

e-series Water-cooled Chilling Unit

ERCV

Installation/Operation Manual

For use with R32

ERCV-M900YA

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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

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	ndicates 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

fire, or explosion.

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

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

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

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

Do not try to defeat the safety features of the unit or make unauthorized setting changes. Forcing the unit to operate the unit by defeating the safety features of the devices such as the pressure switch or the temperature switch, making unauthorized changes to the switch settings, or using accessories other than the ones recommended by Mitsubishi Electric may result in smoke,

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, 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.

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 35°C or below, and the condensation side water temperature is 9°C or above.

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.

The manufacturer may provide other suitable examples or may provide additional information about the refrigerant odour.

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

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

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

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

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

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

Condensation may drip from the unit.

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

To reduce the risk of injury, do not touch 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, 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 outdoors, in an enclosed indoor space, or in a semi-underground space.

- The unit is for exclusive use in a machine room with a ventilation equipment.
- If the refrigerant leaks, a fire may result.
- The unit must be stored where leaking refrigerant will not accumulate.

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 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 indoor humidity exceeds 80% or if the drain water outlet becomes clogged, condensation may drip from the indoor unit onto the ceiling or floor.

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 drain water to enter the buildings and damage the furnishings.

Pipe installation

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 (R32) is present in the refrigerant circuit.

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

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

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 (inverter breaker, Local Switch <Switch + Type-B fuse>, or no-fuse breaker).

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

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

Keep the unsheathed part of cables inside the terminal block.

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

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

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

↑ CAUTION

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

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

Transportation and repairs

⚠ WARNING

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

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

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

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

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

⚠ CAUTION

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

Do not open the control box cover while charging refrigerant.

Doing so may cause sparks, resulting in a fire.

IMPORTANT

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

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

Recover all refrigerant from the unit.

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

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

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

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

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

Short-cycling the compressor may damage the compressor.

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

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



Please build the 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 antifreeze.

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

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

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

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

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

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

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

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

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.

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	430	473

[2] Installation Space Requirement

<1> Unit installation

(1) Required space

(SERVICE SPACE) 000 (816) (816)

(SERVICE SPACE)

(SERVICE SPACE)

(SERVICE SPACE)

(SERVICE SIDE

(SERVICE SPACE)

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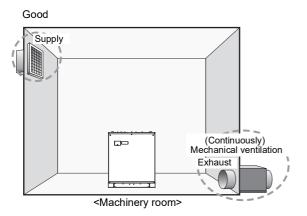
<TOP VIEW>

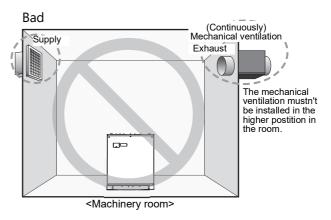
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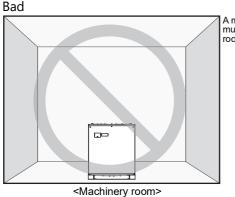
This unit is for exclusive use in a machine room with ventilation equipment.

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).







A mechanical ventilation must be installed in the room.

< 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 m³/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.

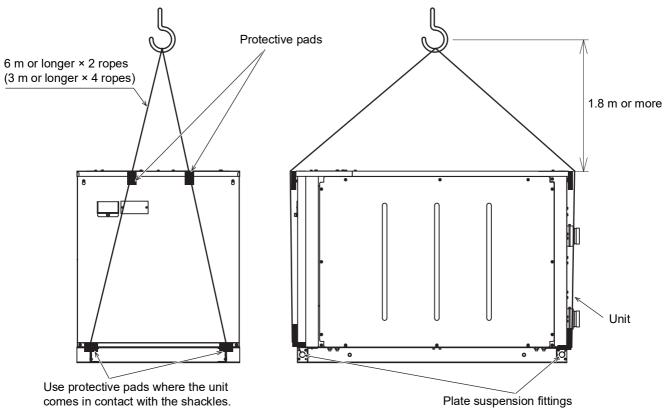
The exhaust ventilation openings shall be located a sufficient distance from intake openings to prevent re-circulation to the occupied space.

- 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



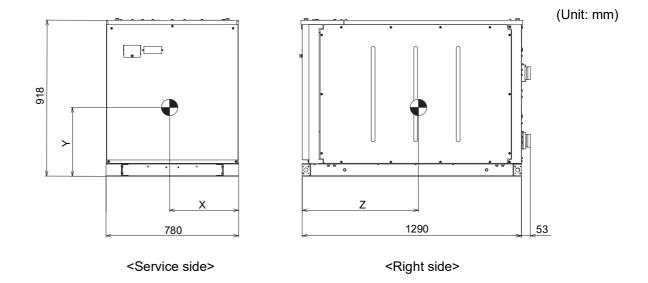
- If transporting the product suspended, use the two suspension sections at the front and rear.
- Always feed rope through the four suspension sections so that the unit is not subjected to shocks.
- Use two ropes that are 6 m or longer. (Use four ropes that are 3 m or longer.)
- Use suspension equipment 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 \P mark.



(Unit: mm)

Model	Х	Υ	Z
ERCV-M900YA	404	409	671

[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)

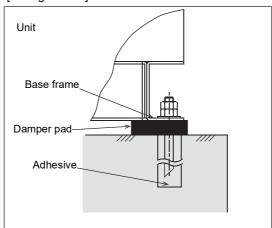
⚠ Warning:

- 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.

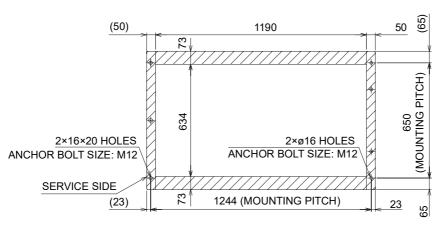
When building the foundation, take the floor strength, and piping and wiring routes into consideration. When using damper pads, be sure to attach them to all corners of the unit.

Bolt size	Number
M12	4

[Enlarged view]



(Unit: mm)



* SECTION SHOWS THE UNIT SURFACE TOUCHING THE FOUNDATION.

3. Water Pipe Installation

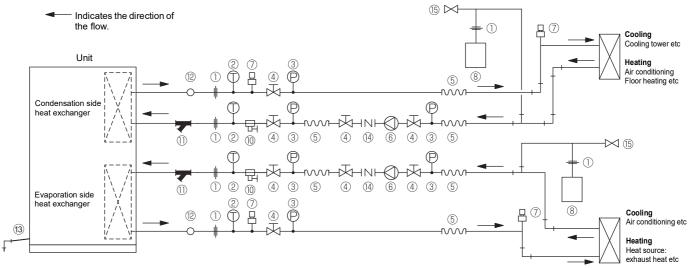
[1] Schematic Piping Diagram and Piping System Components

<1> Water circuit

Please build the condensation side and evaporation side water circuits so that it is a closed system.

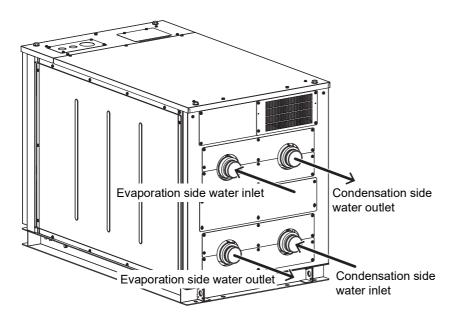
Do not use water directly for showers or other applications. Do not allow other heat source water to mix with the water circuit.

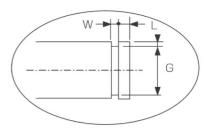
Build a water circuit as inlet water temperature fluctuation is within 5°C/10 minutes.



		— y exhaust fleat etc
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

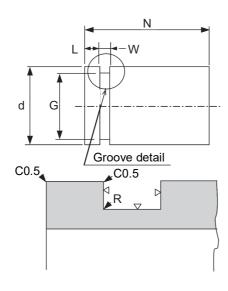




The dimension of the groove pipe at the chiller side

<Opposite side of service side>

Victaulic standard 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 $1 \text{ mg/}\ell$.

(2) Water quality standard

Items		Lower mid-range temperature water system Water Temp. ≤ 60°C		Higher mid-range temperature water system Water Temp. > 60°C		Tendency		
			Recirculating water	Make-up water	Recirculating water	Make-up water	Corrosive	Scale- forming
	pH (25°C)		7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	0	0
	Electric conductivity	(mS/m) (25°C)	30 or less	30 or less	30 or less	30 or less	0)
		(µs/cm) (25°C)	[300 or less]	[300 or less]	[300 or less]	[300 or less]	0	0
	Chloride ion	(mg Cl⁻/ℓ)	50 or less	50 or less	30 or less	30 or less	0	
Standard	Sulfate ion	(mg SO4 ²⁻ /ℓ)	50 or less	50 or less	30 or less	30 or less	0	
items	Acid consumption (pH4.8	ß) (mg CaCO ₃ /ℓ)	50 or less	50 or less	50 or less	50 or less		0
	Total hardness	(mg CaCO ₃ /ℓ)	70 or less	70 or less	70 or less	70 or less		0
	Calcium hardness	(mg CaCO ₃ /ℓ)	50 or less	50 or less	50 or less	50 or less		0
	lonic silica	(mg SiO ₂ /ℓ)	30 or less	30 or less	30 or less	30 or less		0
	Iron	(mg Fe/l)	1.0 or less	0.3 or less	1.0 or less	0.3 or less	0	0
	Copper	(mg Cu/l)	1.0 or less	0.1 or less	1.0 or less	0.1 or less	0	
	Sulfide ion	(mg S ²⁻ /ℓ)	Not to be detected	Not to be detected	Not to be detected	Not to be detected	0	
Reference items	Ammonium ion	(mg NH ₄ ⁺ /ℓ)	0.3 or less	0.1 or less	0.1 or less	0.1 or less	0	
	Residual chlorine	(mg Cl/l)	0.25 or less	0.3 or less	0.1 or less	0.3 or less	0	
	Free carbon dioxide	(mg CO ₂ /ℓ)	0.4 or less	4.0 or less	0.4 or less	4.0 or less	0	
	Ryzner stability index		_	_	_	_	0	0

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

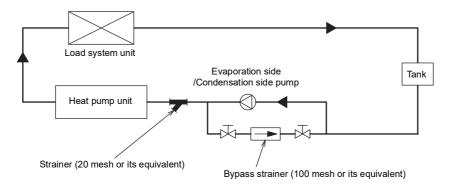
- (3) Please consult with a water quality control specialist about water quality control methods and water quality calculations before using anti-corrosive solutions for water quality management.
- (4) When replacing an air conditioner (including when only the heat exchanger is replaced), first analyze 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

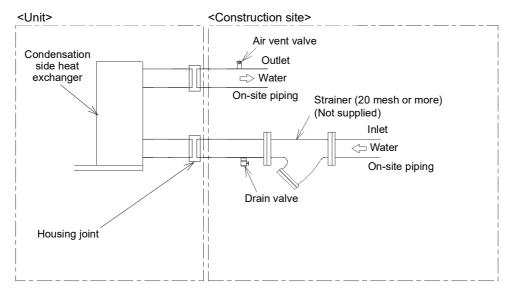
<1> Installing the strainer

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 = $7.7 \text{ m}^3/\text{h}$ (128 L/min)

Unit usage range (water flow rate): 7.7 - 25.8 m³/h

Condensation side water

Minimum flow rate = $4.5 \text{ m}^3/\text{h}$ (75 L/min)

Unit usage range (water flow rate): 4.5 - 30.0 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)*

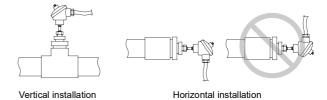
*Items (1) and (2) are field supplied.

Wire specifications

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

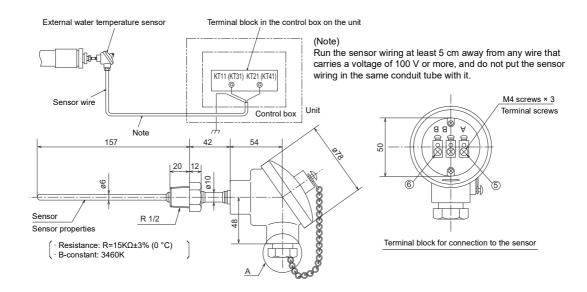
<2> Installing the external water temperature sensor

- 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.



<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.

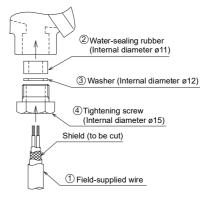


Connect the sensor wiring to terminals KT11 and KT21 (or KT31 and KT41) of the terminal block in the control box on the unit.

Connect the shield to the earth terminal.

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

[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	300	350

(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 (?)

Model	Evaporation side	Condensation side
ERCV-M900YA	18	25

(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 Victaulic joint)	65A housing type joint (Field-supplied Victaulic joint)

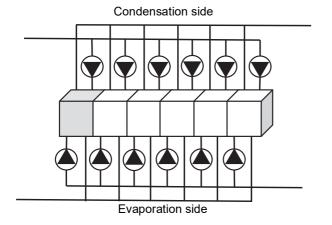
<2> Required amount of water (for multiple units)

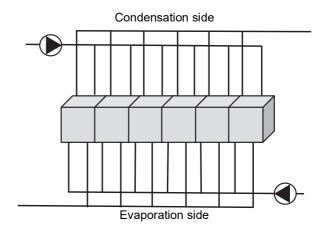
When one unit is in operation during low load by the function to control the number of units in operation

→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)

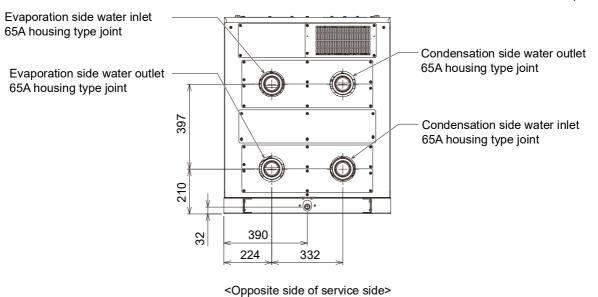
→The total amount of water required by the system is equivalent to the amount for the total number of units





[7] Water Piping Size and Location

(Unit: mm)

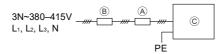


4. Electrical Wiring Installation

[1] Main Power Supply Wiring and Switch Capacity

Schematic Drawing of Wiring (Example)

- A: Switch (with current breaking capability)
- B: 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	
Wodel	Main cable	Branch	Ground	Ourront loakago broakor	Capacity	Fuse	140 Idoo broaker (71)	System Impedance
ERCV-M900YA	14	-	14	75 A 100 mA 0.1 sec. or less	75	75	75	0.12 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 Air Conditioner installer.
- 7. Do not install a phase advancing capacitor on the motor. Doing so may damage the capacitor and result in fire.

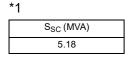
⚠ Warning:

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

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

Note:

- This device is intended for the connection to a power supply system with a maximum permissible system impedance shown in the above table at the interface point (power service box) of the user's supply.
- Ensure that this device is connected only to a power supply system that fulfills the requirements above. If necessary, consult the public power supply company for the system impedance at the interface point.
- This equipment complies with IEC 61000-3-12 provided that the short-circuit power S_{SC} is greater than or equal to S_{SC} (*1) at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, in consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{SC} greater than or equal to S_{SC} (*1).



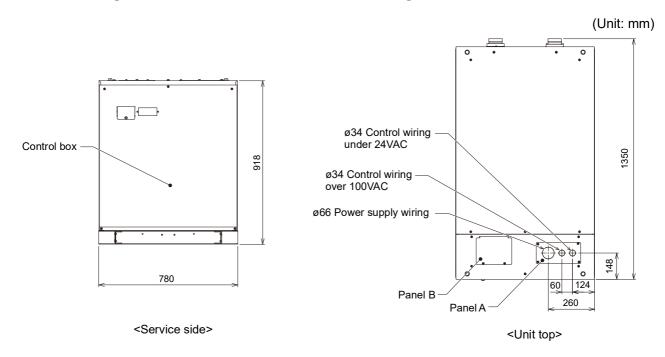
Control cable specifications

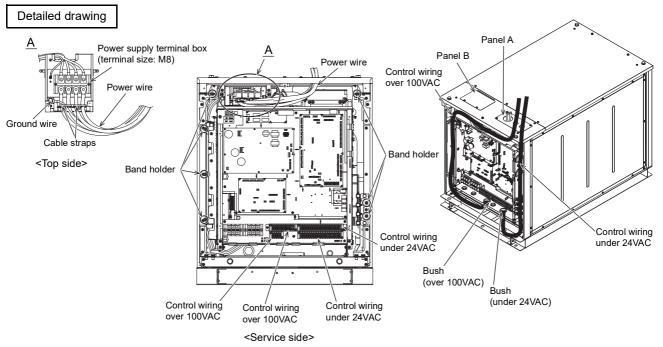
Remote controller cable	Size	0.3 mm² (Max. 250 m total)
	Recommended cable types	2-core sheathed cable
M-NET cable between units	Size	Min. 1.25 mm² (Max. 200 m total)
*2	Recommended cable types	Shielded cable CVVS, CPEVS or MVVS
External input wire size		Min. 0.3 mm ²
External output wire size		1.25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





- (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.

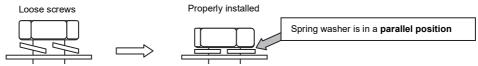
<2> Precautions when fastening screws

- * 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

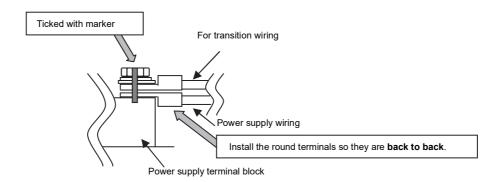
Power supply terminal block, M8 screw: 10 to 13.5 N·m

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.



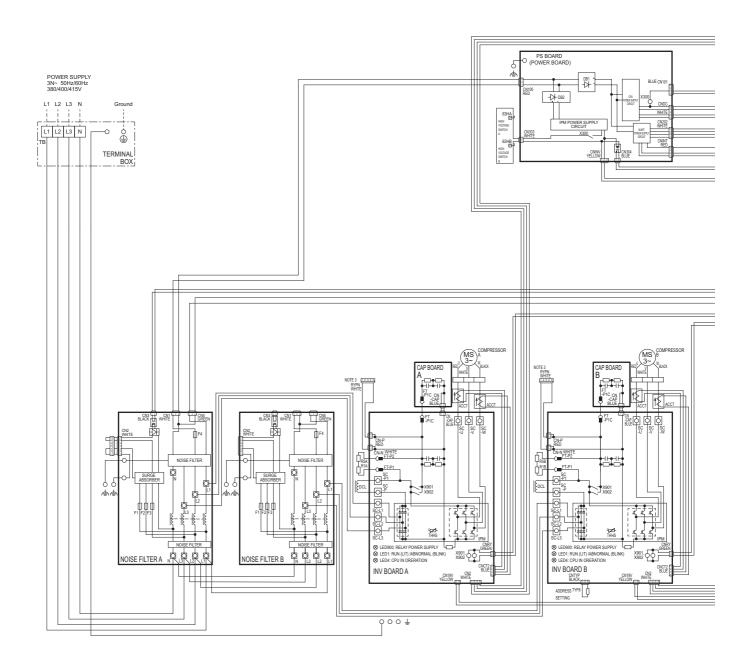
- 2. Check that the wiring does not move at the screw terminal.
- 2 Take extra care not to ruin the screw thread due to fastening the screw at an angle.
 - * To prevent fastening the screw at an angle, install the round terminals so they are back to back.
- 3 After fastening the screw, use a permanent marker to tick off the screw head, washer and terminal.

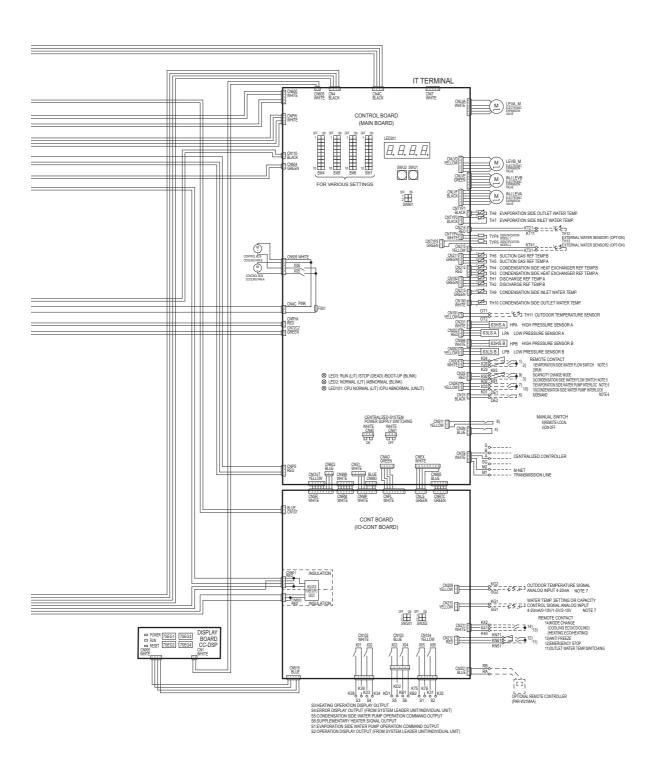


<3> Installing the conduit tube

- 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 ELECTRICAL WIRING DIAGRAM





Note1. The broken lines indicate the optional parts, field-supplied parts, and field work.

Note2. Dashed lines indicate terminal box.

Note3. 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).

Note4. 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.

Note5. Remove the short circuit wire between the terminals K23-K24 and K91-K92 to connect a flow switch.

Note6. 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.

Note7. Use a 4-20 mA signal output device with insulation.

Feeding 30 mA or more current may damage the circuit board.

Note8. Make sure that on site terminal connection is correct.

With wrong connection, operation error may occur.

Note9. 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.

Note10. 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

Note11. 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

: [Ory 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 (d) CONDENSATION SIDE WATER FLOW SWITCH Normal/Error		The unit is allowed to operate.	The unit will not operate.	K23-K24	
(The unit is allowed to operate.	The unit will not operate.	K91-K92	
(e) UNIT OPERATION Run/Stop		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	
			The unit will operate in the Anti-Freeze mode (with the target temperature 25°C) 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.		
		Cooling ECO/Cooling	Cooling ECO mode (Refer to page 52)	Cooling mode	K40-K42	
	Heating ECO/Heating		Heating ECO mode (Refer to page 52)	Heating mode		
Ĺ	h) OUTLET WATER TEMP. SWITCHING	2nd/1st	Setting temp 2 (Refer to page 51 Settings table)	Setting temp 1 (Refer to page 51 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	
1	Analog				Terminal block	
I	nput type		Action			
(I) WATER TEMP. SETTING/ CAPACITY CONTROLL SIGNAL			Water temperature or capacity control signal can be CN421 on the MAIN circuit board. One analog inputypes: 4-20 mA, 0-10 V, 1-5 V, or 2-10 V. * Use a 4-20 mA signal output devise with insulatio	SG1(+)-KG1(-)		
((m)OUTDOOR TEMPERATURE SIGNAL		For Cooling ECO/Heating ECO Input: 4-20 mA			
ľ	(n) EXTERNAL WATER SENSOR 1 (option)		For simultaneous operating group Input: TH12			
(o) EXTERNAL WATER S (option)	SENSOR 2	For identical water system group Input: TH13	KT31-KT41		
(p) OUTDOOR TEMPERA SENSOR	ATURE	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 +2°C.	KB1-KB2
	REMOTE CONTROLLER	PAR-W31MA	A		RA-RB
	CENTRALIZED CONTROLLER				А-В
	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
	Evaporation side water pump interlock	K01-K02	Normal	Error	0	0	O*1
	Condensation side water pump interlock	K01-K03	Normal Error		0	0	O*1
	Evaporation side water flow switch	K23-K24	Normal	Error	0	0	O*1
	Condensation side water flow switch	K91-K92	Normal	Error	0	0	O*1
No-voltage contact	Run	K23-K26	Run	Stop	0	1	-
input	Anti freeze	K40-K41	ON	OFF	0	_	_
	Mode change	K40-K42	Cooling ECO*3 /Heating ECO	Cooling /Heating	0	_	_
	Outlet water temp. switching	KN51-KN61	2nd	1st	0	_	_
	Capacity change mode	K91-K93	Efficiency priority	Capacity priority	0	_	_
	Demand	DE1-DE2	ON	OFF	0	_	_
	Emergency stop	KN51-KN71	Release	Stop	0	_	_
	Water temp. setting / Capacity control signal	SG1(+)-KG1(-)	4-20mA,0-10V,1-5V,	2-10V	0	_	_
	Outdoor temperature signal	SG2(+)-KG2(-)	4-20mA For Cooling ECO/He	ating ECO	0	_	_
Analog input	External water sensor 1 (Option) TH12	KT11-KT21	For simultaneous op	erating group	0	0	_
	External water sensor 2 (Option) TH13	KT31-KT41	For identical water s	ystem group	0	-	_
	Outdoor temperature sensor TH11	OT1-OT2	For Cooling ECO/He	eating ECO	0	-	_
	Operation display output *4 (From system leader unit/ Individual unit)	K31-K32	ON while the unit is	operating	0	- / ○ *2	- / ○ *2
	Error display output *5 (From system leader unit/ Individual unit)	K33-K34	While abnormally sto	pp is ON.	0	- / ○ *2	- / ○ *2
No-voltage contact	Heating operation display output	K38-K39	Heating	Cooling	0	0	0
output	Evaporation side water pump operation command output	K75-K76	ON while the unit is	operating	0	0	O *1
	Condensation side water pump operation command output	KD1-KD2	ON while the unit is	operating	0	0	O *1
	Supplementary heater signal output	KB1-KB2	During the low outdo temperature is ON.	or and water	0	0	0
DC	Remote controller	RA-RB	PAR-W	31MAA	0	_	_
RC	Centralized controller	A-B			0	_	_

^{○:} Input and output signal is enabled.

^{-:} Invalid

^{*1} Invalid when the one pump system

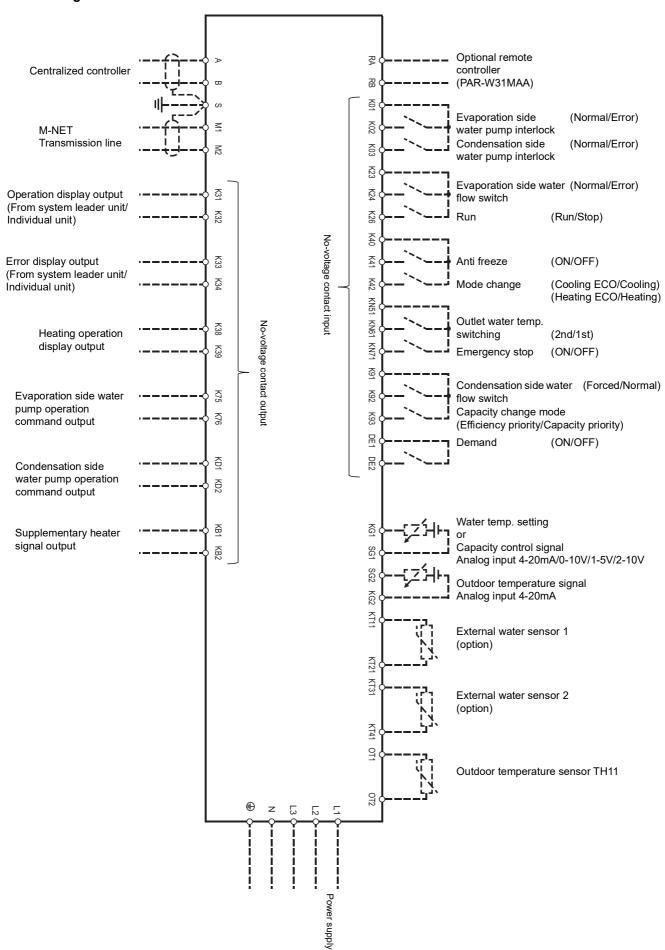
^{*2} System leader unit/Individual unit

^{*3} Refer to the following page for information about the settings of Cooling ECO and Heating ECO. (page 52)

^{*4} Refer to the following page for information about the settings of Operation display output. (page 61)

^{*5} Refer to the following page for information about the settings of Error display output. (page 61)

External signal interface

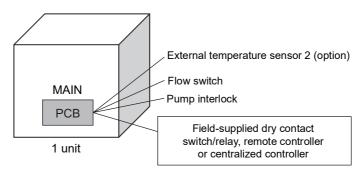


5. System Configurations

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

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

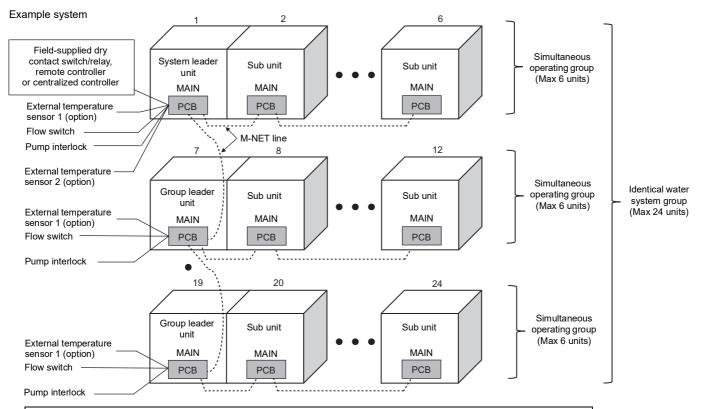
(1) Individual system



Refer to the sections "Switch Types and the Factory Settings" on the next page and "Configuring the Settings" (page 37) for further details.

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

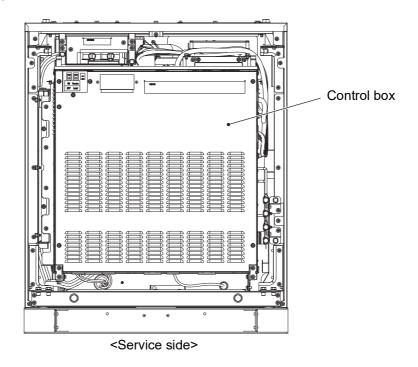
System leader unit	The unit controls the identical water system group.		
Group leader unit The unit transmits the command from the system leader unit to the sub unit.			
Sub unit	The unit is other than leader unit.		



Refer to the sections "Switch Types and the Factory Settings" on the next page and "Configuring the Settings" (page 37) for further details.

[2] Switch Types and the Factory Settings

(1) Switch names and functions



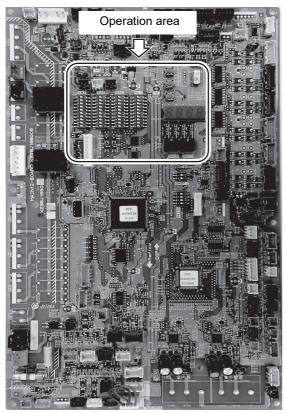
There are three main ways to set the settings as follows:

- ①Dip switches (SW4 SW7)
- ②Dip switches used in combination with the push switches
- 3 Rotary switches

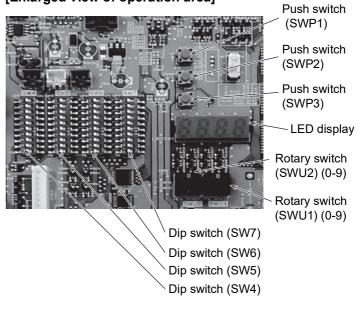
See below for how these switches are used to set certain items.

Different types of switches on the PCB

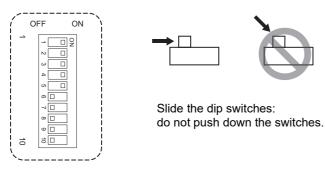
[Control board]



[Enlarged view of operation area]



			Initial Setting	
			MAIN circuit	
SWU1		Sets the 1's digit of the unit address.	"1"	
Rolary Switch	Rotary switch SWU2 Sets the 10's digit of the unit address.			
	SWP1	Use for increasing the setting value.	-	
		Use for decreasing the setting value.	-	
		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 to 10 are "OFF".

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

				Factory setting]					
SV	٧	Function	Usage	MAIN 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	Settings change or view the settings	These switches are used for setting change with push switch SWP 1, 2 and 3.			Depends on the setting	Depends on the setting	Depends on the setting	Depends on the setting	
	1	Model setting	Set the operation mode cooling or heating mode.	OFF	Cooling mode	Heating mode	Required	Required	Required	At a reset
	3	System setting	Set the duties to each unit.	OFF	System leader unit : Group leader unit : Sub unit :	2 / 3 ON ON ON OFF OFF OFF	Required	Required	Required	At a reset
	4 Water-temperature control 1 (option) 5 Water-temperature control 2 (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
SW5			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 *	· · · · · · · · · · · · · · · · · · ·	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
	2	Analog input type setting			Required	Fixed OFF	Fixed OFF	At a reset		
	3	Outdoor temperature input	Selects when using Cooling ECO or Heating ECO function.	OFF	No outdoor temperature : OFF OFF Outdoor temp. analog input 4-20mA input : ON OFF It terminal : OFF ON Outdoor temp. input TH11* : ON ON		Required	Fixed OFF	Fixed OFF	At a reset
SW6	5 6 7 8	Model setting		OFF	Leave the setting as it	is.	Fixed OFF	Fixed OFF	Fixed OFF	Any time
	9	Enables or disables the automatic restoration of operation after power failure (in the same mode as the unit was in before a power failure).		ON	An alarm will be issued when power is restored after a power outage. The alarm will be reset when the power	Automatically restores operation after power failure.	Required	Required	Required	Any time

^{*} 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.

OFF

Recommended product t-mac 500-51791

Relationship between resistance value Rt (kΩ) and temperature t (°C)

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

10 Model setting

• 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

The alarm will be reset when the power is turned off and then

turned back on.

Leave the setting as it is.

Fixed OFF Fixed OFF Any time

 $^{^{\}star}$ Use the following recommended products or similar products for the outdoor temperature thermistor.

[3] Configuring the Settings

The settings must be set only by a qualified personnel.

<1> System configuration

(1) Set the dip switches.

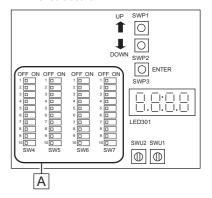
Switch settings on the MAIN circuit

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

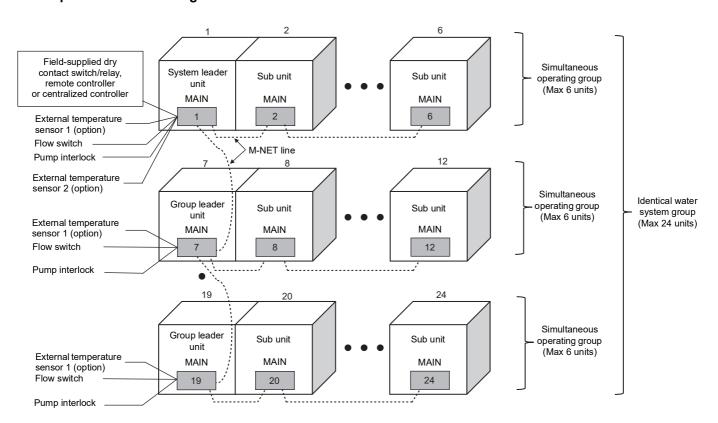
Refer to "Dip switch settings table" (page 36) for further details.

MAIN circuit board



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

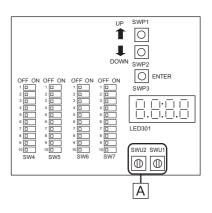
Example of address setting



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).

Main circuit board



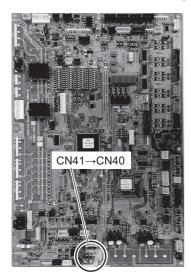
Setting the switches on the group leader unit

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.

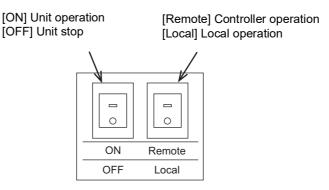
(3) Set the M-NET power supply.

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 a centralized controller.



	Address 1	All addresses othe	er than Address 1				
Move the conn	ector from CN41 to CN40.	Leave the connector connected to CN41.					
	Connector CN40	Conr CN41	nector CN40				

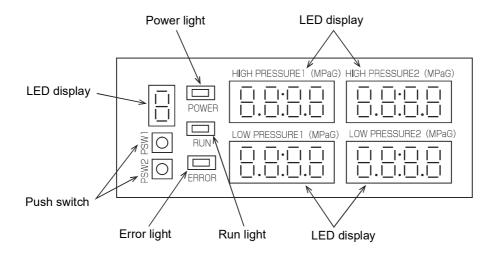
Selector switch settings



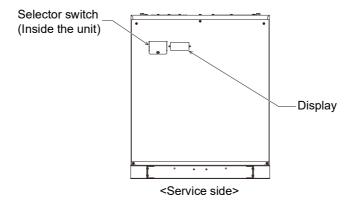
A CAUTION

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

Display



The positions of the selector switch and the display



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			
Analog input or BMS	No-voltage contact input K40-42	Rem Input from	Target water temperature			
(SW5-9: ON)	Mode Change	No remote controller	Manual setting	Schedule setting		
SW5-7: ON	Ineffective - Ineffective Ineffective		Temperature setting for the analog signal input			
	ON (Cooling ECO)	-	Ineffective	Ineffective	Cooling ECO	
	FF OFF (Cooling)	When no RC is used	-	-	Cooling	
SW5-7: OFF		- 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.

Dip switch setting SW5-1 ON: Heating *1

Priority 1	Priority 2	Priority 3		Priority 4			
No-voltage contact input K40-K41	Analog input or BMS	No-voltage contact Remote controller PAR-W31MAA input K40-42 Input from centralized controller or BMS (*2)				Target water temperature	
Anti-freeze	(SW 5-9: ON)	Mode change	Mode change No remote controller Manual setting Scho		Schedule setting		
ON	Ineffective	Ineffective	-	Ineffective	Ineffective	25°C	
	SW5-7: ON	Ineffective	- Ineffective		Ineffective	Temperature setting for the analog signal input	
		ON (Heating ECO)	-	Ineffective	Ineffective	Heating ECO	
			When no RC is used	-	-	Heating	
OFF			-	Anti-freeze	-	25°C	
	SW5-7: OFF	055	-	Heating ECO	-	Heating ECO	
		OFF (Heating)	-	Heating	-	Heating	
		. 67	-	-	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} Centralized controller and BMS cannot both be simultaneously connected. Only connect one or the other.

^{*2} Centralized controller and BMS cannot both be simultaneously connected. Only connect one or the other.

Priority order of the operation signal sources

		No-voltage contact	Input from centralized controller or BMS				
Unit operation	n (Run/Stop)		The last setting has priority.				
	Cooling *1		The last setting has priority.				
	Cooling ECO *1*2	OFF	Cooling ECO can not be set fro	m the remote controller or the			
	Cooling ECO 12	ON	centralized controller.				
Operation mode	Heating *1	The last setting has priority.					
Operation mode	Heating ECO *1*3	OFF	The last setting has priority.				
	Healing ECO 13	ON	Ineffective				
	Anti-freeze *3	OFF	The last settir	ng has priority.			
	Anti-freeze 3	ON	Ineffe	ective			
ECO	mode	OFF		Effective*4			
(The contact C	(The contact ON has priority)			Ineffective			

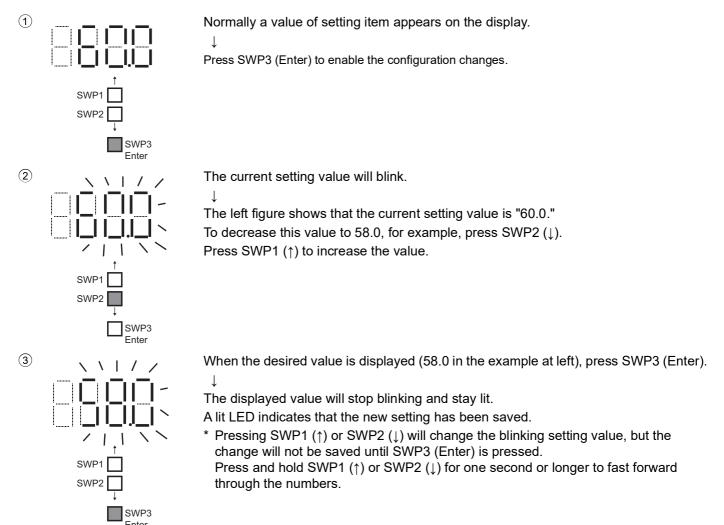
^{*1} When the Anti-freeze contact is ON during heating operation, the setting change is ineffective.
*2 Changing by contact is effective during cooling operation.
*3 Changing by contact is effective during heating operation.
*4 ECO mode cannot be set from centralized controller.

<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.



(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.

Need or non-need to set the setting *5

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

						e setting		
No.	Dip switch setting *1	Dip switch setting (SW4) *2	Setting Item	Default	System	Group	Sub	Notes
19	SW7-1 ON	ON	Preset temp. A (Cooling) *3	4°C	0	ı	_	Range 4–30°C
20	SW7-1 ON	ON	Preset temp. B (Cooling) *3	30°C	0	ı	_	Range 4–30°C
21	SW7-1 ON	ON	Preset temp. A (Heating) *4	25°C	0	ı	_	Range 20-60°C *7
22	SW7-1 ON	ON	Preset temp. B (Heating) *4	55°C	0	ı	_	Range 20-60°C *7
23	SW7-1 ON	ON	Supplementary heater operation water temp. *4	15°C	0	0	0	Range 0–55°C
24	SW7-1 ON	ON	Thermo differential 1 (Cooling mode) *3, *6	3°C	0	0	0	Range 0.2–5°C
25	SW7-1 ON	ON	Thermo differential 2 (Cooling mode) *3, *6	2°C	0	0	0	Range 0.2–5°C
26	SW7-1 ON	ON	Thermo differential 1 (Heating mode) *4, *6	3°C	0	0	0	Range 0.2–5°C
27	SW7-1 ON	ON	Thermo differential 2 (Heating mode) *4, *6	2°C	0	0	0	Range 0.2–5°C
28	SW7-1 ON	ON	Year setting	-	0	ı	_	
29	SW7-1 ON	ON	Month/Date setting	-	0	-	_	
30	SW7-1 ON	ON	Current time	-	0	-	_	

Need or non-need to set

^{*7:} Maximum 60°C. When the target water temperature exceeds 55°C and the Efficiency priority mode (No-voltage contact K91-93: ON) is enabled, the maximum temperature for this setting will be limited to 55°C.



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

^{*1:} Only the switches designated in the table must be set to ON. (The other switches must be OFF.)

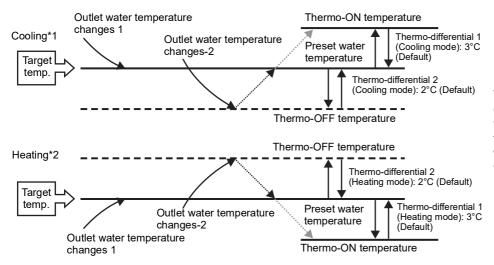
^{*2:} Do not apply undue force when changing the Dip switch settings as this may cause malfunctions.

^{*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

^{*6:} Thermo - ON/OFF temperature conditions (water temperature control)



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.

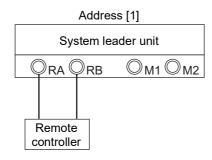
- *1 Control the evaporation side water temperature.
- *2 Control the condensation side water temperature.

<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]

4) SW7: 1, 2, 3, 4 ON and ENTER for 5 seconds. (Initializes the system)

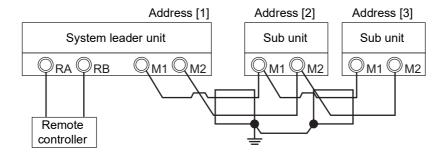
Address 1 → LED display [9999]→[FFFF]

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

Start-up process complete

Address 1 → 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 \rightarrow 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.

 \downarrow

Address 1 → LED display [1]

 \downarrow

Press UP twice.

 \downarrow

Address 1 → LED display [3]

 \downarrow

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]

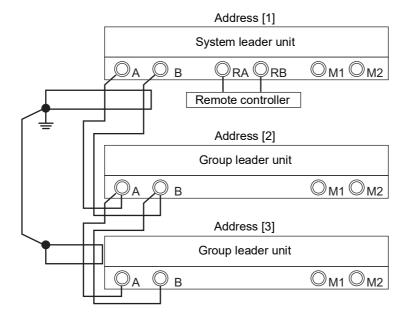
S) SW7: 1, 2, 3, 4 OFF

Start-up process complete

Address 1 \rightarrow 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]

- 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

 \downarrow

Address 1 → LED display [1]

1

Press UP twice.

j.

Address 1 → LED display [3]

1

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]

- 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]

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

Start-up process complete

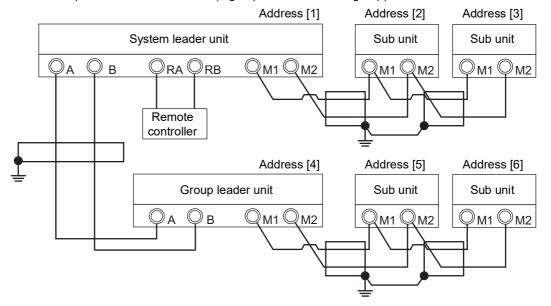
Address 2 \rightarrow LED display [___|]

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

- 3 Setting address 1 (second time)
- 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]
- 2) SW7: 1, 2, 3, 4 OFF Start-up process complete

Address 1 \rightarrow 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]

4) Setting the number of units for each group

```
SW7: 1 ON Press ENTER once. SW4: 1, 2, 3, 4, 8, 10 ON \downarrow Address 1 \rightarrow LED display [1] \downarrow Press UP twice. \downarrow Address 1 \rightarrow LED display [3] \downarrow 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
```

- 2 Setting address 4
- 1) Turn off the power.
- 2) Group leader unit (SW5-2: ON)
- 3) Turn the power back on.

Address 4 \rightarrow LED display [EEEE]

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]

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

Start-up process complete

Address 4 \rightarrow LED display [___|]

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

Address 1 \rightarrow LED display [9999] \rightarrow [FFFF]

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

Start-up process complete

Address 1 → LED display [___||_|]

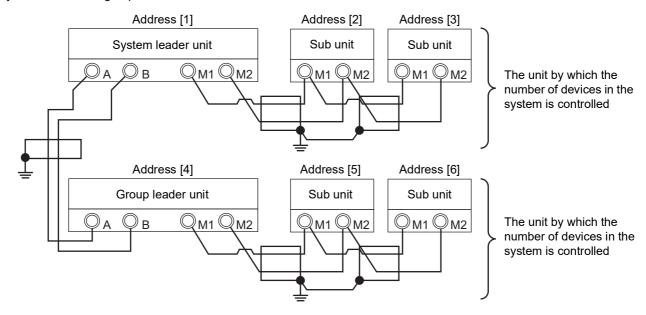
*No settings are required for any address other than for addresses 1 and 4.

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

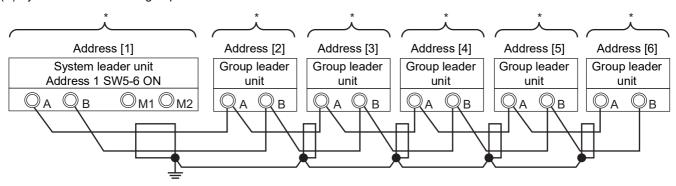
2. Multiple unit control

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



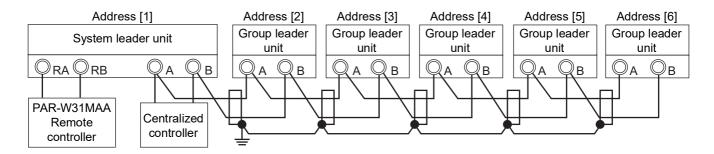
(B) System leader unit and group leader unit



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

3. Example of system configuration

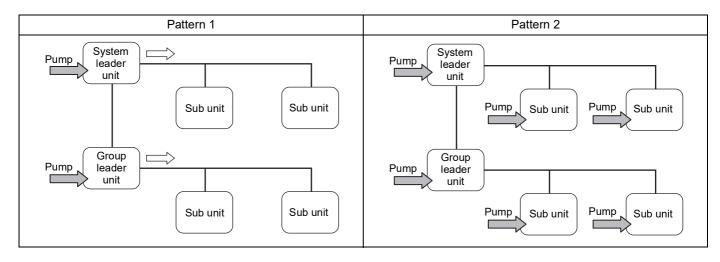
Optimum control of number of operating units



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

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

4. Setting the pump system



Setting item	SW7-1	DIPSW	SW4	Factory setting MAIN	Note
Pump setting	ON	-	ON	0	0: Pattern 1, 1: Pattern 2

^{*}Pump settings must be made on the MAIN circuit on all units.

^{*}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 a centralized controller, leave the M-NET power supply connector as it is.

(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 (\uparrow) or SWP2 (\downarrow) to increase or decrease the value.

When the desired value is displayed, press SWP3 to save the setting value.

Settings table

No.		Diaital						Setting		Setting change from an optional
1 SW7-1	No.	Dip switch setting *1	Dip switch setting (SW4)	Setting Item	Initial value	Unit	Increments			remote controller (PAR-W31MAA) *2
2 SW7-1 ON	1			Setting temp. 1 (Cooling mode) *3	7	°C	0.1°C	4	30	Possible
3 SW7-1 ON	2			Setting temp. 2 (Cooling mode) *4	7	°C	0.1°C	4	30	Possible
4 SW7-1 ON	3			Setting temp. 1 (Heating mode) *3	45	°C	0.1°C	20	60 *5	Possible
5 SW7-2 ON	4			Setting temp. 2 (Heating mode) *4	45	°C	0.1°C	20	60 *5	Possible
6 SW7-2 ON Setting outdoor temp. A at Cooling ECO mode 20 °C 0.1°C -20 55 Not pool of the pool	5			Setting water temp. A at Cooling ECO mode	11.5	°C	0.1°C	4	30	Not possible
7 SW7-2 ON Image: Control of the co	6			Setting outdoor temp. A at Cooling ECO mode	20	°C	0.1°C	-20	55	Not possible
8 SW7-2 ON	7			Setting water temp. B at Cooling ECO mode	7	°C	0.1°C	4	30	Not possible
9 SW7-2 ON Setting water temp. C at Cooling ECO mode 10 °C 0.1°C 4 30 Not pool 10 SW7-2 ON Setting outdoor temp. C at Cooling ECO mode 25 °C 0.1°C -20 55 Not pool 12 3 4 5 6 7 8 9 10 Setting outdoor temp. D at Heating ECO mode 52 °C 0.1°C 20 60 *5 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON SW7-1 ON SETTING OUTDOOR SETTING	8			Setting outdoor temp. B at Cooling ECO mode	35	°C	0.1°C	-20	55	Not possible
10 SW7-2 ON Setting outdoor temp. C at Cooling ECO mode 25 °C 0.1°C -20 55 Not pool 12 3 4 5 6 7 8 9 10 Setting outdoor temp. D at Heating ECO mode 52 °C 0.1°C 20 60 *5 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not pool 12 SW7-1 ON	9			Setting water temp. C at Cooling ECO mode	10	°C	0.1°C	4	30	Not possible
11 SW7-1 ON Setting water temp. D at Heating ECO mode 52 °C 0.1°C 20 60 *5 Not positive temp. D at Heating ECO mode 52 °C 0.1°C 20 60 *5 Not positive temp. D at Heating ECO mode 52 °C 0.1°C 30 °	10			Setting outdoor temp. C at Cooling ECO mode	25	°C	0.1°C	-20	55	Not possible
12 SW7-1 ON Setting outdoor temp. D at Heating ECO mode -7 °C 0.1°C -30 50 Not po	11			Setting water temp. D at Heating ECO mode	52	°C	0.1°C	20	60 *5	Not possible
	12			Setting outdoor temp. D at Heating ECO mode	-7	°C	0.1°C	-30	50	Not possible
13 SW7-1 ON Setting water temp. E at Heating ECO mode 30 °C 0.1°C 20 60 *5 Not po	13	SW7-1 ON		Setting water temp. E at Heating ECO mode	30	°C	0.1°C	20	60 *5	Not possible
14 SW7-1 ON Setting outdoor temp. E at Heating ECO mode 12 °C 0.1°C -30 50 Not po	14			Setting outdoor temp. E at Heating ECO mode	12	°C	0.1°C	-30	50	Not possible
15 SW7-1 ON Setting water temp. F at Heating ECO mode 42 °C 0.1°C 20 60 *5 Not po	15			Setting water temp. F at Heating ECO mode	42	°C	0.1°C	20	60 *5	Not possible
16 SW7-1 ON Setting outdoor temp. F at Heating ECO mode 2 °C 0.1°C -30 50 Not po	16			Setting outdoor temp. F at Heating ECO mode	2	°C	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: 0.5°C
- *3 No-voltage contact KN51-KN61: OFF
- *4 No-voltage contact KN51-KN61: ON
- *5 Maximum 60°C. When the target water temperature exceeds 55°C and the Efficiency priority mode (No-voltage contact K91-93: ON) is enabled, the maximum temperature for this setting will be limited to 55°C.



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
Cooling mode*1	OFF
Heating mode ^{*2}	ON

- *1 Control the evaporation side water temperature.
- *2 Control the condensation side water temperature.
- 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 ($k\Omega$) and temperature t (${}^{\circ}$ C)

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

- Select the thermistor taking note of the tolerance in the resistance values.
- Use shielded cable for the wiring.
- When the outdoor temperature setting input is 4-20mA

Press the push switch SWP3 to enable the configuration changes.

Press the push switches SWP1 (\uparrow) or SWP2 (\downarrow) to increase or decrease the value.

When the desired value is displayed, press SWP3 to save the setting value.

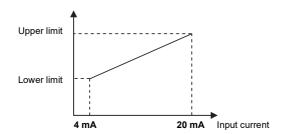
Settings table

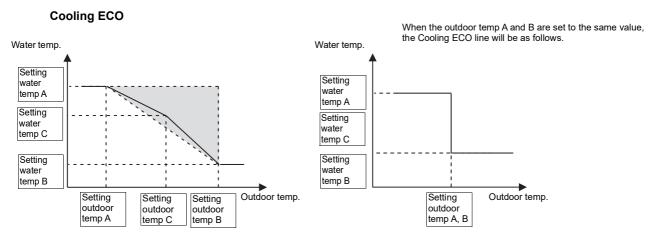
	Dip switch		Setting Item	Initial value			Setting		Setting change from an optional remote controller (PAR-W31MAA)
No.		Dip switch setting (SW4)			Unit	Increments	Lower limit	Upper limit	
1	ON	ON	Outdoor setting Upper limit	40	°C	0.1	-20	55	Not possible
2	ON	ON	Outdoor setting Lower limit	-10	°C	0.1	-20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



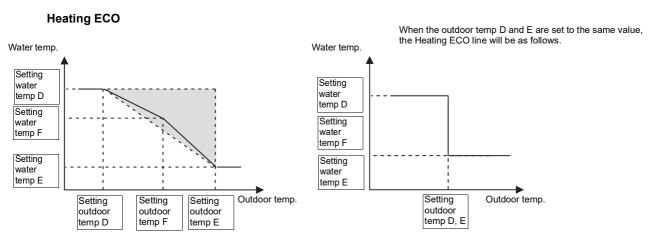
The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

- 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.





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



* 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 (\uparrow) or SWP2 (\downarrow) to increase or decrease the value.

When the desired value is displayed, press SWP3 to save the setting value.

Settings table

	Dip switch						Setting		Setting change from an optional remote
No		Dip switch setting (SW4)	Setting Item	Initial value	Unit	Increments	Lower limit	Upper limit	controller (PAR-W31MAA)
1	ON	ON	Peak-demand control signal input source	0	-	1	0	1	Not possible
2	ON	ON 1 2 3 4 5 6 7 8 9 10	Maximum peak-demand capacity	100	%	1%	60	100	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.

(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

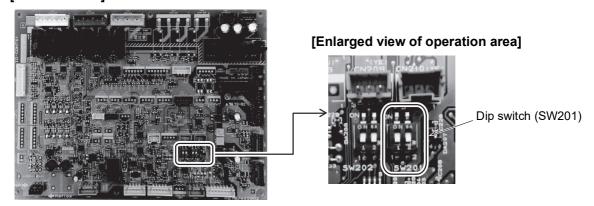
Select SW6-1 and SW6-2 to set the type of analog input signal from a remote location.

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]



(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 (\uparrow) or SWP2 (\downarrow) to increase or decrease the value.

When the desired value is displayed, press SWP3 to save the setting value.

Settings table

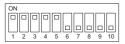
	Dip switch						Setting		Setting change from	
No.	setting (SW7-1)	Dip switch setting (SW4)	Setting Item	Initial value	Unit	Increments	Lower limit	Upper limit	an optional remote controller (PAR-W31MAA)	
1	ON	ON	Preset temp. A (Cooling)	4	°C	1°C	4	30	Not possible	
2	ON	ON	Preset temp. B (Cooling)	30	°C	1°C	4	30	Not possible	
3	ON	ON	Preset temp. A (Heating)	25	°C	1°C	20	60 *1	Not possible	
4	ON	ON	Preset temp. B (Heating)	55	°C	1°C	20	60 *1	Not possible	

^{*1} Maximum 60°C. When the target water temperature exceeds 55°C and the Efficiency priority mode (No-voltage contact K91-93: ON) is enabled, the maximum temperature for this setting will be limited to 55°C.

^{*2} 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.

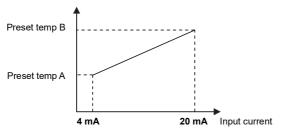
Refer to the table below for how to display the value of the analog input.

No.	Dip switch setting (SW7-1)	Dip switch setting (SW4)	Monitorable items	Unit
1	OFF	ON	Current value (4-20 mA)	mA
2	OFF	ON	5V voltage value (1-5 V)	V
3	OFF	ON	10V voltage value (0-10 V or 2-10 V)	٧

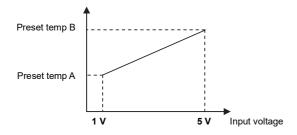


The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

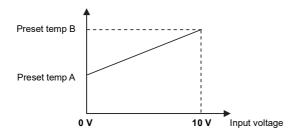
- When the water temperature setting input signal type is 4-20 mA
 - External analog input signal of 4 mA: Preset temp. A
 - External analog input signal of 20 mA: Preset temp. B
 - External analog input signal of between 4 and 20 mA: the preset temperature will be linearly interpolated.



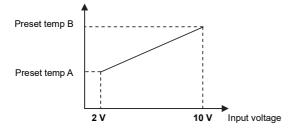
- When the water temperature setting input signal type is 1-5 V
 - External analog input signal of 1 V: Preset temp. A
 - External analog input signal of 5 V: Preset temp. B
 - External analog input signal of between 1 and 5 V: the preset temperature will be linearly interpolated.



- 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.



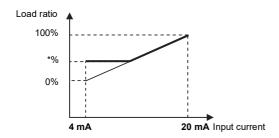
- When the water temperature setting input signal type is 2-10 V
 - External analog input signal of 2 V: Preset temp. A
 - External analog input signal of 10 V: Preset temp. B
 - External analog input signal of between 2 and 10 V: the preset temperature will be linearly interpolated.



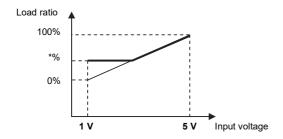
(6) Setting the capacity control ratio using analog signal input

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.

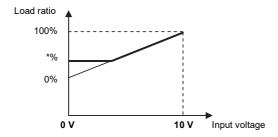
- When the capacity control setting input signal type is 4-20 mA
 - External analog input signal of 4 mA: 0%
 - External analog input signal of 20 mA: 100%
 - External analog input signal of between 4 and 20 mA: the percent will be linearly interpolated.



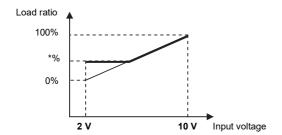
- When the capacity control setting input signal type is 1-5 V
 - External analog input signal of 1 V: 0%
 - External analog input signal of 5 V: 100%
 - External analog input signal of between 1 and 5 V: the percent will be linearly interpolated.



- 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.



- ullet 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.



 $^{^{\}star}$ %: 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.

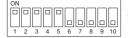
Press the push switch SWP3 to enable the configuration changes.

Press the push switches SWP1 (\uparrow) or SWP2 (\downarrow) to increase or decrease the value.

When the desired value is displayed, press SWP3 to save the setting value.

Settings table

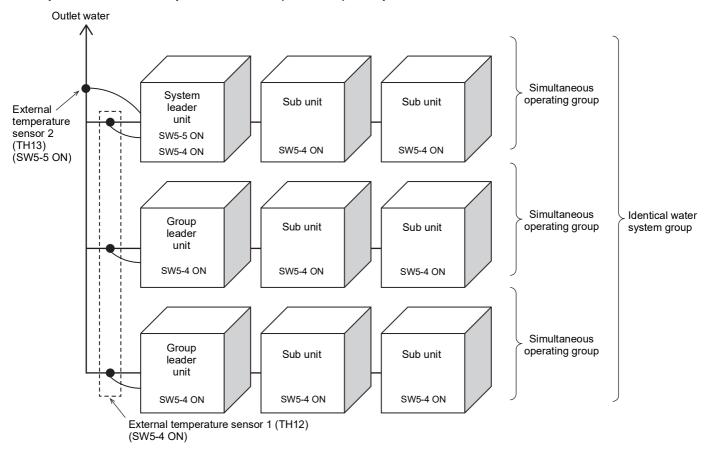
		Dip switch					9	Setting		Setting change from	
٨	No.	setting (SW7-1)	Dip switch setting (SW4)	Setting Item	Initial value	Unit	Increments	Lower limit	Upper limit	an optional remote controller (PAR-W31MAA)	
	1	ON	ON	Supplementary heater operation water temp.	15	°C	0.1°C	0	55	Not possible	



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.



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)

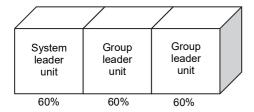
When both TH12 and TH13 are enabled, the target water temperature of TH12 will be corrected to approximate TH13 to the target water temperature. Simultaneous operating group will be controlled to meet the corrected TH12.

(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.



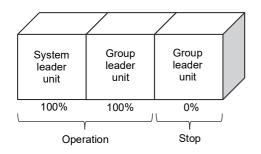
Multiple unit control

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

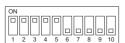
When using the Operation display output (System leader unit), change the setting of the System leader unit shown below from "0 (Individual unit)" to "1 (System leader unit)."

	Dip switch					Setting			Setting change from	
No.	setting (SW7-1)	Dip switch setting (SW4)	Setting Item	Initial value	al value Unit I		Lower limit	Upper limit	an optional remote controller (PAR-W31MAA)	
1	OFF	ON	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)."

	Dip switch					Setting			Setting change from	
No.	setting (SW7-1)	Dip switch setting (SW4)	Setting Item	Initial value	Unit	Increments	Lower limit	Upper limit	an optional remote controller (PAR-W31MAA)	
1	OFF	ON	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.

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	k item	Cause	Solution
The unit does not operate.		The power lamp on the circuit board is not lit.	The main power is not turned on.	Switch on the power.
	The fuse in the control box is not blown.	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.
		Circuit board is lit.	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	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.
	thermistor has tripped.	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	Evaporation side water		Water flow shortage	Increase the water flow rate.
operation, but the water does	temperature is low.	-	Problem with the external devices	Repair the devices.
not heat up.	Evaporation side water temperature is high.	The water inlet/outlet	The water-cooling load is too high.	Install more units.
(Cooling)		temperature differential is normal.	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	LEV fault in the main circuit	Replace the LEV in the main circuit.
			Compressor failure	Replace the compressor.
		small.	High pressure is too high, or low pressure is too low.	Operate the units within the specified pressure range.
The unit is in		The water inlet/outlet	The water-heating load is too high.	Install more units.
operation, but the water does not heat up. (Heating)	Condensation side water	temperature differential is normal.	Low refrigerant charge due to a leak.	Perform a leakage test, repair the leaks, evacuate the system, and charge the refrigerant circuit with refrigerant.
(**	temperature is low.		LEV fault in the main circuit	Replace the LEV in the main circuit.
		The water inlet/outlet temperature differential is	Compressor failure	Replace the compressor.
		small.	High pressure is too high, or low pressure is too low.	Operate the units within the specified pressure range.
	Condensation side water		Water flow shortage	Increase the water flow rate.
	temperature is high.	-	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

F.			0-	0-		reset *2
Error code *1		Error type	Cause (Installation/Setting error)	Cause (Parts problems)	Opera: Selector	tion SW Remote
					switch	controller
Y 106	Power si	upply fault *3	Power supply fault occurred when the operation switch is switched on.	-	0	0
2503	(Flow sw 101: Eva	ipply cutoff vitch has been triggered.) iporation side water indensation side water	The water flow rate dropped below the flow switch threshold. Water supply cutoff	Open-circuited flow switch Broken flow switch wiring	0	0
250 1		upply cutoff (detection by sensor) : Inlet/outlet of unit	No water Water supply cutoff	Inlet water thermistor fault Outlet water thermistor fault	×	×
2000	101: Eva	terlock fault poration side water ndensation side water	Pump interlock connection failure	-	_	_
130 <i>2</i>	High pre 101: A ci 102: B ci		No water Water supply cutoff	Linear expansion valve fault High-pressure sensor fault	0	0
1175	Discharg 101: A ci 102: B ci		-	Low-pressure sensor fault Suction gas refrigerant temperature thermistor fault High-pressure sensor fault Discharge refrigerant temperature thermistor fault Linear expansion valve fault	0	0
130 1	Low pres 101: A ci 102: B ci		Evaporation side water temperature was below the operating range.	Low-pressure sensor fault Linear expansion valve fault Refrigerant deficiency (refrigerant gas leak)	0	0
1 189		gas SH fault IN circuit B circuit	-	Compressor suction gas refrigerant temperature thermistor fault Linear expansion valve fault Low-pressure sensor fault	0	0
5 109	Ther- mistor	Condensation side inlet temperature (TH9)	-	Broken or shorted thermistor wiring	0	0
5 1 10	fault	Condensation side outlet temperature (TH10)	-	Broken or shorted thermistor wiring	0	0
5111		Outdoor temperature (TH11)	-	Broken or shorted thermistor wiring	0	0
5112		External water sensor 1 fault (TH12)	-	Broken or shorted thermistor wiring	0	0
5113		External water sensor 2 fault (TH13)	-	Broken or shorted thermistor wiring	0	0
5 107		Evaporation side inlet water temperature (TH7)	-	Broken or shorted thermistor wiring	0	0
5 108		Evaporation side outlet water temperature (TH8)	-	Broken or shorted thermistor wiring	0	0
S 10 1 S 102		Discharge refrigerant temperature (TH1/TH2) 101: Sensor error 102: Installation error	-	Broken or shorted thermistor wiring	0	0
5 103 5 104		Condensation side heat exchanger refrigerant temperature (TH3/TH4)	-	Broken or shorted thermistor wiring	0	0
5 105 5 106		Suction gas refrigerant temperature (TH5/TH6)	-	Broken or shorted thermistor wiring	0	0
520 1	High-pre 101: A ci 102: B ci		-	Broken or shorted pressure sensor wiring	0	0
5202	Low-pres 101: A ci 102: B ci		-	Broken or shorted pressure sensor wiring	0	0
7 102	Connect	ion count error	-	Setting of connection count fault	×	×
7113	Model se	etting error 1	Dip switches on the PCB were set incorrectly during maintenance.	-	0	0
7117	Model se	etting error 2	-	CNTYP1 resistor fault (connected to the Main control board)	0	0
4 102	Open ph	ase	There is an open phase.	Circuit board fault	×	×

Error			Causa	Cauco		reset *2
code *1		Error type	Cause (Installation/Setting error)	Cause (Parts problems)	Selector	Remote
1 102	(A discharge r	nperature fault efrigerant temperature of 120°C or cted momentarily while the compressor .)	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)	switch	Controller
1138	Condensation	side water abnormal rise	Drop in water flow or water supply cutoff Water temperature rise	-	0	0
1503	Evaporation s	ide water abnormal drop *4	Drop in water flow or water supply cutoff Water temperature drop	-	×	×
15 10	Gas leak fault		-	High pressure sensor fault Refrigerant deficiency (refrigerant gas leak)	0	0
15 12	Low evaporat	on temperature fault	Drop in water flow Water temperature drop	-	×	×
426*	Cooling fan fa	ult	-	Cooling fan fault	0	0
425* (10 l)	Inverter IPM error	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	0	0
425* (102)	ACC	T overcurrent	-	INV board fault Ground fault of the compressor Coil problem	0	0
425* (107)		current relay trip (effective value) ing operation)	-	IPM error (loose terminal screws, cracked due to swelling)	0	0
425* (106)		current relay trip (momentary value) ing operation)	-		0	0
425* (104)		t-circuited IPM/ground fault ing operation)	-	INV board fault Ground fault of the compressor IPM error (loose terminal screws, cracked due to swelling)	0	0
425* (105)		current error due to a short-circuited ing operation)	Inter-phase voltage drop	INV board fault Ground fault of the compressor Shorted output wiring	0	0
422* (108)	Volta relate proble	d	Momentary power failure/power failure Power supply voltage drop	INV board fault 72C fault R1, R5 fault	0	0
422* (109)	during	Bus voltage rise protection	Incorrect power supply voltage	INV board fault	0	0
422* (111)		Logic error	Malfunction due to external noise interference Faulty grounding Improper transmission and external wiring installation (Shielded cable is not used.) Low-voltage signal wire and high-voltage wire are in contact. (Placing the signal wire and power wire in the same conduit)	INV board fault	0	0
422* (129)		Control power supply error	Control power supply failure	INV board, main board fault Broken wiring between INV and main control board	0	0
455* (131)		Inverter bus voltage fault	Power supply voltage drop	MAIN board fault Power supply voltage drop	0	0
423* (125)	(Hea	sink fault tsink 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)	0	0
454*		load protection	Clogged heatsink cooling air passage Power supply voltage drop	 Cooling fan fault Current sensor fault INV circuit fault Compressor fault 	0	0
530* (115)	ACC	T sensor fault	-	INV board fault Ground fault of the compressor and IPM error	0	0
530* (117)		T sensor/circuit fault	-	INV board fault	0	0
530* (119)	Ope	n-circuited IPM/loose ACCT sensor	-	ACCT sensor fault Broken compressor wiring INV circuit fault (IPM error etc.)	0	0

Error			Cause	Cause		reset *2 tion SW
code *1		Error type	(Installation/Setting error)	(Parts problems)	Selector switch	Remote controller
530* (120)	Inverter error	Faulty wiring	-	INV board fault	0	0
5 I IY (0*)		THHS sensor/circuit fault	-	INV board fault	0	0
0403 (0*)		Serial communication error	-	Communication error between control board and INV board (noise interference, broken wiring)	0	0
8831	control- ler error	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	(incl. remote control-	Remote controller signal transmission error	Communication error due to external noise interference	Main control board communication circuit fault	_	_
5834	ler wir- ing	Remote controller signal reception error 2	Communication error due to external noise interference	Main control board communication circuit fault	_	_
5833	fault)	Remote controller over current	Remote controller cable short circuit Remote controller malfunction	Broken remote controller wiring	_	_
4 126	_	input error board CN210)	Analog input type fault (SW6-1, SW6-2)	Broken or open analog signal output device wiring (CN210)	_	-
8500	Commun	nication error	-	-	_	_
6600		ssion line power supply PCB fault	Communication error due to external noise interference	Broken wiring to the transmission power supply circuit board (between the main	-	_
6602 6603 6606 6607 6608	(Simple	multiple unit control mode)		and sub units) Transmission power supply PCB communication circuit fault	-	_
0206	Expansi	on board error	Control failure	Wiring, connector fault between expansion and main control board Expansion board, main control board fault	×	×
7 100	Capacity	y code error	Other capacity units in a group	Group setting fault	_	_
7 105	Address	s setting error	Address setting except for 01 - 50	Main control board fault	0	0
7 109	Prevent	ion error of malfunction	Change setting value that requires power supply reset	System and switch setting check	0	0
7 130	Combina	ation error	Different model in system	Different model check Main control board fault	0	0
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.

O: 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"

 $[\]times$: 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: &}quot;*" shows types of components. (0/1: COMP A, 2: COMP B)

Abnormal stop condition table

Error code	Error type	Preliminary error code	Another unit can be operated in the group
1 102	Discharge temperature fault	1202	·
1138	Condensation side water abnormal rise	1238	<u> </u>
1175	Discharge SH fault	1276	 ⊚
1 189	Suction gas SH fault	1289	<u> </u>
130 1	Low pressure fault	1401	© ©
1302	· ·		
1303	High pressure fault	1402	©
1503	Evaporation side water abnormal drop	1603	0
IS 10	Gas leak fault	-	0
15 12	Low evaporation temperature fault	1612 or none	0
2503	Water supply cutoff (Flow switch)	-	X*1
250 1	Water supply cutoff (Sensor)	-	0
2000	Pump interlock fault	-	0
4 102	Open phase	-	0
4 106	Power supply fault	-	0
4 126	Analog input error	-	_
422*	Inverter bus voltage fault	432*	0
423*	Inverter overheat protection fault	433*	 ⊚
424*	Inverter overload protection	434*	© ©
425*	IPM error (inclusive)/overcurrent relay	435*	0
426*	Cooling fan fault	-	 ⊚
5 10 1	Discharge refrigerant temp. (TH1)		 ⊚
5 102	Discharge refrigerant temp. (TH2)	_	◎
5 103	Condensation side heat exchanger refrigerant temp. (TH3)	_	0
5 104	Condensation side heat exchanger refrigerant temp. (TH4)	-	0
5 105	Suction gas refrigerant temp. (TH5)	-	
5 106	Suction gas refrigerant temp. (TH6)	-	0
5 100			0
	Evaporation side inlet water temp. (TH7)	-	<u> </u>
5 108	Evaporation side outlet water temp. (TH8)	-	0
5 109	Condensation side inlet water temp. (TH9)	-	0
5110	Condensation side outlet water temp. (TH10)	-	0
5111	Outdoor temp. (TH11)	-	0
5112	External water sensor 1 fault (TH12)	-	0
5113	External water sensor 2 fault (TH13)	-	©
5 1 14	THHS sensor/Circuit fault	1214	0
520 1	High pressure sensor fault	-	0
5202	Low pressure sensor fault	-	0
530*	ACCT sensor fault/Circuit fault	430*	0
0403	Serial communication error	430*	0
6500	Communication error	-	0
8600	Communication error	-	0
5088	Communication error	-	0
8803	Communication error	-	0
8606	Communication error	-	0
8807	Communication error	-	0
8608	Communication error	-	0
883 !	Remote controller signal reception error 1	-	_
8832	Remote controller signal transmission error	-	_
6834	Remote controller signal reception error 2	-	-
6833	Remote controller over current	-	0
0206	Expansion board error	-	0
7 100	Capacity code error	-	×
7 102	Connection count error	-	©
7 105	Address setting error	-	0
7 109	Prevention error of malfunction	-	 ⊚
7113	Model setting error	_	0
7	Combination error	-	© ©
,,,,,	I		

- ⊚: Another module can be operated.
- \times : 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

(3) Error code

(4) Nature of the problem in detail

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

7. Operating the Unit

[1] Initial Operation

- 1. Make sure the Run/Stop switch that controls the unit on the local control panel is switched off.
- 2. 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 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.

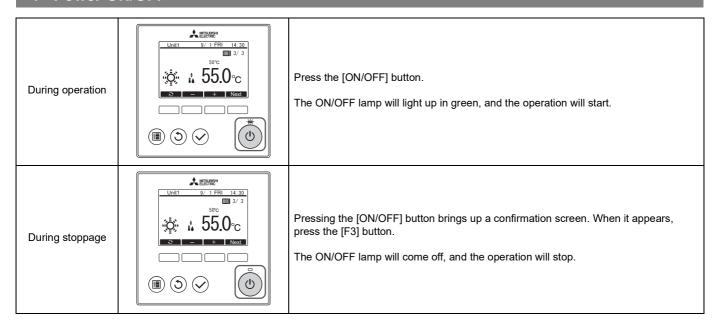
In areas where temperature can drop low enough to cause the water in the pipes to freeze, operate the unit often enough to prevent the water from freezing.

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 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)

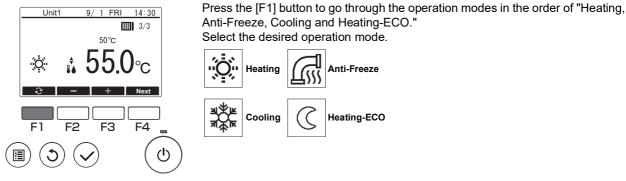
<1> Power ON/OFF



<2> Operation mode and set temperature settings

Operation mode setting

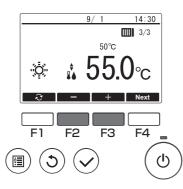
Button operation



- *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

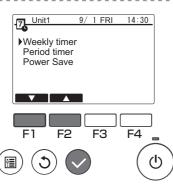
Function description

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.

7



The Weekly timer screen will be displayed.

To check the operation settings:

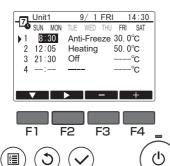
Press the [F1] or [F2] button to check the settings from Monday to Sunday. The [F4] button displays the following page.

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).

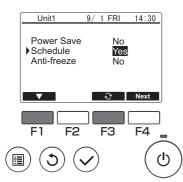
Weekly timer operation is disabled in the following situations:

- 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
- \blacksquare 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

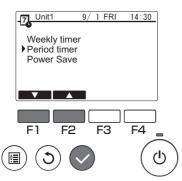
Function description

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.

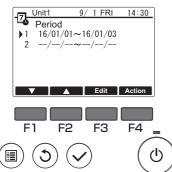
Button operation





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:

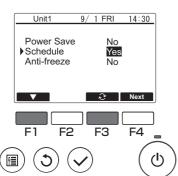
· When Schedule is disabled

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".

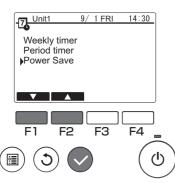
<5> Using power save

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.

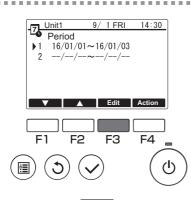
Button operation

1



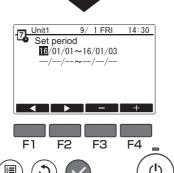
From the Main menu, select "Schedule" > "Power Save" and press the [Select] button.

2



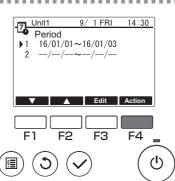
Press the [F3] button to proceed to the settings screen. You can set 2 types of pattern, as necessary.

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



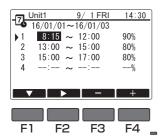
Press the [F1] to [F4] buttons to set the period and then press the [Select] button.

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.

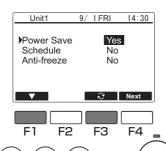








5

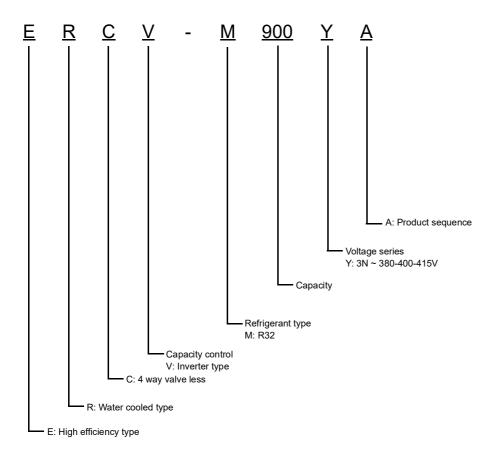


In the Operation setting screen, press the [F1] button to move the cursor to Power Save.

Press the [F3] button to select "Yes".

8. Main Specifications

[1] Model name

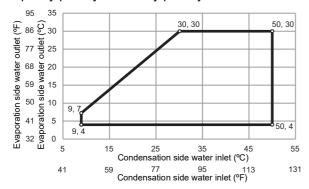


[2] Specifications

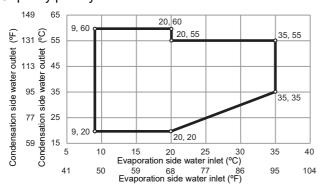
Model		ERCV-M900YA						
Capacity change mode		Capacity priority	Efficiency priority					
Power source			3-phase 4-wire 380-4					
Cooling capacity *1		kW	90.00	45.00				
		kcal/h	77,400	38,700				
	-	BTU/h	307,080	153,540				
	Power input	kW	17.47	8.22				
	EER		5.15	5.47				
	IPLV *5		8.18	<u>-</u>				
	Evaporation side water flow rate	m³/h	15.5	7.7				
	Condensation side water flow rate	m³/h	17.9	8.9				
Cooling capacity (EN14511) *2		kW kcal/h	89.83	44.95				
		BTU/h	77,254 306,500	38,657 153,369				
	Power input	kW	17.80	8.31				
	EER	KVV	5.05	5.41				
	SEER		7.66	-				
	nsc	%	303.4	-				
	Evaporation side water flow rate	m³/h	15.5	7.7				
	Condensation side water flow rate	m³/h	17.9	8.9				
Heating capacity *3		kW	90.00	45.00				
Trouble outputity		kcal/h	77,400	38,700				
		BTU/h	307,080	153,540				
	Power input	kW	19.07	9.40				
	COP		4.72	4.79				
	Condensation side water flow rate	m³/h	15.5	7.7				
	Evaporation side water flow rate	m³/h	21.5	10.7				
Heating capacity (EN14511) *4		kW	90.12	45.03				
		kcal/h	77,503	38,726				
	-	BTU/h	307,489	153,642				
	Power input	kW	19.53	9.52				
	COP		4.61	4.73				
	SCOP Low/Medium nsh Low/Medium	10/	7.10 / 4.86 281.0 / 191.0	-				
	Condensation side water flow rate	% m³/h	15.5	- 7.7				
	Evaporation side water flow rate	m³/h	21.5	10.7				
Current input		A	29 - 27 - 26	13 - 13 - 12				
Current input	Cooling current 380-400-415V *1							
	Heating current 380-400-415V *3	A	31 - 30 - 29	15 - 15 - 14				
**	Maximum current	A	60					
Water pressure drop ^{*1}	Evaporation side	kPa	10	3				
*7	Condensation side	kPa ⁰C	7 4~3	2				
Temperature range (Cooling) *7	Evaporation side water outlet	°F	39~{					
	Condensation side water inlet	°C	9~5					
	Condensation side water inlet	°F	48~1					
Temperature range (Heating) *8*9	Condensation side water outlet	°C	20~60 *6					
remperature range (Heating)	Condensation side water outlet	°F	68~140	20~55 68~131				
	Evaporation side water inlet	°C	9~3					
	Evaporation side water inlet	°F	48~9					
Circulating water volume range	Evaporation side	m ³ /h	7.7~2					
	Condensation side							
		m ³ /h	4.5~30					
Sound pressure level (measured in ar		dB (A)	53	48				
Sound power level (measured in anec		dB (A)	72	66				
Diameter of water pipe	Inlet	mm (in)	65A (2 1/2B) hou					
(Cooling exchanger side)	Outlet	mm (in)	65A (2 1/2B) hou					
Diameter of water pipe	Inlet	mm (in)	65A (2 1/2B) hou					
(Heating exchanger side)	Outlet	mm (in)	65A (2 1/2B) hou					
External finish External dimensions H x W x D		mm	Polyester powder c 918 × 780					
Net weight		mm kg (lbs)	918 × 780 430 (9					
Design pressure	R32	MPa	430 (9	•				
2 saign procedure	Water	MPa	1.0					
Heat exchanger	Evaporation side	~	Stainless steel plate a					
5	Condensation side		Stainless steel plate and copper brazing Stainless steel plate and copper brazing					
Compressor	Туре		Inverter scroll hermetic compressor					
•	Maker		MITSUBISHI ELECTRIC CORPORATION					
	Starting method		Inverter					
	Quantity		2					
	Motor output	kW	8.3 × 2					
	-		MEL46EH					
	Lubricant							
Protection	Lubricant High pressure protection		High pressure switch a	it 4.15MPa (601psi)				
Protection	Lubricant High pressure protection Inverter circuit		High pressure switch a Over heat protection, O	at 4.15MPa (601psi) ver current protection				
	Lubricant High pressure protection Inverter circuit Compressor		High pressure switch a Over heat protection, O Over-heat p	at 4.15MPa (601psi) ver current protection rotection				
Protection Refrigerant	Lubricant High pressure protection Inverter circuit		High pressure switch a Over heat protection, O	tt 4.15MPa (601psi) ver current protection rotection (kg) × 2				

- *1 Under normal cooling conditions at evaporation side water 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 water 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 water inlet temp 10°C (50°F) outlet temp 7°C (44.6°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 water inlet temp 10°C (50°F) outlet temp 7°C (44.6°F). Pump input is included in cooling capacity and power input based on EN14511.
- *5 IPLV is calculated in accordance with AHRI 551-591.
- *6 When using in condensation side water outlet is more than 55°C (131°F), please adjust the condensation inlet water temperature to 50°C (122°F) or less.
- · 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.

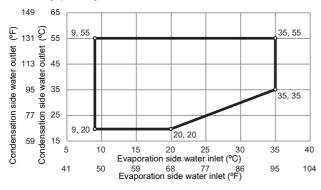
*7 Capacity priority/Efficiency priority



*8 Capacity priority



*9 Efficiency priority



^{*10} Set the minimum water flow rate on the condensation side water to 8.0 m³/h when the evaporation side water inlet temperature during operation is 15°C (59°F) or higher.





WATER-COOLED CHILLING UNIT

MODEL ERCV-M900YA <H>

REFRIGERANT R32 (GWP:675) WEIGHT 5.2kg×2 CO₂ EQUIVALENT 7.0t

CO₂ EQUIVALENT 7.0t LEGAL REFRIGERATION TON

SERIAL No.

OPERATION		С	OOLIN	IG	Н	G		
RATED VOLTAGE	3N~ V	380	400	415	380	400	415	
FREQUENCY	Hz		50/60		50/60			
CAPACITY	kW		89.83		90.12			
	kcal/h		77254		77503			
	Btu/h	,	306500)	307489			
RATED INPUT	kW		17.80		19.53			
EER/COP			5.05		4.61			
RATED CURRENT	Α	29	27	26	31	30	29	
MAX CURRENT	Α		60		60			
RATED CONDITIO	N							
CONDENSATION SIDE OUTLET WATER TEMP.	°C	35			45			
CONDENSATION SIDE INLET WATER TEMP.	°C		30		40			
EVAPORATION SIDE OUTLET WATER TEMP.	°C	7			7			
EVAPORATION SIDE INLET WATER TEMP.	°C		12			10		

EER/COP and capacity according to

EN14511

Contains fluorinated greenhouse gases.

MANUFACTURER:
MITSUBISHI ELECTRIC CORPORATION
AIR-CONDITIONING & REFRIGERATION SYSTEMS WORKS
5-66, TEBIRA, 6-CHOME, WAKAYAMA CITY, JAPAN
MADE IN JAPAN

DWG.NO.KW79L684H01

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 outside temperature, cold-water temperature, and operation conditions. Approximate normal values at 400 V are summarized in the table below.

Model	Cooling	Heating
ERCV-M900YA	27A	30A

^{*1} Under normal cooling conditions

Condensation side water outlet temperature 35°C (95.0°F)

Condensation side water inlet temperature 30°C (86.0°F)

Evaporation side water outlet temperature 7°C (44.6°F)

Evaporation side water inlet temperature 12°C (53.6°F)

*2 Under normal heating conditions

Condensation side water outlet temperature 45°C (113.0°F)

Condensation side water inlet temperature 40°C (104.0°F)

Evaporation side water outlet temperature 7°C (44.6°F)

Evaporation side water inlet temperature 10°C (50.0°F)

<3> Pressure

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

Pressure varies with operation status and conditions.

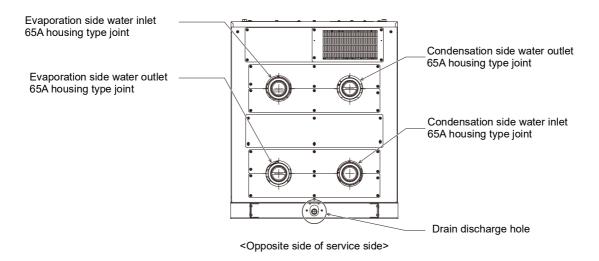
Pressure	Operation pressure
High pressure <mpa></mpa>	1.0 – 3.7
Low pressure <mpa></mpa>	0.7 – 1.4

<4> Water temperature

Ensure that the inlet/outlet cold/hot 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).



<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] Guidelines for Maintenance and Inspection of Major Parts of Water-cooled Heat Pumps

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 nam	е		Regular inspection		Preventive maintenance			
Component parts	Pa	rts name	Inspection item	Inspection method/tools	Judgement criteria <reference></reference>	Maintenance item			
Refrigerant circuit			Sound or vibration at startup, during operation, and at stoppage of the	Visual, auditory, and tactile check	Free from abnormal noise and vibration	If abnormal, replace the compressor.			
	Col	mpressor	compressor Insulation resistance Terminals and wiring	500V megahertz Screwdriver, visual check	The insulation resistance is 1MΩ or greater. Free from loose terminals and wiring contacts	 If the insulation resistance is 1MΩ or less, replace the compressor. Retighten the terminals, and rewire the wiring. 			
		ectronic nsion 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.			
	Definement	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 reppipe. If the pipes are severely worn out, replace or repipe. If the insulation resistance is 1MΩ or less, replace 			
	Refrigerant system	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	valve. If there is corrosion, paint the surface.			
		Container	Corrosion of the accumulator or the oil separator	Visual check	Free from corrosion				
	Protection device (security	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.			
	parts)	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	Co	oling fan	Insulation resistance and abnormal sound	500V megahertz, auditory check	- The insulation resistance is $1M\Omega$ or greater. Free from abnormal sound	Replace the cooling fan if the fan is stuck.			
	Switch	Electromagnetic	Operation and appearance	Visual check	Free from deformation	Replace the switches in case of malfunction, deformation, or discoloration.			
	(including FFB and ELB)	Switch Overcurrent relay Auxiliary relay	Contact points		Normal operation and free from deformation Free from deformation and discoloration				
	Th	ermostat	Operation check	Operation by the unit	Operation as per the technical document	Replace or adjust (calibration)			
	0	il heater	Check energization Insulation resistance	Tester or ammeter Visual check 500V megahertz	Heat up More than 1MΩ	Replace			
	Crank	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 inv		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.			
	Electr (including	ic parts box g 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 s	ensor, 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 po	SW power source • Output voltage		Tester	Within the specified output voltage range	Replace the SW if the voltage is abnormal.			
Structural	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 Paint the surface.			
	Di	rain 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			
O-4:I	Gu	ard panel	Flaked coating	Visual check	• Free from rust	Paint the surface.			
Optional parts		controller switch	Controllability Controllability	Visual check Visual check	The display obeys the operation command. The display obeys the operation command Free from loose and contact	Replace the remote controller switch if the display does not obey the operation command or wrong display appears. Retightening Replace if the resistance is less than 1MΩ			
	-	control system	Loose terminal, wiring contact Insulation resistance Controllability	500V megahertz Visual check	More than 1MΩ The display obeys the operation command	Replace if the resistance is less than 1MΩ Replace the flow switch			
	Phase-advance	w switch	Water leak check Insulation resistance Insulation resistance	500V megahertz 500V megahertz	Free from water leak More than 1MΩ More than 1MΩ	Replace if the resistance is less than 1MΩ			
Water circuit	Elapsed time i	ntegrator Ammeter				• Clean			
Water Circuit	5	Strainer	Check clogging Water leak	Visual check Visual check	Free from stain and clogging Free from water leak				
	Wa	• Water leak • Inclusion of air		Sensory inspection/Air vent valve is open	Free from strange noise	Retightening Release air, or replace and adjust the air vent vane.			
	Flow re	gulating 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			
	Press	sure gauge	Display value under suspension	Visual check	Free from incorrect display value	Replace			
		rmometer	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)

Inspe	ection edule		Mainte sche	enance edule				Preventive maintenance Elapsed year*												
Yearly	Others	Inspection schedule	Hour of use	Period of use	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Remarks
•		Before cooling operation season	20,000Hr																	
•			20,000Hr																	
			20,000Hr				Uı	 nexpecte	l d failure 					١	Wear-out	failure				
•																				
			25,000Hr																	
•			20,000111						 Unexpect 	 ied failure 	 			♦		Une	 xpected fa 	 ailure 		Consumable parts
			15,000Hr			L	nexpecte	ed failure		•		Unex	pected fa	ilure		*	Unex	pected fai	lure	Consumable parts
•				5 years		Unex	pected fa	ailure	•		Unexpec	ted failure		•		Unexpec	ted failure			Parts to be cleaned
•		Before cooling operation						Unexpe	 cted failur 	e I		A			Wear-	out failure				
•		season	25,000Hr						Unexpec	ted failure				<u> </u>		Wear-o	ut failure			
•			25,000Hr											_						
•				8 years			ı	Unexpect	ted failure						Une	xpected f	ailure			Consumable parts
•				8 years				Unexpect	ted failure			♦			Une	expected t	failure			Consumable parts
•				10 years				i I	Unexpec	l ted failure	9			\rightarrow		Une	xpected f	i ailure		Consumable parts
•			25,000Hr						Unexpec	ted failure	•			A		Wear-o	ut failure			
			25,000Hr	10 years				-	Unexpec	ted failure				*		Une	xpected f	ailure		Consumable parts
•			25,000HI						Unexped	ted failur	e			A		Wear-o	out failure			
•				5 years		Unex	pected fa	ailure	A					Wear-o	ut failure	<u> </u>				
•		Before		10 years						ted failure				_		Wear-o	ut failure			
•		cooling operation season		8 years				Unexpect	ted failure						Wear-or	ut failure				Parts to be cleaned
•				8 years 8 years				Unexpect	ted failure						Wear-or	ut failure				Parts to be cleaned
•		Before cooling	25,000Hr	o years																
		cooling operation season		10 years					Unexpec	ted failure	 					Wear-o	out failure			
•				5 years		Unex	pected fa	ilure	A		Unexpect	ed failure		A		Wear-o	ut failure			
•				8 years			Uı	nexpected	d failure						Wear-ou	ıt failure				
•		Before cooling operation		10 years					Unexpect	ed failure						Une	xpected fa	ailure		Parts to be cleaned
•		season		5 years		Unex	pected fa	il ailure			Unexpect	ted failure				Unexpec	ted failure			Parts to be cleaned
•				5 years 5 years																
•				o years		Unex	pected fa	ailure					Wea	ar-out fail	lure					
•				3 years 5 years		17	A mosts if 5		ted failure			ted failure			ted failure	A		ted failure	A	
•	\vdash			o years		Unex	pected fa	allure			nexpect	ed failure			Une	xpected f	allure			
_																				

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

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

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

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

MITSUBISHI ELECTRIC CORPORATION