TOSHIBA

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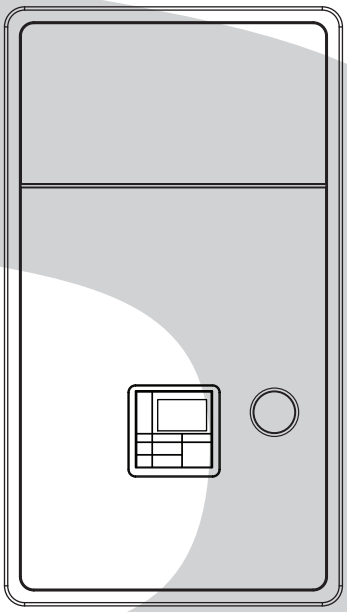
*AIR TO WATER HEAT PUMP*

# Service Manual

HFC
R410A

**Model name:**

| Hydro unit | Outdoor unit |
|---|---|
| HWS-P805XWHM3-E(TR) | HWS-P805HR-E(TR) |
| HWS-P805XWHT6-E(TR) | HWS-P1105HR-E(TR) |
| HWS-P805XWHT9-E | HWS-P805H8R-E |
| HWS-P1105XWHM3-E(TR) | HWS-P1105H8R-E |
| HWS-P1105XWHT6-E(TR) | HWS-P1405H8R-E |
| HWS-P1105XWHT9-E(TR) | |



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# 1 Safety precautions

The unit and this service guide list very important safety precautions.
Understand the following details (indications and symbols) before reading the body text, and follow the instructions.

## [About indication]

| Indication | Meaning of Indication |
|---|---|
| ⚠ DANGER | **Indicates that a wrong operation may cause a service engineer and the third persons around to get fatal or serious injuries.** |
| ⚠ WARNING | **Indicates that a wrong operation may cause a service engineer and the third persons around to get fatal or serious injuries, or that unit defective after the operation may cause a user to have a similar serious accident.** |
| ⚠ CAUTION | **Indicates that a wrong operation may cause a service engineer and the third persons around to get injuries or may cause property damage*, or that unit defective after the operation may cause a user to have a similar accident.** |

* Property damage indicates extended damage to property, furniture, livestock, or pets.

## [About symbols]

| Symbols | Meaning of Symbols |
|---|---|
| ⃠ | **Indicates a forbidden action.**<br>**Specific forbidden actions are described in text near the symbol.** |
| ● | **Indicates a forcible (must do) action.**<br>**Specific forcible actions are described in text near the symbol.** |
| △ | **Indicates a caution (including danger and warning).**<br>**Specific cautions are described in picture or text inside or near the symbol.** |

### ⚠ DANGER

**<Turn off the power breaker>**

**Turn off the power breaker before removing the front panel and cabinet.**
- Failure to do so may cause a high voltage electric shock, leading to death or injury.
- During an operation, the second side circuit of high pressure transmission(*) are applied with a high voltage of 230 V or higher.
- Touching the circuit even with an electrical insulator, let alone a bare hand or body, causes an electric shock.

∗: For details, see the schematic.

**<Discharge between terminals>**

**When the front panel and cabinet are removed, make short-circuit current to discharge between high pressure capacitor terminals.**
- Failure to do so may cause a high voltage electric shock, leading to death or injury.
- After the power is turned off, the high pressure capacitor is still charged with high voltage.

**<Forbidden>**

**Do not turn on the power breaker after removing the front panel cabinet.**
- Failure to do so may cause a high voltage electric shock, leading to death or injury.

### ⚠ WARNING

**<Check earth ground>**

**Before starting failure diagnosis or repair, check that the earth wire (∗) is connected to the unit ground terminal.**
- An unconnected earth wire could cause an electric shock if electric leakage occurs.
- If the earth ground is not properly connected, ask an electrical worker for rework of the ground connection.

∗: Earth wire of class D grounding

## ⚠ WARNING

**<No modification>**

**Do not modify the unit.**

- Do not disassemble or modify the parts also.
- A fire, an electric shock, or an injury may occur.

**<Use specified parts>**

**Use the specified parts (∗) when replacing them.**

- Using parts other than specified ones may cause a fire or an electric shock.

∗: For details, see the parts price list.

**<Keep children away from unit>**

**Keep any person (including children) other than service engineers away from a failure diagnosis or repairing place.**

- A tool or disassembled parts may cause an injury.
- Advise the customer to keep the third persons (including children) away from the unit.

**<Insulation treatment>**

**After connecting a cut lead with a crimp contact, discharge by facing the closed side upward.**

- Connect lead wires with crimping terminals and turn the closed end upwards to avoid exposure to water.

**<Watch out for fire>**

**Observe the following instructions when repairing the refrigerant cycle.**

(1) Watch out for surrounding fire. Always put out the fire of stove burner or other devices before starting the repair.
Should the fire fail to be put out, the oil mixed with refrigerant gas could catch fire.

(2) Do no use a welder in a closed room.
A room with no ventilation may cause carbon monoxide poisoning.

(3) Keep away flammable materials.
The materials may catch the fire of a welder.

**<Use refrigerant carefully>**

**Check the refrigerant name to use the tools and members appropriate for the refrigerant.**

- A product using the refrigerant R410A has the refrigerant name prominently displayed on its outdoor unit. In addition, the diameter of the service port is changed from that of the conventional R22 to prevent incorrect filling.

**Never use refrigerant other than R410A for Air to Water Heat Pump using R410A. Also, never use R410A for Air to Water Heat Pump using other refrigerant (such as R22).**

- A mixture of R410A with different ones excessively raises the pressure in the refrigerant cycle, leading to an injury due to burst.

**Do not make additional charge of the refrigerant.**

- An additional charge when refrigerant gas leaks changes the refrigerant composition in the refrigerant cycle, causing the characteristics change of the Air to Water Heat Pump or excessive high pressure in the refrigerant cycle with more than the specified amount of refrigerant charged. This may cause burst or an injury. If the refrigerant gas leaks, perform refrigerant recovery or other operation to make the Air to Water Heat Pump contain no refrigerant, and then perform vacuuming. After that, refill the unit with the defined amount of liquid refrigerant. Never charge refrigerant exceeding the amount specified.

**When the refrigerant cycle is refilled with refrigerant, do not enter air or refrigerants other than the specified refrigerant, R410A.**

- A mixture of R410A with air or an inappropriate substance causes excessive high pressure inside the refrigerant cycle, leading to an injury due to burst.

**Check that there is no refrigerant gas leak after the installation is completed.**

- If it catches fire of a fan heater, a space heater, or a stove, poisonous gases may be produced.

**<Be careful with wiring>**

**After a repair is completed, be sure to reassemble the parts and put the wiring back to its original state. In addition, be careful with the internal wiring not to be caught in a cabinet or panel.**

- A defective assembly or wiring may cause a disaster at a customer site due to electrical leakage or a fire.

**<Check for water leak>**

**After the repair of a water pathway is completed, check that there is no water leak.**

- In using the product, water leak may cause a fire at a customer site due to electrical leakage or an electric shock.

## ⚠ WARNING

**<Check insulation>**

**After the work is completed, check with an insulating-resistance tester (500V) that the insulation resistance between the live and dead-metal parts is 2 MΩ or higher.**

- A low insulation resistance may cause a disaster at a customer site due to electrical leakage or an electric shock.

**<Ventilate>**

**Ventilate if refrigerant gas leaks during service work.**

- Should refrigerant gas catch fire, poisonous gases may be produced. A closed room full of leaking refrigerant results in the absence of oxygen; it is dangerous. Make sure to ventilate.

**<Caution: electric shock>**

**When checking a circuit while energized if necessary, use rubber gloves not to contact the live part.**

- Contact with the live part may cause an electric shock.
- The unit contains high-voltage circuits. Contact with a part in the control board with your bare hand may cause an electric shock. Take enough care to check circuits.

**<Turn off the power breaker>**

**Because the electrical components are energized with high voltage, always turn off the power breaker before starting to work.**

- Failure to do so may cause an electric shock.

**<Always do>**

**Should refrigerant gas leak, find where the gas leaks and properly repair it.**

- To stop the repair work because the leakage location cannot be identified, perform refrigerant recovery and close the service valve. Failure to do so may cause the refrigerant gas to leak in a room. Although refrigerant gas alone is harmless, if it catches fire of a fan heater, a space heater, or a stove, poisonous gases may be produced.

**When installing the unit or re-installing it after relocation, follow the installation guide for proper operation.**

- A defective installation may cause a refrigerant cycle defective, a water leak, an electric shock, or a fire.

**<Check after repair>**

**After a repair is completed, check for any abnormality.**

- Failure to do so may cause a fire, an electric shock, or an injury.
- Turn off the power breaker to perform check.

**After a repair is completed (and the front panel and cabinet are placed), make a test run to check for any abnormality such as smoke or abnormal sound.**

- Failure to do so may cause a fire or an electric shock. Place the front panel and cabinet before making a test run.

**<Check after re-installation>**

**Check that the following are properly performed after re-installation.**

(1) The earth wire is properly connected.
(2) The installation is stable without any tilt or wobbles.
Failure to check them may cause a fire, an electric shock, or an injury.

## ⚠ CAUTION

**<Wear gloves>**

**Wear gloves (∗) when performing repair.**

- Failure to do so may cause an injury when accidentally contacting the parts.

∗: Thick gloves such as cotton work gloves

**<Cooling check>**

**Perform service work when the unit becomes cool enough after the operation.**

- High temperature of compressor piping or other equipment after a cooling or heating operation may cause burn.

**<Tighten with torque wrench>**

**Tighten a flare nut with a torque wrench in the specified method.**

- A flare nut tightened too much might crack after a long period, causing refrigerant leak.

# 2 Refrigerant (R410A)

This Air to Water Heat Pump adopts a refrigerant HFC (R410A) to prevent destruction of the ozone layer.
The working pressure of R410A refrigerant is 1.6 times higher than that of the conventional refrigerant R22.The refrigerant oil is also changed for the new refrigeration. Therefore, during installation or service work, be sure that water, dust, former refrigerant, or refrigeration machine oil does not enter the refrigerant cycle of the new type refrigerant Air to Water Heat Pump. A wrong installation or service operation may cause a serious accident.
Read carefully the following instructions to use the tools or members for R410A for safety work.

## 2-1. Safety during installation and service

- Use only the refrigerant R410A for Air to Water Heat Pump using R410A.
  A mixture of R410A with different ones excessively raises the pressure in a refrigerant cycle, leading to an injury due to burst.
- Check the refrigerant name to use the tools and members appropriate for the refrigerant.
  A product using the refrigerant R410A has the refrigerant name prominently displayed on its outdoor unit. In addition, the diameter of the service port is changed from that of the conventional R22 to prevent incorrect filling.
- Ventilate if refrigerant gas leaks during service work.
  Should refrigerant gas catch fire, poisonous gases may be produced. A closed room full of leaking refrigerant results in the absence of oxygen; it is dangerous. Make sure to ventilate.
- When the refrigerant cycle is refilled with refrigerant, do not mix air or refrigerants other than the specified refrigerant, R410A.
  A mixture of R410A with air or an inappropriate substance causes excessive high pressure inside the refrigerant cycle, leading to an injury due to burst.
- Check that no refrigerant gas leaks after the installation is completed.
  Should a refrigerant gas leak in a room and catch fire, poisonous gases may be produced.
- When installing the unit that contains large amount of refrigerant such as Air to Water Heat Pump, take measures to prevent the refrigerant from exceeding the threshold concentration in case it leaks.
  Should leaking refrigerant exceed the threshold concentration could cause an accident due to oxygen deficient.
- When installing the unit or re-installing it after relocation, follow the installation guide for proper operation.
  A defective installation may cause a refrigerant cycle defective, a water leak, an electric shock, or a fire.
- Do not modify the product. Do not disassemble or modify the parts also.
  A fire, an electric shock, or an injury may occur.

# 2-2. Installing refrigerant pipe

## 2-2-1. Steel pipe and joint

For refrigerant piping, steel pipe and joints are mainly used. Select those comply with JIS (Japanese Industrial Standards) for a service work. Also, use such clean piping materials that less impurities attach to the inside of pipe and joints.

### Copper pipe

Use copper pipe of the “copper and copper alloy seamless pipe” type with attach oil quantity of 40 mg / 10 m or less. Do not use pipe that is cracked, distorted, or discoloured (especially inside).The expansion valve or capillary may get clogged with impurities.
Considering that Air to Water Heat Pump using R410A is higher in pressure than those using the conventional R22, be sure to select the material that comply with the standard.
Table 2-1 shows the thickness of copper pipe used for R410A.
Never use commercially available thin-walled copper pipe of 0.8 mm thick or less.

### Table 2-1 Wall thickness of copper pipe

| | | Wall thickness (mm) |
|---|---|---|
| **Nominal diameter** | **Outer diameter** | **R410A** |
| 3/8 | 9.52 | 0.80 |
| 5/8 | 15.88 | 1.00 |

### Joints

For the joint of copper pipe, flared joint and socket joint are used. Remove impurities from a joint before using it.

- **Flared joint**
  A flared joint cannot be used for the copper pipe whose outer diameter is 20 mm or larger. A socket joint can be used instead in that case.
  Table 2-2-3 and 2-2-4 show the dimensions of flare pipe, the end of flared joint, and flare nuts.
- **Socket joint**
  A socket joint is used to connect the thick-walled pipe of mainly 20 mm or larger in diameter.
  Table 2-2 shows the wall thickness of socket joints.

### Table 2-2 The minimum wall thickness of socket joints

| Nominal diameter | Reference of outer diameter of copper pipe connected (mm) | Minimum joint wall thickness (mm) |
|---|---|---|
| 3/8 | 9.52 | 0.80 |
| 5/8 | 15.9 | 1.00 |

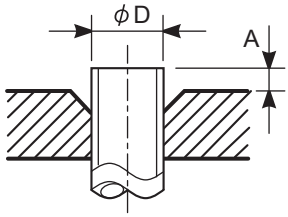
## 2-2-2. Processing of piping materials

When installing refrigerant pipe, prevent water or dust from entering the pipe, and do not use oil other than lubricant used for Air to Water Heat Pump. Make sure that no refrigerant leak occurs.
If piping needs lubrication, use lubricating oil whose water content is removed.
After the oil is put in, be sure to seal the container with air proof cover or other covers.

### Flare and precautions

1) **Cut a pipe.**
   Cut slowly with a pipe cutter so that the pipe is not distorted.
2) **Remove burr and flaw.**
   A burr or flaw in a flare part may cause refrigerant leak. Remove carefully all the burrs, and clean up the cut ends before installation.
3) **Insert a flare nut.**
4) **Flare**
   Check that the clasps and copper pipe are clean. Flare correctly using the clasp. Use a flare tool for R410A or the conventional one. Flare processing dimension varies depending on the flare tool type. When using the conventional flare tool, use a gauge for size adjustment to secure the A dimension.

**Figure 2-2-1**
**Flare dimension**



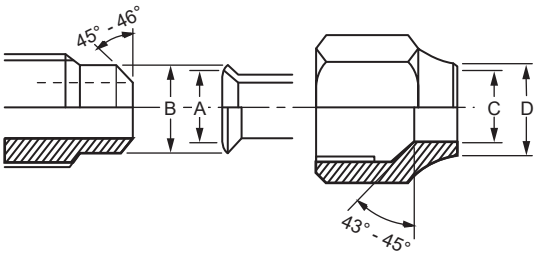

### Table 2-2-3 Flare processing related dimension for R410A

| Nominal diameter | Outer diameter (mm) | Wall thickness (mm) | A (mm) | | |
|---|---|---|---|---|---|
| | | | Flare tool for R410A clutch type | Conventional flare tool | |
| | | | | Clutch type | Butterfly-nut type |
| 3/8 | 9.52 | 0.8 | 0 to 0.5 | 1.0 to 1.5 | 2.0 to 2.5 |
| 5/8 | 15.9 | 1.0 | 0 to 0.5 | 1.0 to 1.5 | 2.0 to 2.5 |

### Table 2-2-4 Dimension of flare for R410A and flare nut

| Nominal diameter | Outer diameter (mm) | Wall thickness (mm) | Dimension (mm) | | | | Flare nut width (mm) |
|---|---|---|---|---|---|---|---|
| | | | A | B | C | D | |
| 3/8 | 9.52 | 0.8 | 13.0 | 13.2 | 9.7 | 20 | 18 |
| 5/8 | 15.9 | 1.0 | 19.1 | 19.7 | 15.9 | 24.5 | 26 |

### Figure 2-2-2 Relationship between flare nut and flare surface



## Flare connecting procedure and precautions

1) Make sure that the flare and connecting portions do not have any flaw and dust.
2) Correctly align the flared surface and the connecting axis.
3) Tighten the flare with designated torque by means of a torque wrench. The tightening torque for R410A is the same as that for the conventional R22. If the torque is weak, gas leakage may occur. If it is too strong, the flare nut may crack and may be made non-removable. When choosing the tightening toque, comply with values designated by products. Table 2-2-5 shows reference values.

**NOTE**

When applying oil to the flare surface, be sure to use oil designated by the product. Using any other oil deteriorates the lubricating oil, possibly causing the compressor to burn out.

## Table 2-2-5 Tightening torque of flare for R410A (Reference values)

| Nominal diameter | Outer diameter (mm) | Tightening torque N•m (kgf•m) |
|---|---|---|
| 3/8 | 9.52 | 33 to 42 (3.3 to 14.2) |
| 5/8 | 15.9 | 66 to 82 (6.8 to 8.2) |

# 2-3. Tools

## 2-3-1. Necessary tools

In Air to Water Heat Pump using R410A, the service port diameter of packed valve of the outdoor unit is changed to prevent mixing of other refrigerant. To reinforce the pressure resistance, flare dimensions and opposite side dimensions of flare nut (For Ø 12.7 copper pipe) of the refrigerant piping are lengthened.

Because the refrigerating machine oil is changed, mixing of oil may generate sludge, clog capillary, or cause other problems. Accordingly, the tools to be used include:

- tools dedicated for R410A (Those that cannot be used for the conventional refrigerant, R22)
- tools dedicated for R410A, but can be also used for the conventional refrigerant, R22
- tools that can be used for the conventional refrigerant, R22.
  The following table shows the tools dedicated for R410A and their interchangeability.

### Tools dedicated for R410A (The following tools must be for R410A)

Tools whose specifications are changed for R410A and their interchangeability

| No. | Tool to be used | Usage | R410A Air to Water Hear Pump installation | | Conventional refrigerant Air to Water Heat Pump installation |
|---|---|---|---|---|---|
| | | | For R410A Existence of new equipment | Conventional equipment can be used | New equipment can be used with conventional refrigerant |
| 1 | Flare tool | Pipe flaring | Yes | *(Note 1) | Yes |
| 2 | Copper pipe gauge for adjusting projection margin | Flaring by conventional flare tool | Yes | *(Note 1) | *(Note 1) |
| 3 | Torque wrench (For Ø15.9) | Connection of flare nut | Yes | No | No |
| 4 | Gauge manifold | Evacuating, refrigerant charge, run check, etc. | Yes | No | No |
| 5 | Charge hose | | | | |
| 6 | Vacuum pump adapter | Vacuum evacuating | Yes | No | Yes |
| 7 | Electrical balance for refrigerant charging | Refrigerant charge | Yes | No | Yes |
| 8 | Refrigerant cylinder | Refrigerant charge | Yes | No | No |
| 9 | Leakage detector | Gas leakage check | Yes | No | Yes |
| 10 | Charging cylinder | Refrigerant charge | *(Note 2) | No | No |

* **(Note 1)** Flaring for R410A by using the conventional flare tool requires projection margin adjustment. This adjustment requires copper pipe gauge or other instrument.

* **(Note 2)** A charging cylinder for R410A is currently under development.

### General tools (Conventional tools are available)

In addition to the above dedicated tools, the following equipment also available for R22 is necessary as the general tools.

1. Vacuum pump
   Use this by attaching vacuum pump adapter.
2. Torque wrench (For Ø6.35)
3. Pipe cutter
4. Reamer
5. Pipe bender
6. Level vial
7. Screwdriver (+, –)
8. Spanner or Monkey wrench
9. Hole core drill (Ø65)
10. Hexagon wrench
    (Opposite side 4 mm)
11. Tape measure
12. Metal saw

Also prepare the following equipment for other work methods or run check.

1. Clamp meter
2. Thermometer
3. Insulation resistance meter
4. Electroscope

# 2-4. Recharging of refrigerant

Recharge, if necessary, the specified amount of new refrigerant according to the following procedure.

Recover the refrigerant, and check that no refrigerant remains in the refrigerant cycle.

↓

Connect the charge hose to packed valve service port on the outdoor unit's gas side.

↓

Connect the charge hose to the vacuum pump adapter.

↓

Open fully both packed valves on the liquid and gas sides.

↓

Open fully the handle of gauge manifold Lo, turn on the vacuum pump, and then perform vacuum evacuating.

↓

When the compound gauge's pointer indicates -0.1 MPa (-76 cmHg), close fully the handle Lo and turn off the vacuum pump.

↓

Let the equipment stay as it is for one to two minutes and check that the compound gauge pointer does not return.

↓

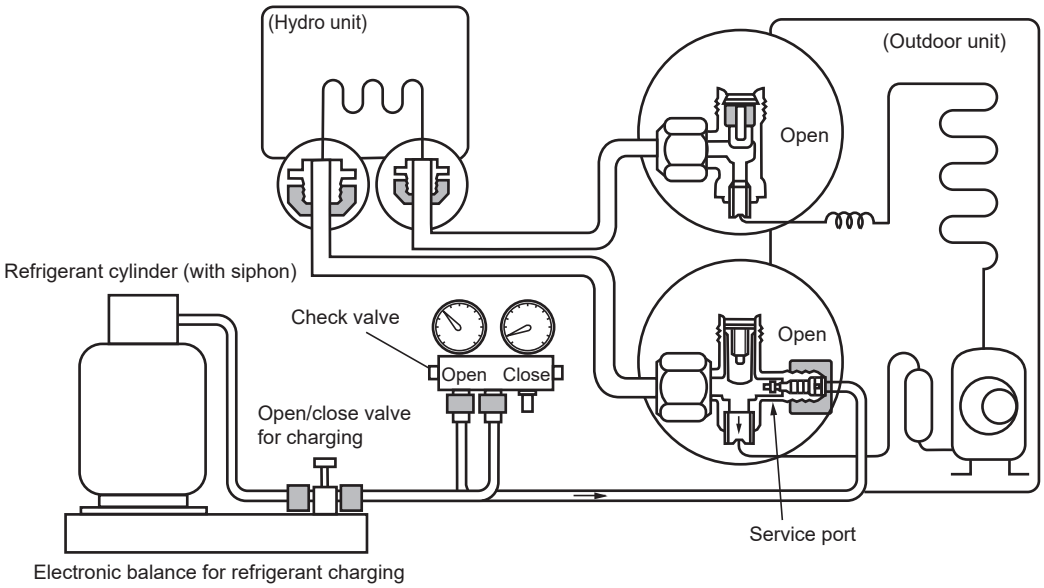
Place the refrigerant cylinder to the electronic balance, connect the connecting hose to the cylinder and the connecting port of the electronic balance, and then charge liquid refrigerant.

(For refrigerant charging, see the figure below)

**NOTE**

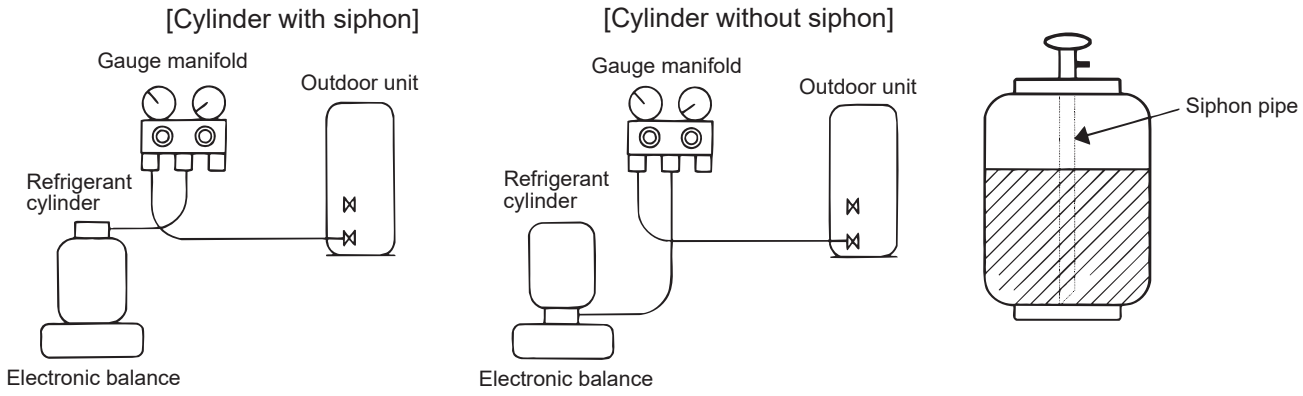
- Never charge refrigerant exceeding the specified amount.
- If the specified amount of refrigerant cannot be charged, charge it a little at a time while running refrigerant recovery (pump down).
- Do not make additional charging.
  An additional charge when refrigerant leaks changes the refrigerant composition in the refrigerant cycle, causing the characteristics change of the Air to Water Heat Pump or excessive high pressure in the refrigerant cycle with more than the specified amount of refrigerant charged. This may cause burst or an injury.

### Fig. 2-4-1 Configuration of refrigerant charging



**NOTE**

- Make sure that the setting is appropriate so that liquid can be charged.
- A cylinder with siphon enables liquid to be charged without the cylinder turned upside down.




**NOTE**

- Because R410A is HFC mixed refrigerant, charging with gas changes the charged refrigerant composition, causing the equipment characteristics to change.

# 2-5. Brazing of pipes

## 2-5-1. Materials of brazing

### Silver brazing metal

Silver brazing metal is an alloy mainly composed of silver and copper.
It uses iron, copper, or copper alloy, and is relatively expensive though it excels in soldering.

### Phosphor bronze brazing metal

Phosphor bronze brazing metal is generally used to join copper or copper alloy.

### Low temperature brazing metal

Low temperature brazing metal is generally called solder, and is an alloy of tin and lead. Do not use it for refrigerant piping because its adhesive capacity is low.

**NOTE**

- Phosphor bronze brazing metal tends to react with sulfur, producing a fragile compound water solution. This may cause gas leakage. Therefore, use other type of brazing metal at a hot spring resort or similar place, and coat the surface with coatings.
- To braze the pipe again while performing service work, use the same type of brazing metal.

## 2-5-2. Flux

### Why flux is necessary

- Removing all the oxide film and any foreign matter on the metal surface assists the flow of brazing metal.
- Flux prevents the metal surface from being oxidized in the course of brazing.
- Reducing the brazing metal's surface tension enables the brazing metal to adhere for better metal processing.

### Characteristics of flux

- The activation temperature of flux matches the brazing temperature.
- A wide effective temperature range makes flux hard to carbonize.
- It is easy to remove slag after brazing.
- The corrosive action to the treated metal and brazing metal is minimum.
- The good performance of flux gives no harm to a human body.
  Since flux works in a complicated manner as described above, select an appropriate type of flux according to metal treatment type, brazing metal and brazing method, or other conditions.

### Type of flux

- Non-corrosive flux
  It is generally a compound of borax and boric acid. It is effective when brazing temperature is higher than 800 °C.
- Active solvent
  Most of this type of flux is generally used for silver brazing.
  It features the increase of oxide film while moving the capability to the borax-boric acid compound to add compounds such as potassium fluoride, potassium chloride, or sodium fluoride.

### Piping materials for brazing and brazing metal / flux

| Piping material | Brazing metal to be used | Flux to be used |
|---|---|---|
| Copper - Copper | Phosphor copper | Do not use |
| Copper - Iron | Silver | Paste flux |
| Iron - Iron | Silver | Vapour flux |

**NOTE**

- Do not enter flux into the refrigerant cycle.
- If chlorine contained in the flux remains within the pipe, the lubricating oil deteriorates. Because of this, use a flux that does not contain chlorine.
- When adding water to the flux, use water that does not contains chlorine. (e.g. distilled water or ion-exchange water)
- Remove the flux after brazing.

## 2-5-3. Brazing

Brazing must be performed by a person qualified and experienced with theoretical knowledge since the operation requires sophisticated techniques.
Perform brazing while flowing dry nitrogen gas (N2) to prevent oxide film from forming during brazing application to the inside of the pipe.

**NOTE**

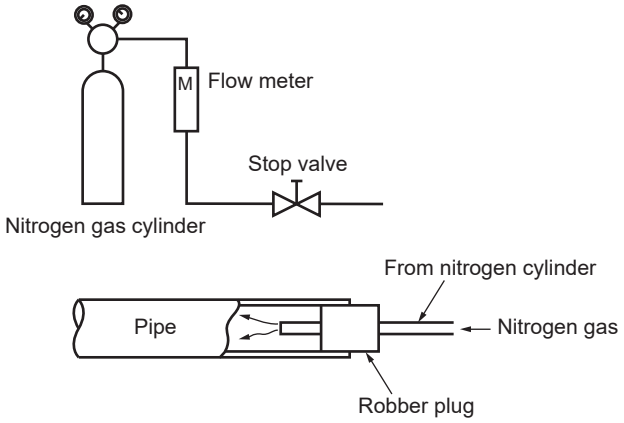
- Never use gas other than nitrogen gas.

### Brazing method to prevent oxidation

1) Attach a reducing valve and a flow meter to the nitrogen cylinder.
2) Use a copper pipe to direct the piping material, and attach the flow meter to the balance.
3) Apply a mark to the clearance between the piping material and the copper pipe filled with nitrogen to prevent the back flow of the nitrogen gas.
4) If the nitrogen gas flows out, be sure to keep open the piping end.

5) Use the reducing valve to adjust the nitrogen gas flow speed to 0.05 $m^3$/hour or 0.02 MPa (0.2 $kgf/cm^2$).
6) After the steps above, keep the nitrogen gas flowing until the pipe cools down to a certain extent. (Temperature where the pipe is cool enough to be touched by hands)
7) Remove the flux completely after brazing.

**Fig 2-5-1**
**Prevention of oxidation during brazing**



# 3 Specifications

| | | | | |
|---|---|---|---|---|
| Unit name | Hydro unit | | HWS-P805XWHM3-E, P805XWHT6-E, P805XWHT9-E | |
| | Outdoor unit | | HWS-P805HR-E | |
| Heating capacity *1 (kW) | | | 8.0 | |
| Cooling capacity *2 (kW) | | | 6.0 | |
| Variable range of compressor frequency | | | 10 - 70 Hz | |
| Power source | | | Single phase 50 Hz 220-230 V | |
| Operation mode | | | Heating | Cooling |
| Electric characteristic *1 *2 | Hydro unit | Current (A) | 0.44 | 0.44 |
| | | Power (kW) | 0.06 | 0.06 |
| | | Power factor (%) | 59.3 | 59.3 |
| | Outdoor unit | Current (A) | 7.57 | 7.39 |
| | | Power (kW) | 1.62 | 1.58 |
| | | Power factor (%) | 93 | 93 |
| | Total | Running current (A) | 8.01 | 7.83 |
| Operating noise sound power level ① | Hydro unit (dB (A)) | | 41 | 41 |
| | Outdoor unit (dB (A)) | | 66 | 65 |
| Coefficient of performance *1 *2 | | | 4.76 | 3.66 |
| Hydro unit | Outer dimension | Height (mm) | 925 | |
| | | Width (mm) | 525 | |
| | | Depth (mm) | 355 | |
| | Net weight (kg) | | 46 | |
| | Color | | Silky shade (Munsell 1Y8.5/0.5) | |
| | Remote controller Outer dimension *3 | Height (mm) | 120 | |
| | | Width (mm) | 120 | |
| | | Depth (mm) | 16 | |
| | Circulation pump | Motor output (W) | 125 (MAX) | |
| | | Flow rate (L/min) | 22.9 | 17.2 |
| | | Type | Non-self-suction centrifugal pump | |
| | Heat exchanger | | Plate-type heat exchange | |
| Outdoor unit | Outer dimension | Height (mm) | 1340 | |
| | | Width (mm) | 900 | |
| | | Depth (mm) | 320 | |
| | Net weight (kg) | | 92 | |
| | Color | | Silky shade (Munsell 1Y8.5/0.5) | |
| | Compressor | Motor output (W) | 2500 | |
| | | Type | Twin rotary type with DC-inverter variable speed control | |
| | | Model | DA422A3F-26M | |
| | Fan motor | Standard air capacity ($m^3$/min) | 103.0 | |
| | | Motor output (W) | 100 × 2 | |
| Refrigerant piping | Connection method | | Flare connection | |
| | Hydro unit | Liquid | Ø9.52 | |
| | | Gas | Ø15.9 | |
| | Outdoor unit | Liquid | Ø9.52 | |
| | | Gas | Ø15.9 | |
| | Maximum length (m) | | 30 | |
| | Maximum chargeless length (m) | | 30 | |
| | Maximum height difference (m) | | ±30 | |
| | Minimum length (m) | | 5 | |
| Refrigerant | Refrigerant name | | R410A | |
| | Charge amount (kg) | | 2.7 | |
| Water piping | Pipe diameter | | R1 1/4 | |
| | Maximum length (m) | | None (Need the flow rate 13ℓ/min or more) | |
| | Maximum height difference (m) | | ±7 | |
| | Maximum working water pressure (kPa) *4 | | 430 | |
| Operating temperature range | Hydro unit (°C) *5 (Cooling / Heating / Hot water) | | 5-32 / 5-32 / 5-32 | |
| | Outdoor unit (°C) (Cooling / Heating / Hot water) | | 10-43 / -25-25 / -25-43 | |
| Operating humidity range | Hydro unit (%) | | 15-85 | |
| | Outdoor unit (%) | | 15-100 | |
| Wiring connection | Power wiring | | 3 wires: including earth wire (Outdoor unit) | |
| | Connecting line | | 4 wires: including earth wire | |

*1 Heating performance measurement conditions: outside air temperature 7 °C, water supply temperature 30 °C, outlet water temperature 35 °C, refrigerant piping length 7.5 m (no height difference).
*2 Cooling performance measurement conditions: outside air temperature 35 °C, water supply temperature 12 °C, outlet water temperature 7 °C, refrigerant piping length 7.5 m (no height difference).
*3 • The remote controller should be shipped with the hydro unit.
• Use two 1.5-meter wires to connect the hydro unit with the remote controller.
*4 Check the water piping for leakage under the maximum operating pressure.
*5 Do not leave the hydro unit at 5 °C or below.
① Max operation
Heating: outside air temperature 7°C, water supply temperature 47°C, outlet water temperature 55°C.
Cooling: outside air temperature 35°C, water supply temperature 12°C, outlet water temperature 7°C.

| | | | | |
|---|---|---|---|---|
| Unit name | Hydro unit | | HWS-P1105XWHM3-E, P1105XWHT6-E, P1105XWHT9-E | |
| | Outdoor unit | | HWS-P1105HR-E | |
| Heating capacity *1 (kW) | | | 11.2 | |
| Cooling capacity *2 (kW) | | | 10.0 | |
| Variable range of compressor frequency | | | 10 - 90 Hz | |
| Power source | | | Single phase 50 Hz 220-230 V | |
| Operation mode | | | Heating | Cooling |
| Electric characteristic *1 *2 | Hydro unit | Current (A) | 0.66 | 0.66 |
| | | Power (kW) | 0.09 | 0.09 |
| | | Power factor (%) | 59.2 | 59.2 |
| | Outdoor unit | Current (A) | 10.33 | 14.99 |
| | | Power (kW) | 2.21 | 3.24 |
| | | Power factor (%) | 93 | 94 |
| | Total | Running current (A) | 10.99 | 15.65 |
| Operating noise sound power level ① | Hydro unit (dB (A)) | | 43 | 43 |
| | Outdoor unit (dB (A)) | | 66 | 66 |
| Coefficient of performance *1 *2 | | | 4.88 | 3.00 |
| Hydro unit | Outer dimension | Height (mm) | 925 | |
| | | Width (mm) | 525 | |
| | | Depth (mm) | 355 | |
| | Net weight (kg) | | 49 | |
| | Color | | Silky shade (Munsell 1Y8.5/0.5) | |
| | Remote controller Outer dimension *3 | Height (mm) | 120 | |
| | | Width (mm) | 120 | |
| | | Depth (mm) | 16 | |
| | Circulation pump | Motor output (W) | 190 (MAX) | |
| | | Flow rate (L/min) | 32.1 | 28.9 |
| | | Type | Non-self-suction centrifugal pump | |
| | Heat exchanger | | Plate-type heat exchange | |
| Outdoor unit | Outer dimension | Height (mm) | 1340 | |
| | | Width (mm) | 900 | |
| | | Depth (mm) | 320 | |
| | Net weight (kg) | | 92 | |
| | Color | | Silky shade (Munsell 1Y8.5/0.5) | |
| | Compressor | Motor output (W) | 2500 | |
| | | Type | Twin rotary type with DC-inverter variable speed control | |
| | | Model | DA422A3F-26M | |
| | Fan motor | Standard air capacity ($m^3$/min) | 103.0 | |
| | | Motor output (W) | 100 × 2 | |
| Refrigerant piping | Connection method | | Flare connection | |
| | Hydro unit | Liquid | Ø9.52 | |
| | | Gas | Ø15.9 | |
| | Outdoor unit | Liquid | Ø9.52 | |
| | | Gas | Ø15.9 | |
| | Maximum length (m) | | 30 | |
| | Maximum chargeless length (m) | | 30 | |
| | Maximum height difference (m) | | ±30 | |
| | Minimum length (m) | | 5 | |
| Refrigerant | Refrigerant name | | R410A | |
| | Charge amount (kg) | | 2.7 | |
| Water piping | Pipe diameter | | R1 1/4 | |
| | Maximum length (m) | | None (Need the flow rate 18ℓ/min or more) | |
| | Maximum height difference (m) | | ±7 | |
| | Maximum working water pressure (kPa) *4 | | 430 | |
| Operating temperature range | Hydro unit (°C) *5 (Cooling / Heating / Hot water) | | 5-32 / 5-32 / 5-32 | |
| | Outdoor unit (°C) (Cooling / Heating / Hot water) | | 10-43 / -25-25 / -25-43 | |
| Operating humidity range | Hydro unit (%) | | 15-85 | |
| | Outdoor unit (%) | | 15-100 | |
| Wiring connection | Power wiring | | 3 wires: including earth wire (Outdoor unit) | |
| | Connecting line | | 4 wires: including earth wire | |

*1 Heating performance measurement conditions: outside air temperature 7 °C, water supply temperature 30 °C, outlet water temperature 35 °C, refrigerant piping length 7.5 m (no height difference).
*2 Cooling performance measurement conditions: outside air temperature 35 °C, water supply temperature 12 °C, outlet water temperature 7 °C, refrigerant piping length 7.5 m (no height difference).
*3 • The remote controller should be shipped with the hydro unit.
• Use two 1.5-meter wires to connect the hydro unit with the remote controller.
*4 Check the water piping for leakage under the maximum operating pressure.
*5 Do not leave the hydro unit at 5 °C or below.
① Max operation
Heating: outside air temperature 7°C, water supply temperature 47°C, outlet water temperature 55°C.
Cooling: outside air temperature 35°C, water supply temperature 12°C, outlet water temperature 7°C.

| | | | | |
|---|---|---|---|---|
| Unit name | Hydro unit | | HWS-P805XWHM3-E, P805XWHT6-E, P805XWHT9-E | |
| | Outdoor unit | | HWS-P805H8R-E | |
| Heating capacity *1 (kW) | | | 8.0 | |
| Cooling capacity *2 (kW) | | | 6.0 | |
| Variable range of compressor frequency | | | 10 - 70 Hz | |
| Power source | | | 3 phase 50 Hz 380-400 V | |
| Operation mode | | | Heating | Cooling |
| Electric characteristic *1 *2 | Hydro unit | Current (A) | 0.44 | 0.44 |
| | | Power (kW) | 0.06 | 0.06 |
| | | Power factor (%) | 59.3 | 59.3 |
| | Outdoor unit | Current (A) | 3.13 | 3.09 |
| | | Power (kW) | 1.65 | 1.58 |
| | | Power factor (%) | 76 | 74 |
| | Total | Running current (A) | 3.28 | 3.24 |
| Operating noise sound power level ① | Hydro unit (dB (A)) | | 41 | 41 |
| | Outdoor unit (dB (A)) | | 66 | 65 |
| Coefficient of performance *1 *2 | | | 4.76 | 3.66 |
| Hydro unit | Outer dimension | Height (mm) | 925 | |
| | | Width (mm) | 525 | |
| | | Depth (mm) | 355 | |
| | Net weight (kg) | | 46 | |
| | Color | | Silky shade (Munsell 1Y8.5/0.5) | |
| | Remote controller Outer dimension *3 | Height (mm) | 120 | |
| | | Width (mm) | 120 | |
| | | Depth (mm) | 16 | |
| | Circulation pump | Motor output (W) | 125 (MAX) | |
| | | Flow rate (L/min) | 22.9 | 17.2 |
| | | Type | Non-self-suction centrifugal pump | |
| | Heat exchanger | | Plate-type heat exchange | |
| Outdoor unit | Outer dimension | Height (mm) | 1340 | |
| | | Width (mm) | 900 | |
| | | Depth (mm) | 320 | |
| | Net weight (kg) | | 92 | |
| | Color | | Silky shade (Munsell 1Y8.5/0.5) | |
| | Compressor | Motor output (W) | 2500 | |
| | | Type | Twin rotary type with DC-inverter variable speed control | |
| | | Model | DA422A3F-27M | |
| | Fan motor | Standard air capacity ($m^3$/min) | 103.0 | |
| | | Motor output (W) | 100 × 2 | |
| Refrigerant piping | Connection method | | Flare connection | |
| | Hydro unit | Liquid | Ø9.52 | |
| | | Gas | Ø15.9 | |
| | Outdoor unit | Liquid | Ø9.52 | |
| | | Gas | Ø15.9 | |
| | Maximum length (m) | | 30 | |
| | Maximum chargeless length (m) | | 30 | |
| | Maximum height difference (m) | | ±30 | |
| | Minimum length (m) | | 5 | |
| Refrigerant | Refrigerant name | | R410A | |
| | Charge amount (kg) | | 2.7 | |
| Water piping | Pipe diameter | | R1 1/4 | |
| | Maximum length (m) | | None (Need the flow rate 13ℓ/min or more) | |
| | Maximum height difference (m) | | ±7 | |
| | Maximum working water pressure (kPa) *4 | | 430 | |
| Operating temperature range | Hydro unit (°C) *5 (Cooling / Heating / Hot water) | | 5-32 / 5-32 / 5-32 | |
| | Outdoor unit (°C) (Cooling / Heating / Hot water) | | 10-43 / -25-25 / -25-43 | |
| Operating humidity range | Hydro unit (%) | | 15-85 | |
| | Outdoor unit (%) | | 15-100 | |
| Wiring connection | Power wiring | | 5 wires: including earth wire (Outdoor unit) | |
| | Connecting line | | 4 wires: including earth wire | |

*1 Heating performance measurement conditions: outside air temperature 7 °C, water supply temperature 30 °C, outlet water temperature 35 °C, refrigerant piping length 7.5 m (no height difference).
*2 Cooling performance measurement conditions: outside air temperature 35 °C, water supply temperature 12 °C, outlet water temperature 7 °C, refrigerant piping length 7.5 m (no height difference).
*3 • The remote controller should be shipped with the hydro unit.
• Use two 1.5-meter wires to connect the hydro unit with the remote controller.
*4 Check the water piping for leakage under the maximum operating pressure.
*5 Do not leave the hydro unit at 5 °C or below.
① Max operation
Heating: outside air temperature 7°C, water supply temperature 47°C, outlet water temperature 55°C.
Cooling: outside air temperature 35°C, water supply temperature 12°C, outlet water temperature 7°C.

| | | | | | | |
|---|---|---|---|---|---|---|
| Unit name | Hydro unit | | HWS-P1105XWHM3-E, P1105XWHT6-E, P1105XWHT9-E | | | |
| | Outdoor unit | | HWS-P1105H8R-E | | HWS-P1405H8R-E | |
| Heating capacity *1 (kW) | | | 11.2 | | 14.0 | |
| Cooling capacity *2 (kW) | | | 10.0 | | 11.0 | |
| Variable range of compressor frequency | | | 10 - 80 Hz | | 10 - 90 Hz | |
| Power source | | | 3 phase 50 Hz 380-400 V | | | |
| Operation mode | | | Heating | Cooling | Heating | Cooling |
| Electric characteristic *1 *2 | Hydro unit | Current (A) | 0.66 | 0.66 | 0.66 | 0.66 |
| | | Power (kW) | 0.09 | 0.09 | 0.09 | 0.09 |
| | | Power factor (%) | 59.2 | 59.2 | 59.2 | 59.2 |
| | Outdoor unit | Current (A) | 4.23 | 5.55 | 5.47 | 6.34 |
| | | Power (kW) | 2.25 | 3.24 | 3.07 | 3.81 |
| | | Power factor (%) | 77 | 85 | 81 | 87 |
| | Total | Running current (A) | 4.45 | 5.77 | 5.69 | 6.56 |
| Operating noise sound power level ① | Hydro unit (dB (A)) | | 43 | 43 | 43 | 43 |
| | Outdoor unit (dB (A)) | | 67 | 66 | 68 | 68 |
| Coefficient of performance *1 *2 | | | 4.88 | | 3.00 | |
| Hydro unit | Outer dimension | Height (mm) | 925 | | | |
| | | Width (mm) | 525 | | | |
| | | Depth (mm) | 355 | | | |
| | Net weight (kg) | | 49 | | | |
| | Color | | Silky shade (Munsell 1Y8.5/0.5) | | | |
| | Remote controller Outer dimension *3 | Height (mm) | 120 | | | |
| | | Width (mm) | 120 | | | |
| | | Depth (mm) | 16 | | | |
| | Circulation pump | Motor output (W) | 190 (MAX) | | | |
| | | Flow rate (L/min) | 32.1 | 28.9 | 40.1 | 31.5 |
| | | Type | Non-self-suction centrifugal pump | | | |
| | Heat exchanger | | Plate-type heat exchange | | | |
| Outdoor unit | Outer dimension | Height (mm) | 1340 | | | |
| | | Width (mm) | 900 | | | |
| | | Depth (mm) | 320 | | | |
| | Net weight (kg) | | 92 | | | |
| | Color | | Silky shade (Munsell 1Y8.5/0.5) | | | |
| | Compressor | Motor output (W) | 2500 | | | |
| | | Type | Twin rotary type with DC-inverter variable speed control | | | |
| | | Model | DA422A3F-27M | | | |
| | Fan motor | Standard air capacity ($m^3$/min) | 103.0 | | | |
| | | Motor output (W) | 100 × 2 | | | |
| Refrigerant piping | Connection method | | Flare connection | | | |
| | Hydro unit | Liquid | Ø9.52 | | | |
| | | Gas | Ø15.9 | | | |
| | Outdoor unit | Liquid | Ø9.52 | | | |
| | | Gas | Ø15.9 | | | |
| | Maximum length (m) | | 30 | | | |
| | Maximum chargeless length (m) | | 30 | | | |
| | Maximum height difference (m) | | ±30 | | | |
| | Minimum length (m) | | 5 | | | |
| Refrigerant | Refrigerant name | | R410A | | | |
| | Charge amount (kg) | | 2.7 | | | |
| Water piping | Pipe diameter | | R1 1/4 | | | |
| | Maximum length (m) | | None (Need the flow rate 18ℓ/min or more) | | | |
| | Maximum height difference (m) | | ±7 | | | |
| | Maximum working water pressure (kPa) *4 | | 430 | | | |
| Operating temperature range | Hydro unit (°C) *5 (Cooling / Heating / Hot water) | | 5-32 / 5-32 / 5-32 | | | |
| | Outdoor unit (°C) (Cooling / Heating / Hot water) | | 10-43 / -25-25 / -25-43 | | | |
| Operating humidity range | Hydro unit (%) | | 15-85 | | | |
| | Outdoor unit (%) | | 15-100 | | | |
| Wiring connection | Power wiring | | 5 wires: including earth wire (Outdoor unit) | | | |
| | Connecting line | | 4 wires: including earth wire | | | |

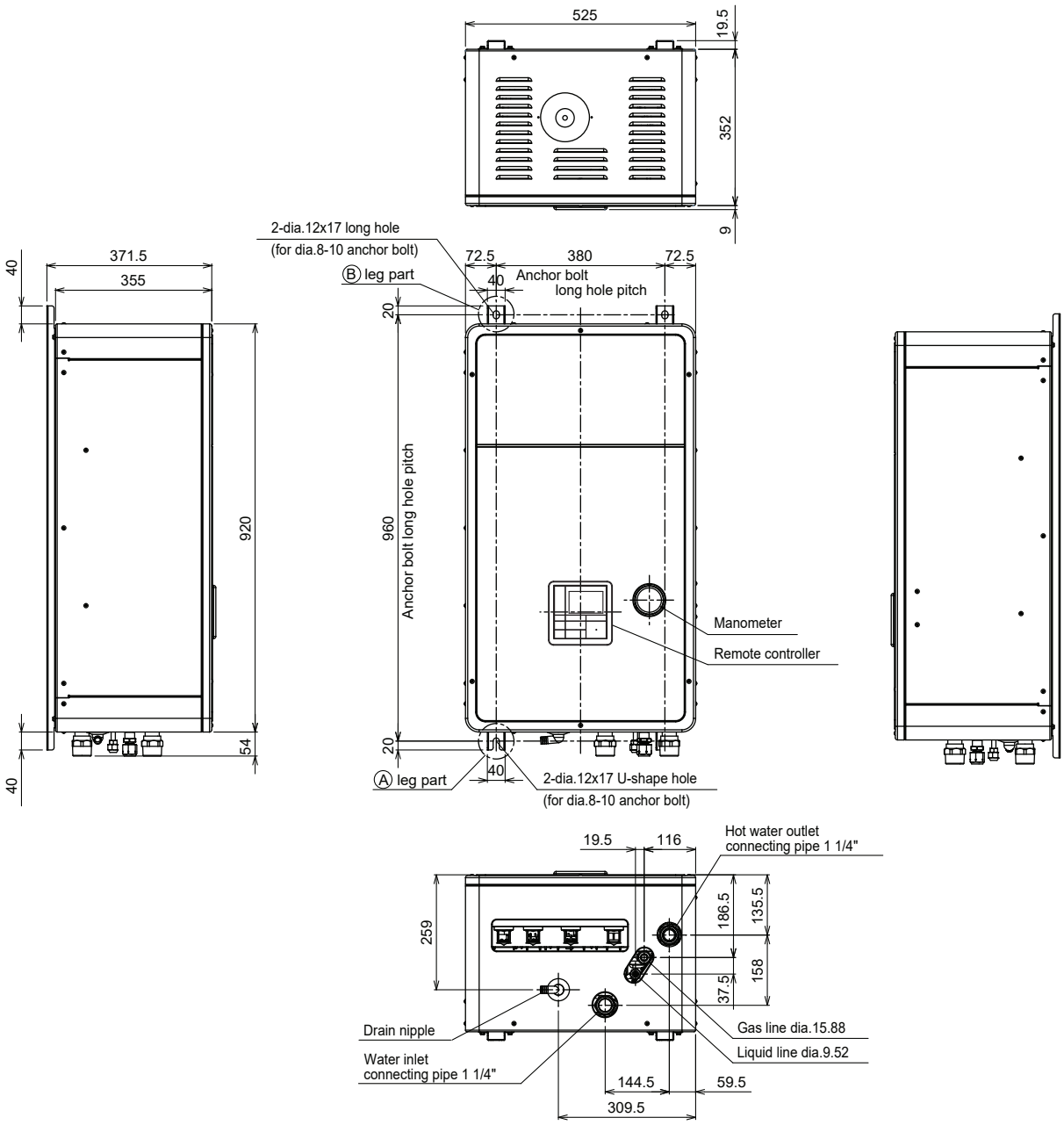
*1 Heating performance measurement conditions: outside air temperature 7 °C, water supply temperature 30 °C, outlet water temperature 35 °C, refrigerant piping length 7.5 m (no height difference).
*2 Cooling performance measurement conditions: outside air temperature 35 °C, water supply temperature 12 °C, outlet water temperature 7 °C, refrigerant piping length 7.5 m (no height difference).
*3 • The remote controller should be shipped with the hydro unit.
• Use two 1.5-meter wires to connect the hydro unit with the remote controller.
*4 Check the water piping for leakage under the maximum operating pressure.
*5 Do not leave the hydro unit at 5 °C or below.
① Max operation
Heating: outside air temperature 7°C, water supply temperature 47°C, outlet water temperature 55°C.
Cooling: outside air temperature 35°C, water supply temperature 12°C, outlet water temperature 7°C.

# 4 Outside drawing

## 4-1. Hydro unit

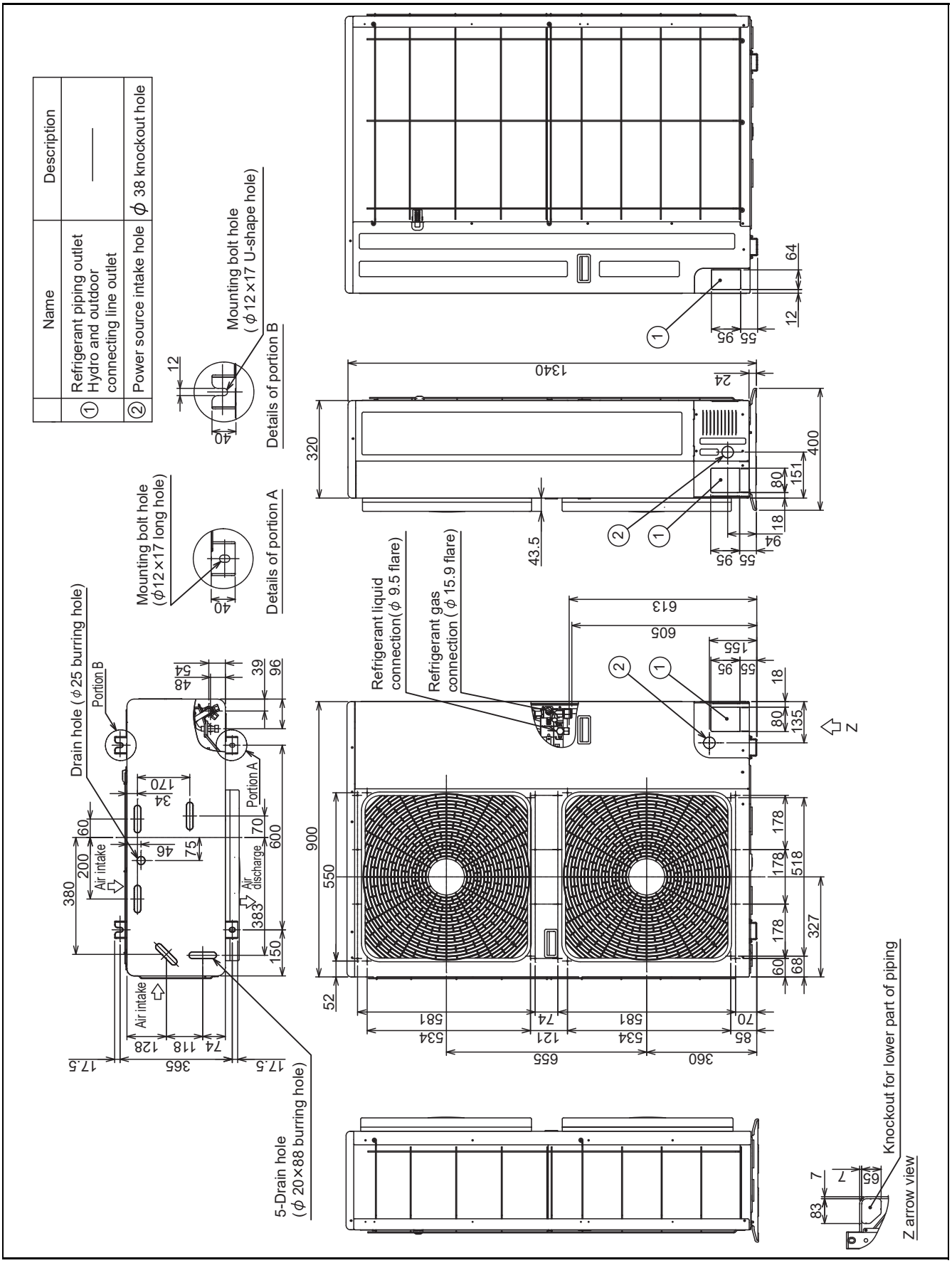
### HWS-P805XWHM3-E, P805XWHT6-E, P805XWHT9-E

### HWS-P1105XWHM3-E, P1105XWHT6-E, P1105XWHT9-E



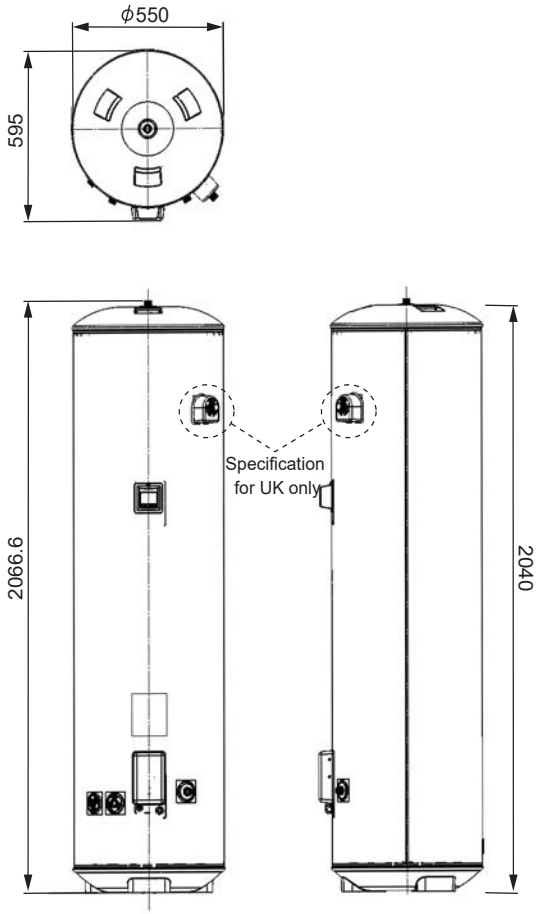
# 4-2. Outdoor unit

## HWS-P805HR-E, P1105HR-E, P805H8R-E, P1105H8R-E, P1405H8R-E

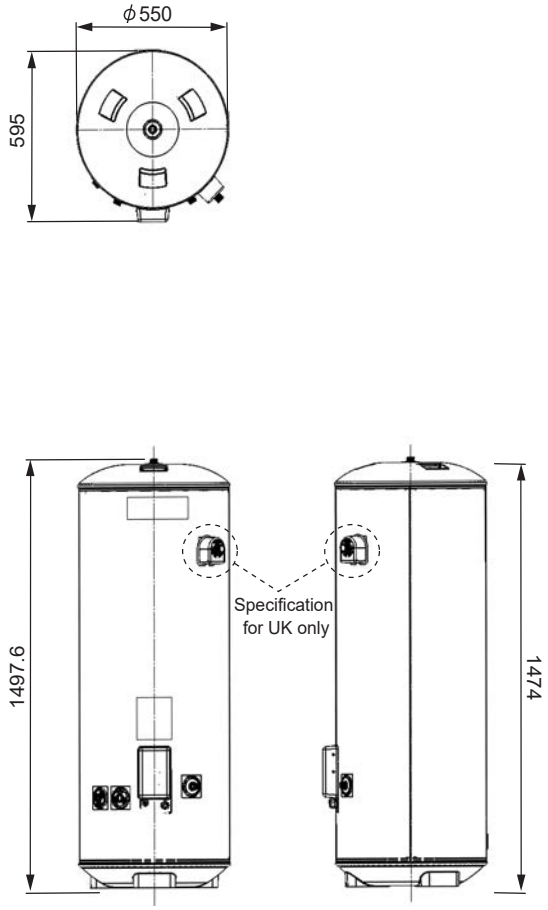


# 4-3. Hot water cylinder

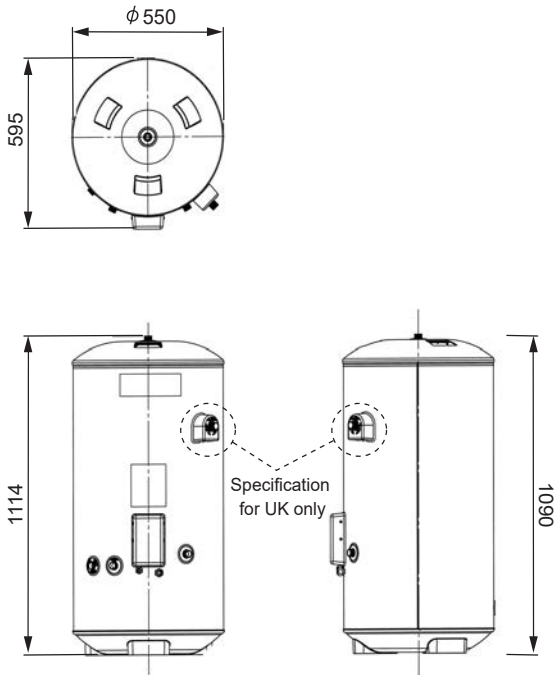
## HWS-3001CSHM3-E(-UK)




## HWS-2101CSHM3-E(-UK)




## HWS-1501CSHM3-E(-UK)



# 5 Wiring diagram

## 5-1. Hydro unit

**⚠ WARNING**

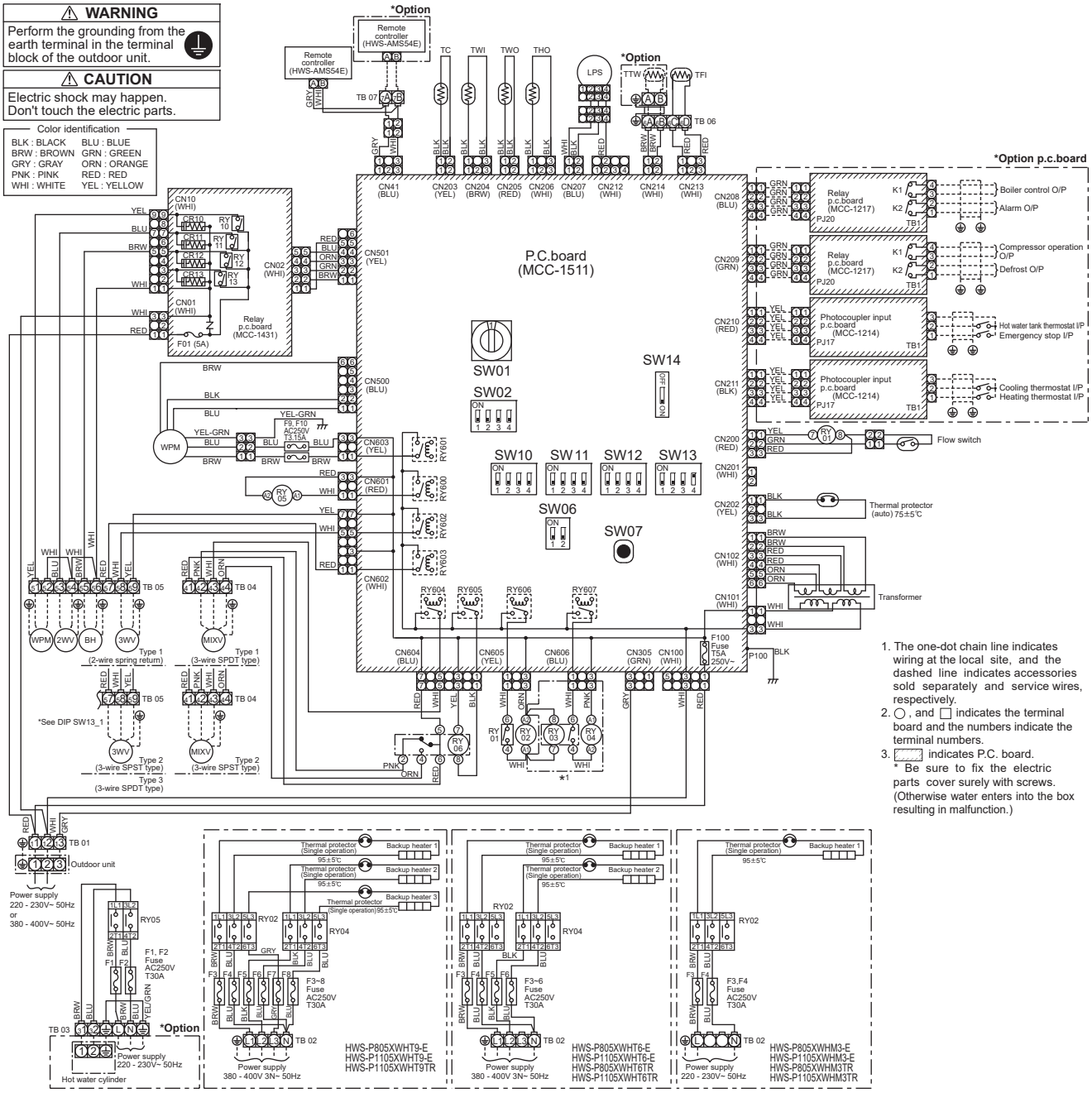
Perform the grounding from the earth terminal in the terminal block of the outdoor unit.

**⚠ CAUTION**

Electric shock may happen.
Don't touch the electric parts.

Color identification

| | |
|---|---|
| BLK : BLACK | BLU : BLUE |
| BRW : BROWN | GRN : GREEN |
| GRY : GRAY | ORN : ORANGE |
| PNK : PINK | RED : RED |
| WHI : WHITE | YEL : YELLOW |




1. The one-dot chain line indicates wiring at the local site, and the dashed line indicates accessories sold separately and service wires, respectively.
2. ○, and □ indicates the terminal board and the numbers indicate the terminal numbers.
3. ▨ indicates P.C. board.
   * Be sure to fix the electric parts cover surely with screws. (Otherwise water enters into the box resulting in malfunction.)

| Symbol | Parts name | Symbol | Parts name |
|---|---|---|---|
| WPM | Water pump motor | TC | Water heat exchanger temperature sensor |
| 3WV | 3-way valve (local) | TWI | Water heat exchanger inlet temperature sensor |
| 2WV | 2-way valve (local) | TWO | Water heat exchanger outlet temperature sensor |
| MIXV | Mixing valve (local) | THO | Backup heater outlet temperature sensor |
| BH | Booster heater | TTW | Hot water cylinder temperature sensor |
| RY01~RY06 | Relay01~Relay06 | TFI | Floor heating inlet temperature sensor |
| LPS | Low pressure sensor | TB | Terminal block |
| Backup heater1, 2, 3 | Heater AC230V, 3kW | | |

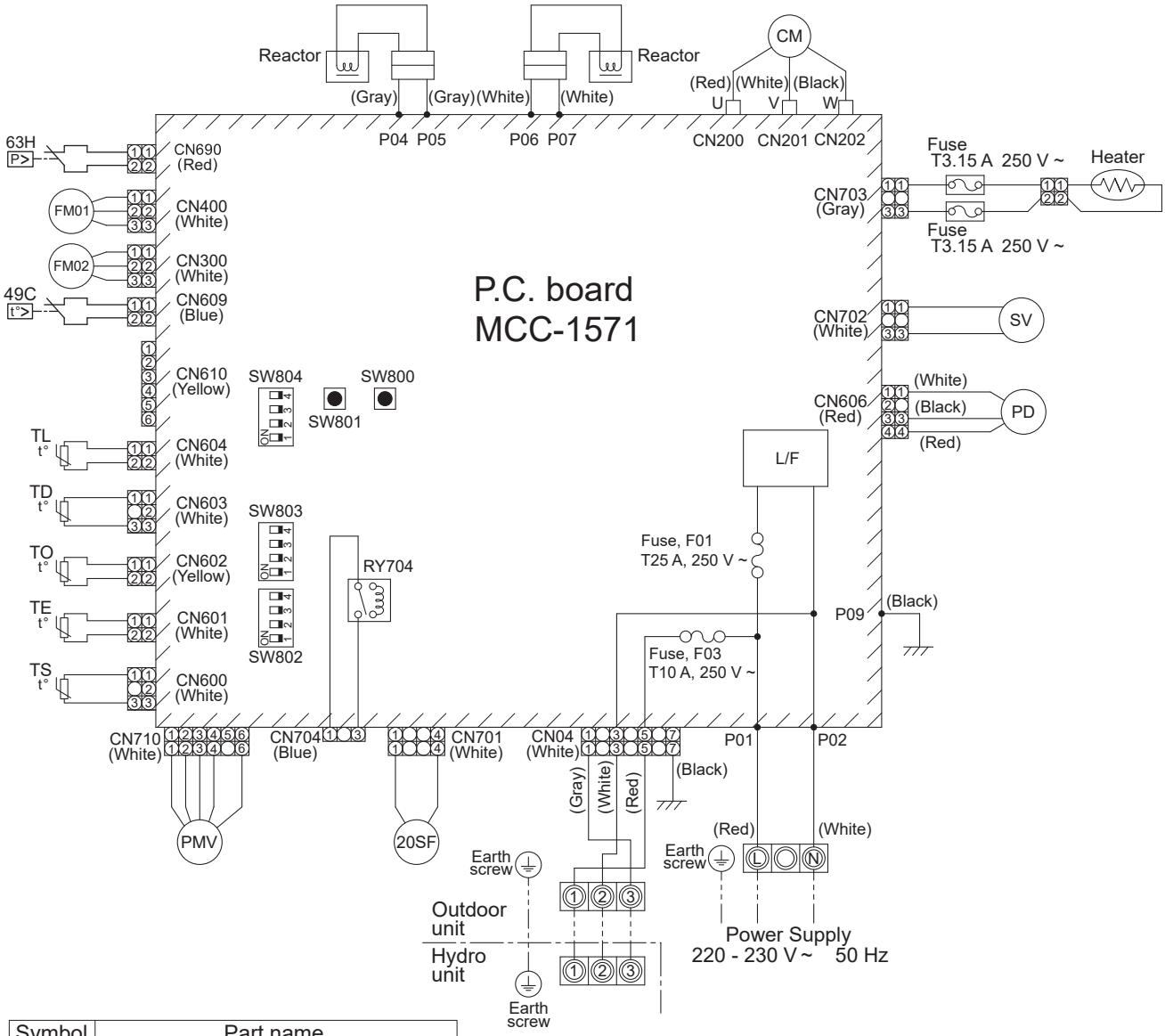
*1 HWS-P805XWHT6-E : Installed
HWS-P1105XWHT6-E : Installed
HWS-P805XWHT9-E : Installed
HWS-P1105XWHT9-E : Installed
HWS-P805XWHM3-E : Not installed
HWS-P1105XWHM3-E : Not installed

*1 HWS-P805XWHT6TR : Installed
HWS-P1105XWHT6TR : Installed
HWS-P1105XWHT9TR : Installed
HWS-P805XWHM3TR : Not installed
HWS-P1105XWHM3TR : Not installed

# 5-2. Outdoor unit

## HWS-P805HR-E, HWS-P1105HR-E

HWS-P805HR-E, -P805HRTR
HWS-P1105HR-E, -P1105HRTR

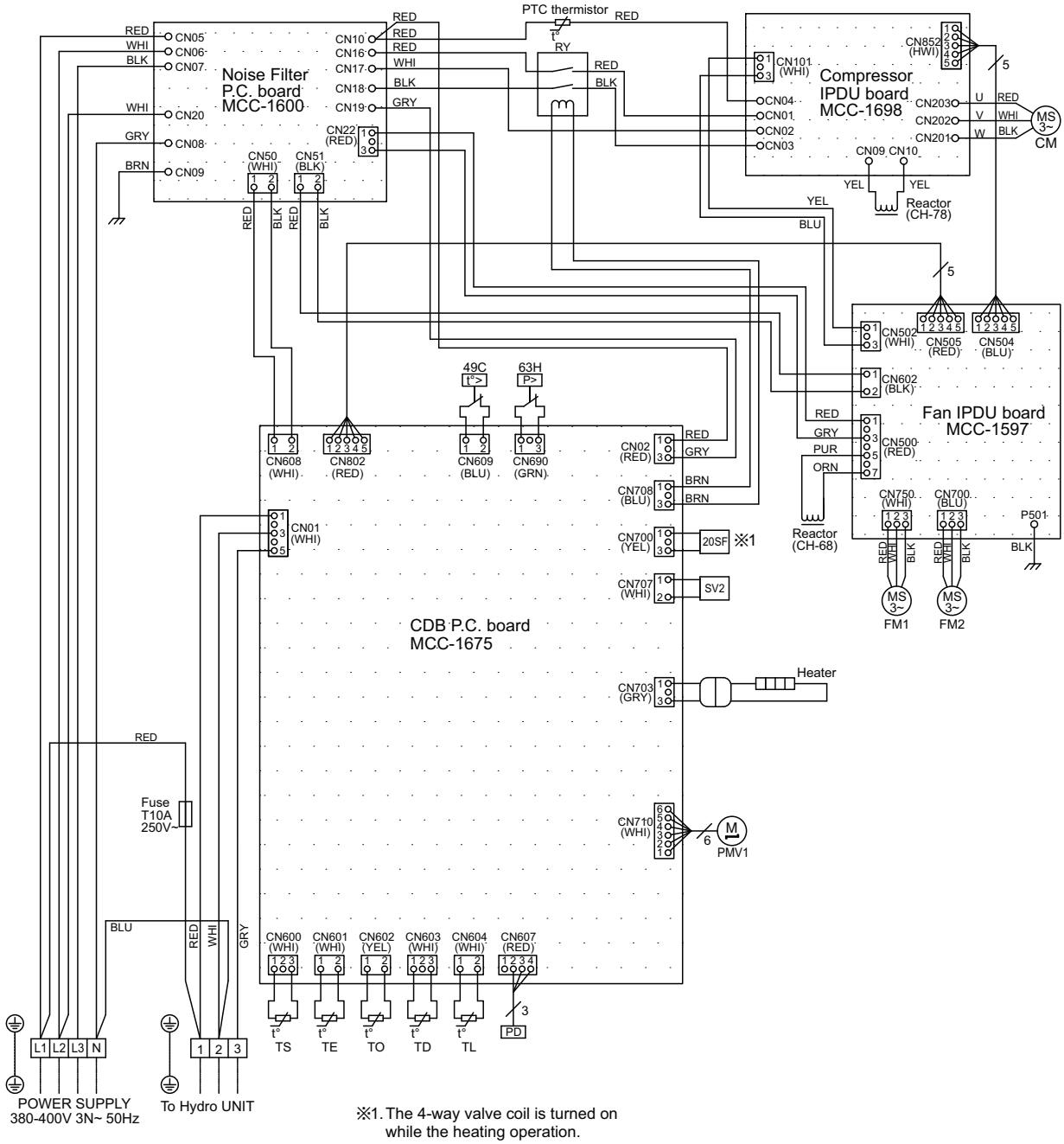



| Symbol | Part name |
|---|---|
| CM | Compressor |
| FM01 | Fan motor |
| FM02 | |
| PMV | Pulse motor valve |
| TD | Pipe temperature sensor(Discharge) |
| TS | Pipe temperature sensor(Suction) |
| TE | Heat exchanger sensor 1 |
| TL | Heat exchanger sensor 2 |
| TO | Outside temperature sensor |
| 20SF | 4-way valve coil |
| SV | 2-way valve coil |
| PD | Pressure sensor |
| 49C | Compressor case thermostat |
| RY | Relay |
| L/F | Line Filter |
| 63H | High-pressure switch |

1. ◎ indicates the terminal block. Alphanumeric characters in the cycle indicate the terminal No.
2. The two-dot chain line indicates the wiring procured locally.
3. ▨ indicates the P.C. board.
4. For the hydro unit circuit, refer to the wiring diagram of the hydro unit.

# 5-3. Outdoor unit

## HWS-P805H8R-E, HWS-P1105H8R-E, HWS-P1405H8R-E




※1. The 4-way valve coil is turned on while the heating operation.

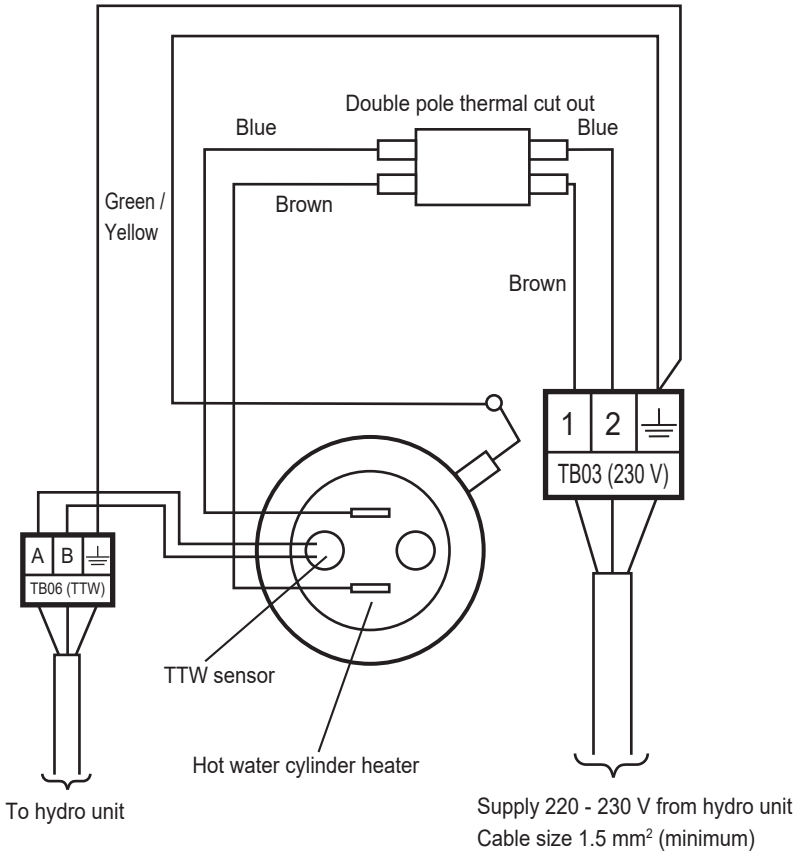
| Symbol | Part name |
|---|---|
| CM | Compressor |
| FM1,2 | Fan motor |
| PMV1 | Pulse motor valve |
| PD | High-pressure sensor |
| RY | Relay |
| SV2 | 2-way valve coil |
| TD | Pipe temperature sensor(Discharge) |
| TS | Pipe temperature sensor(Suction) |
| TE | Heat exchanger sensor 1 |
| TL | Heat exchanger sensor 2 |
| TO | Outside temperature sensor |
| 20SF | 4-way valve coil |
| 49C | Compressor case thermostat |
| 63H | High-pressure switch |

| | |
|---|---|
| ——— | Field wiring |
| ⏚ | Protective earth |
| ▭ | Terminal block |
| —○— | Terminal |
| ○ ○ | Connector |
| ⋯ | P.C.board |

**Color Indication**

| | |
|---|---|
| BLK : BLACK | GRY : GRAY |
| BLU : BLUE | BRN : BROWN |
| RED : RED | PUR : PURPLE |
| YEL : YELLOW | ORN : ORANGE |
| WHI : WHITE | GRN : GREEN |

# 5-4. Hot water cylinder unit



# 6 Key electric component rating

## 6-1. Hydro unit

### HWS-P805XWHM3-E, T6-E, T9-E

| No. | Component name | Model name | | | Type name | Rating |
|---|---|---|---|---|---|---|
| | | M3-E | T6-E | T9-E | | |
| 1 | Circulation pump | O | O | O | UPM 2K 25-60 130 | AC230 V 0.40 A (MAX) |
| 2 | Backup heater 3 kW | O | | | SA3-23652B | AC230 V 3 kW |
| 3 | Backup heater 6 kW | | O | | SA3-23652B | AC400 V (3N) 6 kW |
| 4 | Backup heater 9 kW | | | O | SA3-23652B | AC400 V (3N) 9 kW |
| 5 | Water heat exchange temperature sensor (TC sensor) | O | O | O | – | 10 kΩ (25 °C) |
| 6 | Water inlet temperature sensor (TWI sensor) | O | O | O | – | 10 kΩ (25 °C) |
| 7 | Water outlet temperature sensor (TWO sensor) | O | O | O | – | 10 kΩ (25 °C) |
| 8 | Heater outlet water temperature sensor (THO sensor) | O | O | O | – | 10 kΩ (25 °C) |
| 9 | Floor inlet temperature sensor (TFI sensor) | O | O | O | – | 10 kΩ (25 °C) |
| 10 | Low pressure sensor | O | O | O | – | Operating pressure 0.20 MPa |
| 11 | Bimetal thermostat (auto) | O | O | O | – | Operating temperature 75±3 °C DC12 V / 0.2 A |
| 12 | Bimetal thermostat (single operation) | O | O | O | – | Operating temperature 95±5 °C AC250 V / 16 A |
| 13 | Flow switch | O | O | O | – | Operating flowing quantity 13 ℓ/min |
| 14 | Output board (OP) | OP | OP | OP | TCB-PCIN3E | AC230 V 0.5 A, DC24 V 1 A |
| 15 | Input board (OP) | OP | OP | OP | TCB-PCM03E | Contact input |
| 16 | Remote controller (Main) | O | O | O | HWS-AMS54E | |
| 17 | Remote controller (Sub) | OP | OP | OP | HWS-AMS54E | |
| 18 | Water 3-way valve terminal | O | O | O | – | AC230 V 0.1 A<br>2Wire, 3Wire SPST, SPDT type mountable |
| 19 | Water 2-way valve terminal | O | O | O | – | AC230 V 0.1 A 2Wire type mountable |
| 20 | Mixing valve terminal | O | O | O | – | AC230 V 0.1 A<br>3Wire SPST, SPDT type mountable |
| 21 | Circulation pump terminal | O | O | O | – | AC230 V 1.0 A |
| 22 | Booster heater terminal | O | O | O | – | AC230 V 1.0 A |
| 23 | Fuse | O | O | O | – | AC250 V 30 A |

O ····· Applied
OP ····· Optional accessory

## HWS-P1105XWHM3-E, T6-E, T9-E

| No. | Component name | Model name | | | Type name | Rating |
|---|---|---|---|---|---|---|
| | | M3-E | T6-E | T9-E | | |
| 1 | Circulation pump | O | O | O | UPM GEO 25-85 130 | AC230 V 0.66 A (MAX) |
| 2 | Backup heater 3 kW | O | | | SA3-23652B | AC230 V 3 kW |
| 3 | Backup heater 6 kW | | O | | SA3-23652B | AC400 V (3N) 6 kW |
| 4 | Backup heater 9 kW | | | O | SA3-23652B | AC400 V (3N) 9 kW |
| 5 | Water heat exchange temperature sensor (TC sensor) | O | O | O | – | 10 kΩ (25 °C) |
| 6 | Water inlet temperature sensor (TWI sensor) | O | O | O | – | 10 kΩ (25 °C) |
| 7 | Water outlet temperature sensor (TWO sensor) | O | O | O | – | 10 kΩ (25 °C) |
| 8 | Heater outlet water temperature sensor (THO sensor) | O | O | O | – | 10 kΩ (25 °C) |
| 9 | Floor inlet temperature sensor (TFI sensor) | O | O | O | – | 10 kΩ (25 °C) |
| 10 | Low pressure sensor | O | O | O | – | Operating pressure 0.20 MPa |
| 11 | Thermal protector (auto) | O | O | O | – | Operating temperature 75±3 °C DC42 V / 0.2 A |
| 12 | Thermal protector (single operation) | O | O | O | – | Operating temperature 95±5 °C AC250 V 16 A |
| 13 | Flow switch | O | O | O | – | Operating flowing quantity 18 L/min |
| 14 | Output board (OP) | OP | OP | OP | TCB-PCIN3E | AC230 V 0.5 A, DC24 V 1 A |
| 15 | Input board (OP) | OP | OP | OP | TCB-PCM03E | Contact input |
| 16 | Remote controller (Main) | O | O | O | HWS-AMS54E | |
| 17 | Remote controller (Sub) | OP | OP | OP | HWS-AMS54E | |
| 18 | Water 3-way valve terminal | O | O | O | – | AC230 V 0.1 A<br>2Wire, 3Wire SPST, SPDT type mountable |
| 19 | Water 2-way valve terminal | O | O | O | – | AC230 V 0.1 A 2Wire type mountable |
| 20 | Mixing valve terminal | O | O | O | – | AC230 V 0.1 A<br>3Wire SPST, SPDT type mountable |
| 21 | Circulation pump terminal | O | O | O | – | AC230 V 1.0 A |
| 22 | Booster heater terminal | O | O | O | – | AC230 V 1.0 A |
| 23 | Fuse | O | O | O | – | AC250 V 30 A |

O ····· Applied
OP ····· Optional accessory

# 6-2. Outdoor unit

## HWS-P805HR-E, P1105HR-E

| No. | Component name | Type name | Rating |
|---|---|---|---|
| 1 | Compressor | DA422A3F-26M | |
| 2 | Outdoor fan motor (x2) | ICF-280-A100-1 | Output 100 W |
| 3 | Reactor (x2) | CH-44 | 1.4 mH, 25 A |
| 4 | 4-way valve coil | STF-H01AP1874A1 | AC220 - 230 V full-wave rectifier input, alive time 10 sec or less |
| 5 | Pulse motor valve (PMV) coil | UKV-A038 | DC12 V |
| 6 | Compressor case thermostat | US-622KXTMQO-SS | OFF = 125 ± 4 °C, ON = 90 ± 5 °C |
| 7 | PC board | MCC-1571 | Input 1Ø, AC220 - 230 V ± 10%, 50/60 Hz |
| 8 | High pressure sensor | NSK-BH042D-430 | 0 ~ 4.15 MPa |
| 9 | 2-way valve coil | VPV-MOAJ510B0 | AC220 - 240 V |
| 10 | High pressure switch | ACB-4UB154W | OFF = 4.15 + 0, -0.15 MPa |

## HWS-P805H8R-E, P1105H8R-E, P1405H8R-E

| No. | Component name | Type name | Rating |
|---|---|---|---|
| 1 | Compressor | DA422A3F-27M | |
| 2 | Outdoor fan motor (x2) | ICF-280-A100-1 | Output 100 W |
| 3 | Reactor | CH-78 | 4.2 mH, 16 A |
| 4 | Reactor | CH-68 | 18 mH, 5 A |
| 5 | 4-way valve coil | STF-H01AJ1736A1 | AC220 - 230 V |
| 6 | Pulse motor valve (PMV) coil | UKV-A038 | DC12 V |
| 7 | PC board (Compressor) | MCC-1698 | |
| 8 | PC board (Fan motor drive) | MCC-1597 | |
| 9 | PC board (Control) | MCC-1675 | |
| 10 | PC board (Noise filter) | MCC-1600 | |
| 11 | High pressure switch | ACB-4UB154W | OFF = 4.15 +0, - 0.15 MPa |
| 12 | Compressor case thermostat | US-622 | OFF = 125 ± 4 °C, ON = 90 ± 5 °C |
| 13 | Relay | EL200/240 A2-F() | Contact = AC480V, 20 A |
| 14 | 2-way valve coil | TEV-SMOAJ2170A1 | AC220 - 240 V |

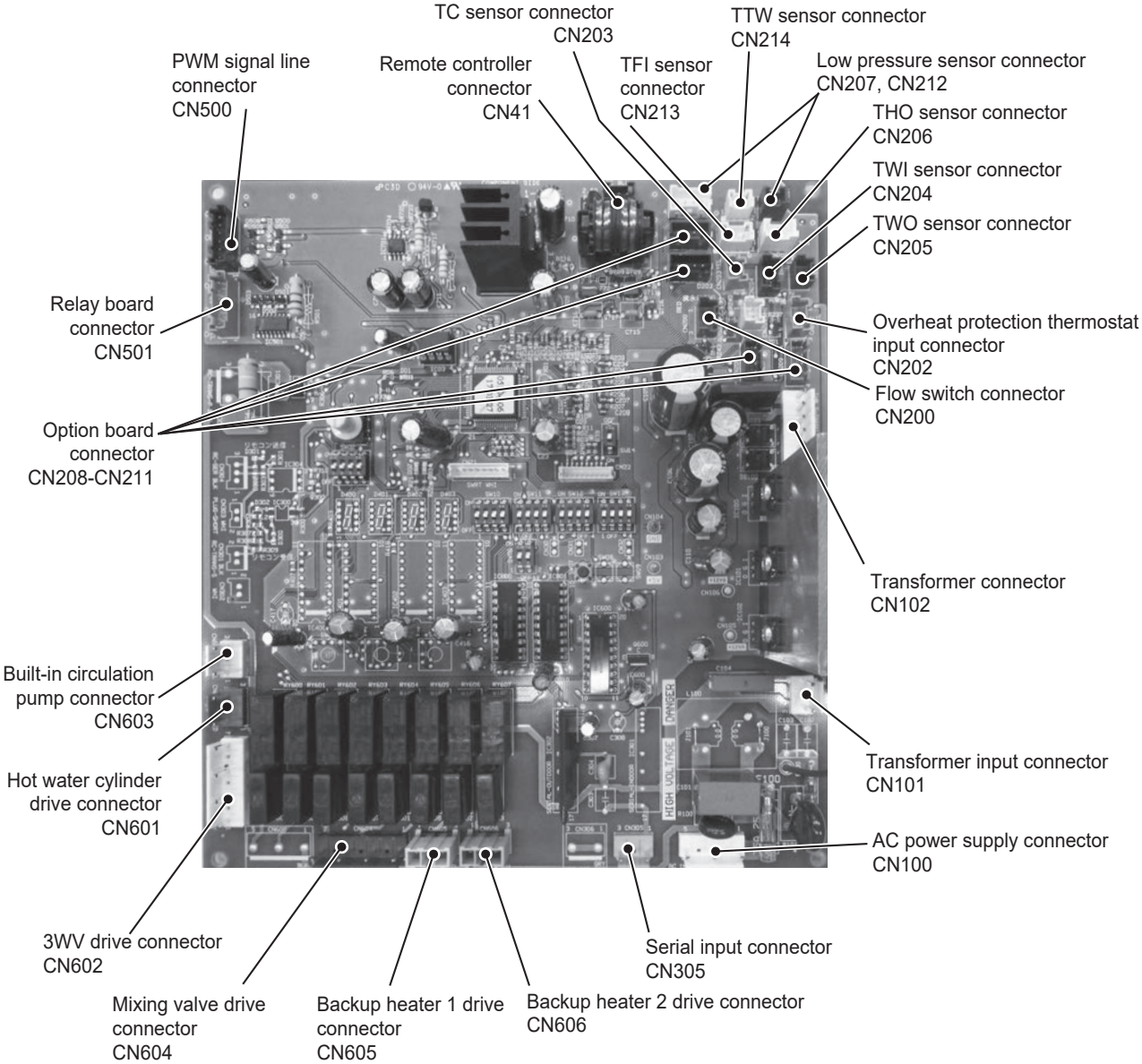
# 6-3. Hot water cylinder unit

| No. | Component name | Model name | | | Type name | Rating |
|---|---|---|---|---|---|---|
| | | 1501 CSH M3-E (-UK) | 2101 CSH M3-E (-UK) | 3001 CSH M3-E (-UK) | | |
| 1 | Hot water cylinder heater | O | O | O | – | AC230 V 2.7 kW |
| 2 | Hot water cylinder temperature sensor (TTW sensor) | O | O | O | – | 10 kΩ (25 °C) |
| 3 | Thermal cut-out | O | O | O | – | Operating temperature Manual reset 82 °C (+3K/-2K) |

O ····· Applied

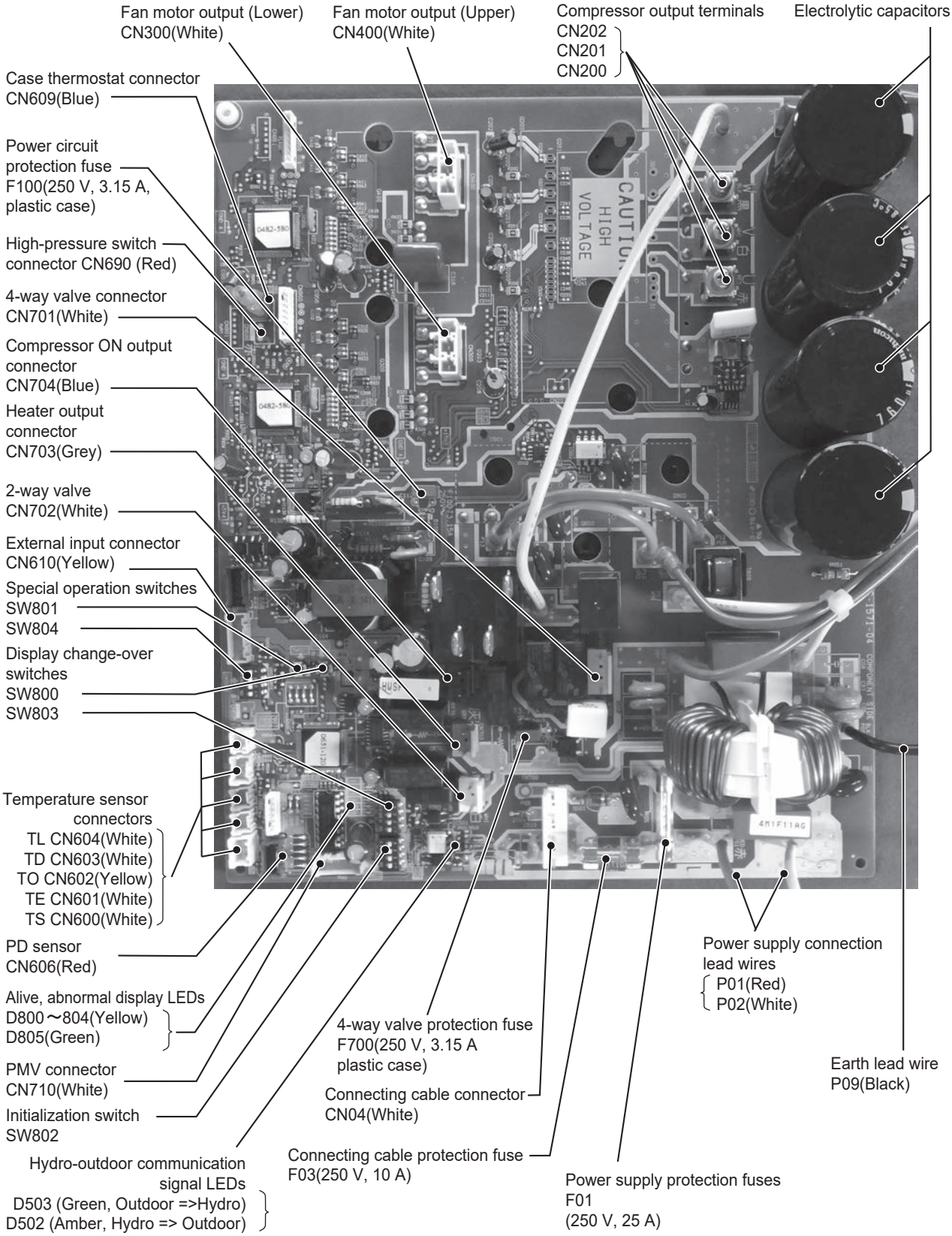
# 6-4. Water heat exchange control board

## HWS-P805XWHM3-E, P805XWHT6-E, P805XWHT9-E
## HWS-P1105XWHM3-E, P1105XWHT6-E, P1105XWHT9-E



# 6-5. Outdoor control board

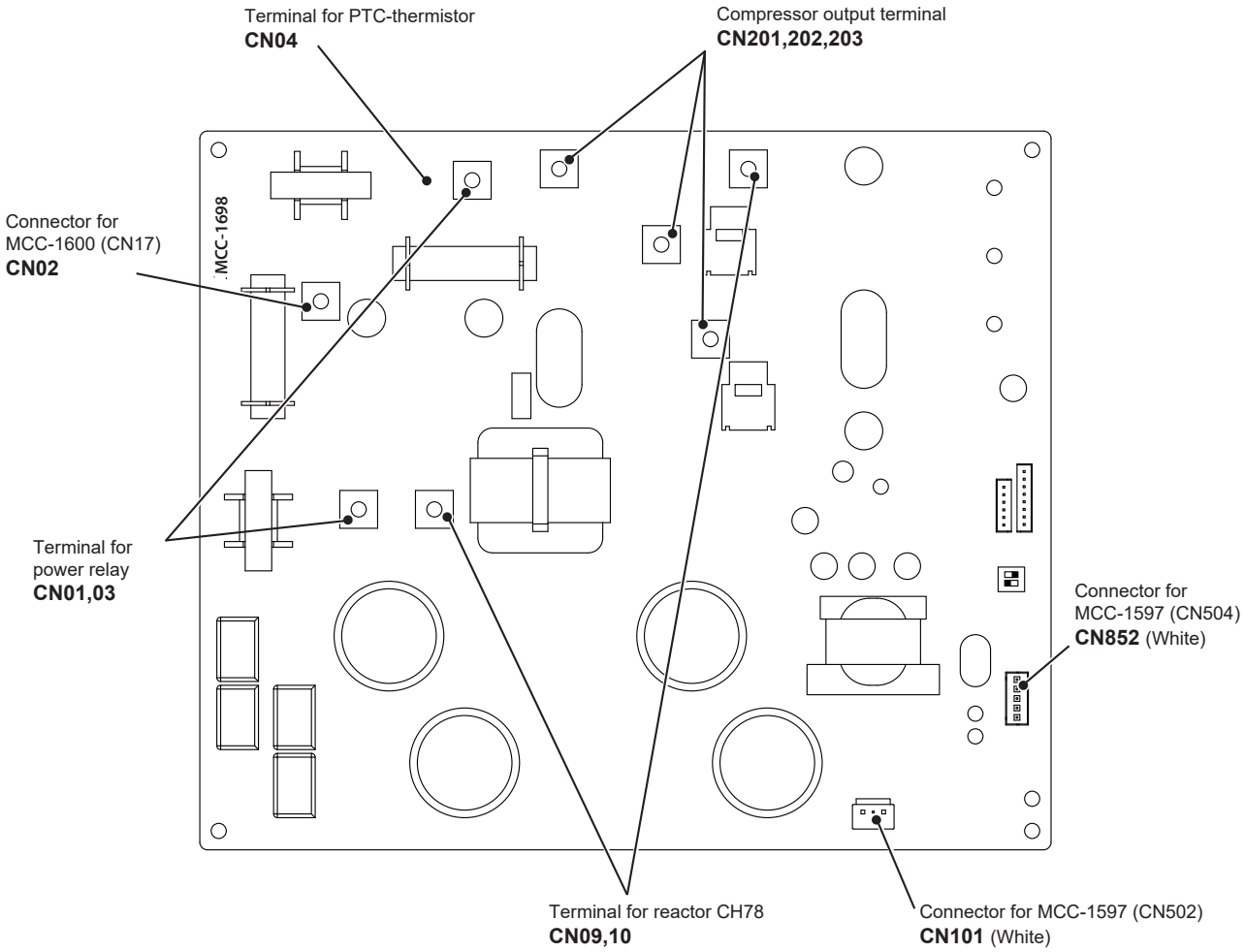
## HWS-P805HR-E, P1105HR-E



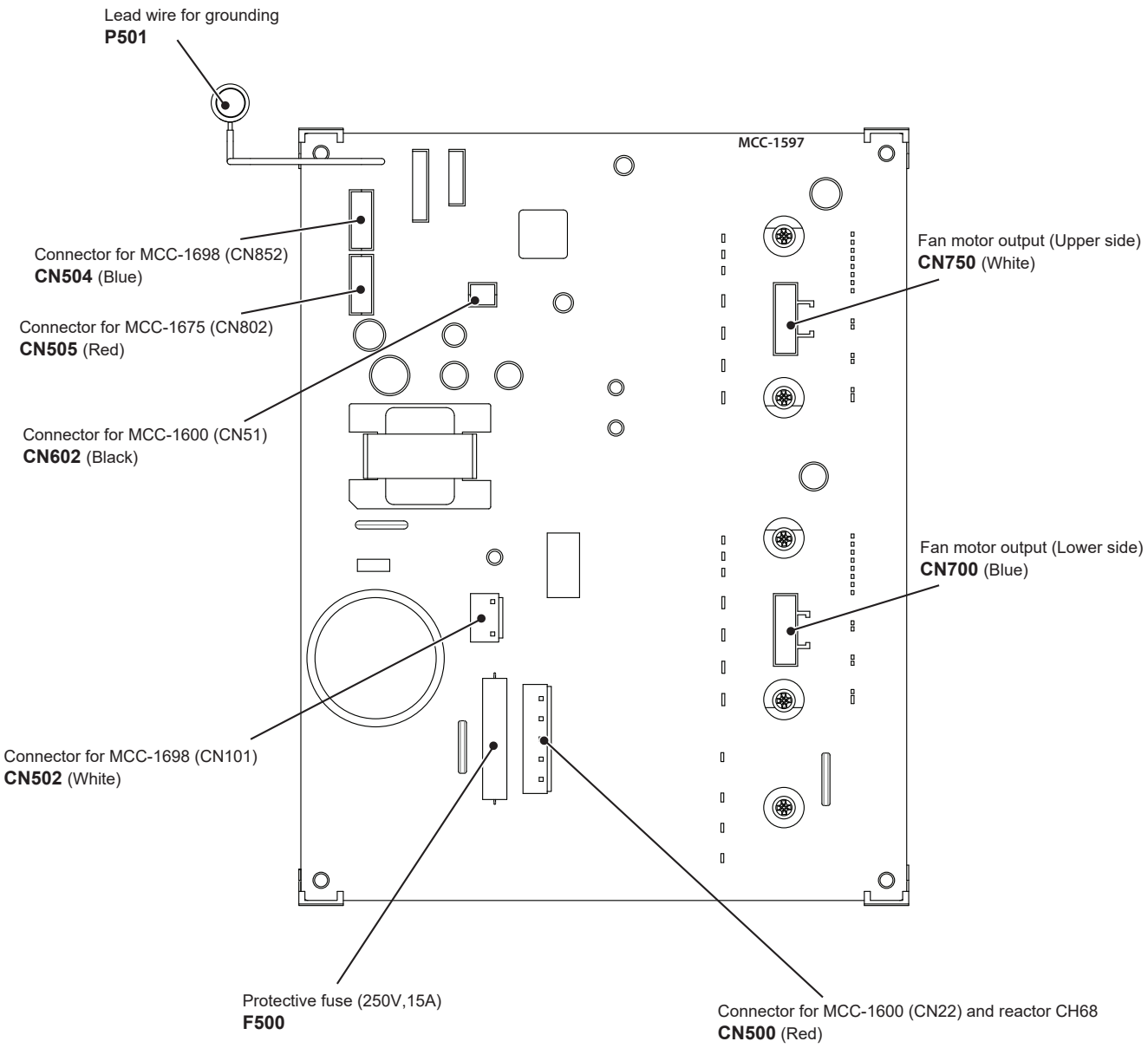
# 6-6. Outdoor unit control (3 phase type)

## HWS-P805H8R-E, P1105H8R-E, P1405H8R-E

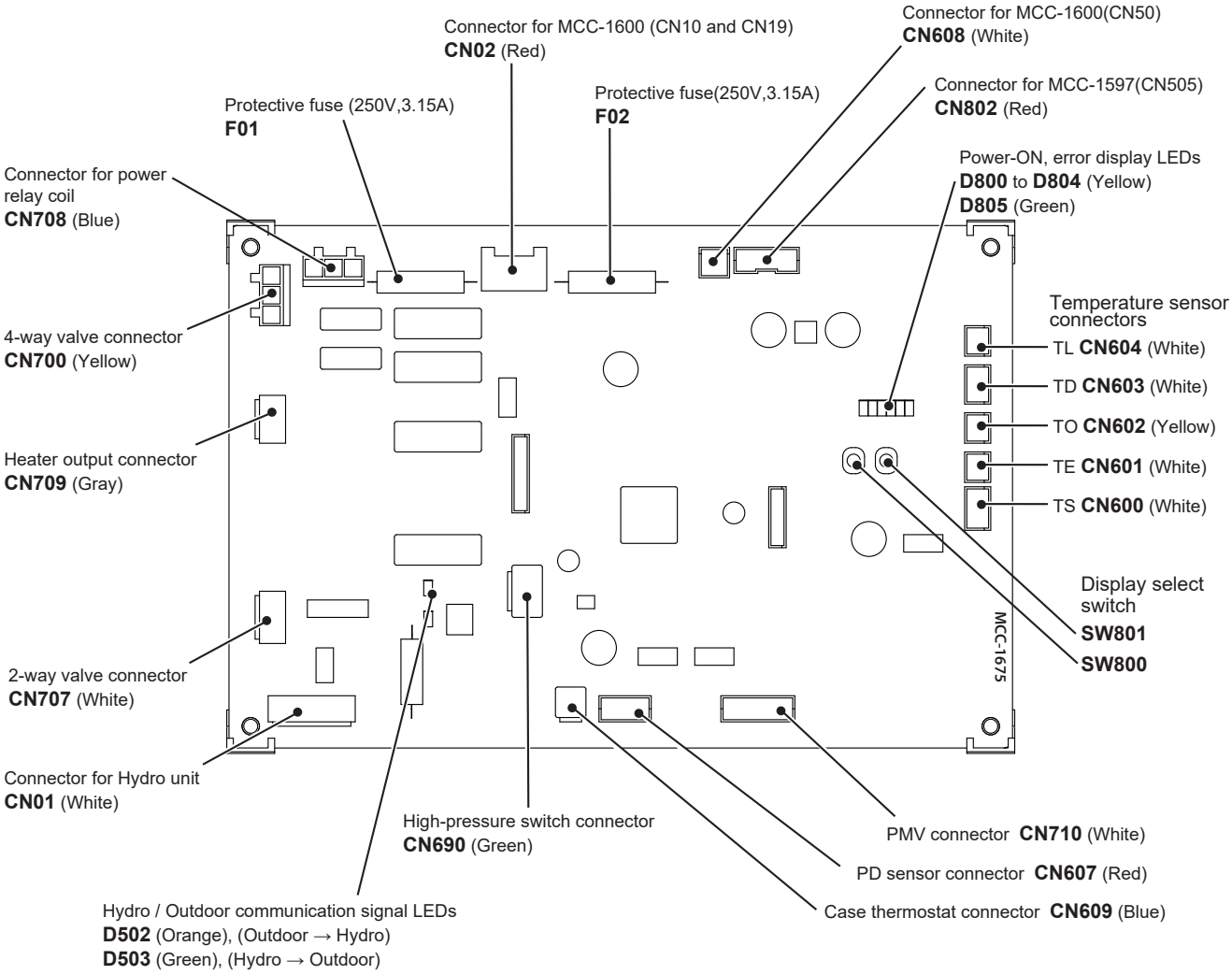
## MCC-1698 (Compressor IPDU)



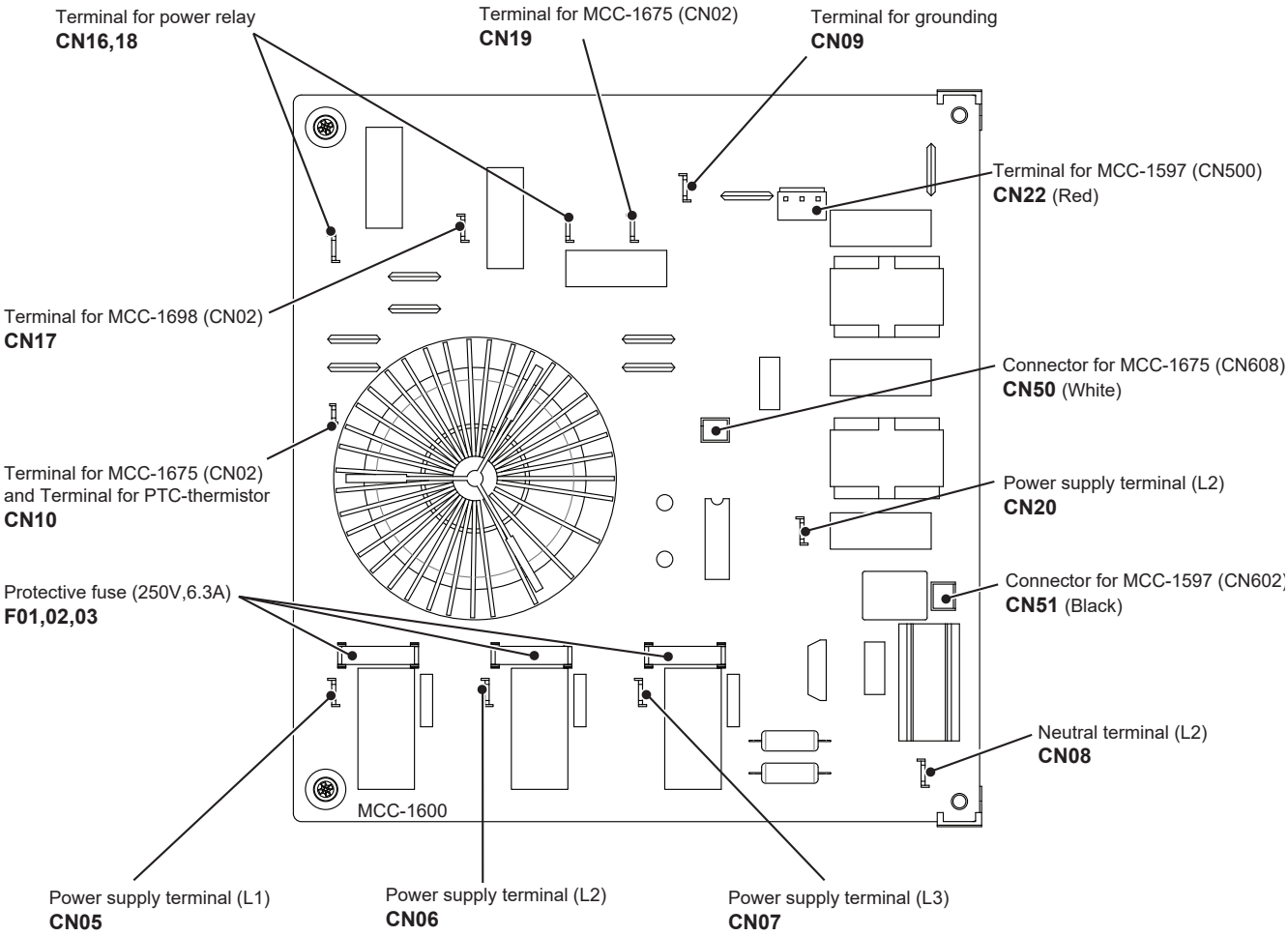
## MCC-1597 (Fan Motor IPDU)



## MCC-1675 (Interface (CDB))

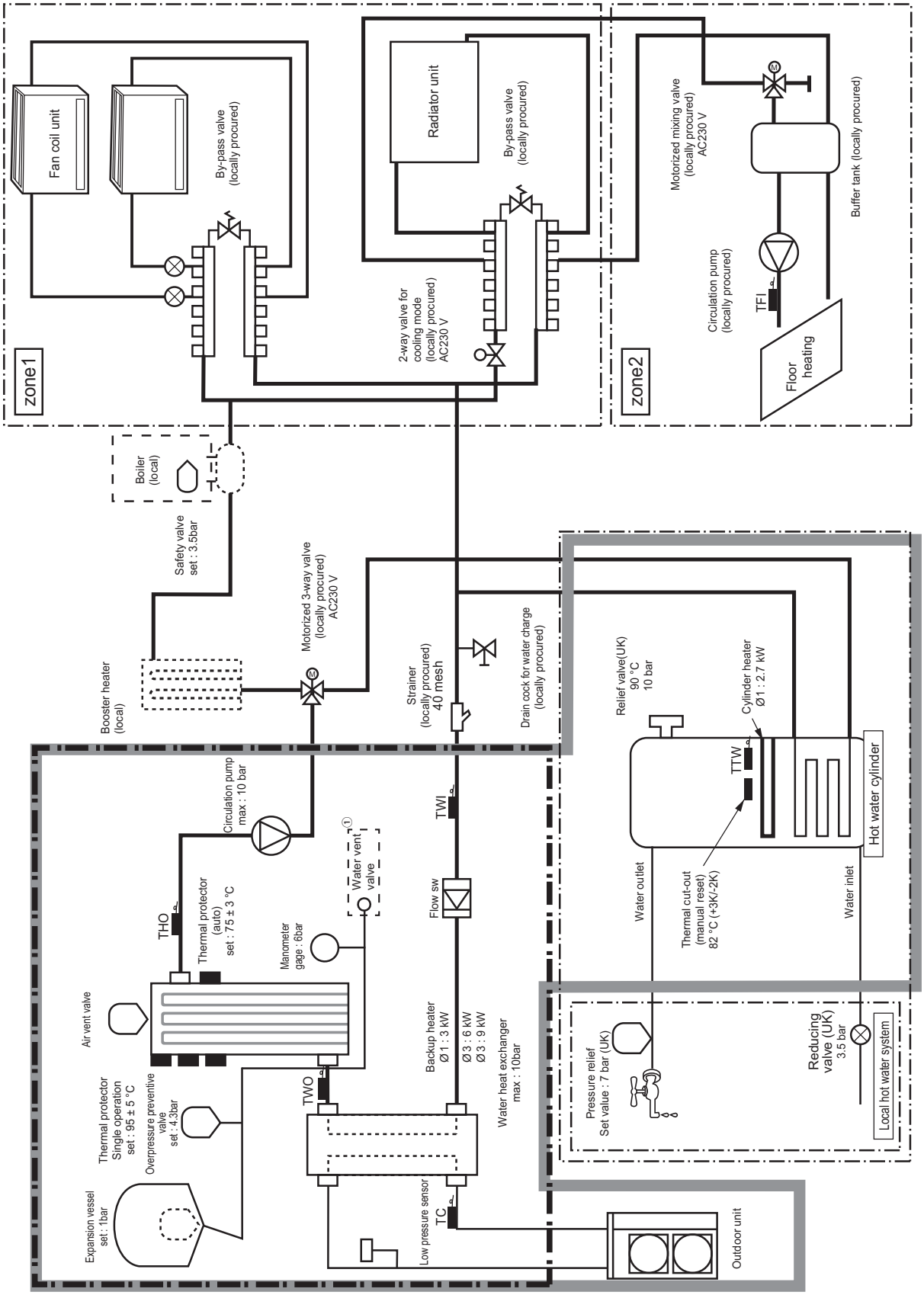


## MCC-1600 (Noise Filter)



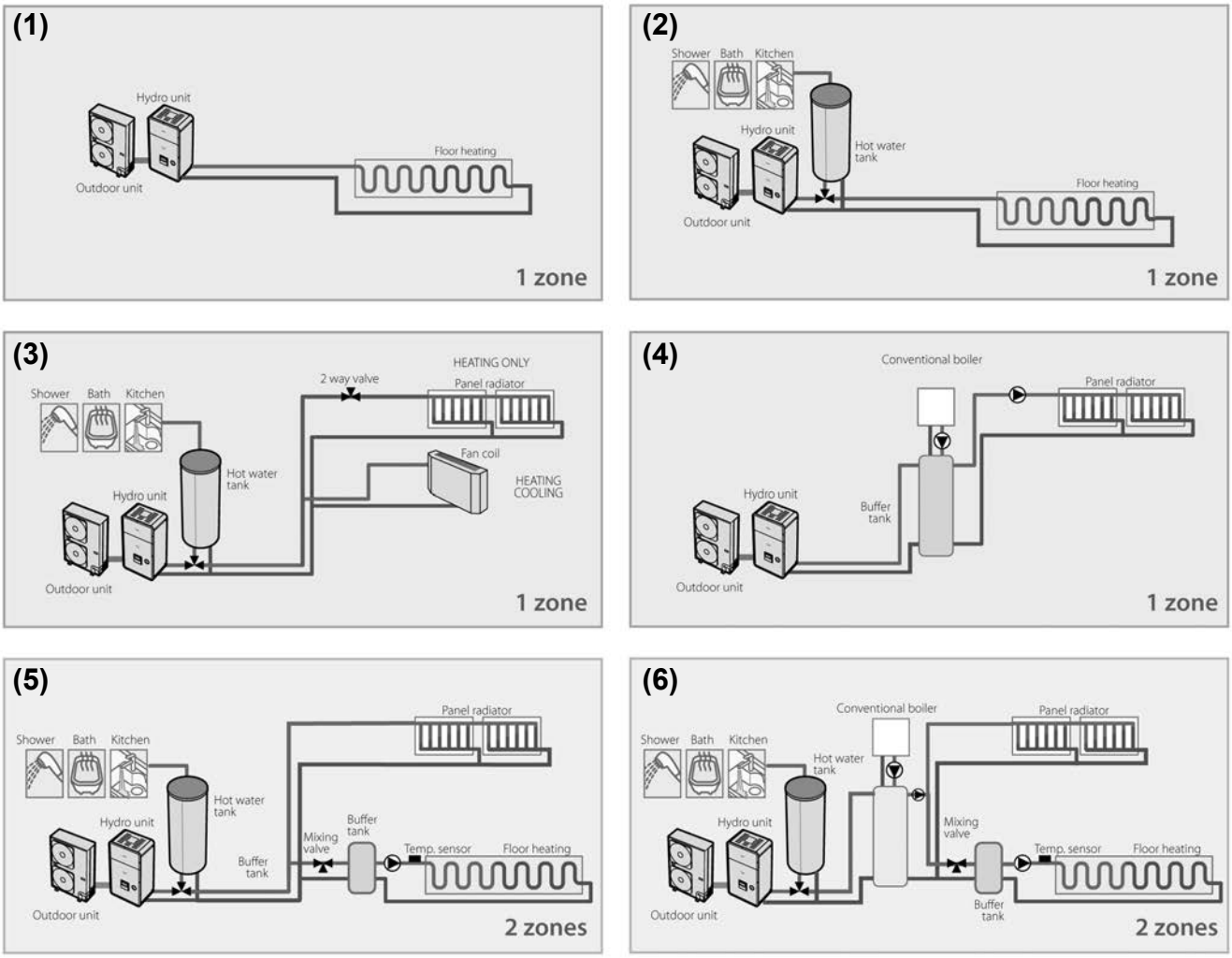
# 7 Refrigeration cycle / Water system diagram

## 7-1. Water system diagram




① Abolition of "Water vent valve" since May 2018.

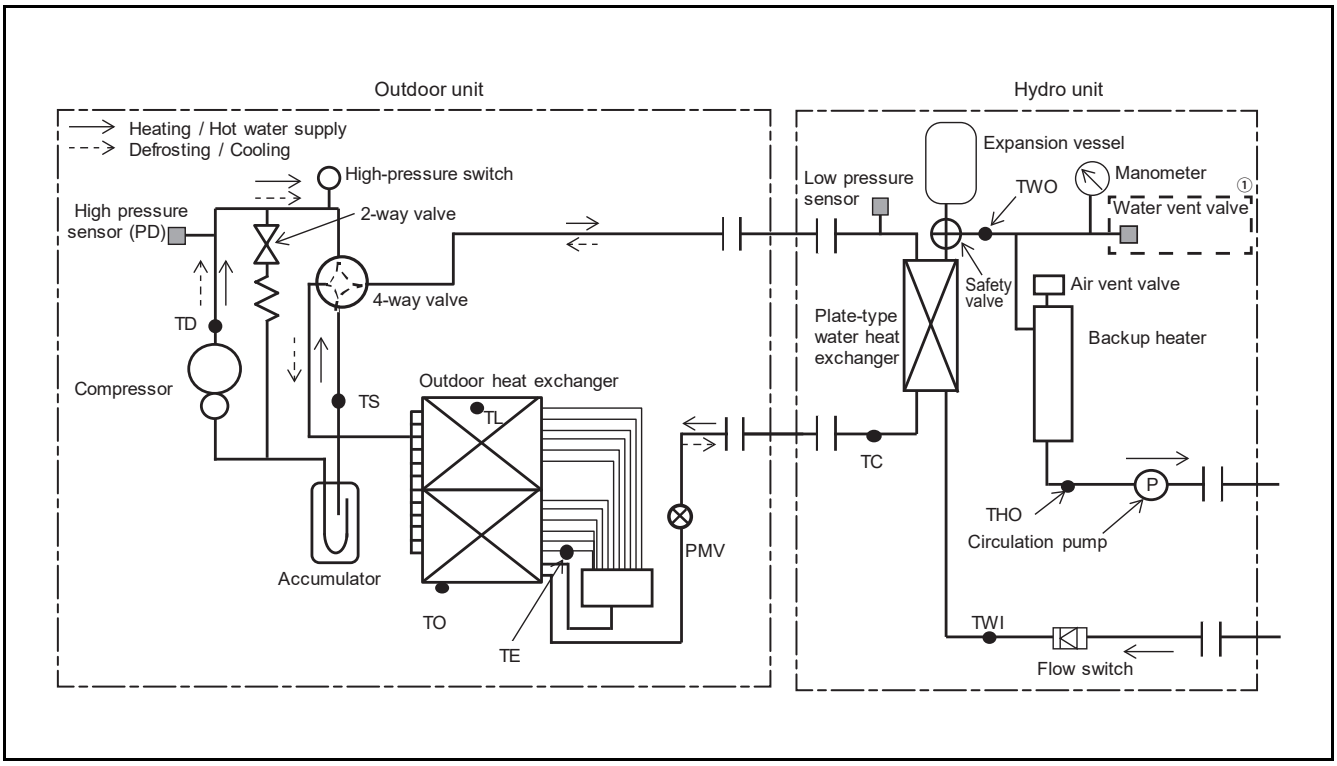
## Installation example of water circuit




The water flowing for a system without buffer tank ((1), (2), (3), (5)) requires18ℓ/min (P805XWH 13ℓ/min) or more.
This water flowing requires 5 or more branches of Floor heating or Radiator etc.
Less than 5 branches may cause a flow deficiency. In this case, please provide a buffer tank and secondary pumps as shown in (4).
Please check how to install the boiler (See page 48)

# 7-2. Refrigeration cycle system diagram

**HWS-P805XWHM3-E, HWS-P805XWHT6-E, HWS-P805XWHT9-E, HWS-P1105XWHM3-E, HWS-P1105XWHT6-E, HWS-P1105XWHT9-E / HWS-P805HR-E, HWS-P1105, HWS-P805H8R-E, HWS-P1105H8R-E, HWS-P1405H8R-E**

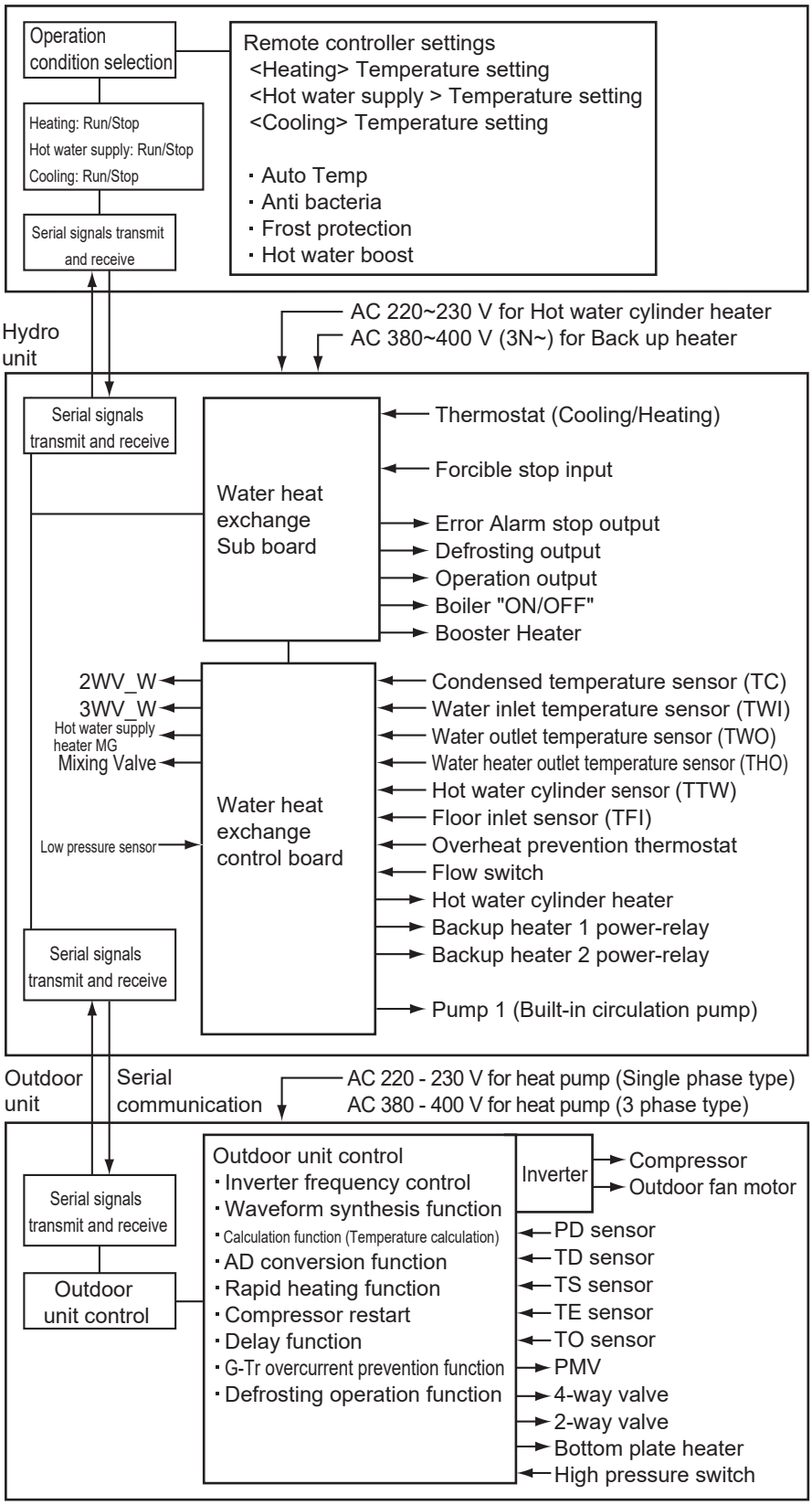


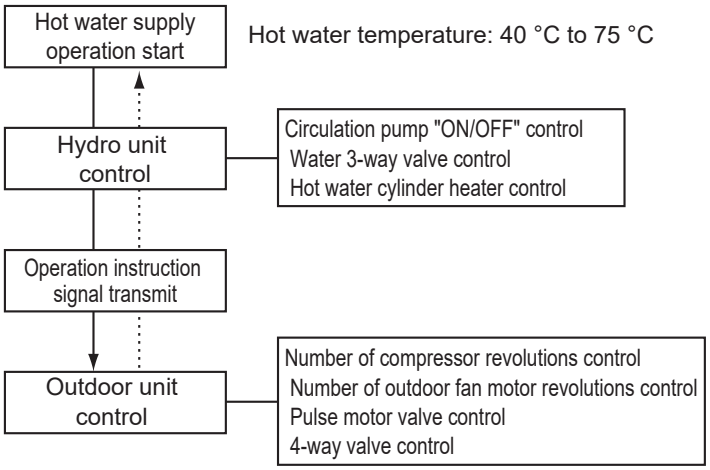
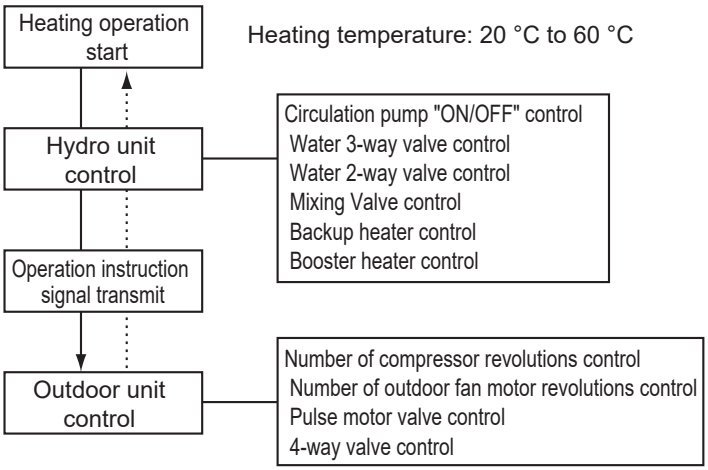

① Abolition of “Water vent valve” since May 2018.

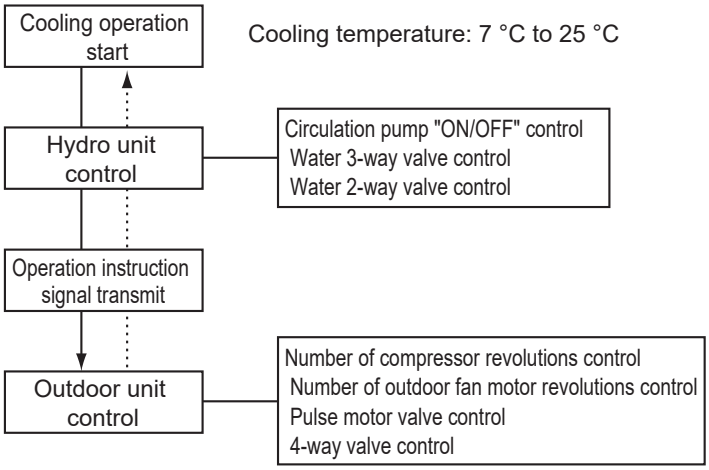
# 8 Operational description

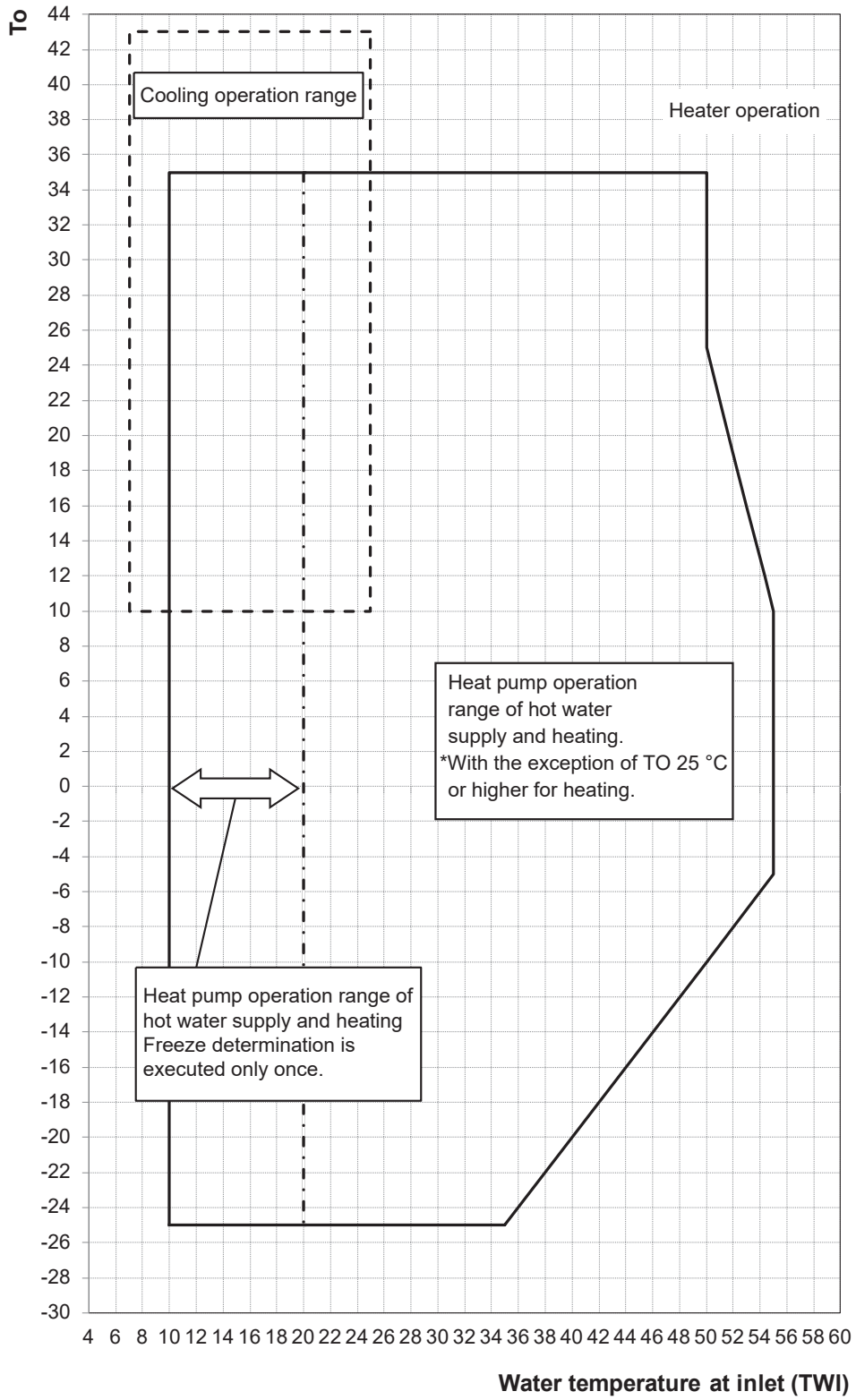
This chapter describes the working circuit and control of Air to Water Heat Pump about the following operations.


| | Item | Page |
|---|---|---|
| 8-1 | **8-1. Basic Operation**<br>1) Operation control<br>2) Hot water supply operation<br>3) Heating operation<br>4) Cooling operation | 40 to 42 |
| 8-2 | **8-2. Operation Mode and Control Method**<br>1) Heat pump operation range of hot water supply, heating and cooling<br>2) Hot water supply operation<br>3) Heating operation<br>4) Cooling operation<br>5) Simultaneous operations of "hot water supply" and "heating"<br>6) Simultaneous operations of "hot water supply" and "cooling"<br>7) Boiler control<br>8) Hot water boost operation<br>9) Anti bacteria operation<br>10) Night setback operation<br>11) Frost protection operation<br>12) Auto operation<br>13) Night time low-noise operation | 43 to 54 |
| 8-3 | **8-3. Hydro Unit Control**<br>1) Capacity control (compressor, high-temperature release, low-temperature release)<br>2) Heater control<br>3) Circulation pump control<br>4) Control by the flow switch<br>5) Mixing Valve control (2-temperature heating control)<br>6) Room temperature control<br>7) Room temperature control with the thermostat<br>8) Hot water cylinder thermostat control<br>9) Control of force stop and restart<br>10) Control of limit of heat pump operation<br>13)Output signal control 1<br>14)Output signal control 2<br>13) Q-H characteristics of hydro unit<br>14) Automatic restart control<br>15) Piping freeze prevention control<br>16) High return water protect control | 54 to 72 |
| 8-4 | **8-4. Outdoor unit control**<br>1) PMV (Pulse motor valve) control<br>2) Discharge temperature release control<br>3) Current release control<br>4) Current releases shift control<br>5) Outdoor fan control<br>6) Defrosting control<br>7) Winding heating control<br>8) Short circuit operation prevention control<br>9) Over current protection control<br>10) High pressure release control<br>12) Compressor case thermostat<br>13) Bottom plate heater control<br>13) 2-way valve control<br>14) Start up from hibernation | 73 to 81 |

| Item | Operation flow and applicable data, etc. | Operation description |
|---|---|---|
| 8-1. Basic Operation | 1) Operation control<br>Remote controller<br>  <br> | 1. Purpose<br>The operations of the hydro unit and the outdoor unit are controlled according to user-defined operation condition settings.<br>2. Details<br>The operation controls include those shown on the left.<br>3. Operations<br>1) An operation condition is selected with the remote controller.<br>2) Setting the remote controller button to “ON” transmits a signal to the hydro unit.<br>3) The hydro unit controller controls the operations shown on the left while also controlling the water 2-way valve, water 3-way valve, circulation pump, mixing valve, hot water cylinder heater, and backup heater.<br>4) The hydro unit controller transmits an operation instruction to the outdoor unit, and uses serial signals to transmit and receive control statuses.<br>5) The outdoor unit control unit performs the operation controls shown on the left while also controlling the compressor, outdoor fan motor, pulse motor valve, 4-way valve, 2-way valve, and bottom plate heater. |

| Item | Operation flow and applicable data, etc. | Operation description |
|---|---|---|
| 8-1.<br>Basic<br>Operation | 2) Hot water supply operation<br>  <br> | Hot water supply operation<br>1. Purpose<br>Hot water supply<br>2. Details<br>This section performs hot water supply operation according to heating conditions specified for the steps on the left.<br>3. Operations<br>1) By pressing the [ F2 ] button on the remote controller, the hydro unit controller starts to transmit a hot water supply operation signal to the outdoor unit.<br>2) The hydro unit performs the operation controls shown on the left while also controlling the circulation pump, hot water cylinder heater "3WV".<br>3) The outdoor unit controls the compressor, outdoor fan motor, electric expansion valve, and 4-way valve based on the operation signals transmitted by the hydro unit. |
| | 3) Heating operation<br>  <br> | Heating operation<br>1. Purpose<br>Heating<br>2. Details<br>This section performs heating operation according to heating conditions specified for the steps on the left.<br>3. Operations<br>1) By pressing the [ F1 ] button on the remote controller, the hydro unit controller starts to transmit a heating operation signal to the outdoor unit.<br>2) The hydro unit performs the operation controls shown on the left while also controlling the circulation pump, backup booster heater "ON/OFF", water 2-way valve, and water 3-way valve.<br>3) The outdoor unit controls the compressor, outdoor fan motor, electric expansion valve, and 4-way valve based on the operation signals transmitted by the hydro unit. |

| Item | Operation flow and applicable data, etc. | Operation description |
|---|---|---|
| 8-1.<br>Basic<br>Operation | 4) Cooling operation<br>  <br> | 1. Purpose<br>Cooling<br>2. Details<br>This section performs cooling operation according to cooling conditions specified for the steps on the left.<br>3. Operations<br>1) By pressing the [ F1 ] button on the remote controller, the hydro unit controller starts to transmit a cooling operation signal to the outdoor unit.<br>2) The hydro unit controller performs the operation controls shown on the left while also controlling the circulation pump, water 2-way valve, and water 3-way valve.<br>3) The outdoor unit controls the compressor, outdoor fan motor, pulse motor valve, and 4-way valve based on the operation signals transmitted by the hydro unit. |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-2. Operation Mode and Control Method | 1) Heat pump operation range of hot water supply, heating and cooling<br>The heat pump operation range of hot water supply, heating and cooling is shown on the figures below.<br>• HWS-P805XWH**-E<br>• HWS-P1105XWH**-E<br>  <br> |

| Item | Operation flow and applicable data, etc. |
|---|---|

8-2. Operation Mode and Control Method

The following shows the operation modes and controlled objects.

| Operation mode / Controlled object | Cooling only | Heating only | Hot water supply only | Heating and Hot water both operate | | | | Cooling and Hot water both operate | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Heat pump select for heating | | Heat pump select for hot water supply | | Heat pump select for cooling | | Heat pump select for hot water supply | |
| | | | | Heating side | Hot water supply side | Heating side | Hot water supply side | Cooling side | Hot water supply side | Cooling side | Hot water supply side |
| Heat pump | O | O | O | O | × | × | O | O | × | × | O |
| Backup heater | × | O | × | O | × | × | × | × | × | × | × |
| Hot water cylinder heater | × | × | O | × | O | × | O | × | O | × | O |

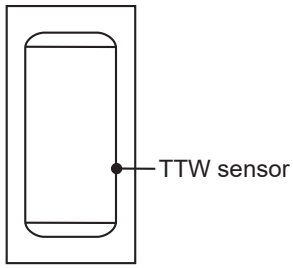
O Possible
× Not possible

2) Hot water supply operation

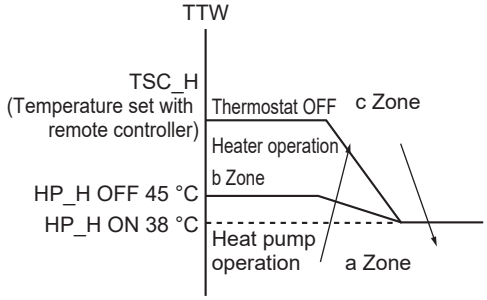
1) Operation start condition
When the [ F2 ] remote controller button is pressed and the following operation start condition is met, the operation starts.
- TTW < 38 °C is detected.

2) Operation mode determination
An operation mode is determined according to the temperature of TTW sensor.
- Heat pump operation selection *1 *2
- When TTW < 38 °C (a zone in the right figure) is met, the heat pump operation is selected.
- Heater operation selection
  When 45 °C ≤ TTW < TSC_H (b zone in the right figure) is met, the heater operation is selected.
- Thermostat status "OFF" selection
  When TTW ≥ TSC_H is met, the thermostat status "OFF" is selected.

3) Operation stop
The operation stops in the following cases.
- The remote controller gives a stop instruction.
- TTW ≥ TSC_H is met.



(Hot water cylinder unit)



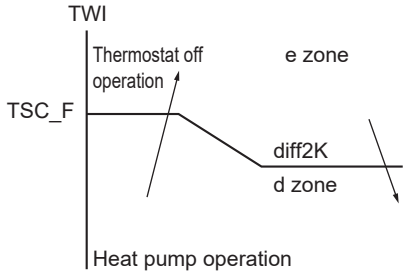
TSC_H is hot water temperature set with remote controller

*1: When the outside temperature is -25 °C or below, the heater operation is selected even if the TTW temperature falls into "a zone".
*2: When "Hot water supply" and "Heating" are simultaneously in operation, the heater operation may be selected depending on the outside air temperature.

Related FC

| FC No. | Setting item | Default | Setting available range |
|---|---|---|---|
| 1E | Upper limit of hot water supply temperature | 75 °C | 60-80 °C |
| 1F | Lower limit of hot water supply temperature | 40 °C | 40-60 °C |
| 20 | Heat pump start temperature | 38 °C | 20-45 °C |
| 21 | Heat pump end temperature | 45 °C | 40-50 °C |
| 24 | Outside air correction start temperature for hot water supply*3 | 0 °C | -20-10 °C |
| 25 | Outside air correction temperature for hot water supply*3 | 3 degree | 0 -15 degree |

*3:When the outside temperature is 0 °C or below, the boil-up temperature will be higher that setting temperature in hot water supply mode.

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-2.<br>Operation Mode and Control Method | 3) Heating operation<br><Operation only for ZONE1><br>• This operation is enabled when DP_SW12_2 ZONE1 is set to "OFF" (default).<br>• The remote controller displays [ZONE 1] settings, and only the set temperature of [ZONE 1] can be changed.<br><br><Operation for ZONE1 and ZONE2 (2 temperatures control)><br>• This operation is enabled when DP_SW12_2 ZONE1 is set to "OFF" (default) and DP_SW12_3 ZONE2 to "ON".<br>• The remote controller displays [ZONE 1] [ZONE 2] settings, and the set temperatures of [ZONE 1] [ZONE 2] can be changed.<br>• To set temperatures for [ZONE 1] and [ZONE 2], use SELECT [ ] to switch between [ZONE 1] and [ZONE 2].<br>• For 2 zone temperatures control, the flow adjustment of MIXING VALVE controls the water temperature of [ZONE 2]. For details,<br>see the description on MIXING VALVE control in 8-3-5. (See page 60)<br><br>1) Operation start condition<br>Pressing the [ F1 ] button of remote controller starts a heating operation. *1 *2<br><br>2) Operation mode selection<br>An operation mode is determined according to the temperature of TWI sensor.<br>• Heat pump operation selection *1 *2<br>When TWI < TSC_F (d zone in the right figure) is met, the heat pump operation is selected.<br>• Thermostat status "OFF"<br>When TWI ≥ TSC_F (e zone in the right figure) is met, the thermostat status "OFF" is selected.<br><br>3) Operation stop condition<br>When the following condition is met, the heating operation stops.<br>• The remote controller gives a stop instruction.<br><br>*1: When the outside temperature is -25 °C or below, the heater operation is selected even if the TWI temperature falls into "d zone".<br>*2: When "Hot water supply" and "Heating" are simultaneously in operation, the heater operation may be selected depending on the outside air temperature.<br><br>  <br><br>TSC_F is a heating temperature set with remote controller<br><br>Related FC |

| FC No. | Setting item | Default | Setting available range |
|---|---|---|---|
| 1A | Upper limit of heating (Zone1) limited temperature | 60 | 37-60 °C |
| 1B | Lower limit of heating (Zone1) limited temperature | 20 | 20-37 °C |
| 1C | Upper limit of heating (Zone2) limited temperature | 60 | 37-60 °C |
| 1D | Lower limit of heating (Zone2) limited temperature | 20 | 20-37 °C |

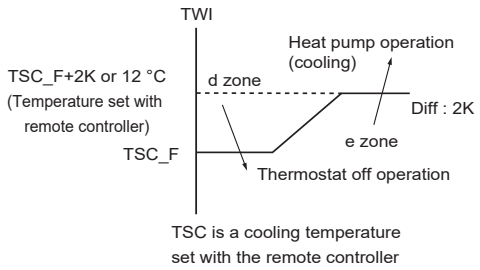
| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-2. Operation Mode and Control Method | |

4) Cooling operation

Pressing the [ F1 ] button and then [OPERATION MODE] starts a cooling operation.

1) Operation start condition
Pressing the [ F1 ] button and then [OPERATION MODE] starts a cooling operation.

2) Operation mode selection
An operation mode is determined according to the temperature of TWI sensor.
- Heat pump operation selection *1
  When TWI ≥ TSC_F (d zone in the right figure) is met, the heat pump operation is selected.
- Thermostat status "OFF"
  When TWI < TSC_F (e zone in the right figure) is met, the thermostat status "OFF" is selected.




3) Operation stop condition
When either of the following conditions is met, the cooling operation stops.
- The remote controller gives a stop instruction.
- The operation is switched to heating.

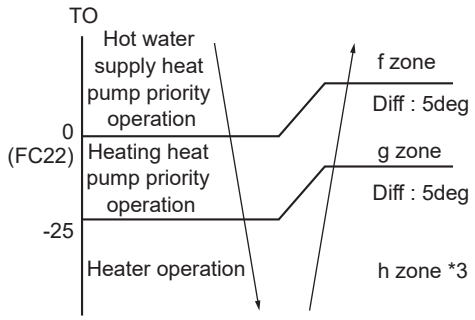
*1: When the outside temperature is 10 °C or below, cooling does not start even if the TWI temperature falls into "d zone".

Related FC

| FC No. | Setting item | Default | Setting available range |
|---|---|---|---|
| 02 | Cooling mode availability | 0 | 0: Permitted |
| 18 | Upper limit of cooling setting temperature | 25 | 18-30 °C |
| 19 | Lower limit of cooling setting temperature | 7 | 7-20 °C |

5) Simultaneous operations of "hot water supply" and "heating"
At the time of "Hot water supply" and "Heating" simultaneous operation, the operation mode is select as follows depending on the outside air temperature.

- f zone Operation with hot water supply priority
  A heat pump operation is performed in the hot water supply side, and a heating operation in the heating side.
  The heat pump maintains a supply of hot water for up to 30 minutes during a simultaneous operation.
- g zone Operation with heating priority
  A heat pump operation is performed in the heating side, and a cylinder heater operation in the hot water supply side.




Operation mode by zone

| Zone | Hot water supply side | Heating side |
|---|---|---|
| f | Heat pump *2 | Stop *2 |
| g | Heater | Heat pump |
| h | Heater *3 | Heater *3 |

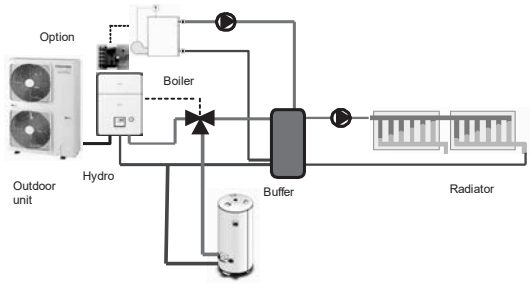
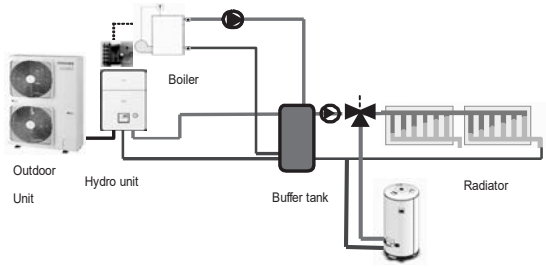
*2: Note that after a heat pump operation for "Hot water supply" is selected in f zone, when the operation moves to a heater operation for "hot water" and then 5 minutes has passed (Hot water supply operation in b zone), the operation mode changes as follows.

| Zone | Hot water supply side | Heating side |
|---|---|---|
| f' | Heater | Heat pump |

When TTW ≥ 45 °C (FC: 21) is met, the operation ends f' zone and returns to f zone.

*3: If the h-zone operation starts while external temperature is higher than -25 °C, the h-zone operation continues for 60 minutes.

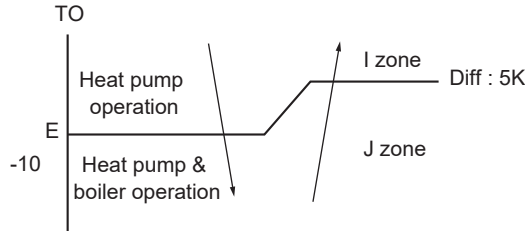
<table>
<tr><th>Item</th><th>Operation flow and applicable data, etc.</th></tr>
<tr><td>8-2.<br>Operation Mode and Control Method</td><td>Related FC
<table>
<tr><th>FC No.</th><th>Setting item</th><th>Default</th><th>Setting available range</th></tr>
<tr><td>22</td><td>Priority mode switch temperature</td><td>0 °C</td><td>-20-20 °C</td></tr>
</table>
* Note: When user selects “hot water supply” and “ZONE1,2”, and Heat pump selects hot water supply mode, the Maximum operating time of heat pump is 30 min.</td></tr>
<tr><td></td><td>6) Simultaneous operations of "hot water supply" and "cooling"<br>For simultaneous operations of "hot water supply" and "cooling", basically cooling runs by a heat pump operation, and hot water supply by a heater operation.
<table>
<tr><th></th><th>Hot water supply side</th><th>Cooling side</th></tr>
<tr><td>Normal</td><td>Heater *</td><td>Heat pump *</td></tr>
</table>
* By setting FC_0F to “1”, heat pump operation for “hot water supply” is permitted. Under the setting, the heat pump runs for the hot water supply side when TTW is less than 38 °C.
<table>
<tr><th></th><th>Hot water supply side</th><th>Cooling side</th></tr>
<tr><td>TTW<38 °C</td><td>Heat pump</td><td>stop</td></tr>
</table>
The operation mode returns to normal when TTW become 45 °C or more (FC: variable).<br><br>Related FC
<table>
<tr><th>FC No.</th><th>Setting item</th><th>Default</th><th>Setting available range</th></tr>
<tr><td>0F</td><td>Heat pump operation for hot water supply permitted / not permitted</td><td>0: Not permit</td><td>1:Permitted (Heat pump may run for hot water supply.)</td></tr>
</table></td></tr>
</table>

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-2.<br>Operation Mode and Control Method | 7) Boiler control<br>The boiler assists the hot water supply operation and heating operation according to the boiler's position.<br><br>7-1) Boiler setting<br>• TCB-PCIN3E optional PC board is required. Connect its connection cable to CN208 port on the PC board of the hydro unit.<br>• Setting DPSW on the hydro unit: DP_SW13_2="ON/OFF" switches "Using boiler / Not using boiler (Default)". Set the switch to "ON" when using the boiler.<br>• The temperature switching the boiler and heat pump: FC_23=-10 °C (Default) See the next item. The boiler output becomes effective when the outside air temperature is -10 °C or less.<br>• Boiler position setting: DP_SW02_1="ON/OFF" must be switched in accordance with the boiler position from the 3-way valve; before the 3-way valve / after the 3-way valve and in the heating side (Default).<br>When the switch is set to "ON", the boiler runs in the hot water supply operations or heating operation. The action of the 3-way valve depends on heat pump's action and the boiler follows their action.<br>When the switch is set to "OFF", the boiler runs in heating operation. Also, the boiler runs when the heat pump is running for hot water supply while heating and supplying hot water simultaneously.<br>• Priority setting between the boiler and hydro unit: FC_3E="0/1" switches the running priority; hydro unit (Default) / boiler.<br>When FC_3E is set to "0" (Default), the hydro unit has priority, the boiler stops as temperature reaches the hydro unit's temperature setting.<br>When FC_3E is set to "1", the boiler continues to run even after temperature reaches the hydro unit's temperature setting. (The setting of FC_3E is effective during the HP+Boiler operation.)<br>• Coordination setting of the boiler and heat pump: when FC_5B="0", the boiler and heat pump runs simultaneously. When FC_5B="1", only the boiler runs, pump ON. (However, if the external air temperature becomes the boiler-HP switching temperature or more within 60 minutes)<br>When FC_5B="2", the heater runs. (the heater may run instead for up to 60 minutes.)<br>When FC_5B="3", only the boiler runs. (Pump OFF:Default)<br>DP_SW10_3 should be "OFF (Default)"<br><br><Installation example><br>DP_SW02_1="OFF"(The boiler is placed after the 3-way valve and in the heating side.)<br>  <br><br>* Boiler & HP switching temp setting FC23= -10<br>** Boiler control / functionality setting FC5B= 0 (HP+Boiler)<br>*** Hot water & cooling priority setting (FC_0F="1" hot water priority is necessary.)<br><br>TO<=-10* / -10*<TO<br>HEATING: Boiler + HP** / HP<br>HOT WATER: HP / HP<br>HEATING & HOT WATER: Boiler for heating HP for hot water or heating / HP<br>COOLING: – / HP (TO≥10)<br>COOLING & HOT WATER: HP for cooling Heater for hot water*** / HP for cooling Heater for hot water***<br><br>DP_SW02_1="ON"(The boiler is placed before the 3-way valve.)<br>  <br><br>* Boiler & HP switching temp setting FC23= -10<br>** Boiler control / functionality setting FC5B= 0 (HP+Boiler)<br>*** Hot water & cooling priority setting (FC_0F="1" hot water priority is necessary)<br><br>TO<=-10* / -10*<TO<br>HEATING: Boiler + HP** / HP<br>HOT WATER: Boiler + HP** / HP<br>HEATING & HOT WATER: Boiler + HP** / HP<br>COOLING: – / HP (TO≥10)<br>COOLING & HOT WATER: HP for cooling Heater for hot water*** / HP for cooling Heater for hot water*** |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-2.<br>Operation Mode and Control Method | |

7-2) Boiler-output control

- I zone: heat pump operation
  Normally the heat pump operation is executed in the zone.
- J zone: heat pump operation and boiler operation *1
  In the zone, the heat pump + boiler operation (*2) is executed and the heater operation is executed in the hot-water-supply side.




*2:Operation mode is not changed with the outside temperature when an external signal to control the limit of heat pump limit operation (see 8-3-10) is input.

7-3) Boiler output limit control

The boiler power output is limited depending on the settings of boiler position (DPSW02_1) and FC62.

| Boiler position (DPSW02_1) | FC62 (Activate/deactivate A02 error detection) | Temperature range in which the boiler signal is output (Detected temperature of TWI, TWO or THO) |
|---|---|---|
| OFF (After 3-way valve, heating side) | 0 | TWI or TWO or THO<58 °C |
| | 1 | TWI or TWO or THO<58 °C |
| ON (Before 3-way valve) | 0 | TWI or TWO or THO<70 °C |
| | 1 | No limit *1 |

7-4) A02 error detection while the boiler is running

A02 error detection is deactivated depending on the settings of FC62 and whether the boiler is installed or not (DPSW13_2).

| Boiler is installed or not (DPSW13_2) | FC62 (Activate/deactivate A02 error detection) | Temperature recognized as A02 error (Detected temperature of TWI, TWO or THO) |
|---|---|---|
| OFF (Not installed) | 0 | TWI or TWO or THO≥70 °C (Beep) |
| | 1 | TWI or TWO or THO≥70 °C (Beep) |
| ON (Installed) | 0 | TWI or TWO or THO≥70 °C (Beep) |
| | 1 | No error detection *1 (No beep) |

*1 If a user runs the boiler under the condition that no limit has been set, and hot water from the boiler has damaged parts inside of the hydro unit, the user is fully responsible for the damage.

7-5)2 zone temperature control while the boiler is running

2 zone temperature control by boiler with P1 OFF is required DPSW10_3 OFF

| Boiler is installed (DPSW13_2) | ZONE2 operation is using (DPSW12_3) | P2 synchronize with P1 (DPSW10_3) | FC5B Coordination of the boiler and heat pump | 2 zone temperature control P1 / P2 / Mixing Valve control |
|---|---|---|---|---|
| ON (Installed) | ON (Using) | OFF (No synchronize, Always ON) | 0 (Boiler and heat pump) | ON / ON / ON |
| | | | 1 (Boiler only) | |
| | | | 2 (Heater only) | |
| | | | 3 (Boiler only(P1 OFF)) | OFF / ON / ON |
| | | ON (Synchronize) | 0 (Boiler and heat pump) | ON / ON / ON |
| | | | 1 (Boiler only) | |
| | | | 2 (Heater only) | |
| | | | 3 (Boiler only(P1 OFF)) | OFF / OFF / OFF |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-2. Operation Mode and Control Method | |

Related FC

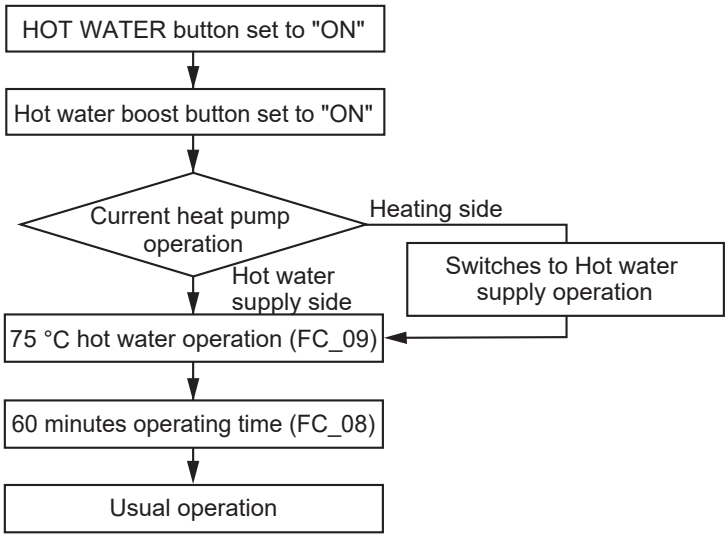
| FC No. | Setting item | Default | Variable range |
|---|---|---|---|
| 23 | Boiler-heat pump switching temperature | -10 °C | -20-20 °C |
| 3E | Control priority between the hydro unit and boiler (Control valid for operating heat pump mode) | 0: Hydro unit control | Independent temperature control for the hydro unit and boiler |
| 5B | Coordination of the boiler and heat pump | 3: Boiler only (Pump OFF) | 0: Boiler and Heat pump<br>1: Boiler only<br>2: Heater only |
| 62 | Activate/deactivate A02 error detection | 0: Activate | 1: Deactivate |

8) Hot water boost operation

A Hot water boost operation heats the water quickly to the set temperature TSC_H = 75 °C (FC_09).

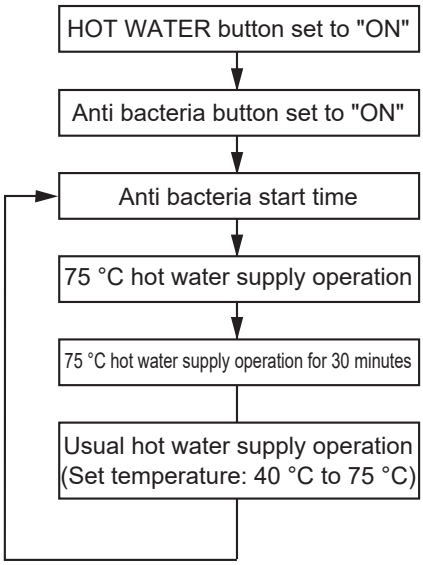
1) How to operate

- When pressing the [Hot water boost] button after pressing the remote controller [ F2 ] button, a heat pump operation in progress in the heating side switches to in the hot water side, and continues the operation regardless of the hot water supply start condition, TTW < 38 °C. In addition, the hot water cylinder is immediately energized to start a Hot water supply operation under TSC_H = 75 °C.
- A Hot water boost operation returns to the usual operation after 60 minutes passed **or** reached 75 °C.
- <u>The remote controller display during a Hot water boost operation is the same as the set temperature display of a usual Hot water supply operation.</u>
- The usual set temperature change is used for changing the set temperature during a Hot water boost operation. Change the BOOST set temperature with FC_09, if necessary.




Related FC

| FC No. | Setting item | Default | Setting available range |
|---|---|---|---|
| 09 | Hot water boost set temperature | 75 °C | 40-80 °C |
| 08 | Hot water boost operation time | 60 min | 30-180 min<br>Every 10 min |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-2. Operation Mode and Control Method | 9) Anti bacteria operation<br>An Anti bacteria operation regularly performs a Hot water supply operation with the set temperature TSC_H = 75 °C (can be set with FC_0A).<br><br>1) How to operate<br>• Pressing the [ F2 ] button and then the remote controller [Anti bacteria] button changes the setting to TSC_H = 75 °C at the set cycle and time (both can be set with the remote controller FC) to start Anti bacteria operation.<br>• The first Anti bacteria operation starts when press the [Anti bacteria] button and starting time come.<br>• When the set temperature 75 °C is reached after the Anti bacteria operation started, the set temperature remains another 30 minutes (can be set with FC_0B).<br>• The priority zone determined by the outside temperature selects an operation, Hot water heat pump or hot water supply heater.<br>• The hot water heat pump operation, when selected, ignores the hot water supply start condition (TTW < 38 °C) and forcibly performs a hot water operation.<br>• During Anti bacteria operation (Forcible hot water operation at 75 °C), the hot water set temperature display is not changed. If it is changed from the remote controller, the normal hot water set temperature will be changed.<br><br>  <br><br><br>⚠ **Caution**<br>• During a 75 °C hot water supply operation with Anti bacteria, the remote controller does not display 75 °C.<br>• Be careful not to burn yourself; Output water may be hotter than that displayed on the remote controller.<br><br>Related FC |

| FC No. | Setting item | Default | Setting available range |
|---|---|---|---|
| 0A | Anti bacteria set temperature | 75 °C | 65-80 °C |
| 0B | Anti bacteria holding time | 30 min | 0 - 60 min |
| Remote controller 0C | Anti bacteria start time | 22:00 | 0:00-22:00 |
| Remote controller 0D | Anti bacteria operation cycle | 7 days | Every day to 10 days |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-2. Operation Mode and Control Method | |

10) Night setback operation

A Night setback operation performs heating at 5K lower and cooling at 5K higher temperatures against the remote controller set temperature from the setting start time (22:00) to the end time (6:00) every day.

**Note)** • Set the remote controller time before starting a Night setback operation.
• The set time can be changed with remote controller FC. (See 10-8 (See page 140))

Related FC

| FC No. | Setting item | Default | Setting available range |
|---|---|---|---|
| Remote controller OE | Night setback start Time setting | 22:00 | 0:00-23:00 |
| Remote controller OF | Night setback end Time setting | 6:00 | 0:00-23:00 |
| 26 | Night setback setting Temperature width | 5 degree | 3 -20 degree |
| 58 | Night setback setting activate | 0. Zone 1 & 2 | 1. Zone 1 only |

11) Frost protection operation

A Frost protection operation performs heating at the set temperature RSC_F = 15 °C (FC).

1) How to operate

- Pressing the remote controller [ F1 ] button and then the [Frost protection] button starts a heating operation at the set temperature of 15 °C.
- Pressing again the [Frost protection] button cancels the Frost protection operation.
- The remote controller displays "F" as the temperature during Frost protection.
- A set temperature change during a Frost protection operation cancels the operation.

2) Automatic stop of Frost protection operation

- The operation period of Frost protection can be set at FC 12 and 13 on the remote controller.
  Longest period available: 20 days and 23 hours
- By entering the operation period (day and hour) at FC 12 and 13 on the remote controller and pressing the [Frost protection] button, the operation period is set and the Frost protection operation will automatically be finished after the period has passed.
- The operation period setting (day and hour) is stored in the memory.

Related FC

| FC No. | Setting item | Default | Setting available range |
|---|---|---|---|
| 3A | Frost protection Yes / No | 1: Yes | 0: No |
| 3B | Frost protection Set temperature | 15 °C | 10-20 °C |
| 12 (Remote controller) | FROST running period (days) | 0 | 0-20 days |
| 13 (Remote controller) | FROST running period (hours) | 0 | 0-23hours |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-2.<br>Operation Mode and Control Method | |

12) Auto operation

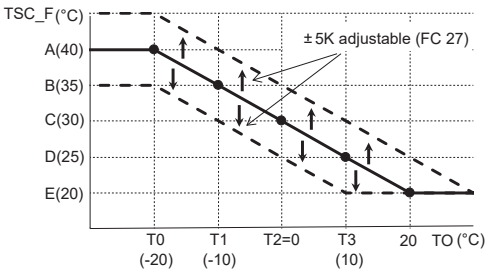
An Auto operation sets the water temperature TSC_F depending on the outside air temperature TO.

1) How to operate

- Pressing the remote controller [ F1 ] button and then setting Auto mode "ON" starts Auto operation for heating.
- During an Auto operation, setting Auto mode "OFF" returns to the usual manual set heating operation.
- The remote controller displays "A" as the temperature during an Auto operation.
  (When 2-temperature control is enabled, the remote controller displays "A".)
- Long-pressing the [ F1 ] button in menu display activates the Auto-Curve FC change mode, enabling the set Auto-Curve water temperature to be shifted by ±5K range (FC_27). When using the auto curve shift function please note the maximum and minimum water temperature at 60 °C and 20 °C respectively.
- Even if the temperature setting is changed during an Auto operation, the operation continues.
- An Auto operation works with a heating operation only, not with a cooling or a hot water supply operation.

<ZONE1>

- An operation starts at the set temperature of straight -line approximation for the following: water temperature A °C with the outside temperature T0 °C, B °C with T1 °C, C °C with T2 °C, D °C with T3 °C, and E °C with 20 °C.




Related FC

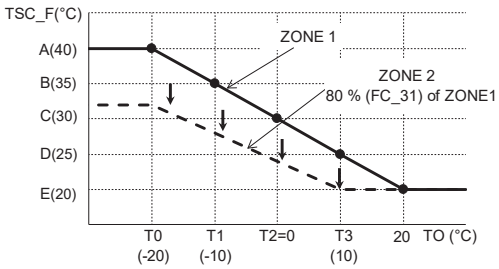
| FC No. | Setting item | Default | range |
|---|---|---|---|
| 2C | Setting temperature A at T0 | 40 | 20~60 °C |
| 2D | Setting temperature B at T1 | 35 | 20~60 °C |
| 2E | Setting temperature C at T2 (= 0 °C) | 30 | 20~60°C |
| 2F | Setting temperature D at T3 | 25 | 20~60 °C |
| 30 | Setting temperature E at 20 °C | 20 | 20~60 °C |
| A1 | Outside temperature T0 | -20 | -30~-20 °C |
| 29 | Outside temperature T1 | -10 | -15~0 °C |
| 2B | Outside temperature T3 | 10 | 0~15 °C |
| 27 | Set temperature shift with heating set to auto | 0 | -5 to 5K |

<ZONE2>

- Set temperature of the ZONE2 can be selected from two methods (FC_A2). One is a percentage of ZONE1, the other is a fixed value.

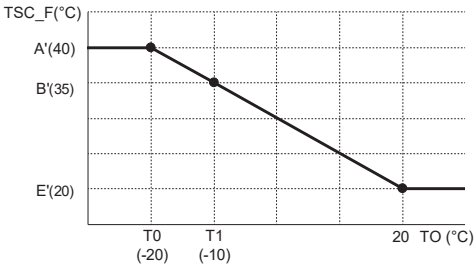
FC_A2 = "0" : Percentage method that is set by FC_31.
FC_A2 = "1" : Fixed value method that is set by FC_A3, A4 and A5.
However, it is automatically controlled the set temperature of ZONE1 to be the ZONE2 or more.

FC_A2=0 Percentage method




Auto-Curve in ZONE2 shows 80% (FC) of that of ZONE1, the water temperature setting does not fall below 20 °C.

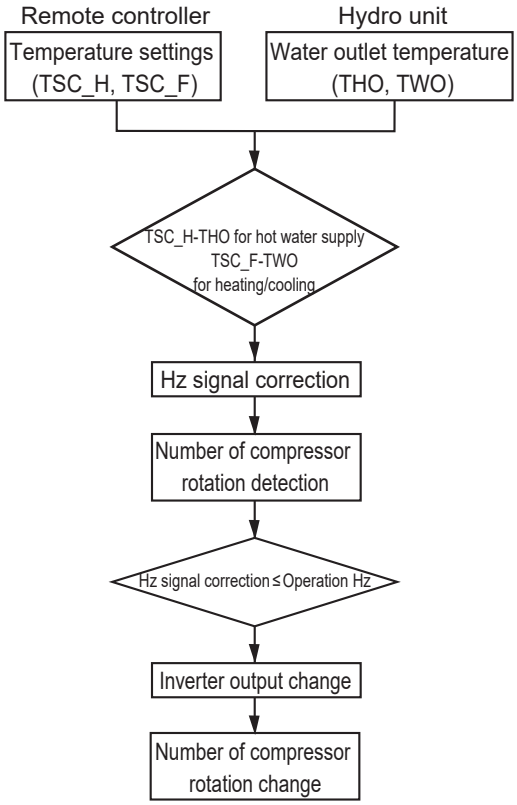
FC_A2=1 Fixed value method




The ZONE2 set temperature A' °C with the outside temperature T0 °C, B' °C with T1 °C, E' °C with 20 °C.

Related FC

| FC No. | Setting item | Default | range |
|---|---|---|---|
| A2 | The choice of how to set ZONE2 | 0 | 0 or 1 |
| A3 | Setting temperature A' at T0 | 40 | 20~60 °C |
| A4 | Setting temperature B' at T1 | 35 | 20~60 °C |
| A5 | Setting temperature E' at 20 °C | 20 | 20~60 °C |
| 31 | Auto-Curve ratio of ZONE2 | 80 | 0~100% |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-2.<br>Operation Mode and Control Method | 13) Night time low-noise operation<br>A night time low-noise operation reduces operation frequency and the number of outdoor fan rotations for a certain period during night time as noise control for urban operation.<br>Maximum operation frequency 40.2 Hz (Hot water supply/Heating/Cooling)<br>Maximum fan tap 500 rpm<br>The night time low-noise operation is enabled / disabled by changing the remote controller FC_09.<br>**<How to set> - Refer to “11. Night time Low-noise Setting” on page 157.**<br>Select "Silent mode" in menu display, and set to "ON". |
| 8-3.<br>Hydro Unit Control | 1) Capacity control (compressor, high-temperature release, low-temperature release)<br>This unit controls the compressor frequency and heater output so that the water outlet temperature matches the remote controller set temperature.<br>1-1) Compressor control<br>• Calculates the different between the remote controller set temperature (TSC_H, TSC_F) and the water outlet temperature (Hot water supply: THO, Heating: TWO).<br>• Sets the Hz signal correction amount that determines the number of compressor rotations by the temperature difference.<br>• Detects the number of compressor rotations.<br>• Compares the Hz signal correction amount and the current operation Hz, and changes the compressor output according to the difference.<br>* The control details are the same for hot water supply, heating, and cooling.<br>  <br><br>Compressor frequency changeable range 10 Hz to 70 Hz (P805HR-E, P805H8R-E)<br>10 Hz to 80 Hz (P1105H8R-E)<br>10 Hz to 90 Hz (P1105HR-E, P1405H8R-E) |

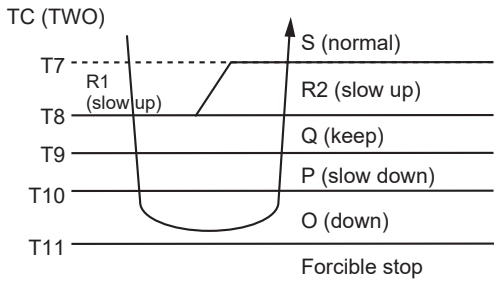
| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | |

1-2) Low temperature release control

A heat pump operation is performed as shown in the table below according to the TC sensor detecting temperature.

- For the detected temperature, TC = TWO of a heat pump operation is used. The values of T7 through T10 varies depending on TWI. (See the table below)
- If the compressor frequency instruction from the hydro unit is less then 10 Hz, the compressor stops.
- TC < 3 °C causes the compressor to stop abnormally. When the compressor restarts when 140 seconds has passed after the stop and TC < 3 °C is not detected for 20 minutes, the abnormal stop counter is cleared. 10 times of compressor abnormal stop stops the operation of heat pump, and fault code A11 is displayed on the remote controller.

* If the heat pump operation is switched to other operation, the abnormality detection counter is reset to 0.




| Zone | Control operation |
|---|---|
| R1 | Increase compressor frequency by 0.8 Hz every 60 sec. |
| R2 | Increase compressor frequency by 0.4 Hz every 60 sec. |
| O | Decrease compressor frequency by 4.5 Hz every 10 sec. |
| P | Decrease compressor frequency by 2.4 Hz every 10 sec. |
| Q | Keep compressor frequency. |

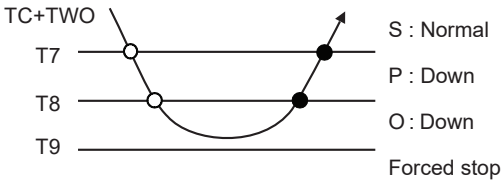
TC=TWO (°C)

| TWI | T7 | T8 | T9 | T10 | T11 |
|---|---|---|---|---|---|
| TWI<10 | 8.0 | 6.0 | 4.0 | 3.0 | 2.5 |
| 10 ≤ TWI<15 | 8.5 | 6.5 | 4.5 | 3.4 | 2.5 |
| 15 ≤ TWI<20 | 9.0 | 7.0 | 5.0 | 4.0 | 2.5 |
| 20 ≤ TWI | 9.5 | 7.5 | 5.5 | 4.5 | 2.5 |

1-3) Freeze release control (TC+TWO release control)

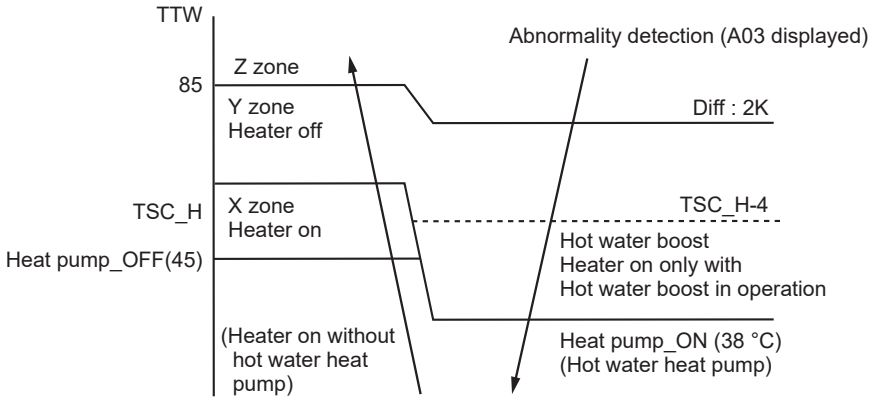
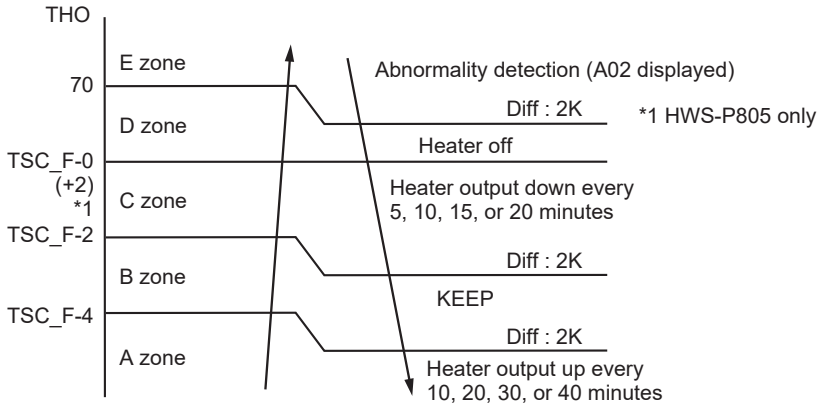
For freeze prevention, the compressor is controlled during cooling operation as shown in the table below according to the calculated values of TC and TWO.

- If TC + TWO falls below -15 for a total of 10 times, the compressor stops abnormally and fault code A10 is displayed on the remote controller.
- When cooling operation has lasted normally for 10 minutes, the abnormality detection counter is reset to 0.




| Zone | Control operation |
|---|---|
| S (normal) | Normal cooling operation |
| P (slowdown) | Decrease compressor frequency by approx. 2.0 Hz every 10 sec. |
| O (down) | Decrease compressor frequency by approx. 4.0 Hz every 10 sec. |
| (Forced stop) | Stop the compressor. |

| | T7 | T8 | T9 |
|---|---|---|---|
| TC+TWO | 6.0 | 4.0 | -15 |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | 2) Heater control<br>2-1) Hot water supply operation<br>During a hot water heat pump operation, the unit energizes the hot water cylinder heater (2.7 kW) when all the following conditions are met. Note that when the hot water supply set temperature (TSC_F) is reached, the unit stops energizing the heater.<br>• When 30 minutes has passed after the hot water heat pump operation started.<br>• The water inlet temperature (TWI) reaches 50 °C.<br>• The hot water cylinder sensor reaches the HP_OFF temperature (45 °C-FC).<br>• The HP_ON temperature (38 °C-FC) is reached without the hot water HP status.<br>• Hot water boost operation is in progress.<br>  <br> |
| | 2-2) Heating operation<br>1) Heater control at the time of heat pump operation<br>• Object to be controlled: Backup heater<br>The backup heater control starts when 13 minutes has passed after the heating heat pump operation started and select the ZONE (A-D). The backup heater control increases, decreases, or maintains the number of heaters every 10 minutes (FC) depending on the difference between the heating set temperature (TSC_F) and the heater outlet temperature (THO). When the heating set temperature (TSC_F) is reached, the hydro stops energizing the backup heater.<br>  <br><br>(1) HWS-**M3-E model has the backup heater 1 of 3 kW only.<br>(2) HWS-**T6-E model has the backup heater 2 of 3 kW. (Total 6 kW)<br>• Restriction of backup heater energization during heating mode (For energy saving)<br>When outdoor temperature is higher than the reference valve, the backup heater is forcibly off during heating mode.<br><br>Related FC |

| Status | Heater ON/OFF |
|---|---|
| Heater 1 | Backup-heater 3 kW = ON |
| Heater 2 | Backup-heater 9 kW = ON |

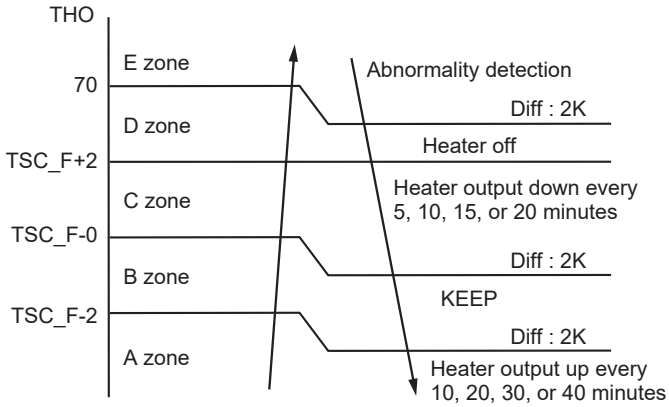
| FC No. | Setting item | Default | Setting available range |
|---|---|---|---|
| B8 | Forcibly heater off at TO ≥ A °C | no restriction | -5 ~ 20 °C |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | |

2) Control at the time of heating heater operation

- Controlled Object: Backup heater, Booster heater

The backup heater control starts when 13 minutes has passed after the heating heat pump operation started. The backup heater control increases, decreases, or maintains the number of heaters every 10 minutes (FC) depending on the difference between the heating set temperature (TSC_F) and the heater outlet temperature (THO). Note that when the heating set temperature (TSC_F) is reached, the unit stops energizing the heater.




| Status | Heater ON/OFF |
|---|---|
| Heater 1 | Backup heater 3 kW = ON |
| Heater 2 | Backup heater 9 kW = ON |
| Heater 3 | Heater 2 + Booster heater |

HWS-**M3-E model has the backup heater 1 of 3 kW only.
HWS-**T6-E model has the backup heater 2 of 3 kW. (Total 6 kW)
Booster heater operation come only output signal. (Booster heater activate under heater only mode)

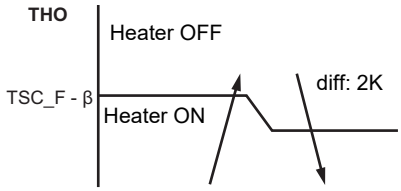
Related FC

| FC No. | Setting item | Default | Setting available range |
|---|---|---|---|
| 20 | Hot water supply heat pump start temperature | 38 °C | 20-45 °C |
| 21 | Hot water supply heat pump stop temperature | 45 °C | 40-50 °C |
| 33 | Heater control of down time | 1:10 min | 0:5 min 2:15 min 3:20 min |
| 34 | Heater control of up time | 0:10 min | 1:20 min 2:30 min 3: 40 min |

2-3) Heater control at the time of defrosting

- Object to be controlled: Backup heater

When a defrosting operation starts during the heating heat pump operation, the unit energizes a backup heater (3 kW) according to the heater outlet temperature sensor (THO) and the set temperature (TSC_F) as shown in Figure.




1) When the heater outlet temperature sensor (THO) drops to the temperature of 2 °C below the TSC_F-β, the backup heater is energized.
β can be changed for energy saving.

Defrosting ends according to the usual heater control.

| Status | Heater ON/OFF |
|---|---|
| Heater 1 | Backup heater 3 kW = ON |

Related FC

| FC No. | Setting item | Default | Setting available range |
|---|---|---|---|
| B9 | β : 0 = 0K, ..., 4 = 40K<br>Recommendation : β = 2(20K) | 0K | 0K - 40K |

2-4) Forcible heater energization

To prevent freeze, the unit energizes or stops energizing a backup heater (3 kW) regardless of the unit status, not operated or in operation.

- Object to be controlled: Backup heater

1) Energization start condition: TWO < 4 or TWI < 4 or THO < 4
2) Energization stop condition: TWO ≥ 5 and TWI ≥ 5 and THO ≥ 5

Defrosting ends according to the usual heater control.

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | |

2-5) No heater operation

According to the DP_SW11 setting, the unit switches the energize / not energize for the hot water cylinder, backup heater, and booster. For details, see 10-1. (See page 135)

(Caution)

All heater should be added to this Air to water system.
The system has been designed to operate with all electrical heaters energized.

3) Circulation pump control

One circulation pump (external circulation pump P2) can be connected to the unit in addition to the built-in circulation pump P1.
You can change the settings of the built-in pump P1 and the external circulation pump P2 using DP_SW10-1, 2, and 3 in the hydro unit.

| Item | Operation | Initial value | DPSW |
|---|---|---|---|
| Circulation pump DPSW10 | 01: Built-in circulation pump P1's action during hot water supply operation: HP operation only / Always energized | OFF: HP operation only | SW10-1 |
| | 02: Built-in circulation pump P1's action during heating operation: Always energized / Turned off when TO sensor detect over than 20 °C. | OFF: Always energized | SW10-2 |
| | 03: External circulation pump P2's action: Non-synchronous / Synchronous with the built-in circulation pump P1 | OFF: Non-synchronous*2 | SW10-3 |
| | 04: Built-in circulation pump P1 ON/OFF cycling (During long periods of system off) | OFF: None | SW10-4 |

If the external circulation pump P2 is set to Non-synchronous, the pump P2 is always energized.

3-1) Controlling the built-in circulation pump P1

Pump type: DC motor, rated voltage 220-230 V, 6 speed (changed manually)
The pump operation starts under the condition below:

- When the [ F2 ] or [ F1 ] button is pressed.

The pump operation stops under the condition below:

- When the [ F2 ] or [ F1 ] button is pressed.
  (Operation will stop fully in about 1 minute.)

| FC_code A0 | Pump flow rate |
|---|---|
| 0 (Default) | 100% |
| 1 | 90% |
| 2 | 80% |
| 3 | 70% |
| 4 | 60% |
| 5 | 50% |

The pump operation stops/restarts under the conditions shown below.

- When changing operation modes, the pump stops for 30 seconds.

| Boiler is installed or not (DPSW13_2) | Boiler position (DPSW02_1) | P1 pump control Stop/restart temperatures (TWI or TWO or THO) |
|---|---|---|
| OFF (Not installed) | OFF (After 3-way valve, heating side) | 70 °C / 68 °C |
| | ON (Before 3-way valve) | 70 °C / 68 °C |
| ON (Installed) | OFF (After 3-way valve, heating side) | 70 °C / 68 °C |
| | ON (Before 3-way valve) | 58 °C / 55 °C |

3-2) Controlling the built-in circulation pump P1 during the hot water supply operation

You can change the action of the built-in circulation pump P1 during the hot water supply operation using DP_SW10-1.

- DP_SW10-1 OFF (Default): The pump stops as the HP for hot water supply stops.
- DP_SW10-1 ON: The pump is always energized.

3-3) Controlling the built-in circulation pump P1 during the heating operation

You can change the action of the built-in circulation pump P1 during the heating operation using DP_SW10-2.

- DP_SW10-2 OFF (Default): The pump is always energized.
- DP_SW10-2 ON : The pump stops when To ≥ 20 °C. (Practically the HP for heating is turned off.)

3-4) Synchronized external circulation pump P2

Pump type: DC motor, rated voltage 220-230 V, connectable directly up to 200W rated power output.
You can select whether the pump P2 is synchronized with the pump P1 using DP_SW10-3. The pump P2 is always energized if the pump P2 is not synchronized.

- DP_SW10-3 OFF (Default): Non-synchronous

**NOTE:**

2 zone temperature control by boiler with P1 OFF is required DP_SW10-3 OFF

3-5) Controlling the external circulation pump P2

You can change the action of the external circulation pump P2 during cooling operation by setting FC64.

- FC64="00"(Default): The pump is always energized.
- FC64="01" : The pump is always stopped.

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | 3-6) Controlling the built-in circulation pump P1 during cooling operation controlled with the room temperature thermostat or room temperature remote controller.<br>You can change the action of the built-in circulation pump P1 by setting FC65.<br>• FC65=”00”(Default): The pump is always energized.<br>• FC65=”01” : The pump is stopped when the thermostat is turned off.<br><br>3-7) Interval operation of the pump P1 during thermostat off operation (For energy saving)<br>The pump of the hydro unit performs intermittent operation according to the outdoor temperature during thermostat off (compressor off) operation.<br><br>**NOTE:**<br>When boiler is installed (DPSW13_2 : ON), do NOT set intermittent operation or do NOT set the valve of A (FC_BA) lower than the Boiler-heat pump switching temperature (FC_23).<br>A, lower limit of To during the heating operation, must be higher than the Boiler-heat pump switching temperature.<br>Because when To is lower than the Boiler-heat pump switching temperature, the boiler output is ON state. But if the pump stops due to the intermittent operation, the boiler output is also turned OFF.<br><br>Related FC |

| FC No. | Setting item | Default | Setting value |
|---|---|---|---|
| 5A | Control of the pump P1 during the hot water supply operation | 0: synchronized with HP | 1: Always energized<br>Equal to DPSW10-1 |
| 64 | Control of the pump P2 during in cooling operation | 0: Always ON | 1: Always stopped |
| 65 | Control of the pump P1 while using the room temperature control or room temperature thermostat | 0: Always ON | 1: Stopped when the thermostat is OFF |
| 9E | Turn off the P1 when TO sensor detect over than this temperature | 0: 20 °C | 10~30 °C |
| 6E | Pump P1 restart diff TO sensor temperature, when turn off the P1 by to sensor detection. | 2: 2K | 1~5K |
| BA | intermittent operation at TO ≥ A °C (heating) | 0: continuous operation | -5 ~ 20 °C |
| BB | intermittent operation at TO < B °C (cooling) | 0: continuous operation | 25 ~ 35 °C |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | |

4) Control by the flow switch

Whether water flows or not is judged with the ON/OFF of the flow switch.

| Model | Determined that water flows when: | Determined that water does not flow when: |
|---|---|---|
| HWS-P805**-E | 13L or more water flows per minute | Water less than 13L flows per minute |
| HWS-P1105**-E | 18L or more water flows per minute | Water less than 18L flows per minute |

Without water-flow determination from the flow switch after the hot water supply operation, heating operation, or cooling operation, The HP, backup heater and booster heater are not energized. Similarly, The “A01” error indication flashes if the flow switch judged that water does not flow.

The specification of the flow switch is the same in P805**-E and P1105**-E. The flow setting differs due to the specification of piping in the hydro unit.

5) Mixing Valve control (2-temperature heating control)

To set different radiator unit supply temperatures or floor heating supply temperatures, the unit performs Mixing Valve control.

When Mixing Valve "Yes" is selected, the unit controls Mixing Valve every 4 minutes (FC) based on the difference TSC_ΔT between the Zone2 set temperature and TFI (floor inlet water temperature sensor) temperature as follows:

| TSC_ΔT | 2 ≤ TSC_ΔT | -2 ≤ TSC_ΔT < 2 | -2 > TSC_ΔT |
|---|---|---|---|
| Control value | + 1 step (Open) | ± 0 step | - 1 step (Close) |

| Initial value | Driving range | 1 step | Control cycle |
|---|---|---|---|
| 6 | 0-12 | 3 WV move 7.5 degrees | 4 min (FC) |

To enable 2 zone temperature control switch DP_SW12-3 to ON.

**NOTE:**

The mixing valve will automatically be reset if 24 hours pass with the valve fully closed.

2 zone temperature control by boiler with P1 OFF is required DP_SW10-3 OFF.

Related FC

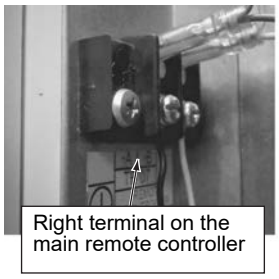
| FC No. | Setting item | Default | Setting available range |
|---|---|---|---|
| 0C | Mixing Valve operation time | 60 | 30 - 240 sec |
| 59 | Mixing Valve control time | 4 | 1 - 30 min |

6) Room temperature control

You can install a sub remote controller (separately purchased) in a room to control room temperature.

6-1) Installing the sub remote controller

- Wiring with the main unit (See the figure on the right) : After detaching the front panel, connect the sub remote controller to the right terminal on the main remote controller, which is connected with the hydro unit. (No polarity)
- Place to install (inside a room): At the height of 100 cm-150 cm on a wall Opposite to the radiator or fan coil installed
  No assignment when floor heating is used on the room.



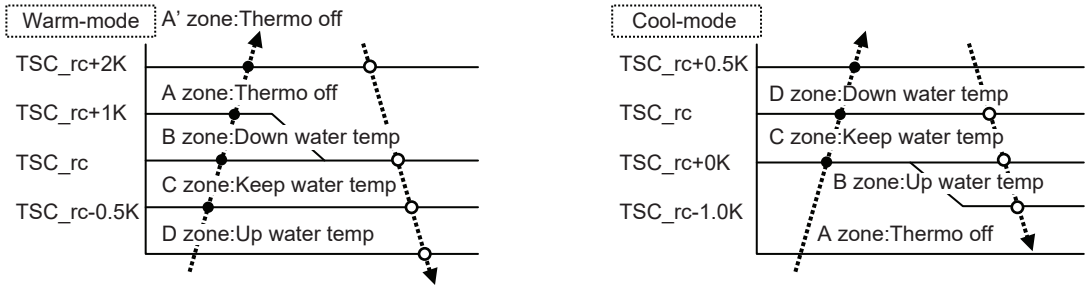

6-2) Room temperature control settings

- Function code setting:FC_40="1"
- Setting of the remote controller Temperature control “ON”.
  (Setting → Initial setting → Temperature control)

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | |

6-3) Control method

- The water temperature setting at starting operation is 40 °C (FC_9D) at heating and 20 °C (FC_96) at cooling. If the temperature setting calculated by Auto curve at starting operation will be used instead of the fixed temperature 40 °C (FC_9D), FC_B5 should be set to “1”.
- The target water outlet temperature is adjusted by 1deg every 30 minutes based on the TSC_rc, the temperature setting on the remote controller, and the room temperature (temperature indicated on the remote controller: T_rc). The adjustable range of water temperature is set with FC18-1B.
- The temperature set on the remote controller and actual room temperature may differ depending on the place of the remote controller or room space. In that case, adjust temperature detection using FC02 (for heating) and FC03 (for cooling) on the remote controller.




How to shift up/down the temperature by remote controller FC02, 03

- Ambient temperature (remote controller) is higher than room temperature: example. 1deg
  Change remote controller FC02, 03 = “-1K” to “-2K”
- Ambient temperature (remote controller) is lower than room temperature: example. 1deg
  Change remote controller FC02, 03 = “-1K” to “0”

| T_rc | Correction control | |
|---|---|---|
| | Heating | Cooling |
| D zone | Setting is corrected upward<br>Water temperature setting is up by 1deg every 30 minutes. | Setting is corrected upward<br>Water temperature setting is down by 1deg every 30 minutes. |
| C zone | No correction | No correction |
| B zone | Setting is corrected downward.<br>Water temperature setting is down by 1deg every 30 minutes. | Setting is corrected downward.<br>Water temperature setting is down by 1deg every 30 minutes. |
| A zone | Thermo off. But if inlet water detect less 25 °C, then heat pump restart. | Thermo off |
| A’ zone | Setting is corrected downward.<br>Water temperature setting is down by 1deg every 39 minutes. | |
| | Thermo off | |

Related FC

| FC No. | Setting item | Default | Variable range |
|---|---|---|---|
| 18 | Upper limit of cooling temperature setting | 25 | 18-25 °C |
| 19 | Lower limit of cooling temperature setting | 7 | 7-18 °C |
| 1A | Upper limit of heating temperature setting (Zone 1) | 60 | 37-60 °C |
| 1B | Lower limit of heating temperature setting (Zone 1) | 20 | 20-37 °C |
| 40 | Room temperature control | 0 | 0:Not permitted 1:Permitted |
| 96 | Initial water temperature setting when controlling cooling by the room temperature remote controller and room temperature thermostat | 20 | 10-25 °C |
| 9D | Initial water temperature setting when controlling heating by the room temperature remote controller and room temperature thermostat | 40 | 20-60 °C |
| 02 (Remote controller) | Room temperature correction (at heating) | -1 | -10K - +10K, 1K step |
| 03 (Remote controller) | Room temperature correction (at cooling) | -1 | -10K - +10K, 1K step |
| B2 | Heat pump restart water condition in A zone. | 25 | 20-37 °C |
| B5 | Choose of the initial setting temperature.<br>Either use the temperature set in FC_9D, or use the temperature calculated by Auto curve.<br>This applies heating operation only. | 0 | 0 : Use the temperature set in FC_9D<br>1 : Use the temperature calculated by Auto curve |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | |

7) Room temperature control with the thermostat

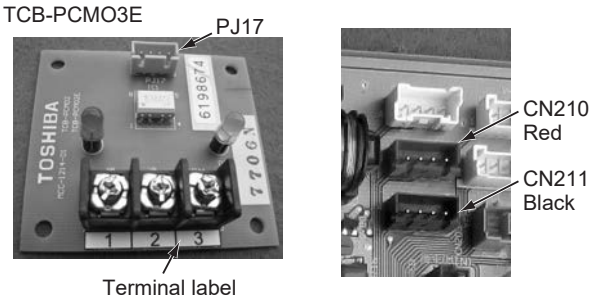
You can install a commercially available thermostat to control room temperature.

7-1) Installing the room temperature thermostat

- TCB-PCM03E optional PC board is required. Connect its connection cable to CN211 port on the PC board of the hydro unit.
- Wiring to the main unit: connect the optional PC board TCB-PCM03E to the hydro unit after detaching the front panel.
  Thermostat for heating : Connect TCB-PCM03E between the terminals (1) and (3).
  Thermostat for cooling : Connect TCB-PCM03E between the terminals (2) and (3).
- Place to install (inside a room): At the height of 120 cm-180 cm on a wall
  Opposite to the radiator or fan coil installed
  No assignment when floor heating is used on the room.

7-2) Room temperature thermostat control setting

- Setting of DPSW on the hydro unit
  DP_SW02_4=“ON” (Default “OFF”)




7-3)Heating thermostat operation

When the heating thermostat does not reach the assigned temperature (the circuit between (1) and (3) is closed), heating starts under the setting that water temperature for heating is 40 °C (FC_9D). If the heating thermostat has not reached the assigned temperature 30 minutes after heating had started, the water temperature setting is turned up 1 degree, and the same action will be repeated every 30 minutes until the thermostat reaches the assigned temperature. The backup heater and booster heater are controlled in the same way as in the normal HP operation.

When the heating thermostat reaches the assigned temperature (the circuit between (1) and (3) is open), the heat pump shifts to the “thermostat off” operation. During the operation, the water temperature setting is turned down by 1 degree every 30 minutes. The backup heater and booster heater are tuned off as the heat pump shifts to the “thermostat off” operation.

7-4)Cooling thermostat operation

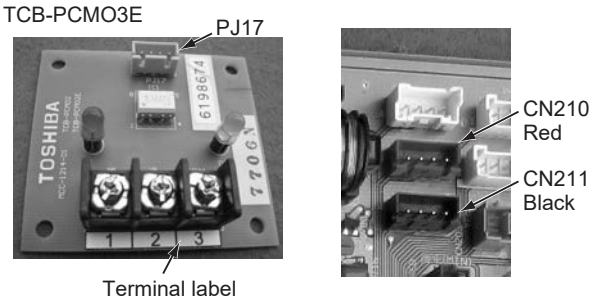
When the cooling thermostat does not reach the assigned temperature (the circuit between (2) and (3) is open), cooling starts under the setting that water temperature fro cooling is 20 °C (FC_96). If the cooling thermostat has not reached the assigned temperature 30 minutes after cooling had started, the water temperature setting is turned down 1 degree, and the same action will be repeated every 30 minutes until the thermostat reaches the assigned temperature.

When the cooling thermostat reaches the assigned temperature (the circuit between (2) and (3) is closed), operation shifts to the “thermostat off” operation. During the operation, the water temperature setting is turned up by 1 degree every 30 minutes.

| Room thermostat | Correction control | Heating operation | Cooling operation |
|---|---|---|---|
| CLOSE | Setting is corrected upward | Thermo on<br>The water temperature setting is turned up by 1 degree every 30 minutes. | Thermo off<br>The water temperature setting is turned up by 1 degree every 30 minutes. |
| OPEN | Setting is corrected downward. | Thermo off<br>The water temperature setting is turned down by 1 degree every 30 minutes. | Thermo on<br>The water temperature setting is turned down by 1 degree every 30 minutes. |

Related FC

| FC No. | Setting item | Default | Variable range |
|---|---|---|---|
| 9D | Initial water temperature setting when controlling heating by the room temperature remote controller and room temperature thermostat. | 40 | 20-60 °C |
| 96 | Initial water temperature setting when controlling cooling by the room temperature remote controller and room temperature thermostat. | 20 | 10-25 °C |
| B5 | Choose of the initial setting temperature.<br>Either use the temperature set in FC_9D, or use the temperature calculated by Auto curve.<br>This applies heating operation only. | 0 | 0 : Use the temperature set in FC_9D<br>1 : Use the temperature calculated by Auto curve |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | 8) Hot water cylinder thermostat control<br>Hot water can be supplied using an existing hot-water cylinder with a thermostat.<br><br>8-1) Installing the hot-water cylinder thermostat<br>• Optional board : TCB-PCM03E optional PC board is required. Connect its connection cable to CN210 port on the PC board of the hydro unit.<br>• Wiring with the main unit : After detaching the front panel, install TCB-PCM03E optional PC board in the hydro unit. Hot-water cylinder heating thermostat : Connect this thermostat between (2) and (3) on TCB-PCM03E.<br>• Place to install the thermostat (hot-water cylinder) : At a height of 30 to 50 cm from the base.<br>• Hot-water heater : A hot-water heater is required. (Without a hot-water heater, the hydro unit will not work.)<br><br>8-2) Setting the hot-water cylinder thermostat<br>Setting of DPSW on the hydro unit : DP_SW02_3 = “ON” (Default “OFF”)<br>  <br>8-3) Hot-water thermostat operation (hot-water supply operation only)<br>If hot water is used when the hot-water thermostat is at the assigned temperature (the circuit between (2) and (3) is open), the hot-water heat pump starts with the hot-water thermostat closed.<br>After 30 minutes, the hot-water cylinder heater turns on, but the hot-water heat pump continues running until the hot-water cylinder thermostat becomes open.<br>It should be noted, however, that the hot-water heat pump might stop if the water input temperature becomes high.<br><br>8-4) Hot-water thermostat operation (hot-water supply + heating operation)<br>If hot water is used when the hot-water thermostat is at the assigned temperature (the circuit between (2) and (3) is open), the hot-water heat pump starts with the hot-water thermostat closed.<br>In 30 minutes, the hot-water heat pump stops. After that, only the hot-water cylinder heater is used to raise water temperature.<br>The heat pump switches to heating operation. Unless the hot-water cylinder thermostat temperature rises, the hot-water heat pump will never take over.<br><br>8-5) Hot-water thermostat operation (hot-water supply + cooling operation)<br>For automatic switching to hot-water supply plus cooling operation, FC-0F is required.<br>If hot water is used when the hot-water thermostat is at the assigned temperature (the circuit between (2) and (3) is open), the hot-water heat pump starts with the hot-water thermostat closed.<br>In 30 minutes, the hot-water heat pump stops. After that, only the hot-water cylinder heater is used to raise water temperature.<br>The heat pump switches to cooling operation. Unless the hot-water cylinder thermostat temperature rises, the hot-water heat pump will never take over.<br><br>Related FC |

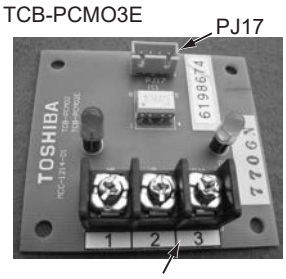
| FC No. | Setting item | Default | Setting value |
|---|---|---|---|
| 0F | Hot water HP allowance while cooling + hot water supply | 0:Not allow | 1:Allow |

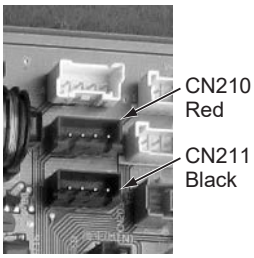
| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | |

9) Control of force stop and restart

The unit can be stopped and restarted with external input. By setting FC52, FC61 and FCB6, you can set an operation mode to run/stop or can run/stop the unit in the mode assigned on the remote controller.

- TCB-PCM03E optional PC board is required. Connect its connection cable to CN210 port on the PC board of the hydro unit.




9-1)Setting the control method

Select a control method by setting FC52.

- FC52=“0”:Stops ESTIA as the circuit between the terminals (1) and (3) is closed. (Default)
- FC52=“1”:Stops ESTIA as the circuit between the terminals (1) and (3) is opened.
- FC52=“2”: Starts ESTIA as the circuit between the terminals (1) and (3) is closed.
  Stops ESTIA as the circuit between the terminals (1) and (3) is opened.
- FC52=“3”:Starts/Stops ESTIA as the circuit between the terminals (1) and (3) is received closed plus.

9-2)Setting the object to control

Select an operation mode by setting FC61.

- FC61=“0”:Hot water supply and heating (Default)
- FC61=“1”:Follows the setting on the remote controller (If the hot water supply operation, heating operation, or hot water supply + heating operation is started manually after the unit was stopped with an external input, the new status is reflected to the setting on the remote controller.)
- FC61=“2”:Hot water supply only
- FC61=“3”:Heating only

It is possible to control each of the heating and hot water supply with the following settings:

- FCB6=“1” (Default “0”) and FC61=“3” and DP_SW02_3=“OFF” (Default “OFF”)
  The terminals (1) and (3) is the heating control.
  The terminals (2) and (3) is the hot water supply control.
  Both of control method is selected by FC52.

9-3)Cautions

The circuit between the external input terminals (1) and (3) is also used to control the limit of heat pump operation. You cannot use the forced stop control when the circuit is configured to control the limit of heat pump operation. (See page 66)

9-4)Setting example

- When you want to turn on/off the unit with static external input reflecting the operation setting on the remote controller (hot water supply, heating, or hot water supply and heating).
  FC52=“2”, FC61=“1”

○ RC on condition
× RC off condition

| | FC61=1 & FC52=2 | | | | |
|---|---|---|---|---|---|
| | | Operation pattern | | | |
| Operation status 1 | Heating | ○ | ○ | × | × |
| | Hot water | ○ | × | ○ | × |
| | ↓ open signal input | | | | |
| Operation status 2 | Heating | × | × | × | × |
| | Hot water | × | × | × | × |
| | ↓ close signal input | | | | |
| Operation status 3 | Heating | ○ | ○ | × | × |
| | Hot water | ○ | × | ○ | × |
| | ↓ open signal input | | | | |
| Operation status 4 | Heating | × | × | × | × |
| | Hot water | × | × | × | × |

Manually ON/OFF change by remote controller

close signal input

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | |

Basic operation logic

There are 4 operation combination pattern for Heating & Hot water
When open signal is input, the operation status change to the next status.
For example, if current operation status is heating ON and hot water OFF, then next status to be heating OFF & hot water OFF when pulse is input Hydro unit memorize the status of the operation pattern before changing OFF status by close signal.
If pulse is input at operation status 2, the operation pattern in the status 3 is same pattern in the status 1.

Manually ON/OFF

If customer change operation pattern manually by remote controller, change then operation pattern will not be same as the basic logic.

1. If customer stop operation (Heating off and hot water off) by the controller, then both heating& hot water are <u>not to be ON with close or open signal</u>.
2. If the unit is stopped (Heating off and hot water off) by open signal, operation pattern will be referred to the pattern before the unit OFF by close signal.

- When you want to turn on/off with the pulse input reflecting the operation setting on the remote controller (hot water supply, heating, or hot water supply and heating).
  FC52="3", FC61="1"

○ RC on condition
× RC off condition

| | FC61=1 & FC52=3 | | | | |
|---|---|---|---|---|---|
| | | Operation pattern | | | |
| Operation status 1 | Heating | ○ | ○ | × | × |
| | Hot water | ○ | × | ○ | × |
| ↓ Pulse input | | | | | |
| Operation status 2 | Heating | × | × | × | ○ |
| | Hot water | × | × | × | ○ |
| ↓ Pulse input | | | | | |
| Operation status 3 | Heating | ○ | ○ | × | × |
| | Hot water | ○ | × | ○ | × |
| ↓ Pulse input | | | | | |
| Operation status 4 | Heating | × | × | × | ○ |
| | Hot water | × | × | × | ○ |

Manually ON/OFF change by remote controller

Pulse input

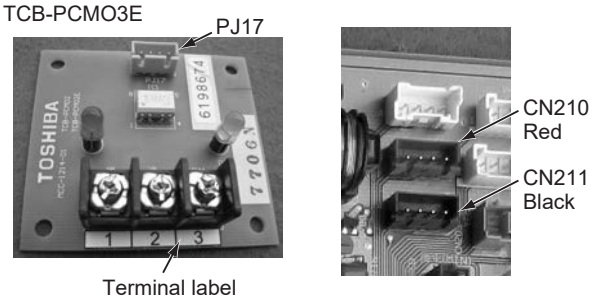
There are 4 operation combination pattern for Heating & Hot water
When pulse signal is input, the operation status change to the next status.
For example, if current operation status is heating ON and hot water OFF, then next status to be heating OFF & hot water OFF when pulse is input Hydro unit memorize the status of the operation pattern before changing OFF status by pulse signal.
If pulse is input at operation status 2, the operation pattern in the status 3 is same pattern in the status 1.

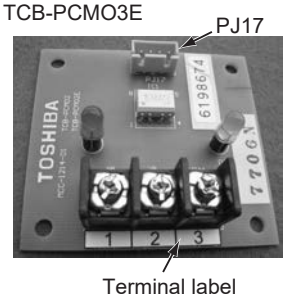
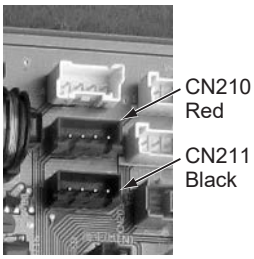
If customer change operation pattern manually by remote controller, then operation pattern will not be same as the basic logic.

1. If customer stop operation (Heating off and hot water off) by the controller, then both heating& hot water <u>to be ON with pulse input</u>.
2. If the unit is stopped (Heating off and hot water off) by pulse input, operation pattern will be referred to the pattern before the unit OFF by pulse.

Related FC

| FC No. | Setting item | Default | Setting value |
|---|---|---|---|
| 52 | Control method | 0 | See page 139 |
| 61 | Object to control | 0 | See page 139 |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | 10) Control of limit of heat pump operation<br>When the peak period of electric power charge is set due to the contract or other conditions, you can limit heat pump operation and give priority to boiler operation using an external input signal. (This control functions only during the period the signal is input.)<br><br>• TCB-PCM03E optional board is required. Connect its connection cable to CN210 port on the PC board of the hydro unit.<br><br>  <br><br><br>10-1)Setting the control method<br>Select an operation mode by setting FC61.<br>• FC61=“4”:Hot water cylinder heater = OFF, backup heater = OFF (Built-in circulation pump is ON.)<br>• FC61=“5”:Hot water cylinder heater = OFF, backup heater = OFF, heat pump = OFF, Built-in circulation pump is stopped.<br><br>10-2)Control summary<br>When the TEMPO signal is input (the circuit is closed), the boiler signal is output regardless the outside temperature and devices are turned off following the setting on FC61.<br>1. Basic operation: heating operation using the boiler<br>2. Switching to hot water supply: the water circuit is switched to the hot water supply side as the unit detect that TTW is less than 38 °C.<br>3. Switching to heating: the water circuit is switched to the heating side as the unit detect that TTW is 45 °C or more, or 30 minutes has passed since operation started. Heating operation continues at least 30 minutes.<br>4. The LED on the PC board lights up when the input signal is ON. |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | 11) Control of force stop and restart (Cooling mode & Mode Selection)<br>You can stop and restart and select Heating or Cooling mode with external input by setting FC52, FC61 and FCB6.<br><br>• TCB-PCM03E optional PC board is required. Connect its connection cable to CN210 port on the PC board of the hydro unit.<br><br>TCB-PCMO3E<br>  <br><br>  <br><br><br>11-1)The Settings<br>DIPSW2_2 =”OFF” : SG Ready control disabled<br>DIPSW2_3 =”OFF” : External cylinder thermostat non-connected<br>DIPSW2_4 =”OFF” : External room thermostat non-connected<br>FC52=”2” (Statics input)<br>FC61=”3”<br>FCB6=”2” (Select the operation mode by external input)<br><br>11-2)The object to control<br>The terminals (2) and (3) is Heating/Cooling mode selection.<br>The terminals (1) and (3) is Heating/Cooling mode ON/OFF control.<br><br>S1: Terminal (2) and (3), S2: Terminal (1) and (3)<br>0: The terminals are opened , 1:The terminals are opened |

| S1 | S2 | Mode |
|---|---|---|
| 0 | 0 | Heating mode OFF |
| 0 | 1 | Heating mode ON |
| 1 | 0 | Cooling mode OFF |
| 1 | 1 | Cooling mode ON |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | 12) Connection to a Smart Grid network (SG ready)<br>The operating mode is controlled through volt free contacts incorporated into the energy meter.<br><br>• TCB-PCM03E optional PC board is required. Connect its connection cable to CN210 port on the PC board of the hydro unit.<br><br>TCB-PCMO3E<br>PJ17<br>Terminal label<br>CN210 Red<br>CN211 Black<br><br>12-1)The Settings<br>DIPSW2_2 ="ON" : SG Ready control enabled<br>DIPSW2_3 ="OFF" : External cylinder thermostat non-connected<br>DIPSW2_4 ="OFF" : External room thermostat non-connected<br>FC61="0~5" : HP and backup heaters ON when "System Forced ON" mode<br>FC61="6" : HP operation only when "System Forced ON" mode<br>FCAC="0~10" : Setting to increase the space heating set point temperature when "System Forced ON" mode<br><br>12-2)The operation mode and control summary<br>S1: Terminal (2) and (3), S2: Terminal (1) and (3)<br>0: The terminals are opened , 1:The terminals are opened |

| S1 | S2 | Mode | Control summary |
|---|---|---|---|
| 0 | 0 | Restricted Operation | • Normal operation but with maximum compressor frequency limited to 40.2Hz (night time operation)<br>• Back up heater control is active<br>• Boiler output control active |
| 1 | 0 | System OFF | • The heat pump and electric heaters are FORCED OFF for a maximum of 2 hours during this period.<br>• The space heating and DHW set points will continue to be displayed on the remote controller.<br>• System safety controls (e.g. freeze protection) will remain active.<br>• Boiler output control will remain active. |
| 0 | 1 | Normal Operation | • This signal is not a START signal – only a recommendation to start<br>• The heat pump and electric heaters are available to operate under normal control if there is a heating or DHW demand<br>• There is no restriction on the compressor frequency – the compressor can operate at maximum frequency if requested by the outdoor unit control software |
| 1 | 1 | System Forced ON | • During this period the system is FORCED ON to allow the heat pump and back up heater to operate<br>• The space heating set point temperature is increased during this period. The temperature increase can be adjusted using FCAC.<br>• If there is a DHW demand during this FORCED ON period then the DHW set point is increased to the set point used for the DHW boost function<br>• The hydro unit back up heaters will continue to operate with a modified control where by the ON/OFF heater delay will be removed<br>• All other controls will remain active (e.g. FC22, FC1A etc.) |

| Item | Operation flow and applicable data, etc. |
|---|---|

13)Output signal control 1

(TCB-PCIN3E optional PC board is required. Connect its connection cable to the CN208 terminal on the PC board in the hydro unit.)

- The circuit between the terminals (1) and (2) gets closed as an error detection signal is output.
- The circuit between the terminals (3) and (4) gets closed as a boiler signal is output.
  The LED on the PC board lights up when the signals are output.

14)Output signal control 2

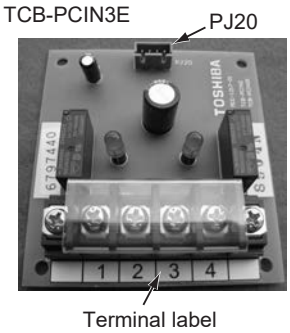
(TCB-PCIN3E optional PC board is required. Connect its connection cable to the CN209 terminal on the PC board in the hydro unit.)

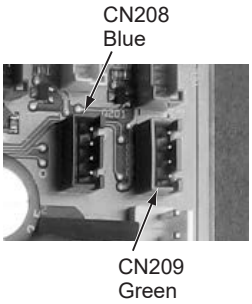
< FC67="0": Default >

- The circuit between the terminals (1) and (2) is closed during defrosting.
- The circuit between the terminal (3) and (4) is closed while the compressor is running.

< FC67="1" >

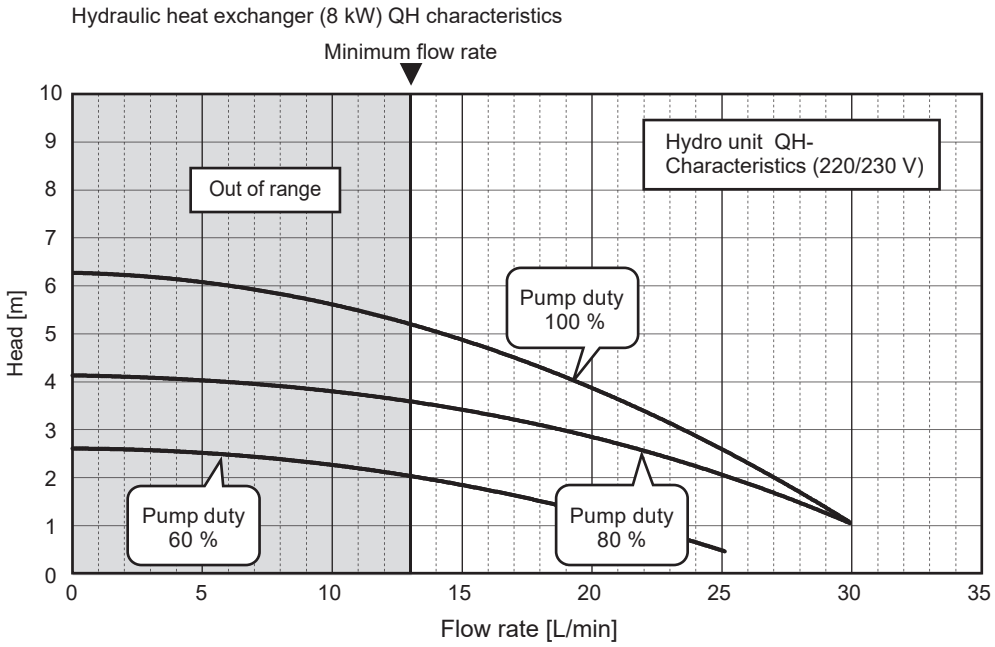
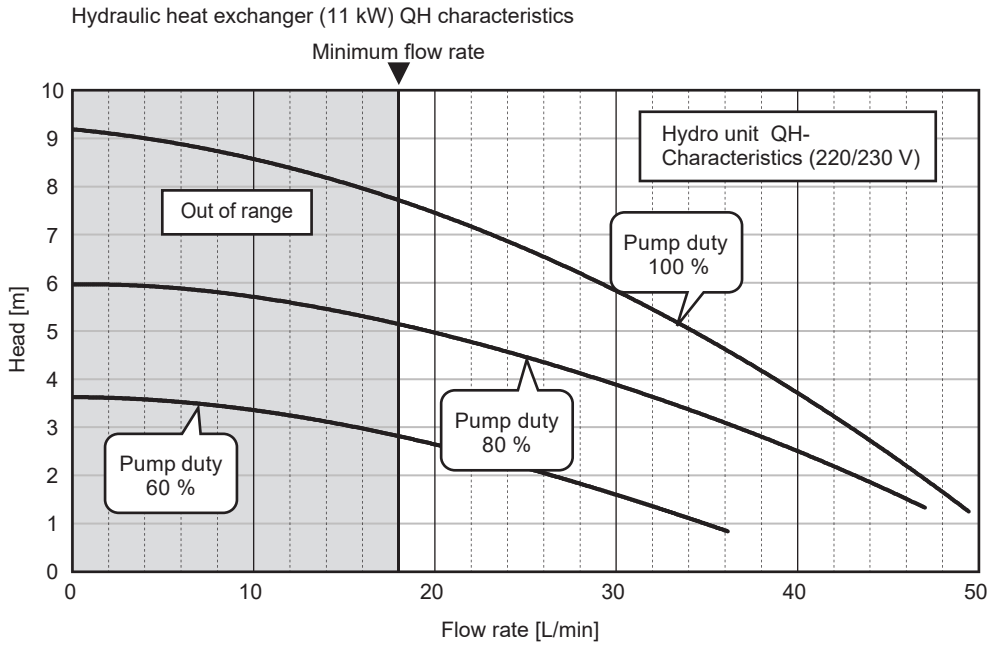
- The circuit between the terminals (1) and (2) gets closed as an error is detected.
- The circuit between the terminals (3) and (4) is closed during operation (when the remote controller is ON)
  The LED on the PC board lights up when the signals are output.



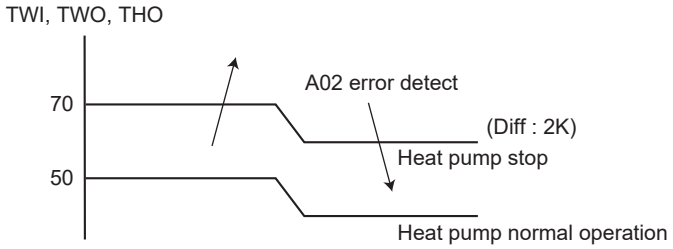



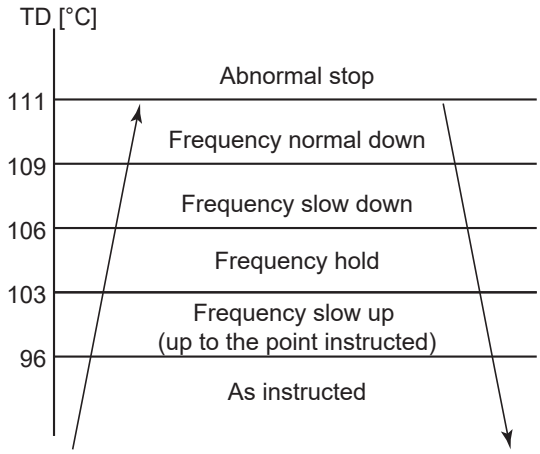

Related FC

| FC No. | Setting item | Default | Setting value |
|---|---|---|---|
| 67 | Changing the condition of optional output (For the optional PC board connected to CN209) | 0: 1-2 During defrosting<br>2-4 While compressor is running. | 1: 1-2 As error is detected<br>2-4 During operation |

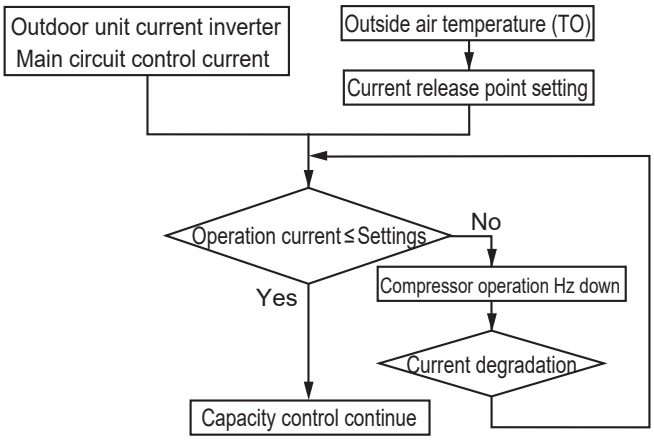
| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | 13) Q-H characteristics of hydro unit<br>The following shows the Q-H characteristics.<br>13-1)HWS-P805XWHM3-E, T6-E, T9-E<br>  <br><br>13-2)HWS-P1105XWHM3-E, T6-E, T9-E<br>  <br> |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-3.<br>Hydro Unit Control | 14) Automatic restart control<br>The unit records operation information before a power outage and retrieves the information after the power is restored to restart automatically the operation with the information.<br><br>14-1)Operation during remote controller<br>• The operation status before a power outage automatically restarts after the power is restored. (The merit functions are also enabled)<br>• Approximately 6 hours or more after a power outage<br>The operation status before a power outage automatically restarts after the power is restored.<br>But the merit functions (Night setback, Anti bacteria) are disabled.<br>• The remote controller time displays "00:00". (The merit functions are disabled)<br><br>14-2)Operation during forcible automatic operation<br>A forcible automatic operation is performed when the power is restored after a power outage.<br><br>14-3) Operation during defrosting operation<br>When the power is restored after a power outage, the usual operation restarts.<br>Note: The operation details recorded before a power outage<br><br>Operation mode: Hot water supply, Heating, Cooling, Hot water supply + Heating, Hot water supply + Cooling<br>Set temperature: Hot water set temperature, Heating set temperature, Cooling set temperature<br><br>Merit function: Hot water supply operation (Anti bacteria)<br>Heating operation (Night setback) |
| | 15) Piping freeze prevention control<br>This control operates when the power is on regardless the remote controller setting ON or OFF.<br>To prevent frost bursting of the water piping for hot water supply and heating, the unit flows water with the circulation pump when the temperature sensor value falls below a certain temperature.<br><br>15-1)Piping freeze prevention control 1<br>1) Start condition: TWO < 4 °C or THWI < 4 °C.or THO < 4 °C<br>2) End condition: TWO ≥ 5 °C and TWI ≥ 5 °C and THO ≥ 5 °C<br>3)-1 How to operate (circulation pump)<br>• When the circulation pump is not in operation, if the sensor detects the freeze prevention control start temperature, the unit operate the circulation pump.<br>• During a freeze prevention operation, a heat pump operation does not start.<br>• When neither [Hot water supply] nor [heating/cooling] is in operation, if the end condition is not met when 3 minutes has passed after an operation starts, the unit performs the operation in 3)-2 to prevent freeze.<br>3)-2 How to operate (circulation pump + backup heater)<br>• When neither [Hot water supply] nor [heating/cooling] is in operation, if the end condition is not met when 3 minutes has passed after an operation starts.<br>• End condition: TWO ≥ 5 °C and TWI ≥ 5 °C and THO ≥ 5 °C<br>• Heating with the set temperature 55 °C operates.<br>3)-3 Abnormal stop<br>• If a freeze prevention operation continues for 30 minutes and does not meet the end condition, the operation stops as abnormal stop. (Remote controller check code: A05)<br><br>15-2)Piping freeze prevention control 2<br>TC and TWO activates freeze prevention regardless of a heat pump operation mode.<br>1) Determination condition: TWO>20 °C. 2*TC+TWO<-12 °C is continuously detected for 180 seconds or longer.<br>Or TWO ≤ 20 °C. TC+TWO<4 °C is continuously detected for 180 seconds or longer.<br>2) Determination cancellation conditions<br>• The stop or operation mode is changed by the remote controller<br>• The mode is defrosting at the time of determination<br>At the next time of defrosting, the start condition is not met.<br>• The mode is other than defrosting at the time of determination<br>After cooling, heating, hot water heat pump restarts, the start condition is not met for 10 minutes.<br>3) Error display<br>• If freeze determination cancellation condition is not met, A04 error is displayed.<br><br>15-3)Piping freeze prevention control 3<br>This control applies only when defrosting is in operation.<br>1) Determination condition: During defrosting, TWI ≤ 15 °C is continuously detected for 30 seconds or longer (After the stop, the unit restarts.)<br>2) Determination cancellation condition<br>• At the next time of defrosting, the start condition is not met.<br>3) Error display<br>• If freeze determination cancellation condition is not met, A04 error is displayed. |

<table>
<tr><th>Item</th><th>Operation flow and applicable data, etc.</th></tr>
<tr><td rowspan="2">8-3.<br>Hydro Unit Control</td><td>15-4)Piping freeze prevention control 4<br>When the value of Ps sensor is low, freeze prevention is activated regardless of a heat pump operation mode.<br>1) Determination condition: Low pressure sensor detects PS < 0.2 MPa and 90 seconds passes (defrosting and cooling) (During a defrosting operation for cooling and heating, or hot water supply)<br>Low pressure sensor detects PS < 0.2 MPa and 10 minutes passes (heating and hot water supply operation)<br>2) Determination cancellation condition<br>• After a restart, the start condition is not met for 180 minutes.<br>• At the next time of defrosting, the start condition is not met. (Defrosting operation for heating or hot water supply)<br>3) Error display<br>• If freeze determination cancellation condition is not met, A08 error is displayed.</td></tr>
<tr><td>16) High return water protect control<br>The hydro unit protects against high return water which made by separate boiler system.<br> 
<br>When A02 error appeared, the built-in circulation pump will stop.<br><br>Related FC
<table>
<tr><th>FC No.</th><th>Setting item</th><th>Default</th><th>Setting available range</th></tr>
<tr><td>62</td><td>Activate/deactivate A02 error detection</td><td>0: Activate</td><td>1: Deactivate</td></tr>
</table>
This FC62 function is valid when DP_SW13-2 is ON. (See 10.1-1. Setting switch names and positions)</td></tr>
</table>

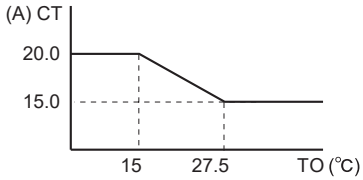
| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-4.<br>Outdoor unit control | 1) PMV (Pulse motor valve) control<br>Valve opening is controlled using the expansion valve with a pulse motor according to a heat pump operation status.<br><br>• PMV is controlled between 30 and 500 pulses during an operation.<br>• At the time of a cooling operation, PMV is controlled with the usual target value of 1 to 4 K temperature difference between TS sensor and TC sensor.<br>• At the time of a hot water supply or heating operation, PMV is controlled with the usual target value of -1 to 4 K (for P805HR-E, P1105HR-E) temperature difference between TS sensor and TE sensor.<br>• For both cooling and heating, if the cycle is overheated, PMV is controlled using the TD sensor. The usual target value is 91 °C for a cooling operation, and 96 °C for a heating operation.<br>* A defective sensor may cause liquid back flow or abnormal overheat of the compressor, significantly shortening the compressor life. If the compressor or other equipment is repaired, first check that the resistance of each sensor or the refrigerant cycle has no problem, then start the operation. |
| | 2) Discharge temperature release control<br>This control detects an abnormality of the refrigerant cycle or compressor to perform failure prevention.<br><br>• This control reduces operation frequency if the PMV control does not lower the outlet temperature or if the outlet temperature rapidly rises. The frequency control is broken down to the unit of 0.6 Hz to stabilize the cycle.<br>• If the discharge temperature detects the abnormal stop zone, the compressor stops and then restarts after 150 seconds. The abnormality detection counter is cleared when the operation continues for 10 minutes. If detected 4 times, the error code is displayed and the compressor does not restart.<br>* An abnormality could occur due to too less refrigerant, PMV defective, or cycle stuck.<br>• For details about an error displayed, see the check code list.<br><br>  <br> |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-4.<br>Outdoor unit control | 3) Current release control<br>The number of compressor rotation is controlled so that current value of the compressor drive circuit does not exceed the specified value.<br><br>• The outdoor unit detects the input current.<br>• The outside air temperature is detected and used to set the specified value of current.<br>• The number of compressor rotation instructed by the hydro unit is used to determine whether the current value exceeds the specified value.<br>• If exceeds, the number of compressor rotation is reduced to the most approximate number instructed by the hydro unit within the specified value range. |

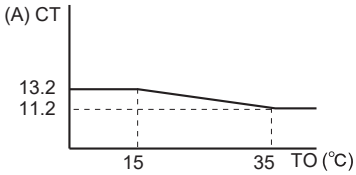



Heating, Hot water supply

| Outside temperature TO (degree °C) | Current release value (A) |
|---|---|
| | P805HR-E, P1105HR-E |
| 27.5 ≦ TO | 15.0 |
| 15 ≦ TO < 27.5 | 20.0 - (To - 15) × 0.4 |
| TO < 15 | 20.0 |

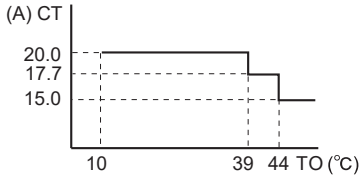



| Outside temperature TO (degree °C) | Current release value (A) |
|---|---|
| | P805H8R-E, P1105H8R-E, P1405H8R-E |
| 35 ≦ TO | 11.2 |
| 15 ≦ TO < 35 | 13.2 - (To - 15) × 0.1 |
| TO < 15 | 13.2 |



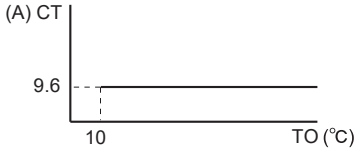

Cooling

| Outside temperature TO (degree °C) | Current release value (A) |
|---|---|
| | P805HR-E, P1105HR-E |
| 44 ≦ TO | 15.0 |
| 39 ≦ TO < 44 | 17.7 |
| 10 ≦ TO < 39 | 20.0 |




| Outside temperature TO (degree °C) | Current release value (A) |
|---|---|
| | P805H8R-E, P1105H8R-E, P1405H8R-E |
| 10 ≦ TO | 9.6 |

No cooling operation available for TO < 10 °C.



| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-4.<br>Outdoor unit control | |

4) Current releases shift control

During a cooling operation, this control prevents the electronic parts, such as a compressor drive element, and compressor from failing.

- The current release control value (I) is selected from the following table according to the TO sensor value.

Current release control value (I)

| Temperature range | P805HR-E, P1105HR-E |
|---|---|
| 50 °C ≤ TO | 14.1 |
| 45 °C ≤ TO < 50 °C | 14.1 |
| 39 °C ≤ TO < 45 °C | 14.1 |
| TO < 39 °C | 14.1 |
| TO error | 14.1 |

5) Outdoor fan control

The outdoor side control part controls the number of fan motor rotations by receiving an operation instruction from the Hydro side (Hydro unit) control part.
For sensing the true outside temperature, fan is operated without compressor operation.

* Although the fan motor is a DC motor, which has non-step variable numbers of rotations, it is limited to some steps for convenience of control.

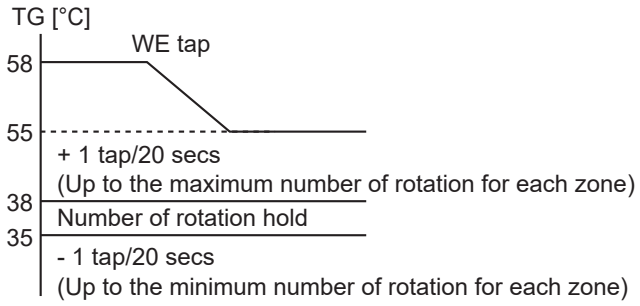
The number of fan tap rotation allocation [rpm]

| | W1 | W2 | W3 | W4 | W5 | W6 | W7 | W8 |
|---|---|---|---|---|---|---|---|---|
| Upper | 200 | 240 | 240 | 260 | 320 | 380 | 480 | 500 |
| Lower | 0 | 0 | 200 | 280 | 360 | 400 | 500 | 520 |

| | W9 | WA | WB | WC | WD | WE | WF |
|---|---|---|---|---|---|---|---|
| Upper | 530 | 610 | 640 | 660 | 720 | 780 | 890 |
| Lower | 550 | 630 | 660 | 700 | 740 | 820 | 910 |

5-1) Cooling fan control

- The TL sensor, TO sensor and operation frequency control the outdoor fan. The control is performed by 1 tap of the DC fan control (14 taps).
- For 60 seconds after the start, the maximum fan tap for each zone that is shown in the following table is fixed. After that, the fan is controlled according to the TG. (TG: temperature converted from PD)



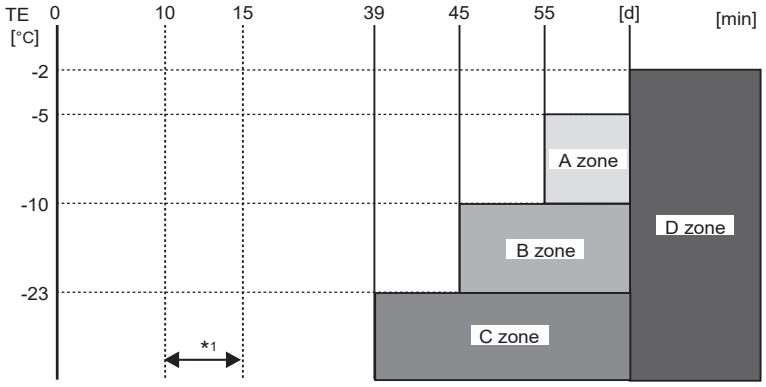

| Temperature range | Less than 20 Hz | | 20 Hz or more to less than 45 Hz | | 45 Hz or more | |
|---|---|---|---|---|---|---|
| | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum |
| 38 °C ≤ TO | W6 | WC | W8 | WC | WA | WD |
| 29 °C ≤ TO < 38 °C | W5 | WB | W7 | WB | W9 | WC |
| 15 °C ≤ TO < 29 °C | W4 | W8 | W6 | WA | W8 | WC |
| 5 °C ≤ TO < 15 °C | W3 | W6 | W5 | W8 | W7 | WA |
| 0 °C ≤ TO < 5 °C | W2 | W4 | W4 | W6 | W5 | W8 |
| -4 °C ≤ TO < 0 °C | W2 | W3 | W3 | W5 | W4 | W6 |
| TO < -4 °C | W1 | W2 | W1 | W4 | W2 | W6 |
| TO error | W1 | WC | W1 | WC | W2 | WD |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-4.<br>Outdoor unit control | 5-2) Hot water supply and heating fan control<br><br>1) The TE sensor, TO sensor and operation frequency control the outdoor fan.<br>(The minimum W1 to the maximum are controlled according to the table below.)<br>2) For 3 minutes after the start, the maximum fan tap for each zone that is shown in the following table is fixed. After that, the fan is controlled according to the TE sensor temperature.<br>3) If TE ≥ 24 °C continues for 5 minutes, the operation stops. No error code is displayed for this; the status is the same as the usual thermostat off. The operation restarts after 150 seconds. This intermittent running is not abnormal.<br><br>**NOTE**<br>If the heat-pump was thermo-off, the out-door fan motor (up/down) continue to run 10 min with W3 rotation.<br>When the water pump of hydro unit turns on, the fan motor will operate sensing value of outside air temperature (TO). |

TE [°C]

| | |
|---|---|
| | -2 tap/20 secs (to W1)<br>Stop time count |
| 24 | |
| | -2 tap/20 secs (to W1) |
| 21 | |
| | -1 tap/20 secs (to W1) |
| 18 | |
| | Number of revolutions hold |
| 15 | |
| | + 1 tap/20 secs<br>(Up to the maximum tap for each zone) |

| Temperature range | Less than 20 Hz | 20 Hz or more to less than 45 Hz | 45 Hz or more |
|---|---|---|---|
| | Maximum | Maximum | Maximum |
| 30 °C ≤ TO | W4 | W4 | W6 |
| 25 °C ≤ TO < 30 °C | W5 | W5 | W7 |
| 20 °C ≤ TO < 25 °C | W6 | W7 | W8 |
| 10 °C ≤ TO < 20 °C | W7 | W8 | W9 |
| 5 °C ≤ TO < 10 °C | W9 | WA | WA |
| -3 °C ≤ TO < 5 °C | WA | WA | WB |
| -10 °C ≤ TO < -3 °C | WB | WB | WB |
| TO < -10 °C | WD | WD | WD |
| TO abnormal | WD | WD | WD |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-4.<br>Outdoor unit control | 6) Defrosting control<br>6-1) Defrost operation<br>This control defrosts the outdoor heat exchanger. The temperature sensor (TE sensor) of the outdoor heat exchanger determines frost formation, and then defrosting is performed in the 4-way valve reverse defrosting method.<br><br>1) During a heating operation, defrosting is performed when the TE sensor meets any of the conditions in A through D zones.<br>2) During defrosting, when TE sensor maintains 12 °C or higher for 3 seconds or 7 °C ≤ TE < 12 °C for a minute, the defrosting ends. Also, when defrosting continues for 10 minutes even if the TE sensor temperature is below 7 °C, the defrosting ends.<br>3) After the defrosting, stop the compressor for approx. 40 seconds before starting a heating operation.<br>4) Switching the jumper "J805" and "J806" of the outdoor control board can change the time of d above mentioned. (Factory default: 150 minutes)<br><br>Heating operation starts<br>  <br><br>*1 In 10 to 15 minutes after the heating operation starts, the lowest value of TE is recorded as TEO, and the lowest temperature of To as ToO.<br><br>**To Normal**<br>A Zone: Maintain " (TEO - TE) - (ToO - To) ≥ 3 °C" for 20 sec<br>B Zone: Maintain " (TEO - TE) - (ToO - To) ≥ 2 °C" for 20 sec<br>C Zone: Maintain " TE ≤ -23 °C" for 20 sec<br>D Zone: Accumulate compressor operation status of TE < -2 °C for 150 min |

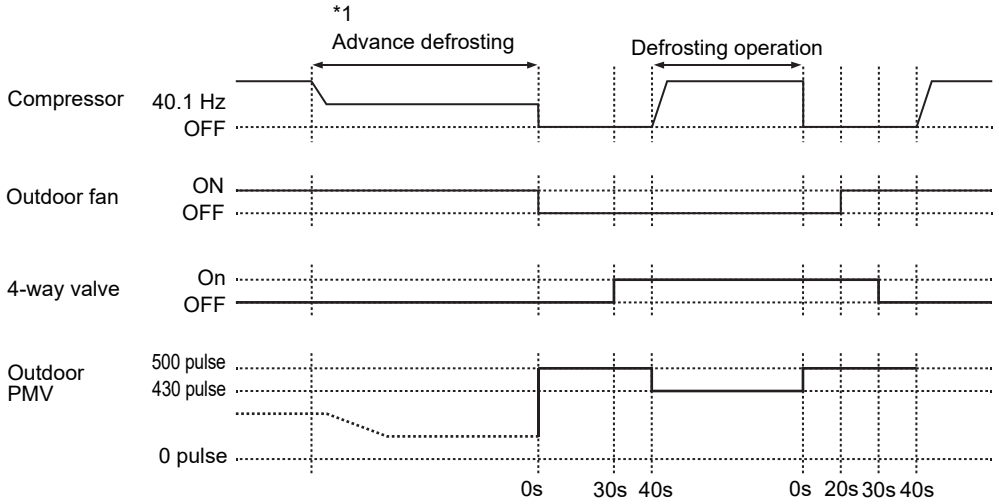
| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-4.<br>Outdoor unit control | Jumper switching O: Short circuit ×: Open |

| J805 | J806 | [d] |
|---|---|---|
| O | O | 150 min (Factory default) |
| O | × | 90 min |
| × | O | 60 min |
| × | × | 30 min |

6-2) Advance defrost operation

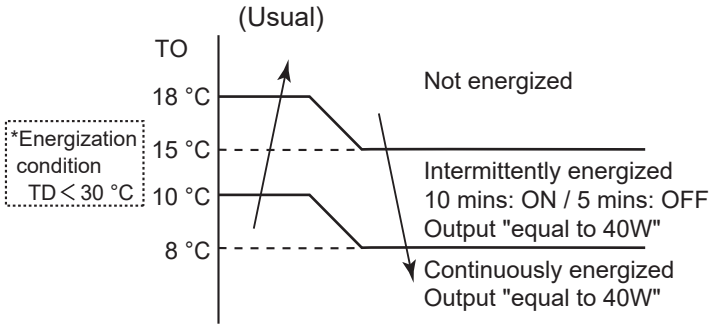
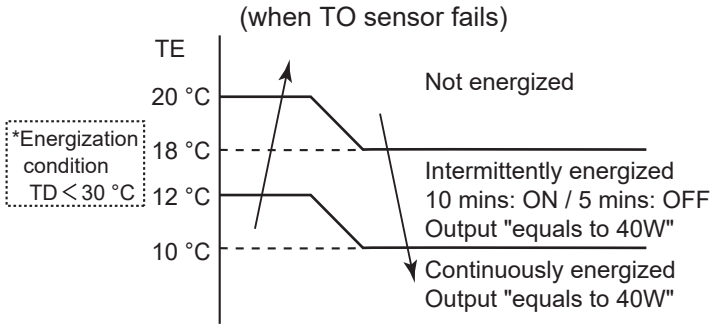
When compressor temperature is low, defrosting preliminary operation will be carried out to carry defrosting smoothly in effect.

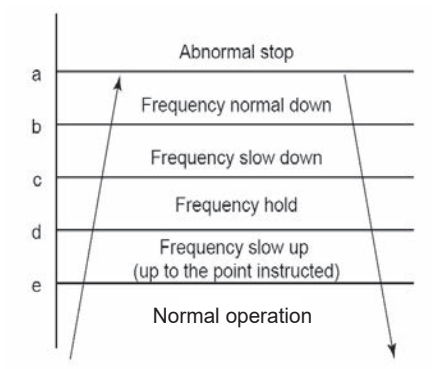
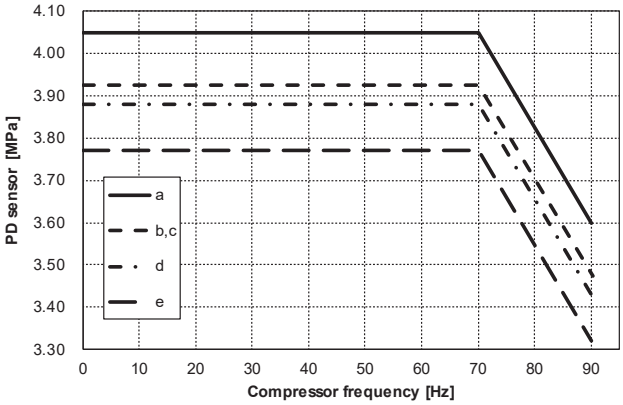
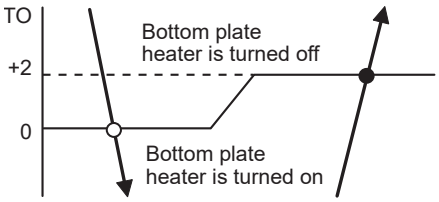
1) Start condition of advance defrosting
   - TD < 50 ºC and A, B, C or D zone detected.
2) Conditions for changing over from defrosting preliminary operation to defrosting.
   - When TD ≥ 50 °C is detected during defrosting preliminary operation.
   - When thermostat is turned off during defrosting preliminary operation.
   - When defrosting preliminary operation is carried out more than 10 minutes.
3) Control details
   - Target SH during defrosting preliminary operation will be 6 to 10 K. (refer to 8-4-1 (See page 73))
   - PMV control interval will be shorter than normal.
   - Operation frequency will be fixed.

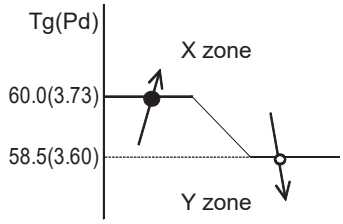
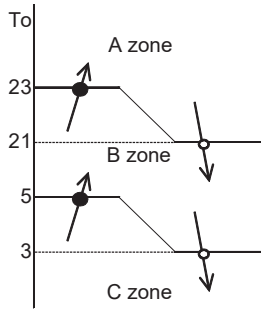



Dotted line shows a operating image.

*1. When TD ≥ 50 °C, Advance defrosting will be skipped.

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-4.<br>Outdoor unit control | 7) Winding heating control<br>1) This control energizes the inactive compressor instead of the case heater to warm the compressor. The purpose is to prevent the refrigerant from staying inside the compressor.<br>2) After the unit is installed, failure to perform energization for the given time period may cause the compressor to fail. Also, when starting an operation long after the power left off, first energize the compressor before starting the operation in the same way as a trial run.<br>3) Energization is determined by the TD sensor and TO sensor. If the TO sensor fails, the TE sensor automatically takes over the operation. Determine if the TO sensor has failed check the LED's on the outdoor unit PCB.<br>4) If TD is 30 °C or higher, the energization stops.<br>  <br><br>  <br><br>Notes<br>During winding energization, energizing noise may be heard, but this is not abnormal. |
| | 8) Short circuit operation prevention control<br>1) In 11 minutes after the operation start, the compressor may not stop for protection. This status is not abnormal. (The operation duration time of the compressor varies depending on a operation status.)<br>2) If the operation stops with the remote controller, the operation does not continue. |
| | 9) Over current protection control<br>1) A detection of abnormal current with the over current protection control stops the compressor.<br>2) Set the abnormality detection counter to 1, and restarts the compressor after 150 seconds.<br>3) When the stop by over current protection control counts 8 times, error code is displayed and the compressor does not restart.<br>(Remote controller error code display: HO1) |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-4.<br>Outdoor unit control | 10) High pressure release control<br>1) To prevent excessive high pressure rise, operating frequency is controlled by the PD sensor.<br>2) If the PD sensor detects an abnormal stop zone pressure, the compressor stops and the abnormality detection counter increments.<br>3) When the compressor stops in 2), the heat-pump operation restarts when the pressure decrease to zone "e" (normal operation) after 150 seconds passed.<br>4) When the compressor stops in 2), the abnormality detection counter is cleared when the operation continues for 10 minutes. If the counter counts 10 times, error code is displayed on the remote-controller and the compressor does not restart.<br>5) For details about an check code displayed, see the check code list. (See page 85)<br>  <br><br>  <br><br>11) High pressure switch<br>The high pressure switch detects abnormal high pressure (higher than 4.15 Mpa) in refrigeration cycle and protect the compressor.<br>• The high pressure switch stops the compressor as the pressure in the refrigeration cycle becomes higher than 4.15 Mpa.<br>• The compressor will restart three minutes after stopping.<br>• If the high pressure switch functions again after restarting, the compressor stops and the “P04” error code is indicated.<br><br>12) Compressor case thermostat<br>The compressor case thermostat functions to protect the compressor when the blow-out temperature from the compressor is too high.<br>• The compressor case thermostat on the upper part of compressor stops the compressor.<br>• The compressor will restart three minutes after stopping.<br>• If the compressor case thermostat functions again after restarting (functions at 125 °C), compressor stops and the “H04” error code is indicated.<br>13) Bottom plate heater control<br>Control ON and OFF of the bottom plate heater using the outdoor temperature sensor (TO).<br>  <br> |

| Item | Operation flow and applicable data, etc. |
|---|---|
| 8-4.<br>Outdoor unit control | 13) 2-way valve control<br>To control the bypass 2-way valve, reducing the minimum capacity and reducing the pressure increase purpose.<br>Bypass circuit is connect the discharge pipe and the suction pipe of the compressor.<br><br>1)Bypass operation start condition<br>The operation start in the following cases. (On cases of 2-way valve.)<br><Heating or hot water supply> Any of the following cases<br>Pd is the case of X zone.<br>•(To ≥ B zone) and (compressor operation Hz is low).<br>Pd is the case of Y zone.<br>(To ≥ B zone) and (compressor operation Hz is low) and (Operation of the previous time of 12 minutes or less)<br><Defrosting> Any of the following cases<br>•TWI < 36 °C<br>•TC+TWO<9 °C<br><Cooling> Any of the following cases<br>•(To ≤ B zone) and (compressor operation Hz is low)<br>•(To ≤ B zone) and (When the hydro unit is operating release control.)<br>  <br><br>The operation stop in the following cases. (Off cases of 2-way valve.)<br>When the 2-way valve turned on once, it does not turn off for 5 minutes.<br><Heating or hot water supply> Any of the following cases<br>•(Pd ≤ Y zone) and (When the compressor rotational speed is increasing.)<br>•(Pd ≤ Y zone) and (To ≤ C zone)<br>•When the compressor is stopped.<br><Defrosting><br>•When the compressor is stopped.<br><Cooling> Any of the following cases<br>•(Compressor rotational speed is increasing.) and (The hydro unit is not operating release control.)<br>•When the compressor rotational speed is increasing.<br>  <br><br>14) Start up from hibernation<br>This control operates at startup, in order to warm up the compressor by the heat from the water.<br>System is operated at a defrost cycle when the start condition is satisfied.<br>System is switched to the normal heating operation when the end condition is satisfied.<br>14-1)Start conditions<br>This control is operated when starting the compressor in a state that all of the following conditions is satisfy.<br>•Compressor off time is 2 hours or more (Also start up at the first time after turn on the power.)<br>•TD ≤ 40 °C and TWI ≥ 25 °C and TO ≤ 3 °C<br>14-2)End conditions<br>When one of the following conditions is satisfy, operation is switched to the normal heating.<br>•10 minutes has passed since operation started.<br>•TD ≥ TWI+10 °C<br>•TG ≥ TWI TG : Condensing temperature calculated from the Pd<br>•TWI < 25 °C |

# 9 Method of defect diagnosis

In order to diagnose the defective part of the heat pump system, first understand the symptom of the defect.
(1) Check the operation status. (It does not move, or it moves but stops, etc.)
(2) Flashing display on the display part of the hydro unit.
(3) Check the “check code” by the remote controller.

Please refer to the following procedure of defect diagnosis for the identification.

| No. | Procedure of defect diagnosis | | Remark |
|---|---|---|---|
| 9-1 | Matters to be confirmed first | 9-1-1. Check the power supply voltage<br>9-1-2. Check for any miswiring of the connection cables between the hydro unit and the outdoor unit<br>9-1-3. About the installation of the temperature sensor | Check the power supply for the heat pump hot water heater, the crossover between the hydro unit and the outdoor unit, and the installation of temperature sensors. |
| 9-2 | Non-defective operation (program operation) | | Non-defective program operations for the protection of the heat pump unit. |
| 9-3 | Outline of the determination diagram | 9-3-1. Procedure of defect diagnosis<br>9-3-2. How to determine from the check code on the remote controller<br>9-3-3. How to cancel a check code on the remote controller<br>9-3-4. How to diagnose by error code | With reference to the "check code", roughly identify the defect from the defect diagnosis for the heat pump hot water heater and determine the defective part from individual symptoms. |
| 9-4 | Diagnosis flow chart for each error code | 9-4-1. Hydro unit failure detection<br>9-4-2. Outdoor unit failure detection<br>9-4-3. Temperature sensor, temperature-resistance characteristic table | |
| 9-5 | Operation check by PC board | 9-5-1. Operation check mode | The operation check mode allows to determine good or not by checking the operation of the 4-way valve, 2-way valve and pulse motor valve. |
| 9-6 | Brief method for checking the key components | 9-6-1. Hydro unit<br>9-6-2. Outdoor unit | How to determine the presence of any defect particularly in functional parts. |

# 9-1. Matters to be confirmed first

## 9-1-1. Check the power supply voltage

Check that the power supply voltage is AC220-230 V± 10% (signal phase). If the power supply voltage is not in this range, it may not operate normally.

## 9-1-2. Check for any miswiring of the connection cables between the hydro unit and the outdoor unit

The hydro unit and the outdoor unit are connected with three connection cables. Make sure the interconnecting connections between the hydro unit and the outdoor unit terminal blocks are connected to the correct terminal numbers. If not connected correctly, the heat pump system does not operate. However, a miswiring would not cause damage to the equipment.

## 9-1-3. About the installation of the temperature sensor

If each sensor is removed due to the replacement of the water heat exchange or inverter board, or the replacement of the refrigeration cycle parts, make sure to put the sensor back to the position where it was before.

- Each sensor position has a marking. Make sure to put it back to the exact position.
- Make sure to install it with a sensor holder so that the temperature sensing part of the sensor and the straight part of the copper piping are attached with each other tightly.
- If the installation of the sensor is incomplete or the installed position is wrong, it will not perform a normal control operation and may cause a defect such as a malfunction of the equipment or an occurrence of an abnormal sound, etc.

# 9-2. Non-defective operation (program operation) … No fault code display appears.

In order to control the heat pump unit, there are the following operations as the built-in program operations in the microcomputer. If a claim occurs about the operation, please confirm whether it falls under any of the contents in the following table.
If it does, please understand that the symptom is not a defect of the equipment, and it is an operation necessary for the control and maintenance of the heat pump unit.

### Table 9-2-1 Non-defective operation

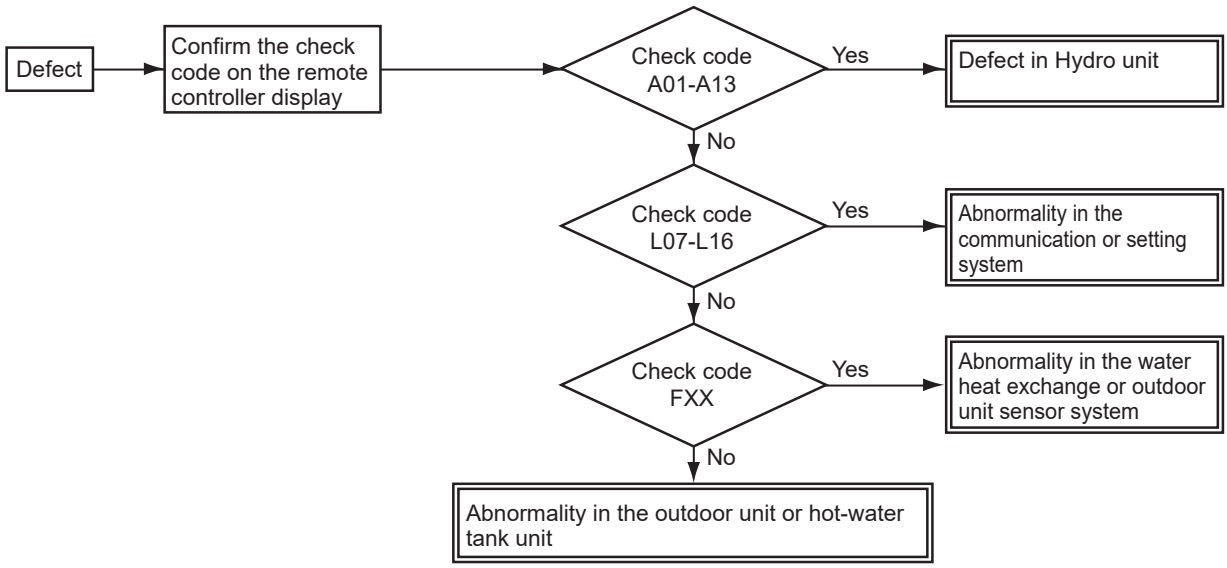
| No. | Operation of the heat pump system | Explanation |
|---|---|---|
| 1 | The compressor sometimes does not operate even within the range of compressor “ON”. | The compressor does not operate during the operation of the compressor reboot timer (3 min). Even after the power activation, the compressor reboot timer continues to be active. |
| 2 | During the hot water supply or heating operation, without reaching the set temperature, the compressor operation frequency stays at a frequency of less than the maximum Hz or lowers down. | It may be caused by the high temperature release control (release protection control by the temperature of the water heat exchanger) or the current release control, or the high pressure release control. |
| 3 | The “Stop” operation on the remote controller will not stop the circulation pump. (The same for hot water supply, heating and cooling) | In order to deal with the temperature increase in the heat exchanger after stopping, the operation continues for 1 min after the compressor is stopped. |
| 4 | “ON” on the remote controller will not operate the compressor. (It will not operate even after the reboot delay timer elapsed) | When the outdoor temperature (TO sensor detection temperature) is -25 °C or lower, the heat pump will not operate in order to protect the compressor, and the heater will operate instead. |
| 5 | When the power is turned on, it starts operation without operating the remote controller. | • The auto restart operation may be working.<br>• The antifreeze operation may be working.<br>• If the TWI, TWO or THO sensor detects a temperature below 4 °C, the operation changes from circulation pump --->> circulation pump + heater.) |

# 9-3. Outline of the determination diagram

The first determination of whether a defective part is in the hydro unit or the outdoor unit can be performed by the following method.

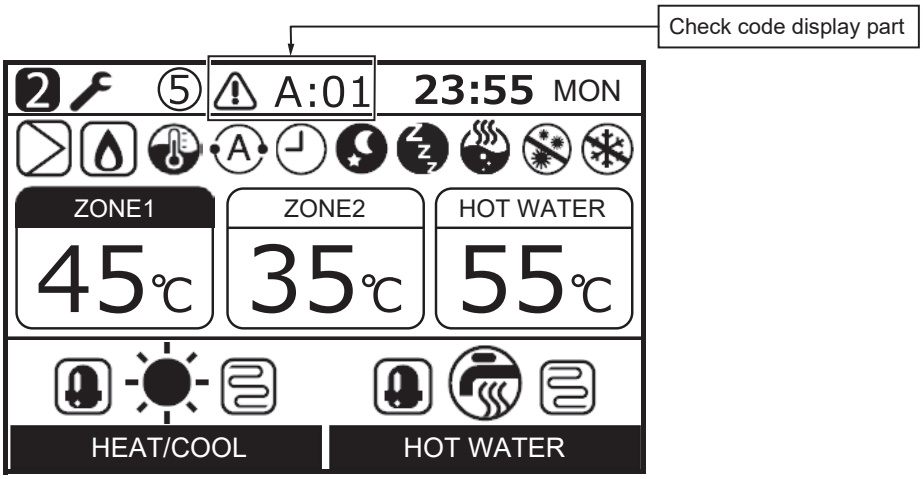
## 9-3-1. Procedure of defect diagnosis

In the case of a defect, please apply the following procedure in order to find the defective part.




## 9-3-2. How to determine from the check code on the remote controller

If the defect is limited by the check code displayed on the remote controller, please repair the defect based on the table on the next page.
The check codes are separated into two groups: software and hardware errors.
Since a hardware error cannot be cancelled without a part replacement etc., please perform a repair.
If its abnormality is determined, the abnormality is noticed by indicating the check code on the remote controller check code display part while sounding off a buzzer.




## 9-3-3. How to cancel a check code on the remote controller

Press [ F1 ] or [ F2 ] button (on the operation side) to clear the check code.

Although the above procedure cancels the check code, the hardware error will be displayed again until the hardware repair is completed.

# 9-3-4. How to diagnose by error code

## Defect mode detected by the Hydro Unit

O ... Possible
× .... Not possible

| Check code | Diagnostic functional operation | | | Determination and action | Number of abnormalities for confirmation | Detailed item |
|---|---|---|---|---|---|---|
| | Operational cause | Backup operation | Automatic reset | | | |
| A01 | **Pump or flowing quantity error**<br>1) Detected by TC sensor<br>TC≥63 °C is detected in the heating or hot water supply heat pump operation (except for defrosting). | Heating<br>×<br>Hot water<br>O | × | 1. Almost no or little water flow.<br>• Not enough vent air<br>• Dirt clogging in the water piping system.<br>• The water piping is too long.<br>• Installation of buffer tank and secondary pump | 4 | 93 |
| | 2) Detected by flow switch abnormality<br>When no signal of the flow switch is showing 2 min after the built-in circulation pump operation started. | | | | 8 | 93 |
| | 3) Detection of chattering abnormality in the flow switch input<br>Chattering detection: Detects input changes (OFF⇔ON) 4 times within 10 seconds during operation. | | | | 8 | 93 |
| | 4) Disconnection of the flow switch connector<br>When the stopped built-in circulation pump starts its operation, the flow switch status is detecting "water flow". | | | 1. Disconnection of the flow switch connector.<br>2. Defect of the flow switch. | 2 | 93 |
| A02 | **Temperature increase error** (heating)<br>When one of the TWI, TWO and THO sensors exceeds 70 °C. | Heating<br>×<br>Hot water<br>O | O | 1. Check the water inlet, water outlet and heater outlet (TWI, TWO, THO) sensors.<br>2. Defect of the backup heater (defect automatic reset thermostat). | 1 | 94 |
| A03 | **Temperature increase error** (hot water supply)<br>When the TTW sensor exceeds 85 °C. | Heating<br>O<br>Hot water<br>× | O | 1. Check the hot water cylinder sensor (TTW).<br>2. Check the hot water cylinder thermal cut-out. | 1 | 95 |
| A04 | **Antifreeze operation (1)**<br>1)TWO>20 °C condition:<br>2×TC+TWO≤-12 °C is detected.<br>2)TWO≤20 °C condition:<br>TC+TWO≤4 °C is detected.<br>3)TWI≤10 °C is detected during defrosting. | O | × | 1. Almost no or little water flow.<br>• Dirt clogging in the water piping system.<br>• The water piping is too long, or too short.<br>2. Check the heater power circuit.<br>• Power supply voltage, breaker, power supply connection<br>3. Set the presence of the backup heater.<br>4. Check the water inlet, water outlet and heat exchange (TWI, TWO, TC) sensors and Flow Switch. | Heating8<br>Hot water8<br>Cooling4 | 96 |
| A05 | **Piping antifreeze operation**<br>Activating the heater under the condition of TWO<4orTWI<4orTHO<4 does not achieve TWO, TWI, THO≥5 °C after 30 min elapsed. | O | O | 1. Check the heater power circuit.<br>• Power supply voltage, breaker, power supply connection<br>2. Check the water inlet, water outlet and heater outlet sensors (TWI, TWO, THO).<br>3. Disconnection of the backup heater. | 1 | 97 |

| Check code | Diagnostic functional operation | | | Determination and action | Number of abnormalities for confirmation | Detailed item |
|---|---|---|---|---|---|---|
| | Operational cause | Backup operation | Automatic reset | | | |
| A07 | **Combination error**<br>Model name of the Hydro unit is different. | O | × | 1. Check DP_SW13_4 is set to "ON". | 1 | — |
| A08 | **Low pressure sensor operation error**<br>The low pressure sensor detected 0.2 MPa or less. | O | × | 1. Almost no or little water flow.<br>2. Defect of the flow switch.<br>3. On-load cooling or prolonged defrosting (a lot of frost formation) under the above conditions.<br>4. Defect in the low pressure sensor.<br>5. Check the refrigeration cycle (gas leak) | 8 | 98 |
| A09 | **Overheat protection operation**<br>When the thermostat of the backup heater activates during the operation of the heat pump or backup heater.<br>When the thermostat operation is activated while it has been stopped. | Heating<br>×<br>Hot water<br>O | × | 1. No water (heating without water) or no water flow.<br>2. Defect of the flow switch. | 2 | 99 |
| | | | | 3. Defect of the backup heater (poor automatic reset thermostat). | 1 | |
| A10 | **Antifreeze operation (2)**<br>When TC-TWO<-15K detected in cooling mode. | O | × | 1. Almost few water flow.<br>2. Defect of the flow switch.<br>3. Low refrigerant. | 10 | 100 |
| A11 | **Operation of the release protection**<br>When the TWO release counts to 10. | Heating<br>Cooling<br>×<br>Hot water<br>O | × | 1. Almost no water flow.<br>2. Defect of the flow switch.<br>3. Check the water outlet temperature sensor (TWO). | 10 | 101 |
| A12 | **Heating, hot water heater**<br>The antifreeze control is detected under the condition of TWI<15 °C while TWI≥15 °C, TTW≥20 °C is not detected after the heater backup. | O | O | 1. Activated by a large load of heating or hot water supply.<br>2. Check the heater power circuit (backup or hot water cylinder heater).<br>• Power supply voltage, breaker, power supply connection | 1 | 102 |
| A13 | **Pump error** | Heating<br>×<br>Hot water<br>O | × | 1. Pump has stopped by a certain cause.<br>• Low supply voltage.<br>• High humidity around the electric box of the pump.<br>• Dew condensation to the electric board of the pump.<br>• Once turn off the power supply to the system and turn on again and operate the system.<br>2. Check the Flow switch in the Hydro unit. | 2 | 103 |
| E03 | **Regular communication error between hydro unit and remote controller**<br>When there is no regular communication from the remote controller for 3 min, or when no remote controller is equipped. | × | O | 1. Check remote controller connection.<br>2. Defect in the remote controller. | 1 | — |

| Check code | Diagnostic functional operation | | | Determination and action | Number of abnormalities for confirmation | Detailed item |
|---|---|---|---|---|---|---|
| | Operational cause | Backup operation | Automatic reset | | | |
| E04 | **Regular communication error between hydro unit and outdoor unit**<br>The serial signal cannot be received from outdoor. | O | O | 1. Check the serial circuit.<br>• Miswiring of the crossover between the water heat exchanger and the outdoor unit | 1 | 103 |
| E08 | **Duplicate address of Hydro unit, or Duplicate master Hydro unit during Group control** | × | O | 1. Set the address No. of the Rotary switch "SW01" correctly for each Hydro unit. | 1 | — |
| E18 | **Regular communication error between master Hydro unit and slave Hydro unit during Group control** | × | O | 1. Check the Hydro unit connection.<br>• Miswiring of the master and slave Hydro unit. | 1 | — |
| F03 | **TC sensor error**<br>Open or short circuit in the heat exchange temperature sensor. | O | O | 1. Check the resistance value and connection of the heat exchange temperature sensor (TC). | 1 | 104 |
| F10 | **TWI sensor error**<br>Open or short circuit in the water inlet temperature sensor. | O | O | 1. Check the resistance value and connection of the water inlet temperature sensor (TWI). | 1 | 106 |
| F11 | **TWO sensor error**<br>Open or short circuit in the water outlet temperature sensor. | Heating<br>×<br>Hot water<br>O | O | 1. Check the resistance value and connection of the water outlet temperature sensor (TWO). | 1 | 106 |

| Check code | Diagnostic functional operation | | | Determination and action | Number of abnormalities for confirmation | Detailed item |
|---|---|---|---|---|---|---|
| | Operational cause | Backup operation | Automatic reset | | | |
| F14 | **TTW sensor error**<br>Open or short circuit in the hot water cylinder sensor. | Heating<br>×<br>Hot water<br>O | O | 1. Check the resistance value and connection of the hot water cylinder sensor (TTW). | 1 | 107 |
| F17 | **TFI sensor error**<br>Open or short circuit in the floor temperature sensor.<br>(Only when zone 2 is used) | Heating<br>×<br>Hot water<br>O | O | 1. Check the resistance value and connection of the floor-inlet temperature sensor (TFI). | 1 | 107 |
| F18 | **THO sensor error**<br>Open or short circuit in the heater outlet temperature sensor. | Heating<br>×<br>Hot water<br>O | O | 1. Check the resistance value and connection of the heater outlet temperature sensor (THO). | 1 | 107 |
| F19 | **Detection of THO disconnection error**<br>When TWO–THO>15K is detected and 30 sec elapsed. | Heating<br>×<br>Hot water<br>O | × | 1. Check for any disconnection of the heater outlet temperature sensor (THO).<br>2. Defect of the flow switch. | 1 | 108 |
| F20 | **TFI sensor error**<br>When TWO–TFI>40K is detected and TFI<TWI–5K is detected 60 sec. | Heating<br>×<br>Hot water<br>O | × | 1. Check the connection of the floor-inlet temperature sensor (TFI). | 1 | 109 |
| F23 | **Low pressure sensor error**<br>When PS<0.07 MPa is detected for 90 sec or more. (cooling, defrosting)<br>When PS<0.07 MPa is detected for 10 min or more. (hot water supply, heating) | O | O | 1. Check the connection (body or connection wiring) of the low pressure sensor.<br>2. Check the resistance value of the low pressure sensor.<br>3. Check the refrigeration cycle (gas leak) | 1 | 110 |
| F29 | **EEROM error**<br>Inconsistency is detected once without verify ACK after writing to EEPROM. | × | × | 1. Replace the water heat exchange control board. | 1 | 110 |
| F30 | **Extended IC error**<br>When the extended IC is abnormal. | × | × | 1. Replace the water heat exchange control board. | 1 | 110 |
| L02 | **Combination error**<br>Model name of the outdoor unit is different. | × | × | 1. Check the model name of the outdoor unit. | 1 | 110 |
| L07 | **Communication error**<br>Individual hydro units have a group line. | × | × | 1. Replace the water heat exchange control board. | 1 | 110 |
| L09 | **Communication error**<br>The capability code for the hydro unit has not been set. | × | × | 1. Check the setting of the FC01 capability specifications.<br>HWS-P805xx-E = 0012<br>HWS-P1105xx-E = 0015 | 1 | 111 |
| L16 | **Setting error**<br>When ZONE1 has not been set, while ZONE2 has been set. | × | × | 1. Check the body DP-SW12_2,3. | 1 | 111 |
| P31 | **Slave Hydro unit error which occurs when error occurs in master Hydro unit** | × | O | 1. Check the remote controller connection.<br>2. Defect in the remote controller.<br>3. Set the address No. of the Rotary switch "SW01" correctly for each Hydro unit. | 1 | — |

## Defect mode detected by the outdoor unit

O ... Possible
× .... Not possible

| Check code | Diagnostic functional operation | | | Determination and action | Number of abnormalities for confirmation | Detailed item |
|---|---|---|---|---|---|---|
| | Operational cause | Backup operation | Automatic reset | | | |
| F04 | **TD sensor error**<br>Open or short circuit in the discharge temperature sensor. | O | × | 1. Check the resistance value and connection of the discharge sensor (TD). | 4 | 105<br>126 |
| F06 | **TE sensor error**<br>Open or short circuit in the heat exchange temperature sensor. | O | × | 1. Check the resistance value and connection of the heat exchange temperature sensor (TE). | 4 | 105<br>126 |
| F07 | **TL sensor error**<br>Open or short circuit in the heat exchange temperature sensor. | O | × | 1. Check the resistance value and connection of the heat exchange temperature sensor (TL). | 4 | 105<br>127 |
| F08 | **TO sensor error**<br>Open or short circuit in the outdoor temperature sensor. | O | × | 1. Check the resistance value and connection of the outdoor temperature sensor (TO). | 1 | 106<br>127 |
| F12 | **TS sensor error**<br>Open or short circuit in the suction temperature sensor. | O | × | 1. Check the resistance value and connection of the suction temperature sensor (TS). | 4 | 127 |
| F13 | **TH sensor error**<br>Open or short circuit in the heat-sink temperature sensor. | O | × | 1. Check the resistance value and connection of the heat-sink temperature sensor (TH). | 8 | 128 |
| F15 | **TE, TS sensors error**<br>TE, TS sensor connections are opposite. | O | × | 1. Check for any wrong installation of the heat exchange temperature sensor (TE) and the suction temperature sensor (TS). | 4 | 128 |
| F24 | **PD sensor error**<br>Open or short circuit in the high pressure sensor. | O | × | 1. Check the value of PD sensor by the remote controller. | 4 | 129 |
| F31 | **EEPROM error** | O | × | | 1 | 129 |
| H01 | **Compressor breakdown**<br>1 When the operation frequency lowers due to the current release 40 sec or later after the compressor activation and it stops by underrunning the minimum frequency.<br>2 When the operation frequency lowers due to the current limit control and it stops by underrunning the minimum frequency.<br>3 When an excess current is detected 0.8 sec or later after the compressor activation. | O | × | 1. Check the power supply voltage (AC220-230 V±10%).<br>2. Over-loaded condition of the refrigeration cycle.<br>3. Check that the service valve is fully open. | 8 | 114 |
| H02 | **Compressor lock**<br>1 When the input current is more than zero 20 sec or later after the compressor activation and the activation has not been completed. | O | × | 1. Defect of compressor (lock)<br>– Replace the compressor.<br>2. Defect of compressor wiring (open phase). | 8 | 114 |
| H03 | **Defect in the current detection circuit** | O | × | 1. Replace the outdoor inverter control board. | 8 | — |

| Check code | Diagnostic functional operation | | | Determination and action | Number of abnormalities for confirmation | Detailed item |
|---|---|---|---|---|---|---|
| | Operational cause | Backup operation | Automatic reset | | | |
| H04 | **Operation of case thermostat**<br>When the case thermostat exceeds 125 °C. | O | × | 1. Check the refrigeration cycle (gas leak).<br>2. Check the case thermostat and connector.<br>3. Check that the service valve is fully open.<br>4. Defect of the pulse motor valve.<br>5. Check for kinked piping. | 10 | 115 |
| L10 | **Unset service PC board jumper**<br>Jumpers J800-J803 have not been cut. | O | × | 1. Cut J800-J803. | 1 | 115 |
| L15 | **Combination error**<br>Model name of the Hydro unit is different. | × | × | 1. Check the model name of the Hydro unit.<br>2. Check DP_SW13_4 is set to "ON". | 1 | 116 |
| L29 | **The communication between the outdoor PC board MUCs error**<br>No communication signal between IPDU and CDB. | O | × | 1. Replace the outdoor control board. | 1 | 116 |
| P03 | **The outlet temperature error**<br>When the discharge temperature sensor (TD) exceeds 111 °C. | O | × | 1. Check the refrigeration cycle (gas leak).<br>2. Defect of the pulse motor valve.<br>3. Check the resistance value of the discharge temperature sensor (TD). | 4 | 117 |
| P04 | **The high pressure switch error** | O | × | 1. Almost no or little water flow.<br>2. Defect of the flow switch.<br>3. Defect in the high pressure switch.<br>4. Failure of a refrigerant valve to open. | 10 | 118 |
| P05 | **The power supply voltage error**<br>When the power supply voltage is extremely high or low. | O | × | 1. Check the power supply voltage. (AC220-230 V±10%). | 8 | 119 |
| P07 | **Overheating of heat-sink error**<br>When the heat-sink exceeds 105 °C. | O | × | 1. Check the thread fastening and heat-sink grease between the outdoor control board and the heat-sink.<br>2. Check the heat-sink fan duct.<br>3. Check the resistance value of the heat-sink temperature sensor (TH). | 4 | 119 |
| P15 | **Detection of gas leak**<br>When the discharge temperature sensor (TD) exceeds 106 °C for consecutive 10 min.<br>When the suction temperature sensor (TS) exceeds 60 °C for cooling or 40 °C for heating for 10 consecutive min.<br>When TG ≤ TC -10 K is detected and TG ≤ TWI-15 K is detected 10min. (hot water supply, heating)<br>When TG ≤ TE -12 K is detected for 10min. (cooling) | O | × | 1. Check the refrigeration cycle (gas leak).<br>2. Check that the service valve is fully open.<br>3. Defect of the pulse motor valve.<br>4. Check for kinked piping.<br>5. Check the resistance value of the discharge temperature sensor (TD) and the suction temperature sensor (TS).<br>6. Check the PD sensor by remote controller. | 8 | 120 |

| Check code | Diagnostic functional operation | | | Determination and action | Number of abnormalities for confirmation | Detailed item |
|---|---|---|---|---|---|---|
| | Operational cause | Backup operation | Automatic reset | | | |
| P19 | **The 4-way valve inversion error**<br>When the heat exchange temperature sensor (TE) exceeds 30 °C or the suction temperature sensor (TS) exceeds 50 °C during the heat pump operation. | O | × | 1. Check the operation of the 4-way valve unit or the coil characteristics.<br>2. Defect of the pulse motor valve.<br>3. Check the resistance value of the heat exchange temperature sensor (TE) and the suction temperature sensor (TS). | 4 | 121 |
| P20 | **High pressure protection operation**<br>When an abnormal stop occurs due to the high pressure release control.<br>When the high pressure sensor (PD) detects 4.05 MPa. | O | × | 1. Check that the service valve is fully open.<br>2. Defect of the pulse motor valve.<br>3. Check the outdoor fan system (including clogging).<br>4. Over-filling of refrigerant.<br>5. Check the value of the high pressure sensor (PD).<br>6. The water piping is too short. Install a buffer tank, or set the setting temperature lower. | 10 | 123 |
| P22 | **Outdoor fan system error**<br>When a DC fan rotor position detection NG, element short circuit, loss of synchronization, or abnormal motor current occurs. | O | × | 1. Check the lock status of the motor fan.<br>2. Check the connection of the fan motor cable connector.<br>3. Check the power supply voltage. (AC220~230 V±10%) | 8 | 124 |
| P26 | **Short circuit of the compressor driver element error**<br>When an abnormal short circuit of IGBT is detected. | O | × | 1. P26 abnormality occurs when operating with the compressor wiring disconnected … Check the control board.<br>2. No abnormality occurs when operating with the compressor wiring disconnected … Compressor rare short. | 8 | 125 |
| P29 | **Compressor rotor position error**<br>The rotor position in the compressor cannot be detected. | O | × | 1. Even if the connection lead wire of the compressor is disconnected, it stops due to an abnormality in the position detection … Replace the inverter control board.<br>2. Check the wire wound resistor of the compressor. Short circuit … Replace the compressor. | 8 | 126 |

Check code : H04, P04, P29

After the error is detected, It takes approximately 40 ~ 50 minutes while the error code is displayed on the remote controller.

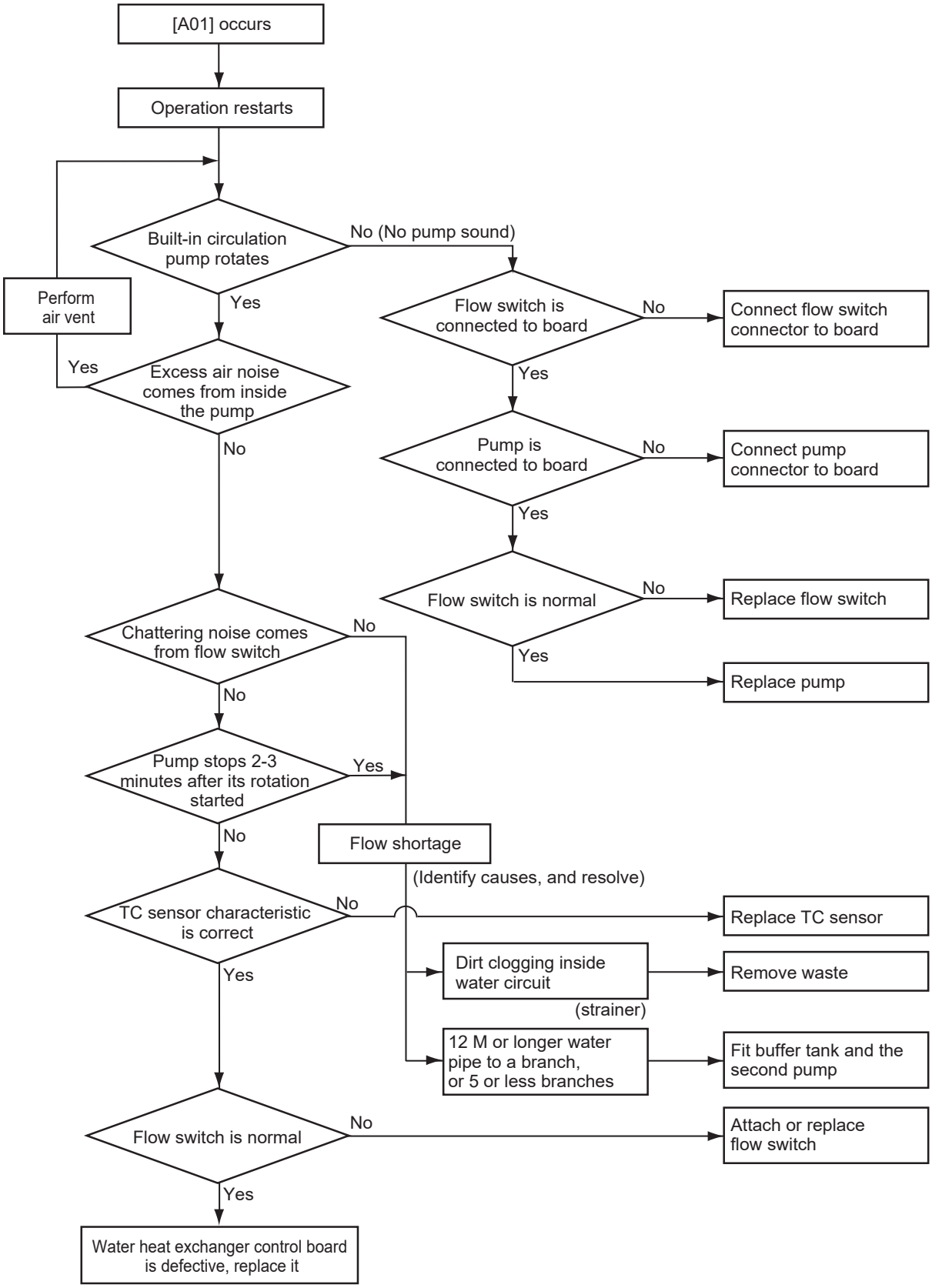
## Defect mode detected by the remote controller

| Check code | Diagnostic functional operation | | | Determination and action |
|---|---|---|---|---|
| | Operational cause | Status of air-conditioning | Condition | |
| Not displaying at all (cannot operate by the remote controller) | **No communication between hydro unit an remote controller**<br>• The remote controller wiring is not connected correctly.<br>• The hydro unit has not been turned on. | Stop | – | Defect in the remote controller power supply<br>1. Check the remote controller wiring.<br>2. Check the remote controller.<br>3. Check the hydro unit power supply wiring.<br>4. Check the water heat exchange control board. |
| E01 | **No communication between hydro unit and remote controller**<br>• Disconnection of the crossover between the remote controller and the base unit of the Hydro unit (detected on the remote controller side). | Stop (Automatic reset) | Displayed when the abnormality is detected. | Defect in the reception of the remote controller<br>1. Check the remote controller crossover.<br>2. Check the remote controller.<br>3. Check the hydro power supply wiring.<br>4. Check the water heat exchanger board. |
| E02 | **Defect in the signal transmission to the hydro unit.**<br>(Detected on the remote controller side) | Stop (Automatic reset) | Displayed when the abnormality is detected. | Defect in the transmission of the remote controller<br>1. Check the transmitter circuit inside the remote controller.<br>… Replace the remote controller. |
| E09 | **Several remote controller base units**<br>(Detected on the remote controller side) | Stop (The handset continues) | Displayed when the abnormality is detected. | 1.2 Check several base units with the remote controller<br>… The base unit is only one, and others are handsets. |

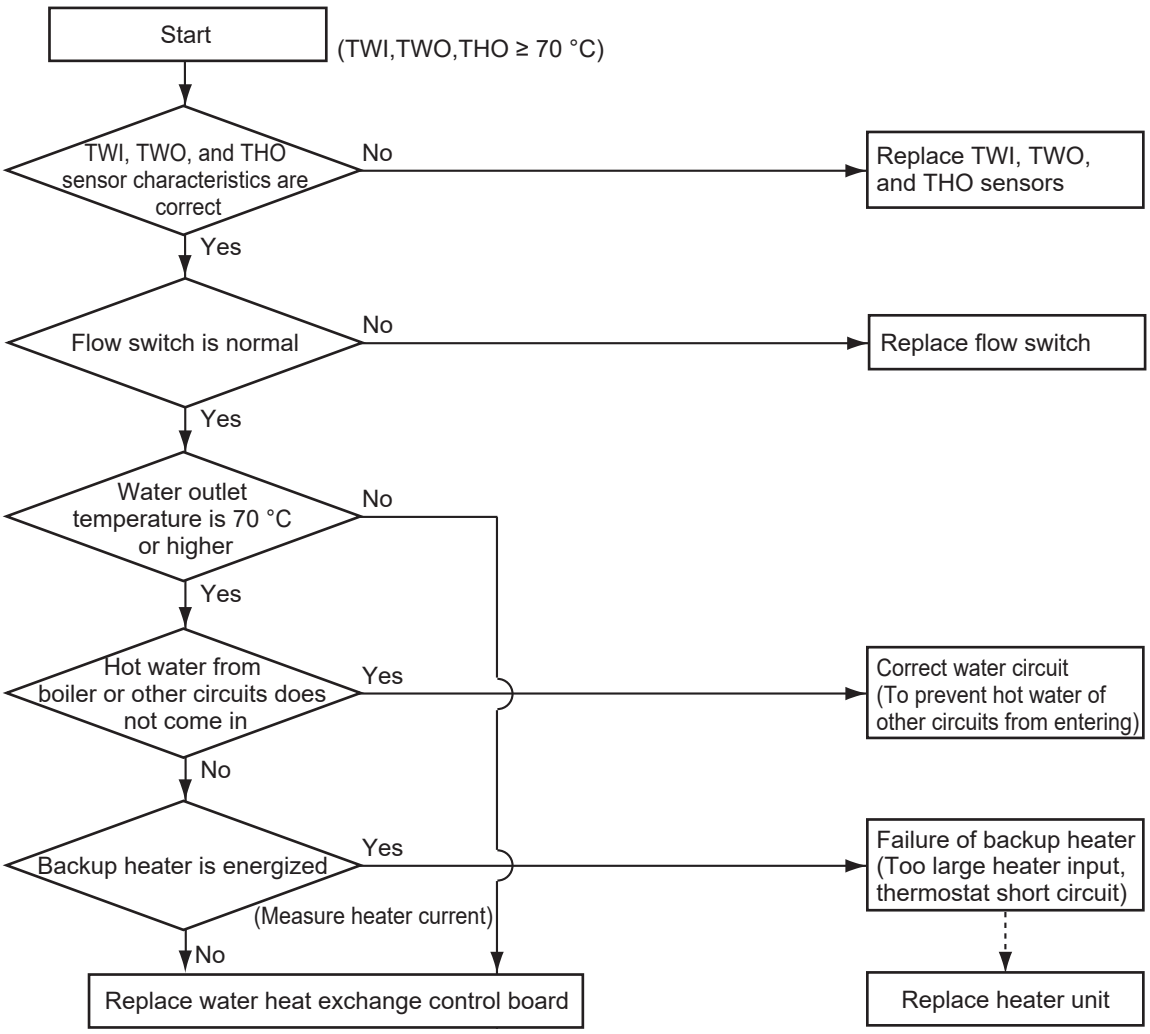
# 9-4. Diagnosis flow chart for each error code

## 9-4-1. Hydro unit failure detection

### [A01] Error Pump flow determination

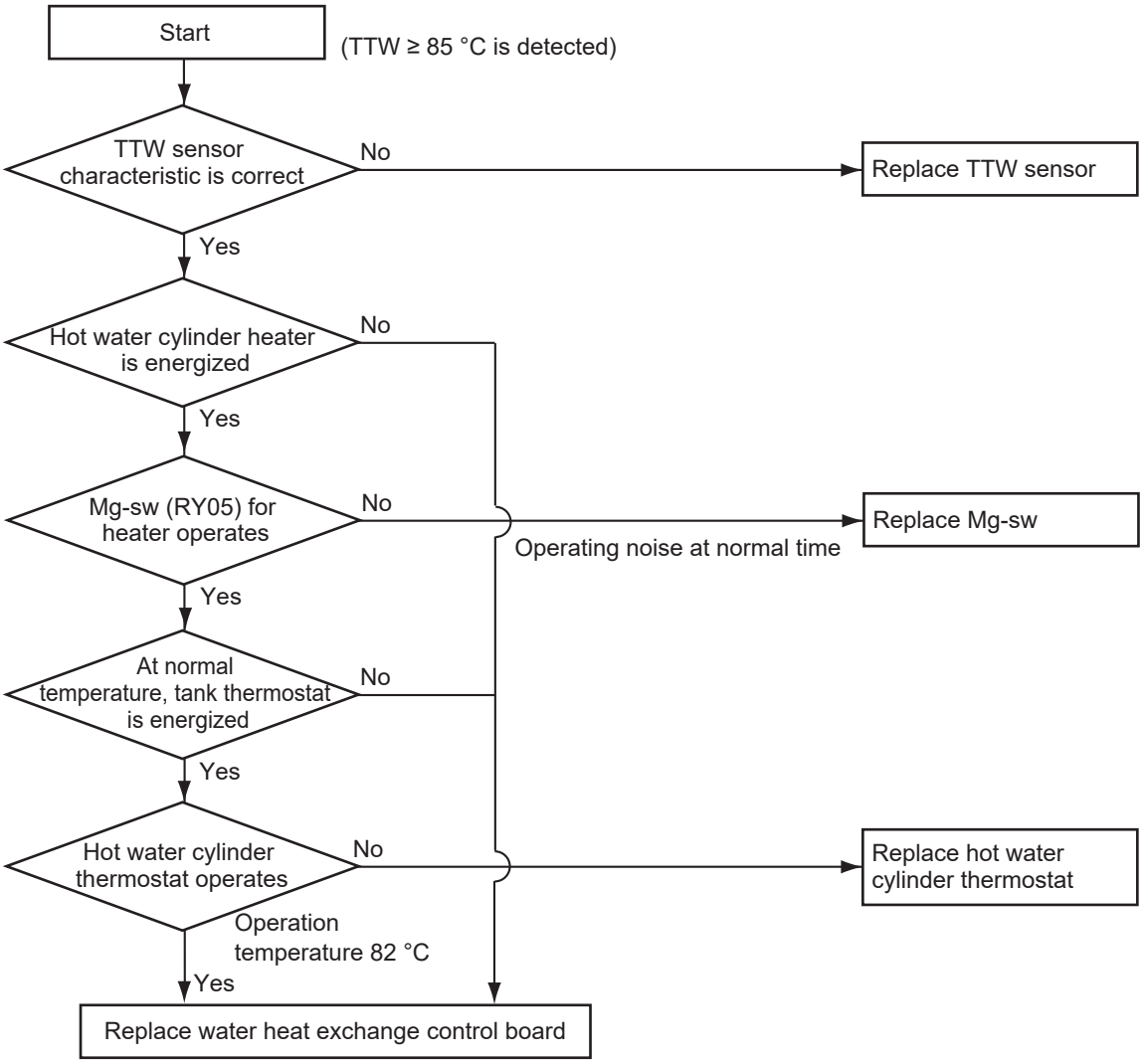


## [A02] Error Temperature rise and error short circuit



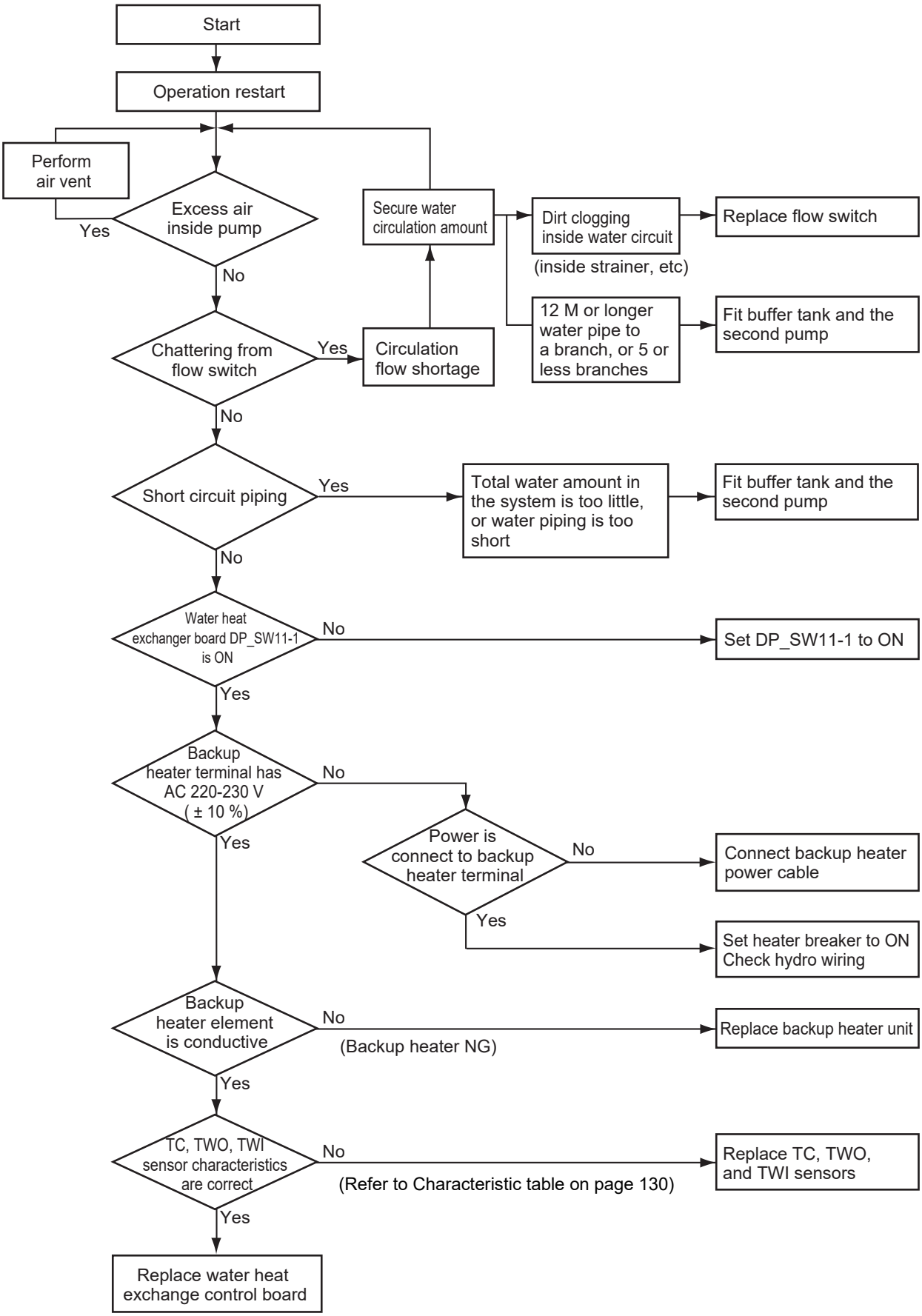

- If Boiler setting is ON (DPSW13-2 is ON) and FC62 is “1”, the A02 error is not detected.

## [A03] Error Temperature rise and error short circuit

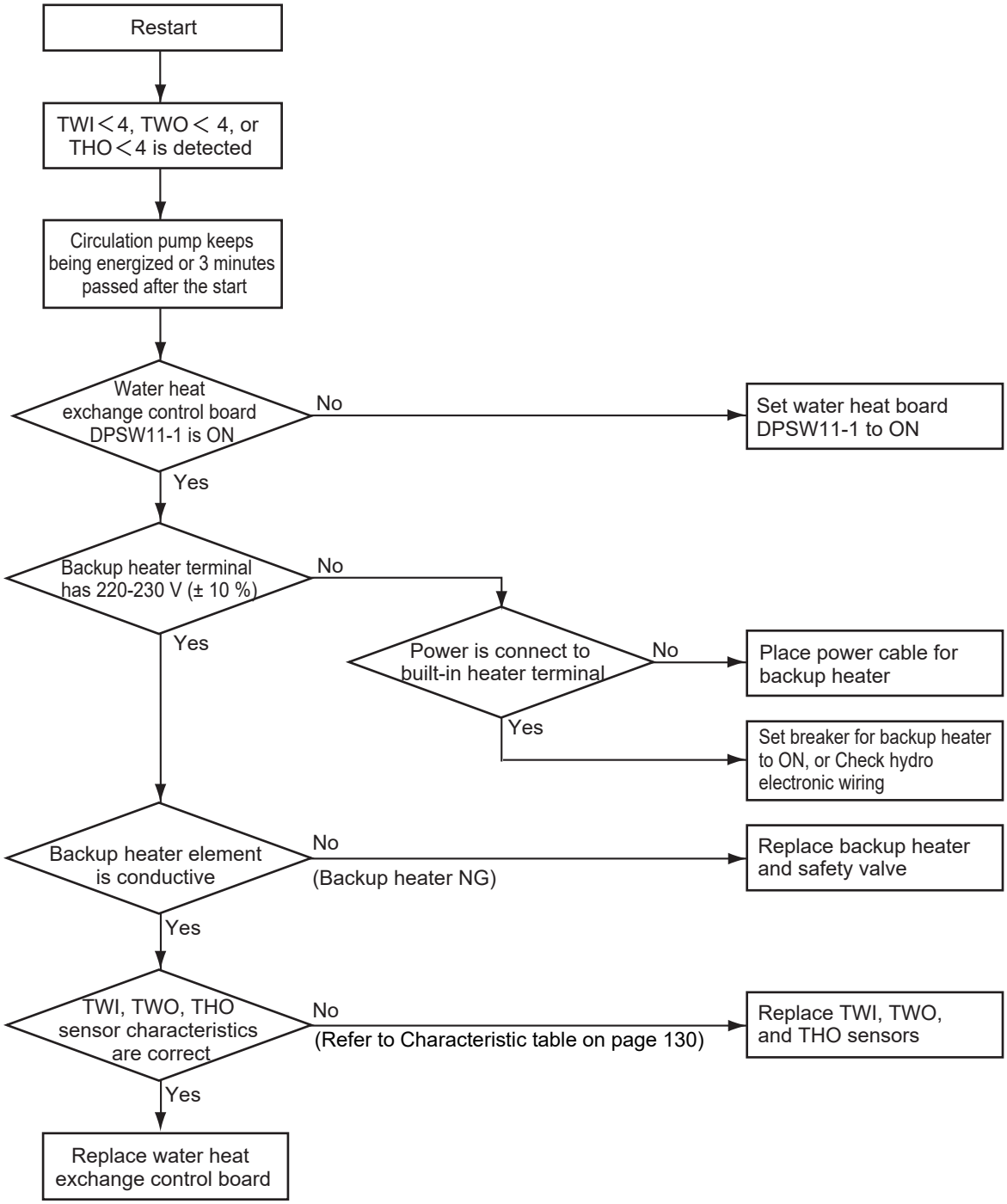


## [A04] Error Freeze prevention control

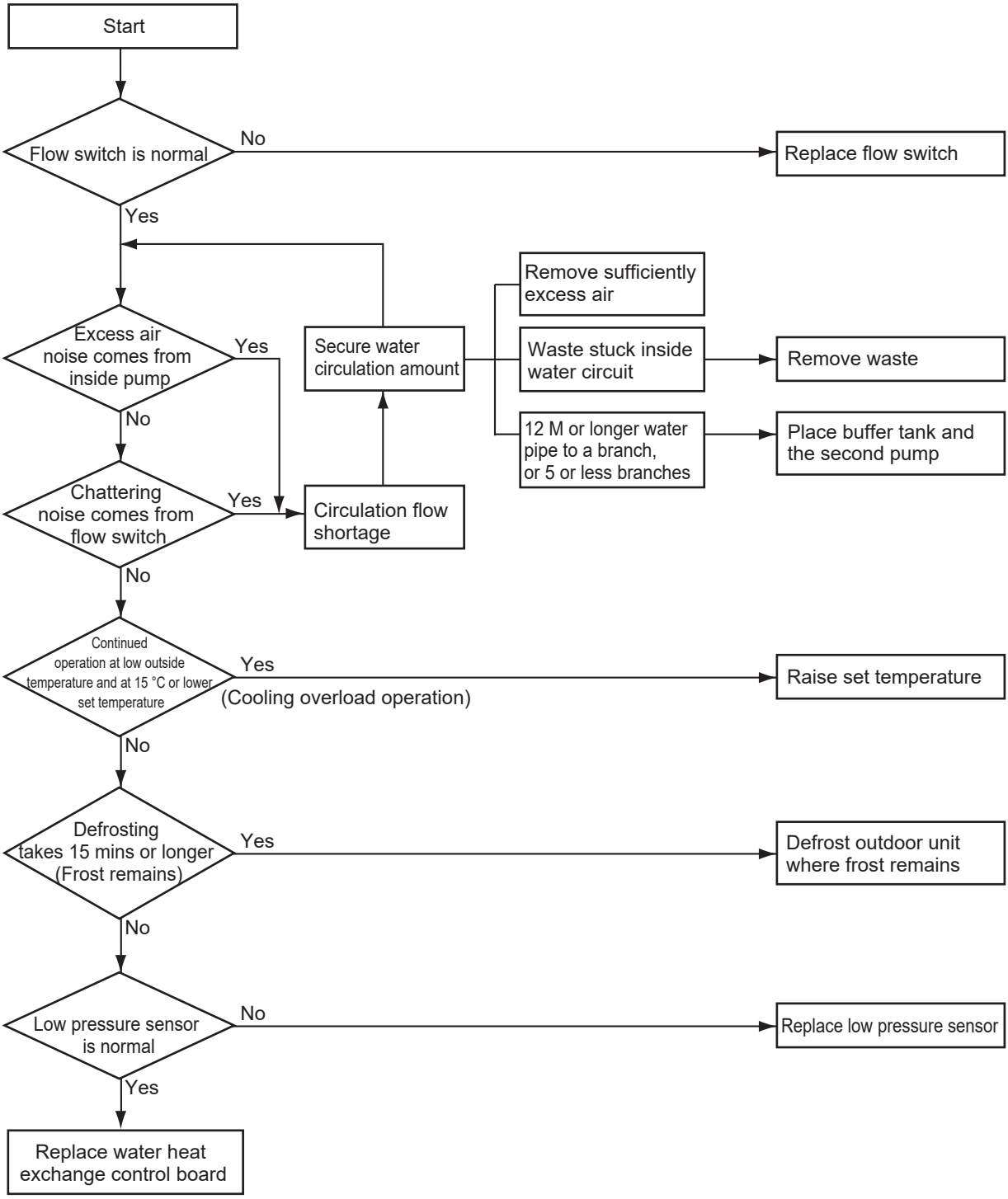
When the outside temperature and inlet water temperature is low (approx. 20 °C or lower) and the room load is large (operation frequency ≥ rating), the freeze prevention control may be activated.



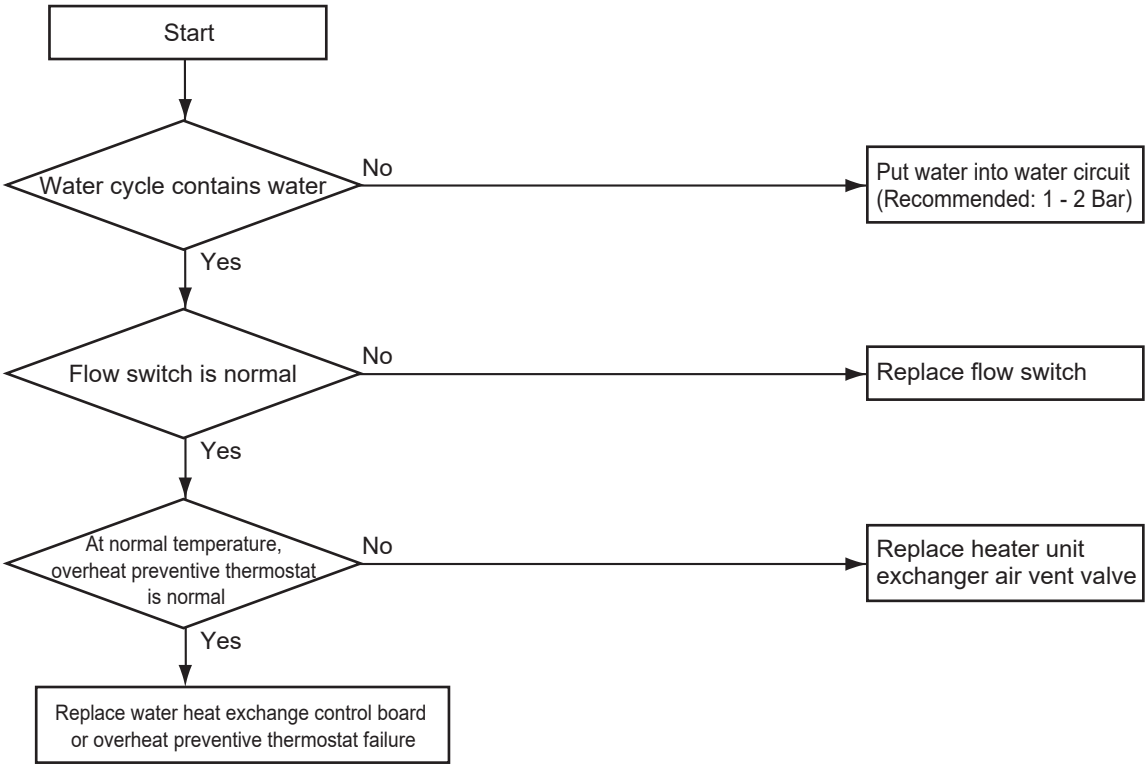
## [A05] Error Piping freeze prevention control



## [A08] Error Low pressure sensor lowering operation failure (Cooling / Defrosting operation)

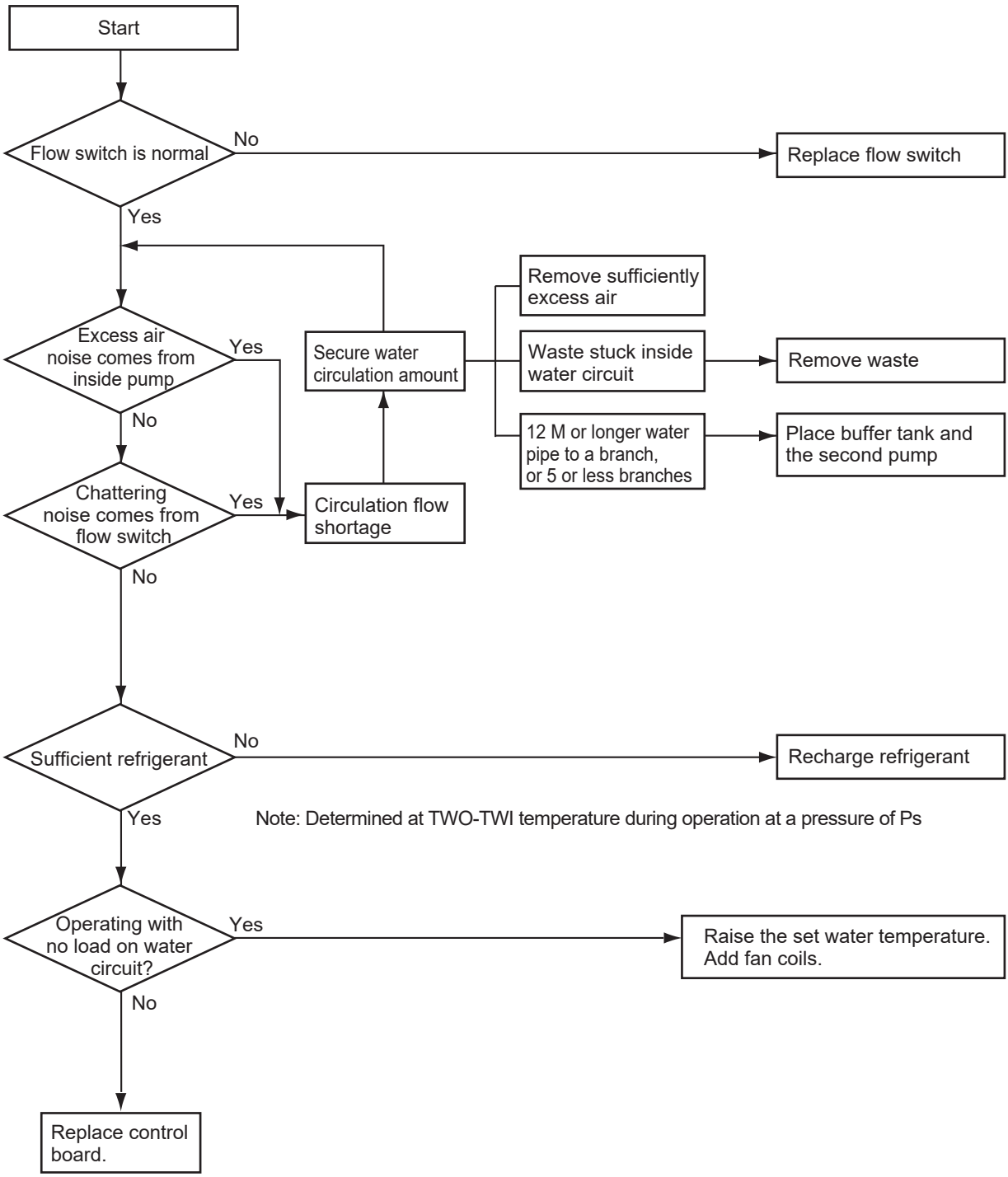


## [A09] Error Overheat prevention thermostat failure (Hot water supply / Heating operation)

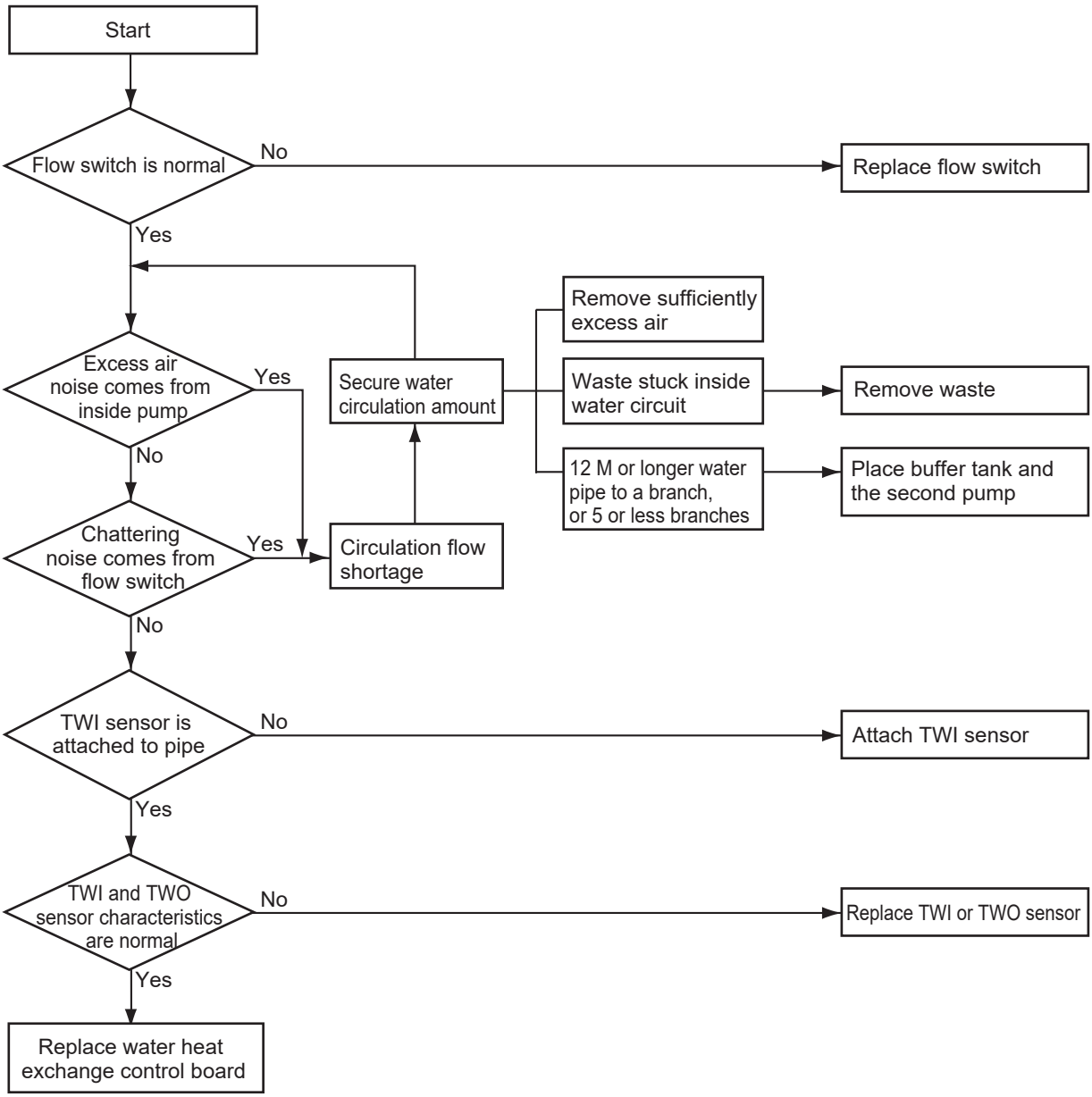



*Replace water heat exchange control board or overheat preventive thermostat failure: After the control board is replaced, if the same operation repeats, the overheat preventive thermostat is determined as defective (does not operate at 75 °C).

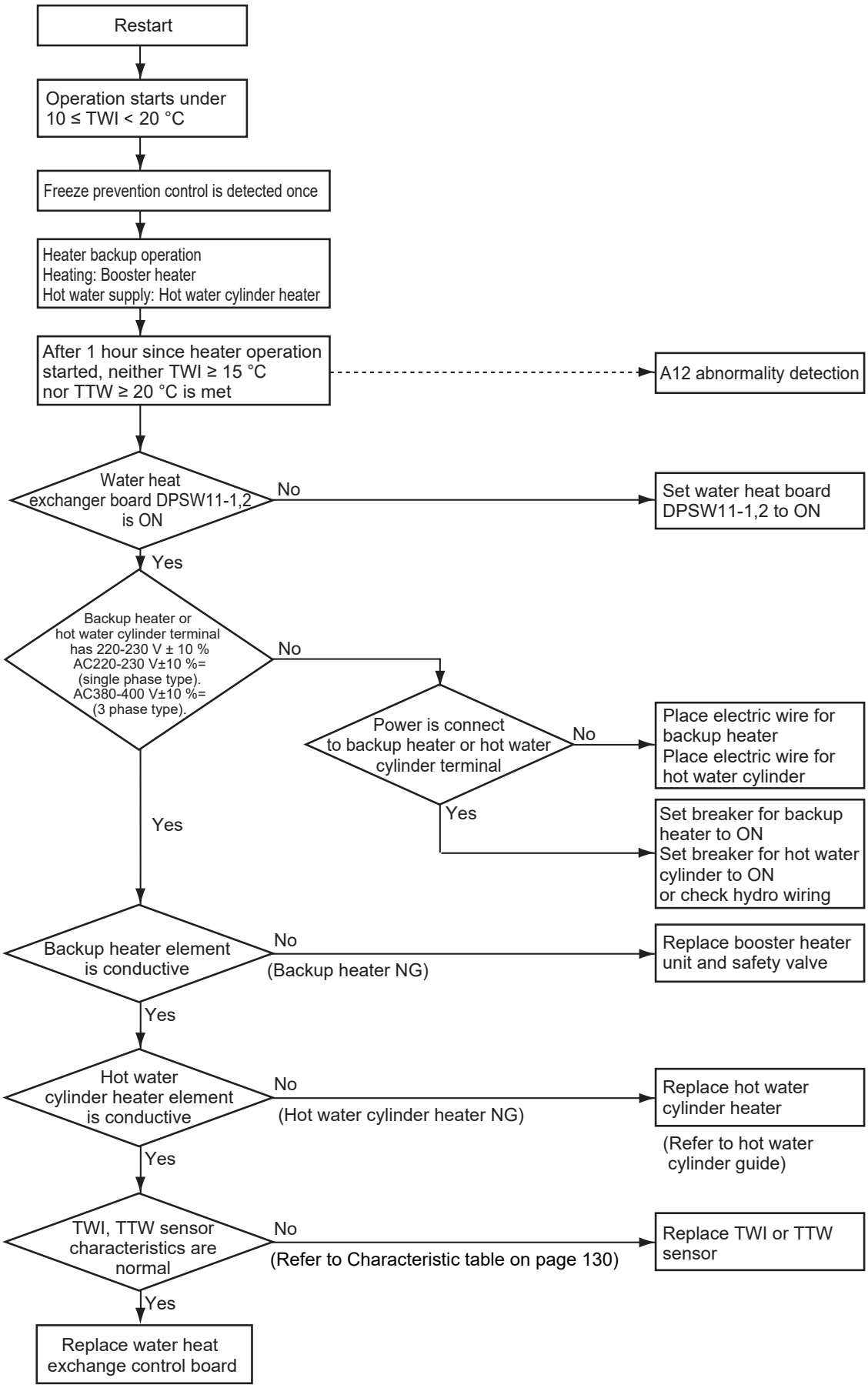
## [A10] Error Freeze prevention control (2) (Cooling only)



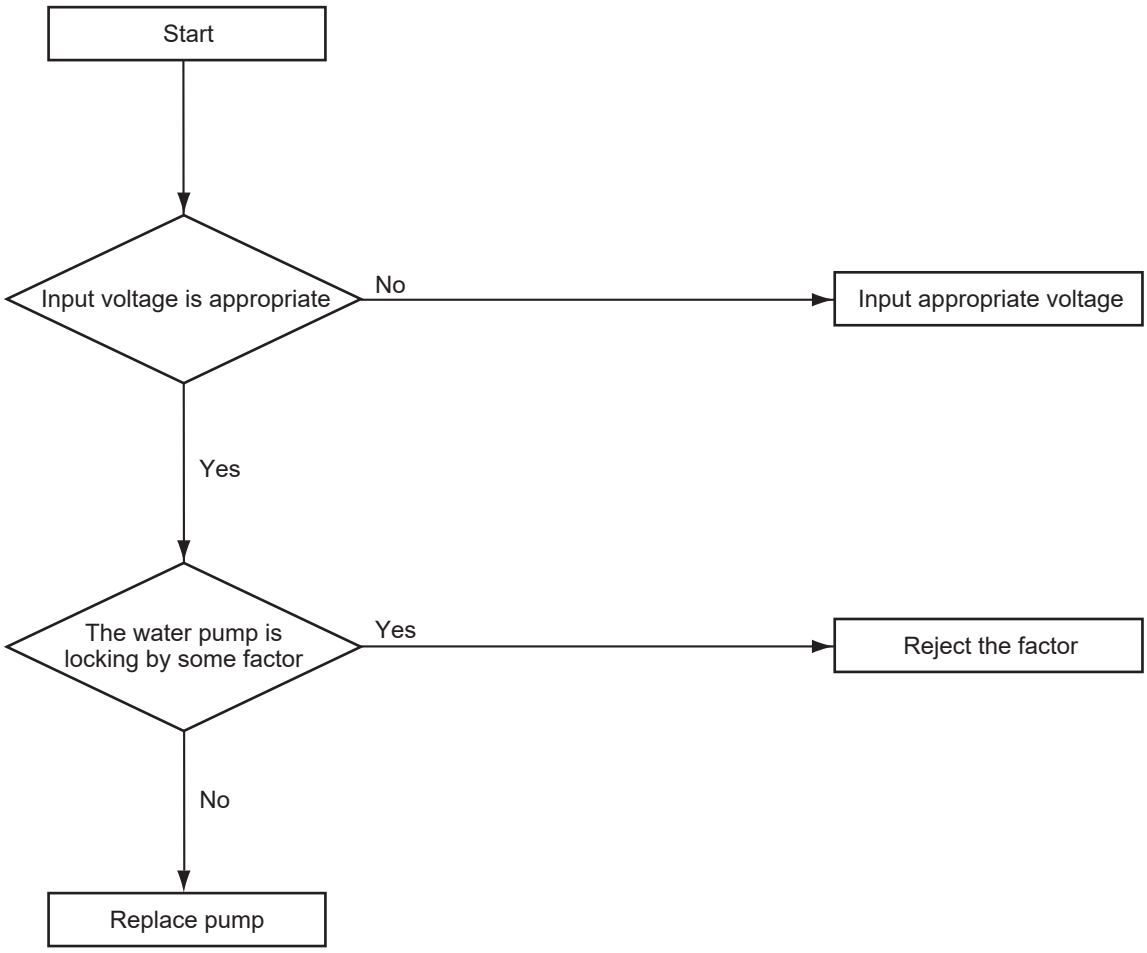
## [A11] Error Release protection operation



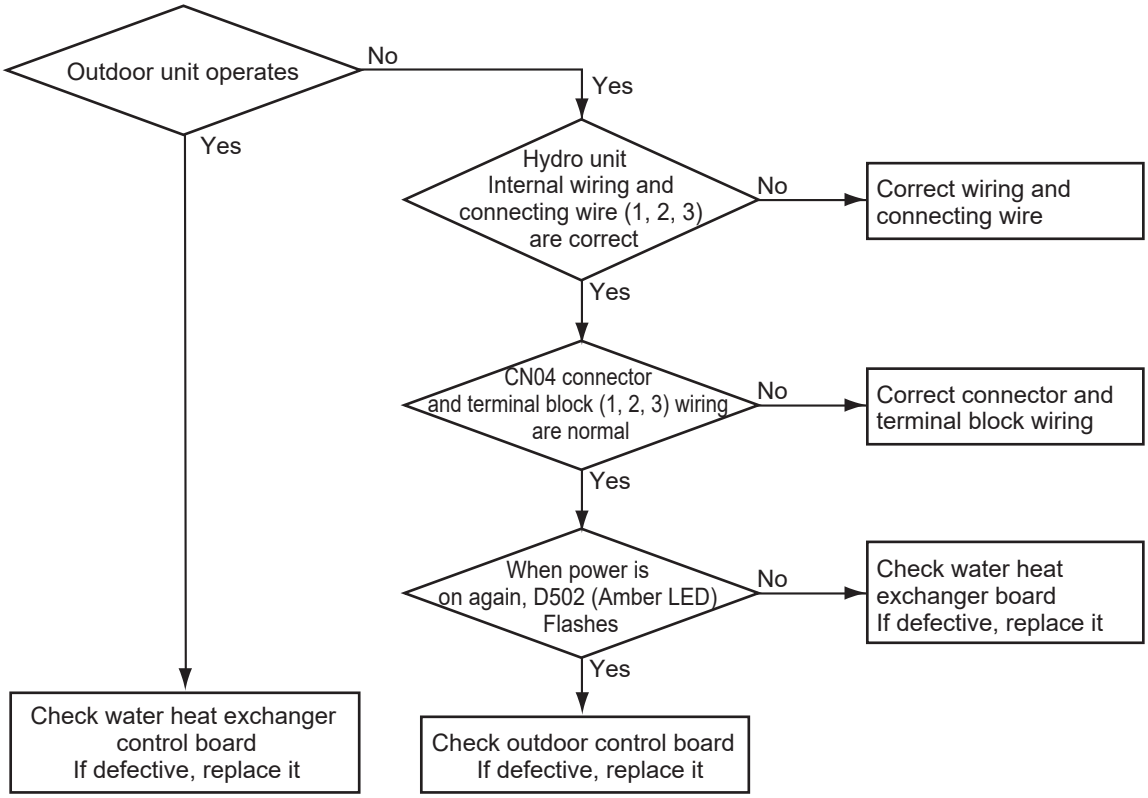
## [A12] Error Heating or Hot water supply heater failure



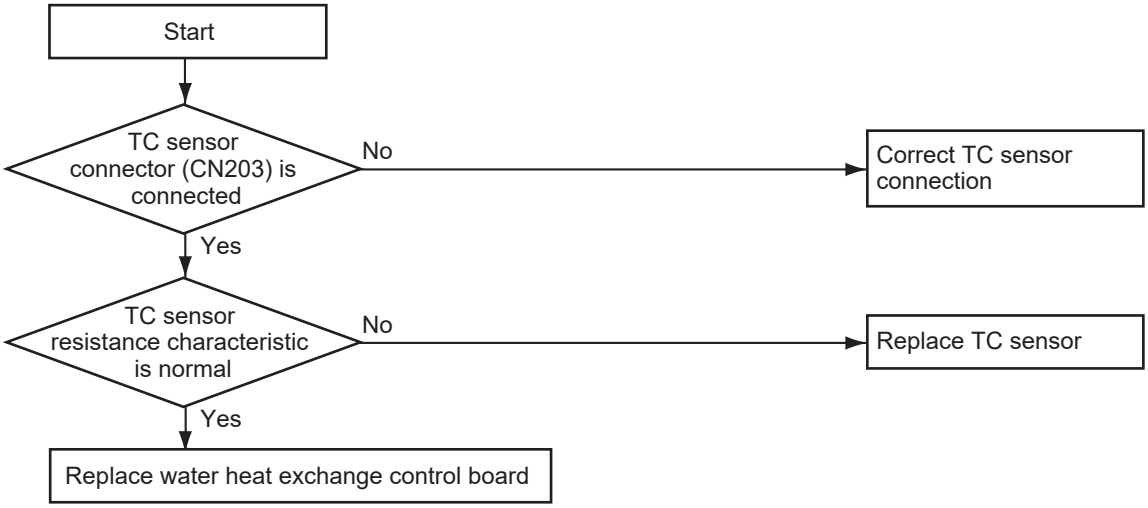
## [A13] Pump error



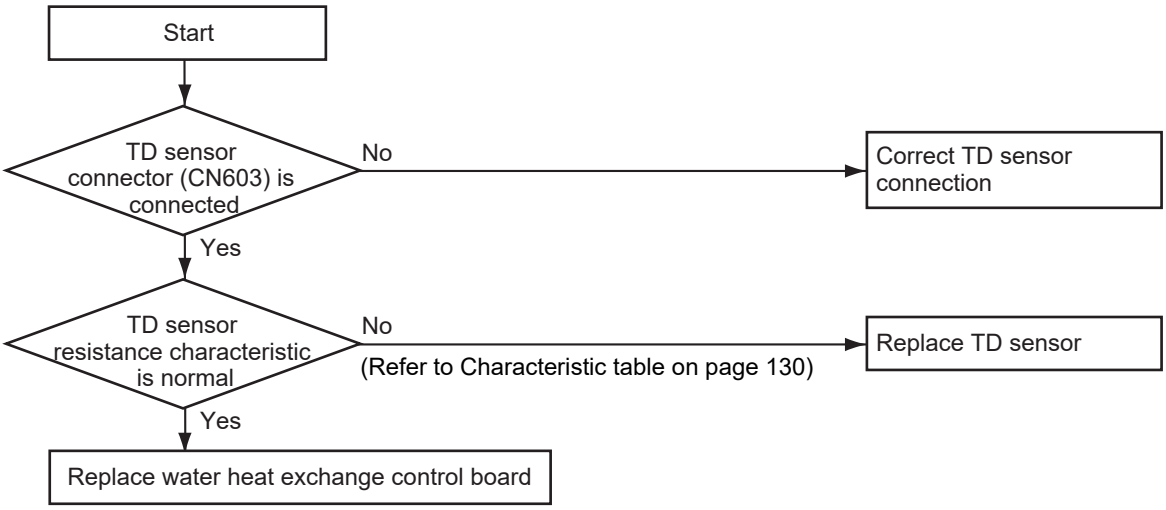
## [E04] Error



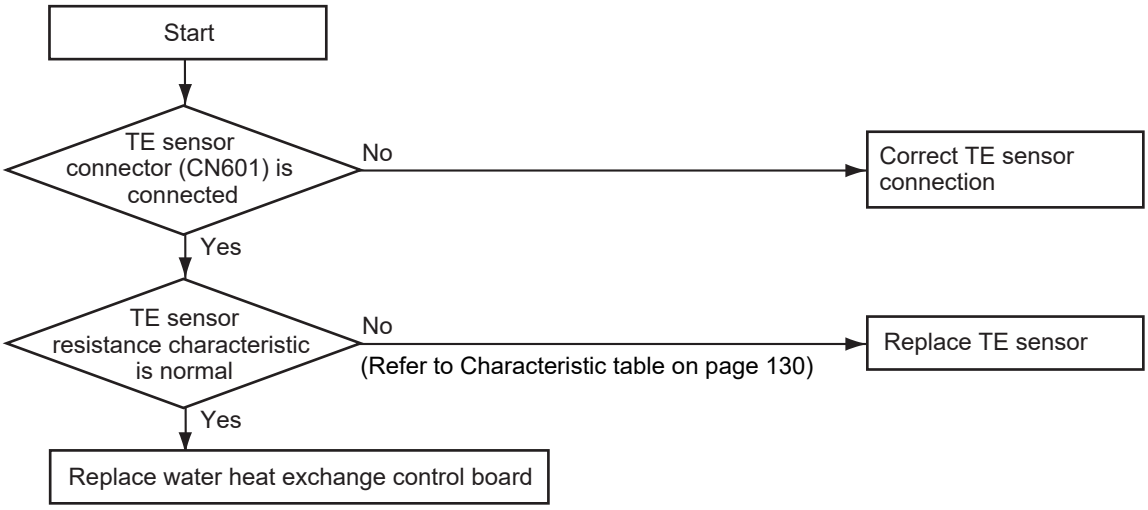

## [F03] Error TC sensor failure



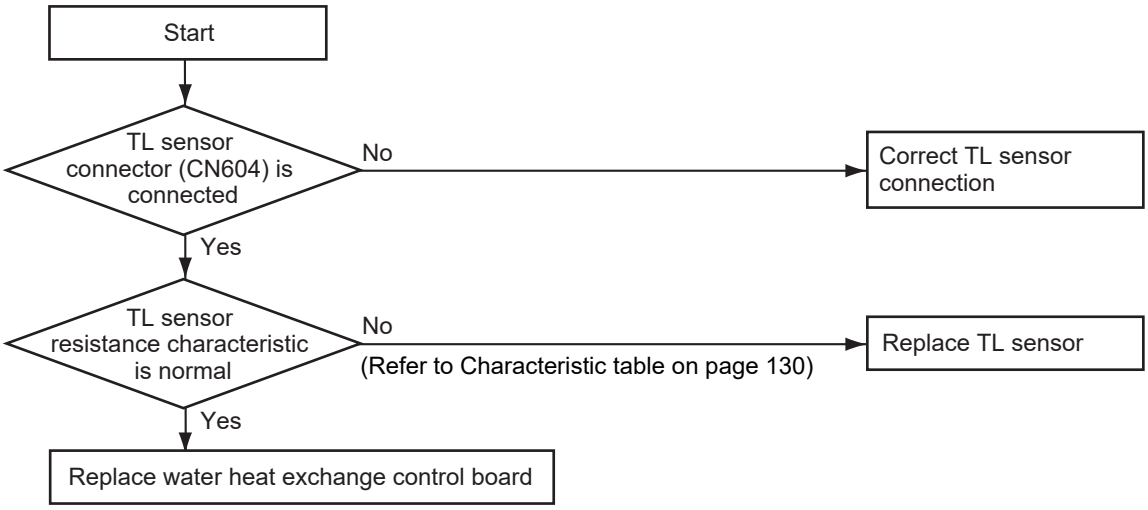
## [F04] Error TD sensor failure



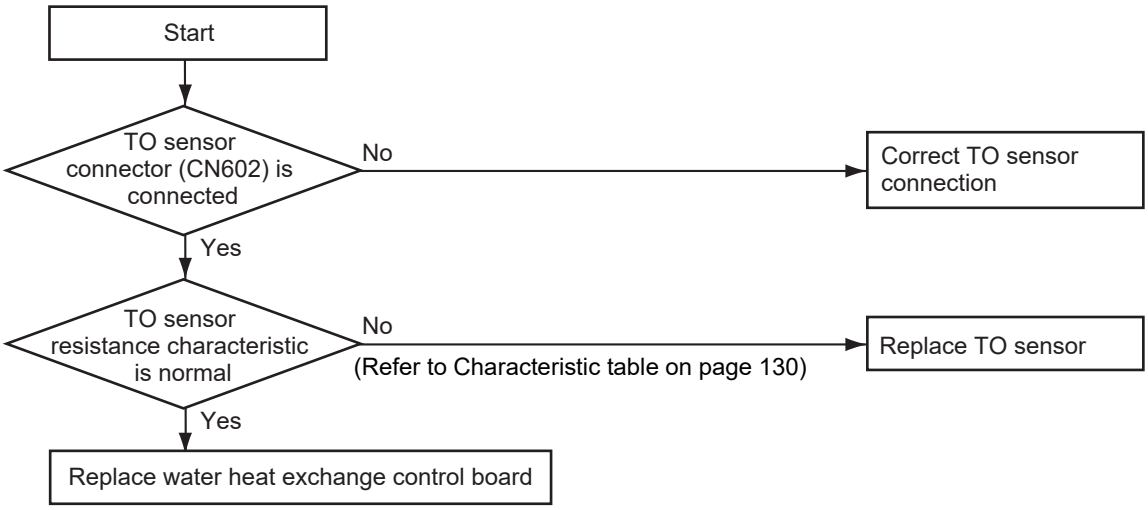

## [F06] Error TE sensor failure



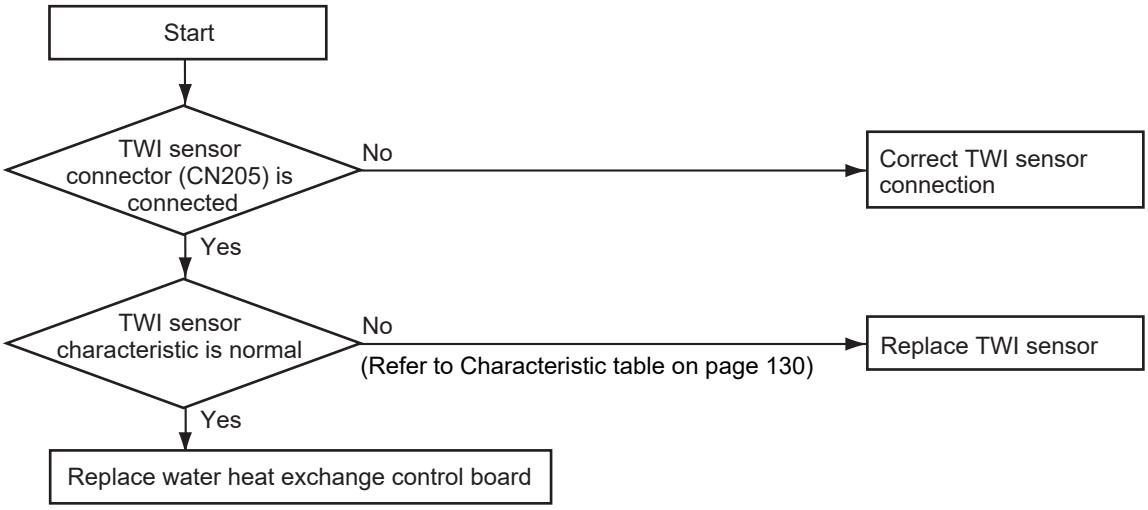

## [F07] Error TL sensor failure



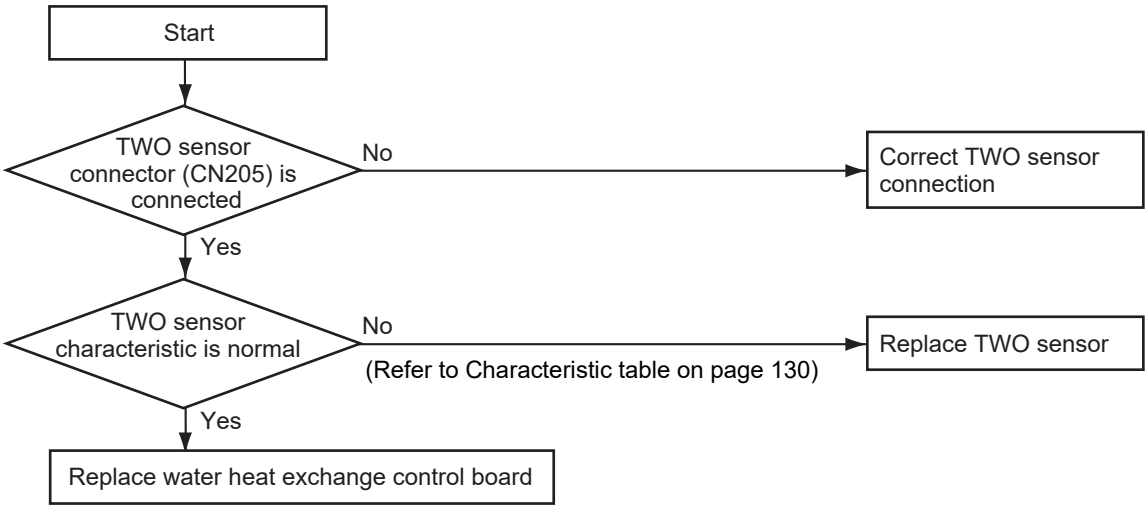
## [F08] Error TO sensor failure



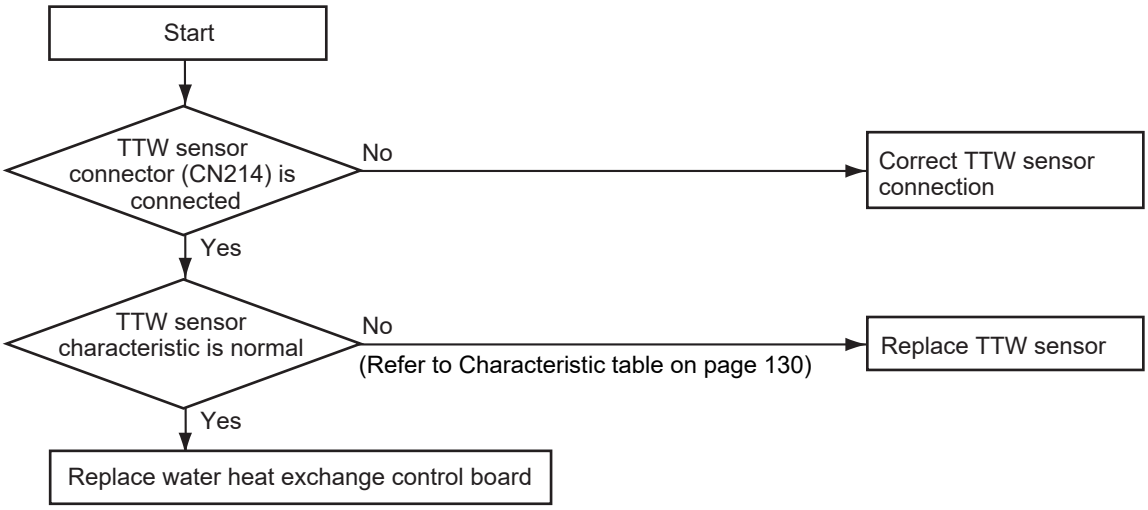

## [F10] Error TWI sensor failure



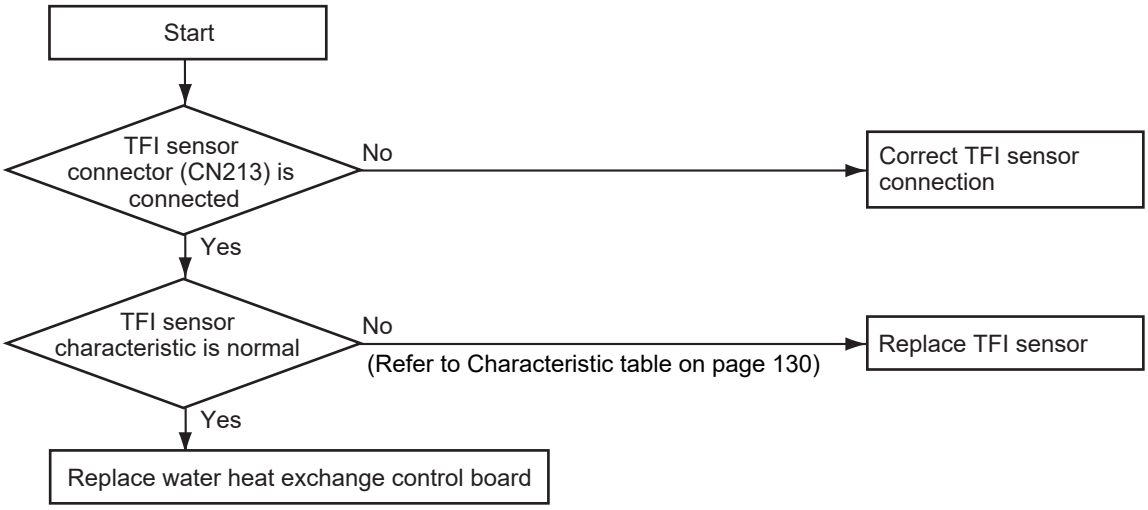

## [F11] Error TWO sensor failure



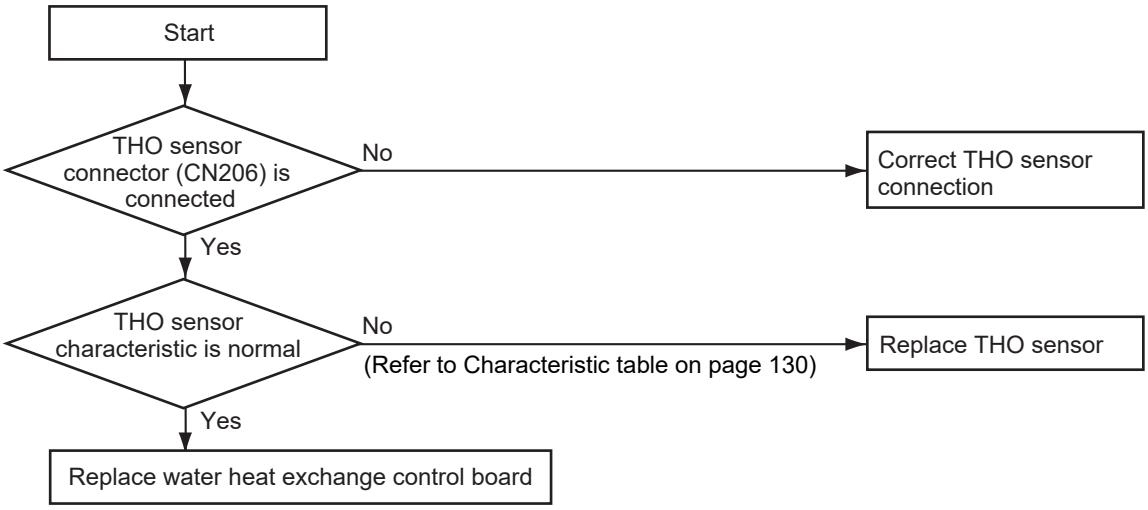
## [F14] Error TTW sensor failure



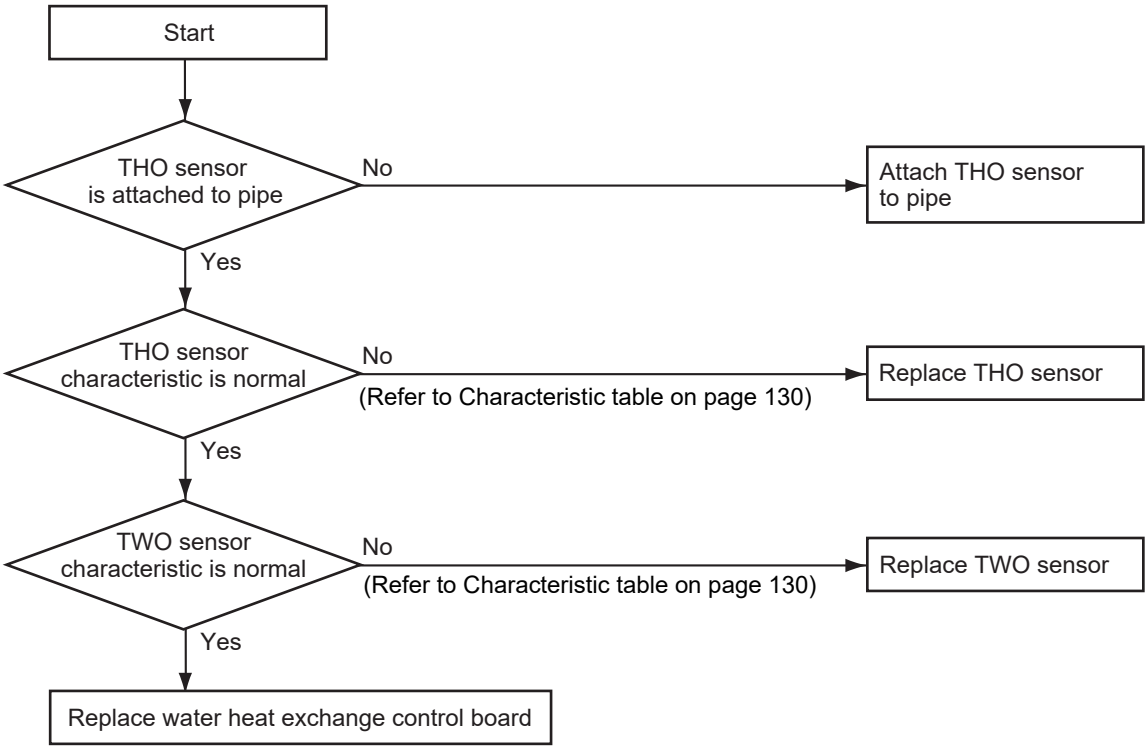

## [F17] Error TFI sensor failure



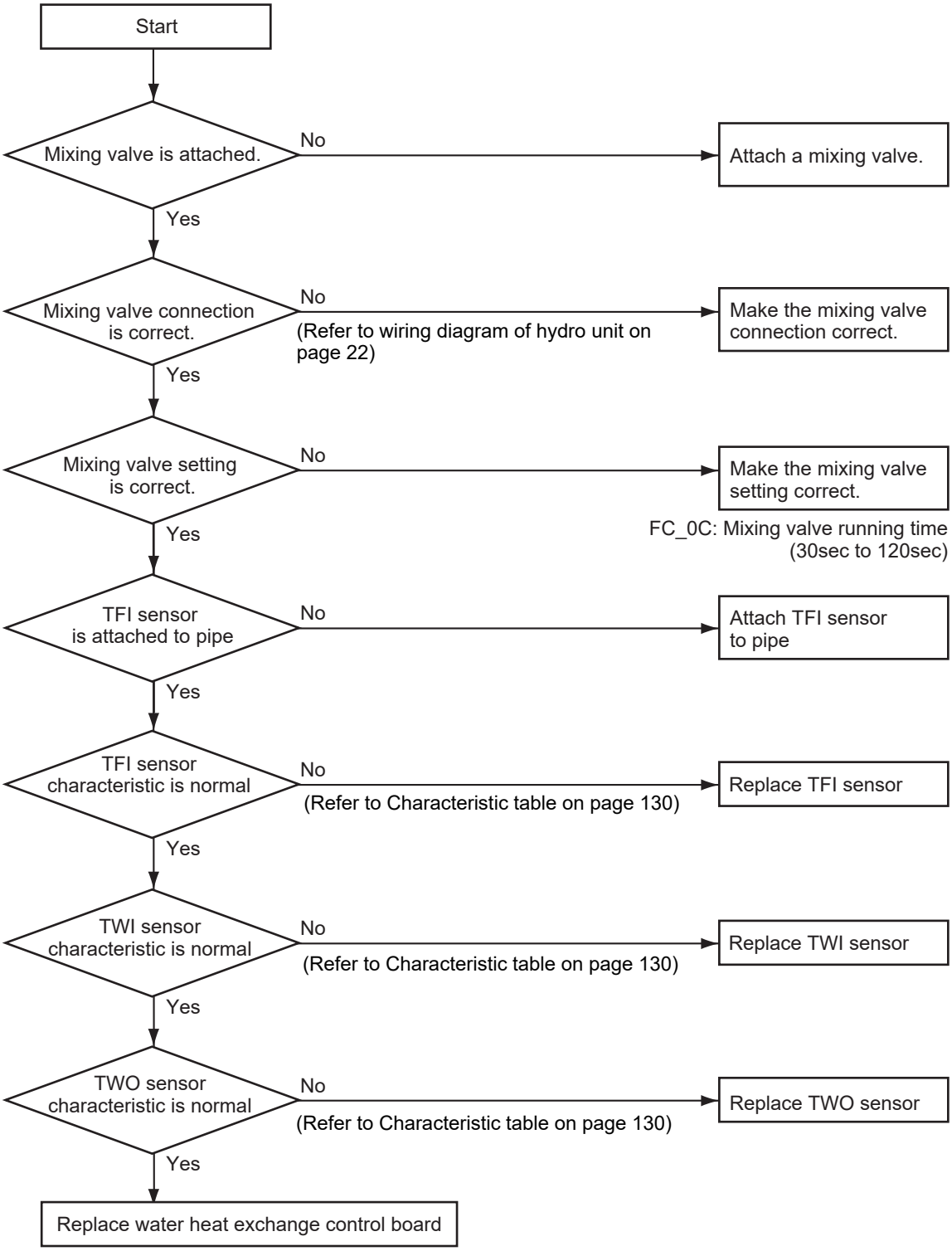

## [F18] Error THO sensor failure



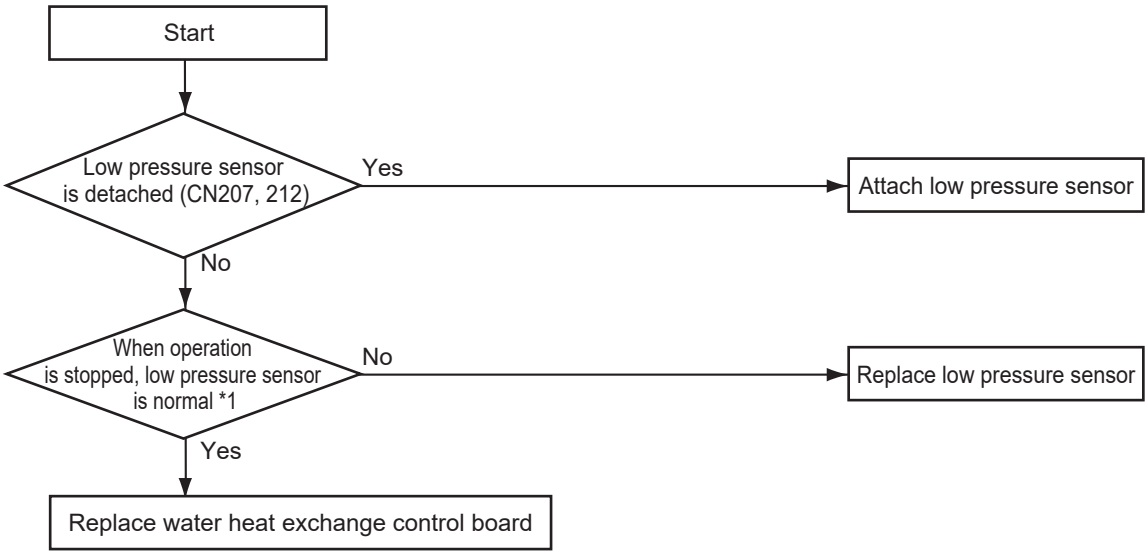
## [F19] Error THO sensor detach failure



## [F20] Error TFI detach failure



## [F23] Error Low pressure sensor detach failure

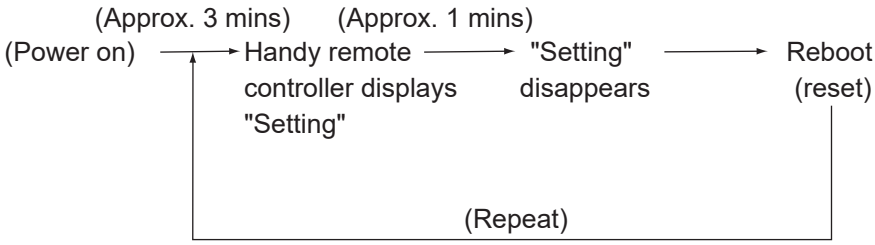



*1 How to determine: When operation is stopped

## [F29] Error EEPROM failure

A failure is detected in the IC10 non-volatile memory on the water heat exchanger board during a hot water supply unit operation. Replace the service board.

* If the unit does not have EEPROM inserted when the power is turned on, or if EEPROM data read or write is unavailable, automatic address mode repeats. In this case, the intensive control unit displays [97 Abnormal].




## [F30] Error Enhanced IC failure

Enhanced IC on water heat exchanger control board is abnormal.
Replace the water heat exchanger control board to a service board.

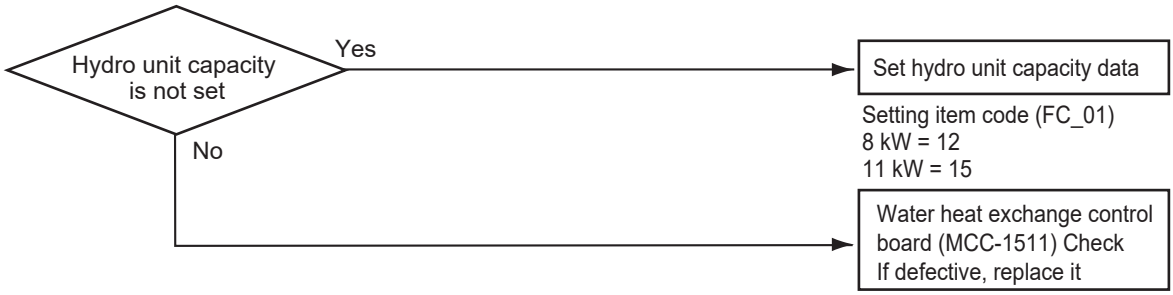
## [L02] Combination Error

The model name of the outdoor unit is not HWS-Pxx05H(8)R-E.
Replace the outdoor unit with the proper model.

## [L07] Error

At the time of power on, detecting the above failure automatically activates the automatic address setting mode.
(Check code is not output)
Note that if the above failure is detected in the automatic address setting mode, a check code may be output.

## [L09] Error




## [L16] Error

In DP_SW12-2, 3 of main unit water heat exchanger, if ZONE1 is not set and ZONE2 is set, [L16] displays abnormality.
Set correctly DP_SW12-2, 3.

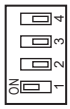
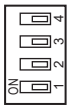
# 9-4-2. Outdoor unit failure detection

## Diagnosis procedure for each check code

- One check code may indicate multiple symptoms. In such a case, see the LED indication on the outdoor board to narrow down the check details.
- The handy remote controller displays a check code only when the same failure repeatedly occurs while the LED on the outdoor board indicates an error even if it occurs only once. This may cause indication inconsistency between the remote controller and LED.

**▼ HWS-P805HR-E, HWS-P1105HR-E** ····· <Model A>

**Outdoor board LED indication method**

| | |
|---|---|
| **Dip switch setting**<br>• Setting 1 only of SW803 to ON indicates the latest failure. Because the error log is recorded, you can see the detail even after the power is once turned off. (Not including outside air temperature sensor (TO) failure)<br>• After check work is done or when outside air temperature sensor (TO) failure is detected, set all the SW803 switches to OFF.<br>(An abnormality now is indicated.) | <Latest abnormality><br>SW803 1 only is ON<br>  <br><br><Abnormality now><br>SW803 All OFF (Initial status)<br>  <br> |
| **Indication switching**<br>• One or more LEDs of D800 through D804 lit yellow indicates that a failure occurred. <Indication 1><br>• With the status above, pressing the SW800 button for one second causes the yellow LED to flash. <Indication 2><br>• Pressing again SW800 for one second or longer returns to <Indication 1>.<br>• The combination of <Indication 1> and <Indication 2> can determine what kind of abnormality. | <Indication 1> ⇔ <Indication 2><br>(Normal) (Abnormality occurs)(Press SW800)<br>D800 (yellow) ● ○ ●<br>D801 (yellow) ● ○ ●<br>D802 (yellow) ● ● ◎<br>D803 (yellow) ● ● ●<br>D804 (yellow) ● ○ ●<br>D805 (green) ○ ○ ○<br>(Example of outlet temperature sensor failure)<br>●···Off ○···Light ◎···Flash (5 times/sec) |

▼ **HWS-P805H8R-E, HWS-P1105H8R-E, HWS-P1405H8R-E** ····· <Model B>
**How to check LED display on the outdoor PC board**

**[Service switch operation]**

**Currently occurring trouble indication**

Even if only one of D800 to D804 is rapidly flashing then trouble has arisen. If any of D800 to D801 is slowly flashing or D805 is flashing then press and hold down SW800 and SW801 at the same time for at least 5 seconds.

| D800 (YEL) | D801 (YEL) | D802 (YEL) | D803 (YEL) | D804 (YEL) | D805 (GRN) | |
|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | No trouble |
| ◎ | ● | ● | ● | ● | ○ | Trouble detected<br>(Example. Discharge temp. trouble) |

●: Off ○: Light ◎: Flash (5 times/sec)

**Latest trouble indication**

- The following operation results in the latest trouble being indicated. It is retained in the memory and hence can be confirmed even when the power supply has been turned off.
  1) Confirm D800 to D804 are off (or rapidly flashing) and that D805 is lit up. If D800 to D804 are slowly flashing or D805 is flashing then push and hold down SW01 and SW02 at the same time for at least 5 seconds. D800 to D804 will turn off (or be rapidly flashing) and D805 will change to flashing.
  2) Push and hold down SW01 for at least 5 seconds. D804 will start slowly flashing.
  3) Push SW800 several times until reaching the LED indication (D800 to D804) of 'Latest (including current) trouble indication'.
  4) Push SW801. The latest trouble will be indicated.
  5) Ensure to carry out step 1) to set the LEDs to the initial state (current occurring trouble) when finished and then exit.

Latest (including current) trouble indication

| D800 (YEL) | D801 (YEL) | D802 (YEL) | D803 (YEL) | D804 (YEL) | D805 (GRN) |
|---|---|---|---|---|---|
| ○ | ● | ● | ● | ● | ◎ |

●: Off ○: Light ◎: Flash (5 times/sec)

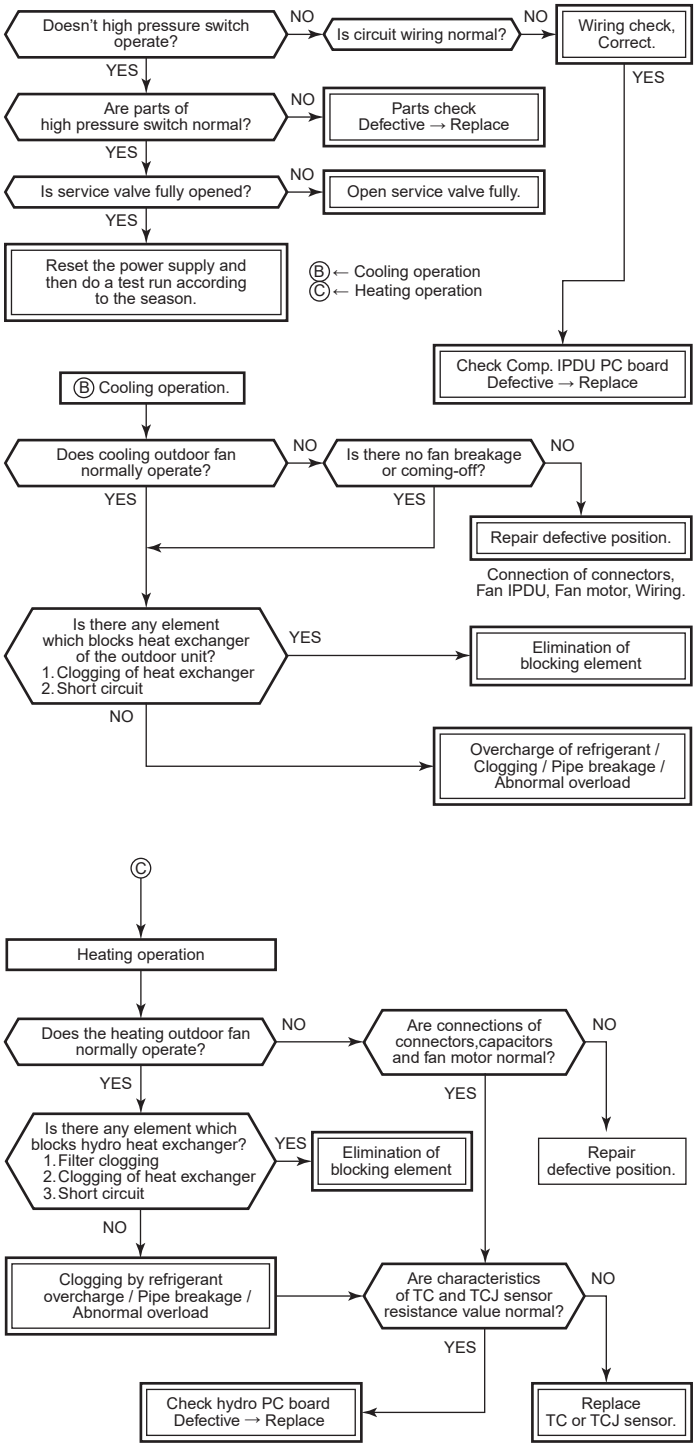
| Check code | Outdoor LED indication | Check and Action procedure (No specific description indicates outdoor unit parts.) |
|---|---|---|
| [H01] | <Indication 1> <Indication 2><br>●◎<br>●●<br>○●<br>●●<br>○●<br>○○<br><Model A><br><br>◎◎●◎●○<br><Model B> | **[Compressor fails]**<br>Power voltage is normal. AC220-230 V±10 % ··· Model A AC380-400 V±10 % ··· Model B → No → Improve power line<br>↓ Yes<br>Wiring connection is normal. Compressor lead (Board side, compressor side reactor lead, power lead) → No → Check and correct wiring connection<br>↓ Yes<br>Abnormally over loaded → Yes → Deal with or remove causes<br>↓ No<br>Check outdoor control board If defective, replace it<br>PC board<br><Model A><br>P805HR-E, P1105HR-E (MCC-1571)<br><Model B><br>P805H8R-E, P1105H8R-E, P1405H8R-E (MCC-1675) |
| [H02] | <Indication 1> <Indication 2><br>●●<br>●◎<br>○●<br>●●<br>○●<br>○○<br><Model A><br><br>●●◎◎●○<br><Model B> | **[Compressor lock]**<br>Power voltage is normal. AC220-230 V±10 % ··· Model A AC380-400 V±10 % ··· Model B → No → Improve power line<br>↓ Yes<br>Wiring connection is normal. Compressor lead (board side, compressor side) reactor, power lead → No → Check and correct wiring connection<br>↓ Yes<br>Compressor is normal. → No → Refrigerant stays inside. → No → Lock compressor and replace it.<br>Yes → Check outdoor board If defective, replace it<br>Refrigerant stays inside. → Yes → Pulse motor valve operates normally. → No → TE, TS sensor pulse motor valve check If defective, replace<br>Pulse motor valve operates normally. → Yes → Check outdoor board If defective, replace it<br>PC board<br><Model A><br>P805HR-E, P1105HR-E (MCC-1571)<br><Model B><br>Check compressor IPDU PC board. (MCC-1698)<br>Failure → Replace<br>* When replacing Compressor IPDU PC board, replace the fuse. |

| Check code | Outdoor LED indication | Check and Action procedure (No specific description indicates outdoor unit parts.) |
|---|---|---|
| [H04] | <Indication 1> <Indication 2><br>●●<br>●●<br>○◎<br>●●<br>○●<br>○○<br><Model A><br><br>●◎◎◎●○<br><Model B> | **[Case thermostat operation]**<br>CN609 connector and case thermostat is normal. — No → Correct connector / Replace case thermostat<br>Yes ↓<br>If case thermostat is short circuited, cooling and heating can operate. — No → Check outdoor board / If defective, replace it<br>Yes ↓<br>PC board<br><Model A><br>P805HR-E,<br>P1105HR-E<br>(MCC-1571)<br><br><Model B><br>Check CDB PC board.<br>(MCC-1675)<br>Failure → Replace<br>* When replacing CDB PC board, replace the fuse.<br>No gas leakage. Enough Refrigerant. — No → Correct defective portion / Re-charge refrigerant<br>Yes ↓<br>Service valve is fully opened. — No → Open fully service valve<br>Yes ↓<br>Pulse motor valve is normal. — No → Correct defective portion / Replace defective parts<br>Yes ↓<br>Check for piping collapse and break. If defective, repair or replace it. |
| [L10] | <Indication 1> <Indication 2><br>●●<br>●●<br>○◎<br>●●<br>○●<br>○○<br><Model A><br><br>●●●●◎○<br><Model B> | **[Model not set] Only when service board is used**<br>Cut jumper line by following the instruction comes with the service board package |

| Check code | Outdoor LED indication | Check and Action procedure<br>(No specific description indicates outdoor unit parts.) |
|---|---|---|
| [L15] | <Indication 1> <Indication 2><br>● ◎<br>○ ◎<br>○ ◎<br>● ◎<br>○ ●<br>○ ○<br><Model A> | **[Combination failure between the hydro unit]**<br>Replace the hydro unit with the proper model |
| | ◎◎◎◎◎○<br><Model B> | |
| [L29] | | * Any of the following abnormality may occur.<br>Seeing the LED on the outdoor board can determine which abnormality occurs.<br>Communication failure between MCUs, Heat sink temperature sensor (TH) failure, EEPROM failure, Model not specified, Heat sink overheat failure, gas leakage detection, 4-way valve invert failure |
| | <Indication 1> <Indication 2><br>● ◎<br>○ ●<br>○ ◎<br>● ◎<br>○ ◎<br>○ ○<br><Model A> | **[Communication failure between MCUs]**<br>Check outdoor control board<br>If defective, replace it<br>PC board<br>P805HR-E,<br>P1105HR-E<br>(MCC-1571) |
| | ◎●●●◎○<br><Model B> | **[Communication trouble MCUs]**<br>Is the communication line between the compressor IPDU PC board (CN 852) and the FAN - IPDU PC board (CN 504) connected?<br>NO → Correct wiring<br>YES ↓<br>Is the communication line between the control PC board (CN 802) and the FAN-IPDU PC board (CN 505) connected?<br>NO → Correct wiring<br>YES ↓<br>Check compressor IPDU PC board.<br>Failure → Replac<br>* When replacing Compressor IPDU PC board, replace the fuse. |

| Check code | Outdoor LED indication | Check and Action procedure (No specific description indicates outdoor unit parts.) |
|---|---|---|
| [P03] | <Indication 1> <Indication 2><br>○ ◎<br>○ ◎<br>○ ●<br>● ●<br>○ ●<br>○ ○<br><Model A><br><br>●◎●●◎○<br><Model B> | **[Abnormal outlet temperature]**<br>No gas leakage. Appropriate refrigerant amount. → No → Correct defective portion Re-charge refrigerant<br>↓ Yes<br>Pulse motor valve is normal. → No → Correct defective portion Replace defective parts<br>↓ Yes<br>Abnormally over loaded → Yes → Deal with or remove causes<br>↓ No<br>CN603 connector is normal. TD sensor resistance is normal → No → Correct connector Replace sensor<br>↓ Yes<br>Check outdoor control board If defective, replace it<br>PC board<br><Model A><br>P805HR-E, P1105HR-E (MCC-1571)<br><Model B><br>P805H8R-E, P1105H8R-E, P1405H8R-E (MCC-1675) |

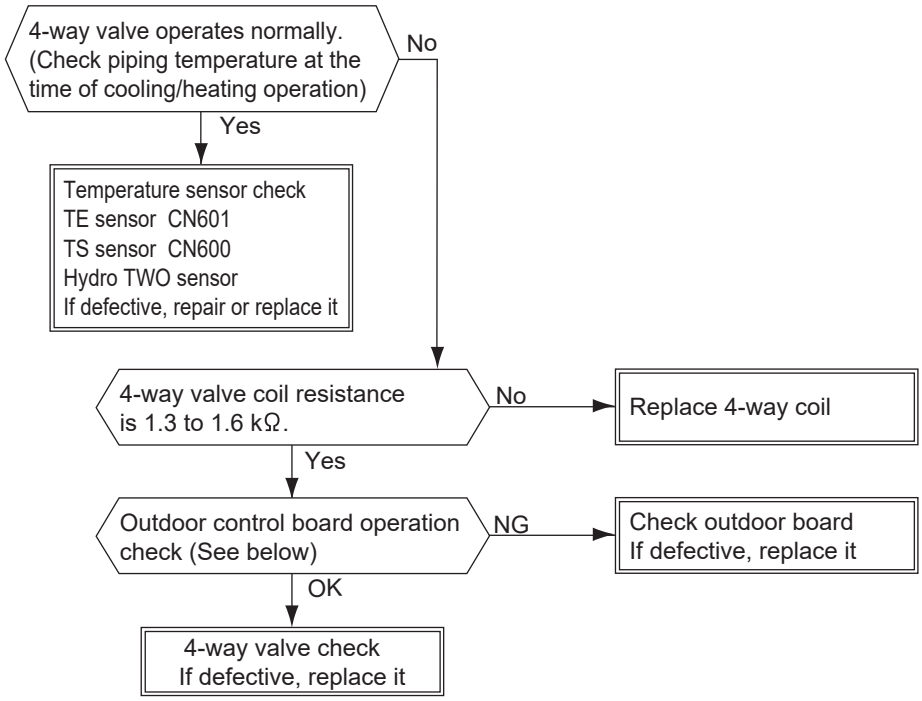
| Check code | Outdoor LED indication | Check and Action procedure (No specific description indicates outdoor unit parts.) |
|---|---|---|
| [P04] | * Any of the following abnormality may occur.<br>Seeing the LED on the outside board can determine which abnormality occurs.<br>1.High pressure sensor activated.<br>2.Power source failure (Vdc)<br>3.Hi pressure protection operation<br>4.Case thermostat operation | |
| | <Display 1> <Display 2><br>○ ●<br>○ ●<br>○ ◎<br>● ●<br>○ ●<br>○ ○<br><Model A><br><br>◎◎●●◎○<br><Model B> | **[High pressure SW system error]**<br>Power supply error (Vdc), High pressure protective operation, Case thermostat operation. |



| Check code | Outdoor LED indication | Check and Action procedure (No specific description indicates outdoor unit parts.) |
|---|---|---|
| [P05] | <Indication 1> <Indication 2><br>○ ◎<br>○ ●<br>○ ◎<br>● ●<br>○ ●<br>○ ○<br><Model A><br><br>●●◎●◎○<br><Model B> | **[Power source failure (voltage defective, open phase)]**<br>Power voltage abnormal drops or rise<br>AC220-230 V±10 % ··· Model A<br>AC380-400 V±10 % ··· Model B<br>Yes → Check electric work<br>No → Check outdoor control board<br>If defective, replace it<br>PC board<br><Model A><br>P805HR-E, P1105HR-E (MCC-1571)<br><Model B><br>P805H8R-E, P1105H8R-E, P1405H8R-E (MCC-1675) |
| [P07] | <Indication 1> <Indication 2><br>○ ◎<br>○ ◎<br>○ ◎<br>● ●<br>○ ●<br>○ ○<br><Model A> | **[Heat sink overheat failure]**<br>HWS-P805HR-E, P1105HR-E<br>The screws are loose in motor drive element, Q200/300/400, of outdoor control board and rectifier, DB01/02/03. (MCC-1571) Radiation grease was not applied to backside of Q200, DB01, DB02, or DB03.<br>Yes → Apply radiation grease as needed Tighten screws (Be sure to place back the insulation sheet between Q300/400 and the heat sink.)<br>No → Is not the ventilation flue of the heat sink blocked? Is not the fan blocked? (Short-circuit, etc.)<br>Yes → Remove obstacles, Deal with short circuit<br>No → Check outdoor control board<br>If defective, replace it |

| Check code | Outdoor LED indication | Check and Action procedure (No specific description indicates outdoor unit parts.) |
|---|---|---|
| [P07] | ●◎◎●◎○<br><Model B> | **[Heat sink overheat trouble]**<br>Is there any looseness in the screw stop of the motor drive element Q21 of the compressor IPDU PC board, the sub heat sink, and the diode bridge? Are radiation grease properly applied? → YES → Apply radiation grease to objective, retightening of screw<br>↓ NO<br>Does something block the ventilation around the heastsink? Does something block air flow from the fan? (Short circuit etc.) → NO → Remove blocking matter, Short circuit improvement<br>↓ YES<br>Check compressor IPDU PC board.<br>Failure → Replace<br>* When replacing Compressor IPDU PC board, replace the fuse. |
| [P15] | <Indication 1> <Indication 2><br>○ ◎<br>○ ◎<br>○ ◎<br>● ◎<br>○ ●<br>○ ○<br><Model A> | **[Gas leakage detection]**<br>No gas leakage. Appropriate refrigerant amount. → No → Correct defective portion Re-charge refrigerant<br>↓ Yes<br>Pulse motor valve is normal. → No → Correct defective portion Replace defective parts<br>↓ Yes<br>Service valve is fully opened. → No → Open fully service valve<br>↓ Yes<br>Piping collapse → Yes → Repair or replace pipe<br>↓ No<br>Temperature sensor check Discharge sensor CN603 Suction sensor CN600 → NG → Correct connector Replace sensor<br>↓ OK<br>Check outdoor control board If defective, replace it<br><br>PC board<br><Model A><br>P805HR-E, P1105HR-E (MCC-1571)<br><Model B><br>P805H8R-E, P1105H8R-E, P1405H8R-E (MCC-1675) |
| | ◎◎◎●◎○<br><Model B> | |

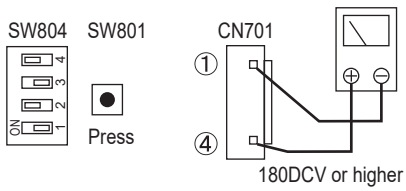
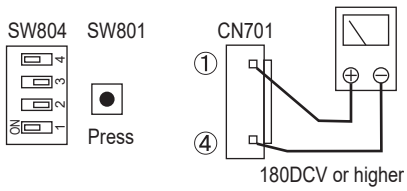
| Check code | Outdoor LED indication | Check and Action procedure (No specific description indicates outdoor unit parts.) |
|---|---|---|
| [P19] | <Indication 1> <Indication 2><br>○ ◎<br>○ ◎<br>○ ●<br>● ●<br>○ ◎<br>○ ○<br><Model A> | **[4-way valve invert failure]** |




Outdoor control board operation check direction (Self-hold valve) = P805HR-E, P1105HR-E

1) With the dip switch SW804 set as in the table below, pressing SW801 for approx. 1 second can check the operation of switching to cooling cycle or to heating cycle.
   - The board are energized for 10 seconds.
   - Take more than a minute for the next check because the parts (coil, resistance R700) generate large heat. (This does not apply when no coil is connected.)

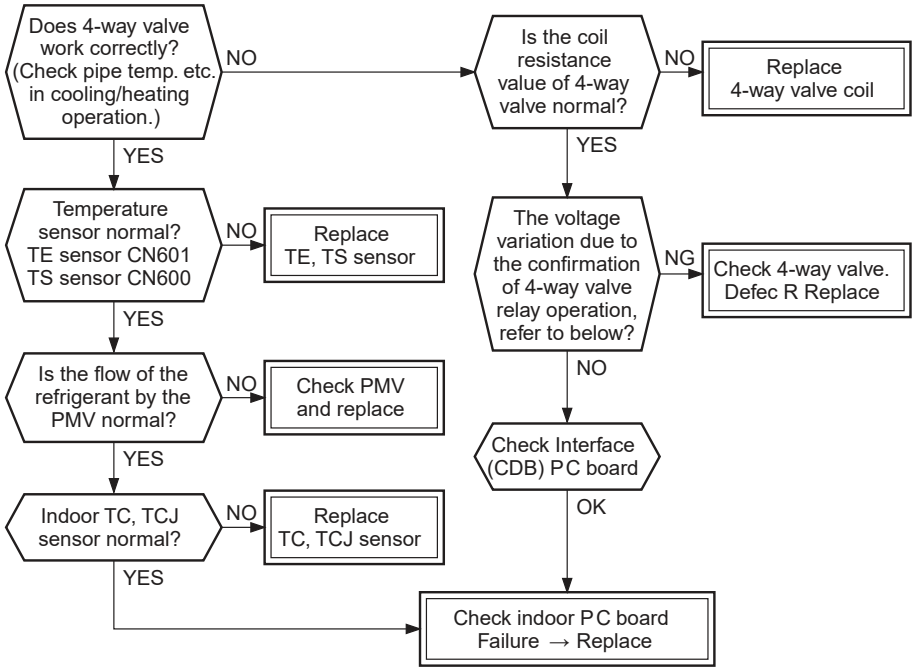
2) After the check, set all the SW804 dip switches to OFF.

| Switching to cooling cycle | Switching to heating cycle |
|---|---|
|  |  |



**Note:** Check with a tester
With an analog tester: If a tester shows 180DCV or higher, the board is good.
With digital tester: Although values shown has some range, if its maximum value is 180DCV or higher, the board is good.

| Check code | Outdoor LED indication | Check and Action procedure (No specific description indicates outdoor unit parts.) |
|---|---|---|
| [P19] | ●●●◎◎○<br><Model B> | **[4-way valve inverse trouble]** |




[4-way valve relay operation check]

Service switches SW800 and SW801 can be used to check the operation of the 4-way valve relay.

Use to check whether there are any problems with the 4-way valve or 4-way valve coil.

[Method of operation]

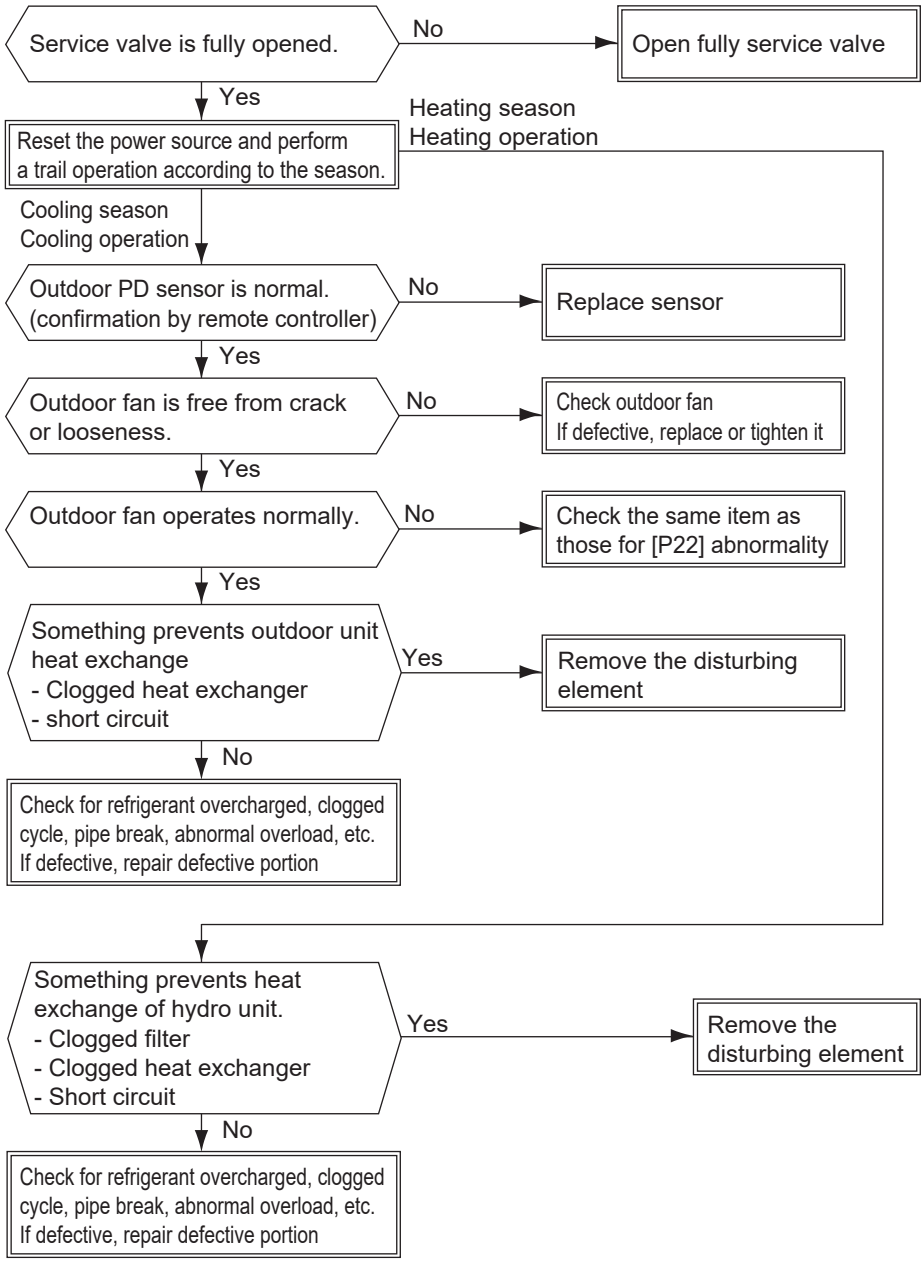
1) Push ensure that D800 to D804 are off (or rapidly flashing) and that D805 is lit up. If D800 to D804 are slowly flashing or D805 is flashing then push and hold down SW800 and SW801 at the same time for at least 5 seconds. D800 to D804 will turn off (or rapidly flash) and D805 turn on.
2) Push and hold down SW800 for at least 5 seconds. D804 will start slowly flashing.
3) Push SW800 until reaching the below [4-way valve resistance value relay operation] LED indication.

| 4-way valve resistance value relay operation | D800 | D801 | D802 | D803 | D804 |
|---|---|---|---|---|---|
| | ● | ● | ○ | ○ | ◎ |

●: Off ○: Light ◎: Flash (5 times/sec)

4) Push SW801until D805 starts rapidly flashing.
5) Push and hold down SW801 for at least 5 seconds. D804 will start slowly flashing, D805 will turn on, and the 4-way valve resistance value relay operation will turn on.
6) Push and hold down SW800 and SW801 at the same time for at least 5 seconds or wait 2 minutes to return to normal control.

| Check code | Outdoor LED indication | Check and Action procedure (No specific description indicates outdoor unit parts.) |
|---|---|---|
| [P20] | <Indication 1> <Indication 2><br>○ ●<br>○ ●<br>○ ◎<br>● ●<br>○ ◎<br>○ ○<br><Model A> | **[Hi pressure protection operation]** |
| | ◎●●◎◎○<br><Model B> | |



| Check code | Outdoor LED indication | Check and Action procedure (No specific description indicates outdoor unit parts.) |
|---|---|---|
| [P22] | <Indication 1> <Indication 2><br>○ ●<br>○ ◎<br>○ ◎<br>● ●<br>○ ◎<br>○ ○<br><Model A> | **[Blower system failure]**<br>Power voltage is normal (AC220-230 V±10 %: single phase) → No → Check wiring / Request power source repair<br>↓ Yes<br>When not energized, the fan motor can be smoothly rotated by hand. Fan motor coil resistance is normal. Between red - white leads 12 -20Ω Between white - black leads 12 - 20Ω Between black - red leads 12 - 20Ω → No → Replace fan motor<br>↓ Yes<br>Check outdoor control board If defective, replace it<br>PC board P805HR-E, P1105HR-E (MCC-1571)<br><br>Outdoor fan sole operation check<br>1) With the dip switch SW804 set as in the table below, pressing SW801 for approx. 1 second can check the outdoor fan sole operation. Perform this check to determine which of upper or lower fan has a problem.<br>• When SW801 is pressed again for 1 second or when 2 minutes has passed, the fan stops.<br>2) After the check, set all the SW804 dip switches to OFF.<br>**Outdoor fan sole operation**<br>SW804 SW801<br>ON 1 2 3 4<br>Press |

| Check code | Outdoor LED indication | Check and Action procedure (No specific description indicates outdoor unit parts.) |
|---|---|---|
| [P22] | ●◎●◎◎○<br><Model B> | **[Fan system trouble]**<br>Is power supply voltage normal? AC342 to 457V → NO → Check wiring construction. Ask repair of power supply.<br>↓ YES<br>Rotate shaft of the fan motor by hands during power-OFF. Can it rotate smoothly? Is coil resistance of fan motor correct? Between red and white lead wire : 12 to 20Ω Between white and black lead wire : 12 to 20Ω Between black and red lead wire : 12 to 20Ω → NO → Replace fan motor.<br>↓ YES<br>Is not the fuse (near the terminal block) blows? → NO → Replace fuse.<br>↓ YES<br>Check FAN-IPDU PC board Failure → Replace<br>[Confirmation of independent operation of outdoor fan]<br>Service switches SW800 and SW801 can be used to check the operation of the 4-way valve relay.<br>Use to check whether there are any problems with the 4-way valve or 4-way valve coil.<br>[Method of operation]<br>1) Push ensure that D800 to D804 are off (or rapidly flashing) and that D805 is lit up. If D800 to D804 are slowly flashing or D805 is flashing then please push and hold down SW800 and SW801 at the same time for at least 5 seconds. D800 to D804 will turn off (or rapidly flash) and D805 turn on.<br>2) Push and hold down SW800 for at least 5 seconds. D804 will start slowly flashing.<br>3) Push SW800 until reaching the below [Confirmation of independent operation of outdoor fan] LED indication.<br>Confirmation of independent operation of outdoor fan: D800 ○, D801 ○, D802 ●, D803 ○, D804 ◎<br>● : Off ○ : Light ◎: Flash (5 times/sec)<br>4) Push SW801 until D805 starts rapidly flashing.<br>5) Push and hold down SW801 for at least 5 seconds. D804 will start slowly flashing, D805 will turn on, and the 4-way valve resistance value relay operation will turn on.<br>6) Push and hold down SW800 and SW801 at the same time for at least 5 seconds or wait 2 minutes to return to normal control. |
| [P26] | <Indication 1> <Indication 2><br>○ ●<br>○ ◎<br>○ ●<br>● ◎<br>○ ◎<br>○ ○<br><Model A><br>◎◎●◎◎○<br><Model B> | **[Compressor drive element shorted out]**<br>The connection between compressor lead and reactor is correct. (Check with wiring diagram) → No → Correct wiring<br>↓ Yes<br>A operation without compressor lead does not cause the same problem. → No → Replace outdoor board <Model A> Replace Compressor IPDU board MCC-1698 <Model B><br>↓ Yes<br>Compressor check (rare short circuit, etc.) If defective, replace it |

| Check code | Outdoor LED indication | Check and Action procedure (No specific description indicates outdoor unit parts.) |
|---|---|---|
| [P29] | <Indication 1> <Indication 2><br>○ ◎<br>○ ●<br>○ ◎<br>● ◎<br>○ ◎<br>○ ○<br><Model A> | **[Position detection circuit failure]**<br>Check outdoor control board<br>If defective, replace it<br>PC board<br><Model A><br>(MCC-1571)<br><Model B><br>(MCC-1698) |
| | ●●◎◎◎○<br><Model B> | |
| No code | <Indication 1> <Indication 2><br>● ◎<br>○ ◎<br>○ ◎<br>● ◎<br>○ ◎<br>○ ○<br><Model A> | **[Discharge abnormality]** Compressor's loss of synchronism due to rapid load change, etc.<br>* Although the outdoor LED indicates abnormality, the compressor restarts and no abnormality is confirmed.<br>* This may occur due to the open phase of the compressor or wiring detach. |
| [F04] | <Indication 1> <Indication 2><br>○ ●<br>○ ●<br>● ◎<br>● ●<br>○ ●<br>○ ○<br><Model A> | **[Discharge temperature sensor (TD) failure]**<br>TD sensor connector (CN603) is connected → No → Correct TD sensor connection<br>↓ Yes<br>TD sensor resistance characteristic is normal → No → Replace TD sensor<br>See the characteristic table on page 103<br>↓ Yes<br>Replace outdoor control board<br>PC board<br><Model A><br>P805HR-E, P1105HR-E (MCC-1571)<br><Model B><br>P805H8R-E, P1105H8R-E, P1405H8R-E<br>(MCC-1675) |
| | ◎●●●●○<br><Model B> | |
| [F06] | <Indication 1> <Indication 2><br>○ ●<br>○ ◎<br>● ◎<br>● ●<br>○ ●<br>○ ○<br><Model A> | **[Heat exchanger temperature sensor (TE) failure]**<br>TE sensor connector (CN601) is connected → No → Correct TE sensor connection<br>↓ Yes<br>TE sensor resistance characteristic is normal → No → Replace TE sensor<br>See the characteristic table on page 103<br>↓ Yes<br>Replace outdoor control board<br>PC board<br><Model A><br>P805HR-E, P1105HR-E (MCC-1571)<br><Model B><br>P805H8R-E, P1105H8R-E, P1405H8R-E<br>(MCC-1675) |
| | ●◎●●●○<br><Model B> | |

| Check code | Outdoor LED indication | Check and Action procedure (No specific description indicates outdoor unit parts.) |
|---|---|---|
| [F07] | <Indication 1> <Indication 2><br>○ ◎<br>○ ◎<br>● ◎<br>● ●<br>○ ●<br>○ ○<br><Model A> | **[Heat exchanger temperature sensor (TL) failure]**<br>TL sensor connector (CN604) is connected — No → Correct TL sensor connection<br>YES ↓<br>TL sensor resistance characteristic is normal — No → Replace TL sensor<br>See the characteristic table on page 103<br>YES ↓<br>Replace outdoor control board<br>PC board<br><Model A><br>P805HR-E, P1105HR-E (MCC-1571)<br><Model B><br>P805H8R-E, P1105H8R-E, P1405H8R-E (MCC-1675) |
| | ◎◎●●●○<br><Model B> | |
| [F08] | <Indication 1> <Indication 2><br>○ ●<br>○ ●<br>● ●<br>● ◎<br>○ ●<br>○ ○<br><Model A> | **[Outside air temperature sensor (TO) failure]**<br>TO sensor connector (CN602) is connected — No → Correct TO sensor connection<br>Yes ↓<br>TO sensor resistance characteristic is normal — No → Replace TO sensor<br>See the characteristic table on page 103<br>Yes ↓<br>Replace outdoor control board<br>PC board<br><Model A><br>P805HR-E, P1105HR-E (MCC-1571)<br><Model B><br>P805H8R-E, P1105H8R-E, P1405H8R-E (MCC-1675) |
| | ●●◎●●○<br><Model B> | |
| [F12] | <Indication 1> <Indication 2><br>○ ●<br>○ ●<br>● ◎<br>● ◎<br>○ ●<br>○ ○<br><Model A> | **[Suction temperature sensor (TS) failure]**<br>TS sensor connector (CN600) is connected — No → Correct TS sensor connection<br>Yes ↓<br>TS sensor resistance characteristic is normal — No → Replace TS sensor<br>Yes ↓<br>Replace outdoor control board<br><Model A><br>P805HR-E, P1105HR-E (MCC-1571)<br><Model B><br>P805H8R-E, P1105H8R-E, P1405H8R-E (MCC-1675) |
| | ◎●◎●●○<br><Model B> | |

| Check code | Outdoor LED indication | Check and Action procedure<br>(No specific description indicates outdoor unit parts.) |
|---|---|---|
| [F13] | <Indication 1> <Indication 2><br>○ ◎<br>○ ●<br>● ◎<br>● ◎<br>○ ●<br>○ ○<br><Model A> | **[Heat sink temperature sensor (TH) failure]**<br>Replace outdoor control board<br>PC board<br><Model A><br>P805HR-E, P1105HR-E (MCC-1571)<br><Model B><br>Check compressor IPDU PC board. (MCC-1698)<br>Failure → Replace<br>* When replacing Compressor IPDU PC board,replace the fuse. |
| | ●◎◎●●○<br><Model B> | |
| [F15] | <Indication 1> <Indication 2><br>○ ◎<br>○ ◎<br>● ◎<br>● ◎<br>○ ●<br>○ ○<br><Model A> | **[Heat exchanger sensor (TE, TS) wrong wiring]**<br>TE and TS sensor is attached to the correct position. → No → Correct sensor attaching position<br>↓ Yes<br>TE sensor resistance characteristic is normal → No → Replace TE sensor<br>See the characteristic table on page 103<br>↓ Yes<br>TS sensor resistance characteristic is normal → No → Replace TS sensor<br>See the characteristic table on page 103<br>↓ Yes<br>Replace outdoor control board<br>PC board<br><Model A><br>P805HR-E, P1105HR-E (MCC-1571)<br><Model B><br>P805H8R-E, P1105H8R-E, P1405H8R-E (MCC-1675) |
| | ◎◎◎●●○<br><Model B> | |

| Check code | Outdoor LED indication | Check and Action procedure (No specific description indicates outdoor unit parts.) |
|---|---|---|
| [F24] | <Indication 1> <Indication 2><br>○ ●<br>○ ●<br>● ●<br>● ◎<br>○ ◎<br>○ ○<br><Model A> | **[High pressure sensor (PD) failure]**<br>PD sensor connector CN606 ....Model A CN607 ....Model B is connected → No → Correct PD sensor connection<br>↓ Yes<br>PD sensor is normal → No → Replace PD sensor<br>↓ Yes<br>Replace outdoor control board<br>PC board<br><Model A><br>P805HR-E, P1105HR-E (MCC-1571)<br><Model B><br>P805H8R-E, P1105H8R-E, P1405H8R-E (MCC-1675) |
| | ◎●●◎●○<br><Model B> | |
| [F31] | <Indication 1> <Indication 2><br>○ ◎<br>○ ◎<br>● ◎<br>● ◎<br>○ ◎<br>○ ○<br><Model A> | **[EEPROM failure]**<br>Check outdoor control board If defective, replace it<br>PC board<br><Model A><br>P805HR-E, P1105HR-E (MCC-1571)<br><Model B><br>P805H8R-E, P1105H8R-E, P1405H8R-E (MCC-1675) |
| | ●◎●◎●○<br><Model B> | |

## 9-4-3. Temperature sensor, temperature-resistance characteristic table

**TC, TWI, TWO, TFI, TTW, TE, TS, TO sensors**

**Typical value**

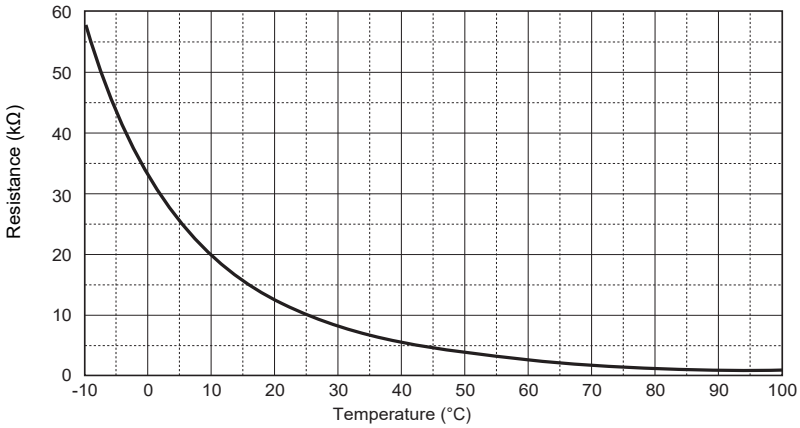
| Temperature (°C) | Resistance value (kΩ) | | |
|---|---|---|---|
| | (Minimum) | (Standard) | (Maximum) |
| -10 | 55.42 | 55.73 | 60.04 |
| 0 | 32.33 | 33.80 | 35.30 |
| 10 | 19.63 | 20.35 | 21.09 |
| 20 | 12.23 | 12.59 | 12.95 |
| 25 | 9.75 | 10.00 | 10.25 |
| 30 | 7.764 | 7.990 | 8.218 |
| 40 | 5.013 | 5.192 | 5.375 |
| 50 | 3.312 | 3.451 | 3.594 |
| 60 | 2.236 | 2.343 | 2.454 |
| 70 | 1.540 | 1.623 | 1.709 |
| 80 | 1.082 | 1.146 | 1.213 |
| 90 | 0.7740 | 0.8237 | 0.8761 |
| 100 | 0.5634 | 0.6023 | 0.6434 |

**TD, TL sensors**

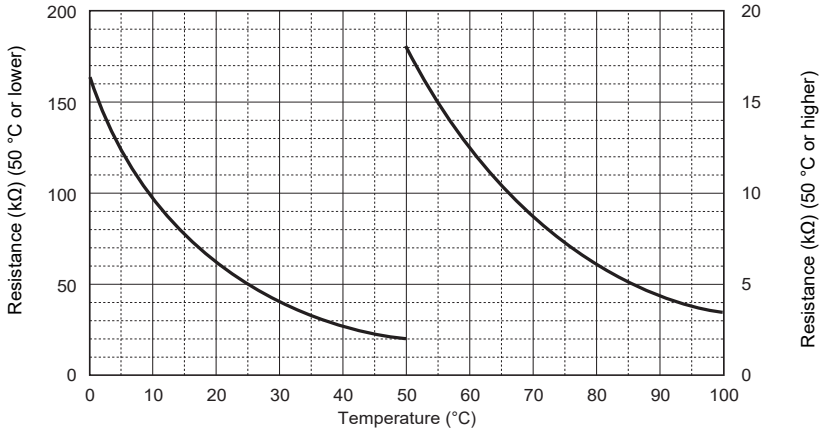
**Typical value**

| Temperature (°C) | Resistance value (kΩ) | | |
|---|---|---|---|
| | (Minimum) | (Standard) | (Maximum) |
| 0 | 150.5 | 161.3 | 172.7 |
| 10 | 92.76 | 99.05 | 105.6 |
| 20 | 58.61 | 62.36 | 66.26 |
| 25 | 47.01 | 49.93 | 52.97 |
| 30 | 37.93 | 40.22 | 42.59 |
| 40 | 25.12 | 26.55 | 28.03 |
| 50 | 17.00 | 17.92 | 18.86 |
| 60 | 11.74 | 12.34 | 12.95 |
| 70 | 8.269 | 8.668 | 9.074 |
| 80 | 5.925 | 6.195 | 6.470 |
| 90 | 4.321 | 4.507 | 4.696 |
| 100 | 3.205 | 3.336 | 3.468 |

TC, TWI, TWO, TFI, TTW, TE, TS, TO sensors




TD, TL sensors




* Since the TH sensor (outdoor unit heat-sink temperature sensor) is built in the outdoor control board, the resistance value cannot be measured.

# 9-5. Operation check by PC board switch

## 9-5-1. Operation check mode

This mode allows to check the operations of the water 2-way valve, water 3-way valve, mixing valve, and circulation pump. This operation is valid when the hydro unit and the outdoor unit are turned on the power.

### Operation check mode

**(1) Preparation**

1) Turn all of the remote controllers "OFF" for the hot water supply and heating.
2) Turn off the hydro unit and the outdoor unit.
3) Remove the front panel of the hydro unit.
4) Set SW06_2 "ON".

**(2) Operation check**

1) Turn on the hydro unit and the outdoor unit.
2) Rotate switch DIP SW01 to position "1" and press tactile switch SW07 for 5 sec. or longer.
3) Rotating the rotary SW01 allows to check each operation.
4) Set the DIP SW06_2 "OFF" to finish.

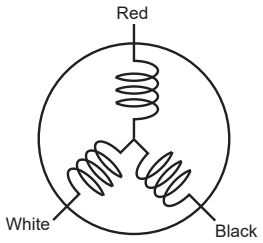
| Rotary switch | Check contents | | Remark |
|---|---|---|---|
| 1 | None | | |
| 2 | 2WV_W | Alive for approx. 2 sec, not alive for 3 sec | |
| 3 | 3WV_W | | |
| 4 | Mixing valve | Alive for 30 sec in the forward direction<br>Alive for 30 sec in the reverse direction | |
| 5 | Built-in circulation pump | Alive / not alive for 20 sec | |
| 6 | External circulation pump 1 | Alive / not alive for 20 sec | |
| 7 | (External circulation pump 2) | Alive / not alive for 20 sec | Reserved |
| 8 | Water heat exchange backup heater | Repeat heater 1, heater 2, and OFF every 20 sec | The built-in circulation pump operates. |
| 9 | Hot water cylinder heater | Alive / not alive for 10 sec | |
| 10 | Backup heater | Alive / not alive for 10 sec | The built-in circulation pump and external circulation pump operate. |
| 11 | Check the alarm output. | Output for 10 sec / no output for 10 sec | |
| 12 | Check the boiler output. | Output for 10 sec / no output for 10 sec | |
| 13 | Check the defrost output. | Output for 10 sec / no output for 10 sec | |
| 14 | Check the operation output. | Output for 10 sec / no output for 10 sec | |
| 15 | None | | |
| 16 | Built-in circulation pump continuous operation | Continuously alive | Do not operate the circulation pump alive continuously without any water in hydro unit. |

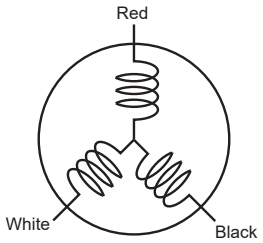
# 9-6. Brief method for checking the key components

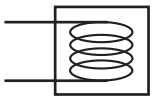
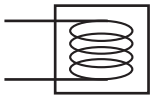
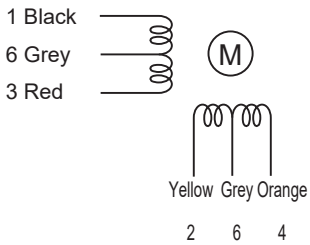
## 9-6-1. Hydro unit

<table>
<tr><th>No.</th><th>Component name</th><th>Check procedure</th></tr>
<tr><td>1</td><td>Water heat exchange temperature (TC) sensor<br>Water inlet temperature (TWI) sensor<br>Water outlet temperature (TWO) sensor<br>Hot water cylinder temperature (TTW) sensor<br>Floor inlet temperature (TFI) sensor</td><td>Remove the connector and measure the resistance value with a tester. (Normal temperature)
<table>
<tr><th>Sensor \ Temperature</th><th>0 °C</th><th>10 °C</th><th>20 °C</th><th>30 °C</th></tr>
<tr><td>Water heat exchange temperature (TC) sensor</td><td rowspan="5">33.8 kΩ</td><td rowspan="5">20.35 kΩ</td><td rowspan="5">12.59 kΩ</td><td rowspan="5">7.99 kΩ</td></tr>
<tr><td>Water inlet temperature (TWI) sensor</td></tr>
<tr><td>Water outlet (TWO) sensor</td></tr>
<tr><td>Hot water cylinder temperature (TTW) sensor</td></tr>
<tr><td>Floor inlet temperature (TFI) sensor</td></tr>
</table></td></tr>
</table>

## 9-6-2. Outdoor unit

<table>
<tr><th>No.</th><th>Component name</th><th>Check procedure</th></tr>
<tr><td>1</td><td>Compressor<br>Type<br>DA422A3F-26M<br>(P805, P1105HR-E)<br>DA422A3F-27M<br>(P805, P1105, P1405H8R-E)</td><td>Measure the resistance value of each winding with a tester.<br> 

P805, P1105HR-E
<table>
<tr><th>Location</th><th>Resistance value</th></tr>
<tr><td>Red ─ White</td><td>1.04-1.16 Ω</td></tr>
<tr><td>White ─ Black</td><td>1.04-1.16 Ω</td></tr>
<tr><td>Black ─ Red</td><td>1.04-1.16 Ω</td></tr>
</table>
At 20 °C<br>
P805 to 1405H8R-E
<table>
<tr><th>Location</th><th>Resistance value</th></tr>
<tr><td>Red ─ White</td><td>0.75-0.83 Ω</td></tr>
<tr><td>White ─ Black</td><td>0.75-0.83 Ω</td></tr>
<tr><td>Black ─ Red</td><td>0.75-0.83 Ω</td></tr>
</table>
At 20 °C</td></tr>
<tr><td>2</td><td>Outdoor fan motor<br>Type<br>ICF-280-A100-1</td><td>Measure the resistance value of each winding with a tester.<br> 

<table>
<tr><th>Location</th><th>Resistance value</th></tr>
<tr><td>Red ─ White</td><td rowspan="3">14.8 ± 1.5 Ω</td></tr>
<tr><td>White ─ Black</td></tr>
<tr><td>Black ─ Red</td></tr>
</table></td></tr>
<tr><td>3</td><td>4-way valve coil<br>Type<br>STF-H01AP1874A1<br>STF-H01AJ1736A1</td><td>Measure the resistance value.<br>P805, P1105HR-E<br>1617 Ω ± 113 Ω<br>P805 to P1405H8R-E<br>1725 Ω ± 172.5 Ω<br>  </td></tr>
<tr><td>4</td><td>2-way valve coil<br>Type<br>VPV-MOAJ510B0<br>TEV-SMOAJ2170AI</td><td>Measure the resistance value.<br>P805, P1105HR-E<br>1435 Ω ± 144 Ω<br>P805 to P1405H8R-E<br>2163Ω ± 151 Ω<br>  </td></tr>
<tr><td>5</td><td>Pulse motor valve coil<br>Type<br>UKV-A038</td><td> 

<table>
<tr><th>Location</th><th>Resistance value</th></tr>
<tr><td>Grey ─ Black, Red</td><td>43-49 Ω</td></tr>
<tr><td>Grey ─ Yellow, Orange</td><td>43-49 Ω</td></tr>
</table>
Condition 20 °C</td></tr>
<tr><td>6</td><td>Suction temperature (TS) sensor<br>Heat exchange temperature (TE) sensor<br>Outdoor temperature (TO) sensor</td><td>Remove the connector and measure the resistance value with a tester.<br>10-20 kΩ (Normal temperature)
<table>
<tr><th>Temperature / Sensor (kΩ)</th><th>0 °C</th><th>10 °C</th><th>20 °C</th><th>30 °C</th></tr>
<tr><td>Outdoor heat exchange temperature sensor (TE)</td><td rowspan="2">33.8</td><td rowspan="2">20.4</td><td rowspan="2">12.6</td><td rowspan="2">8.0</td></tr>
<tr><td>Suction temperature sensor (TS)</td></tr>
</table></td></tr>
</table>

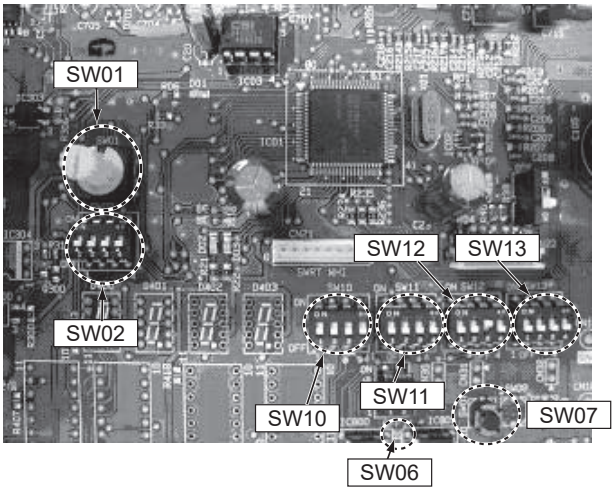
<table>
<tr><th>No.</th><th>Component name</th><th>Check procedure</th></tr>
<tr><td>7</td><td>Discharge temperature (TD) sensor</td><td>Remove the connector and measure the resistance value with a tester.
<table>
<tr><th>Temperature<br>Sensor (kΩ)</th><th>0 °C</th><th>10 °C</th><th>20 °C</th><th>30 °C</th></tr>
<tr><td>Discharge temperature sensor (TD)</td><td>161.3</td><td>99.0</td><td>62.4</td><td>40.2</td></tr>
</table></td></tr>
</table>

# 10 Hydro unit and outdoor unit settings

## Hydro unit

## 1. Hydro unit Setting

### 1-1. Setting switch names and positions




### 1-2. SW02 (System switching 1)

| SW02 | Switching details | Factory default | | Remarks |
|---|---|---|---|---|
| 02_1 | Boiler install position After 3WV heating side / Before 3WV | After 3WV, heating | OFF | Before 3 WV |
| 02_2 | OFF = SG Ready control de-activated<br>ON = SG Ready control activated | SG Ready control de-activated | OFF | |
| 02_3 | External cylinder thermostat connected. | No | OFF | |
| 02_4 | External room thermostat connected. | No | OFF | |

### 1-3. SW10 (Pump switching)

| SW10 | Switching details | Factory default | | Remarks |
|---|---|---|---|---|
| 10_1 | Pump P1 operation during hot water mode<br>OFF = P1 ON during heat pump activate<br>ON = P1 Continuous run | Heat-pump activate | OFF | |
| 10_2 | Pump P1 operation during room heating. P1 pump stop or not using outside air temperature.<br>OFF = Continuous run<br>ON = Pump P1 stop when TO>20 $^{o}$C (Available to change the temperature setting by FC 9E) | Continuous run | OFF | |
| 10_3 | Synchronization of Pump P1 and P2. | Non-synchronous | OFF | |
| 10_4 | Pump P1 ON/OFF cycling (During long periods of system OFF) | No | OFF | |

### 1-4. SW11 (Heater Yes/No switching)

| SW11 | Switching details | Factory default | | Remarks |
|---|---|---|---|---|
| 11_1 | Hydro unit backup heater Energized Yes/No | Energized | OFF | |
| 11_2 | Hot water cylinder heater Energized Yes/No | Energized | OFF | |
| 11_3 | External booster heater output Enabled Yes/No | Enabled | OFF | |
| 11_4 | – | – | OFF | |

### 1-5. SW12 (System switching 2)

| SW12 | Switching details | Factory default | | Remarks |
|---|---|---|---|---|
| 12_1 | Hot water supply is using | Yes | OFF | |
| 12_2 | ZONE1 operation is using | Yes | OFF | |
| 12_3 | ZONE2 operation is using | No | OFF | |
| 12_4 | – | – | OFF | |

### 1-6. SW13 (System switching 3)

| SW13 | Switching details | Factory default | | Remarks |
|---|---|---|---|---|
| 13_1 | 3WV SPST/SPSD Specification switching | SPST | OFF | |
| 13_2 | Boiler output enabled | No | OFF | |
| 13_3 | Auto Restart of power outage after system power failure. | Yes | OFF | |
| 13_4 | – | – | ON | |

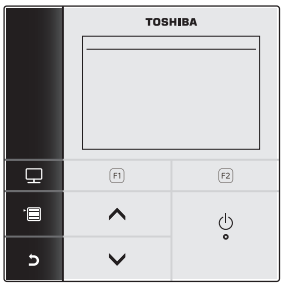
## 2. Function Code Setting

- Hydro unit function code setting is available only for the header remote controller.
- Set function codes for various operation modes with the remote controller.

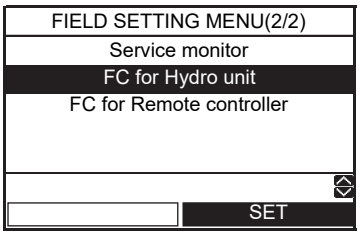
### 2-1. How to set hydro unit function code

**<Procedure> Perform the following when no operation is in progress.**

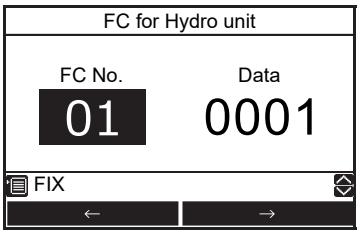
**1** **Press the [ ] button and the [ ] button at same time for 4 seconds or longer on the top screen to display the "FIELD SETTING MENU".**




**2** **Press the [ ] / [ ] button to select "FC for Hydro unit" on the FIELD SETTING MENU screen, then press the [ F2 ] button.**



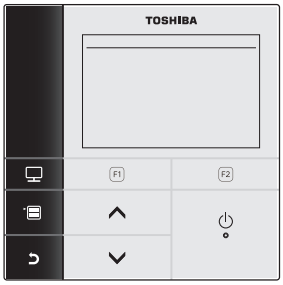

**3** **Press the [ F1 ] / [ F2 ] button to select FC number or Data, then press the [ ] / [ ] button to set the value.**



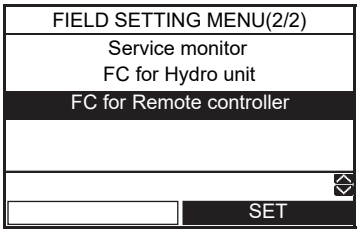

**4** **Press the [ ] button. The set value is registered.**

**2-2. How to set remote controller function code**
**<Procedure> Perform the following when no operation is in progress.**

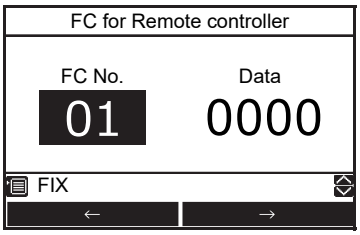
***1*** **Press the [ ] button and the [ ] button at same time for 4 seconds or longer on the top screen to display the "FIELD SETTING MENU".**




***2*** **Press the [ ] / [ ] button to select "FC for Remote controller" on the FIELD SETTING MENU screen, then press the [ F2 ] button.**




***3*** **Press the [ F1 ] / [ F2 ] button to select FC number or Data, then press the [ ] / [ ] button to set the value.**




***4*** **Press the [ ] button. The set value is registered.**

## Function code table

| FC | Item | Details | | | Factory default |
|---|---|---|---|---|---|
| 01 | Water heat exchanger capacity *1 | 0012: P805XWH**-E | | 0015: P1105XWH**-E | Depends on type |
| 02 | Cooling/Non-cooling switching | 0000: Cooling | | 0001: Not cooling | 0000: Cooling |
| 08 | Hot water boost operation time (operating time) | 0003: 30 min | - | 0018: 180 min | 0006: 60 min |
| 09 | Hot water boost set temperature | 0040: 40 °C | - | 0080: 80 °C | 0075: 75 °C |
| 0A | Anti bacteria set temperature | 0065: 65 °C | - | 0080: 80 °C | 0075: 75 °C |
| 0B | Anti bacteria holding time | 0000: 0 min | - | 0060: 60 min | 0030: 30 min |
| 0C | Mixing valve drive time | 0003: 30 sec | - | 0024: 240 sec | 0006: 60 sec |
| 0F | Hot water HP allowance while cooling + hot water supply | 0000: Not allow | - | 0001: Allow | 0000: Not allow |
| 18 | Upper limit of cooling set temperature | 0018: 18 °C | - | 0030: 30 °C | 0025: 25 °C |
| 19 | Lower limit of cooling set temperature | 0007: 7 °C | - | 0018: 20 °C | 0007: 7 °C |
| 1A | Upper limit of heating (ZONE1) set temperature | 0037: 37 °C | - | 0060: 60 °C | 0060: 60 °C |
| 1B | Lower limit of heating (ZONE1) set temperature | 0020: 20 °C | - | 0037: 37 °C | 0020: 20 °C |
| 1C | Upper limit of heating (ZONE2) set temperature | 0037: 37 °C | - | 0060: 60 °C | 0060: 60 °C |
| 1D | Lower limit of heating (ZONE2) set temperature | 0020: 20 °C | - | 0037: 37 °C | 0020: 20 °C |
| 1E | Upper limit of hot water set temperature | 0060: 60 °C | - | 0080: 80 °C | 0075: 75 °C |
| 1F | Lower limit of hot water set temperature | 0040: 40 °C | - | 0060: 60 °C | 0040: 40 °C |
| 20 | Hot water HP start temperature | 0020: 20 °C | - | 0045: 45 °C | 0038: 38 °C |
| 21 | Hot water HP stop temperature | 0040: 40 °C | - | 0050: 50 °C | 0045: 45 °C |
| 22 | Priority mode Hot water supply/Heating switching temperature | -0020: -20 °C | - | 0020: 20 °C | 0000: 0 °C |
| 23 | Boiler output enable switching temperature | -0020: -20 °C | - | 0020: 20 °C | -0010: -10 °C |
| 24 | Outside air temperature for hot water temperature compensation start | -0020: -20 °C | - | 0010: 10 °C | 0000: 0 °C |
| 25 | Hot water temperature compensation value | 0000: 0K | - | 0015: 15K | 0003: 3K |
| 26 | Night setback change temperature range | 0003: 3K | - | 0020: 20K | 0005: 5K |
| 27 | Set temperature shift with heating Auto | -0005: -5K | - | 0005: 5K | 0000: 0K |
| 29 | Outside air temperature T1 temperature | -0015: -15 °C | - | 0000: 0 °C | -0010: -10 °C |
| 2B | Outside air temperature T3 temperature | 0000: 0 °C | - | 0015: 15 °C | 0010: 10 °C |
| 2C | Set temperature A with outside air temperature of T0 | 0020: 20 °C | - | 0060: 60 °C | 0040: 40 °C |
| 2D | Set temperature B with outside air temperature of T1 | 0020: 20 °C | - | 0060: 60 °C | 0035: 35 °C |
| 2E | Set temperature C with outside air temperature of 0 °C | 0020: 20 °C | - | 0060: 60 °C | 0030: 30 °C |
| 2F | Set temperature D with outside air temperature of T3 | 0020: 20 °C | - | 0060: 60 °C | 0025: 25 °C |
| 30 | Set temperature E with outside air temperature of 20 °C | 0020: 20 °C | - | 0060: 60 °C | 0020: 20 °C |
| 31 | Zone2 ratio with Zone1 as Auto | 0000: 0% | - | 0100: 100% | 0080: 80% |
| 33 | Hydro unit backup heater down time | 0000: 5 min<br>0002: 15 min | | 0001: 10 min<br>0003: 20 min | 0001: 10 min |
| 34 | Hydro unit backup heater up time | 0000: 10 min<br>0002: 30 min | | 0001: 20 min<br>0003: 40 min | 0000: 10 min |
| 3A | Frost protection function Invalid/Valid | 0000: Invalid | | 0001: Valid | 0001: Valid |
| 3B | Frost protection set temperature | 0008: 8 °C | - | 0020: 20 °C | 0015: 15 °C |
| 3C | 2-way valve operation (logical reverse) control | 0000: Energised during cooling<br>0001: Not energised during cooling | | | 0000: Activate during cooling |
| 3E | Heating HP/Boiler priority switching when using boiler | 0000: Priority on HP | | 0001: Priority on boiler | 0000: Priority on HP |
| 40 | Activate/deactivate room temperature control | 0000: Deactivate | | 0001: Activate | 0000: Deactivate |

*1 FC_01 is needed for PCB replacement or function code reset procedure has been completed.
*2 System restart with remote controller.
*3 Restart in the mode when stopping.
*4 In addition, it is enable only when switch 2-3 is set to “OFF” and FC61 is set to “3”.

| FC | Item | Details | Factory default |
|---|---|---|---|
| 52 | External input contact logic (must be used in with FC61) | 0000: CLOSE to stop system *2<br>0001: OPEN to stop system *2<br>0002: OPEN to stop system, CLOSE to restart system (Statics input)<br>0003: CLOSE to stop system, CLOSE again to restart system (plus input) | 0000:CLOSE to stop |
| 54 | Logic of 3-way valve's action when powered (Single return only) | 0000: Not reversed (Hot water mode when powered)<br>0001: Reversed (Heating when powered) | 0000: Not reversed (Hot water mode when powered) |
| 58 | Night setback is activated | 0000: Zone 1 & 2<br>0001: Zone 1 only | 0000: Zone1 & 2 |
| 59 | Interval of Mixing Valve control | 0001: 1 minute - 0030: 30 minutes | 0004: 4 minutes |
| 5A | P1 setting while in hot water supply mode | 0000: While running HP only<br>0001: P1 continues running | 0000: While running HP only |
| 5B | Boiler running setting | 0000: Boiler and HP<br>0001: Boiler only with pump running<br>0002: Heater<br>0003: Boiler only (Pump stopping) | 0003: Boiler only |
| 61 | Changing the target of stopping/starting by external signal or changing the TEMPO setting | 0000: Hot water supply and heating<br>0001: Keeping initial status *3<br>0002: Hot water supply only<br>0003: Heating only<br>0004: TEMPO1 (Not activate the heaters)<br>0005: TEMPO2 (Not activate the heaters, inlet pump, heat pump)<br>0006: SG Ready control ; without heater | 0000: Hot water supply and heating |
| 62 | Activate/deactivate A02 error detection | 0000: Activate<br>0001: Deactivate | 0000: Activate |
| 64 | Continuously run or stop the P2 pump while cooling | 0000: Continuously run P2<br>0001: Stop P2 | 0000: Continuous running |
| 65 | P1 pump setting when the thermostat is deactivated in the room temperature remote controller and room temperature thermostat settings | 0000: Continuously run P1<br>0001: Stop P1 when the thermostat is OFF | 0000: Continuous running |
| 67 | Changing the condition of optional output (For the optional PC board connected to CN209) | 0000: 1-3 During defrosting<br>2-3 While compressor is running.<br>0001: 1-3 As error is detected<br>2-3 During operation | 0000: 1-3 During defrosting<br>2-3 While compressor is running. |
| 6E | To diff temperature, when pump P1 stop at to 20 °C | 0001: 1K 0005: 5K | 0002: 2K |
| 73 | Hot water tank heater start time of heat-pump while operating | 0000: 30 min passed 0003: 120 min passed | 0000: 30 min passed |
| 92 | Upper room temperature limit when cooling | 0000: 0 °C - 0055: 55 °C | 0029: 29 °C |
| 93 | Lower room temperature limit when cooling | 0000: 0 °C - 0055: 55 °C | 0018: 18 °C |
| 94 | Upper room temperature limit when heating | 0000: 0 °C - 0055: 55 °C | 0029: 29 °C |
| 95 | Lower room temperature limit when heating | 0000: 0 °C - 0055: 55 °C | 0018: 18 °C |
| 96 | Initial water temperature setting when controlling cooling by the room temperature remote controller and room temperature thermostat | 0005: 5 °C - 0030: 30 °C | 0020: 20 °C |
| 9D | Initial water temperature setting when controlling heating by the room temperature remote controller and room temperature thermostat | 0020: 20 °C - 0060: 60 °C | 0040: 40 °C |
| 9E | TO temperature setting to stop the P1 pump during the middle period heating | 0010: 10 °C - 0030: 30 °C | 0020: 20 °C |
| A0 | P1 pump speed control changes the percentage duty of the PWM control | 0000: 100% 0005: 50% | 0000: 100% |
| A1 | Outside air temperature T0 temperature | -0030: -30 °C - -0020: -20 °C | -0020: -20 °C |
| A2 | Zone2 temperature setting method | 0000: Percentage (FC31)<br>0001: Fixed value (FCA3~ A5) | 0000: Percentage |
| A3 | Set temperature A' with outside temperature of T0 | 0020: 20 °C - 0060: 60 °C | 0040: 40 °C |
| A4 | Set temperature B' with outside temperature of T1 | 0020: 20 °C - 0060: 60 °C | 0035: 35 °C |

*1 FC_01 is needed for PCB replacement or function code reset procedure has been completed.
*2 System restart with remote controller.
*3 Restart in the mode when stopping.
*4 In addition, it is enable only when switch 2-3 is set to "OFF" and FC61 is set to "3".

| FC | Item | Details | Factory default |
|---|---|---|---|
| A5 | Set temperature E' with outside temperature of 20 °C | 0020: 20 °C - 0060: 60 °C | 0020: 20 °C |
| B2 | HP restart water temperature in A zone. (Valid only room temp control using 2nd remote controller) | 0020: 20 °C 0037: 37 °C | 0025: 25 °C |
| B5 | Initial water temperature setting method when controlling heating by the room temperature remote controller and room temperature thermostat | 0000: The fixed temperature by FC9D<br>0001: The calculated temperature by Auto curve | 0000: The fixed |
| B6 | Changing the target of stopping / starting by external signal (CN210 - terminal 2 and 3) | 0000: none (Local hot water tank thermostat)<br>0001: Hot water supply control *4<br>0002: Heating/Cooling mode selection<br>In addition, it is enabled only when swich 2_3 is set to “OFF” and FC61 is set to“3” | 0000: none |
| B8 | Forcibly heater off at T0 ≥ A °C | 0000: no restriction, 0001: 20 °C<br>0002: 15 °C, ⋯, 0006: -5 °C | 0000: no restriction |
| B9 | Backup heater energization temperature during defrosting. | Correction coefficient B<br>0000: 0K, ⋯, 0004: 40K | 0000: 0K |
| BA | Intermittent operation at T0 ≥ A °C<br>(heating mode) | 0000: continuous operation<br>0001: 20 °C, ⋯, 0006: -5 °C | 0000: continuous operation |
| BB | Intermittent operation at T0 < B °C<br>(cooling mode) | 0000: continuous operation<br>0001: 35 °C, ⋯, 0003: 25 °C | 0000: continuous operation |
| BC | Pump off time during thermostat off operation | 0000: 5 min, ⋯, 0005: 30 min | 0001: 10 min |
| AB | Group control | 0000: TTW value of each Hydro Unit<br>0001: TTW value transmitted from Master Unit | 0000: each Hydro Unit |
| AC | The temperature increase during<br>“Forced ON” mode (SG Ready control) | 0-10(0K - 10K) | 0000: 0K |

*1 FC_01 is needed for PCB replacement or function code reset procedure has been completed.
*2 System restart with remote controller.
*3 Restart in the mode when stopping.
*4 In addition, it is enable only when switch 2-3 is set to “OFF” and FC61 is set to “3”.

## Remote controller function code table

| FC | Item | Details | Fist shipment |
|---|---|---|---|
| 02 | Temperature correction by the room temperature sensor (heating) | -10K~+10K: By 1K steps | -1: -1K correction |
| 03 | Temperature correction by the room temperature sensor (cooling) | -10K~+10K: By 1K steps | -1: -1K correction |
| 05 | 24H/12H display switching | 0: 24H display 1: 12H (AM/PM) display | 0: 24H display |
| 09 | Night time low-noise mode | 0: Invalid 1: Valid | 0: Invalid |
| 0A | Night time low-noise start time | 0 - 23 (0:00 to 23:00) | 22: 22:00 |
| 0B | Night time low-noise end time | 0 - 23 (0:00 to 23:00) | 06: 06:00 |
| 0C | Anti bacteria start time | 0 - 23 (0:00 to 23:00) | 22: 22:00 |
| 0D | Anti bacteria start cycle | 1 - 10 (Every day to 10-day cycle) | 07: 7-day cycle |
| 0E | Starting time of Night setback | 0 - 23 (0:00 to 23:00) | 22: 22:00 |
| 0F | Ending time of Night setback | 0 - 23 (0:00 to 23:00) | 06: 06:00 |
| 11 | Remote controller Alarm Tone. | 0: Alarm Tone OFF 1: Alarm Tone ON | 1: Alarm Tone ON |
| 12 | Frost running period (days) | (0 days – 20 days) | 00: No setting |
| 13 | Frost running period (hours) | (0 hours – 23 hours) | 00: No setting |
| 14 | Start and End temperature | 20 - 55 (20 °C - 55 °C) | 00: No setting |
| 15 | Max temperature | 20 - 55 (20 °C - 55 °C) | 00: No setting |
| 16 | Continuation days for every step up to Max temperature | 1 - 7 (1 day - 7 days) | 00: No setting |
| 17 | Temperature difference for every step up to Max temperature | 1 - 10 (1 K - 10 K) | 00: No setting |
| 18 | Continuation days for every step down to End temperature | 1 - 7 (1 day - 7 days) | 00: No setting |
| 19 | Temperature difference for every step down to End temperature | 1 - 10 (1 K - 10 K) | 00: No setting |
| 1A | Continuation days in Max temperature | 1 - 30 (1 day - 30 days) | 00: No setting |

*14~1A: for floor drying function

## 2-3. How to reset hydro function code

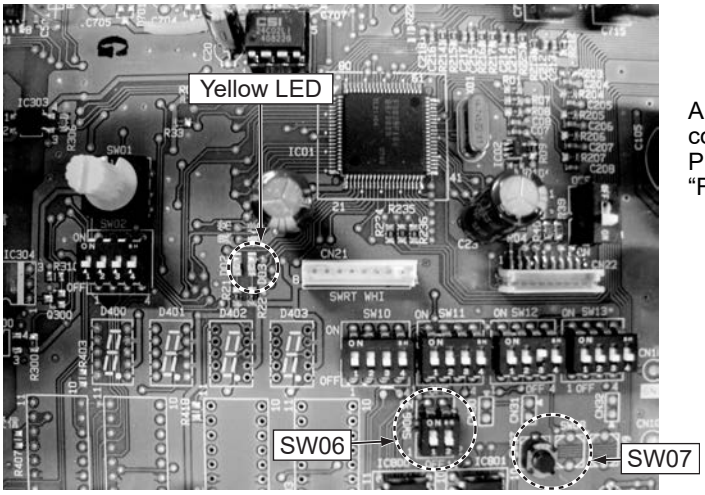
**If the hydro unit PCB has been replaced, it is necessary to change the FC 01 (capacity setting)**

**(1) Preparation**

1) Turn all off the Hot water supply operation and Heating/Cooling operation.
2) Turn off the power supply of the hydro unit and the outdoor unit.
3) Remove the front panel of the hydro unit and cover to the hydro unit electrical box.
4) Set SW06_1 and _2 "ON".

**(2) Procedure**

1) Turn on the power supply of the hydro unit and the outdoor unit.
   - The small yellow LED located near the MCU should be flashing slowly.
2) Press tactile switch SW07 until the yellow LED turns off.
   - When the tactile switch SW07 has been press for 5 sec, flashing becomes quickly. And when the switch will be pressed further 5 sec, the yellow LED will turn off.
     When the SW07 is released, the yellow LED start to flash quickly again.
3) Turn off the power supply of the hydro unit and the outdoor unit.
4) Set SW06_1 and _2 to "OFF".
5) Replace the electrical box cover and front panel on the hydro unit.




And you can reset hydro function code on remote controller.
Press the [ ∧ ] [ ∨ ] [ ↩ ] long time in "FC for Hydro unit" display, and select "YES".

## 2-4. How to reset remote controller function code

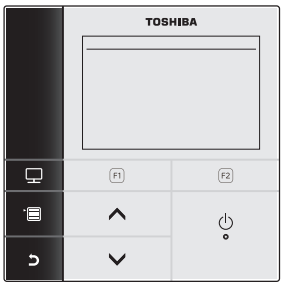
You can reset remote controller function code on remote controller.
Press the [ ∧ ] [ ∨ ] [ ↩ ] long time in "FC for remote controller" display, and select "YES".

## 3. Test run

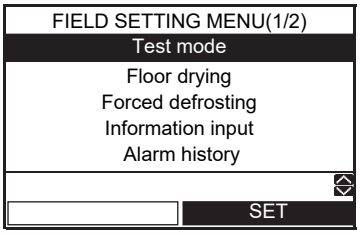
- Even if the outside air temperature or water temperature is outside the setting value range, Heating, Cooling and Hot water supply operation become possible.
- Since the protection setting is disabled in the TEST mode, do not continue a test run longer than 10 minutes.

**<Procedure>**

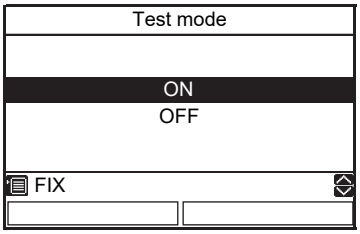
**1** **Press the [ ] button and the [ ] button at same time for 4 seconds or longer on the top screen to display the "FIELD SETTING MENU".**



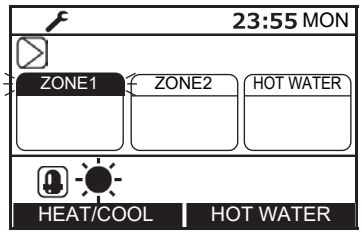

**2** **Press the [ ] / [ ] button to select "Test mode" on the FIELD SETTING MENU screen, then press the [ F2 ] button.**




**3** **Press the [ ] button to select ON, then press the [ ] button. The mark appears on the top screen.**




**4** **Start the heating or cooling or Hot water operation on the top screen, then the selected mode mark is blinking during Test mode.**



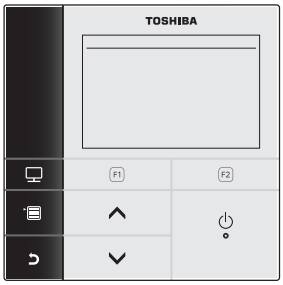

- The pump is activated in 30 seconds. If air is not released completely, the flow rate switch is activated to stop operation. Release air again according to the piping procedure. Little air entrainment is discharged from the purge valve.
- Check that the hydraulic pressure has become the predetermined pressure 0.1 to 0.2 MPa (1 to 2 bar). If the hydraulic pressure is insufficient, replenish water.
- Heating operation starts. Check that the hydro unit starts heating.
- Press the [ F1 ] button to select the Cooling operation, in a few second, the operation starts.
- Check that the hydro unit starts cooling and that the floor heating system is not cooled.
- Press the [ F1 ] button to stop the operation.
- Press the [ F2 ] button to start the Hot water supply operation.
- Check that there is no air entrainment.
- Check that hot water is present at the connection port of the hot water cylinder.
- Press the [ F2 ] button or [ ON/OFF] button to stop the operation.

## 4. Auto Curve Setting

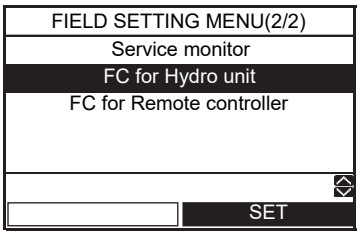
- This function is available only for the header remote controller.
- Set function codes for various operation modes with the remote controller.

**<Procedure> Perform the following when no operation is in progress.**

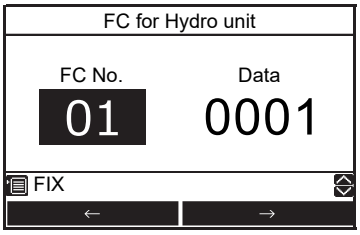
***1*** **Press the [ ] button and the [ ] button at same time for 4 seconds or longer on the top screen to display the "FIELD SETTING MENU".**




***2*** **Press the [ ] / [ ] button to select "FC for Hydro unit" on the FIELD SETTING MENU screen, then press the [ F2 ] button.**



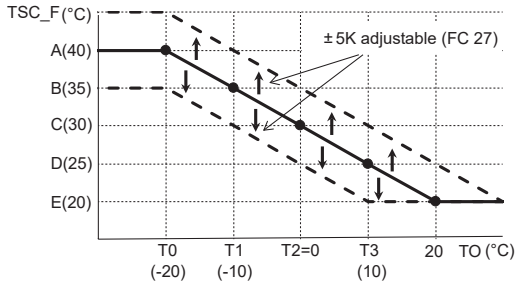

***3*** **Press the [ F1 ] / [ F2 ] button to select FC number or Data, then press the [ ] / [ ] button to set the value.**




***4*** **Press the [ ] button. The set value is registered.**

<ZONE1>

- An operation starts at the set temperature of straight -line approximation for the following: water temperature A °C with the outside temperature T0 °C, B °C with T1 °C, C °C with T2 °C, D °C with T3 °C, and E °C with 20 °C.




Related FC

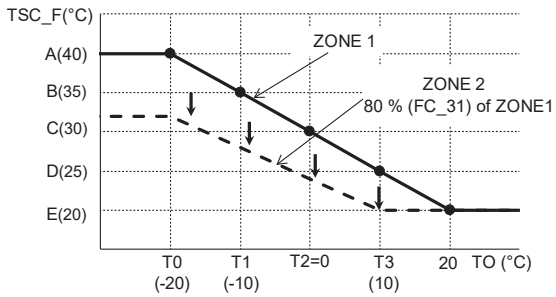
| FC No. | Setting item | Default | range |
|---|---|---|---|
| 2C | Setting temperature A at T0 | 40 | 20~60 °C |
| 2D | Setting temperature B at T1 | 35 | 20~60 °C |
| 2E | Setting temperature C at T2(= 0 °C) | 30 | 20~60 °C |
| 2F | Setting temperature D at T3 | 25 | 20~60 °C |
| 30 | Setting temperature E at 20 °C | 20 | 20~60 °C |
| A1 | Outside temperature T0 | -20 | -30~-20 °C |
| 29 | Outside temperature T1 | -10 | -15~0 °C |
| 2B | Outside temperature T3 | 10 | 0~15 °C |
| 27 | Set temperature shift with heating set to auto | 0 | -5 to 5K |

<ZONE2>

- Set temperature of the ZONE2 can be selected from two methods (FC_A2). One is a percentage of ZONE1, the other is a fixed value.

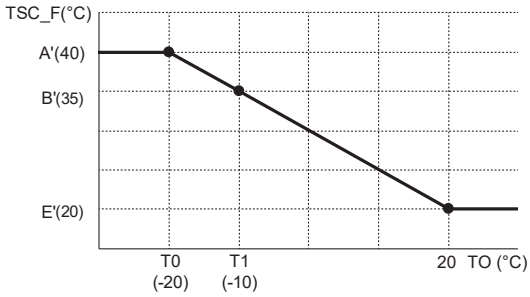
FC_A2 = "0" : Percentage method that is set by FC_31.
FC_A2 = "1" : Fixed value method that is set by FC_A3, A4 and A5.
However, it is automatically controlled the set temperature of ZONE1 to be the ZONE2 or more.

FC_A2=0 Percentage method




Auto-Curve in ZONE2 shows 80% (FC) of that of ZONE1, the water temperature setting does not fall below 20 °C.

FC_A2=1 Fixed value method




The ZONE2 set temperature A' °C with the outside temperature T0 °C, B' °C with T1 °C, E' °C with 20 °C.

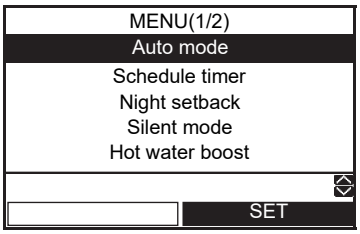
Related FC

| FC No. | Setting item | Default | range |
|---|---|---|---|
| A2 | The choice of how to set ZONE2 | 0 | 0 or 1 |
| A3 | Setting temperature A' at T0 | 40 | 20~60 °C |
| A4 | Setting temperature B' at T1 | 35 | 20~60 °C |
| A5 | Setting temperature E' at 20 °C | 20 | 20~60 °C |
| 31 | Auto-Curve ratio of ZONE2 | 80 | 0~100% |

**Auto-Curve temperature shift**

- This function is available only for the header remote controller.
- The set temperature can be shifted in the range of ±5K of the current setting.

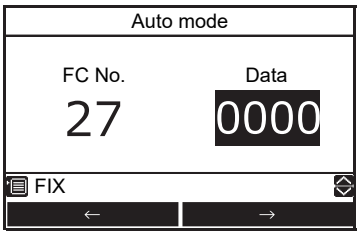
***1*** **Press the [ ∧ ] / [ ∨ ] button to select "Auto mode" on the MENU screen.**




***2*** **Press the [ F1 ] button for 4 seconds or longer to enter the setting mode. The function code setting screen appears.**
**FC No. 27: Shifted temperature (Range: -5 ~ +5, Default: 0)**

***3*** **Press the [ F2 ] button to select Data value, then press the [ ∧ ] / [ ∨ ] button to adjust the temperature between -5K to +5 K.**

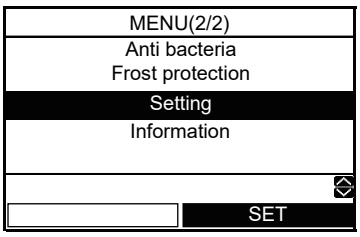
***4*** **Press the [ ▤ ] button. The set temperature is registered.**



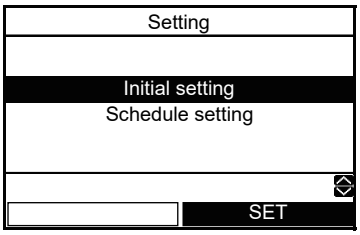
## 5. Clock Setting

- Setting for the clock (date, month, year, time)

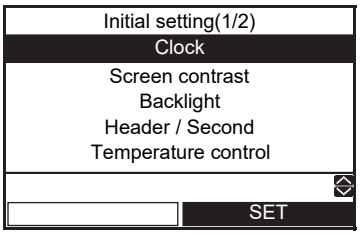
**1** **Press the [ ∧ ] / [ ∨ ] button to select “Setting” on the MENU screen, then press the [ F2 ] button.**




**2** **Press the [ ∧ ] / [ ∨ ] button to select “Initial setting” on the Setting screen, then press the [ F2 ] button.**



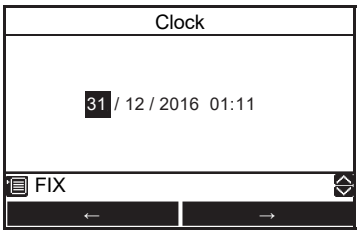

**3** **Press the [ ∧ ] / [ ∨ ] button to select “Clock” on the Initial setting screen, then press the [ F2 ] button.**




**4** **Press the [ F1 ] / [ F2 ] button to select the date, month, year, and, time.**

**5** **Press the [ ∧ ] / [ ∨ ] button to set the value, then press the [ ▤ ] button.**

- The clock display appears on the top screen.
- The clock display blinks if the clock setting has been reset due to power failure or other cause.



## 6. Scheduled Operation Setting

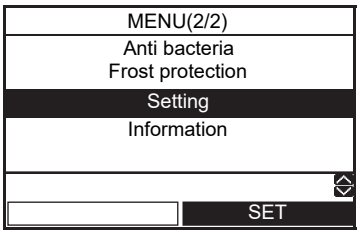
### 6-1. How to set scheduled operation

- This function is available only for the header remote controller.
- Schedule setting makes the following modes to be flexibly set: hot water supply, heating, cooling, hot water supply and heating, hot water supply and cooling, and stop, and set temperature.
- Set the unit clock and the schedule condition setting before schedule timer setting.

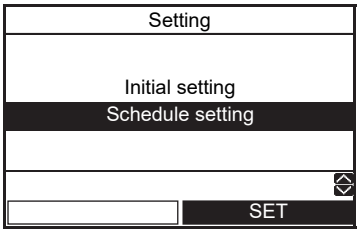
**<Preparation>**

Set the remote controller time at first.

**1 Press the [ ∧ ] / [ ∨ ] button to select "Setting" on the MENU screen, then press the [ F2 ] button.**



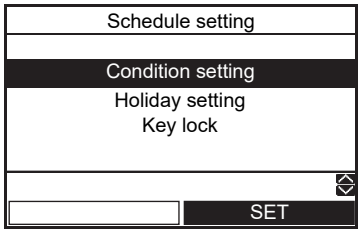

**2 Press the [ ∧ ] / [ ∨ ] button to select "Schedule setting" on the setting screen, then press the [ F2 ] button.**



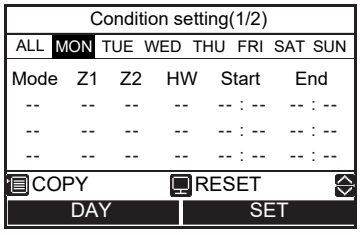

**Condition setting**

- Up to 6 different running patterns per day can be programmed.

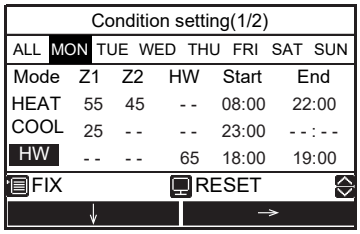
**1 Press the [ ∧ ] / [ ∨ ] button to select "Condition setting" on the Schedule setting screen, then press the [ F2 ] button.**



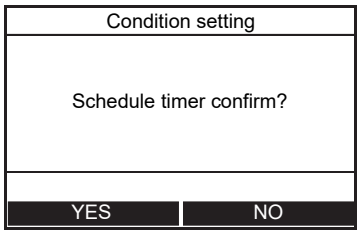

**2 Press the [ F1 ] button to select the day, then press the [ F2 ] button to input running pattern.**




**3 Press [ F1 ] / [ F2 ] button to select the change item, then press the [ ∧ ] / [ ∨ ] button.**



**4** **Press the [ ] button.**




**5** **Press the [ F1 ] button to Fix.**

Mode :Operation mode (HEAT, COOL, HW (Hot water))
Z1 :ZONE1 setting temperature
Z2 :ZONE2 setting temperature
HW :Hot water supply operation setting temperature
Start :Operation start time (0:00 ~ 23:59)
End :Operation end time (0:00 ~ 24:00, -- : --)

- “-- : --” means the operation continues.

If End time is set earlier than Start time, an error is displayed.

**To set up ranging over a day**

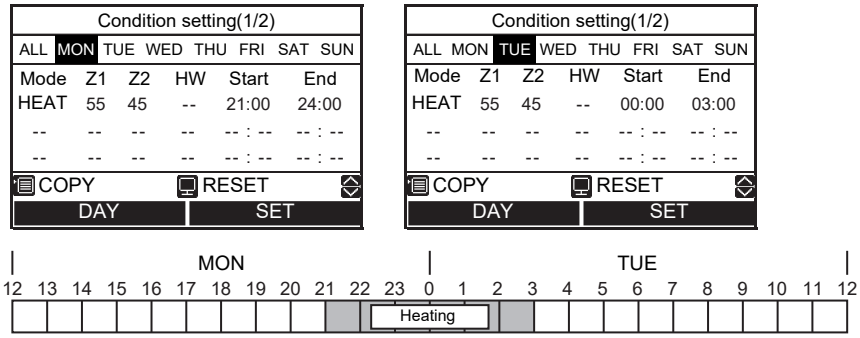
There are two methods.

①If “24:00” is set to “END” and “00:00” is set to “START” next day, the previous operation status will be continued. And set the time you want to stop to “END”.

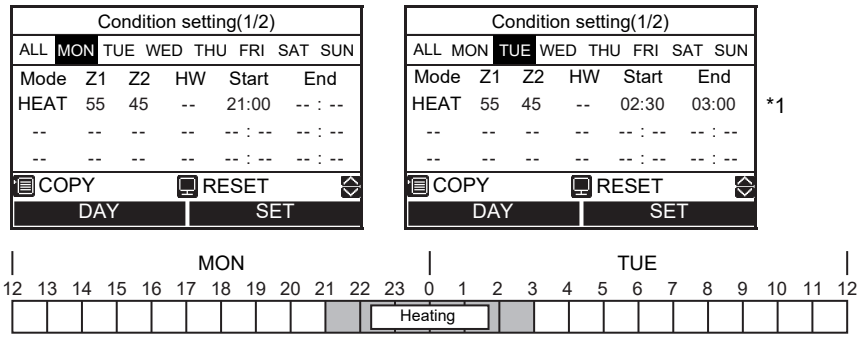
②If “--” is set to “END”, the previous operation status will be continued next day. And set the time you want to stop to “END”. Any “START” time is sufficient if it is earlier than “END” time.

In the case of heating operation from 21:00 of Monday night to 3:00 of Tuesday morning.

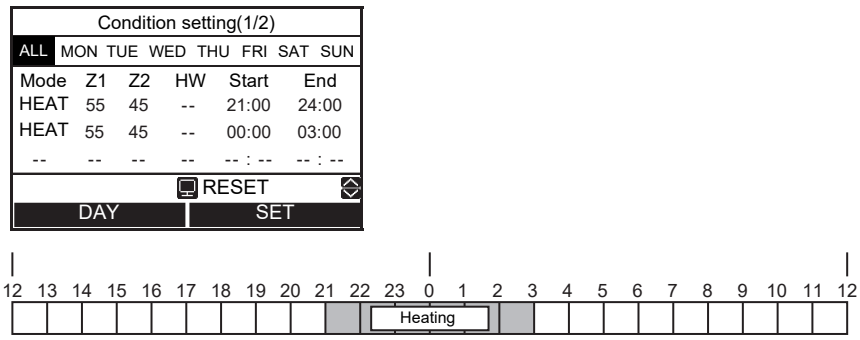
Example of set up (1)



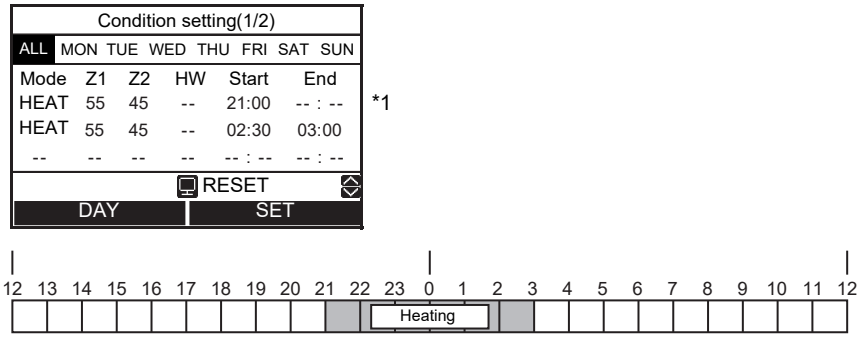

Example of set up (2)




Example of set up (3) (ALL DAY)



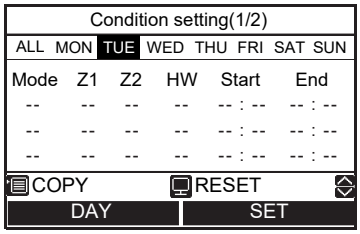

Example of set up (4) (ALL DAY)



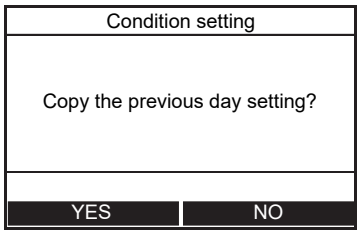

*1: “START” time is permissible 00:00 ~ 02:59 in this example.

**To copy the settings of the previous day**

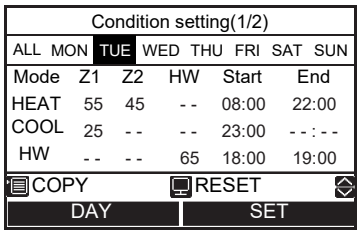
**1** **Press the [ F1 ] button to select the day, then press the [ ▤ ] button to copy the settings of the previous day.**




**2** **Press the [ F1 ] button, then the contents of the setting is displayed.**



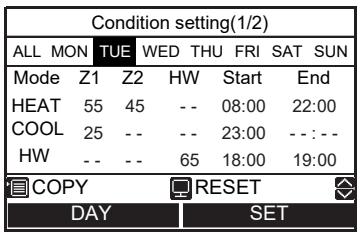

↓



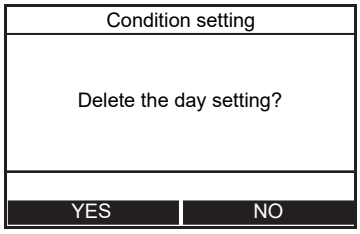

- If the [ ▤ ] button is pressed in the state where “MON” is selected, the contents of the setting of “SUN” is copied.

**To reset the settings for each day.**

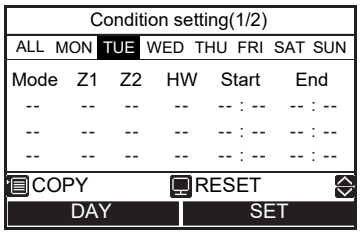
**1** **Press the [ F1 ] button to select the day, then press the [ ▭ ] button to reset the settings of the day.**




**2** **Press the [ F1 ] button, then the contents of the setting is cleared.**



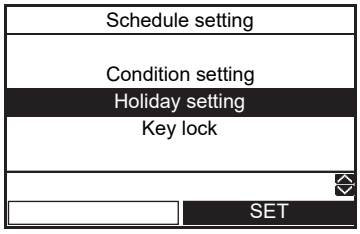

↓



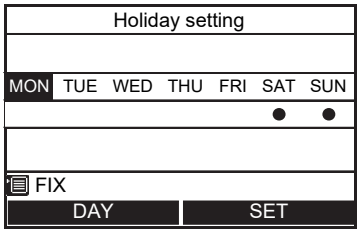
**Holiday setting**

- Set the days of the week when the schedule timer not used.

**1** **Press the [ ∧ ] / [ ∨ ] button to select "Holiday setting" on the Schedule setting screen, then press the [ F2 ] button.**




**2** **Press the [ F1 ] button to select the day, then press the [ F2 ] button to set.**
**●: Schedule timer is not used.**



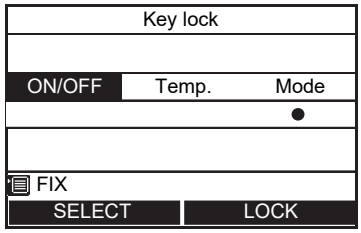

**3** **Press the [ ▤ ] button to Fix.**

**Key lock**

- Select whether to LOCK / UNLOCK [ON/OFF], [Temperature], [mode] during schedule timer.

**1** **Press the [ ∧ ] / [ ∨ ] button to select "Key lock" on the Schedule setting screen, then press the [ F2 ] button.**

**2** **Press the [ F1 ] button to select object, then press the [ F2 ] button to select LOCK or UNLOCK.**
**●: LOCK**

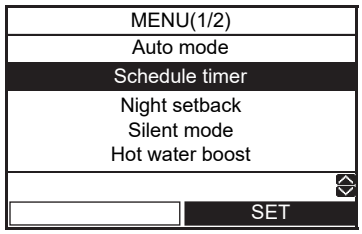



**3** **Press the [ ▤ ] button to Fix.**

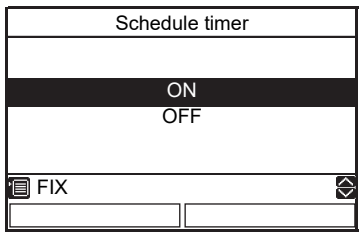
- When "LOCK" is selected, the key cannot be used during Key lock and schedule timer.
- The factory default is "UNLOCK".

**To enable the Schedule timer function**

**1** **Press the [ ∧ ] / [ ∨ ] button to select "Schedule timer" on the MENU screen, then press the [ F2 ] button.**



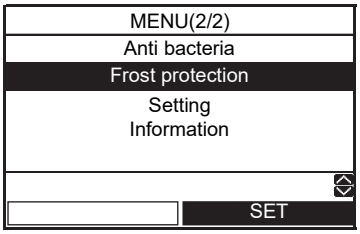

**2** **Press the [ ∧ ] button to select "ON" on the Schedule timer screen, then press the [ ▤ ] button. The ◷ mark appears on the top screen.**



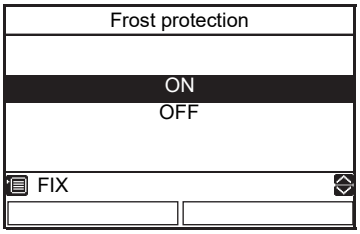
## 7. Frost protection Setting

- This function performs operation with the minimum capacity (target water temperature:15°C) to prevent pipes from freezing in case the unit is not used for a long period due to absence.
- Cancel schedule timer to start Frost protection operation. When Frost protection is operated with schedule timer on, it may stop during its operation.
- The minimum capacity can be changed, ask the installation company to make the required changes to the settings.
- This function takes precedence over the Night setback operation that is set separately.
- Start the heating operation before making the setting.
  It may not be able to go to the setting screen immediately after start. In that case, select “Frost protection” again after tens of seconds.

**1 Press the [ ∧ ] / [ ∨ ] button to select “Frost protection” on the MENU screen, then press the [ F2 ] button.**

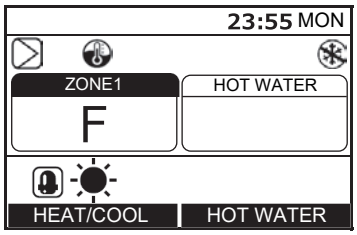



**2 Press the [ ∧ ] button to select “ON” on the Frost protection screen, then press the [ ▤ ] button.**




**3 The temperature indication change to “F” and ❄ mark appears on the top screen.**

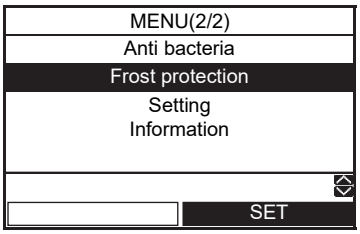
- When the set period has passed, the Frost protection operation ends automatically.



**<How to set Frost protection operation end time>**

- This function is available only for the header remote controller.

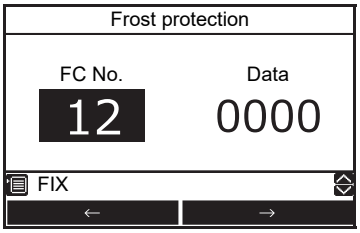
***1*** **Press the [ ∧ ] / [ ∨ ] button to select "Frost protection" on the MENU screen.**




***2*** **Press the [ F1 ] button for 4 seconds or longer to enter the setting mode. The function code setting screen appears.**
**FC No. 12: End days (Range: 0~20, Default: 0)**
**13: End times (Range: 0~23, Default: 0)**
**ex)**
**Code No. 12: 05**
**13: 13 = 5 days 13 hours**

***3*** **Press the [ F1 ] / [ F2 ] button to select FC number or Data, then press the [ ∧ ] / [ ∨ ] button to set the value.**

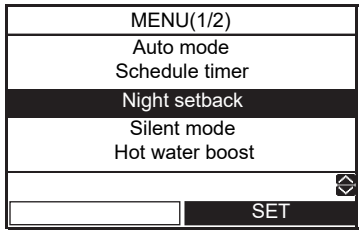
***4*** **Press the [ ▤ ] button. The set value is registered.**



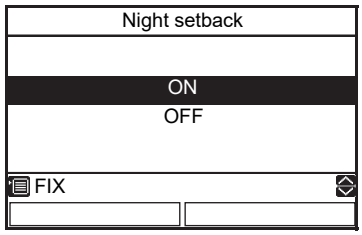
## 8. NIGHT Operation Setting

- This function is used for energy saving during specified time zone (sleeping hours, etc.).
- For night time hours (sleeping hours, etc.), this function shifts the set temperature of heating or cooling by 5K.

**1** **Press the [ ∧ ] / [ ∨ ] button to select an "Night setback" on the MENU screen, then press the [ F2 ] button.**




**2** **Press the [ ∧ ] button to select "ON" on the Night setback screen, then press the [ ▤ ] button.**

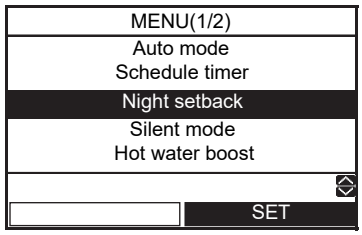



**3** **Start the heating or cooling operation, then the mark appears on the top screen.**

**<How to set NIGHT operation start and end time>**

- This function is available only for the header remote controller.

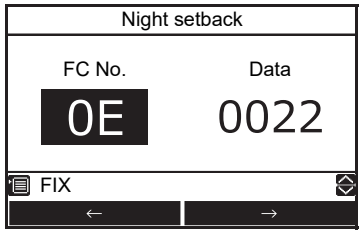
**1** **Press the [ ∧ ] / [ ∨ ] button to select an "Night setback" on the MENU screen.**




**2** **Press the [ F1 ] button for 4 seconds or longer to enter the setting mode. The function code setting screen appears.**
**FC No. 0E: Start time (Range: 0~23, Default: 22)**
**0F: End time (Range: 0~23, Default: 06)**

**3** **Press the [ F1 ] / [ F2 ] button to select FC number or Data, then press the [ ∧ ] / [ ∨ ] button to set the value.**
**The same value cannot be set to 0E and 0F.**

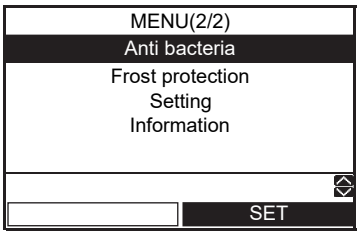
**4** **Press the [ ▤ ] button. The set time is registered.**



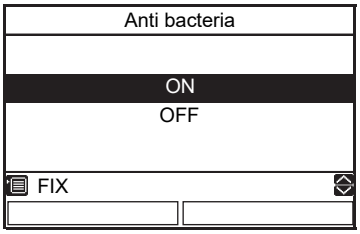
## 9. Anti bacteria Setting

- This setting regularly raises the hot water cylinder temperature to prevent bacteria from growing.
- The Anti bacteria operation is performed to maintain the temperature (75°C) for the period (30 minutes) when the preset start time (22:00) comes according to the preset cycle (7 days).
- The maintain temperature and the period can be changed, ask the installation company to make the required changes to the settings.

**1** **Press the [ ∧ ] / [ ∨ ] button to select "Anti bacteria" on the MENU screen, then press the [ F2 ] button.**




**2** **Press the [ ∧ ] button to select "ON" on the Anti bacteria screen, then press the [ ▤ ] button.**




**3** **Start the hot water operation, then the ⊛ mark appears on the top screen.**

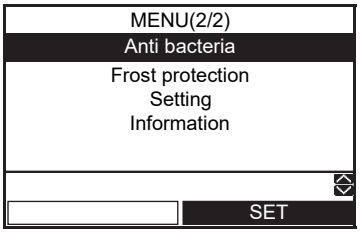
**<How to set Anti bacteria temperature and holding time>**

In FC_0A or 0B, the set temperature and holding time can be changed.
FC_0A: Set temperature change range 70 to 80 °C (75 °C: default)
FC_0B: Holding time change range 0 to 60 minutes (30 minutes: default)

**<How to set Anti bacteria start time and cycle>**

- This function is available only for the header remote controller.

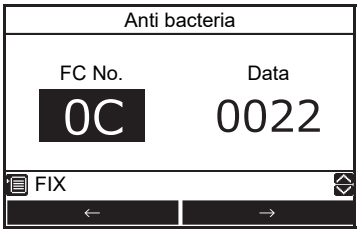
**1** **Press the [ ∧ ] / [ ∨ ] button to select "Anti bacteria" on the MENU screen.**




**2** **Press the [ F1 ] button for 4 seconds or longer to enter the setting mode. The function code setting screen appears.**
**FC No. 0C: Start time (Range: 0~23, Default: 22)**
**0D: cycle (Range: 0~10, Default: 07)**

**3** **Press the [ F1 ] / [ F2 ] button to select FC number or Data, then press the [ ∧ ] / [ ∨ ] button to set the value.**

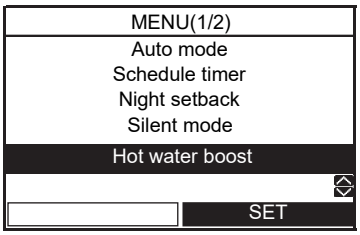
**4** **Press the [ ▤ ] button. The set value is registered.**



## 10. Hot water boost Setting

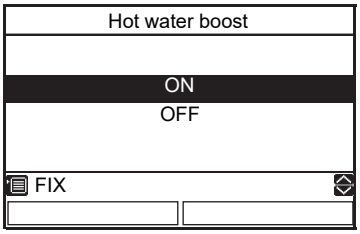
- This function is used when temporarily giving priority to the hot water supply operation. The hot water supply operation is performed in preference to other operations with a target of the preset time (60 minutes) or the preset temperature (75°C). Use this function when hot water is not used for a long time or before using a large amount of hot water.
- The preset time and temperature settings can be changed to values with in a range of 30 to 180 minutes and 40 to 80°C. Ask the installation company to make the required changes to the settings.
- Start the hot water operation before making the setting.
  It may not be able to go to the setting screen immediately after start. In that case, select “Hot water boost” again after tens of seconds.

**1 Press the [ ∧ ] / [ ∨ ] button to select “Hot water boost” on the MENU screen, then press the [ F2 ] button.**




**2 Press the [ ∧ ] button to select “ON” on the Hot water boost screen, then press the [ ▤ ] button. The ♨ mark appears on the top screen.**

- When the set time period has passed or the water temperature has reached the set temperature, the Hot water boost operation ends automatically.




Hot water boost operation with the heat pump and heater ends when the water temperature reaches 75 °C; however, the normal hot water supply operation automatically starts after 60 minutes even if the temperature is not as high as 75 °C.

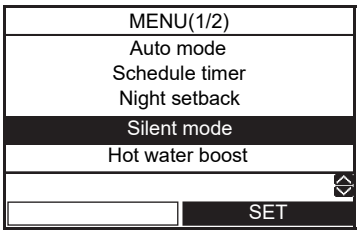
**<How to set Hot water boost operation time and temperature>**

In FC_08 or 09, the operation time and set temperature can be changed.
FC_08: Operation time change range 30 to 120 minutes (60 minutes: default)
FC_09: Set temperature change range 40 to 80 °C (75 °C: default)

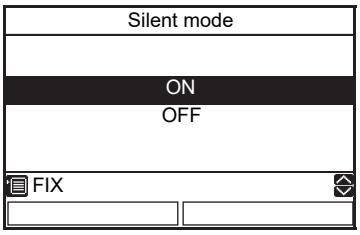
## 11. Night time Low-noise Setting

- This function is available only for the header remote controller.
- This setting is used to reduce noise output, from the outdoor unit, during night time for neighbours. Night time low-noise operates with lower operation frequency and fan tap than normal operation only for the set time period.

**1** **Press the [ ∧ ] / [ ∨ ] button to select "Silent mode" on the MENU screen, then press the [ F2 ] button.**




**2** **Press the [ ∧ ] button to select "ON" on the Silent mode screen, then press the [ ▤ ] button.**

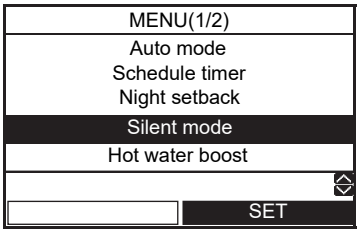



**3** **Start the heating, cooling or hot water operation. The ⏲ mark appears on the top screen during the set-up time zone.**

**<How to enable, set start time and end time of night time low-noise>**

- This function is available only for the header remote controller.

**1** **Press the [ ∧ ] / [ ∨ ] button to select "Silent mode" on the MENU screen.**




**2** **Press the [ F1 ] button for 4 seconds or longer to enter the setting mode. The function code setting screen appears.**
**FC No. 0A: Start time (Range: 0~23, Default: 22)**
**0B: End time (Range: 0~23, Default: 06)**

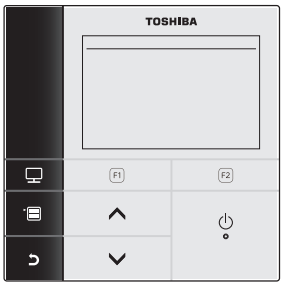
**3** **Press the [ F1 ] / [ F2 ] button to select FC number or Data, then press the [ ∧ ] / [ ∨ ] button to set the value.**
**The same value cannot be set to 0A and 0B.**

**4** **Press the [ ▤ ] button. The set time is registered.**

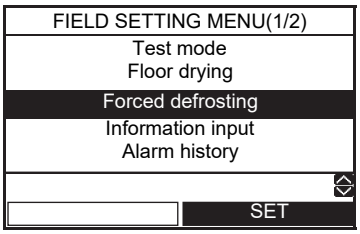
## 12. Forced Defrosting Setting

- This function is available only for the header remote controller.
- This function can active the forced defrosting mode for the outdoor unit.

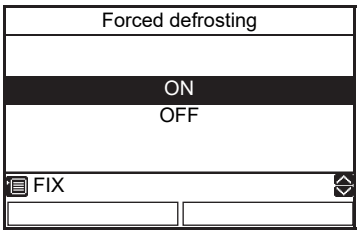
***1*** **Press the [ ] button and the [ ] button at same time for 4 seconds or longer on the top screen to display the "FIELD SETTING MENU".**




***2*** **Press the [ ] / [ ] button to select "Forced defrosting" on the FIELD SETTING MENU screen, then press the [ F2 ] button.**




***3*** **Press the [ ] button to select ON, then press the [ ] button.**




***4*** **Start the heating operation on the top screen.**

(Operation)

- Press the F1 button.
- Set the operation to the heating mode.
- After a while, forced defrosting signals are transmitted to the outdoor unit, and the unit starts defrosting. (Forced defrosting lasts for up to 10 minutes.)
- After the defrosting, the heating operation starts.
- To perform defrosting again, start with ***1*** above. (Performing the forced defrosting once cancels the forced defrosting setting above described.)

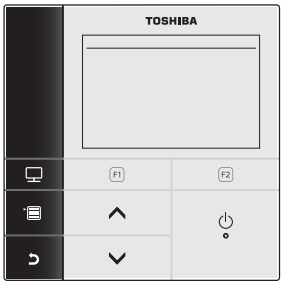
## 13. Display Function of Set Temperature and Other Settings

- The sensor sensing temperature is displayed on the remote controller.
- This function allows you to make sure whether the sensor is installed properly.

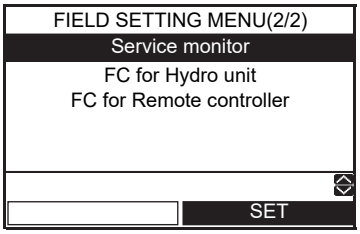
### ■ Sensor temperature display calling

**<Procedure>**

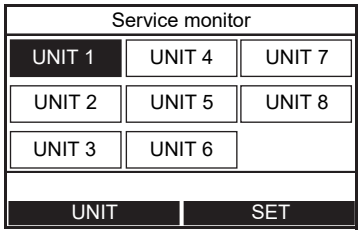
**1** **Press the [ ] button and the [ ] button at same time for 4 seconds or longer on the top screen to display the "FIELD SETTING MENU".**

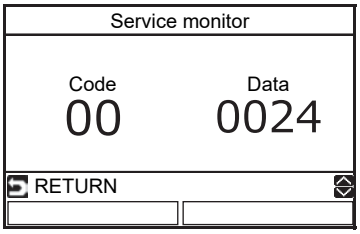



**2** **Press the [ ] / [ ] button to select "Service monitor" on the FIELD SETTING MENU screen, then press the [ F2 ] button.**




**3** **Press the [ F1 ] button to select the unit, then press the [ F2 ] button to display the status.**



| | Item code | Data name | Unit |
|---|---|---|---|
| Hydro unit data | 00 | Control temperature (Hot water cylinder) | °C |
| | 01 | Control temperature (Zone1) | °C |
| | 02 | Control temperature (Zone2) | °C |
| | 03 | Remote controller sensor temperature | °C |
| | 04 | Condensed temperature (TC) | °C |
| | 06 | Water inlet temperature (TWI) | °C |
| | 07 | Water outlet temperature (TWO) | °C |
| | 08 | Water heater outlet temperature (THO) | °C |
| | 09 | Floor inlet temperature (TFI) | °C |
| | 0A | Hot water cylinder temperature (TTW) | °C |
| | 0B | Mixing valve position | step |
| | 0E | Low pressure (Ps) × 1/10 | kPa |
| | 0F | Hydro soft Ver. | – |

| | Item code | Data name | Unit |
|---|---|---|---|
| Outdoor unit data | 60 | Heat exchange temperature (TE) | °C |
| | 61 | Outside air temperature (TO) | °C |
| | 62 | Discharge temperature (TD) | °C |
| | 63 | Suction temperature (TS) | °C |
| | 65 | Heat sink temperature (THS) | °C |
| | 6A | Current × 10 | A |
| | 6D | Heat exchanger coil temperature (TL) | °C |
| | 70 | Compressor operation Hz | Hz |
| | 72 | Number of revolutions of outdoor fan (lower or 1 fan model) | rpm |
| | 73 | Number of revolutions of outdoor fan (upper) | rpm |
| | 74 | Outdoor PMV position × 1/10 | pls |

| | Item code | Data name | Unit |
|---|---|---|---|
| Service data | F0 | Micro computer energized accumulation time × 1/100 | h |
| | F1 | Hot water compressor ON accumulation time × 1/100 | h |
| | F2 | Cooling compressor ON accumulation time × 1/100 | h |
| | F3 | Heating compressor ON accumulation time × 1/100 | h |
| | F4 | Built-in circulation pump operation accumulation time × 1/100 | h |
| | F5 | Hot water cylinder heater operation accumulation time × 1/100 | h |
| | F6 | Backup heater operation accumulation time × 1/100 | h |
| | F7 | Booster heater operation accumulation time × 1/100 | h |

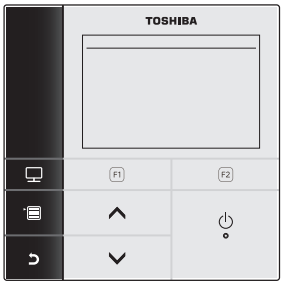
- Some sensors (temperature / pressure) or fan are not displayed, because not connected.

## 14. Failure History Calling Function

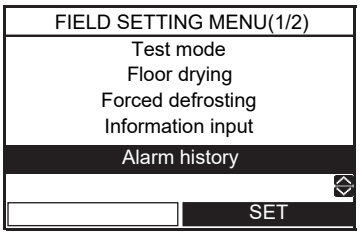
- List of latest 10 alarm data: error information of error code, date and time is displayed.

**<Procedure>**

**1** **Press the [ ] button and the [ ] button at same time for 4 seconds or longer on the top screen to display the "FIELD SETTING MENU".**

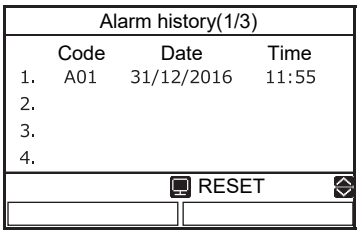



**2** **Press the [ ] / [ ] button to select "Alarm history" on the FIELD SETTING MENU screen, then press the [ F2 ] button.**

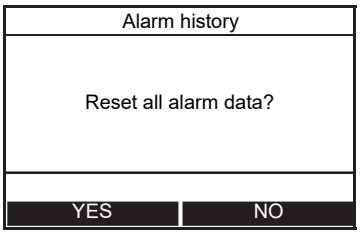



**To reset the alarm history**

**1** **Press the [ ] button to reset the alarm history.**




**2** **Press the [ F1 ] button, then all alarm data is cleared.**



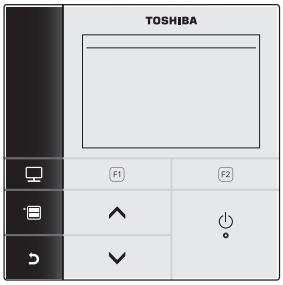

**NOTE**

If the current failure is the same as the one occurred last time before deleted, the history may not record the current failure.

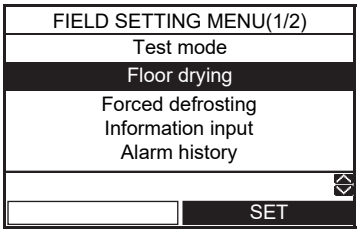
## 15. Floor drying

- This function is available only for the header remote controller.
- This function is used for drying concrete etc.
- Service personnel must operate the unit after setting the related function code.
- Operation is not started unless All the related function codes are set.
- Refer to the following for the settings of the related items. Please setup on the responsibility for an installer. An unsuitable setup may cause a crack of concrete etc.
- When the operation starts, the unit operates as follows.

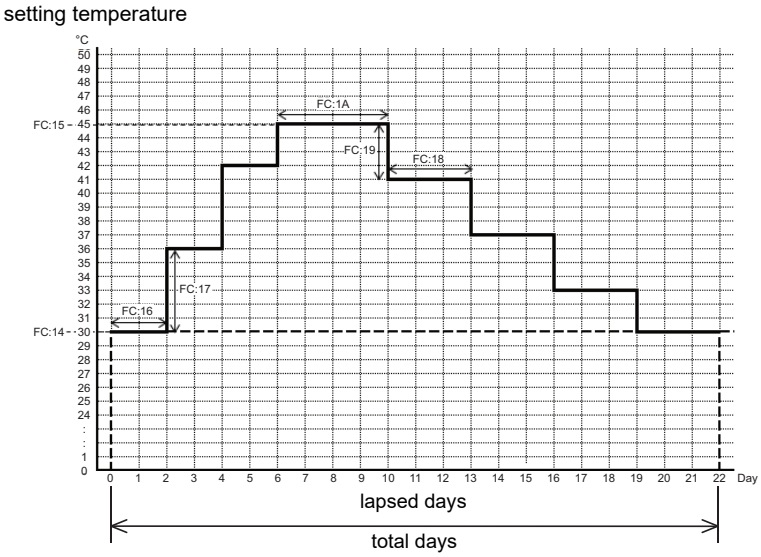
**1** **Press the [ ] button and the [ ] button at same time for 4 seconds or longer on the top screen to display the "FIELD SETTING MENU".**



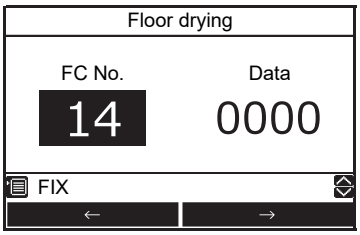

**2** **Press the [ ] / [ ] button to select "Floor drying" on the FIELD SETTING MENU, then press the [ F1 ] button for 4 seconds or longer.**




**FC:14 setting start and End temperature [20-55°C]**
**FC:15 setting Max temperature [20-55°C]**
**FC:16 continuation days for every step up to Max temperature [1-7 days]**
**FC:17 temperature difference for every step up to Max temperature [1-10 K]**
**FC:18 continuation days for every step down to End temperature [1-7 days]**
**FC:19 temperature difference for every step down to End temperature [1-10 K]**
**FC:1A Continuation days in Max temperature [1-30 days]**



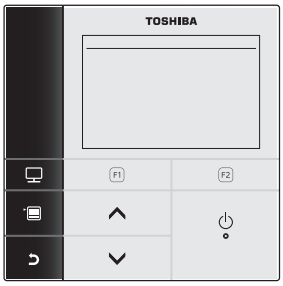

**3** **Press the [ F1 ] / [ F2 ] button to select FC number or Data, then press the [ ] / [ ] button to set the value.**



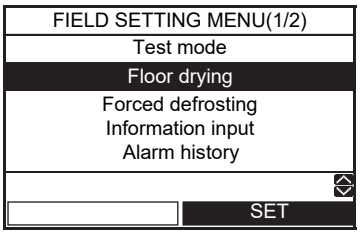

**4** **Press the [ ] button. The set value is registered.**

**To start the operation**

**1** **Press the [ ] button and the [ ] button at same time for 4 seconds or longer on the top screen to display the "FIELD SETTING MENU".**

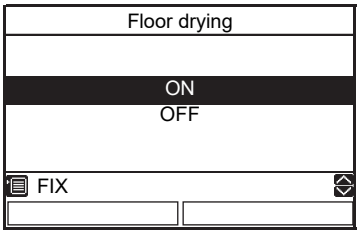



**2** **Press the [ ] / [ ] button to select "Floor drying" on the FIELD SETTING MENU, then press the [ F2 ] button.**



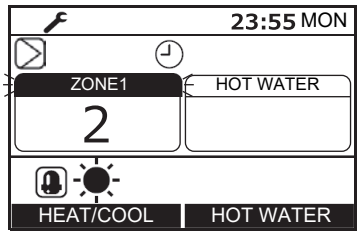

**3** **Press the [ ] button to select the ON, then press the [ ] button.**

- Check the total days for Floor drying operation, then press [ F1 ] button. The mark and mark appears on the Top screen.




**4** **Start the heating operation on the top screen.**

- Then ZONE1 mark blinks during Floor drying operation and lapsed days are displayed.




- If some abnormalities occur during Floor drying operation, the System stops and Alarm history screen is displayed.
- After heating operation is stopped by operating the remote controller during Floor drying operation, if heating operation is again started within 30 minutes, Floor drying operation is started from the time of stopping.

## Outdoor unit

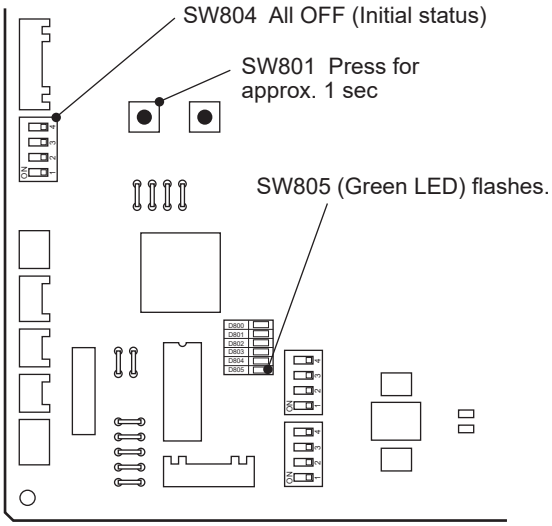
## 16. Outdoor Unit Setting

### 16-1. Refrigerant recovery control

Although HFC refrigerant is "Ozone depletion potential = 0", emission control is applied to it as a greenhouse effect gas.
This model has a switch for the outdoor unit to perform an environment-friendly refrigerant recovery operation (pump down) when the model is replaced or discarded.

**[How to operate]**

**<HWS-P805HR-E, P1105HR-E>**




***1*** **Remove the water in the hydro unit.**
(With the water remained in the hydro unit, performing refrigerant recovery may freeze the water and burst the unit.) *1

***2*** **▼HWS-P805HR-E, HWS-P1105HR-E**
Set SW804 on the PC board of the outdoor unit to all OFF, and then press SW801 for 1 second or more. The air to water heat pump enters the forced cooling mode for up to 10 minutes.

**▼HWS-P805H8R-E, HWS-P1105H8R-E, HWS-P1405H8R-E**
Ensure the LED display shows the initial state. If not then please ensure to return it to the initial state. Push and hold down SW800 for at least 5 seconds. D804 will start slowly flashing. Push SW800 until the LED display becomes as follows. Push SW801, then D805 will start flashing. Push and hold down SW801 for at least 5 seconds. D804 will start slow flashing and D805 will change to on. The air to water heat pump enters the forced cooling mode.

| D800 | D801 | D802 | D803 | D804 |
|---|---|---|---|---|
| ○ | ● | ● | ● | ◎ |

●: Off ○: Light ◎: Flash (5 times/sec)

***3*** **After 3 minutes has passed, close the liquid-side valve.**

***4*** **After the refrigerant recovery is completed, close the gas-side valve.**

***5*** **▼HWS-P805HR-E, HWS-P1105HR-E**
Press SW801 for at least 1 second to stop operation.
**▼HWS-P805H8R-E, HWS-P1105H8R-E, HWS-P1405H8R-E**
Press and hold down SW800 and SW801 at the same time for at least 5 seconds to stop operation.

*1 : If can not remove the water
Operate the circulation pump, to prevent freezing.
1.Turn off the power. (hydro and outdoor unit)
2.Set SW06-2 “ON”.
3.Turn on the power. (hydro and outdoor unit)
4.Rotate switch SW01 to position “1” and press tactile switch SW07 for 5 sec, or longer.
5.Rotating the rotary SW01 to position “16”.
6.If you finish refrigerant recovery operation, set SW06-2 “OFF” and set SW01 “1”.

## 16-2. Outdoor unit settings (Existing piping, Power save, etc.)

The following settings are available with dip switch setting and jumper wire setting.

<table>
<tr><th>Function</th><th>Where to set</th><th>Control details</th></tr>
<tr><td>Existing piping setting</td><td rowspan="3">SW802<br>4 --- OFF<br>3 --- Existing piping setting<br>2 --- Power save setting<br>1 --- Snow prevention fan control<br>ON<br>* All OFF position at factory default</td><td>When using a Ø19.1 pipe for the existing piping, set the switch to ON. This case may decrease heating capacity depending on the outside air temperature when heating or on a room temperature.</td></tr>
<tr><td>Power save setting</td><td>When using the power save function, set the switch to ON. This setting controls the compressor frequency lowering (about 10%) according to the heat exchange temperature of the hydro unit during a heating or hot water supply operation.</td></tr>
<tr><td>Snow prevention fan control</td><td>This control enables the function that prevents snow from entering the draft air duct through the fan guard or a heat exchanger gap and causing motor lock. If the outside air temperature is 0 °C below, this control operates the outdoor fan in W5 even if the compressor is not in operation.</td></tr>
<tr><td>Defrosting time change</td><td>J805, J806</td><td>If the defrosting interval is shorter than the standard, the jumper wire is cut. For the control details or how to cut the jumper wire, see defrosting control.</td></tr>
<tr><td>Maximum frequency change</td><td>J807</td><td>If the maximum value of compressor frequency need to be lowered, cut the jumper wire shown on the left.<br>This control lowers the maximum frequency when hot water supply, heating, or cooling is in operation.<br>In this case, the maximum capacity decreases.<br>Maximum frequency of compressor
<table>
<tr><th rowspan="2">Model</th><th colspan="2">P805HR-E</th><th colspan="2">P1105HR-E</th></tr>
<tr><th>Cooling</th><th>Heating</th><th>Cooling</th><th>Heating</th></tr>
<tr><td>Standard</td><td>37.2</td><td>70.2</td><td>53.4</td><td>90.0</td></tr>
<tr><td>J807 cut</td><td>33.0</td><td>63.0</td><td>48.0</td><td>81.0</td></tr>
</table>
<table>
<tr><th rowspan="2">Model</th><th colspan="2">P805H8R-E</th><th colspan="2">P1105H8R-E</th><th colspan="2">P1405H8R-E</th></tr>
<tr><th>Cooling</th><th>Heating</th><th>Cooling</th><th>Heating</th><th>Cooling</th><th>Heating</th></tr>
<tr><td>Standard</td><td>37.2</td><td>70.2</td><td>53.4</td><td>80.4</td><td>64.2</td><td>90.0</td></tr>
<tr><td>J807 cut</td><td>33.0</td><td>63.0</td><td>48.0</td><td>72.0</td><td>57.6</td><td>81.0</td></tr>
</table></td></tr>
</table>

## 16-3. Service support functions (LED indication, Switch operation method)

The following settings are available with dip switches.

(1) Overview

Using 3 dip switches (SW802, SW803, SW804) and 2 push-button switches (SW800, SW801) can make settings available and confirm operations.

### For operation

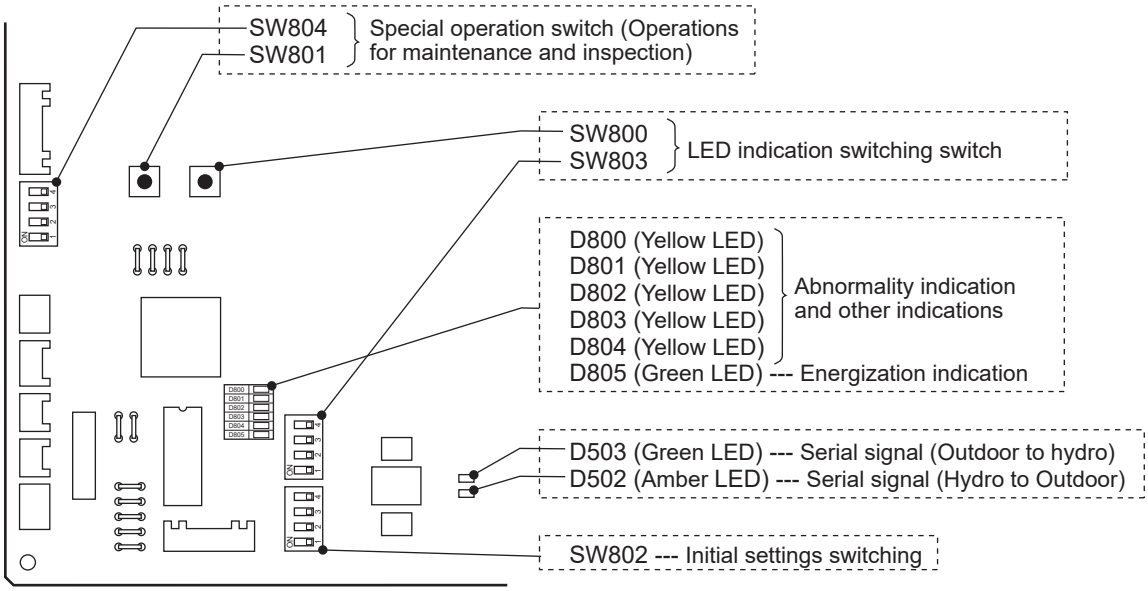
| Part number | Specification | Operation details |
|---|---|---|
| SW800 | Press button switch | This switch switches the indications of LED (D800 to D804) on the outdoor control board. |
| SW803 | Dip switch | |
| SW801 | Press button switch | This switch enables users to perform a special operation for maintenance and inspection. |
| SW804 | Dip switch | |
| SW802 | Dip switch | This switch performs initial settings. |

### For display

| Part number | Specification | Operation details |
|---|---|---|
| D502 | Amber LED | Signal display (signals from the hydro unit) of communication between hydro unit and outdoor unit (serial communication) |
| D503 | Green LED | Signal display (signals from the outdoor unit) of communication between hydro unit and outdoor unit (serial communication) |
| D800 to D804 | Yellow LED | **Abnormality indication**<br>All OFF of SW803 or the lit status of any of D800 to D804 indicates that the outdoor control unit detects an abnormality.<br>Setting SW803 to other than OFF shows details with LED indication. |
| D805 | Green LED | **Energization indication**<br>This LED lights when the outdoor unit is energized.<br>During a special operation with the SW801 or SW804 operation, this LED flashes. |

**Note:** All the LEDs have no colour when off.

**<HWS-P805HR-E, P1105HR-E>**



(2) LED indication switching (SW800, SW803 operation)

(2) -1. Indication switching list

Operating SW803 can switch the indications of LED D800 to D804 on the outdoor control board.

| Switch | Function and details |
|---|---|
| SW803 | **Abnormality indication (Current abnormality)**<br>This switch indicates the current abnormality.<br>Without an abnormality, the lights are off.<br>(See (2)-2) |
| SW803 | **Abnormal indication (Latest abnormality: Latest abnormality including the current one)**<br>After the abnormality status is released, this setting enables users to see the previous abnormalities.<br>(Previous abnormality can be checked even if the power is once turned off.)<br>* If there is an abnormality now, the abnormality details of the current one is displayed.<br>* This setting does not display a TO sensor failure.<br>(Check for the failure with the setting for current abnormality.)<br>(See (2)-2) |
| TD SW803<br>TE SW803<br>TS SW803<br>TO SW803<br>TL SW803<br>TH SW803<br>TWI SW803<br>TC* SW803 | **Temperature sensor indication**<br>These switches indicate the temperature sensor detecting value.<br>* TC=TWO+2 (heating, hot water supply)<br>TC=TWO (cooling)<br>(See (2)-3) |
| SW803 | **Current indication**<br>This switch indicates the current value in the outdoor unit.<br>(See (2)-3) |
| SW803 | **Compressor operation frequency indication**<br>This switch indicates the compressor operation frequency.<br>(See (2)-3) |
| SW803 | **PMV position indication**<br>This switch indicates PMV (Pulse motor valve) position.<br>(See (2)-3) |

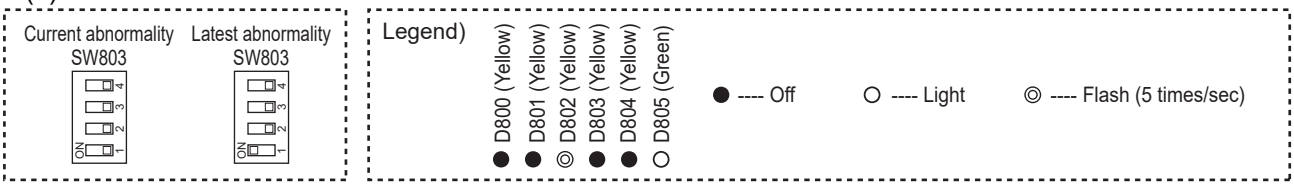
(2) -2. Abnormality indication

**▼HWS-P805HR-E, HWS-P1105HR-E**

The current abnormality and the latest abnormality (including the current one) can be identified by the LED D800 to D804 on the outdoor control board.

1) Setting all the SW803 dip switches to OFF indicates the current abnormality status.
2) Setting SW803 dip switch <1> only to ON indicates the previous abnormality (including the current one).
3) An abnormality lights any of the LEDs from D800 to D804.(Indication 1)
4) Pressing the push-button switch SW800 for approx. 1 second switches indication.(Indication 2)
5) When SW800 is again pressed or 2 minutes has passed, the indication 1 status returns.

(2) -2-1.




| Indication 1 (Initial indication) | Indication 2 (SW800 operation) | Abnormality details | Remote controller Abnormality code |
|---|---|---|---|
| ●●●●●○ | ●●●●●○ | Normal | --- |
| ○○●●○○ | ●●◎●●○ | Discharge temperature sensor (TD) failure | F04 |
| | ●◎◎●●○ | Heat exchanger temperature sensor (TE) failure | F06 |
| | ◎◎◎●●○ | Heat exchanger temperature sensor (TL) failure | F07 |
| | ●●●◎●○ | Outside air temperature sensor (TO) failure | F08 |
| | ●●◎◎●○ | Suction temperature sensor (TS) failure | F12 |
| | ◎●◎◎●○ | Heat sink temperature sensor (TH) failure | F13 |
| | ◎◎◎◎●○ | Heat exchanger, suction sensor (TE, TS) wrong wiring | F15 |
| | ●●●◎◎○ | High pressure sensor (PD) failure | F24 |
| | ◎◎◎◎◎○ | EEPROM failure | F31 |
| ●●○●○○ | ◎●●●●○ | Compressor break down | H01 |
| | ●◎●●●○ | Compressor lock | H02 |
| | ◎◎●●●○ | Current detection circuit failure | H03 |
| | ●●◎●●○ | Faulty compressor case thermostat | H04 |
| ●○○●○○ | ●◎●◎●○ | Not set up the capacity | L10 |
| | ◎◎◎◎●○ | Combination failure between the hydro unit | L15 |
| | ◎●◎◎◎○ | Communication failure between MCUs | L29 |
| | ◎◎◎◎◎○ | Other abnormality (e.g. Compressor's loss of synchronism) | No abnormality confirmation |
| ○○○●○○ | ◎◎●●●○ | Abnormal discharge temperature | P03 |
| | ◎●◎●●○ | Power failure | P05 |
| | ◎◎◎●●○ | Heat sink overheat failure | P07 |
| | ◎◎◎◎●○ | Gas leakage detection | P15 |
| | ◎◎●●◎○ | 4-way valve reverse failure | P19 |
| | ●●◎●◎○ | Hi pressure protection operation | P20 |
| | ●◎◎●◎○ | Fan drive system failure | P22 |
| | ●◎●◎◎○ | Compressor drive | P26 |
| | ◎●◎◎◎○ | Compressor rotor position failure | P29 |

▼ **HWS-P805H8R-E, HWS-P1105H8R-E, HWS-P1405H8R-E**

## Diagnostic Procedure for Each Check Code (Outdoor Unit)

1) This section describes the diagnostic method for each check code displayed on the wired remote controller.
2) In some cases, a check code indicates multiple symptoms.
   In this case, confirm LED display on the outdoor PC board to narrow the contents to be confirmed.
3) The check code on the remote controller is displayed only when the same trouble occurred continuously by multiple times while LED of the outdoor PC board displays even an trouble which occurred once.
   Therefore the display on the remote controller may differ from that of LED.

## How to check LED display on the outdoor PC board

### [Service switch operation]

### Currently occurring trouble indication

Even if only one of D800 to D804 is rapidly flashing then trouble has arisen. If any of D800 to D804 is slowly flashing or D805 is flashing then press and hold down SW800 and SW801 at the same time for at least 5 seconds. Currently occurring trouble will be indicated.

| D800 (YEL) | D801 (YEL) | D802 (YEL) | D803 (YEL) | D804 (YEL) | D805 (GRN) | |
|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | No trouble |
| ◎ | ● | ● | ● | ● | ○ | Trouble detected<br>(Example. Discharge temp. trouble) |

●: Off ○: Light ◎: Flash (5 times/sec)

### Latest trouble indication

- The following operation results in the latest trouble being indicated. It is retained in the memory and hence can be confirmed even when the power supply has been turned off.

1) Confirm D800 to D804 are off (or rapidly flashing) and that D805 is lit up. If D800 to D804 are slowly flashing or D805 is flashing then push and hold down SW800 and SW801 at the same time for at least 5 seconds. D800 to D804 will turn off (or be rapidly flashing) and D805 will change to on.
2) Push SW800 several times until reaching the LED indication (D800 to D805) of ‘Latest (including current) trouble indication’.
3) Push SW801. The latest trouble will be indicated.
4) Ensure to carry out step 1) to set the LEDs to the initial state (current occurring trouble) when finished and then exit.

Latest (including current) trouble indication

| D800 (YEL) | D801 (YEL) | D802 (YEL) | D803 (YEL) | D804 (YEL) | D805 (GRN) |
|---|---|---|---|---|---|
| ○ | ● | ● | ● | ● | ◎ |

●: Off ○: Light ◎: Flash (5 times/sec)

(2) -2-2.Current trouble indication

| LED indication | | | | | | Name of trouble | Wired remote control trouble code |
|---|---|---|---|---|---|---|---|
| D800 | D801 | D802 | D803 | D804 | D805 | | |
| ● | ● | ● | ● | ● | ○ | Normal | — |
| ◎ | ● | ● | ● | ● | ○ | Discharg temp. sensoe (TD) trouble | F04 |
| ● | ◎ | ● | ● | ● | ○ | Heat exchanger temp. sensoe (TE) trouble | F06 |
| ◎ | ◎ | ● | ● | ● | ○ | Heat exchanger temp. sensoe (TL) trouble | F07 |
| ● | ● | ◎ | ● | ● | ○ | Outside temp. sensoe (TO) trouble | F08 |
| ◎ | ● | ◎ | ● | ● | ○ | Suction temp. sensoe (TS) trouble | F12 |
| ● | ◎ | ◎ | ● | ● | ○ | Heat sink temp. sensoe (TH) trouble | F13 |
| ◎ | ◎ | ◎ | ● | ● | ○ | Miswiring of heat exchanger temp. sensoe (TE, TS) | F15 |
| ● | ● | ● | ◎ | ● | ○ | Low pressure sensoe (Ps) trouble | F23 |
| ● | ◎ | ● | ◎ | ● | ○ | EEPROM trouble | F31 |
| ◎ | ◎ | ● | ◎ | ● | ○ | Compressor break down | H01 |
| ● | ● | ◎ | ◎ | ● | ○ | Compressor lock | H02 |
| ◎ | ● | ◎ | ◎ | ● | ○ | Current detection circuit trouble | H03 |
| ● | ◎ | ◎ | ◎ | ● | ○ | Case thermostat operation | H04 |
| ◎ | ◎ | ◎ | ◎ | ● | ○ | Low pressure protective operation | H06 |
| ● | ● | ● | ● | ◎ | ○ | Unset model type | L10 |
| ◎ | ● | ● | ● | ◎ | ○ | Communication trouble between MCUs | L29 |
| ● | ◎ | ● | ● | ◎ | ○ | Discharge temp. sensoe trouble | P03 |
| ◎ | ◎ | ● | ● | ◎ | ○ | High pressure SW operation | P04 |
| ● | ● | ◎ | ● | ◎ | ○ | Power supply trouble | P05 |
| ● | ◎ | ◎ | ● | ◎ | ○ | Heat sink overheat trouble | P07 |
| ◎ | ◎ | ◎ | ● | ◎ | ○ | Gas leak detection | P15 |
| ● | ● | ● | ◎ | ◎ | ○ | 4-way valve reversal trouble | P19 |
| ◎ | ● | ● | ◎ | ◎ | ○ | High pressure protective operation | P20 |
| ● | ◎ | ● | ◎ | ◎ | ○ | Fan system trouble | P22 |
| ◎ | ◎ | ● | ◎ | ◎ | ○ | Short-circuit of compressor drive element | P26 |
| ● | ● | ◎ | ◎ | ◎ | ○ | Position detection circuit trouble | P29 |
| ◎ | ● | ● | ◎ | ● | ○ | High pressure sensor (Pd) trouble | F24 |
| ◎ | ◎ | ◎ | ◎ | ◎ | ○ | Combination failure between the hydro unit | L15 |

●: Off ○: Light ◎: Flash (5 times/sec)

(2) -2-3.Latest (including current) trouble indication

| LED indication | | | | | | Name of trouble |
|---|---|---|---|---|---|---|
| D800 | D801 | D802 | D803 | D804 | D805 | |
| ● | ● | ● | ● | ● | ◇ | Normal |
| ◎ | ● | ● | ● | ● | ◇ | Discharg temp. sensoe (TD) trouble |
| ● | ◎ | ● | ● | ● | ◇ | Heat exchanger temp. sensoe (TE) trouble |
| ◎ | ◎ | ● | ● | ● | ◇ | Heat exchanger temp. sensoe (TL) trouble |
| ● | ● | ◎ | ● | ● | ◇ | Outside temp. sensoe (TO) trouble |
| ◎ | ● | ◎ | ● | ● | ◇ | Suction temp. sensoe (TS) trouble |
| ● | ◎ | ◎ | ● | ● | ◇ | Heat sink temp. sensoe (TH) trouble |
| ◎ | ◎ | ◎ | ● | ● | ◇ | Miswiring of heat exchanger temp. sensoe (TE, TS) |
| ● | ● | ● | ◎ | ● | ◇ | Low pressure sensoe (Ps) trouble |
| ● | ◎ | ● | ◎ | ● | ◇ | EEPROM trouble |
| ◎ | ◎ | ● | ◎ | ● | ◇ | Compressor break down |
| ● | ● | ◎ | ◎ | ● | ◇ | Compressor lock |
| ◎ | ● | ◎ | ◎ | ● | ◇ | Current detection circuit trouble |
| ● | ◎ | ◎ | ◎ | ● | ◇ | Case thermostat operation |
| ◎ | ◎ | ◎ | ◎ | ● | ◇ | Low pressure protective operation |
| ● | ● | ● | ● | ◎ | ◇ | Unset model type |
| ◎ | ● | ● | ● | ◎ | ◇ | Communication trouble between MCUs |
| ● | ◎ | ● | ● | ◎ | ◇ | Discharge temp. sensoe trouble |
| ◎ | ◎ | ● | ● | ◎ | ◇ | High pressure SW operation |
| ● | ● | ◎ | ● | ◎ | ◇ | Power supply trouble |
| ● | ◎ | ◎ | ● | ◎ | ◇ | Heat sink overheat trouble |
| ◎ | ◎ | ◎ | ● | ◎ | ◇ | Gas leak detection |
| ● | ● | ● | ◎ | ◎ | ◇ | 4-way valve reversal trouble |
| ◎ | ● | ● | ◎ | ◎ | ◇ | High pressure protective operation |
| ● | ◎ | ● | ◎ | ◎ | ◇ | Fan system trouble |
| ◎ | ◎ | ● | ◎ | ◎ | ◇ | Short-circuit of compressor drive element |
| ● | ● | ◎ | ◎ | ◎ | ◇ | Position detection circuit trouble |
| ◎ | ● | ● | ◎ | ● | ◇ | High pressure sensor (Pd) trouble |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◇ | Combination failure between the hydro unit |

●: Off ○: Light ◎: Flash (5 times/sec) ◇: Flash (1 time/sec)

(2)-3. Sensor, Current, Compressor operation frequency, PMV position indication

The values detected by controller, such as temperature sensor or current values, can be easily checked.

(2) -3-1.

**▼HWS-P805HR-E, HWS-P1105HR-E**

Legend)

| D800 (Yellow) | D801 (Yellow) | D802 (Yellow) | D803 (Yellow) | D804 (Yellow) | D805 (Green) |
|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ |

● ---- Off ○ ---- Light

| Item setting / LED indication | Temperature sensor (℃) TD SW803, TE SW803, TS SW803, TO SW803, TL SW803, TH SW803, TA SW803, TC* SW803 *Refer to page 167 | Current (A) SW803 | Compressor operation frequency (r.p.s.) SW803 | PMV position (pulse) SW803 |
|---|---|---|---|---|
| ●●●●○ | less than –25 | 0-0.9 | 0-4 | 0-19 |
| ○●●●○ | –25 – –21 | 1-1.9 | 5-9 | 20-39 |
| ●○●●○ | –20 – –16 | 2-2.9 | 10-14 | 40-59 |
| ○○●●○ | –15 – –11 | 3-3.9 | 15-19 | 60-79 |
| ●●○●○ | –10 – –6 | 4-4.9 | 20-24 | 80-99 |
| ○●○●○ | –5 – –1 | 5-5.9 | 25-29 | 100-119 |
| ●○○●○ | 0 – 4 | 6-6.9 | 30-34 | 120-139 |
| ○○○●○ | 5-9 | 7-7.9 | 35-39 | 140-159 |
| ●●●○○ | 10-14 | 8-8.9 | 40-44 | 160-179 |
| ○●●○○ | 15-19 | 9-9.9 | 45-49 | 180-199 |
| ●○●○○ | 20-24 | 10-10.9 | 50-54 | 200-219 |
| ○○●○○ | 25-29 | 11-11.9 | 55-59 | 220-239 |
| ●●○○○ | 30-34 | 12-12.9 | 60-64 | 240-259 |
| ○●○○○ | 35-39 | 13-13.9 | 65-69 | 260-279 |
| ●○○○○ | 40-44 | 14-14.9 | 70-74 | 280-299 |
| ○○○○○ | 45-49 | 15-15.9 | 75-79 | 300-319 |
| ●●●●○ | 50-54 | 16-16.9 | 80-84 | 320-339 |
| ○●●●○ | 55-59 | 17-17.9 | 85-89 | 340-359 |
| ●○●●○ | 60-64 | 18-18.9 | 90-94 | 360-379 |
| ○○●●○ | 65-69 | 19-19.9 | 95-99 | 380-399 |
| ●●○●○ | 70-74 | 20-20.9 | 100-104 | 400-419 |
| ○●○●○ | 75-79 | 21-21.9 | 105-109 | 420-439 |
| ●○○●○ | 80-84 | 22-22.9 | 110-114 | 440-459 |
| ○○○●○ | 85-89 | 23-23.9 | 115-119 | 460-479 |
| ●●●○○ | 90-94 | 24-24.9 | 120-124 | 480-499 |
| ○●●○○ | 95-99 | 25-25.9 | 125-129 | 500 |
| ●○●○○ | 100-104 | 26-26.9 | 130-134 | – |
| ○○●○○ | 105-109 | 27-27.9 | 135-139 | – |
| ●●○○○ | 110-114 | 28-28.9 | 140-144 | – |
| ○●○○○ | 115-119 | 29-29.9 | 145-149 | – |
| ●○○○○ | 120 or higher | 30-30.9 | 150-154 | – |
| ○○○○○ | sensor failure, not connected | 31 or higher | 155 or higher | – |

* TD, TL, and TH show errors below the ordinary temperature because they are sensors for high temperature.

* Current value for the outdoor unit only is shown.

**▼HWS-P805H8R-E, HWS-P1105H8R-E, HWS-P1405H8R-E**

**[Method of Operation]**

1) Confirm D800 to D804 are off (or rapidly flashing) and that D805 is lit up. If D800 to D804 are slowly flashing or D805 is flashing then push and hold down SW800 and SW801 at the same time for at least 5 seconds. D800 to D804 will turn off (or be rapidly flashing) and D805 will change to on.
2) Push SW800 several times until the LED indication (D800 to D805) reaches the desired display item.

(2) -3-2.

| LED display | Control content |
|---|---|
| D800 D801 D802 D803 D804 D805<br>● ● ● ● ● ◎ | Trouble indication (Current trouble)<br>Displays the current trouble.<br>Will not appear if no trouble has occurred. |
| D800 D801 D802 D803 D804 D805<br>○ ● ● ● ● ◎ | Trouble indication (Latest trouble: latest and including current trouble)<br>Previous trouble can be checked using this setting, for example, after previous trouble has been resolved (and even after the power has been turned off).<br>* If trouble is currently occurring then the same content will be displayed. |
| D800 D801 D802 D803 D804 D805<br>● ○ ● ● ● ◎ | Discharge temperature sensor (TD) indication<br>Displays the discharge temperature sensor (TD) value.<br>(Refer to (2)-3-3) |
| D800 D801 D802 D803 D804 D805<br>○ ○ ● ● ● ◎ | Outdoor heat exchanger temperature sensor (TE) indication<br>Displays the outdoor heat exchanger temperature sensor (TE) value.<br>(Refer to (2)-3-3) |
| D800 D801 D802 D803 D804 D805<br>● ○ ○ ● ● ◎ | Outdoor heat exchanger temperature sensor (TL) indication<br>Displays the outdoor heat exchanger sensor (TL) value.<br>*Refer to page 167<br>(Refer to (2)-3-3) |
| D800 D801 D802 D803 D804 D805<br>● ● ○ ● ● ◎ | Inlet temperature sensor (TS) indication.<br>Displays the inlet temperature sensor (TS) value.<br>(Refer to (2)-3-3) |
| D800 D801 D802 D803 D804 D805<br>○ ● ○ ● ● ◎ | Outdoor external temperature sensor (TO) indication.<br>Displays the outdoor external temperature sensor (TO) value.<br>(Refer to (2)-3-3) |
| D800 D801 D802 D803 D804 D805<br>○ ○ ○ ● ● ◎ | Heat sink temperature sensor (TH) indication.<br>Displays the heat sink temperature sensor (TH) value.<br>(Refer to (2)-3-3) |
| D800 D801 D802 D803 D804 D805<br>○ ● ● ○ ● ◎ | Current indication.<br>Displays the outdoor unit current value.<br>(Refer to (2)-3-3) |
| D800 D801 D802 D803 D804 D805<br>● ○ ● ○ ● ◎ | Compressor operation frequency indication.<br>Displays the operating frequency of the compressor.<br>(Refer to (2)-3-3) |
| D800 D801 D802 D803 D804 D805<br>○ ○ ● ○ ● ◎ | PMV opening indication.<br>Displays the degree to which the PMV is open.<br>(Refer to (2)-3-3) |
| D800 D801 D802 D803 D804 D805<br>● ● ○ ○ ● ◎ | Indoor suction temperature sensor (TA) indication.<br>Displays the indoor suction temperature sensor (TA) value.<br>(Refer to (2)-3-3) |
| D800 D801 D802 D803 D804 D805<br>○ ● ○ ○ ● ◎ | Indoor heat exchange temperature sensor (TC) indication.<br>Displays the indoor heat exchange temperature sensor (TC) value.<br>(Refer to (2)-3-3) |
| D800 D801 D802 D803 D804 D805<br>● ○ ○ ○ ● ◎ | Indoor heat exchanger sensor (TCJ) indication.<br>Displays the indoor heat exchanger sensor (TCJ) value.<br>(Refer to (2)-3-3) |
| D800 D801 D802 D803 D804 D805<br>○ ○ ○ ○ ● ◎ | – |
| D800 D801 D802 D803 D804 D805<br>● ● ● ○ ● ◎ | – |
| D800 D801 D802 D803 D804 D805<br>● ● ● ● ○ ◎ | High pressure sensor (Pd) indication.<br>Displays the High pressure sensor (Pd) value. |

●: Off ○: Light ◎: Flash (5 times/sec)

3) Push SW801 to switch to the desired display item.
4) To access the other display items repeat steps 1) to 3).
5) Before exiting ensure to perform step 1) and set the LED to the initial state (current abnormality indication).

(2) -3-3 Sensor, current, compressor operation frequency, PMV opening indication

Interface (CDB) PC board detected values (for example temperature and current sensor values) can be easily checked.

* Temperature sensors ... TD, TE, TL, TS, TO, TH, TWI, TC(1), TCJ
* Current ..... Current sensor (CT) value detected
* Pressure..... High pressure sensor (Pd) value detected

TC(1).....TC=TWO+2 (heating,hot water supply) / TC=TWO (cooling)

| LED indication | | | | | | Temperature sensor (˚C) | Current (A) | Compressor frequency (rps) | Degree of PMV opening (pls) | Pressure (MPa) |
|---|---|---|---|---|---|---|---|---|---|---|
| D800 (YEL) | D801 (YEL) | D802 (YEL) | D803 (YEL) | D804 (YEL) | D805 (GRN) | | | | | |
| ● | ● | ● | ● | ● | ◇ | Less than -25 | 0 ~ | 0 ~ | 0 ~ 19 | 0 ~ |
| ○ | ● | ● | ● | ● | ◇ | -25 ~ | 1 ~ | 5 ~ | 20 ~ 39 | 0.2 ~ |
| ● | ○ | ● | ● | ● | ◇ | -20 ~ | 2 ~ | 10 ~ | 40 ~ 59 | 0.4 ~ |
| ○ | ○ | ● | ● | ● | ◇ | -15 ~ | 3 ~ | 15 ~ | 60 ~ 79 | 0.6 ~ |
| ● | ● | ○ | ● | ● | ◇ | -10 ~ | 4 ~ | 20 ~ | 80 ~ 99 | 0.8 ~ |
| ○ | ● | ○ | ● | ● | ◇ | -5 ~ | 5 ~ | 25 ~ | 100 ~ 119 | 1.0 ~ |
| ● | ○ | ○ | ● | ● | ◇ | 0 ~ | 6 ~ | 30 ~ | 120 ~ 139 | 1.2 ~ |
| ○ | ○ | ○ | ● | ● | ◇ | 5 ~ | 7 ~ | 35 ~ | 140 ~ 159 | 1.4 ~ |
| ● | ● | ● | ○ | ● | ◇ | 10 ~ | 8 ~ | 40 ~ | 160 ~ 179 | 1.6 ~ |
| ○ | ● | ● | ○ | ● | ◇ | 15 ~ | 9 ~ | 45 ~ | 180 ~ 199 | 1.8 ~ |
| ● | ○ | ● | ○ | ● | ◇ | 20 ~ | 10 ~ | 50 ~ | 200 ~ 219 | 2.0 ~ |
| ○ | ○ | ● | ○ | ● | ◇ | 25 ~ | 11 ~ | 55 ~ | 220 ~ 239 | 2.2 ~ |
| ● | ● | ○ | ○ | ● | ◇ | 30 ~ | 12 ~ | 60 ~ | 240 ~ 259 | 2.4 ~ |
| ○ | ● | ○ | ○ | ● | ◇ | 35 ~ | 13 ~ | 65 ~ | 260 ~ 279 | 2.6 ~ |
| ● | ○ | ○ | ○ | ● | ◇ | 40 ~ | 14 ~ | 70 ~ | 280 ~ 299 | 2.8 ~ |
| ○ | ○ | ○ | ○ | ● | ◇ | 45 ~ | 15 ~ | 75 ~ | 300 ~ 319 | 3.0 ~ |
| ● | ● | ● | ● | ○ | ◇ | 50 ~ | 16 ~ | 80 ~ | 320 ~ 339 | 3.2 ~ |
| ○ | ● | ● | ● | ○ | ◇ | 55 ~ | 17 ~ | 85 ~ | 340 ~ 359 | 3.4 ~ |
| ● | ○ | ● | ● | ○ | ◇ | 60 ~ | 18 ~ | 90 ~ | 360 ~ 379 | 3.6 ~ |
| ○ | ○ | ● | ● | ○ | ◇ | 65 ~ | 19 ~ | 95 ~ | 380 ~ 399 | 3.8 ~ |
| ● | ● | ○ | ● | ○ | ◇ | 70 ~ | 20 ~ | 100 ~ | 400 ~ 419 | 4.0 ~ |
| ○ | ● | ○ | ● | ○ | ◇ | 75 ~ | 21 ~ | 105 ~ | 420 ~ 439 | 4.2 ~ |
| ● | ○ | ○ | ● | ○ | ◇ | 80 ~ | 22 ~ | 110 ~ | 440 ~ 459 | 4.4 ~ |
| ○ | ○ | ○ | ● | ○ | ◇ | 85 ~ | 23 ~ | 115 ~ | 460 ~ 479 | 4.6 ~ |
| ● | ● | ● | ○ | ○ | ◇ | 90 ~ | 24 ~ | 120 ~ | 480 ~ 499 | 4.8 ~ |
| ○ | ● | ● | ○ | ○ | ◇ | 95 ~ | 25 ~ | 125 ~ | 500 | 5.0 ~ |
| ● | ○ | ● | ○ | ○ | ◇ | 100 ~ | 26 ~ | 130 ~ | — | 5.2 ~ |
| ○ | ○ | ● | ○ | ○ | ◇ | 105 ~ | 27 ~ | 135 ~ | — | 5.4 ~ |
| ● | ● | ○ | ○ | ○ | ◇ | 110 ~ | 28 ~ | 140 ~ | — | 5.6 ~ |
| ○ | ● | ○ | ○ | ○ | ◇ | 115 ~ | 29 ~ | 145 ~ | — | 5.8 ~ |
| ● | ○ | ○ | ○ | ○ | ◇ | 120 ~ | 30 ~ | 150 ~ | — | 6.0 ~ |
| ○ | ○ | ○ | ○ | ○ | ◇ | Sensor trouble | 31 or more | 155 or more | — | 6.2 or more |

●: Off ○: Light ◇: Flash (1 time/sec)

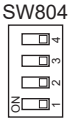
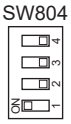
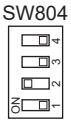
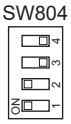
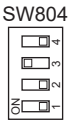
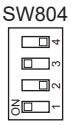
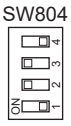
(3) Special operation for maintenance and inspection (SW801, SW804)

**▼HWS-P805HR-E, HWS-P1105HR-E**

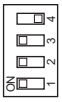
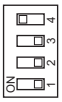
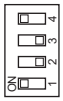
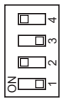
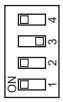
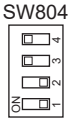
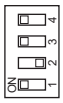
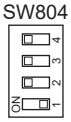
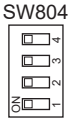
SW801 and SW804 can perform the following special operations for maintenance and inspection.

1) Switches the dip switch SW804. (See the table below)
2) Presses the push-button switch SW801 for approx. 1 second.
3) Starts the functions shown below. During the start processing of each function, LED D805 (Green) flashes.
4) When the push-button switch SW801 is pressed for approx. 1 second, or the dip switch SW804 is switched, or the defined time for each function has passed, the each function stops and LED D805 (Green) returns to continuous lit.

**<Special operation>**

| SW804 | Operation when press button switch SW801 is pressed | |
|---|---|---|
| SW804  | **Refrigerant recovery operation**<br>The outdoor unit operates cooling. The hydro unit may freeze with this operation alone. **Remove beforehand the water in the hydro unit. (See 10-15-1 (See page 164))** | |
| SW804  | **Hydro unit cooling request**<br>Performs a trial cooling operation. (See Note1 (See page 164)) | |
| SW804  | **Hydro unit heating request**<br>Performs a trial heating operation.(See Note1 (See page 164)) | |
| SW804  | **Fan motor forcible operation**<br>Forcibly performs a fan motor operation.<br>When SW801 is pressed again or after 2 minutes, the operation returns to the normal control. | **Caution:**<br>Although these controls are available during an operation, basically perform them when no operation is in progress.<br>Performing these controls during an operation may cause dangerously rapid pressure change. |
| SW804  | (No operation particularly) | |
| SW804  | **PMV full open operation**<br>Fully opens PMV (Pulse motor valve).<br>When SW801 is pressed again or after 2 minutes, the operation returns to the normal control. | |
| SW804  | **PMV full close operation**<br>Fully closes PMV (Pulse motor valve).<br>When SW801 is pressed again or after 2 minutes, the operation returns to the normal control. | |

**(Note 1)** The forced test run with this setting cannot be cancelled by the remote controller in the hydro unit. Be sure to cancel the operation from the outdoor unit. (Press again SW801 for 1 second)

| SW804 | Operation when press button switch SW801 is pressed | |
|---|---|---|
| SW804  | **PMV half open operation**<br>Half opens (250 pulses) PMV (Pulse motor valve).<br>When SW801 is pressed again or after 2 minutes, the operation returns to the normal control. | **Caution:**<br>Although these controls are available during an operation, basically perform them when no operation is in progress.<br>Performing these controls during an operation may cause dangerously rapid pressure change. |
| SW804  | **4-way valve relay operation (RY700, CN700 for check)**<br>Sets 4-way valve energization relay (RY700) to ON.<br>When SW801 is pressed again or after 2 minutes, the operation returns to the normal control.<br>**Caution:**<br>Do not connect the coil into the body when perform this operation. | |
| SW804  | **Self-holding valve vacuum operation (Switch to heating cycle)**<br>(RY700, RY701, RY705, CN701 for check)<br>Sets relay RY700, RY701, and RY705 to ON.<br>(CN701 Between 1 to 4 Voltage = Approx. 325V)<br>This function operates for 10 seconds. After that it becomes OFF. | |
| SW804  | **Self-holding valve release operation (Switch to cooling cycle)**<br>Sets relay RY700 to ON.<br>(CN701 Between 1 to 4 Voltage = Approx. 325V)<br>This function operates for 10 seconds. After that it becomes OFF. | |
| SW804  | **SV (2-way) valve relay operation (RY702, CN702 for check)**<br>Sets SV valve relay (RY702) to ON.<br>When SW801 is pressed again or after 2 minutes, the operation returns to the normal control. | |
| SW804  | **Heater output relay operation (RY703, CN703 for check)**<br>Sets relay for optional heater (RY703) to ON.<br>When SW801 is pressed again or after 2 minutes, the operation returns to the normal control. | |
| SW804  | **External output relay operation (RY704, CN704 for check)**<br>Sets relay for external output (RY704) to ON.<br>When SW801 is pressed again or after 2 minutes, the operation returns to the normal control. | |
| SW804  | (No operation particularly) | |
| SW804  | **External output relay operation change**<br>**Note:**<br>Do not use this setting. | |

**(Note 1)** The forced test run with this setting cannot be cancelled by the remote controller in the hydro unit. Be sure to cancel the operation from the outdoor unit. (Press again SW801 for 1 second)

**▼HWS-P805H8R-E, HWS-P1105H8R-E, HWS-P1405H8R-E**

**[Method of Operation]**

1) Ensure the LED display shows the initial state. If not then please ensure to return it to the initial state.
2) Push and hold down SW800 for at least 5 seconds. D804 will start slowly flashing.
3) Push SW800 until reaching the LED display function you wish to set.

| Special operations | LED display | Control content |
|---|---|---|
| Refrigerant recovery operation | D800 ○ D801 ● D802 ● D803 ● D804 ◎ | The outdoor unit performs cooling operations. Indoor units do not operate with just this operation and hence do any fan only operations in advance. |
| PMV fully open operation | D800 ○ D801 ● D802 ○ D803 ● D804 ◎ | PMV (Puls Motor Valve) fully opens. Perform step 6) below or returns to normal control after 2 minutes. (⇒ Note 1) |
| PMV fully closed operation | D800 ● D801 ○ D802 ○ D803 ● D804 ◎ | PMV (Puls Motor Valve) fully closed. Perform step 6) below or returns to normal control after 2 minutes. (⇒ Note 1) |
| PMV intermediate open operation | D800 ○ D801 ○ D802 ○ D803 ● D804 ◎ | Sets the PMV (Puls Motor Valve) to intermediate open (500 pulses). Perform step 6) below or returns to normal control after 2 minutes. (⇒ Note 1) |
| Indoor heating test command | D800 ○ D801 ● D802 ● D803 ○ D804 ◎ *Refer to page 167 | Performs a heating test run. Carrying out step 6) below returns to normal control. (⇒ Note 2) |
| Indoor cooling test run command | D800 ● D801 ○ D802 ● D803 ○ D804 ◎ | Performs a cooling test run. Carrying out step 6) below returns to normal control. (⇒ Note 2) |
| Forced fan motor operation | D800 ○ D801 ○ D802 ● D803 ○ D804 ◎ | Forcibly operates the fan motor. Perform step 6) below or returns to normal control after 2 minutes. (⇒ Note 1) |
| 4 way valve relay operation | D800 ● D801 ● D802 ○ D803 ○ D804 ◎ | Turns on the 4 way valve relay. Perform step 6) below or returns to normal control after 2 minutes. (⇒ Note 1) |
| SV2 valve opening/ closing | D800 ● D801 ◎ D802 ● D803 ● D804 ◎ | Forces the SV2 valve to move to the opposite position to the current position. After 2 minutes returns to normal control. (⇒ Note 1) |
| Heater output relay operation | D800 ◎ D801 ● D802 ◎ D803 ● D804 ◎ | Turns on the heater output relay. (⇒ Note 2) |

●: Off ○: Light ◎: Flash (5 times/sec)

**Note 1:** The operations can take place while the equipment is on but it is better if it has been turned off first.A sudden change in pressure could occur while the operations are taking place, which can be dangerous.

**Note 2:** Trial indoor cooling operation request/trial indoor heating operation request

**Caution)** Forced test operations using this setting cannot be cancelled using the indoor remote control. Refer to (6) below.

4) Push SW801 until D805 starts rapidly flashing.
5) Push and hold down SW801 for at least 5 seconds. D804 will start slowly flashing and D805 will turn on and the special operation will take effect.
6) To invalidate any of the various settings push and hold down SW800 and SW801 at the same time for at least 5 seconds. D800 to D804 will be off (or rapidly flashing) and D805 lit up (initial state: current trouble indication) and the special operation will have been disabled (normal control).

* If any uncertainty arises then push and hold down SW800 and SW801 at the same time for at least 5 seconds. You will return to step 1).

# 11 Replacement of the service PC board

## 1. Outdoor unit (Single phase type)

**HWS-P805HR-E, P1105HR-E**
**MCC-1571 (CDB)**

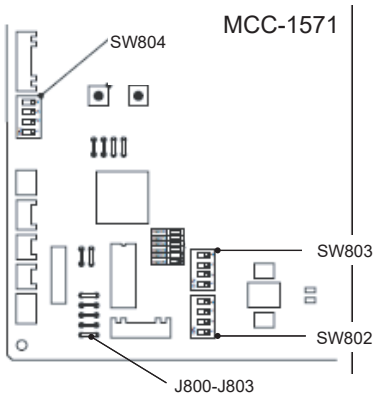
### ■ Setting the jumper wires and DIP switches

| Parts name | | Function | Setting |
|---|---|---|---|
| Jumper wire | J800~J803 | Model switching | Cut these jumper wires according to the following table. |
| | J804~J811 | Settings | Set these jumper wires to the settings of the PC board before replacement. |
| DIP switch | SW802 | Settings | Set SW802 to the setting of the PC board before replacement. |
| | SW803 | LED indication switching | Set SW803 to all OFF. |
| | SW804 | Special operations for service | Set SW804 to all OFF. |
| | SW805 (Only H8series) | Special operations for service | Set SW805 to all OFF |

#### Model switching (J800 to J803)

Since this service PC board is available for several models, cut the jumper wires according to the following table. If they are not cut correctly, an error code “L10” or “L29” appears on the remote controller and the operation of the air conditioner is disabled.

| Model name | J 800 | J 801 | J 802 | J 803 |
|---|---|---|---|---|
| Factory default | ○ | ○ | ○ | ○ |
| HWS-805H-E | ○ | × | × | ○ |
| HWS-1105H-E | × | × | × | ○ |
| HWS-1405H-E | ○ | ○ | ○ | × |
| HWS-P805HR-E | × | ○ | ○ | × |
| HWS-P1105HR-E | ○ | × | ○ | × |
| | ○:Connected ×:Cut | | | |



# 2. Outdoor unit (3 phase type)

**HWS-P805H8R-E, P1105H8R-E , P1405H8R-E**
**MCC-1675 (CDB)**

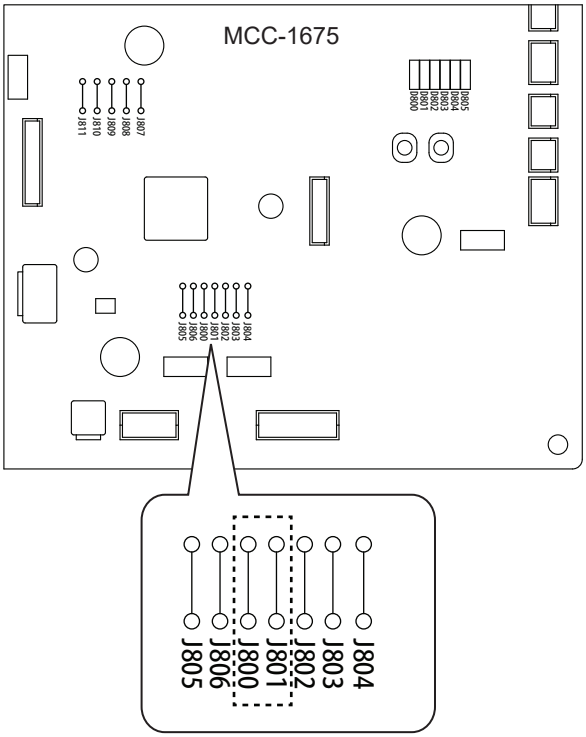
## ■ Setting the jumper wires

| Parts name | | Function | Setting |
|---|---|---|---|
| Jumper wire | J800~J801 | Model switching | Cut these jumper wires according to the following table. |
| | J802~J811 | Settings | Set these jumper wires to the settings of the PC board before replacement. |

### Model switching (J800 to J801)

Since this service PC board is available for several models, cut the jumper wires according to the following table. If they are not cut correctly, a certain error code appears on the remote controller and the operation is disabled.

| Model name | J 800 | J 801 |
|---|---|---|
| Factory setting (default) | ○ | ○ |
| HWS-P805H8R-E | × | ○ |
| HWS-P1105H8R-E | ○ | × |
| HWS-P1405H8R-E | × | × |
| | ○:Connected ×:Cut | |



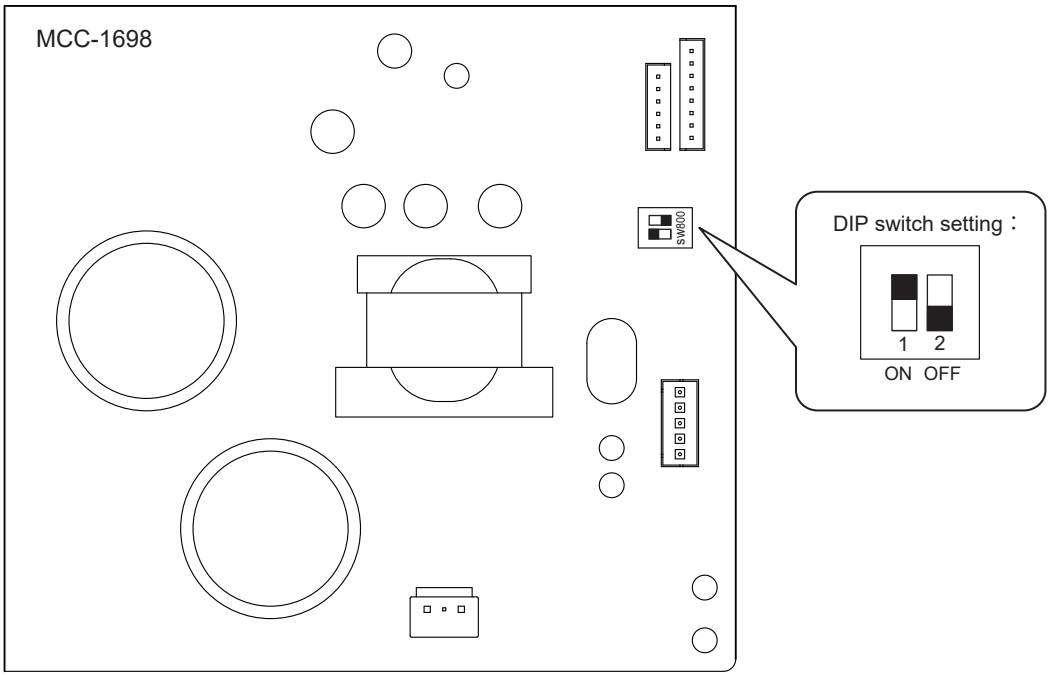
# 3. Outdoor unit (3 phase type)

**HWS-P805H8R-E, P1105H8R-E, P1405H8R-E**
**MCC-1675(CDB)**

## ■ Setting the DIP switches

| Parts name | | Function |
|---|---|---|
| DIP switch | SW800 | Adress setting |

Check the DIP switch according to the following figure. If they are not set correctly, a certain error code appears on the remote controller and the operation is disabled.




## ■ Installing the PC board

1) Apply thermal greass between HEATSINK and Power Devices (DB01 and Q201) on Compressor PC board.
2) Screw the Compressor PC board to the HEATSINK by the four screws. Do not use an electric driver or an air driver. As it can cause component damage. The torque of the screws for DB01 and Q201 are “1.2Nm”.

# 12 How to exchange main parts

## ⚠ WARNING

**<Turn off the power breaker>**
**Because the electrical components are energized with high voltage, always turn off the power breaker before starting to work.**

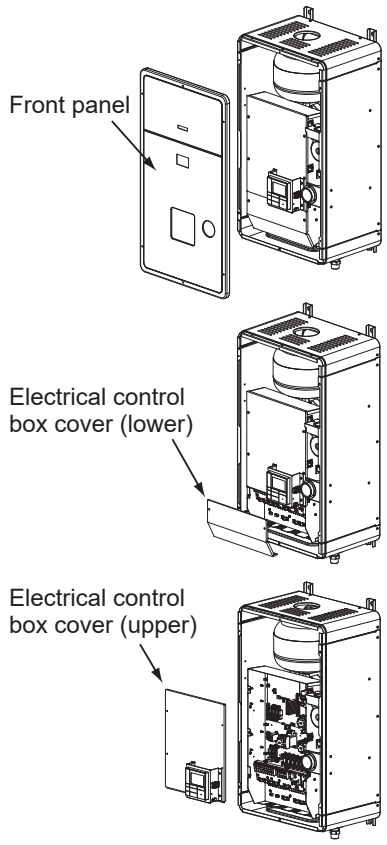
**<Check>**
**Ensure that no water pressure is present when replacing the water circuit (circulation pump, heater unit, flow switch, etc). After a repair is complete, perform a test run (after attaching the front panel, upper and lower cabinets, and side cabinet) and check that no abnormality including smoke or abnormal noise occurs. Failure to do so may cause a fire or an electric shock. Place the cabinets before making a test run.**

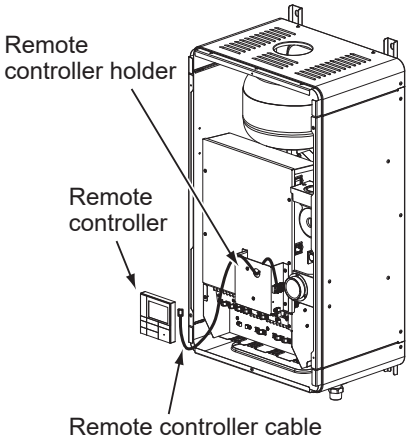
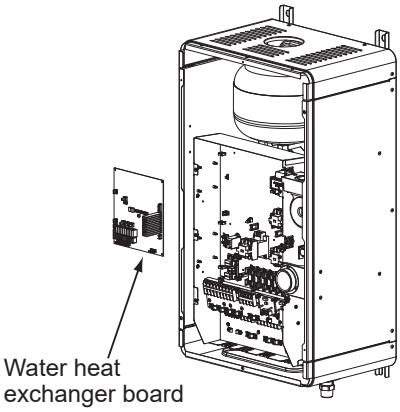
**<Watch out for fire>**
**Observe the following instructions when repairing the refrigerant cycle.**
(1) Watch out for surrounding fire. Always put out the fire of stove burner or other devices before starting the repair.
Should the fire fail to be put out, the oil mixed with refrigerant gas could catch fire.
(2) Do not use a welder in a closed room.
A room with no ventilation may cause carbon monoxide poisoning.
(3) Keep away flammable materials.
The materials may catch the fire of a welder.

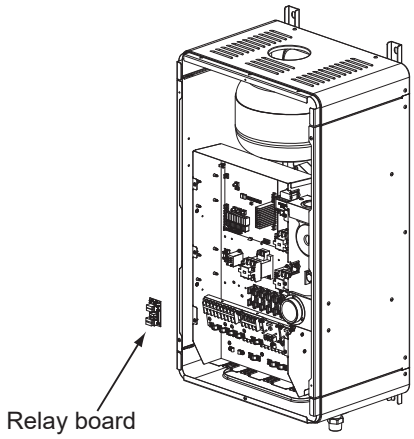
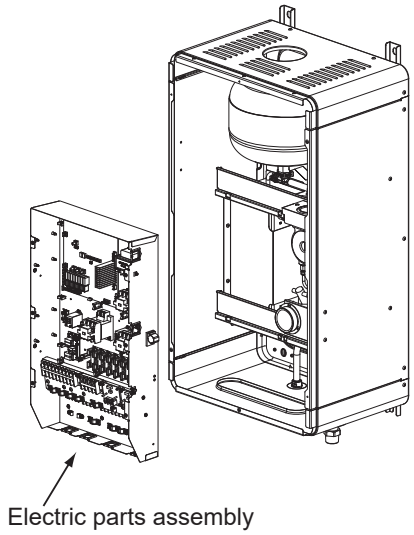
## ⚠ CAUTION

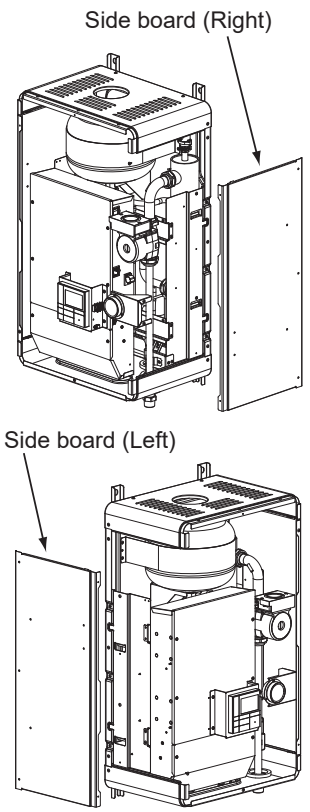
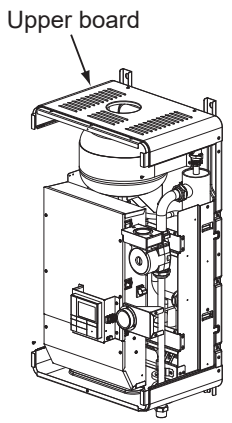
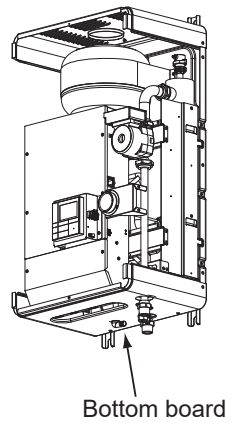
**<Wear gloves>**
**Wear gloves (∗) when performing repair.**
**Failure to do so may cause an injury when accidentally contacting the parts.**
∗: Thick gloves such as cotton work gloves

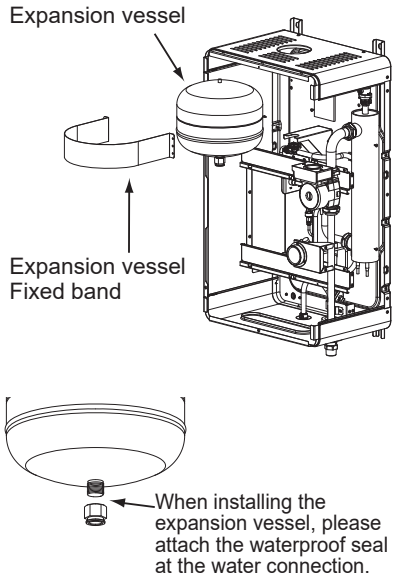
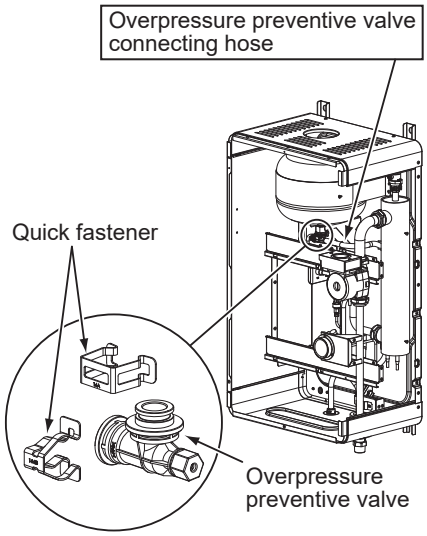
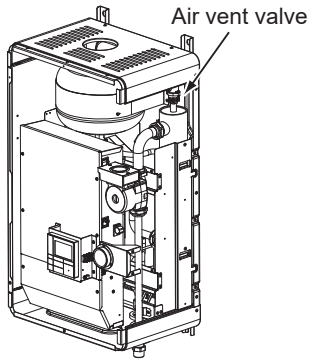
## 1. Hydro Unit

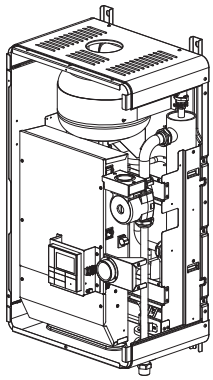
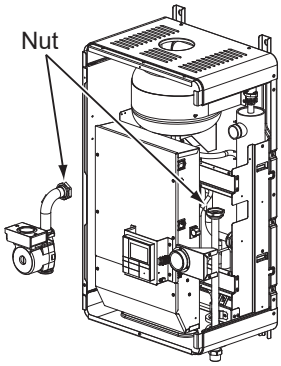
| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 1 | Common procedure | Wear gloves when performing the work.<br>Failure to do so may cause an injury when accidentally contacting the parts. |  |
| | Front panel<br><br>Electrical control box cover (lower)<br><br>Electrical control box cover (upper) | 1. How to remove<br>1) Stop the hydro unit operation, and turn off the power breaker.<br>2) Remove the front panel. (ST1T Ø4 × 10, 6 screws)<br>3) After unscrew the screws, remove the front panel by pulling it toward you.<br>4) Remove the electrical control box cover (lower). (ST2T Ø4 × 8, 2 screws)<br>5) Disconnect the power source cable and outdoor unit connecting cable from the terminal block.<br>6) Remove the electrical control box cover (upper). (ST2T Ø4 × 8, 4 screws)<br>7) Disconnect the remote controller connecting cable from the CN41 connector of the water heat exchange board.<br><br>2. How to attach<br>1) Connect the remote controller connecting cable to the water heat exchange board.<br>2) Attach the electrical control box cover (upper).<br>3) Connect the power source cable and outdoor unit connecting cable to the terminal block, and fix with the cord clamp.<br>4) Attach the electrical control box cover (lower).<br>5) Attach the front panel. | |

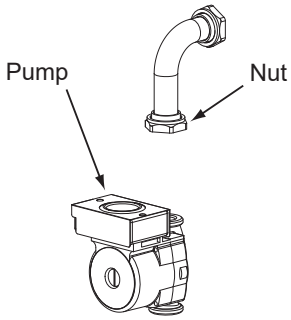
| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 2 | Remote controller | 1.How to remove<br>1) Perform the step 1-1.<br>2) Remove the remote controller from the holder using a flat-blade screwdriver. (Release the stopper.)<br>3) Disconnect the remote controller cable from the terminal block on the back side of the remote controller.<br><br>2.How to attach<br>1) Attach it in the reverse order of the removal. |  |
| 3 | Water heat exchanger board MCC-1511 | 1. How to remove<br>1) Perform the step 1-1.<br>2) Disconnect the connectors and lead cables connected to other parts from the water heat exchanger board.<br>1. Connector<br>CN100: TB 01 3P Connector (5P: White)<br>CN101: Trans (3P: White)<br>CN102: Trans (6P: White)<br>CN200: Flow switch (3P: Red)<br>CN201: Pressure switch (2P: White)<br>CN202: Bimetal thermostat (3P: Yellow)<br>CN203: TC sensor (2P: Yellow)<br>CN204: TWI sensor (3P: Brown)<br>CN205: TWO sensor (2P: Red)<br>CN206: THO sensor (3P: White)<br>CN207: Low pressure sensor (2P: Blue)<br>CN212: Low pressure sensor (4P: White)<br>CN213: TB 06 4P Terminal block (3P: White)<br>CN214: TB 06 4P Terminal block (2P: White)<br>CN305: TB 01 3P Terminal block (3P: Green)<br>CN500: PWM control line (6P: Blue)<br>CN501: Relay board (6P: Yellow)<br>CN601: Relay 05 (3P: Red)<br>CN602: TB 04 6P Terminal block (7P: White)<br>CN603: Pump (3P: Yellow)<br>CN604: Relay 06, TB 04 4P Terminal block (7P: Blue)<br>CN605: Relay 01, Relay 02 (3P: Yellow)<br>CN606: Relay 03, Relay 04 (3P: Blue)<br>2. Round-shape terminal<br>100: Ground (ST2T Ø4 × 8, 1 wire)<br>**NOTE**<br>When removing the connector, release the safety lock of the housing.<br>3) Release the 6 stoppers of the water heat exchanger board to remove the board. |  |

| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 4 | Relay board<br>MCC-1431 | 1. How to remove<br>1) Perform the step 1-1.<br>2) Disconnect the connectors and lead cables connected to other parts from the relay board.<br><br>1. Connector<br>CN01: TB 01 3P Terminal block (3P: White)<br>CN02: Water heat exchanger board (5P: White)<br>CN10: TB 05 9P Terminal block (9P: White)<br>**NOTE**<br>When removing the connector, release the safety lock of the housing.<br><br>3) Release the 3 stoppers of the relay board to remove the board. |  |
| 5 | Electric parts assembly | 1. How to remove<br>1) Perform the step 1-1.<br>2) Disconnect the connectors and lead cables connected to other parts from the water heat exchanger board.<br><br>1. Connector<br>CN200: Flow switch (3P: Red)<br>CN201: Pressure switch (2P: White)<br>CN202: Bimetal thermostat (3P: Yellow)<br>CN203: TC sensor (2P: Yellow)<br>CN204: TWI sensor (3P: Brown)<br>CN205: TWO sensor (2P: Red)<br>CN206 THO sensor (3P: White)<br>CN207: Low pressure sensor (2P: Blue)<br>CN212: Low pressure sensor (4P: White)<br>CN603: Pump (3P: Yellow)<br>Disconnect the heater power source cable (For backup heater and hot water cylinder heater) from the MgSW.<br>**NOTE**<br>When removing the connector, release the safety lock of the housing.<br><br>3) Remove the fixed screws.<br>(ST2T Ø4 × 8, 2 screws)<br>4) Remove the electric parts assembly by pulling it toward you while pulling it upward because the assembly back side has a hook holding structure. |  |

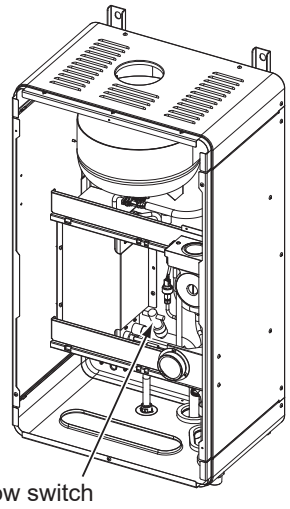
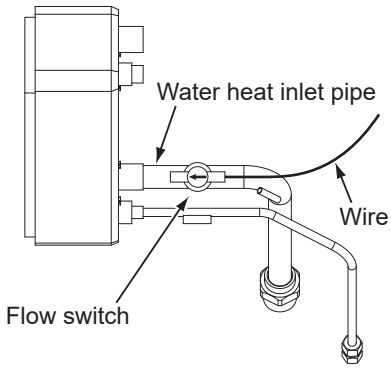
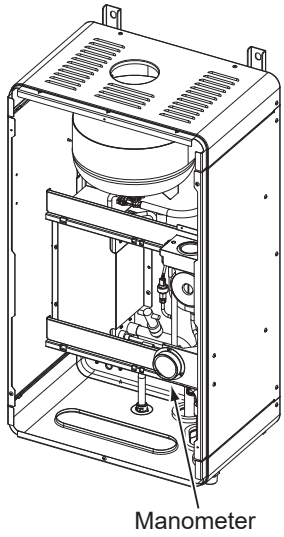
| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 6 | Side board | 1. Side board (Right)<br>1) Perform the step 1-1-1), 2), 3).<br>2) Remove the fixed screws of the side board (Right). (ST1T Ø4 × 10, 5 screws)<br>3) Remove the fixed screws of the side board (Right) and the manometer fixing board. (ST1T Ø4 × 10, 2 screws)<br><br>2. Side board (Left)<br>1) Remove the fixed screws of the side board (Left). (ST1T Ø4 × 10, 5 screws) |  |
| 7 | Upper board | 1) Perform the step 1-1-1), 2), 3) and step 6.<br>2) Remove the fixed screws of the upper board. (ST1T Ø4 × 10, 4 screws) |  |
| 8 | Bottom board | 1) Perform the step 1-1-1), 2), 3) and step 6.<br>2) Remove the fixed screws of the bottom board. (ST1T Ø4 × 10, 4 screws)<br>Removal is required if water and refrigerant piping are connected. |  |

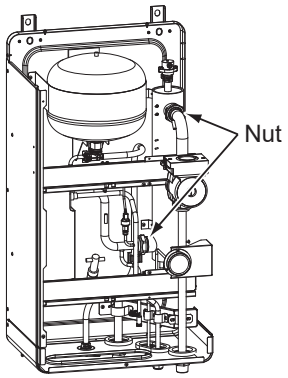
| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 9 | Expansion vessel | To replace a water circuit part, first close the water supply source valve and the valve of water pipe connected to the hydro unit.<br><br>1) Perform the step 1-1, step 5, step 6-1<br>2) Remove the fixed band of the expansion vessel. (ST1T Ø4 × 8, 4 screws)<br>3) Remove the expansion vessel connection.<br><br>When installing the expansion vessel, please attach the waterproof seal at the water connection.<br><br>After the expansion vessel replacement repair, open the water supply source valve and water piping valve to pass water through the hydro unit, and check that the expansion vessel connection has no water leakage. |  |
| 10 | Overpressure preventive valve | To replace a water circuit part, first close the water supply source valve and the valve of water pipe connected to the hydro unit.<br><br>1) Perform the step 1-1, step 5, step 6-1<br>2) Remove the quick fastener.<br>3) Remove the Overpressure preventive valve.<br><br>The Overpressure preventive valve connection uses an O ring for water seal. Be careful not to scratch the O ring; otherwise, water leakage may occur.<br><br>After the Overpressure preventive valve replacement repair, open the water supply source valve and water piping valve to pass water through the hydro unit, and check that the Overpressure preventive valve connection has no water leakage. |  |
| 11 | Air vent valve | To replace a water circuit part, first close the water supply source valve and the valve of water pipe connected to the hydro unit.<br><br>1) Perform the step 1-1-1), 2), 3), step 6-1.<br>2) Remove the air vent valve.<br><br>The Air vent valve connection uses an O ring for water seal. Be careful not to scratch the O ring; otherwise, water leakage may occur.<br><br>After the air vent valve replacement repair, open the water supply source valve and water piping valve to pass water through the hydro unit, and check that the air vent valve connection has no water leakage. |  |

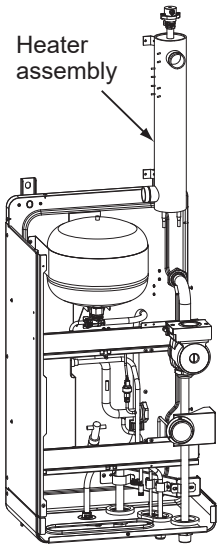
<table>
<tr><th>No.</th><th>Exchange parts name</th><th>Work procedure</th><th>Remarks</th></tr>
<tr>
<td>12</td>
<td>Pump</td>
<td>
To replace a water circuit part, first close the water supply source valve and the valve of water pipe connected to the hydro unit.<br><br>
1. How to remove<br>
1) Perform the step 1-1-1), 2), 3), step 6-1.<br>
2) Remove the 2 nuts of the heater connection and the lower side of the pump. (Water pipe wrench is necessary.)<br>
3) Remove the nut of the upper part of the pump.<br><br>
2. How to attach<br><br>
The pump connection uses a liquid packing for water seal. When replacing the pump, use a packing which was slathered with the liquid gasket.<br><br>
<table><tr><th>Part code</th><th>Service parts</th></tr><tr><td>37595721</td><td>Packing</td></tr></table><br>
1) Attach a new pump in the reverse order of the removal.<br><br>
After the pump replacement repair, open the water supply source valve and water piping valve to pass water through the hydro unit, and check that the pump connection has no water leakage.
</td>
<td>



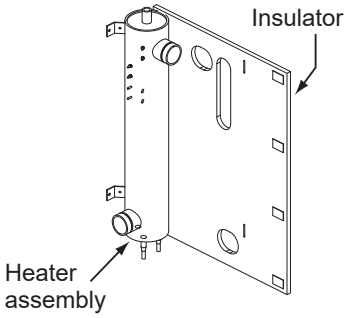


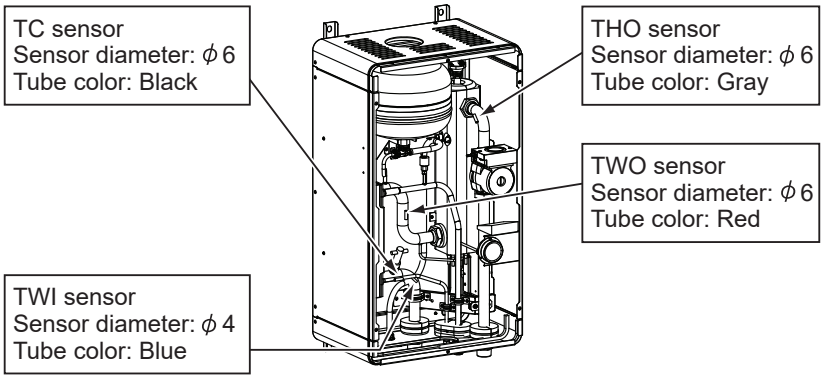
</td>
</tr>
</table>

| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 13 | Flow switch | To replace a water circuit part, first close the water supply source valve and the valve of water pipe connected to the hydro unit.<br><br>1. How to remove<br>1) Perform the step 1-1 and step 5.<br>2) Remove the flow switch.<br><br>The flow switch connection uses an O ring for water seal. Be careful not to scratch the O ring; otherwise, water leakage may occur.<br><br>2. How to attach<br>1) Attach a new flow switch in the reverse order of the removal.<br><br>**NOTE**<br>As shown on the right,<br>place a flow sensor parallel to the water heat exchanger inlet pipe so that the wire is place on the right side from the front view.<br><br>After the flow switch replacement repair, open the water supply source valve and water piping valve to pass water through the hydro unit, and check that the flow switch connection has no water leakage. |  <br>  |
| 14 | Manometer | To replace a water circuit part, first close the water supply source valve and the valve of water pipe connected to the hydro unit.<br><br>1. How to remove<br>1) Perform the step 1-1 and step 5 and 6.<br>2) Remove the manometer.<br><br>After the manometer replacement repair, open the water supply source valve and water piping valve to pass water through the hydro unit, and check that the manometer connection has no water leakage. |  |

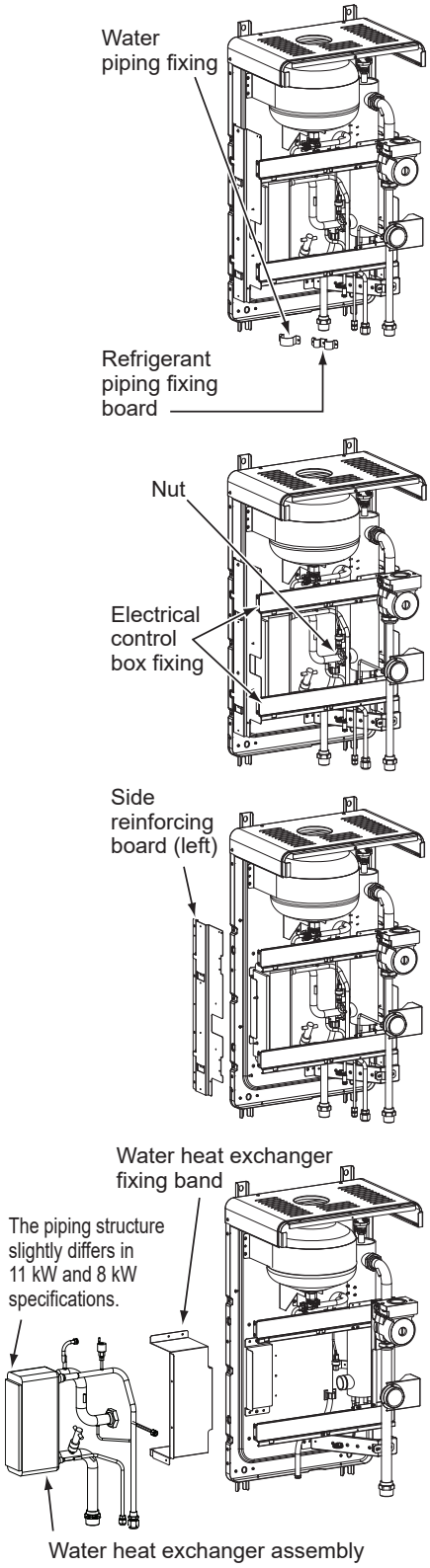
<table>
<tr><th>No.</th><th>Exchange parts name</th><th>Work procedure</th><th>Remarks</th></tr>
<tr><td>15</td><td>Heater assembly</td><td>
To replace a water circuit part, first close the water supply source valve and the valve of water pipe connected to the hydro unit.<br><br>
1. How to remove<br>
1) Perform the step 1-1, step 5, 6, 7, and 11.<br>
2) Remove the nut of the heater connection.<br>
3) Remove the 2 fixed screws of the heater.<br>
4) Pull the heater out upward.<br>
5) Remove the insulator from the heater.<br><br>
2. How to attach<br><br>
The heater connection uses a liquid packing for water seal. When replacing the heater, use a packing which was slathered with the liquid gasket.<br>
<table><tr><th>Part code</th><th>Service parts</th></tr><tr><td>37595721</td><td>Packing</td></tr></table>
1) Attach a new heater in the reverse order of the removal.<br><br>
After the heater assembly replacement repair, open the water supply source valve and water piping valve to pass water through the hydro unit, and check that the heater connection has no water leakage.
</td><td>






</td></tr>
<tr><td>16</td><td>TC sensor<br>TWI sensor<br>TWO sensor<br>THO sensor</td><td>
1. How to remove<br>
1) Perform the step 1-1 and step 5.<br>
2) Take the sensor out.<br>


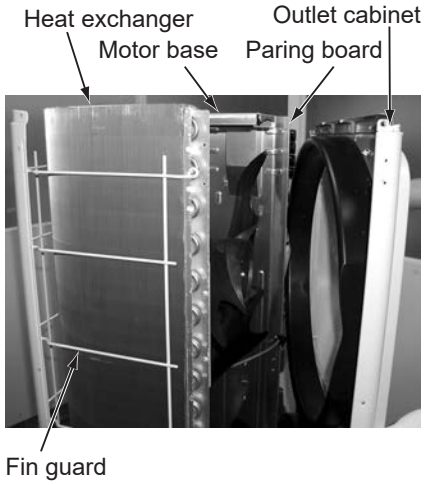
</td><td></td></tr>
</table>

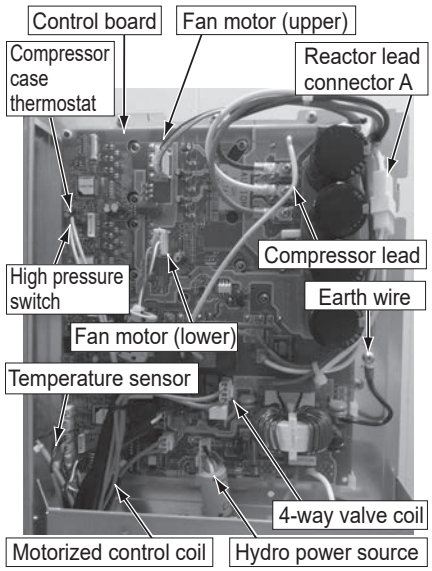
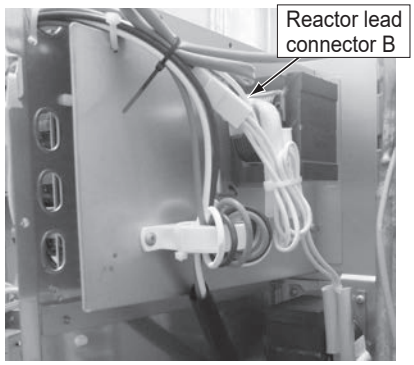
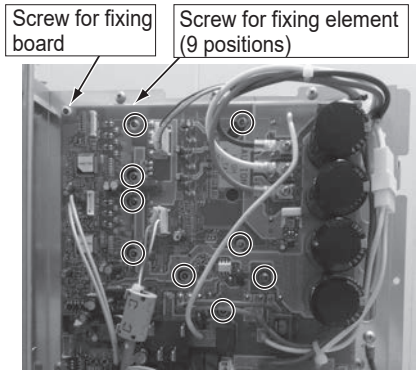
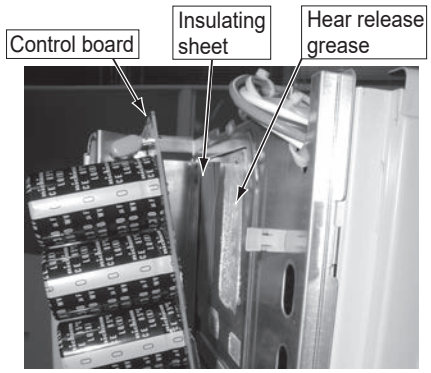
| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 17 | Water heat exchanger assembly | • Close the water piping source valve and the valve of water pipe connected to the hydro unit, and then remove the refrigerant and water piping.<br>• Perform refrigerant recovery with the outdoor unit.<br>• Disconnect all the power source cable, outdoor unit connection cable, and cylinder connection cable.<br><br>1. How to remove<br>1) Perform the step 1-1, step 5, 6, and 8.<br>2) Remove the water pipe fixing board. (ST2T Ø4 × 8, 2 screws)<br>3) Remove the refrigerant piping fixing board. (ST2T Ø4 × 8, 3 screws)<br>4) Remove the nut of the heater connection.<br>5) Remove the fixed screws of the electrical control box fixing board. (ST2T Ø4 × 8, 4 screws)<br>6) Remove the side reinforcing board (left). (ST2T Ø4 × 8, 6 screws) 3 for inside, 3 for outside<br>7) Remove the water heat exchanger fixing band. (ST2T Ø4 × 8, 6 screws)<br>8) Remove the water heat exchanger assembly.<br><br>The heater connection uses a packing for water seal. Be careful not to scratch the packing; otherwise, water leakage may occur.<br><br>2. How to attach<br>1) Attach a new water heat exchanger assembly in the reverse order of the removal.<br>2) Restore all piping and wiring as in the original state, and check that there is no water or refrigerant leakage.<br><br>• After the water heat exchanger assembly replacement repair, open the water supply source valve and water piping source valve to pass water through the hydro unit, and check that the connection has no water leakage.<br>• After connecting the refrigerant pipe, check that the connection has no refrigerant leakage. |  |

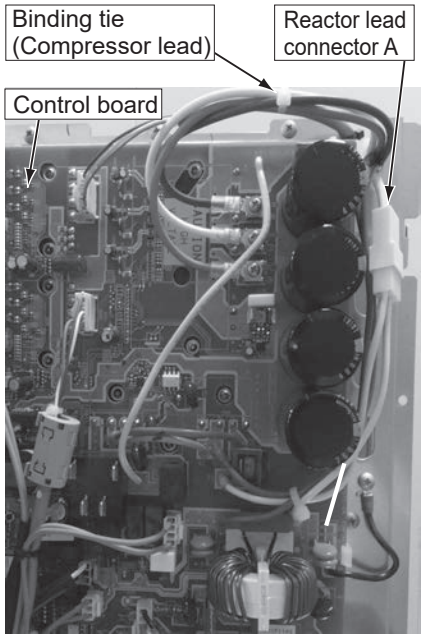
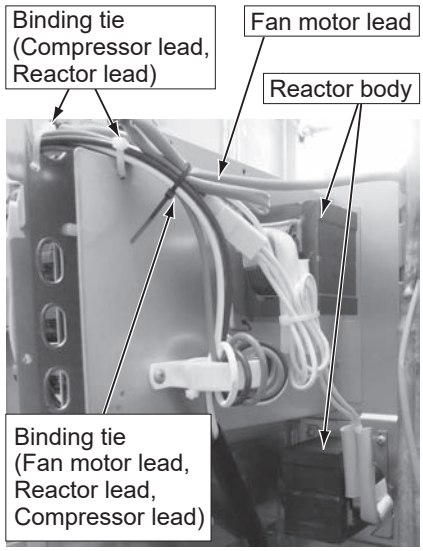
## 2. Outdoor Unit

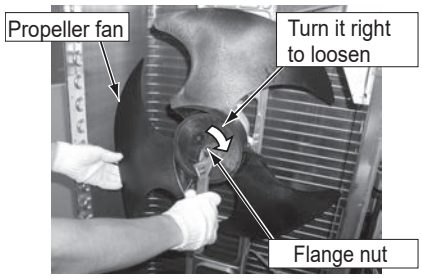
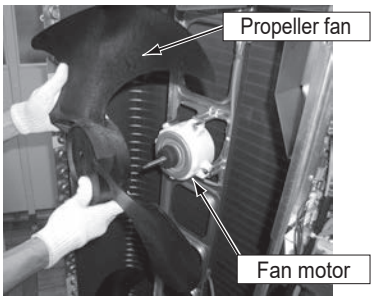
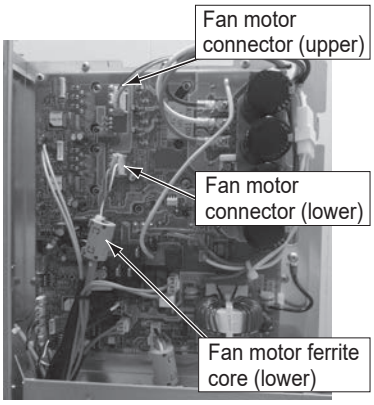
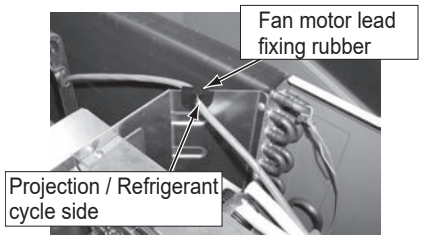
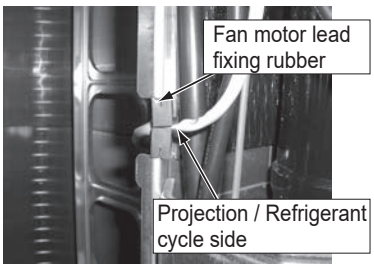
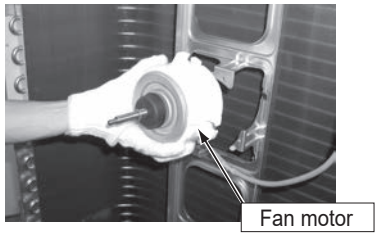
### HWS-P805HR-E, P1105HR-E

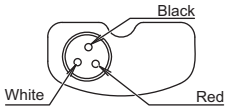
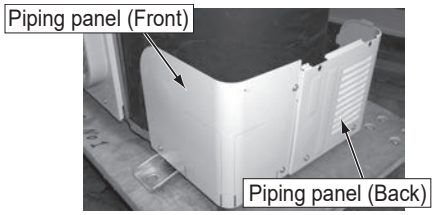
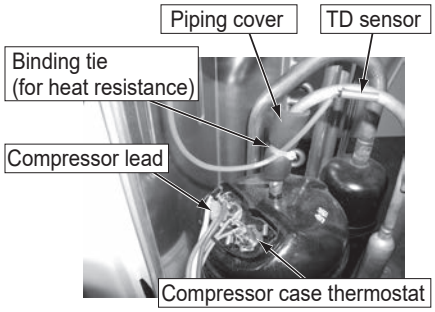
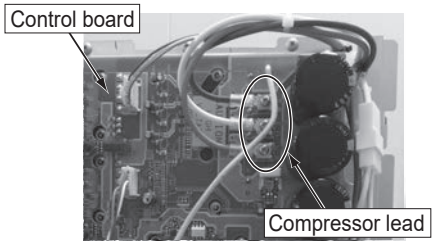
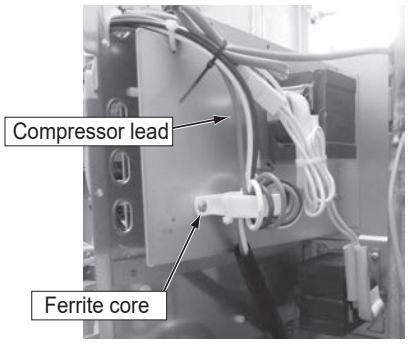
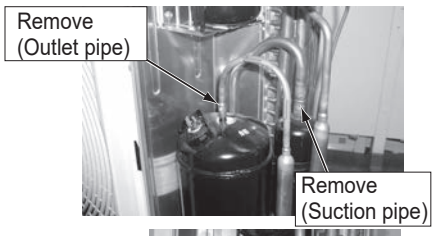
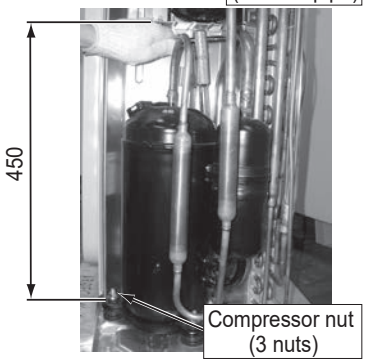
| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 1 | Common procedure | **NOTE**<br>Wear gloves when performing the work.<br>Failure to do so may cause an injury when accidentally contacting the parts.<br><br>1. How to remove<br>1) Stop the operation by remote controller and turn off the breaker.<br>2) Remove the front panel.<br>(Hex Ø4 × 10, 2 screws)<br>• After unscrewing the screws, remove the front panel while pulling it downward.<br>3) Disconnect the power source cable and connecting cables between hydro and outdoor from the cord clamp and terminals.<br>4) Remove the top board.<br>(Hex Ø4 × 10, 5 screws)<br><br>2. How to attach<br>1) Attach the top board.<br>(Hex Ø4 × 10, 5 screws)<br>2) Connect the power source cable and connecting cables between hydro and outdoor to the terminal, and fix them with the cord clamp.<br><br>**NOTE**<br>The power source cable and connecting cable between hydro and outdoor units must be fixed along the connecting piping by using a cable tie so that the cables do not contact the compressor, gas side valve, gas side piping and outlet pipe.<br><br>3) Attach the front panel.<br>(Hex Ø4 × 10, 2 screws) | Front panel<br> <br>Top board<br> |

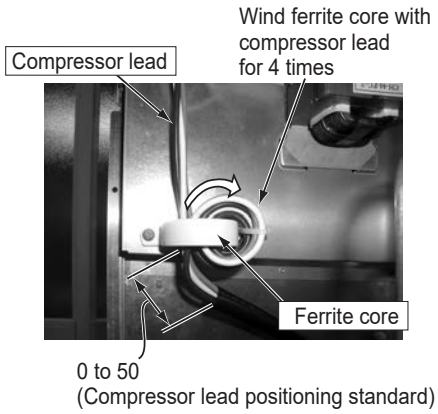
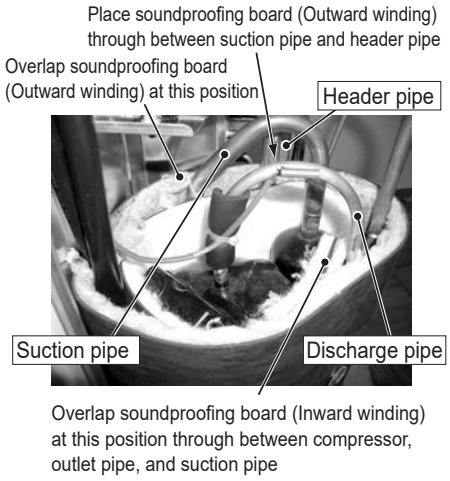
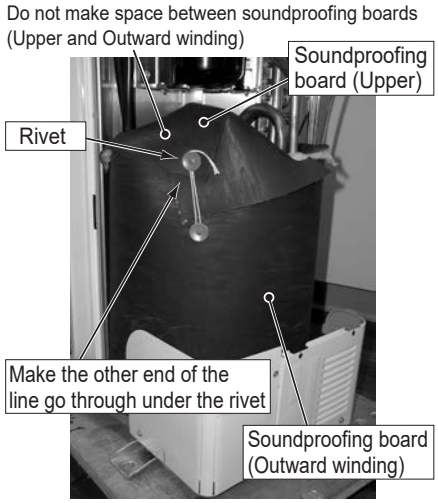
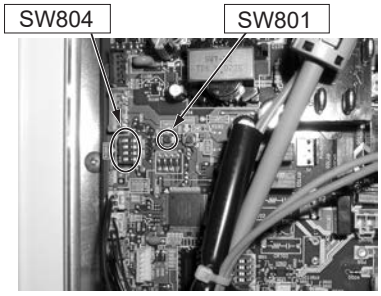
| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 2 | Outlet cabinet | How to remove<br>1) Perform the step 1-1.<br>2) Remove the screws of the outlet cabinet and parting board.<br>(ST1T Ø4 × 8, 4 screws)<br>3) Remove the screws of the outlet cabinet and bottom board.<br>(Hex Ø4 × 10, 2 screws)<br>4) Remove the screws of the outlet cabinet and motor base.<br>(ST1T Ø4 × 8, 2 screws)<br>5) Remove the screws of the outlet cabinet and heat exchanger.<br>(ST1T Ø4 × 8, 1 screws)<br>6) Remove the screws of the outlet cabinet and fin guard.<br>(Hex Ø4 × 10, 2 screws) |  |
| 3 | Side cabinet | 1) Perform the step 1-1.<br>2) Remove the screws that fixes the inverter assembly and the side cabinet.<br>(ST1T Ø4 × 8, 2 screws)<br>3) Remove the screws of the side cabinet and valve fixing board.<br>(ST1T Ø4 × 8, 2 screws)<br>4) Remove the screws of the side cabinet and piping panel (back).<br>(Hex Ø4 × 10, 2 screws)<br>5) Remove the screws of the side cabinet and bottom board.<br>(Hex Ø4 × 10, 1 screws)<br>6) Remove the screws of the side cabinet and fin guard (heat exchanger).<br>(Hex Ø4 × 10, 5 screws)<br>7) Remove the side cabinet while shifting it upward (inverter hook). | |

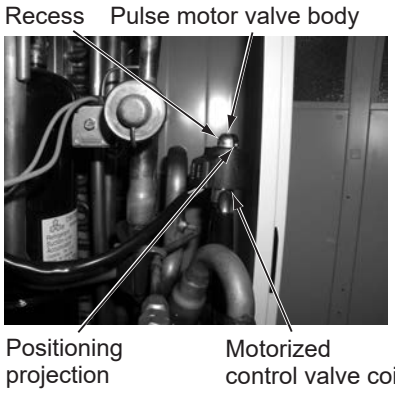
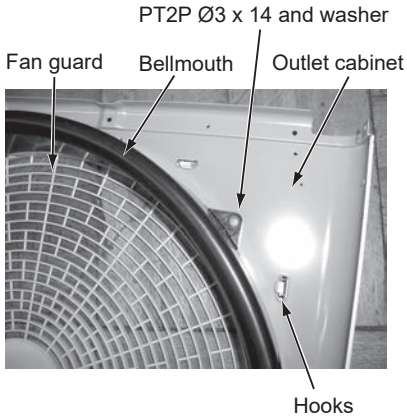
| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 4 | Electric parts replacement | 1. Control board<br>1) Perform the step 1-1.<br><br>**⚠ WARNING**<br><br>For 1 minute after the power is turned off, do not disassemble the inverter to prevent an electric shock.<br><br>2) Remove the connector connected to the control (Hydro power source, temperature sensor, electric control valve coil, 4-way valve coil, compressor case thermostat, fan motor, high pressure switch)<br>* Remove the connector by releasing the lock in the housing.<br><br>3) Remove the lead cable connected to the control board.<br>Compressor lead U: CN200 Red<br>V: CN201 White<br>W: CN202 Black<br>Reactor lead connector A<br>connector B<br><br>4) Remove the earth wire of the control board. (Truss B tight screw Ø4 × 6, 1 screw)<br><br>5) Remove the fixed screws of the control board. (Collar screw for fixing element Ø3 × 16, 9 screws, Pan S-tight screw for fixing the board Ø3 × 20, 1 screw)<br><br>6) Remove the control board. (Supporter 5 positions)<br>Note) Removing the control board may be difficult due to the heat release grease for the heat sink.<br><br>7) Attach a new control board.<br><br>**NOTE**<br>• Be careful for not taking the compressor lead V: CN201 White for the reactor lead CN05 or 06 White. (The compressor lead has a transparent sleeve at its ring terminal. The reactor lead ring terminal does not have sleeve.)<br>• Be sure to attach the insulating sheet. (Applying beforehand a bit of heat release grease to the back side of the insulating sheet can easily paste the sheet to the heat sink.) |  <br>  <br>  <br>  |

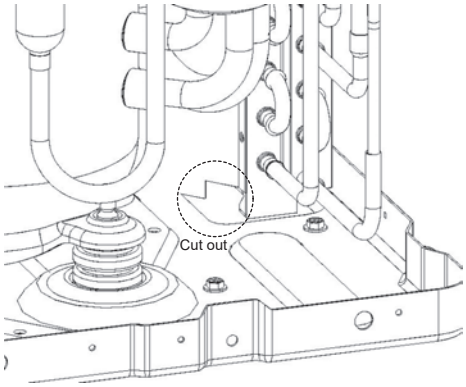
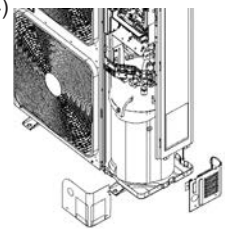
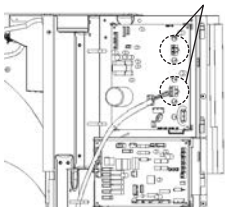
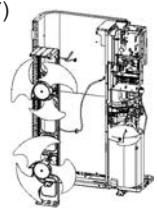
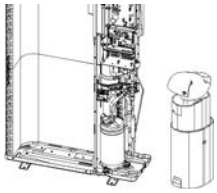
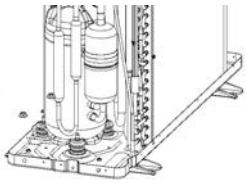
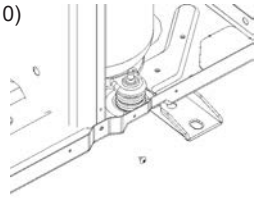
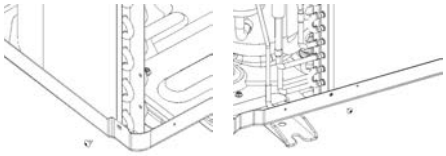
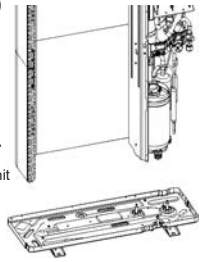
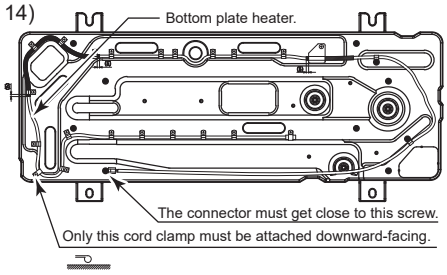
| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 4 | Electric parts replacement | 2. Reactor<br>1) Perform the step 1-1.<br><br>2) Remove the reactor lead connected to the control board.<br>Reactor lead connector A, B<br><br>3) Cut the binding tie that binds the compressor leads and fan motor leads.<br><br>4) Remove the reactor.<br>(Truss B tight screw Ø4 × 6, 4 screw)<br><br>5) Attach a new reactor.<br><br>**NOTE**<br>Be sure to bind the removed binding tie by using the commercially available binding tie.<br>Make sure that the fan motor lead and the reactor body do not contact each other. |  <br>  |

| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 5 | Fan motor | 1) Perform the step 1-1 and step 2.<br><br>2) Remove the fan motor and the flange nut that fixes the propeller fan.<br>• To loosen the flange nut, turn it clockwise. (Turn it counter clockwise for tightening.)<br><br>3) Remove the propeller fan.<br><br>4) Remove the connector for fan motor from the inverter. (control board)<br>(Remove the ferrite core of the lower fan motor to use it again for a new fan motor.)<br><br>5) Remove the fan motor lead from the fan motor lead fixing rubber on the through hole of the parting board.<br><br>6) Remove the fixed screws (4 for each) while holding the fan motor so that it does not drop.<br><br>* Notes in assembling fan motor<br>• Tighten the flange nut in 4.95 N•m (50 kgf•cm).<br>• To prevent the fan motor lead from contacting the propeller fan, adjust the length of fan motor lead fixing rubber so that it does not slack. Attach the fan motor lead fixing rubber to the parting board so that the projection part is placed on the refrigerant cycle side.<br>• Make sure that the reactor body and the fan motor lead do not contact each other.<br>• Be sure to bind the removed binding tie by using the commercially available binding tie.<br>• Be sure to re-attach the ferrite core of the lower fan motor. (Fix this with a commercially available binding tie.)<br><br>**NOTE**<br>Fix the fan motor lead to the motor base using a metal tie so that the fan motor lead does not contact the propeller fan. |  <br>  <br>  <br>  <br>  <br>  |

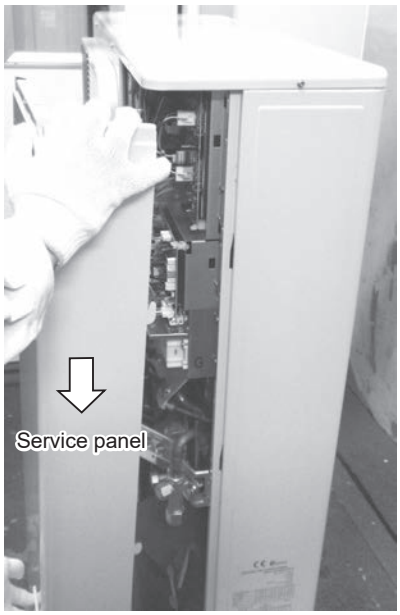
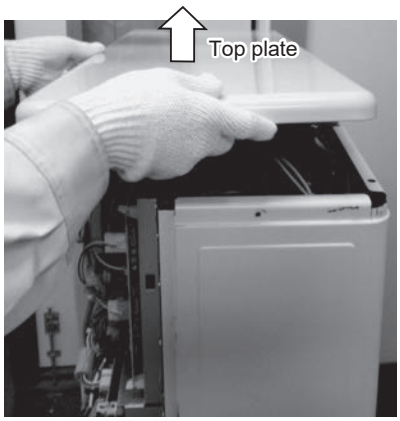
| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 6 | Compressor<br>Compressor lead | 1. Remove defective compressor<br>1) Perform refrigerant gas recovery.<br>2) Perform the step 1-1 and step 3.<br>3) Remove the piping panel (Front).<br>Remove screws of the piping panel (Front) and bottom board.<br>(Hex Ø4 × 10, 2 screws)<br>Remove screws of the piping panel (Front and Back).<br>(Hex Ø4 × 10, 1 screws)<br>4) Remove the piping panel (Back).<br>Remove screws of the piping panel (Back) and bottom board.<br>(Hex Ø4 × 10, 2 screws)<br>5) Remove the soundproofing board. (Upper, Inward winding, Outward winding)<br>6) Remove the compressor terminal cover, and then remove the compressor lead and compressor case thermostat.<br>  <br><br>7) Remove the TD sensor fixed to the discharge piping.<br>8) Remove the compressor lead. (Leave the ferrite core attached to the electrical control box.)<br>Control board U: CN200 Red<br>V: CN201 White<br>W: CN202 Black<br>9) Remove the outlet and suction pipes connected to the compressor by using a burner.<br><br>**⚠ WARNING**<br>When removing the piping by burning the solder, take enough care for a fire going off at the moment the wax melts if oil remains inside the piping.<br><br>**NOTE**<br>Do not make fire flame contact with the 4-way valve and pulse motor valve.<br>(This may cause an operation failure.)<br><br>10) Pull out the discharge and suction pipes of the refrigerant cycle upward.<br>11) Remove the compressor nuts that fix the compressor to the bottom board. (3 nuts)<br>12) Pull the compressor out toward you.<br><br>**NOTE**<br>The compressor weighs 20 kg or more.<br>Two people should be required to handle it. |  <br><br>  <br><br>  <br><br>  <br><br>  <br><br>  <br> |

| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 6 | Compressor<br>Compressor lead | 2. Attach the compressor<br>1) Attach the compressor in the reverse order of the removal.<br>**NOTE**<br>• Be sure to replace the compressor lead after the compressor replacement. (Compressor lead spare parts code: 43160591)<br>At this time, wind the ferrite core with the compressor lead for 4 times.<br>• Attach the soundproofing board (Inward winding, Outward winding), as shown in the right figure, through between the compressor and between the piping and parting board.<br>• Fix the TD sensor with a commercially available heat resistant binding tie through the piping cover so that the sensor do not contact the discharge pipe.<br><br>3) Vacuuming<br>1) Connect the vacuum pump to the charge port and check joint of the gas piping valve to operate the vacuum pump.<br>2) Perform vacuuming until the vacuum low pressure gauge shows 1(mmHg).<br>**NOTE**<br>Open fully the pulse motor valve before vacuuming. With the valve closed, vacuuming between the outdoor unit liquid valve and the pulse motor valve may fail.<br><br>How to make pulse motor valve forcible full open<br>• Turn on the electric leakage breaker.<br>• Set the SW804 dip switch 1 and 3 on the outdoor unit control board to ON.<br>• Press SW801 on the outdoor unit control board for 1 second or longer.<br>• After pressing SW801 for 1 second or longer, turn off the electric leakage breaker within 2 minutes.<br><br>4. Charge refrigerant<br>1) Add refrigerant whose amount is defined according to the piping length from the valve charge port. (HWS-P805HR-E, P1105HR-E : 2.7 kg) |  <br>  <br>  <br>  |

| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 7 | Pulse motor valve coil | 1. How to remove<br>1) Perform the step 1-1.<br>2) Remove the coil from the pulse motor valve body by pulling upward while rotating the coil.<br><br>2. How to attach<br>1) Fix the coil by exactly adjusting the coil positioning projection to the recess of the pulse motor valve body. |  |
| 8 | Fan guard | 1. How to remove<br>1) Perform the step 1-1 and step 2.<br>**NOTE**<br>Perform a replacement work on cardboard or cloth to prevent the product from being damaged.<br><br>2) Remove the outlet cabinet and put with the fan guard side down.<br>3) Remove the screw for the bell mouth and fan guard.<br>(PT2P Ø3 x 14 and washer, 4 pcs.)<br><br>4) Release the hooks (8 positions) of the fan guard.<br><br>2. How to attach<br>1) Press the hooks (8 positions) with hands from the front side to fix them.<br>2) Attach the bell mouth fixed with screws and washers.<br>(PT2P Ø3 x 14 and washer, 4 pcs.)<br>**NOTE**<br>Check that all the hooks are fixed to the given positions. |  |

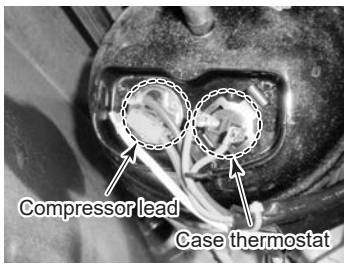
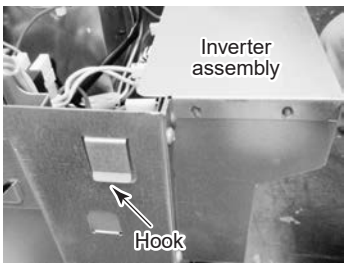
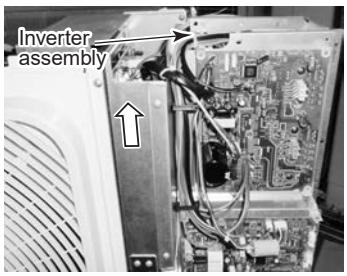
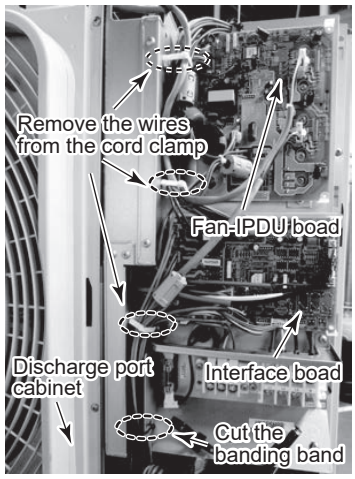
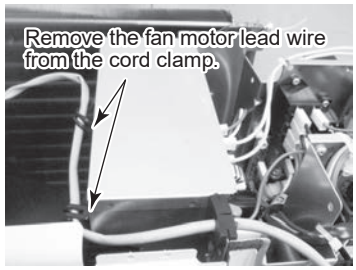
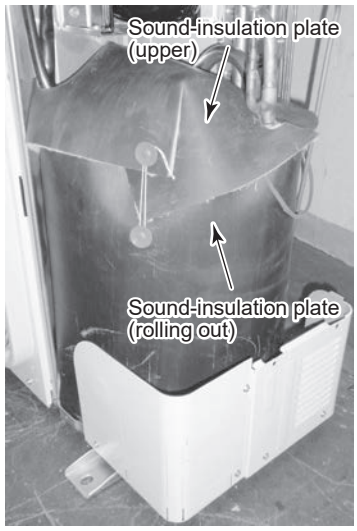
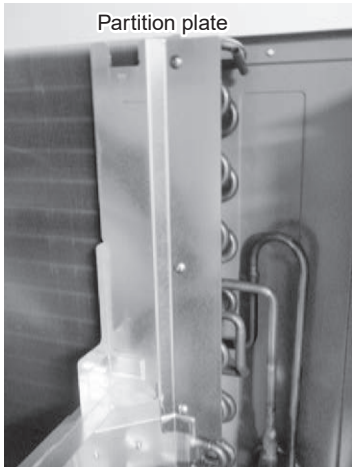
| No. | Exchange parts name | Work procedure | Remarks |
|---|---|---|---|
| 9 | Bottom plate heater | 1. Detachment<br>1) Recover the refrigerant. (See 16-1. Refrigerant recovery control)<br>Drain the water in the hydro unit before refrigerant recovery.<br>2) Execute steps 1-1, 2, and 3.<br>3) Detach the two fin guards.<br>(9 pcs. hex screws Ø4 × 10)<br>4) Detach the two piping panels.<br>(5 pcs. hex screws Ø4 × 10)<br>5) Disconnect the 3” and 5” refrigerant pipes.<br>6) Disconnect the fan motor connectors from the PC board (one for the upper fan and one for the lower fan. Cut the tie-lap bands (6) location)<br>7) Detach the fan motor base.<br>(2 pcs. hex screws Ø5 × 10)<br>8) Remove the insulation mats (One above the compressor and two around it).<br>9) Remove the three nuts fixing the compressor.<br>10) Remove the screw fixing the partition plate and bottom plate.<br>(1 pcs. ST1T Ø4 × 8)<br>11) Remove the screws fixing the heat exchanger and bottom plate.<br>(2 pcs. ST1T Ø4 × 8)<br>12) Disconnect the connector of the bottom plate heater from the CDB PC board.<br>13) Lift the main unit up and detach the bottom plate.<br>14) Replace the heater.<br>(21 pcs. ST2T Ø4 × 8 and 2 pcs. hex screw Ø5 × 10)<br><br>2. Attachment<br>Execute the opposite of steps 1)-13) in reverse order.<br><br>**Note for step 10**<br>The partition plate has a cutout for the heater. Connect the heater cord through the cutout when reassembling the unit.<br>  <br> | 3)<br> <br>4)<br>  <br>Fan motor connection<br>6)<br>  <br>7)<br>  <br>8)<br>  <br>9)<br>  <br>10)<br>  <br>11)<br>  <br>13)<br>  <br><br>14)<br>  <br> |

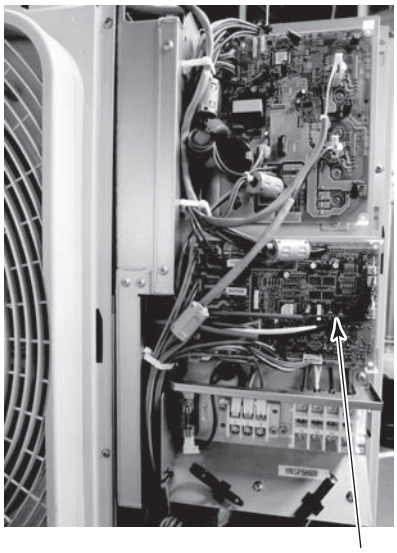
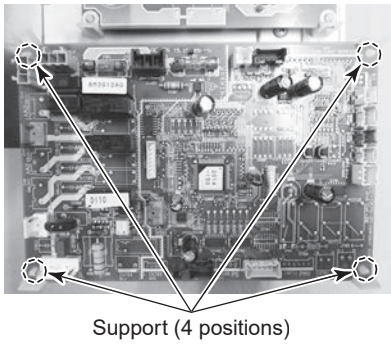
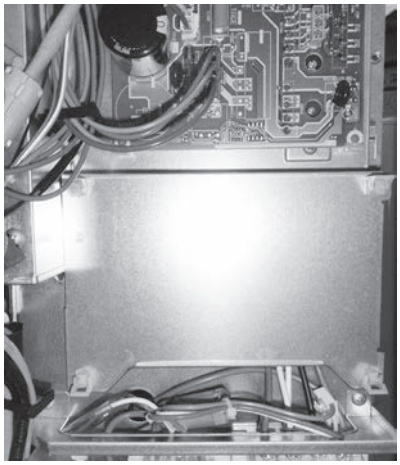
## HWS-P805H8R-E, P1105H8R-E , P1405H8R-E

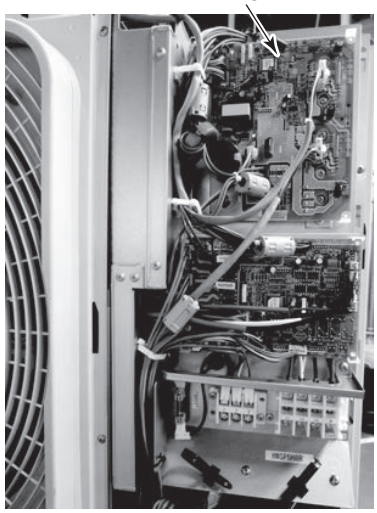
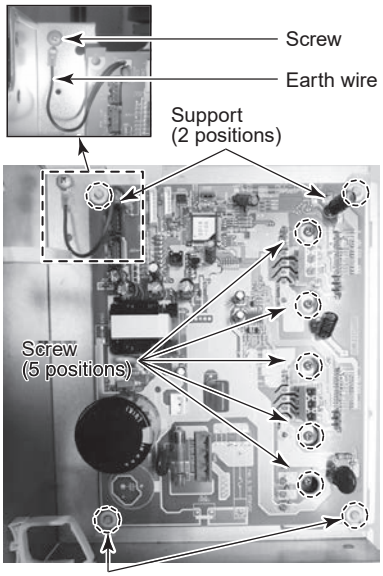
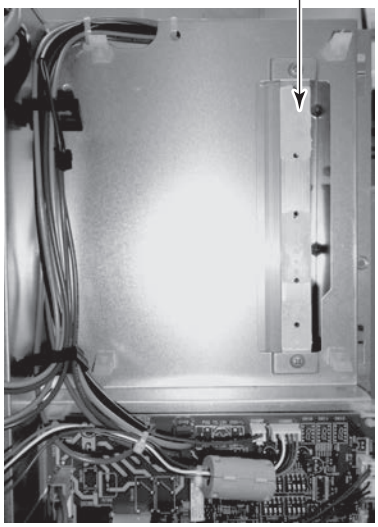
| No. | Part name | Procedure | Remarks |
|---|---|---|---|
| 1 | Common procedure | **⚠ WARNING**<br>Stop operation of the air to water and turn off breaker switch.<br><br>**⚠ CAUTION**<br>Ensure wearing of gloves when performing any work in order to avoid injury from parts, etc.<br><br>1. Detachment<br>1) Remove the service panel.<br>(Hexagonal screws Ø4 × 10, 2 pcs.)<br>• Remove the screws and then pull service panel downward to remove.<br>2) Remove the power supply cable and the system interconnection wire from the cord clamp and the terminal.<br>3) Remove the top plate.<br>(Hexagonal screws Ø4 × 10, 5 pcs.)<br><br>2. Attachment<br>1) Attach the top plate.<br>(Hexagonal screws Ø4 × 10, 5 pcs.)<br>2) Connect the power supply cable and the system interconnection wire to the terminal and then fix with the cord clamp.<br><br>**⚠ CAUTION**<br>The power supply cable and the system interconnection wire must be affixed along the crossover pipe using a commercially available bundling band so that they do not make contact with the compressor, gas valve, gas pipe and discharge pipe.<br><br>3) Attach the front panel.<br>(Hexagonal screws Ø4 ×10, 2 pcs.) |  <br>  |

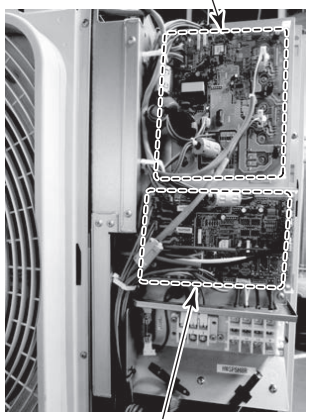
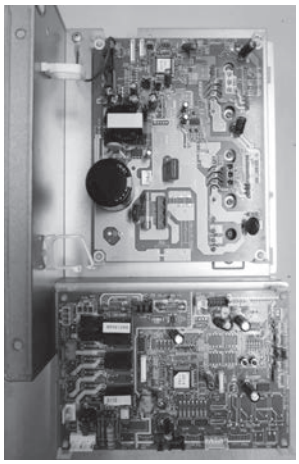
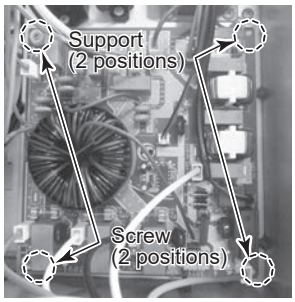
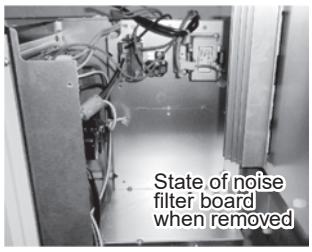
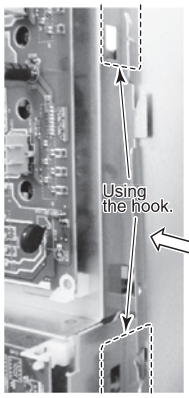
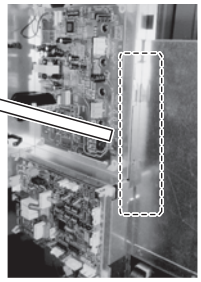
| No. | Part name | Procedure | Remarks |
|---|---|---|---|
| 2 | Discharge port cabinet | 1. Detachment<br>1) Carry out the operation in 1. of 1) above.<br>2) Remove the screws fixing the inverter assembly, the discharge port cabinet and the partition board. (ST1T Ø4 × 8, 4 pcs.)<br>3) Remove the screws for the discharge port cabinet and the bottom plate. (Hexagonal screw Ø4 × 10, 2 pcs.)<br>4) Remove screw for the discharge port cabinet and heat exchanger. (ST1T Ø4 × 8, 1 pc.)<br>5) Remove screw for the discharge port cabinet and the motor base. (ST1T Ø4 × 8, 2 pcs.)<br>6) Remove screws for the discharge port cabinet and the fin guard. (Hexagonal screw Ø4 × 10, 2 pcs.)<br><br>2. Attachment<br>1) Attach the discharge port cabinet and end board of heat exchanger and fix with a screw. (ST1T Ø4 × 8, 1 pc.)<br>2) Mount other removed screws into original positions. | |

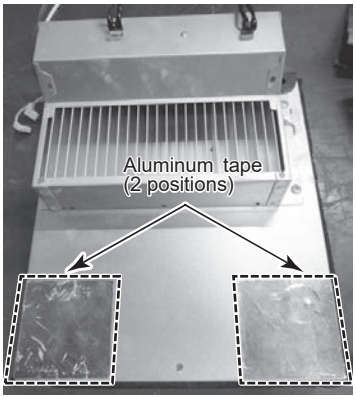
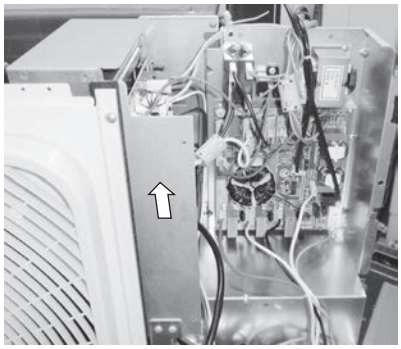
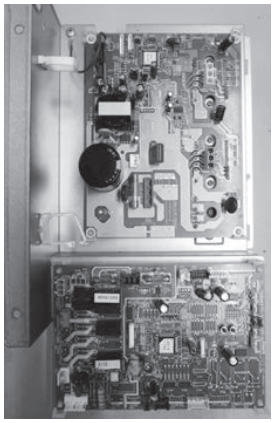
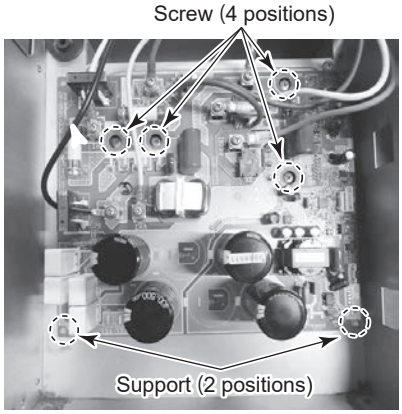
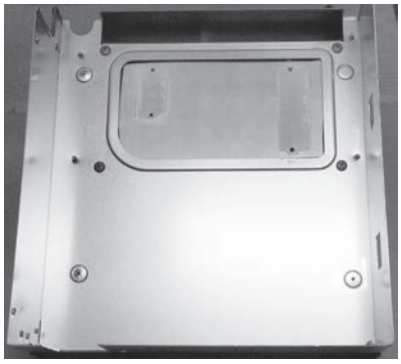
| No. | Part name | Procedure | Remarks |
|---|---|---|---|
| 3 | Side cabinet | 1. Detachment<br>1) Carry out the operation in 1. of 1) above.<br>2) Remove the screws fixing the inverter assembly and the side cabinet. (ST1T Ø4 × 10, 3 pcs.)<br>3) Remove the screws for the side cabinet and the valve fixing plate. (ST1T Ø4 × 10, 2 pcs.)<br>4) Remove screw for the side cabinet and piping panel (rear). (Hexagonal screw Ø4 × 10, 2 pcs.)<br>5) Remove screw for the side cabinet and the bottom plate. (Hexagonal screw Ø4 × 10, 1 pc.)<br>6) Remove screws for the side cabinet, heat exchanger and the fin guard. (Hexagonal screw Ø4 × 10, 5 pcs.)<br><br>2. Attachment<br>1) Temporarily suspend the side cabinet on the inverter assembly using the hook.<br>2) Mount the removed screws in the opposite procedure to that during detachment. | <br> |

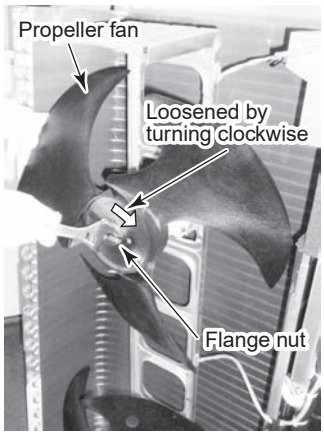
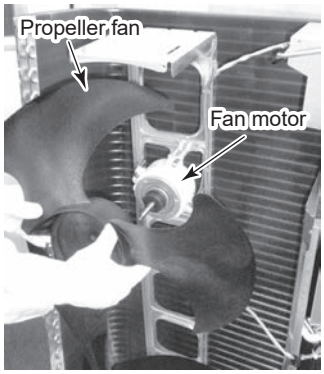
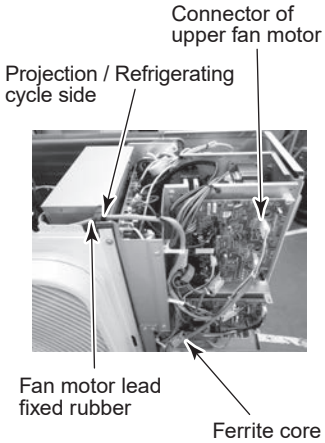
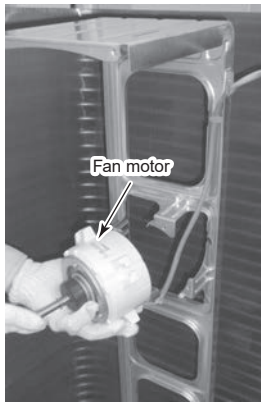
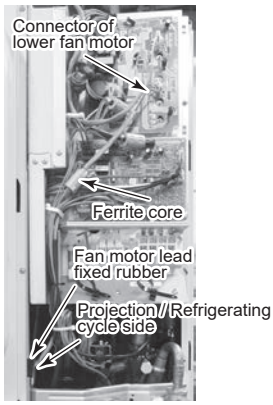
| No. | Part name | Procedure | Remarks |
|---|---|---|---|
| 4 | Inverter assembly | 1. Detachment<br>1) Carry out the operation in 1. of 1), 1. of 3) above.<br>2) Remove the connectors connected to the Fan IPDU board, the connector connected to other components from the control board<br>• Interface board<br>CN600 : TS sensor (3P: White, tube: Gray)<br>CN601 : TE sensor (2P: White, tube: Blue)<br>CN602 : TO sensor (2P: Yellow, tube: Black)<br>CN603 : TD sensor (3P: White, tube: Red)<br>CN604 : TL sensor (2P: White, tube: White)<br>CN609 : Case thermo. (2P: Blue)<br>CN690 : High pressure switch (3P: Green)<br>CN700 : 4-way coil (3P: Yellow)<br>CN710 : PMV coil (6P: White)<br>CN707 : 2-way coil (2P: White)<br>CN709 : Heater (3P: Gray)<br>CN607 : Pd sensor (4P: Red)<br>• Fan IPDU board<br>CN700 : Outdoors lower fan motor (3P: Blue)<br>CN750 : Outdoors upper fan motor (3P: White)<br>Cut the banding band and remove connector connected from fan motor to fan motor relay board.<br>* Remove connectors after unlocking housing section.<br>3) Remove the screw (1 position) fixing the discharge port cabinet.<br>4) Cut bundling band fixing various lead lines to inverter assembly.<br>5) Remove sound-insulation plate (upper).<br>6) Remove terminal cover of compressor and remove compressor lead.<br>7) Pull up the inverter assembly at upper side to remove hook of partition plate (rear left part).<br><br>2. Attachment<br>1) Mount the inverter assembly on the partition plate.<br><br>⚠ **CAUTION**<br>When mounting the inverter assembly on the partitioning plate, ensure proper mounting of the hook (rear left part) with partitioning plate.<br><br>2) Mount the individual components in the opposite procedure to that during detachment.<br><br>  <br>  <br>  |  <br>  <br>  <br>  |

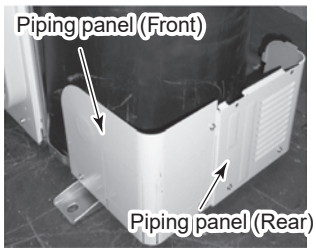
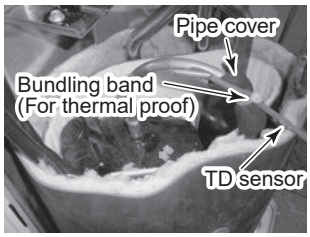
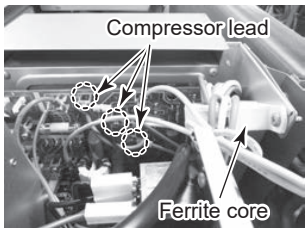
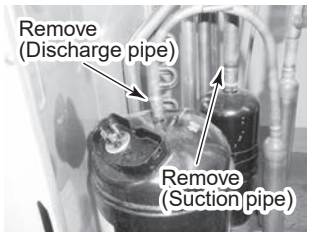
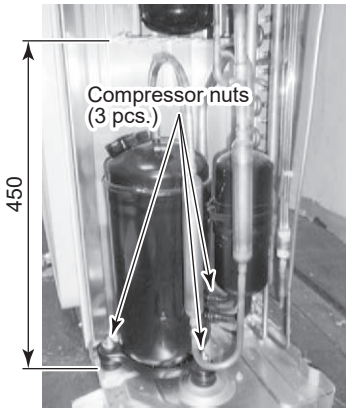
| No. | Part name | Procedure | Remarks |
|---|---|---|---|
| 5 | Interface board<br>(Control board)<br>MCC-1675 | 1. Detachment<br>1) Carry out the operation in 1. of 1), 1. of 3) above.<br>2) Remove lead wires and connectors to other components from the interface board (control board).<br>CN01 : Hydro/Outdoor connection terminal (5P: White)<br>CN02 : Power relay (3P: Red)<br>CN600 : TS sensor (3P: White, tube: Gray)<br>CN601 : TE sensor (2P: Green, tube: Blue)<br>CN602 : TO sensor (2P: Yellow, tube: Black)<br>CN603 : TD sensor (3P: White, tube: Red)<br>CN604 : TL sensor (2P: White, tube: White)<br>CN608 : Connection with noise filter board (2P: White)<br>CN609: Case thermo. (2P :Blue)<br>CN690 : High pressure switch (3P: Green)<br>CN700 : 4-way coil (3P: Yellow)<br>CN708 : Magnet switch (3P: Blue)<br>CN710 : PMV coil (6P: White)<br>CN802 : Connection with Fan IPDU board (5P: Red)<br>CN707 : 2-way coil (2P: White)<br>CN709 : Heater (3P: Gray)<br>CN607 : Pd sensor (4P: Red)<br><br>* Remove connectors after unlocking housing section<br><br>3) Remove the claws of the supports (4 positions) fixing the board and remove the interface board (Control board).<br><br>2. Attachment<br>1) Mount the interface board (Control board).<br>2) Mount the individual components in the opposite procedure to that during detachment. |  <br>Interface board (Control board)<br>  <br>Support (4 positions)<br>  <br>Statue of control board when removed |

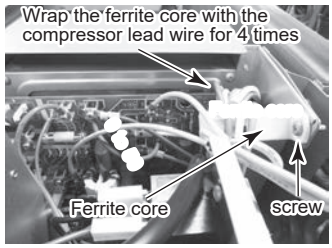
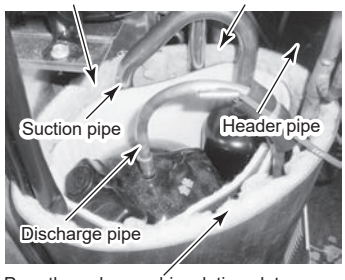
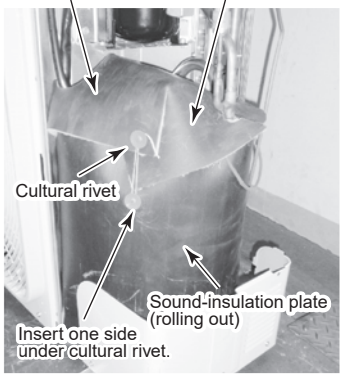
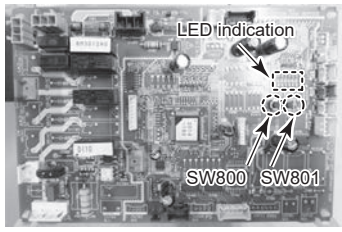
| No. | Part name | Procedure | Remarks |
|---|---|---|---|
| 6 | Fan-IPDU board<br>MCC-1597 | 1. Detachment<br>1) Carry out the operation in 1. of 1), 1. of 3) above.<br>2) Remove lead wires and connectors to other components from the Fan-IPDU board.<br>CN500 : Connection between reactor and noise filter board (7P, Red)<br>CN502 : Compressor IPDU board (3P, White)<br>CN504 : Compressor IPDU board (5P, Blue)<br>CN505 : Interface board (5P, Red)<br>CN602 : Noise filter board (2P, Black)<br>CN700 : Outdoors lower fan motor (3P, Blue)<br>CN750 : Outdoors upper fan motor (3P, White)<br><br>* Connectors should be removed after unlocking the housing section.<br><br>3) Remove screw fixing the earth wire.<br>4) Remove the claw of the support (4 positions) fixing the board and the screw (5 positions) fixing the heat sink and then remove the Fan-IPDU board.<br><br>2. Attachment<br>1) Mount Fan-IPDU board<br>2) Mount components in the opposite method to that when removing. |  <br>  <br>  <br>State of Fan-IPDU board when removed |

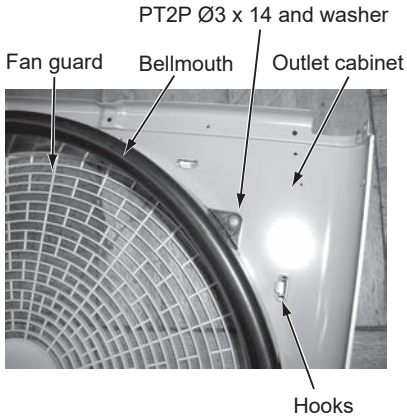
| No. | Part name | Procedure | Remarks |
|---|---|---|---|
| 7 | Noise filter board<br>MCC-1600 | 1. Detachment<br>1) Perform the operation in 1. of 1),1. of 4), 1.-2 of 5) and 1.-2 of 6).<br>2) Remove the screws (3 positions) fixing the inverter assembly (front). Then slide the inverter assembly (front) upwardly and remove.<br>3) Remove the lead wires connector to other components from the noise filter board.<br>CN05: Power supply terminal block (Red)<br>CN06: Power supply terminal block (White)<br>CN07: Power supply terminal block (Black)<br>CN08: Power supply terminal block (Gray)<br>CN09: Connection to earth (Brown)<br>CN10: Posister (Red)<br>CN16: Relay (Red)<br>CN17: Compressor IPDU board (White)<br>CN18: Relay (Black)<br>CN19: Interface board (Gray)<br>CN20: Power supply terminal block (White)<br>CN22: Fan-IPDU board (5P, Red)<br>CN50: Interface board (2P, White)<br>CN51: Fan-IPDU board (2P, Black)<br><br>* Connectors should be removed after unlocking the housing section.<br><br>4) Remove the claw of the support (2 positions) and the screw (2 positions) fixing the base and then remove the noise filter base.<br><br>2. Attachment<br>1) Mount noise filter board.<br>2) Mount components in the opposite method to that when removing. | Fan-IPDU board<br>  <br>Interface board<br>  <br>Inverter assembly (front)<br>  <br>Noise filter board<br>  <br> <br>Using the hook,<br>it is possible to temporarily suspend the inverter assembly (front).<br>  <br>  |

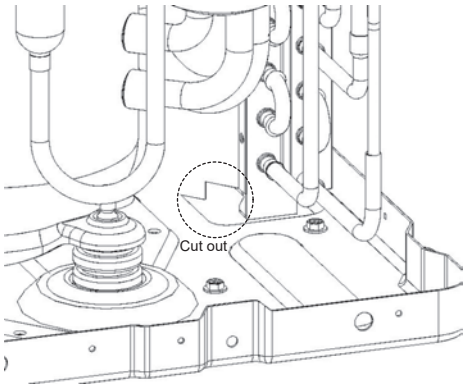
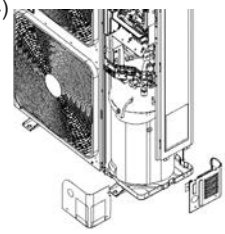
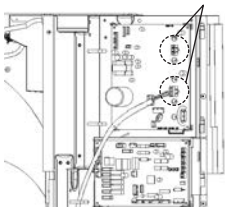
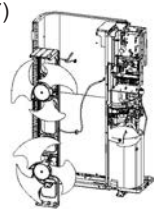
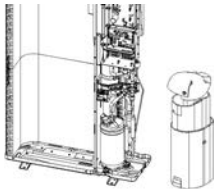
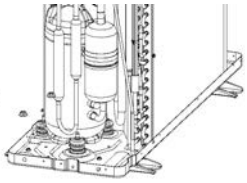
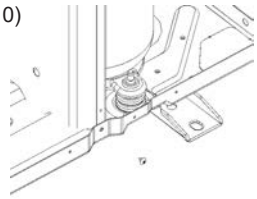
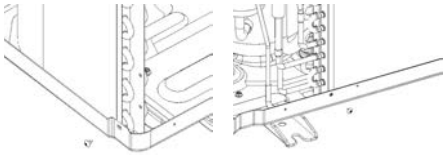
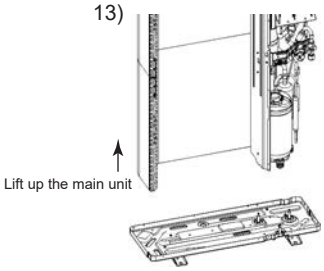
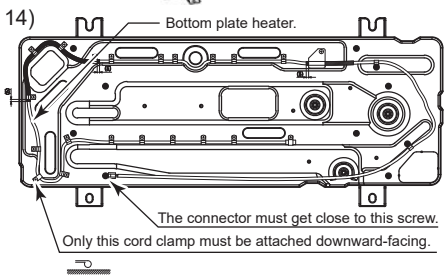
| No. | Part name | Procedure | Remarks |
|---|---|---|---|
| 8 | Compressor IPDU board MCC-1698 | 1. Detachment<br>1) Carry out the operation in 1. of 1), 1. of 4), 1. of 5), 1. of 6) and 1. of 7).<br>2) Remove the screw (4 positions) fixing the inverter assembly (IPDU).<br>3) Remove the lead wire and connector to other components from the compressor IPDU board.<br>CN04 : Posister (Red)<br>CN09 : Reactor (Yellow)<br>CN10 : Reactor (Yellow)<br>CN01 : Relay (Red)<br>CN02 : Noise filter board (White)<br>CN03 : Relay (Black)<br>CN101 : FAN-IPDU board (3P, White)<br>CN201 : Compressor (Black)<br>CN202 : Compressor (White)<br>CN203 : Compressor (Red)<br>CN852 : FAN-IPDU board (5P, White)<br><br>* Connectors should be removed after unlocking the housing section.<br><br>4) Slide and remove the inverter assembly (IPDU).<br>5) Remove the screw (4 positions) fixing the heat sink and the support (2 positions) fixing the compressor IPDU board and then remove the compressor IPDU board.<br><br>2. Attachment<br>1) Mount compressor IPDU board.<br>2) Mount components in the opposite method to that when removing.<br><br>* To replace the support of compressor IPDU board, attach the aluminium tape to the position shown below.<br>  <br> |  <br>  <br>Inverter assembly (front)<br><br>Screw (4 positions)<br>  <br><br>Compressor IPDU bord<br>  <br>State of compressor IPDU board when removed |

| No. | Part name | Procedure | Remarks |
|---|---|---|---|
| 9 | Fan motor | 1. Detachment<br>1) Carry out works of item 1 of 1) and work of 2).<br>2) Remove the flange nut fixing the fan motor and the propeller fan.<br>• The flange nut is loosened by turning it clockwise. (When tightening it, turn it counterclockwise.)<br>3) Remove the propeller fan.<br>4) Remove the connector for the fan motor from the inverter.<br>(Remove the ferrite core of the lower fan motor because it is used.)<br>5) Remove the fan motor lead from the fan motor lead fixed rubber of the penetrated part of the partition board.<br>6) Remove the fixing screws (4 pieces each) while supporting the fan motor so that it does not fall down.<br>* Cautions for assembling of fan motor<br>• Tighten the flange nut with 4.95N•m (50 kgf•cm).<br>• Adjust length of the fan motor lead wire at the fan motor lead fixed rubber so that the fan motor lead is not slackened; otherwise the fan motor lead may come to contact with the propeller fan.<br>Attach the fan motor lead fixed rubber to the partition board so that the projection is set at the refrigerating cycle side.<br>• Be sure so that the rector body does not contact with the fan motor lead.<br>• Be sure to bundle the removed bundling band with the bundling band on the market.<br>• Necessarily attach the ferrite core of the lower fan motor again. (Fix it with bundling band on the market.)<br><br>**REQUIREMENT**<br>Be sure to fix the fan motor lead to the motor base using the metal band of the motor base so that the fan motor lead does not come to contact with the propeller fan. |  <br>  <br>  <br>  <br>  |

| No. | Part name | Procedure | Remarks |
|---|---|---|---|
| 10 | Compressor<br>Compressor lead | 1. Removal of defective compressor<br>1) Recover the refrigerant gas.<br>2) Carry out work of item 1 of 1), 1 of 3) and 1 of 7).<br>3) Remove the piping panel (Front).<br>Remove the piping panel (Front) and screws of the bottom plate. (Hexagonal screw Ø4 × 10, 2 pcs.)<br>Remove screw of the piping panel (Front) and the piping panel (Rear). (Hexagonal screw Ø4 × 10, 1 pc.)<br>4) Remove the piping panel (Rear).<br>Remove the piping panel (Rear) and screws of the bottom plate. (Hexagonal screw Ø4 × 10, 2 pcs.)<br>5) Remove the sound-insulation plate.<br>(Upper, rolling in, rolling out)<br>6) Remove the terminal cover of the compressor and then remove the compressor lead and the compressor case thermo.<br>7) Remove TD sensor which is fixed to the discharge pipe.<br>8) Remove the compressor lead.<br>Control PC board U: CN203 Red<br>V: CN202 White<br>W: CN201 Black<br>9) Remove ferrite core from compressor lead.<br>10) Using a burner, remove the discharge pipe and the suction pipe which are connected to the compressor.<br><br>**⚠ WARNING**<br>In case of removing the piping by broiling the welded part with a burner, if there is oil in the pipe, it may burst into flames at the moment that wax melted, so take sufficient care.<br><br>**⚠ CAUTION**<br>Note so that the flame does not catch the 4-way valve and PMV. (A malfunction may be caused.)<br><br>11) Pull off the discharge pipe and the suction pipe of the refrigerating cycle upward.<br>12) Remove the compressor nuts which fix the compressor to the bottom plate. (3 pcs.)<br>13) Pull out the compressor toward you.<br><br>**⚠ CAUTION**<br>As weight of the compressor is 20 kg or more, handle it by 2 workers. |  <br>  <br>  <br>  <br>  |

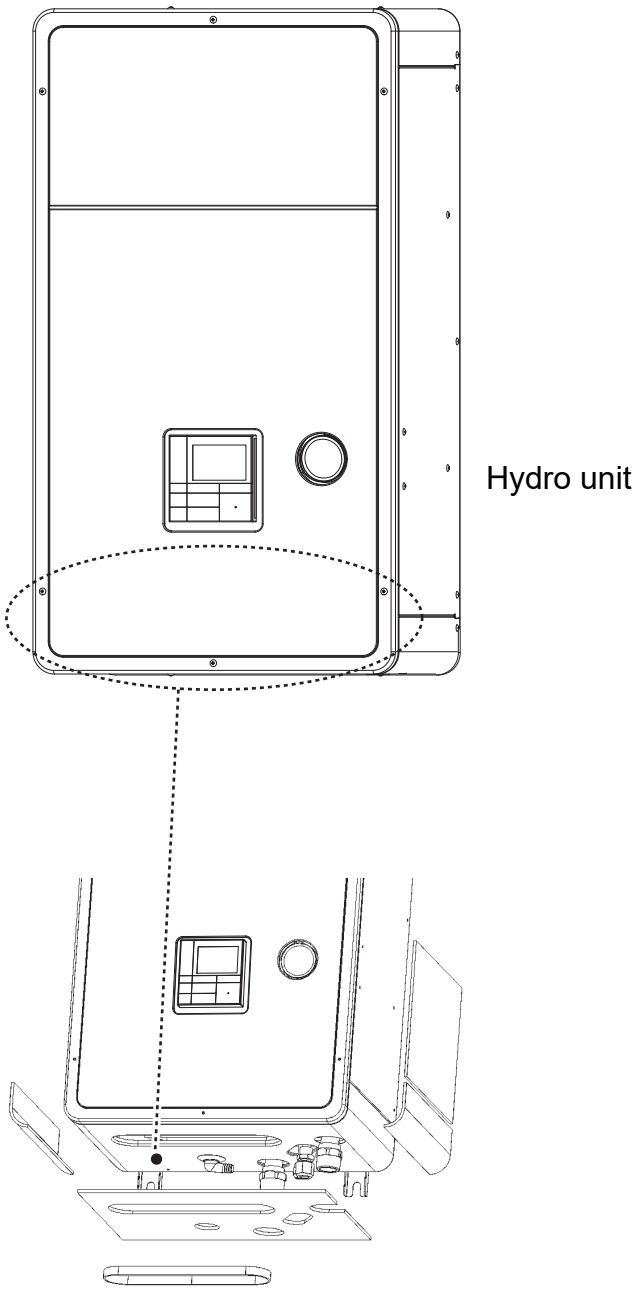
| No. | Part name | Procedure | Remarks |
|---|---|---|---|
| 10 | Compressor<br>Compressor lead<br>(Continued) | 2. Mounting of compressor<br>1) Mount the compressor in the reverse procedure for removal.<br><br>**NOTE**<br>• After replacement of the compressor, be sure to replace the compressor lead. (Repair part code of compressor lead: 43160612)<br>In this time, wrap the ferrite core with the compressor lead wire by 1 time.<br>• As shown in the right figure, mount the sound-insulation plate (rolling in, rolling out) by passing through it between the compressor and the piping, and between the piping and the partition board.<br>• Fix TD sensor by the bundling band for heat proof on the market via the pipe cover so that TD sensor does not directly come to contact with the discharge pipe.<br><br>3. Vacuuming<br>1) Connect the vacuum pump to the charge port and the check joint of the gas pipe valve and then drive the vacuum pump.<br>2) Carry out vacuuming until the vacuum low pressure gauge indicates 1 (mmHg).<br><br>**NOTE**<br>Before vacuuming, open PMV fully.<br>If PMV is closed, vacuum may be impossible between liquid pipe valve and PMV of the outdoor unit.<br><br>• Turn on the power supply breaker.<br>• Ensure that D805 of the LED indication of the outdoor unit is lit up. If D805 is not lit up (off or flashing) then push and hold down SW800 and SW801 at the same time for at least 5 seconds and check that D805 lights up.<br>• Push and hold SW800 down for at least 5 seconds or to confirm that D804 is slowly flashing (once/second).<br>• Push SW800 several times until the the LED indications(D800 to D804) become the following.<br><br>D800: ○ D801: ● D802: ○ D803: ● D804: ◎<br>● :Off ○ :Light ◎ :Flash (5 times/sec)<br><br>• Push SW801 and D805 will start rapidly flashing.<br>• Push and hold SW801 down for at least 5 seconds and D804 will start slowly flashing. Once D805 lights up the PMV will start to open.<br>After 30 seconds turn off the power breaker.<br><br>4. Refrigerant charge<br>1) Add the refrigerant amount determined by the pipe length from the charge port of the valve. |  <br>Put the end of sound-insulation plate (rolling out) on the other end at this position.<br>Pass through sound-insulation plate (rolling out) between suction pipe and header pipe.<br>  <br>Pass through sound-insulation plate (rolling in) between compressor and discharge pipe, suction pipe and then put the end of sound-insulation plate on the other end at this position.<br><br>There should be no clearance between sound-insulation plate (upper) and sound-insulation plate (rolling out).<br>Sound-insulation plate (upper)<br>  <br>  |

| No. | Part name | Procedure | Remarks |
|---|---|---|---|
| 11 | Pulse motor valve coil | 1. How to remove<br>1) Perform the step 1-1.<br>2) Remove the coil from the pulse motor valve body by pulling upward while rotating the coil.<br><br>2. How to attach<br>1) Fix the coil by exactly adjusting the coil positioning projection to the recess of the pulse motor valve body. | |
| 12 | Fan guard | 1. How to remove<br>1) Perform the step 1-1 and step 2.<br>**NOTE**<br>Perform a replacement work on cardboard or cloth to prevent the product from being damaged.<br><br>2) Remove the outlet cabinet and put with the fan guard side down.<br>3) Remove the screw for the bell mouth and fan guard.<br>(PT2P Ø3 x 14 and washer, 4 pcs.)<br><br>4) Release the hooks (8 positions) of the fan guard.<br><br>2. How to attach<br>1) Press the hooks (8 positions) with hands from the front side to fix them.<br>2) Attach the bell mouth fixed with screws and washers.<br>(PT2P Ø3 x 14 and washer, 4 pcs.)<br>**NOTE**<br>Check that all the hooks are fixed to the given positions. |  |

| No. | Part name | Procedure | Remarks |
|---|---|---|---|
| 13 | Bottom plate heater | 1. Detachment<br>1) Recover the refrigerant. (See 16-1. Refrigerant recovery control)<br>Drain the water in the hydro unit before refrigerant recovery.<br>2) Execute steps 1-1, 2, and 3.<br>3) Detach the two fin guards.<br>(9 pcs. hex screws Ø4 × 10)<br>4) Detach the two piping panels.<br>(5 pcs. hex screws Ø4 × 10)<br>5) Disconnect the 3” and 5” refrigerant pipes.<br>6) Disconnect the fan motor connectors from the PC board (one for the upper fan and one for the lower fan. Cut the tie-lap bands (6) location)<br>7) Detach the fan motor base.<br>(2 pcs. hex screws Ø5 × 10)<br>8) Remove the insulation mats (One above the compressor and two around it).<br>9) Remove the three nuts fixing the compressor.<br>10) Remove the screw fixing the partition plate and bottom plate.<br>(1 pcs. ST1T Ø4 × 8)<br>11) Remove the screws fixing the heat exchanger and bottom plate.<br>(2 pcs. ST1T Ø4 × 8)<br>12) Disconnect the connector of the bottom plate heater from the CDB PC board.<br>13) Lift the main unit up and detach the bottom plate.<br>14) Replace the heater.<br>(21 pcs. ST2T Ø4 × 8 and 2 pcs. hex screw Ø5 × 10)<br><br>2. Attachment<br>Execute the opposite of steps 1)-13) in reverse order.<br><br>**Note for step 10**<br>The partition plate has a cutout for the heater. Connect the heater cord through the cutout when reassembling the unit.<br>  <br> | 3)<br> <br>4)<br>  <br>Fan motor connection<br>6)<br>  <br>7)<br>  <br>8)<br>  <br>9)<br>  <br>10)<br>  <br>11)<br>  <br>13)<br>  <br><br>14)<br>  <br> |

# 13 For cooling installation

If user install the Hydro unit to place humidity location or high humidity region, also user use cooling mode, please attach moisture- proof parts which parts are contained in Hydro unit.




• Stick the optional insulator for cooling to the bottom of the Hydro Unit.

# 14 Periodic inspection items

For a long-term safe operation of this equipment, perform periodic inspection and parts replacement.

## <Inspection items>

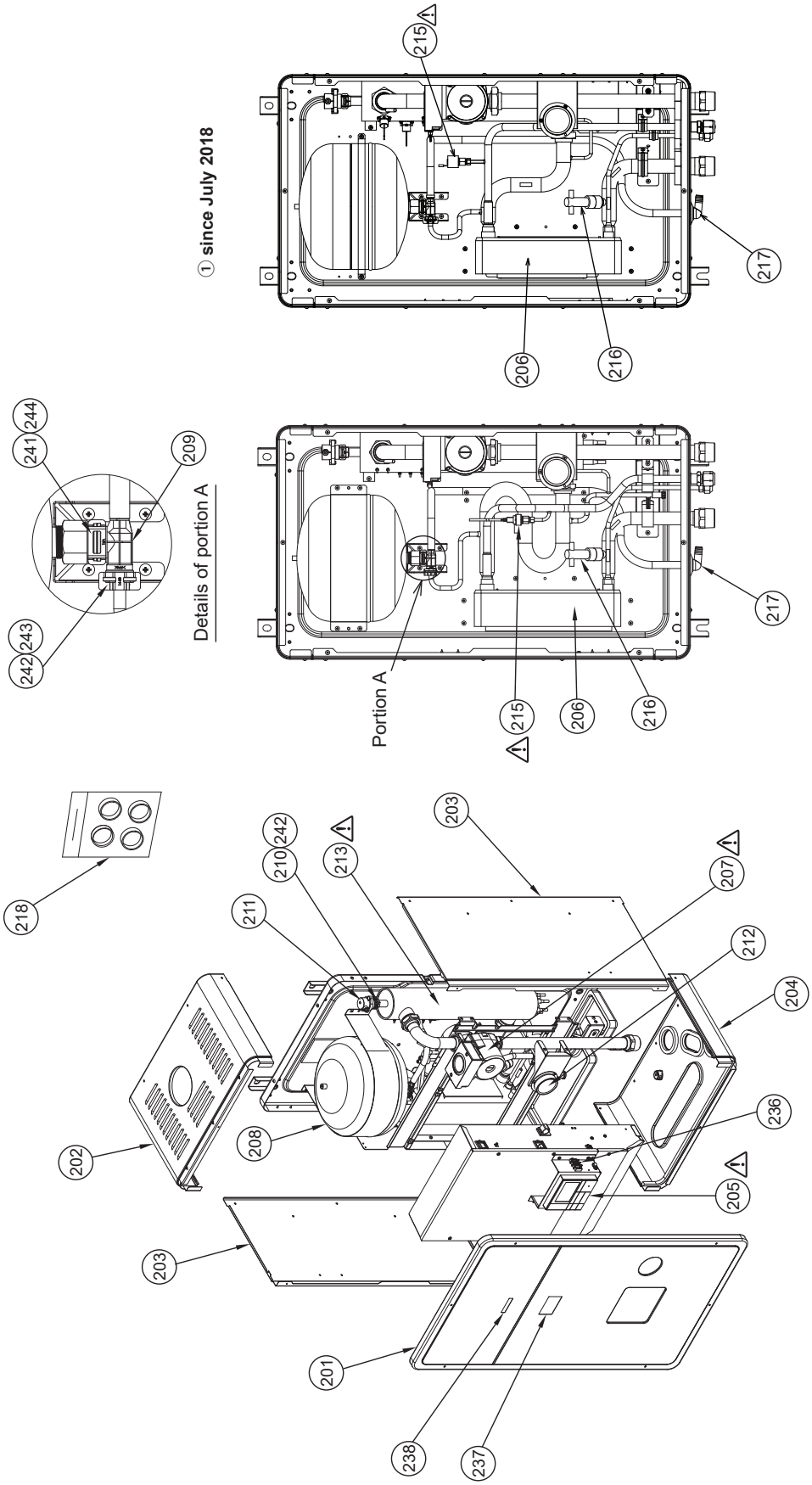
| Hydro unit (HWS-P805**-E, P1105**-E) | Frequency | Periodic inspection details |
|---|---|---|
| 1. Insulation measurement (Power source circuit / Heater circuit) | Annually | Insulation measurement with a mega tester |
| 2. Power source measurement (No-load voltage) | Annually | Electronic voltage measurement: 220-230 V ±10% |
| 3. Operation check | Annually | Hot water supply / Heating / *-Cooling operation check with remote controller |
| 4. Refrigerant leakage / Water leakage inspection | Annually | Visual inspection and check with a leak tester: No leakage must be found |
| 5. Water heat exchanger inspection (Internal dirt and clogging) | Annually | Checking for water dirtiness in a closed cycle, Cleaning |
| 6. Inlet / Outlet water temperature measurement | Annually | Temperature measurement: Temperature measurement during an operation |
| 7. Circulation pump inspection | Annually | No leakage or abnormal noise must be found (Replacement every 10 years: Charged) |
| 8. Air vent valve inspection | Annually | Water leakage, Air vent |
| 9. Expansion vessel | Annually | Visual check for charge pressure abnormality, water leakage, or corrosion |
| 10. Heater assembly | Annually | Check for appearance damage, deformation, or loose terminal |
| 11. Flow switch | Annually | Operation check while running |
| 12. Manometer | Annually | Water leakage, water pressure check |
| 13. Safety valve | Annually | Water leakage, Appearance check, Drainage check |
| 14. Water heat exchanger control board, Terminal block | Annually | Check for loose connector and connecting terminal |

| Outdoor unit (HWS-P805HR-E, P1105HR-E P805H8R-E, P1105H8R-E, P1405H8R-E) | Frequency | Periodic inspection details |
|---|---|---|
| 1. Insulation measurement (Power source circuit / Compressor) | Annually | Insulation measurement with a mega tester |
| 2. Power source measurement (No-load voltage / Rated operation) | Annually | Electronic voltage measurement:<br>220-230 V ±10% (Single phase type)<br>380-400 V ±10% (3 phase type) |
| 3. Operation frequency (Outdoor unit operation check) | Annually | Frequency check by rated operation (See 10-13) |
| 4. Refrigerant leakage inspection | Annually | Visual inspection and check connection with a leak tester: No leakage must be found |
| 5. Air heat exchanger inspection (Dirt and clogging) | Annually | Visual inspection, Clear clogging |
| 6. Fan inspection (Scratch, damage) | Annually | Check for scratches or damages to the fan or abnormal motor sound |
| 7. Cycle parts<br>(Compressor, 4-way valve, Pulse motor valve) | Annually<br>Annually | Operation check by trial run |
| 8. Inverter control board, Terminal block | Annually | Check for loose connector and connecting terminal |

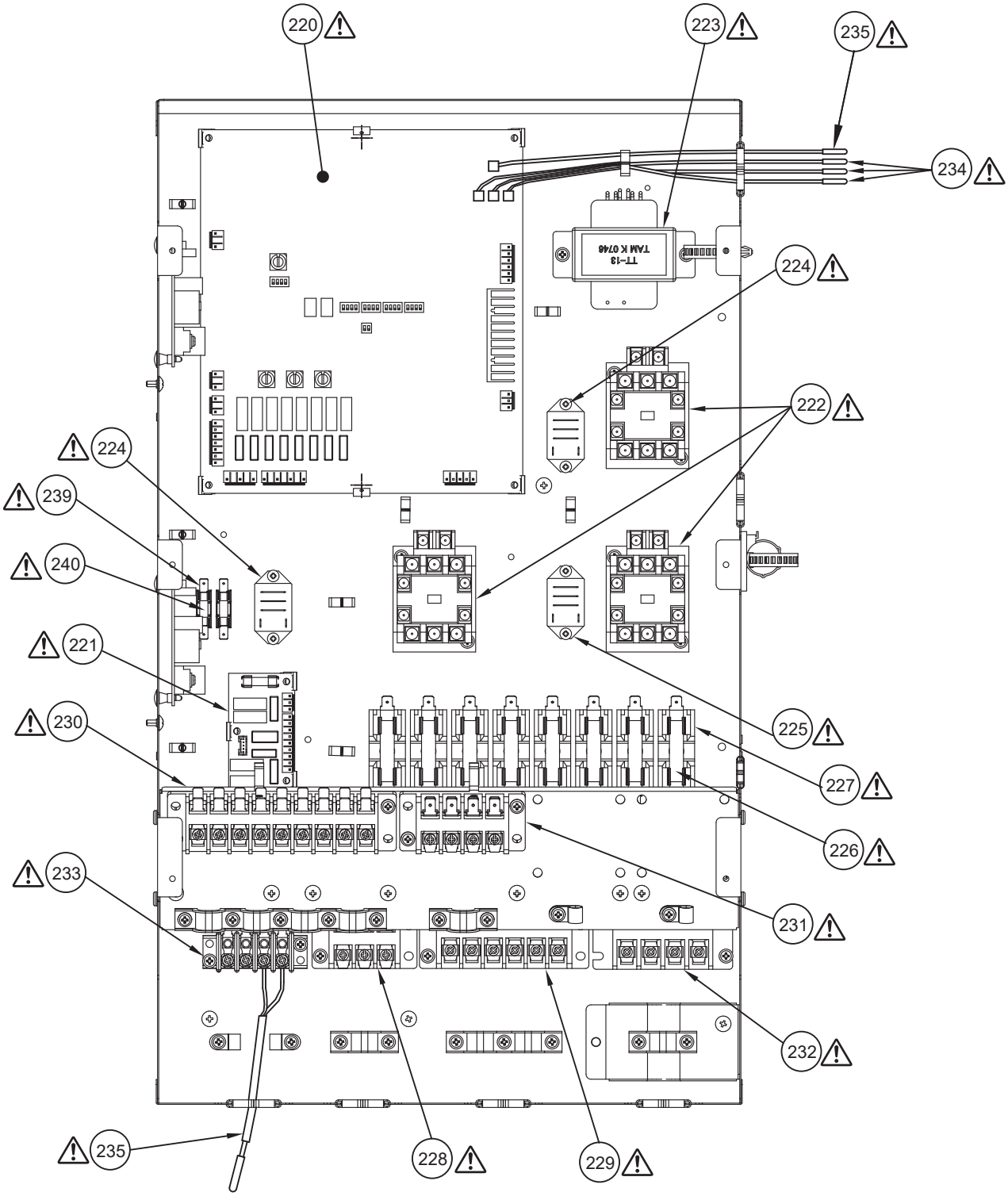
| Hot water cylinder (HWS-150CSHM3-E(-UK), 210CSHM3-E(-UK), 300CSHM3-E(-UK)) | Frequency | Periodic inspection details |
|---|---|---|
| 1. Insulation measurement (Power source circuit) | Annually | Insulation measurement with a mega tester |
| 2. Power source measurement (No-load voltage) | Annually | Electronic voltage measurement: 220-230 V ±10% |
| 3. Water leakage inspection | Annually | Visual inspection for leakage: No leakage must be found |
| 4. Terminal block | Annually | Check for loose connector and connecting terminal |
| 5. Heater assembly | Annually | Check for appearance damage, deformation, or loose terminal |
| 6. Temperature, Pressure relief valve (Specification for UK only) | Annually | Drainage check |

# 15 Part exploded view, part list

## Hydro Unit

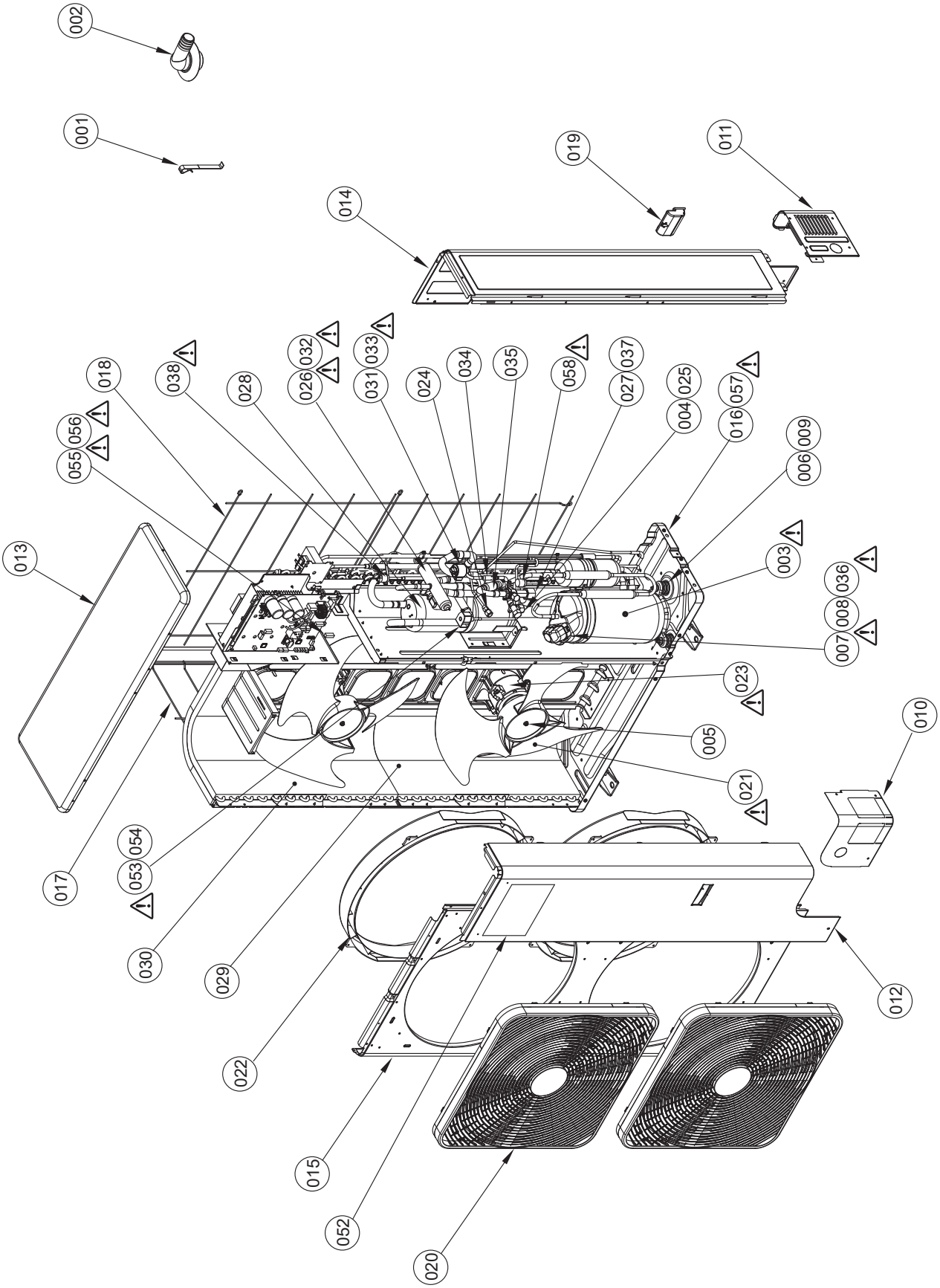


## E-P-Box Assembly (Hydro Unit)



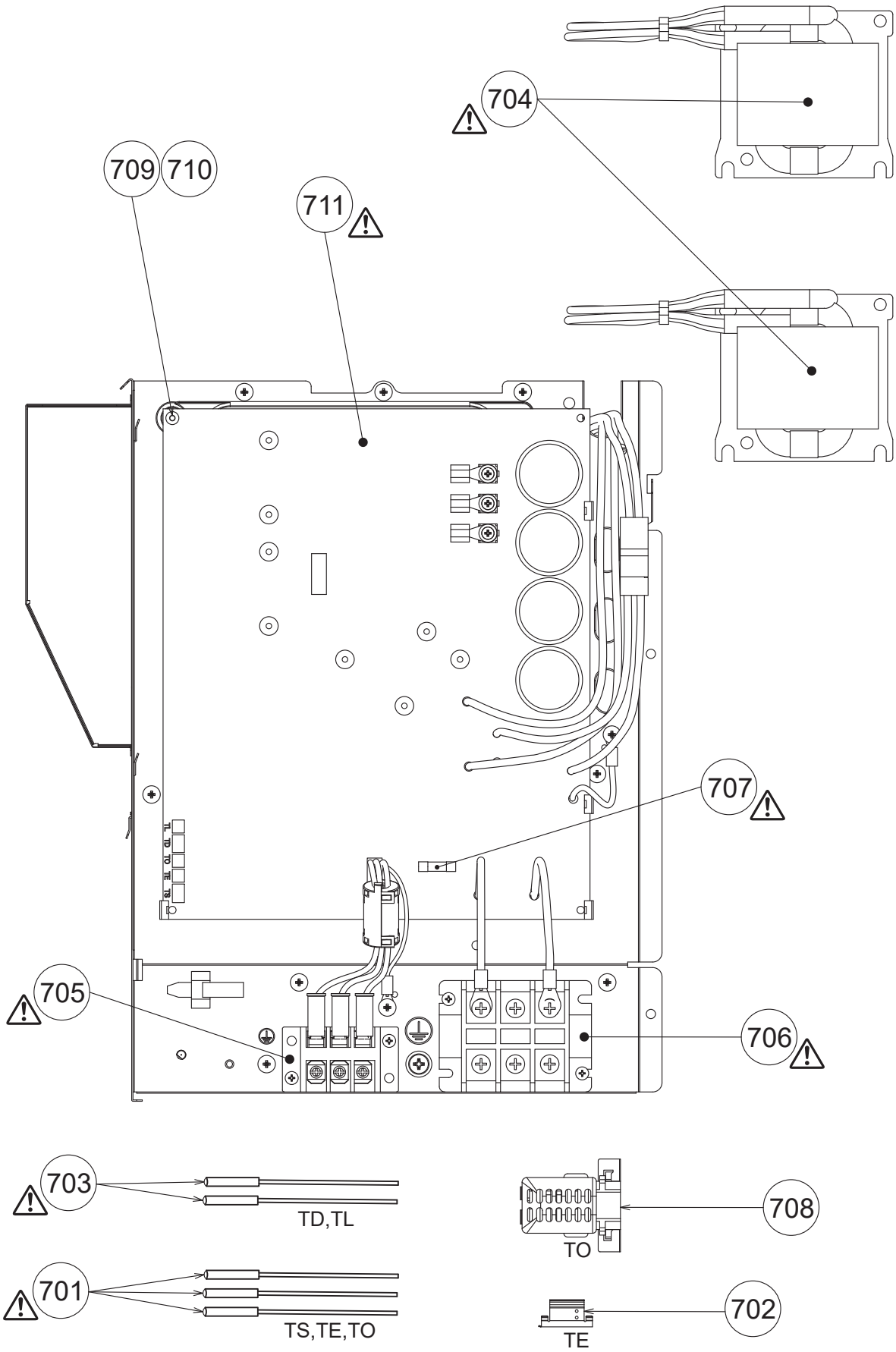
| Safety ⚠ | Location No. | Part No. | Description | Number of pieces per unit | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | HWS-P805XWHM3-E | HWS-P805XWHT6-E | HWS-P805XWHT9-E | HWS-P1105XWHM3-E | HWS-P1105XWHT6-E | HWS-P1105XWHT9-E |
| | 201 | 37500840 | CABINET, FRONT | 1 | 1 | 1 | 1 | 1 | 1 |
| | 202 | 37500800 | PLATE, UP | 1 | 1 | 1 | 1 | 1 | 1 |
| | 203 | 37500801 | PLATE, SIDE | 2 | 2 | 2 | 2 | 2 | 2 |
| | 204 | 37500835 | PLATE, DN, ASSY | 1 | 1 | 1 | 1 | 1 | 1 |
| ⚠ | 205 | 37566711 | REMOTE CONTROLLER | 1 | 1 | 1 | 1 | 1 | 1 |
| | 206 | 37546887 | PIPE ASSY, WATER HEAT EXCHANGER | | | | 1 | 1 | 1 |
| | 206 | 37546888 | PIPE ASSY, WATER HEAT EXCHANGER | 1 | 1 | 1 | | | |
| ⚠ | 207 | 37541739 | PUMP, WATER, ASSY | 1 | 1 | 1 | | | |
| ⚠ | 207 | 37541740 | PUMP, WATER, ASSY | | | | 1 | 1 | 1 |
| | 208 | 37542710 | VESSEL, EXPANTION | 1 | 1 | 1 | 1 | 1 | 1 |
| | 209 | 37547773 | VALVE ASSY, OVERPRESSURE PREVENTIVE | 1 | 1 | 1 | 1 | 1 | 1 |
| | 210 | 37519776 | FASTENER, QUICK | 1 | 1 | 1 | 1 | 1 | 1 |
| | 211 | 37547769 | VALVE, AIR VENT | 1 | 1 | 1 | 1 | 1 | 1 |
| | 212 | 37543706 | METER, PRESSURE | 1 | 1 | 1 | 1 | 1 | 1 |
| ⚠ | 213 | 37545713 | HEATER ASSY | 1 | | | 1 | | |
| ⚠ | 213 | 37545714 | HEATER ASSY | | 1 | | | 1 | |
| ⚠ | 213 | 37545715 | HEATER ASSY | | | 1 | | | 1 |
| ⚠ | 215 | 37551736 | SENSOR, LOW PRESSURE | 1 | 1 | 1 | 1 | 1 | 1 |
| | 216 | 37551735 | SWITCH, FLOW | | | | 1 | 1 | 1 |
| | 216 | 37551737 | SWITCH, FLOW | 1 | 1 | 1 | | | |
| | 217 | 43F32441 | NIPPLE, DRAIN | 1 | 1 | 1 | 1 | 1 | 1 |
| | 218 | 37595721 | PACKING, ASSY | 1 | 1 | 1 | 1 | 1 | 1 |
| ⚠ | 220 | 3026V072 | PC BOARD ASSY | 1 | 1 | 1 | 1 | 1 | 1 |
| ⚠ | 221 | 4316V338 | PC BOARD ASSY | 1 | 1 | 1 | 1 | 1 | 1 |
| ⚠ | 222 | 43152401 | CONTACTOR, MAGNETIC | 2 | 3 | 3 | 2 | 3 | 3 |
| ⚠ | 223 | 43158187 | TRANSFORMER | 1 | 1 | 1 | 1 | 1 | 1 |
| ⚠ | 224 | 43154156 | RELAY, LY1F | 1 | 2 | 2 | 1 | 2 | 2 |
| ⚠ | 225 | 43054107 | RELAY, LY1F | 1 | 1 | 1 | 1 | 1 | 1 |
| ⚠ | 226 | 43160297 | FUSE | 4 | 6 | 8 | 4 | 6 | 8 |
| ⚠ | 227 | 43060059 | FUSE, HOLDER | 4 | 6 | 8 | 4 | 6 | 8 |
| ⚠ | 228 | 43160565 | TERMINAL BLOCK, 3P, 20A | 1 | 1 | 1 | 1 | 1 | 1 |
| ⚠ | 229 | 43160566 | TERMINAL BLOCK, 6P, 20A | 1 | 1 | 1 | 1 | 1 | 1 |
| ⚠ | 230 | 4306A130 | TERMINAL BLOCK, 9P, 20A | 1 | 1 | 1 | 1 | 1 | 1 |
| ⚠ | 231 | 43160576 | TERMINAL BLOCK, 4P, 20A | 1 | 1 | 1 | 1 | 1 | 1 |
| ⚠ | 232 | 43160579 | TERMINAL | 1 | 1 | 1 | 1 | 1 | 1 |
| ⚠ | 233 | 43160561 | TERMINAL, 4P | 1 | 1 | 1 | 1 | 1 | 1 |
| ⚠ | 234 | 43050425 | SENSOR ASSY, SERVICE | 3 | 3 | 3 | 3 | 3 | 3 |
| ⚠ | 235 | 43150320 | SENSOR ASSY, SERVICE | 2 | 2 | 2 | 2 | 2 | 2 |
| ⚠ | 236 | 43160568 | TERMINAL, 2P | 1 | 1 | 1 | 1 | 1 | 1 |
| | 237 | 37517875 | MARK, ESTIA | 1 | 1 | 1 | 1 | 1 | 1 |
| | 238 | 37517876 | MARK, TOSHIBA FOR ESTIA | 1 | 1 | 1 | 1 | 1 | 1 |
| ⚠ | 239 | 43160571 | FUSE, HOLDER, 15A, 250V | 2 | 2 | 2 | 2 | 2 | 2 |
| ⚠ | 240 | 43F6A156 | FUSE(ET), 3.15A, AC250V | 2 | 2 | 2 | 2 | 2 | 2 |
| | 241 | 3025Q006 | RING, O | 1 | 1 | 1 | 1 | 1 | 1 |
| | 242 | 3025Q013 | RING, O | 2 | 2 | 2 | 2 | 2 | 2 |
| | 243 | 3025S012 | FASTENER,QUICK | 1 | 1 | 1 | 1 | 1 | 1 |
| | 244 | 3025S013 | FASTENER,QUICK | 1 | 1 | 1 | 1 | 1 | 1 |

## Outdoor Unit (HWS-P805HR-E, P1105HR-E)



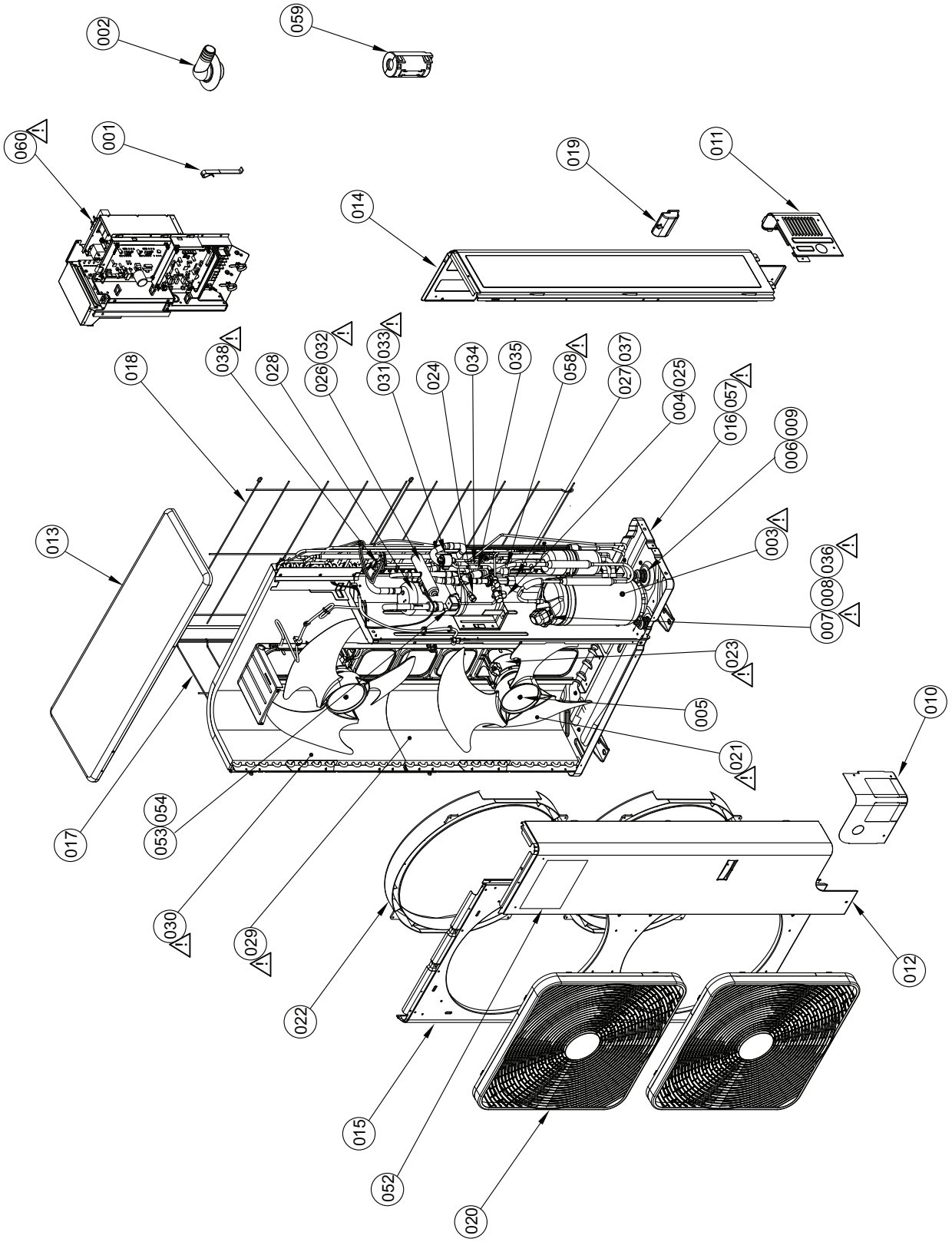
| Safety ⚠ | Ref. No. | Part No. | Description | Number of pieces per unit | |
|---|---|---|---|---|---|
| | | | | HWS-P805HR-E | HWS-P1105HR-E |
| | 001 | 43F19904 | HOLDER, SENSOR (TS) | 3 | 3 |
| | 002 | 43F32441 | NIPPLE, DRAIN | 1 | 1 |
| ⚠ | 003 | 43041794 | COMPRESSOR, DA422A3F-25M | 1 | 1 |
| | 004 | 43F47246 | BONNET, 3/8 IN | 1 | 1 |
| | 005 | 43F47669 | NUT, FLANGE | 2 | 2 |
| | 006 | 43049739 | CUSHION, RUBBER | 3 | 3 |
| ⚠ | 007 | 43F50407 | THERMOSTAT,BIMETAL | 1 | 1 |
| | 008 | 43F63317 | HOLDER,THERMOSTAT | 1 | 1 |
| | 009 | 43F97212 | NUT | 3 | 3 |
| | 010 | 43100437 | PANEL, FRONT, PIPING | 1 | 1 |
| | 011 | 43100438 | PANEL, BACK, PIPING | 1 | 1 |
| | 012 | 43100439 | PANEL, FRONT | 1 | 1 |
| | 013 | 43100440 | PLATE, ROOF | 1 | 1 |
| | 014 | 43100441 | PANEL, SIDE | 1 | 1 |
| | 015 | 43100442 | PANEL, AIR OUTLET | 1 | 1 |
| | 016 | 37500804 | BASE ASSY | 1 | 1 |
| | 017 | 43107274 | GUARD, FIN, SIDE | 1 | 1 |
| | 018 | 43107275 | GUARD, FIN, BACK | 1 | 1 |
| | 019 | 43107276 | HANGER | 3 | 3 |
| | 020 | 43119540 | GUARD, FAN ASSY | 2 | 2 |
| ⚠ | 021 | 43120244 | FAN, PROPELLER, PB521 | 2 | 2 |
| | 022 | 43122113 | BELL MOUTH | 2 | 2 |
| ⚠ | 023 | 4312C100 | MOTOR, FAN, ICF-280-A100-1(A) | 2 | 2 |
| | 024 | 43146676 | J0INT,CHECK | 1 | 1 |
| | 025 | 4314N092 | VALVE, PACKED, 9.52 | 1 | 1 |
| | 026 | 37546878 | VALVE, 4-WAY, STF-H0404 | 1 | 1 |
| | 027 | 43146724 | VALVE, BALL, SBV-JA5GTC-1, R0HS | 1 | 1 |
| | 028 | 43148170 | ACCUMULATOR ASS'Y | 1 | 1 |
| | 029 | 37546876 | CONDENSER ASSY, DOWN | 1 | 1 |
| | 030 | 37546877 | CONDENSER ASSY, UP | 1 | 1 |
| | 031 | 4314N023 | VALVE, PLUS, MODULAING, UKV-25D100 | 1 | 1 |
| ⚠ | 032 | 37547768 | COIL, VLVE, 4WAY, STF-H01AP1880A1 | 1 | 1 |
| ⚠ | 033 | 4314N025 | COIL, PMV, UKV-A038 | 1 | 1 |
| | 034 | 4314Q031 | STRAINER | 1 | 1 |
| | 035 | 4314Q032 | STRAINER | 1 | 1 |
| ⚠ | 036 | 43160591 | LEAD ASSY, COMPRESSOR | 1 | 1 |
| | 037 | 43194029 | BONNET, 5/8 IN | 1 | 1 |
| ⚠ | 038 | 37551741 | SWITCH ASSY, PRESSURE ACB-4UB154W | 1 | 1 |
| | 052 | 37517891 | MARK, TOSHIBA FOR ESTIA | 1 | 1 |
| ⚠ | 053 | 4314N038 | COIL, SOLENOID, AC220-240 50HZ | 1 | 1 |
| | 054 | 43146711 | VALVE, 2WAY | 1 | 1 |
| ⚠ | 055 | 43160571 | FUSE, HOLDER, 15A, 250V | 2 | 2 |
| ⚠ | 056 | 43F6A156 | FUSE(ET), 3.15A, AC250V | 2 | 2 |
| ⚠ | 057 | 37545716 | HEATER ASSY | 1 | 1 |
| ⚠ | 058 | 37550762 | SENSOR ASSY, PRESSURE | 1 | 1 |

## Inverter Assembly (HWS-P805HR-E, P1105HR-E)



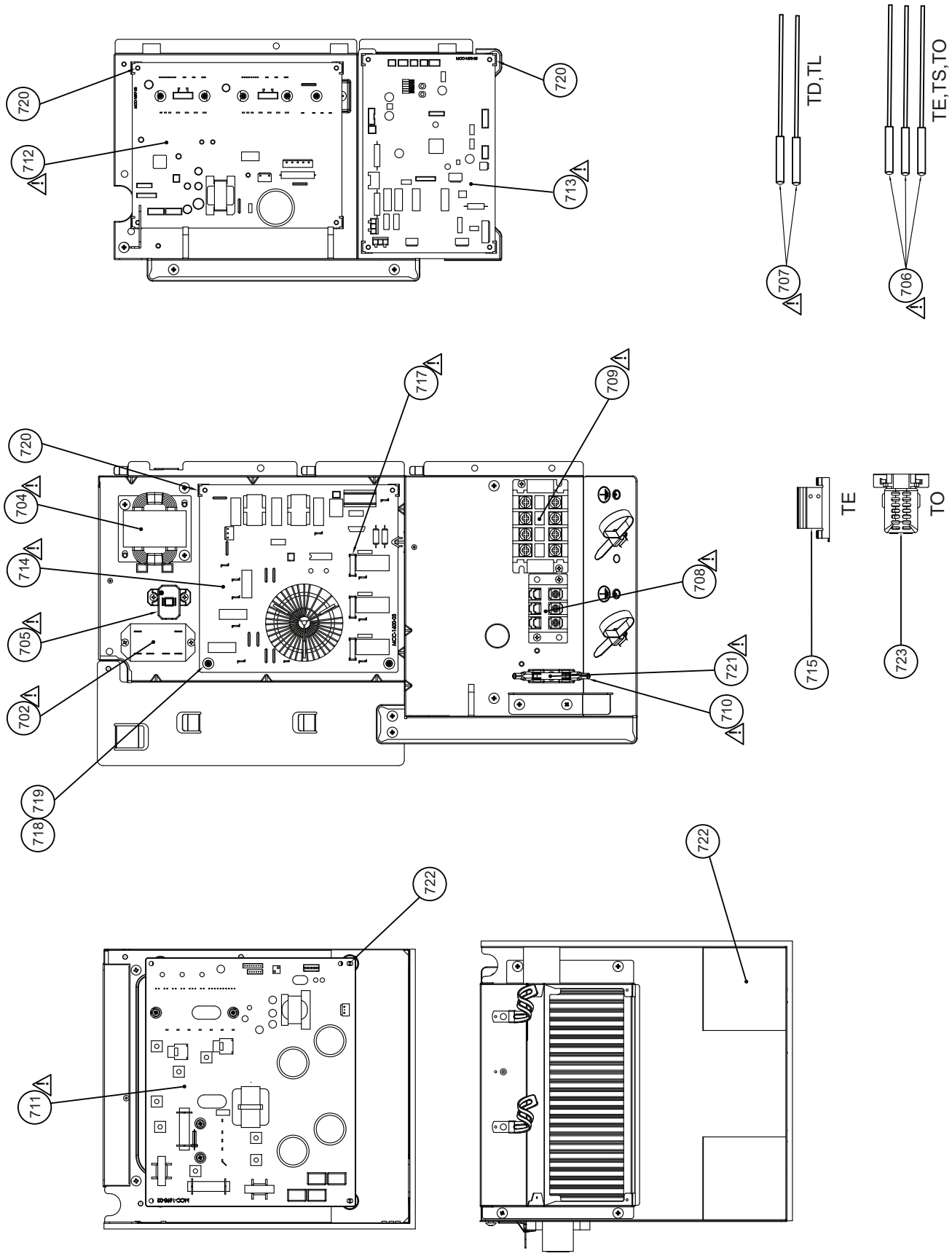
| Safety ⚠ | Ref. No. | Part No. | Description | Number of pieces per unit | |
|---|---|---|---|---|---|
| | | | | HWS-P805HR-E | HWS-P1105HR-E |
| ⚠ | 701 | 43050425 | SENSOR ASSY, SERVICE | 3 | 3 |
| | 702 | 43F63325 | HOLDER, SENSOR (TE) | 1 | 1 |
| ⚠ | 703 | 43150319 | SENSOR ASSY, SERVICE | 2 | 2 |
| ⚠ | 704 | 43158190 | REACTOR | 2 | 2 |
| ⚠ | 705 | 43160565 | TERMINAL BLOCK, 3P, 20A | 1 | 1 |
| ⚠ | 706 | 43160581 | TERMINAL | 1 | 1 |
| ⚠ | 707 | 43160589 | FUSE | 1 | 1 |
| | 708 | 43163055 | HOLDER, SENSOR | 1 | 1 |
| | 709 | 43163059 | SPACER, BUSH | 1 | 1 |
| | 710 | 43163060 | SPACER, COLLAR | 1 | 1 |
| ⚠ | 711 | 3026V074 | PC BOARD ASSY, MCC-1571 | 1 | 1 |

## Outdoor Unit (HWS-P805H8R-E, P1105H8R-E, P1405H8R-E)



| Safety ⚠ | Ref. No. | Part No. | Description | Number of pieces per unit | | |
|---|---|---|---|---|---|---|
| | | | | HWS-P805H8R-E | HWS-P1105H8R-E | HWS-P1405H8R-E |
| | 001 | 43F19904 | HOLDER, SENSOR (TS) | 3 | 3 | 3 |
| | 002 | 43F32441 | NIPPLE, DRAIN | 1 | 1 | 1 |
| ⚠ | 003 | 4304C703 | COMPRESSOR, DA422A3F-27M | 1 | 1 | 1 |
| | 004 | 43F47401 | BONNET, 3/8 IN | 1 | 1 | 1 |
| | 005 | 43F47669 | NUT, FLANGE | 2 | 2 | 2 |
| | 006 | 43049739 | CUSHION, RUBBER | 3 | 3 | 3 |
| ⚠ | 007 | 43F50407 | THERMOSTAT,BIMETAL | 1 | 1 | 1 |
| | 008 | 43F63317 | THERMOSTAT,HOLDER | 1 | 1 | 1 |
| | 009 | 43F97212 | NUT | 3 | 3 | 3 |
| | 010 | 43100437 | PANEL, FRONT, PIPING | 1 | 1 | 1 |
| | 011 | 43100438 | PANEL, BACK, PIPING | 1 | 1 | 1 |
| | 012 | 43100439 | PANEL, FRONT | 1 | 1 | 1 |
| | 013 | 43100440 | PLATE, ROOF | 1 | 1 | 1 |
| | 014 | 43100470 | PANEL, SIDE | 1 | 1 | 1 |
| | 015 | 43100442 | PANEL, AIR OUTLET | 1 | 1 | 1 |
| | 016 | 37500804 | BASE ASSY | 1 | 1 | 1 |
| | 017 | 43107274 | GUARD, FIN, SIDE | 1 | 1 | 1 |
| | 018 | 43107275 | GUARD, FIN, BACK | 1 | 1 | 1 |
| | 019 | 43107276 | HANGER | 3 | 3 | 3 |
| | 020 | 43119540 | GUARD, FAN ASSY | 2 | 2 | 2 |
| ⚠ | 021 | 43120244 | FAN, PROPELLER, PB521 | 2 | 2 | 2 |
| | 022 | 43122113 | BELL MOUTH | 2 | 2 | 2 |
| ⚠ | 023 | 4312C100 | MOTOR, FAN, ICF-280-A100-1(A) | 2 | 2 | 2 |
| | 024 | 43146676 | J0INT,CHECK | 1 | 1 | 1 |
| | 025 | 4314N092 | VALVE, PACKED, 9.52 | 1 | 1 | 1 |
| | 026 | 37546878 | VALVE, 4-WAY, STF-H0404 | 1 | 1 | 1 |
| | 027 | 43146724 | VALVE, BALL, SBV-JA5GTC-1, R0HS | 1 | 1 | 1 |
| | 028 | 43148170 | ACCUMULATOR,2.5L | 1 | 1 | 1 |
| ⚠ | 029 | 37546876 | CONDENSER ASSY, DOWN | 1 | 1 | 1 |
| ⚠ | 030 | 37546889 | CONDENSER ASSY, UP | 1 | 1 | 1 |
| | 031 | 4314N023 | VALVE, PLUS, MODULAING, UKV-25D100 | 1 | 1 | 1 |
| ⚠ | 032 | 4314N080 | COIL, SOLENOID, STF-H01AJ1736A1 | 1 | 1 | 1 |
| ⚠ | 033 | 4314N025 | COIL, PMV, UKV-A038 | 1 | 1 | 1 |
| | 034 | 4314Q031 | STRAINER | 1 | 1 | 1 |
| | 035 | 4314Q032 | STRAINER | 1 | 1 | 1 |
| ⚠ | 036 | 43160658 | LEAD ASSY, COMPRESSOR | 1 | 1 | 1 |
| | 037 | 43147194 | BONNET, 5/8 IN | 1 | 1 | 1 |
| ⚠ | 038 | 37551741 | SWITCH ASSY, PRESSURE ACB-4UB154W | 1 | 1 | 1 |
| | 052 | 37517891 | MARK, TOSHIBA FOR ESTIA | 1 | 1 | 1 |
| | 053 | 4314N187 | COIL, SOLENOID, TEV-SMOAJ2170A1 | 1 | 1 | 1 |
| | 054 | 4314N188 | VALVE, 2WAY, TEV-S1220DQ50 | 1 | 1 | 1 |
| ⚠ | 057 | 37545716 | HEATER ASSY | 1 | 1 | 1 |
| ⚠ | 058 | 37550762 | SENSOR ASSY, PRESSURE | 1 | 1 | 1 |
| | 059 | 43F60029 | FILTER,N0ISE | 1 | 1 | 1 |
| ⚠ | 060 | 43158227 | REACTOR | 1 | 1 | 1 |

## Inverter Assembly (HWS-P805H8R-E, P1105H8R-E, P1405H8R-E)



| Safety ⚠ | Ref. No. | Part No. | Description | Number of pieces per unit | | |
|---|---|---|---|---|---|---|
| | | | | HWS-P805H8R-E | HWS-P1105H8R-E | HWS-P1405H8R-E |
| ⚠ | 702 | 43154177 | RELAY | 1 | 1 | 1 |
| ⚠ | 704 | 43158207 | REACTOR | 1 | 1 | 1 |
| ⚠ | 705 | 43153007 | THERMISTOR, PTC | 1 | 1 | 1 |
| ⚠ | 706 | 43050425 | SENSOR ASSY, SERVICE | 1 | 1 | 1 |
| ⚠ | 707 | 43150319 | SENSOR ASSY, SERVICE | 1 | 1 | 1 |
| ⚠ | 708 | 43160565 | TERMINAL BLOCK, 3P, 20A | 1 | 1 | 1 |
| ⚠ | 709 | 43160579 | TERMINAL | 1 | 1 | 1 |
| ⚠ | 710 | 43160667 | FUSE BLOCK | 1 | 1 | 1 |
| ⚠ | 711 | 3026V076 | PC BOARD ASSY,MCC-1698,COMP | 1 | 1 | 1 |
| ⚠ | 712 | 3026V077 | PC BOARD ASSY,MCC-1597,FAN | 1 | 1 | 1 |
| ⚠ | 713 | 3026V078 | PC BOARD ASSY, MCC-1675, CDB | 1 | 1 | 1 |
| ⚠ | 714 | 4316V620 | PC BOARD ASSY, MCC-1600, N/F | 1 | 1 | 1 |
| | 715 | 43F63325 | HOLDER, SENSOR (TE) | 1 | 1 | 1 |
| ⚠ | 717 | 43160590 | FUSE | 2 | 2 | 2 |
| | 718 | 43282001 | BUSHING | 2 | 2 | 2 |
| | 719 | 43183020 | COLLAR | 3 | 3 | 3 |
| | 720 | 43F63248 | SUPPORTER, ASSY | 3 | 3 | 3 |
| ⚠ | 721 | 43060700 | FUSE, 10A, 250V | 2 | 2 | 2 |
| | 722 | 3759V702 | SPACER, ASSY | 3 | 3 | 3 |
| | 723 | 43163055 | HOLDER, SENSOR (TO) | 1 | 1 | 1 |

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## Revision record

| | | | |
|---|---|---|---|
| First issue | - | - | Jul. 2017 |
| Revised ① | Abolition of “Water vent valve” since May 2018. | Page 15, 16, 28, 30, 160, 175 | Jul. 2018 |
| Revised ② | • Addition of new three phase models to lineup.<br>• Addition of new function to all models. | | Jan. 2019 |