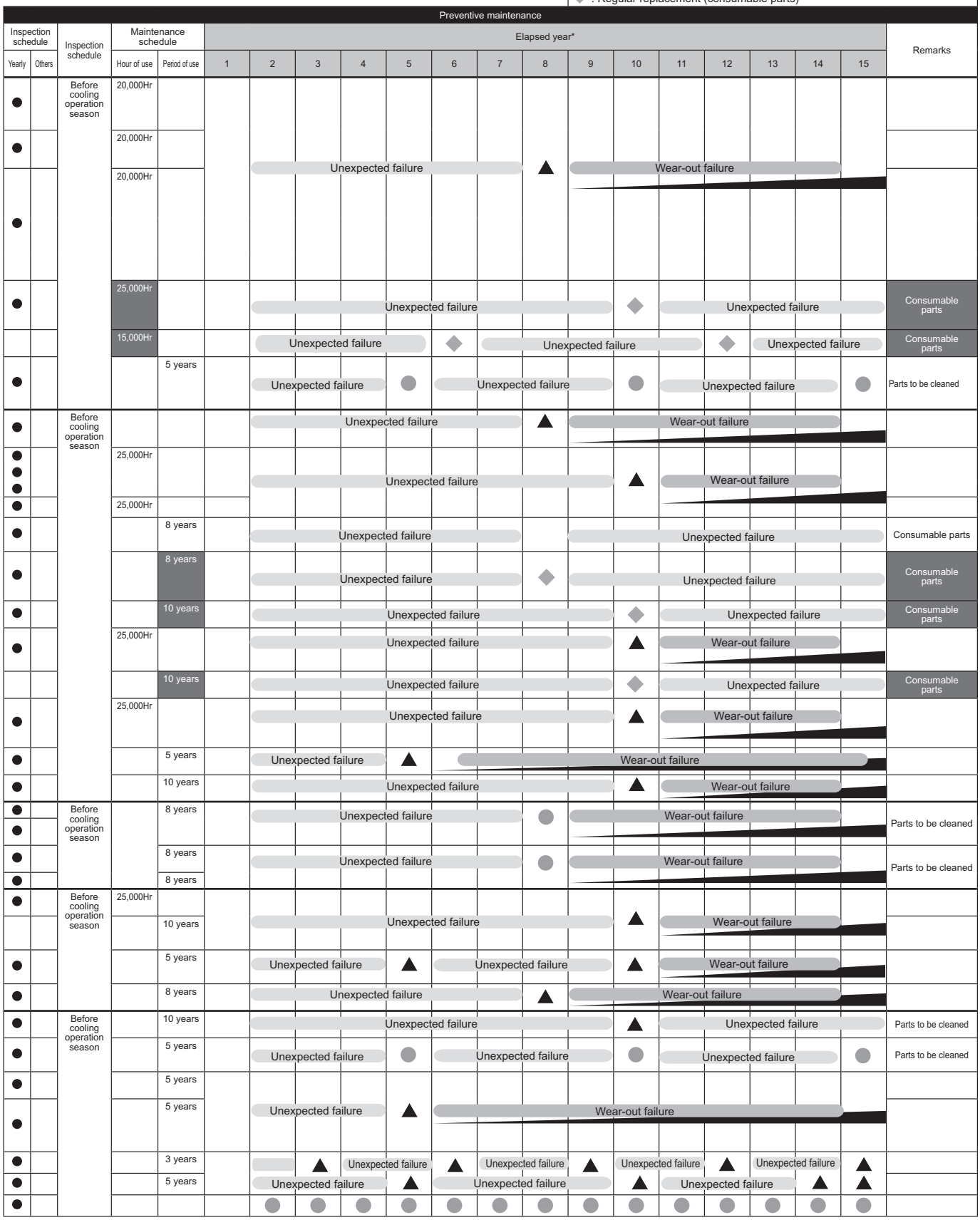
Parts name			Regular inspection			Preventive maintenance
Component parts	Parts name		Inspection item	Inspection method/tools	Judgement criteria <Reference>	Maintenance item
Refrigerant circuit	Compressor		• Sound or vibration at startup, during operation, and at stoppage of the compressor • Insulation resistance • Terminals and wiring	Visual, auditory, and tactile check 500V megahertz Screwdriver, visual check	• Free from abnormal noise and vibration • The insulation resistance is 1MΩ or greater. • Free from loose terminals and wiring contacts	• If abnormal, replace the compressor. • If the insulation resistance is 1MΩ or less, replace the compressor. • Retighten the terminals, and rewire the wiring.
	Electronic expansion valve		• Operation • Operating sound by turning ON or OFF the unit (pressure check)	Tactile check Auditory and tactile check	• Refrigerant circulation is confirmed. • Operating sound is heard and temperature change is confirmed.	• Replace the electronic expansion valve if it is stuck.
	Refrigerant system	Inner piping	• Sympathetic vibration, contact, and corrosion of the inner piping • Sympathetic vibration and contact of the capillary tube	Visual check Visual check	• Free from abnormal sympathetic vibration, sound, and corrosion • Free from abnormal sympathetic vibration and contact wear	• If the pipes are severely corroded, replace or repair the pipe. • If the pipes are severely worn out, replace or repair the pipe. • If the insulation resistance is 1MΩ or less, replace the valve. • If there is corrosion, paint the surface.
		Solenoid valve	• Operation and insulation performance of the solenoid valve and the 4-way valve •Corrosion and abnormal sound	500V megahertz Visual and auditory check	• The insulation resistance is 1MΩ or greater. • Free from abnormal noise and corrosion	
		Container	• Corrosion of the accumulator or the oil separator	Visual check	• Free from corrosion	
	Protection device (security parts)	High pressure switch	• Operating pressure, refrigerant leak, and insulation resistance	Pressure gauge etc.	• The high-voltage circuit breaker operates at the set value. • The measured value is within the range specified by the regulation.	• Replace the parts regularly.
		Fusible plug	• Appearance (swollen soluble metal)	Visual check	• The soluble metal is at the normal position.	
	Heat exchanger	Water	• Amount of water, temperature • Refrigerant leak • Drain	• Thermometer, flowmeter and differential pressure gauge • Refrigerant leak detector • Check the heat exchanger and the inside the pipe.	• Tolerance • Free from leakage • Installation	• Adjust the valve and operation setting • If the refrigerant leak is detected, repair or replace the heat exchanger • Add the drain valve
Electrical/ Electronic parts	Cooling fan		• Insulation resistance and abnormal sound	500V megahertz, auditory check	• The insulation resistance is 1MΩ or greater. Free from abnormal sound	• Replace the cooling fan if the fan is stuck.
	Switch (including FFB and ELB)	Electromagnetic switch Overcurrent relay Auxiliary relay	• Operation and appearance • Contact points	Visual check	• Free from deformation • Normal operation and free from deformation • Free from deformation and discoloration	• Replace the switches in case of malfunction, deformation, or discoloration.
	Thermostat		• Operation check	• Operation by the unit	• Operation as per the technical document	• Replace or adjust (calibration)
	Oil heater		• Check energization • Insulation resistance	• Tester or ammeter • Visual check • 500V megahertz	• Heat up • More than 1MΩ	• Replace
	Crankcase heater		• Whether the crankcase heater is powered during compressor stop • Insulation resistance of the crankcase heater	Tester 500V megahertz	• The crankcase heater is powered during compressor stop, and is heated up. • The insulation resistance is 1MΩ or greater.	• Rewire the electric wiring. • If the insulation resistance is 1MΩ or less, replace the crankcase heater.
	Fuse		• Appearance	Visual check	• Free from deformation and discoloration	• Replace the fuse if the fuse is blown.
	Control box (including inverter) Electrolytic capacitor		• Insulation resistance or the circuit • Dust of the circuit board • Terminals and connectors • Appearance of the electrolytic capacitor	500V megahertz Visual check Screwdriver, visual check Visual check	• The insulation resistance is 1MΩ or greater. • Free from accumulation of dust • All connectors are properly connected. • Free from liquid leak and deformation	• If tainted with a large amount of dust, clean with a brush. • Replace the circuit board in case of malfunction. • Retighten the terminals, and reconnect the connectors. • Replace the electrolytic capacitor in case of liquid leak.
		Smoothing capacitor	• Capacitance and insulation resistance	Electrostatic meter, 500V megahertz	• At or over the specified value	• Replace the capacitor regularly.
	Electric parts box (including circuit board)		• Insulation resistance of the circuit and appearance of the capacitor • Terminals and connectors • Self-diagnosis mode and appearance	500V megahertz Visual check Visual check	• The insulation resistance is 1MΩ or greater. • All connectors are properly connected. • No error display appears.	• Replace the circuit board in case of malfunction. • Retighten the terminals, and reconnect the connectors. • Replace the circuit board in case of liquid leak.
	Pressure sensor, thermistor		• Open, short-circuit, and appearance	Tester, visual check	• Within the specified value, and free from discoloration	• If the wire is disconnected or short-circuit, replace the pressure sensor or the thermistor.
	SW power source		• Output voltage	Tester	• Within the specified output voltage range	• Replace the SW if the voltage is abnormal.
Structural parts	Decorative part (design part)		• Dirt and damage	Visual check	• Free from dirt, damage, and deformation	• Wash the panel with neutral detergent, and paint the surface.
	Frame, bottom plate		• Rust and insulation material • Flaked coating	Visual check	• Free from rust and damaged insulation	• Repair the frame or the bottom plate if the insulation material is torn. • Paint the surface.
	Drain pan		• Check the drain for clogging. • Check for peeling paint.	Visual check	• Free from drain clogging • Free from rust and holes	• Clean the drain pan and check tilt • Repair painting
	Guard panel		• Flaked coating	Visual check	• Free from rust	• Paint the surface.
Optional parts	Remote controller switch		• Controllability	Visual check	• The display obeys the operation command.	• Replace the remote controller switch if the display does not obey the operation command or wrong display appears.
	Central control system		• Controllability • Loose terminal, wiring contact • Insulation resistance	• Visual check • 500V megahertz	• The display obeys the operation command • Free from loose and contact • More than 1MΩ	• Retightening • Replace if the resistance is less than 1MΩ
	Flow switch		• Controllability • Water leak check • Insulation resistance	• Visual check • 500V megahertz	• The display obeys the operation command • Free from water leak • More than 1MΩ	• Replace the flow switch
	Phase-advanced condenser Elapsed time integrator Ammeter		• Insulation resistance	• 500V megahertz	• More than 1MΩ	• Replace if the resistance is less than 1MΩ
Water circuit	Strainer		• Check clogging	• Visual check	• Free from stain and clogging	• Clean
	Water pipe		• Water leak • Inclusion of air	• Visual check • Sensory inspection/Air vent valve is open	• Free from water leak • Free from strange noise	• Retightening • Release air, or replace and adjust the air vent vane.
	Flow regulating valve		• Water temperature difference (flow rate)	• Thermometer	• Proper temperature difference range	• Replace and adjust
	Pump		• Vibration • Insulation resistance • Water leak check • Loose terminal, wiring contact • Clean and inspect the strainer	• Visual/audibility/tactile impression check • 500V megahertz • Visual check	• Free from strange noise • More than 1MΩ • Free from loose and contact • Free from water leak • Free from clogging	• Replace • Retightening • Modify the wiring
	Pressure gauge		• Display value under suspension	• Visual check	• Free from incorrect display value	• Replace
	Thermometer		• Display value under suspension	• Surface thermometer	• Free from incorrect display value	• Replace
	Water		• Water quality management	• Water quality analysis	• Water quality criterion	• Adjust water quality

Note1) Unexpected failure is a sudden and unpredictable failure that occurs randomly before the parts or the device reaches its lifespan. It is difficult to take the technical measures, and at the moment where only the measures based on statistics can be taken.

Note2) The elapsed year shown in the column marked with * is the estimated period of time under the condition the equipment used 10 hours per day and for 2500 hours per year without frequent start and stop. The years vary depending on the operating condition. Confirm the details whenever conclude the maintenance contract.

Note3) ◢ shows the estimated the year of initial wear-out happen and increase of failure rate year by year.

Remark of semiotics
- ● : Inspection schedule
- ● : Cleaning or adjustment schedule of the parts based on the inspection result
- ▲ : Replacement or repair of the parts in case of error after inspection
- ◆ : Regular replacement (consumable parts)



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

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

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