DAIKIN

SiUS732505E

R-410A

R-134a

Service Manual

MEGA·Q

All-Electric Hot Water Generation System

RXHWQ120MQTJA
BWLP120TJU
BRP26B2VJU

60 Hz

Introduction

1. Safety Cautions

Be sure to read the following safety cautions before conducting repair work.
After the repair work is complete, be sure to conduct a test operation to ensure that the equipment operates normally, and explain the cautions for operating the product to the customer.

	This manual is for the person in charge of maintenance and inspection.

Caution Items

The caution items are classified into ⚠**Warning** and ⚠**Caution**. The ⚠**Warning** items are especially important since death or serious injury can result if they are not followed closely. The ⚠**Caution** items can also lead to serious accidents under some conditions if they are not followed. Therefore, be sure to observe all the safety caution items described below.

Pictograms

△ This symbol indicates an item for which caution must be exercised.
The pictogram shows the item to which attention must be paid.
◯ This symbol indicates a prohibited action.
The prohibited item or action is shown in the illustration or near the symbol.
● This symbol indicates an action that must be taken, or an instruction.
The instruction is shown in the illustration or near the symbol.

1.1 Warnings and Cautions Regarding Safety of Workers

⚠ Warning	
Do not store equipment in a room with fire sources (e.g., naked flames, gas appliances, electric heaters).	
Be sure to disconnect the power cable from the socket before disassembling equipment for repair. Working on equipment that is connected to the power supply may cause an electrical shock. If it is necessary to supply power to the equipment to conduct the repair or inspect the circuits, do not touch any electrically charged sections of the equipment.	
If refrigerant gas is discharged during repair work, do not touch the discharged refrigerant gas. Refrigerant gas may cause frostbite.	
When disconnecting the suction or discharge pipe of the compressor at the welded section, evacuate the refrigerant gas completely at a well-ventilated place first. If there is gas remaining inside the compressor, the refrigerant gas or refrigerating machine oil discharges when the pipe is disconnected, and it may cause injury.	
If refrigerant gas leaks during repair work, ventilate the area. Refrigerant gas may generate toxic gases when it contacts flames.	
Be sure to discharge the capacitor completely before conducting repair work. The step-up capacitor supplies high-voltage electricity to the electrical components of the outdoor unit. A charged capacitor may cause an electrical shock.	

Warning	
Do not turn the air conditioner on or off by plugging in or unplugging the power cable. Plugging in or unplugging the power cable to operate the equipment may cause an electrical shock or fire.	
Be sure to wear a safety helmet, gloves, and a safety belt when working in a high place (more than 2 m (6.5 ft)). Insufficient safety measures may cause a fall.	
In case of R-410A/R-134a refrigerant models, be sure to use pipes, flare nuts and tools intended for the exclusive use with the R-410A/R-134a refrigerant. The use of materials for other refrigerant models may cause a serious accident, such as damage to the refrigerant cycle or equipment failure.	
Do not mix air or gas other than the specified refrigerant (R-410A/R-134a) in the refrigerant system. If air enters the refrigerant system, an excessively high pressure results, causing equipment damage and injury.	

Caution	
Do not repair electrical components with wet hands. Working on the equipment with wet hands may cause an electrical shock.	
Do not clean the air conditioner with water. Washing the unit with water may cause an electrical shock.	
Be sure to provide an earth / grounding when repairing the equipment in a humid or wet place, to avoid electrical shocks.	
Be sure to turn off the power switch and unplug the power cable when cleaning the equipment. The internal fan rotates at a high speed, and may cause injury.	
Be sure to conduct repair work with appropriate tools. The use of inappropriate tools may cause injury.	
Be sure to check that the refrigerating cycle section has cooled down enough before conducting repair work. Working on the unit when the refrigerating cycle section is hot may cause burns.	
Conduct welding work in a well-ventilated place. Using the welder in an enclosed room may cause oxygen deficiency.	

1.2 Warnings and Cautions Regarding Safety of Users

⚠ Warning	
Do not store the equipment in a room with fire sources (e.g., naked flames, gas appliances, electric heaters).	
Be sure to use parts listed in the service parts list of the applicable model and appropriate tools to conduct repair work. Never attempt to modify the equipment. The use of inappropriate parts or tools may cause an electrical shock, excessive heat generation or fire.	
If the power cable and lead wires are scratched or have deteriorated, be sure to replace them. Damaged cable and wires may cause an electrical shock, excessive heat generation or fire.	
Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances, since it may cause an electrical shock, excessive heat generation or fire.	
Be sure to use an exclusive power circuit for the equipment, and follow the local technical standards related to the electrical equipment, the internal wiring regulations, and the instruction manual for installation when conducting electrical work. Insufficient power circuit capacity and improper electrical work may cause an electrical shock or fire.	
Be sure to use the specified cable for wiring between the indoor and outdoor units. Make the connections securely and route the cable properly so that there is no force pulling the cable at the connection terminals. Improper connections may cause excessive heat generation or fire.	
When wiring between the indoor and outdoor units, make sure that the terminal cover does not lift off or dismount because of the cable. If the cover is not mounted properly, the terminal connection section may cause an electrical shock, excessive heat generation or fire.	
Do not damage or modify the power cable. Damaged or modified power cables may cause an electrical shock or fire. Placing heavy items on the power cable, or heating or pulling the power cable may damage it.	
Do not mix air or gas other than the specified refrigerant (R-410A/R-134a) in the refrigerant system. If air enters the refrigerant system, an excessively high pressure results, causing equipment damage and injury.	
If the refrigerant gas leaks, be sure to locate the leaking point and repair it before charging the refrigerant. After charging the refrigerant, make sure that there is no leak. If the leaking point cannot be located and the repair work must be stopped, be sure to pump-down, and close the service valve, to prevent refrigerant gas from leaking into the room. Refrigerant gas itself is harmless, but it may generate toxic gases when it contacts flames, such as those from fan type and other heaters, stoves and ranges.	
When relocating the equipment, make sure that the new installation site has sufficient strength to withstand the weight of the equipment. If the installation site does not have sufficient strength or the installation work is not conducted securely, the equipment may fall and cause injury.	

Warning	
Check to make sure that the power cable plug is not dirty or loose, then insert the plug into a power outlet securely. If the plug is dusty or has a loose connection, it may cause an electrical shock or fire.	
When replacing the coin battery in the remote controller, be sure to dispose of the old battery to prevent children from swallowing it. If a child swallows the coin battery, see a doctor immediately.	

Caution	
Installation of a leakage breaker is necessary in some cases depending on the conditions of the installation site, to prevent electrical shocks.	
Do not install the equipment in a place where there is a possibility of combustible gas leaks. If combustible gas leaks and remains around the unit, it may cause a fire.	
Check to see if parts and wires are mounted and connected properly, and if connections at the soldered or crimped terminals are secure. Improper installation and connections may cause excessive heat generation, fire or an electrical shock.	
If the installation platform or frame has corroded, replace it. A corroded installation platform or frame may cause the unit to fall, resulting in injury.	
Check the earth / grounding, and repair it if the equipment is not properly earthed / grounded. Improper earth / grounding may cause an electrical shock.	
Be sure to measure insulation resistance after the repair, and make sure that the resistance is 1 MΩ or greater. Faulty insulation may cause an electrical shock.	
Be sure to check the drainage of the indoor unit after the repair. Faulty drainage may cause water to enter the room and wet the furniture and floor.	
Do not tilt the unit when removing it. The water inside the unit may spill and wet the furniture and floor.	

2. Icons Used

The following icons are used to attract the attention of the reader to specific information.

Icon	Type of Information	Description
 Warning	Warning	**Warning** is used when there is danger of personal injury.
 Caution	Caution	**Caution** is used when there is danger that the reader, through incorrect manipulation, may damage equipment, lose data, get an unexpected result or have to restart (part of) a procedure.
 Note	Note	**Note** provides information that is not indispensable, but may nevertheless be valuable to the reader, such as tips and tricks.
 Reference	Reference	**Reference** guides the reader to other places in this binder or in this manual, where he/she will find additional information on a specific topic.

3. Revision History

Month / Year	Version	Revised contents
04 / 2025	SiUS732505E	First edition

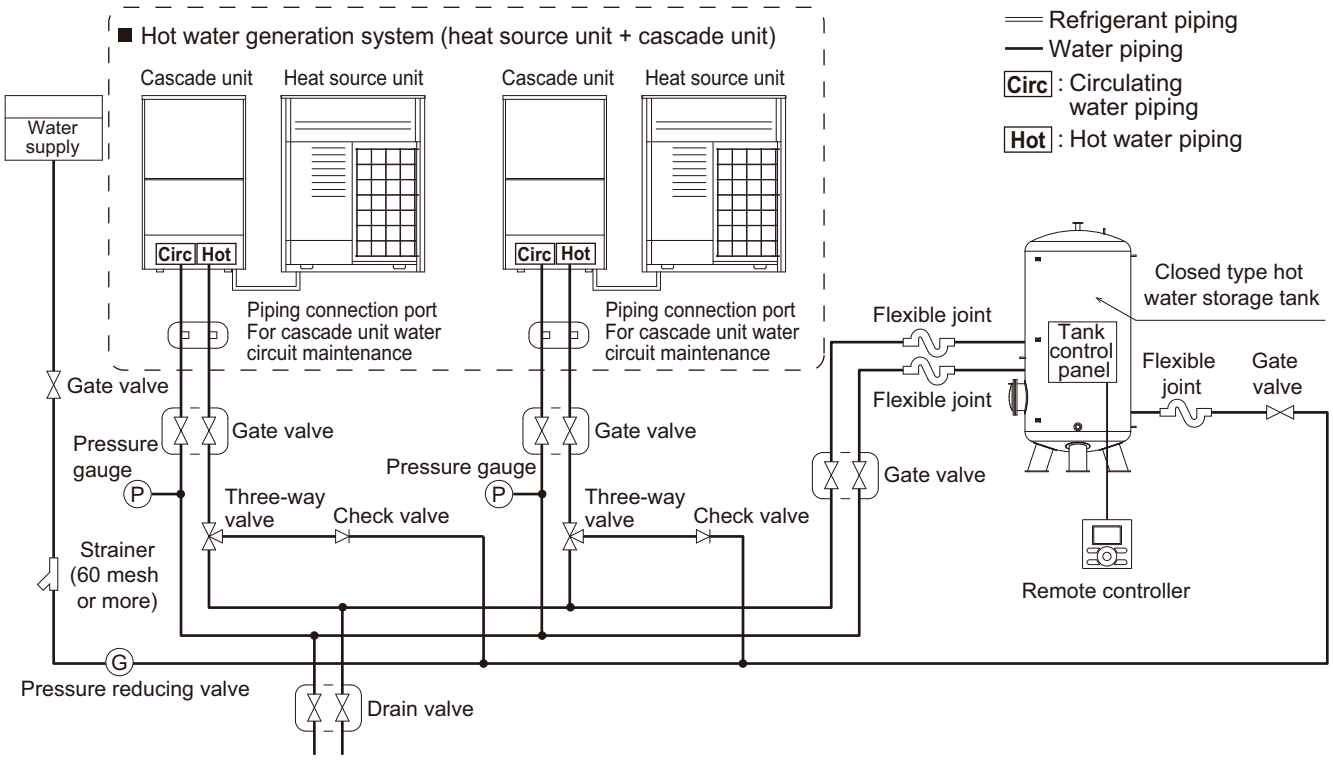
Part 1
General Information

1. System Overview

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

- MEGA·Q is an all-electric hot water generation system composed of a dedicated heat source unit (RXHWQ120MQTJA), a cascade unit (BWLP120TJU), and a controller kit (BRP26B2VJU). The heat source unit cannot be used alone.
- Up to 8 MEGA·Q systems can be controlled by one controller kit and operate together depending on the capacity required. (In the case of a multiple hot water storage tank configuration, a controller kit is required for each hot water storage tank.)
- The hot water generation system uses a two-source refrigerant circuit (Cascade configuration). In the high refrigerant temperature source side circuit **R-134a** is used, and in the low refrigerant temperature source side circuit **R-410A** is used.
- Hot water generated by MEGA·Q is non-potable and cannot be used for drinking. Water quality may change due to accumulation of scales in the tank due to long-term use or deterioration of piping materials.

Hot water generation system (closed tank system)

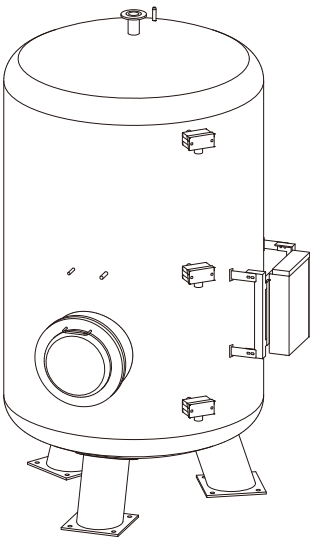


2. Model Names and External Appearance

Heat Source Unit and Cascade Unit

Cascade Unit (BWLP120TJU) **Heat Source Unit (RXHWQ120MQTJA)**

Controller Kit



Hot water storage tank (field supply) with controller kit (BRP26B2VJU)

Remote controller for operation

3. Specifications

3.1 Hot Water Generation System

Model name				RXHWQ120MQTJA + BWLP120TJU	
Hot water storage heating performance	★1 ★9 Intermediate hot water storage heating capacity		Btu/h (kW)	119,000 (35.0)	
	★1 ★9 Intermediate hot water storage heating power consumption		Btu/h (kW)	30,000 (8.75)	
	Intermediate hot water storage heating COP			4.0	
	★2 ★9 Winter hot water storage heating capacity		Btu/h (kW)	119,000 (35.0)	
	★2 ★9 Winter hot water storage heating power consumption		Btu/h (kW)	34,000 (10.1)	
	Hot water storage heating in winter COP			3.5	
	★3 ★9 Summer hot water storage heating capacity		Btu/h (kW)	119,000 (35.0)	
	★3 ★9 Summer hot water storage heating power consumption		Btu/h (kW)	26,000 (7.61)	
	Summer hot water storage heating COP			4.6	
	★4 ★9 Hot water storage heating capacity during frost formation		Btu/h (kW)	119,000 (35.0)	
	★4 ★9 Hot water storage heating power consumption during frost formation		Btu/h (kW)	48,000 (14.0)	
	Hot water storage heating during frost formation COP			2.5	
Heat retention and heating performance	★5 ★9 Intermediate heat retention heating capacity		Btu/h (kW)	44,000 (13.0)	
	★5 ★9 Intermediate heat retention heating power consumption		Btu/h (kW)	15,000 (4.33)	
	Intermediate heat retention heating COP			3.0	
	★6 ★9 Winter heat retention heating capacity		Btu/h (kW)	44,000 (13.0)	
	★6 ★9 Winter heat insulation heating power consumption		Btu/h (kW)	17,000 (5.00)	
	Winter heat insulation COP			2.6	
	★7 ★9 Summer heat retention heating capacity		Btu/h (kW)	44,000 (13.0)	
	★7 ★9 Summer heat insulation heating power consumption		Btu/h (kW)	13,000 (3.94)	
	Summer heat insulation COP			3.3	
	★8 ★9 Defrosting period heat retention heating capacity		Btu/h (kW)	44,000 (13.0)	
	★8 ★9 Frosting period heat retention heating power consumption		Btu/h (kW)	21,000 (6.20)	
	Heat retention during frost formation COP			2.1	
★9 ★10 Sound pressure level			dB(A)	55 (Winter 59)	
Unit model name				Heat Source Unit	Cascade Unit
Model name				RXHWQ120MQTJA	BWLP120TJU
Power supply				3 phase, 208/230 V, 60 Hz	
Casing color				Ivory white (5Y7.5/1)	
External dimensions (H × W × D)			inch (mm)	66-11/16 × 48-7/8 × 30-3/16 (1,694 × 1,242 × 767)	60-1/16 × 35-3/16 × 30 (1,525 × 893 × 762)
Heat exchanger	Evaporator			Cross fin coil	Plate heating exchanger
	Condenser			—	Winding spiral tube heat exchanger
Compressor	Type			Hermetically sealed scroll type	
	Starting system			Soft start (Inverter)	
	Motor output		kW	(4.4 + 4.4)	(4.5 + 4.5)
Fan	Type			Propeller fan	—
	Motor output × Number		kW	0.75 × 2	—
	Airflow rate		cfm (m^3/min)	8,228 (233)	—
	Drive system			Direct drive	—
Water pump				—	Non-self-priming canned pump
Connecting pipe	Heat source unit	Liquid side pipe	inch (mm)	ϕ1/2 (12.7) C1220T (Brazed connection)	—
		Gas side pipe	inch (mm)	ϕ1-1/8 (28.6) C1220T (Brazed connection) ★11	—
	Heat source unit ~ Cascade unit	Liquid side pipe	inch (mm)	ϕ1/2 (12.7) C1220T (Brazed connection)	
		Gas side pipe	inch (mm)	ϕ7/8 (22.2) C1220T (Brazed connection) ★11	
	Cascade unit	Liquid side pipe	inch (mm)	—	ϕ1/2 (12.7) C1220T (Brazed connection)
		Gas side pipe	inch (mm)	—	ϕ7/8 (22.2) C1220T (Brazed connection)
		Inlet (water) pipe		—	N/A
		Circulation (water) pipe		—	R3/4 male thread (NPT3/4 male thread after the installation of piping adaptor)
		Outlet (hot water) pipe		—	R3/4 male thread (NPT3/4 male thread after the installation of piping adaptor)
Weight			lbs (kg)	695 (315)	639 (290)
Safety device				High pressure switch, Fan driver overload protector, Overcurrent relay, Inverter overload protector	High pressure switch, Inverter overload protector
Defrost method				Deicer	—
Refrigerant	Refrigerant name			R-410A	High side: R-134a / Low side: R-410A
	Charge		lbs (kg)	18.1 (8.2)	13.2 (6.0)
	Control			Electronic expansion valve	
Design pressure	High pressure		psig (MPa)	478 (3.30)	High side: 550 (3.80) / Low side: 580 (4.00)
	Low pressure		psig (MPa)	320 (2.21)	High side: 248 (1.71)
Standard accessories				Installation manual, Operation manual, Attached pipe, Clamps, Vinyl tube ★12	Attached pipe, Pipe adaptor, Conduit plate, Vinyl tube
Drawing no.				C: 4D135232D	

Notes:

1. ★1 Operating conditions: Outside air temperature: 60.8°FDB, 53.6°FWB / Water supply temperature 62.6°F / Hot water temperature 149.0°F / Water volume 2.8 gal/min
2. ★2 Operating conditions: Outside air temperature: 44.6°FDB, 42.8°FWB / Water supply temperature 48.2°F / Hot water temperature 149.0°F / Water volume 2.4 gal/min
3. ★3 Operating conditions: Outside air temperature: 77.0°FDB, 69.8°FWB / Water supply temperature 75.2°F / Hot water temperature 149.0°F / Water volume 3.2 gal/min
4. ★4 Operating conditions: Outside air temperature: 35.6°FDB, 33.8°FWB / Water supply temperature 41.0°F / Hot water temperature 149.0°F / Water volume 2.2 gal/min (including capacity reduction due to defrosting)
5. ★5 Operating conditions: Outside air temperature: 60.8°FDB, 53.6°FWB / Water entry temperature 140.0°F / Water volume 3.8 gal/min
6. ★6 Operating conditions: Outside air temperature: 44.6°FDB, 42.8°FWB / Incoming water temperature 140.0°F / Water volume 3.8 gal/min
7. ★7 Operating conditions: Outside air temperature: 77.0°FDB, 69.8°FWB / Incoming water temperature 140.0°F / Water volume 3.8 gal/min
8. ★8 Operating conditions: Outside air temperature: 35.6°FDB, 33.8°FWB / Water entry temperature 140.0°F / Water volume 3.8 gal/min (including capacity reduction due to defrosting)
9. ★9 5-15/16 inch (150 mm) between the heat source unit and the cascade unit, 0 inch (0 mm) height difference
10. The water quality used is water supply and JRA GL-02-1994 (high-level medium-temperature water system), and it cannot be used for drinking.
11. The water supply water pressure should be 5.8 psig (40 kPa) or more, and the maximum working pressure on the water side is 72.5 psig (500 kPa).
12. ★10 The driving sound conforms to JIS B 8616 standard and is the value when converted to an anechoic chamber. When measured in the actual installed state, it receives ambient noise and reflection, It is usually larger than the displayed value.
13. When connecting pipes, depending on the piping connection form (front connection, bottom connection), it is necessary to prepare on-site work (expansion, bending) and piping joints (L joints, same diameter joints).
14. ★11 The pipe diameter on the gas side of the heat source unit is different between the heat source unit and the cascade unit. When arranging piping, procure with the gas side piping diameter between the heat source unit and the cascade unit. (Deformed joints are attached to the cascade unit)
15. ★12 The installation manual and operation manual are the same as the cascade unit.

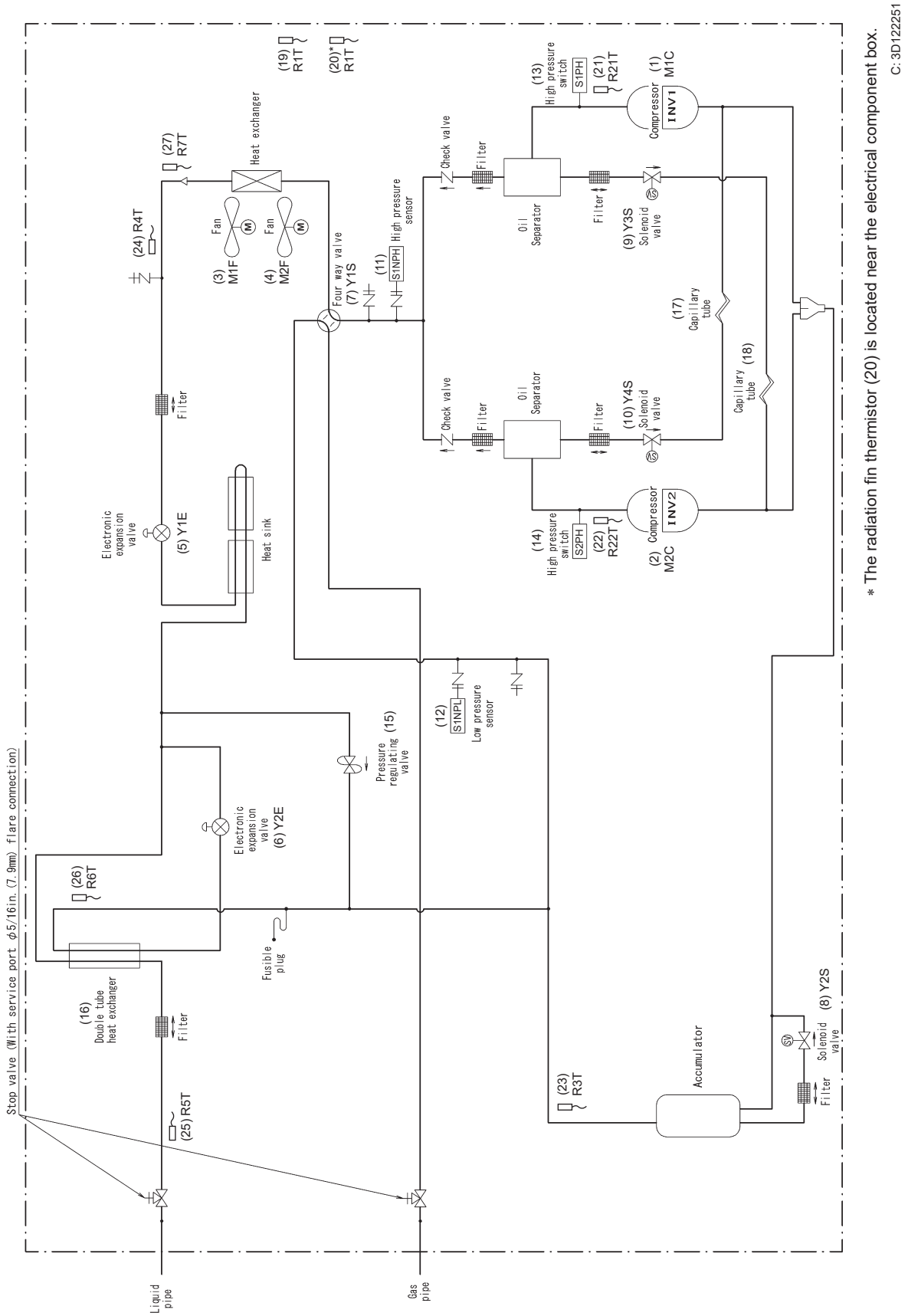
Part 2
Refrigerant Circuit

1. Refrigerant Circuit (Piping Diagrams)

1.1 Heat Source Unit

No. in piping diagram	Electric symbol	Name	Function
(1)	M1C	Compressor	Compressor is operated in multi-steps according to Tc.
(2)	M2C		
(3)	M1F	Fan motor	Because the system is an air heat exchange type, the fan is operated at 10-step rotation speed by using the inverter.
(4)	M2F		
(5)	Y1E	Electronic expansion valve (Main)	PFC control is applied to keep the outlet superheating degree of evaporator heat exchanger constant.
(6)	Y2E	Electronic expansion valve (Injection)	PI control is applied to keep the outlet superheating degree of subcooling heat exchanger constant.
(7)	Y1S	Solenoid valve (Four way valve)	Used to switch the operation mode between heating and defrost.
(8)	Y2S	Solenoid valve (Accumulator oil return)	Used to return oil from the accumulator to the compressor.
(9)	Y3S	Solenoid valve (Oil return 1)	Used to control the amount of oil from the oil separator to the compressor.
(10)	Y4S	Solenoid valve (Oil return 2)	
(11)	S1NPH	High pressure sensor	Used to detect high pressure.
(12)	S1NPL	Low pressure sensor	Used to detect low pressure.
(13)	S1PH	High pressure switch (For M1C compressor)	In order to prevent the increase of high pressure when an error occurs, this switch is activated at high pressure of 4.0 MPa (580 psi) or more to stop the compressor operation.
(14)	S2PH	High pressure switch (For M2C compressor)	
(15)	—	Pressure regulating valve	This valve opens at a pressure of 4.0 MPa (580 psi) for prevention of pressure increase, thus resulting in no damage of functional parts due to the increase of pressure in transportation or storage.
(16)	—	Subcooling heat exchanger	Used to subcooling liquid refrigerant from the electronic expansion valve.
(17)	—	Capillary tube	Used to return the refrigerating oil separated through the oil separator to the compressor.
(18)	—		
(19)	R1T	Thermistor (Outdoor air) (A1P)	Used to detect outdoor air temperature, correct discharge pipe temperature, and others.
(20)	R1T	Thermistor (Radiation fin) (A3P)	• Used for outdoor fan speed control. • Used for inverter radiation fin temperature control. • Used for pressure difference control.
(21)	R21T	Thermistor (M1C discharge pipe)	Used to detect discharge pipe temperature, make the temperature protection control of compressor, and others.
(22)	R22T	Thermistor (M2C discharge pipe)	
(23)	R3T	Thermistor (Accumulator inlet)	Used to detect gas pipe temperature at the accumulator inlet.
(24)	R4T	Thermistor (Heat exchanger liquid pipe)	This detects temperature of liquid pipe between the air heat exchanger and main electronic expansion valve. Used to make judgements on the recover or discharge refrigerants to the refrigerant regulator.
(25)	R5T	Thermistor (Subcooling heat exchanger liquid pipe)	This detects temperature of liquid pipe between the main electronic expansion valve and subcooling heat exchanger.
(26)	R6T	Thermistor (Subcooling heat exchanger gas pipe)	This detects temperature of gas pipe on the evaporation side of subcooling heat exchanger. Used to exercise the constant control of superheating degree at the outlet of subcooling heat exchanger.
(27)	R7T	Thermistor (Heat exchanger deicer)	Used to detect liquid pipe temperature of air heat exchanger.

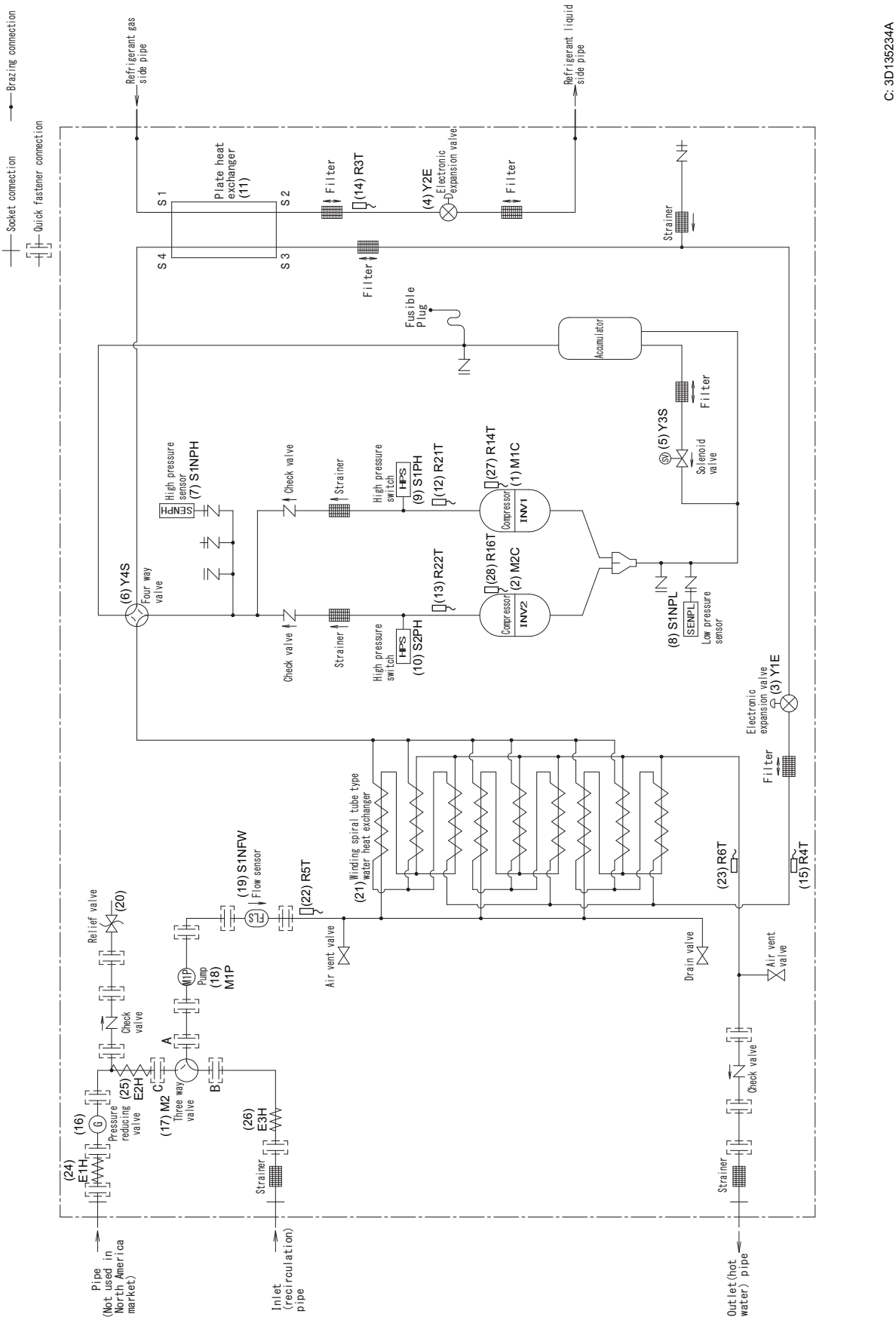
RXHWQ120MQTJA



1.2 Cascade Unit

No. in piping diagram	Electric symbol	Name	Function
(1)	M1C	Compressor	Compressors are operated in multi-steps by using the inverter.
(2)	M2C		
(3)	Y1E	Electronic expansion valve (High side)	Applies control to keep the subcooling degree of spiral tube water heat exchanger constant.
(4)	Y2E	Electronic expansion valve (Low side)	Applies control to keep the subcooling degree of plate heat exchanger constant.
(5)	Y3S	Solenoid valve (Accumulator oil return)	Returns oil from the accumulator to the compressor.
(6)	Y4S	Four way valve	Switches the operation mode between normal and defrost operations.
(7)	S1NPH	High pressure sensor	Detects high pressure (high side).
(8)	S1NPL	Low pressure sensor	Detects low pressure (high side).
(9)	S1PH	High pressure switch (For M1C compressor)	In order to prevent an increase of high pressure (high side) when a malfunction occurs, this switch is activated at high pressure of 3.8 MPa (551 psi) or more to stop the operation.
(10)	S2PH	High pressure switch (For M2C compressor)	
(11)	—	Plate heat exchanger	Transfers heat between R-410A and R-134a.
(12)	R21T	Thermistor (M1C discharge pipe)	Detects discharge pipe temperature, makes the temperature protection control of compressor, and others.
(13)	R22T	Thermistor (M2C discharge pipe)	
(14)	R3T	Thermistor (Low side liquid pipe)	Detects temperature of low side liquid pipe (R-410A).
(15)	R4T	Thermistor (High side liquid pipe)	Detects temperature of high side liquid pipe (R-134a).
(16)	—	Pressure reducing valve	Reduces inlet water pressure to 40 kPa (5.8 psi).
(17)	M2	Electric three way valve	N/A
(18)	M1P	Water pump	Sends water from inlet pipe to the cascade unit by adjusting the flow of water.
(19)	S1NFW	Flow sensor	Detects water flow rate.
(20)	—	Relief valve	Discharges water outside of the unit to release the pressure when the pressure inside the unit rises.
(21)	—	Spiral tube water heat exchanger	Transfers heat between water and R-134a refrigerant to make hot water.
(22)	R5T	Thermistor (Water inlet)	Detects temperature at the water inlet.
(23)	R6T	Thermistor (Water outlet)	Detects temperature at the water outlet.
(24)	E1H	Anti-freezing heater	Prevents freezing by warming the water pipes inside the unit that cannot be protected by anti-freezing operation at low outdoor temperature.
(25)	E2H		
(26)	E3H		
(27)	R14T	Thermistor (M1C compressor overheating protection)	Detects compressor surface temperature. This switch is activated at surface temperature of 120°C (248°F) or more to stop the compressor.
(28)	R16T	Thermistor (M2C compressor overheating protection)	

BWLP120TJU

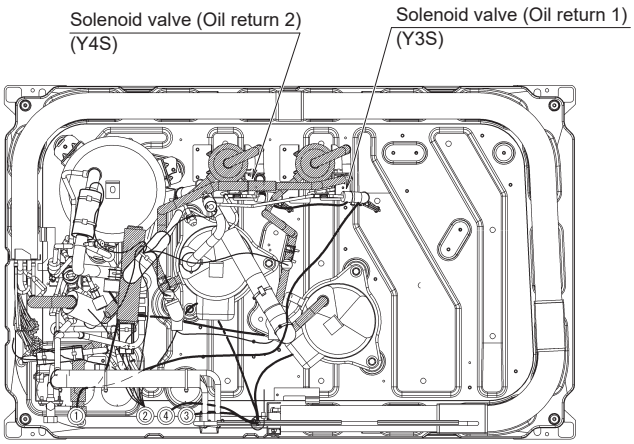

Brazing connection
Socket connection
Quick fastener connection
C: 3D135234A
Refrigerant gas side pipe
Refrigerant liquid side pipe
Plate heat exchanger (11)
S1
S2
S3
S4
Filter
(14) R3T
(4) Y2E Electronic expansion valve
Strainer
Fusible Plug
Accumulator
(5) Y3S Solenoid valve
High pressure sensor (7) S1NPH
Check valve
High pressure switch (9) S1PH
(12) R21T
(27) R14T
(1) M1C Compressor INV1
(6) Y4S Four way valve
(28) R16T
(2) M2C Compressor INV2
(13) R22T
(10) S2PH
(8) S1NPL Low pressure sensor
(3) Y1E Electronic expansion valve
(21) Winding spiral tube type water heat exchanger
(23) R6T
(15) R4T
(19) S1NFW Flow sensor
(22) R5T
Air vent valve
Drain valve
Relief valve
(20)
(18) M1P Pump
Check valve
(25) E2H
(17) M2 Three way valve
A
B
C
(26) E3H
(16) Pressure reducing valve
(24) E1H
Pipe (Not used in North America market)
Inlet (recirculation) pipe
Outlet(hot water) pipe

2. Functional Parts Layout

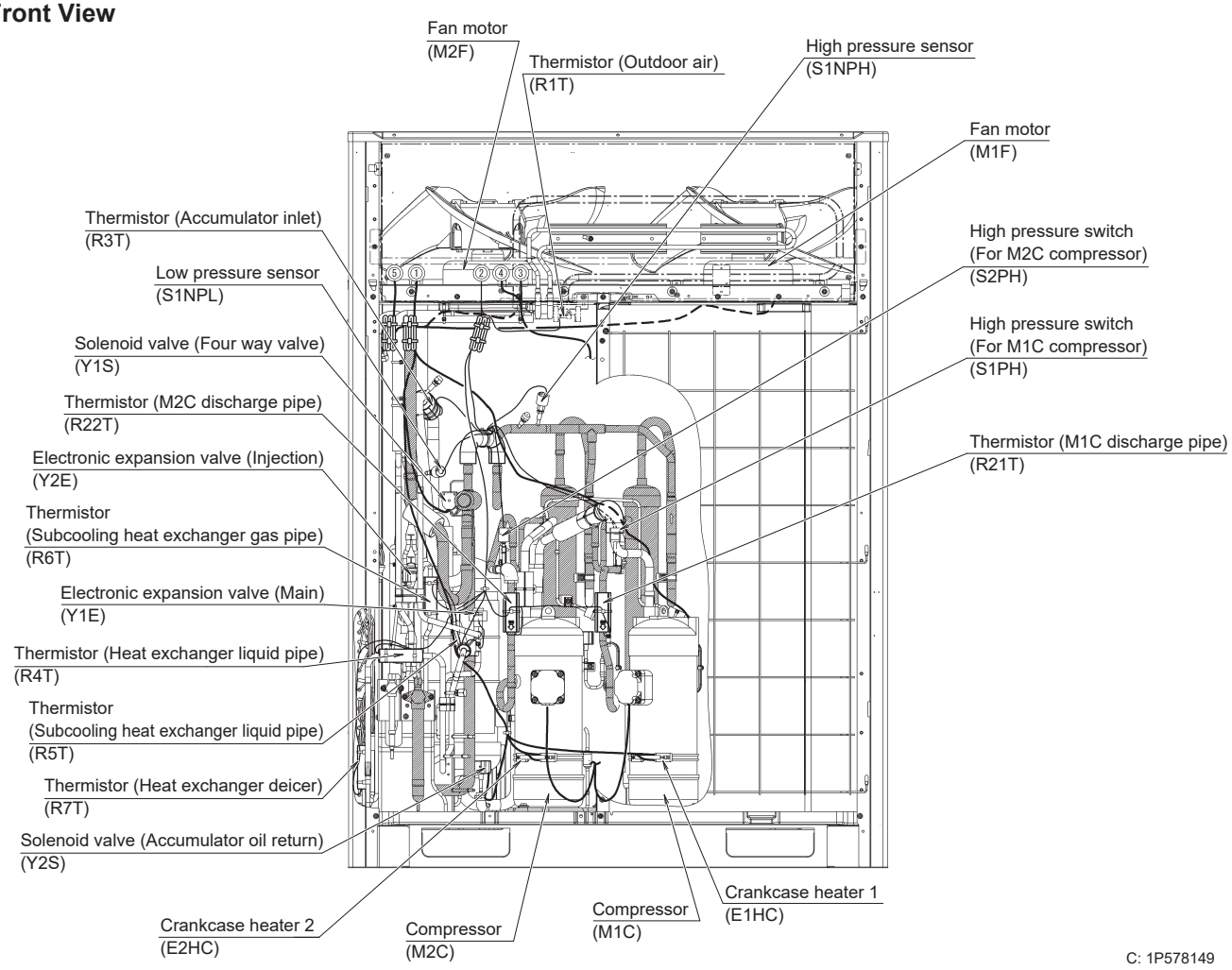
2.1 Heat Source Unit

RXHWQ120MQTJA

Top View



Front View



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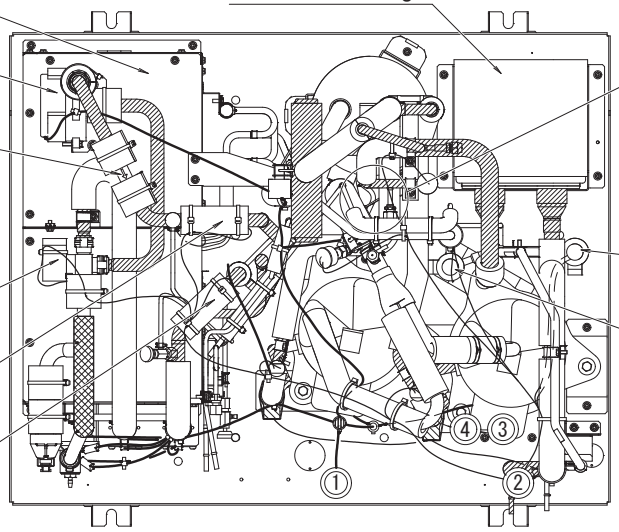
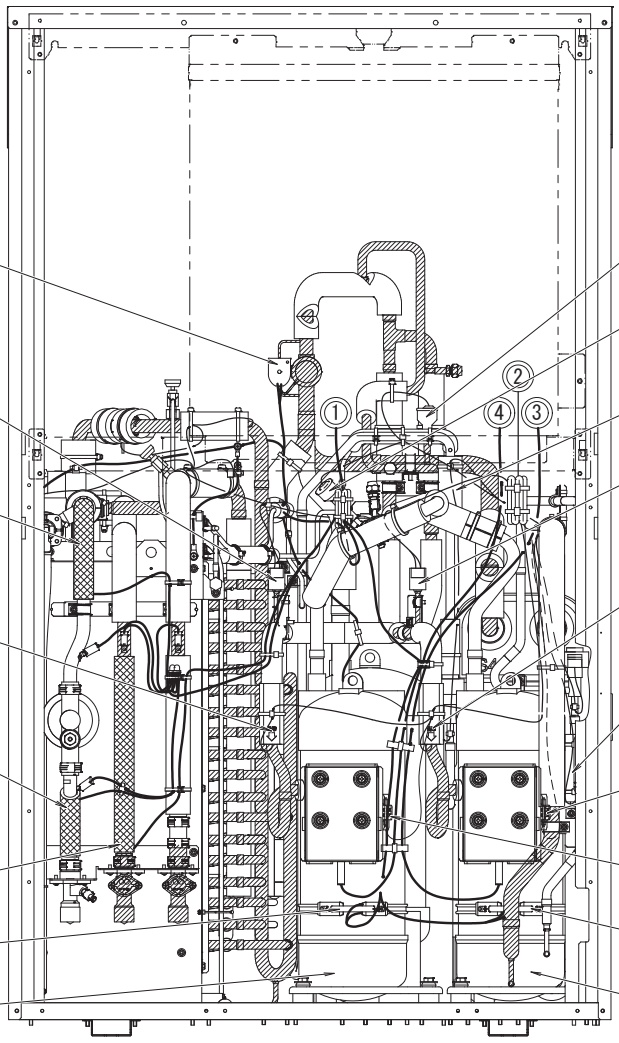
2.2 Cascade Unit

BWLP120TJU

Top View



Front View



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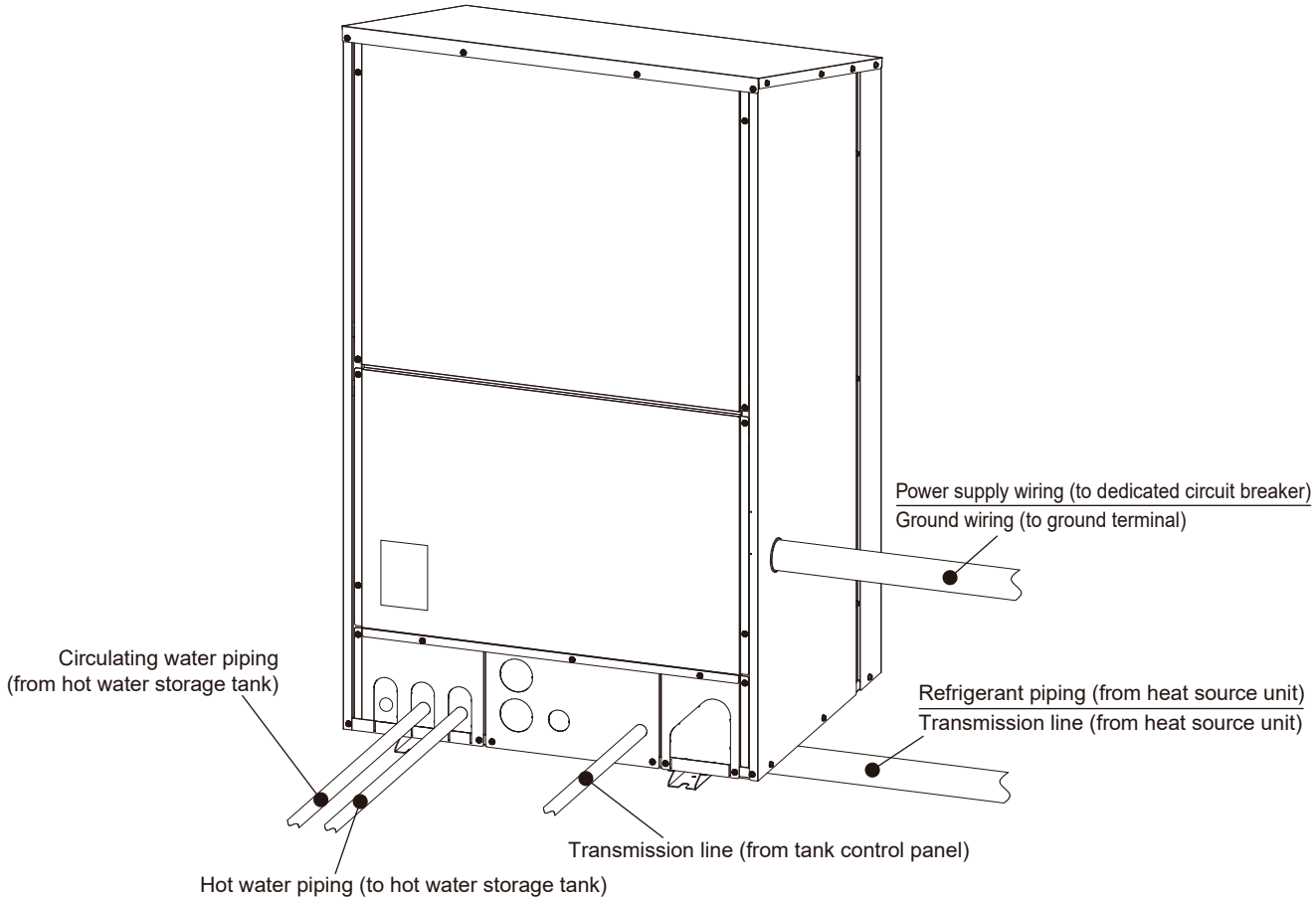
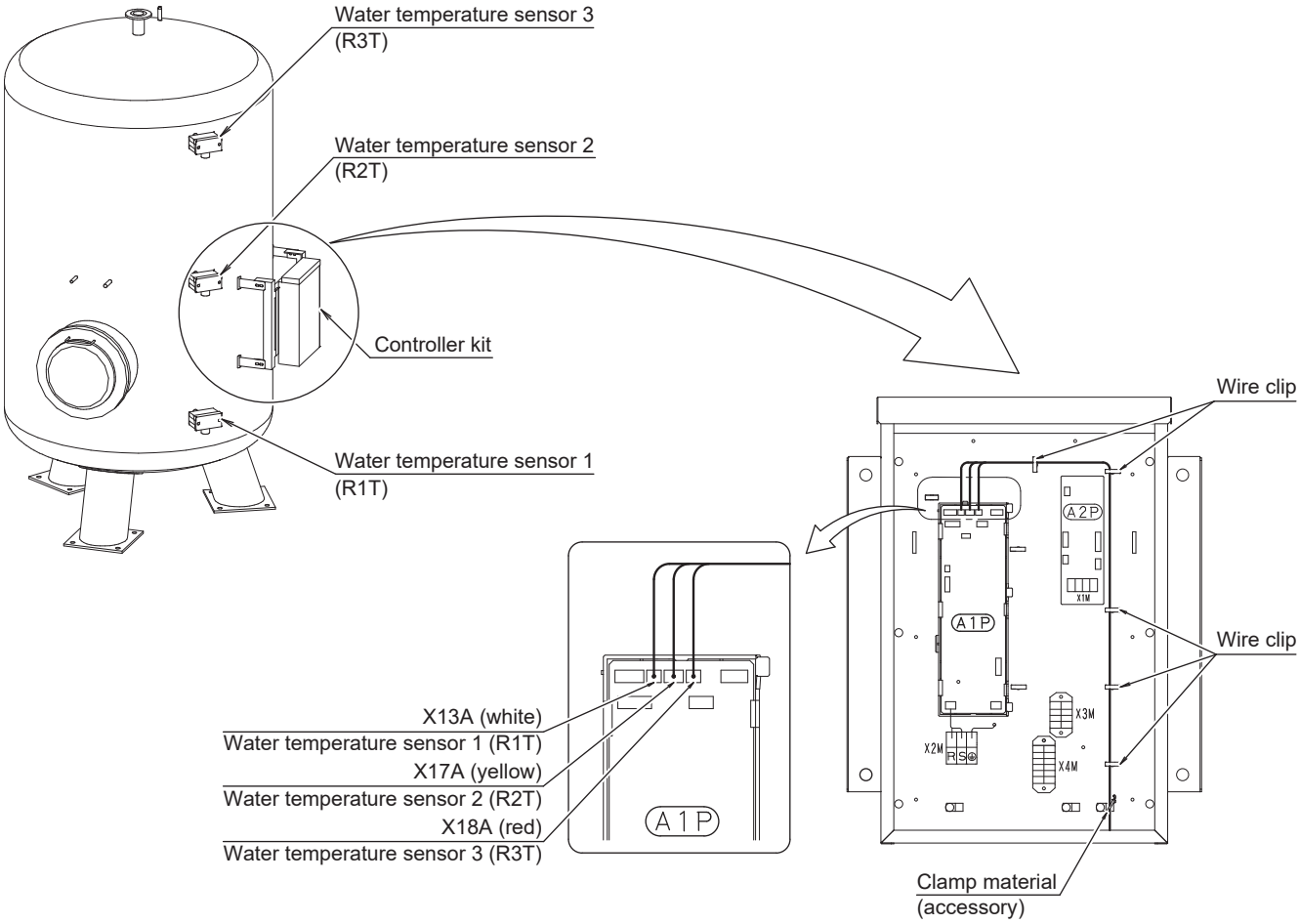
External View



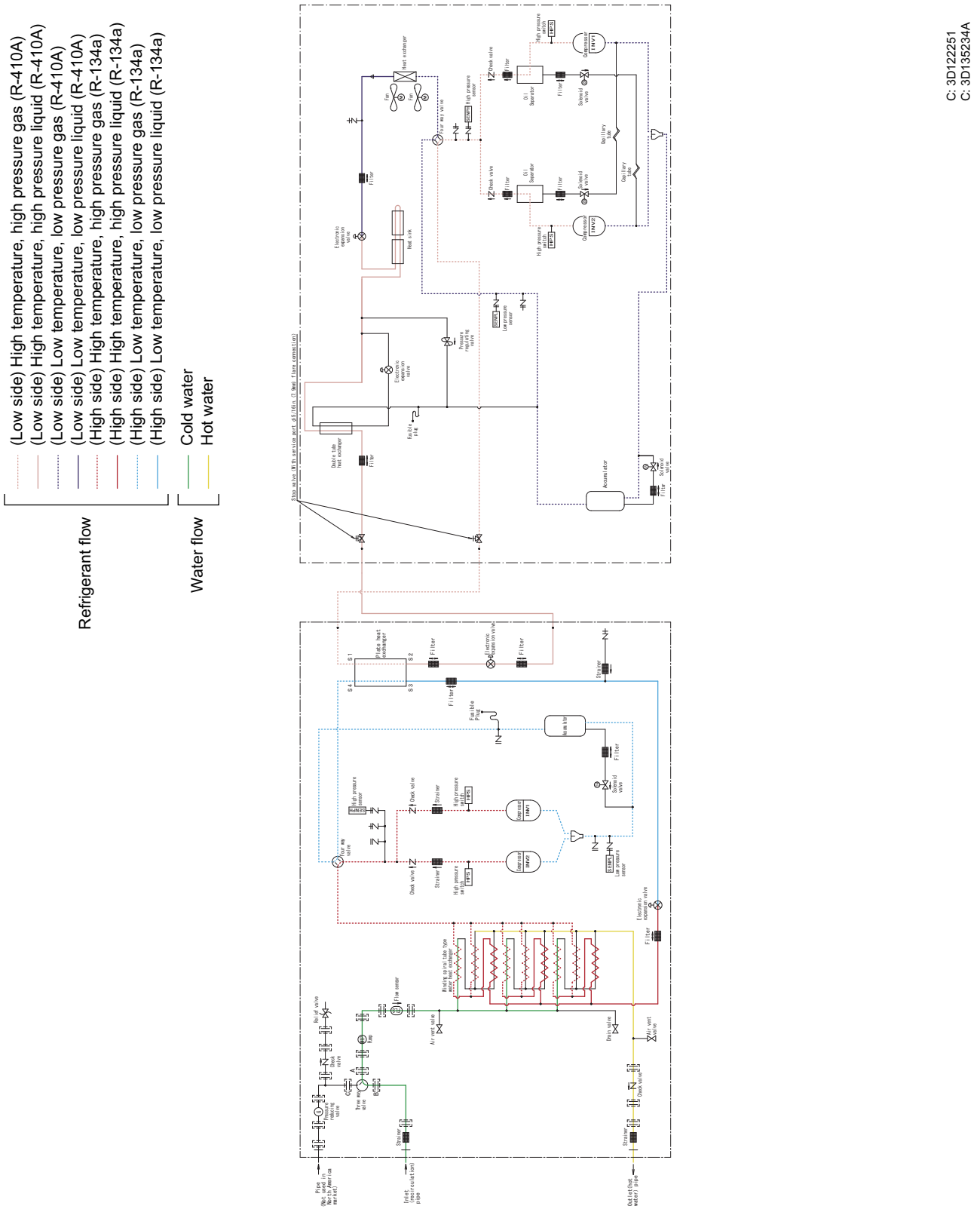
2.3 Hot Water Storage Tank, Controller Kit



Note(s) When two tanks are installed, each tank requires one controller kit.

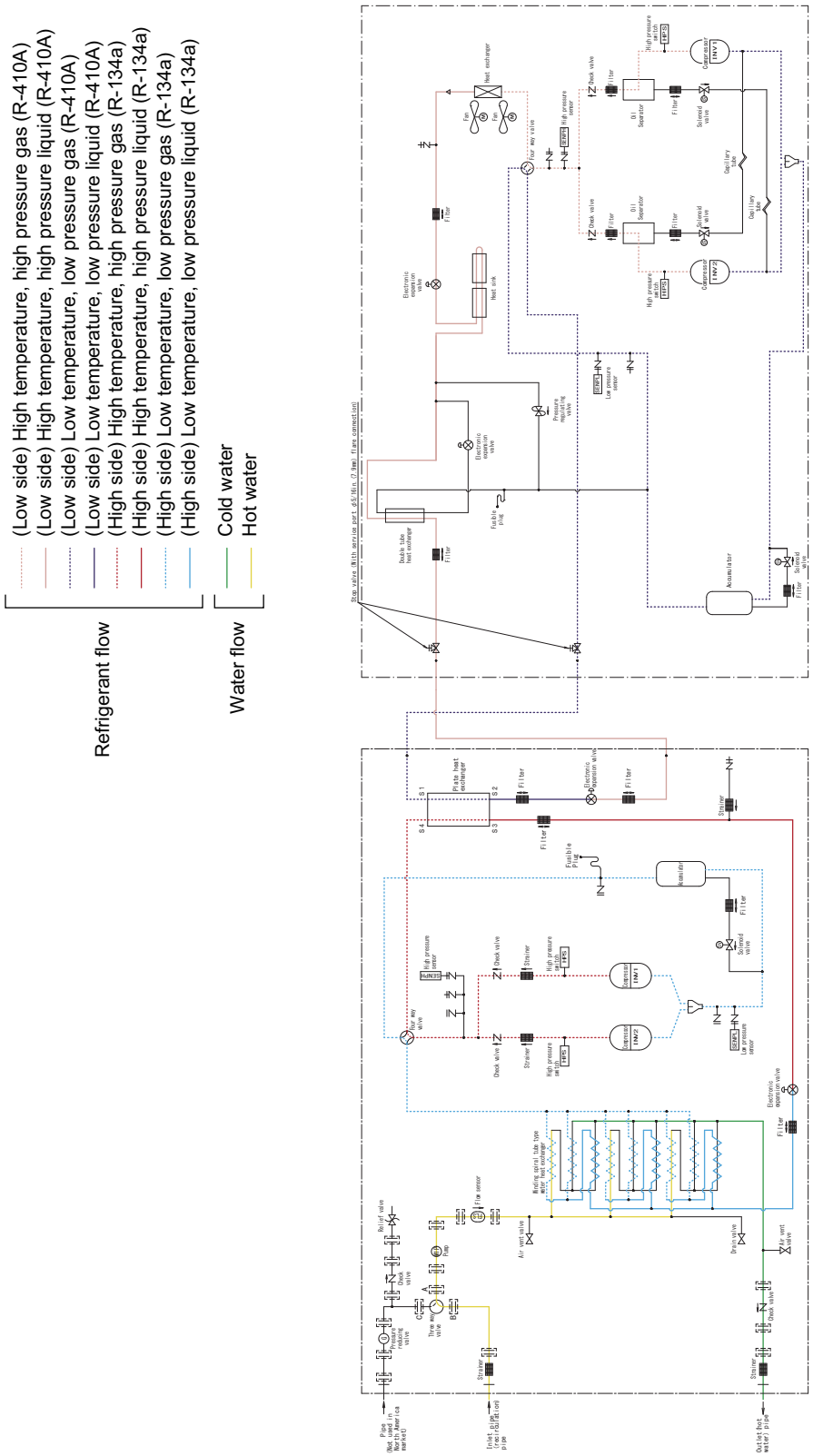
3. Refrigerant Flow for Each Operation Mode

3.1 Normal Operation



C: 3D122251
C: 3D135234A

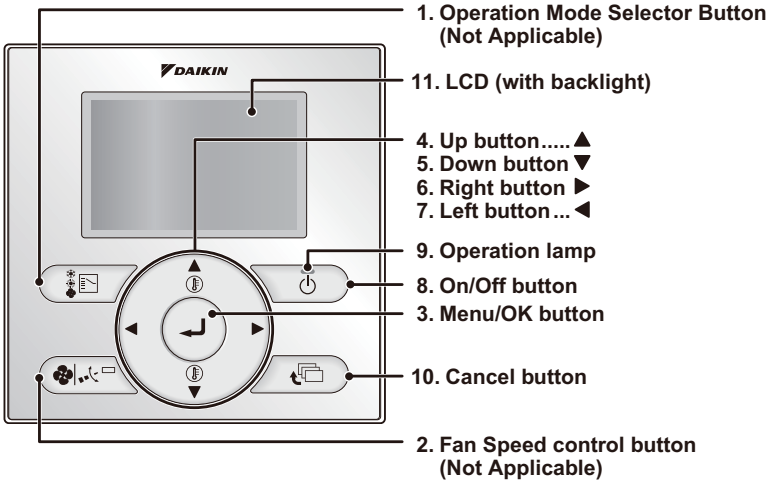
3.2 Defrost Operation



C: 3D122251
C: 3D135234A

Part 3
Remote Controller

1. Names and Functions



Functions other than basic operation items (i.e., On/Off , and Hot water supply temperature settings) are set from the menu screen.

1. Operation Mode Selector Button (This function is not available for this system)

2. Fan Speed control button (This function is not available for this system)

3. Menu/OK button

- Used to enter the main menu.
- Used to enter the selected item.

4. Up button ▲

- Used to raise the set temperature of the hot water supply.
- The item above the current selection will be highlighted. (The highlighted items will be scrolled continuously when the button is continuously pressed.)
- Used to change the selected item.

5. Down button ▼

- Used to lower the set temperature of the hot water supply.
- The item below the current selection will be highlighted. (The highlighted items will be scrolled continuously when the button is continuously pressed.)
- Used to change the selected item.

6. Right button ▶

- Used to highlight the next items on the right-hand side.
- Each screen is scrolled in the right-hand direction.

7. Left button ◀

- Used to highlight the next items on the left-hand side.
- Each screen is scrolled in the left-hand direction.

8. On/Off button

- Press this button and system will start.
- Press this button again to stop the system.

9. Operation lamp (Green)

- This lamp illuminates solid green during normal operation.
- This lamp flashes if an error occurs.

10. Cancel button

- Used to return to the previous screen.
- Press and hold this button for 4 seconds or longer to display service settings menu.

11. LCD (with backlight)

- The backlight will be illuminated for approximately 30 seconds by pressing any button.

Note(s) Temperature can be displayed on the remote controller in Celsius only.
Use the conversion table below to convert a temperature between Celsius and Fahrenheit.

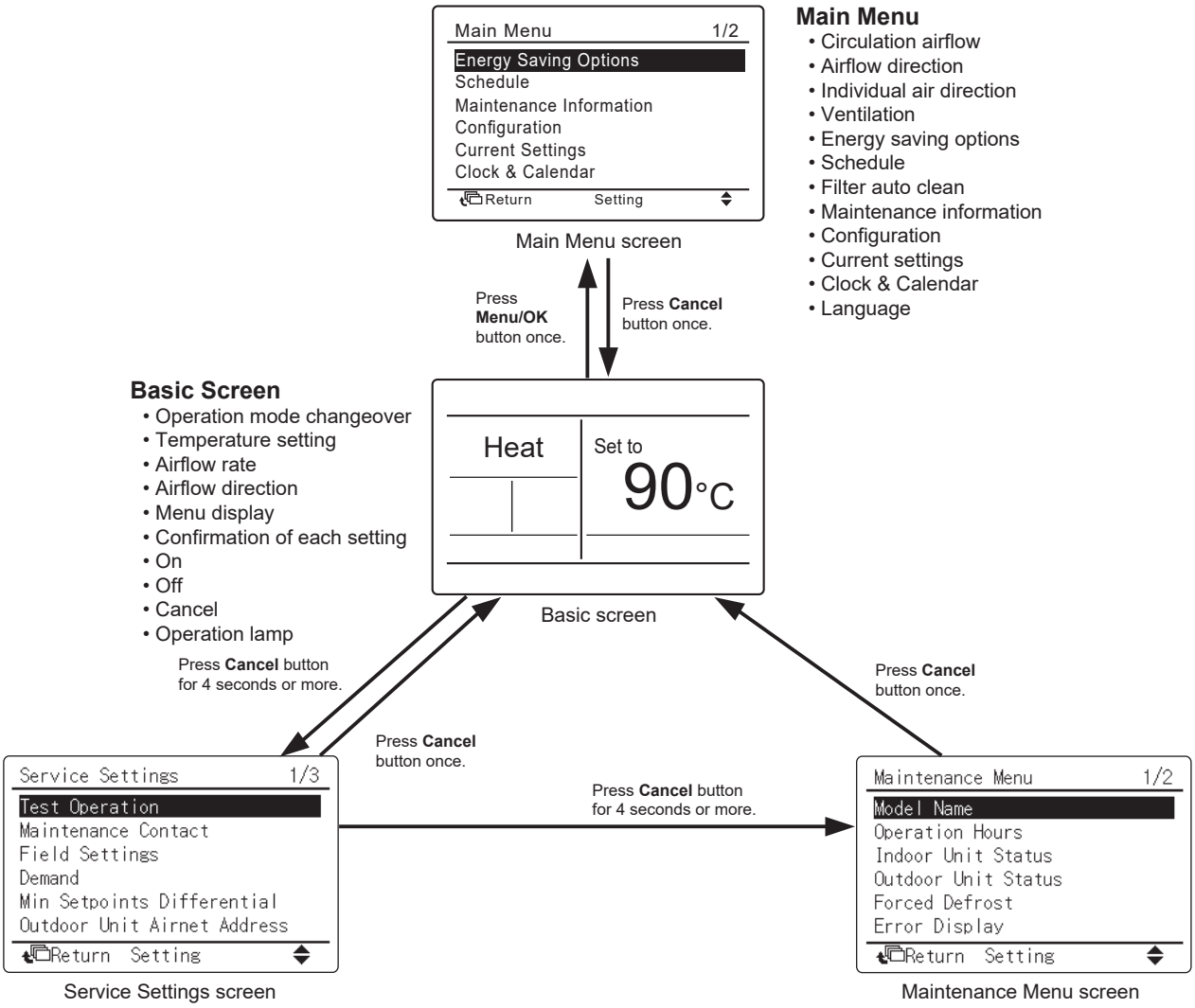
°C	60	61	62	63	64	65	66	67	68	69
°F	140.0	141.8	143.6	145.4	147.2	149.0	150.8	152.6	154.4	156.2

°C	70	71	72	73	74	75	76	77	78	79
°F	158.0	159.8	161.6	163.4	165.2	167.0	168.8	170.6	172.4	174.2

°C	80	81	82	83	84	85	86	87	88	89	90
°F	176.0	177.8	179.6	181.4	183.2	185.0	186.8	188.6	190.4	192.2	194.0

Mode Access Operation

On power-up, the message **Checking the connection. Please stand by.** will be displayed on the remote controller screen. Then that message will disappear and the basic screen will be displayed. To access a mode from the basic screen, refer to the figure below.
When any of the operation buttons is pressed, the backlight will come on and remains lit for about 30 seconds. Be sure to press a button while the backlight is on (this does not apply to the **On/Off** button.)



Main Menu
- Circulation airflow
- Airflow direction
- Individual air direction
- Ventilation
- Energy saving options
- Schedule
- Filter auto clean
- Maintenance information
- Configuration
- Current settings
- Clock & Calendar
- Language

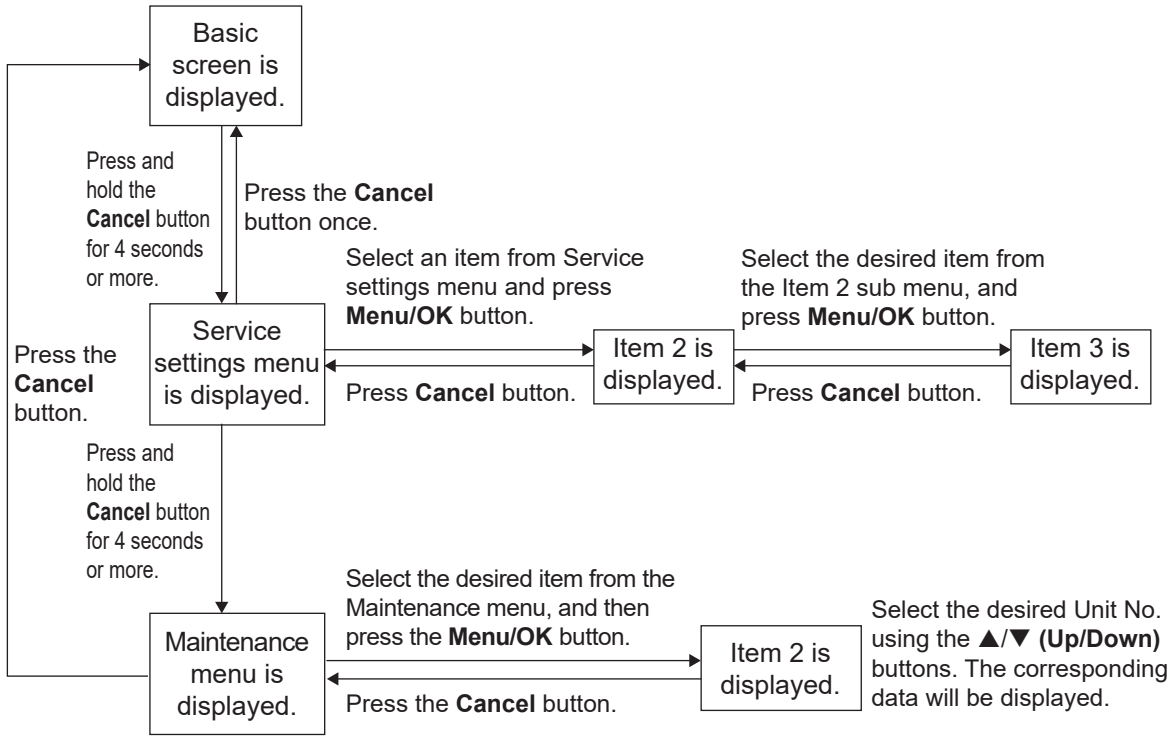
Basic Screen
- Operation mode changeover
- Temperature setting
- Airflow rate
- Airflow direction
- Menu display
- Confirmation of each setting
- On
- Off
- Cancel
- Operation lamp

Service Settings Menu
- Test Operation
- Maintenance contact
- Field settings
- Demand
- Min setpoints differential
- External input interlock
- Group address
- Indoor unit AirNet address
- Outdoor unit AirNet address
- Error history
- Indoor unit status
- Outdoor unit status
- Forced fan ON
- Switch main sub controller
- Filter indicator
- Test filter auto clean
- Brush/Filter ind
- Disable filter auto clean

Maintenance Menu
- Model name
- Operation hours
- Indoor unit status
- Outdoor unit status
- Forced defrost
- Error display
- Swap unit No.
- Addressed sensor value

2. Service Settings Menu, Maintenance Menu

Operating the remote controller allows service data to be acquired and various services to be set.



2.1 Service Settings Menu

Service settings menu	Item 2	Remarks
Test Operation	—	—
Maintenance Contact	None	—
	Maintenance Contact	—, 0 to 9 (in order)
Field Settings	Indoor Unit No.	—
	Mode No.	—
	First Code No.	—
	Second Code No.	—
Demand	Enable/Disable	Enable, Disable
	Settings	40%, 70%
		Start time (by the unit of 30 minutes)
		Ending time (by the unit of 30 minutes)
Min setpoints Differential	None, Single SP, 0 to 8°C	—
External Input Interlock	—	—
Group Address	Group Address (Group)	Gr Addr. Set
	Group Address (Unit)	Unit No., Gr Addr. Set
Indoor unit Airnet Address	Unit No., Address Set	—
Outdoor unit Airnet Address	Unit No., Address Set	—
Error History	RC Error History	Unit No., Error, Date, Time (Up to 10 errors received by the remote controller can be displayed.)
	Indoor Unit Error History	Unit No., Error, Date, Time (Up to 5 errors from the indoor unit error record can be displayed.)
Indoor Unit Status	Unit No.	—
	Th1	Suction air thermistor
	Th2	Heat exchanger liquid pipe thermistor
	Th3	Heat exchanger gas pipe thermistor
	Th4	Discharge air thermistor
	Th5	—
	Th6	—
Outdoor Unit Status	Unit No.	—
	Th1	Outdoor air thermistor
	Th2	Heat exchanger thermistor
	Th3	Discharge pipe thermistor
	Th4	—
	Th5	—
	Th6	—
Forced Fan ON	Unit No.	—
Switch Main Sub controller	—	—
Filter Indicator	—	—
Test Filter Auto Clean	—	—
Brush / Filter Ind	—	—
Disable Filter Auto Clean	No, Yes	—

2.2 Maintenance Menu

Maintenance Menu	Item 2	Remarks
Model Name	Unit No.	Select the unit number you want to check.
	Indoor unit	The model names are displayed. (A model code may be displayed instead, depending on the particular model.)
	Outdoor unit	
	R-32 mark display	—
Operation Hours	Unit No.	Select the unit number you want to check.
	Indoor unit operation hours	All of these are displayed in hours.
	Indoor fan operation hours	
	Indoor unit energized hours	
	Outdoor unit operation hours	
	Outdoor fan 1 operation hours	
	Outdoor fan 2 operation hours	
	Outdoor compressor 1 operation hours	
	Outdoor compressor 2 operation hours	
Indoor Unit Status	Unit No.	Select the unit number you want to check.
	FAN	Fan tap
	Speed	Fan speed (rpm)
	FLAP	Airflow direction
	EV	Degree that electronic expansion valve is open (pulse)
	MP	Drain pump ON/OFF
	EH	Electric heater ON/OFF
	Hu	Humidifier ON/OFF
	TBF	Anti-freezing control ON/OFF
	FLOAT	FLOAT SWITCH ON/OFF
	T1/T2	T1/T2 input from outside ON/OFF
	Th1	Suction air thermistor
	Th2	Indoor liquid pipe thermistor
	Th3	—
	Th4	—
	Th5	—
	Th6	—
Outdoor Unit Status	Unit No.	Select the Unit No. you want to check.
	FAN step	Fan tap
	COMP	Compressor power supply frequency (Hz)
	EV1	Degree that electronic expansion valve is open (pulse)
	SV1	Solenoid valve ON/OFF
	Pe	Low pressure (MPa)
	Pc	High pressure (MPa)
	Th1	—
	Th2	—
	Th3	—
	Th4	—
	Th5	—
	Th6	—
Error Display	Display error ON	Displays the error on the screen.
	Display error OFF	Displays neither errors nor warnings.
	Display warning ON	Displays a warning on the screen if an error occurs.
	Display warning OFF	No warning is displayed.
Swap Unit No.	Current Unit No.	A unit No. can be transferred to another.
	Transfer Unit No.	

Maintenance Menu	Item 2	Remarks
Addressed Sensor Value	Unit No.: 0 - 15	Select the unit number you want to check.
	Code 00: 01: 02: 03: 04: 05: 06: 07: 08: 09:	 Remote controller thermistor (°C) Suction air thermistor (°C) Heat exchanger liquid pipe thermistor (°C) Heat exchanger gas pipe thermistor (°C) Indoor unit address No. Outdoor unit address No. BS unit address No. Zone control address No. Cooling/Heating batch address No. Demand/low-noise address No.
	Data	The corresponding data will be displayed, based on the Unit No. and Code selected.

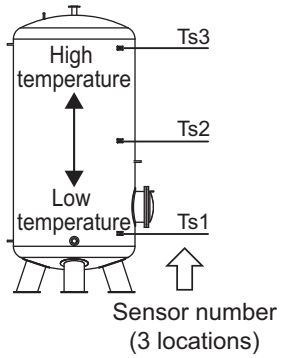
Part 4
Functions and Control

1. Control Overview

1.1 MEGA·Q (Closed Type System)

With MEGA·Q, the hot water storage operation of the hot water generation system is started and stopped by comparing the water heating start temperature set by the remote controller with the actual water temperature at the bottom of the tank.
It also compares water reheating start temperature set by the remote controller with the actual water temperature at the top of the tank, and starts and stops water reheating operation of the hot water generation system accordingly.

Remote controller settings description
After the test operation, configure settings with the remote controller before starting operation.

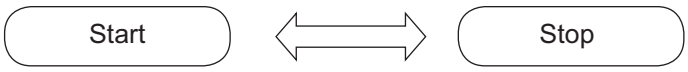


Closed type hot water storage tank

- Outlet water temperature setting of the hot water generation system (60-90°C, 1°C increments)
- Water heating start detection sensor (Ts1/Ts2) and water heating start temperature setting (30 to 80°C, in 5°C increments) (*1, *3)
- Water heating end detection sensor (Ts1/Ts2) and water heating end temperature setting (30 to 80°C, in 5°C increments) (*1, *2, *3)
- Water reheating start temperature setting (50 to 80°C, in 5°C increments) (*1, *4)

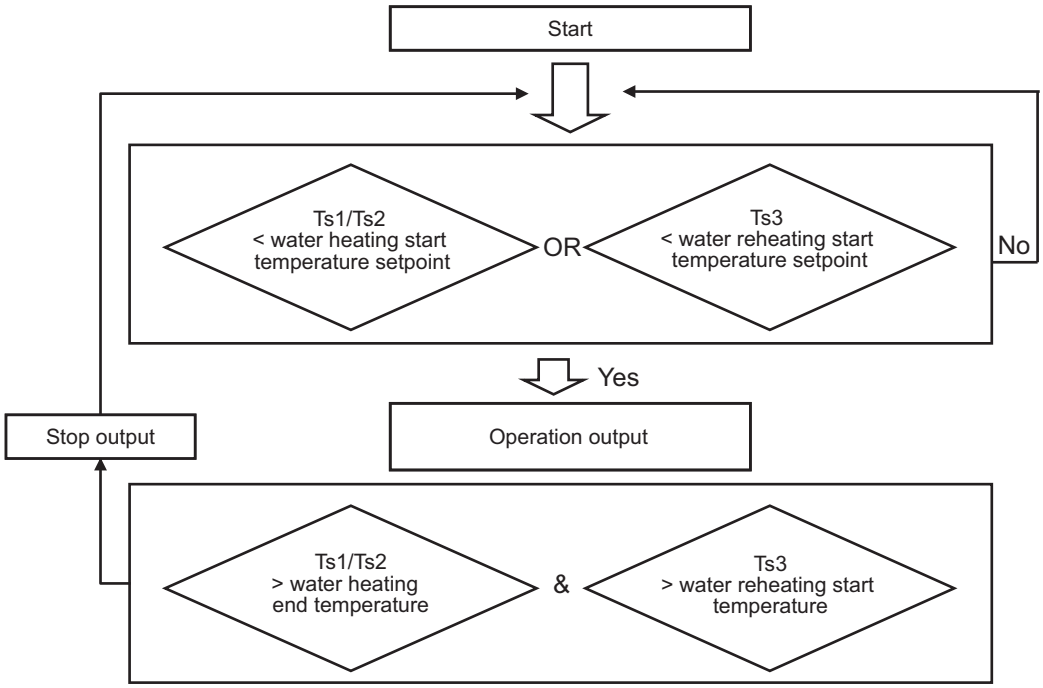
*1: Configured with operation remote controller service settings.
*2: To prevent setting mistakes, the water heating end temperature should be more than 5°C above the water heating start temperature.
*3: Select the detection sensor from the sensor number Ts1/Ts2 in the figure.
*4: The detection sensor is the sensor number Ts3 in the figure.

System start/stop
Operation of MEGA·Q can be started and stopped using the remote controller.



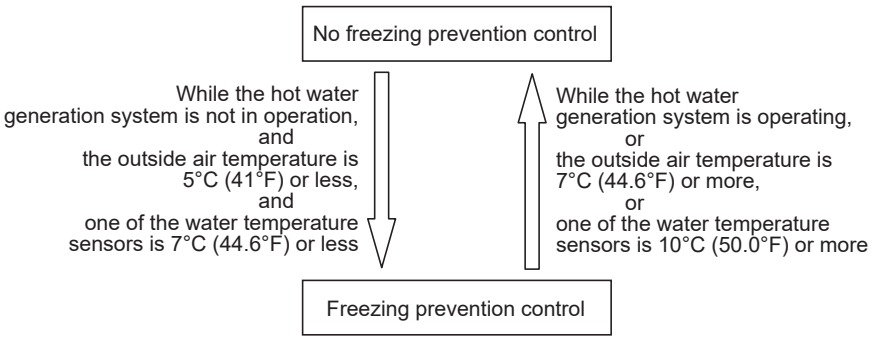
Hot water generation system operation

If the tank water temperature is lower than the water heating start temperature or the water reheating start temperature set by the remote controller, the operation will start.
If the tank water temperature is higher than the water heating end temperature and the water reheating start temperature set by the remote controller, the operation will end.

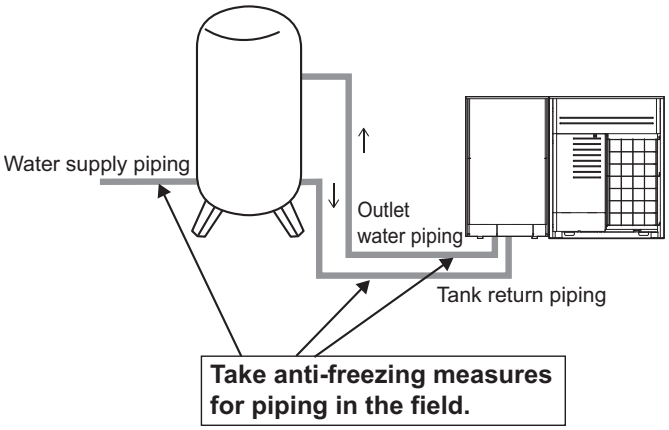


1.2 Freezing Prevention Control of Hot Water Generation System

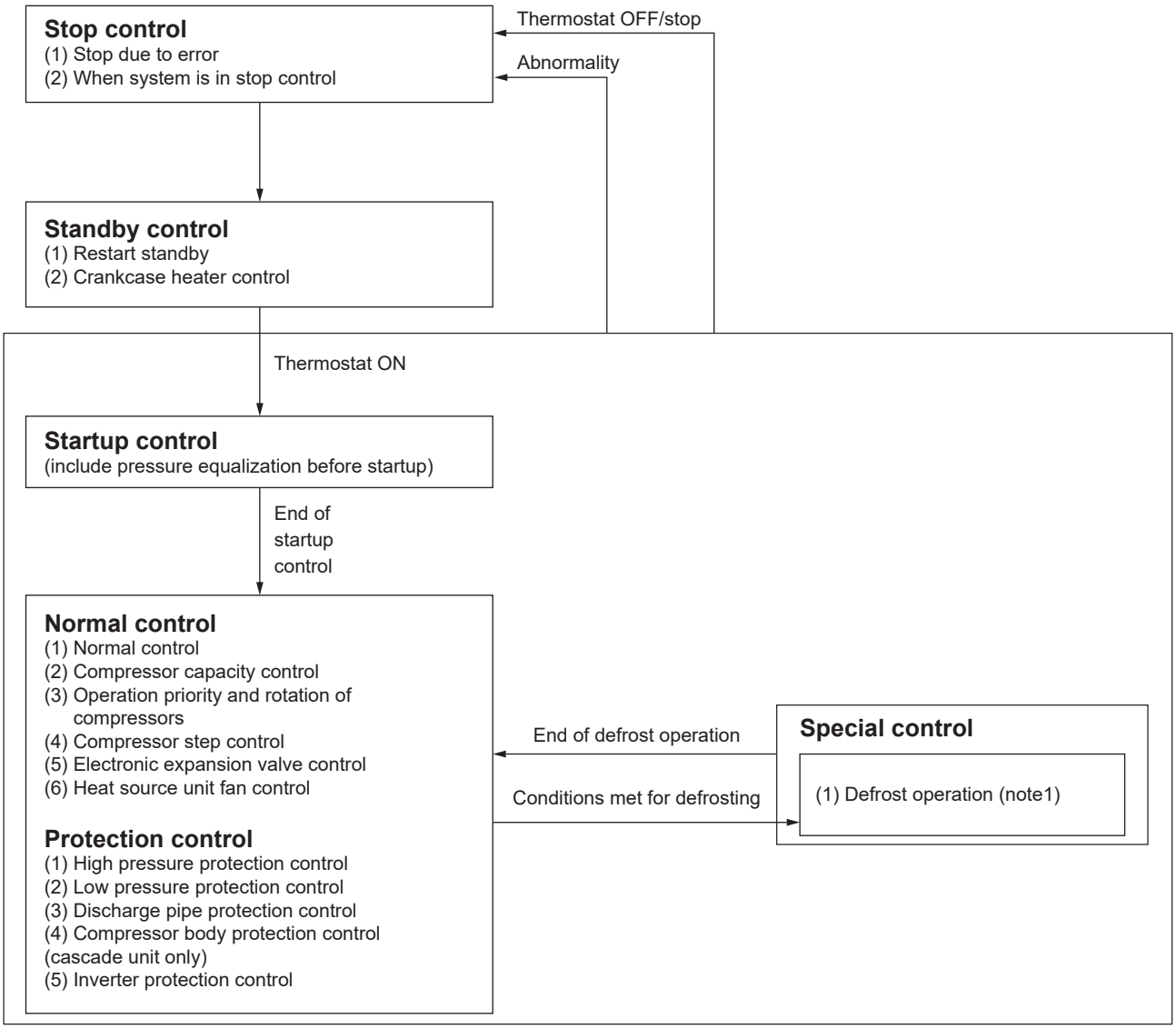
To prevent freezing, the hot water generation system automatically operates the pump to circulate water in the tank circulation system even while the system is not in operation. It may also turn on the anti-freezing heater to prevent freezing of water pipes other than those of the circulation circuit inside the unit.
To enable this control to operate properly, never turn off the power if there is a risk of freezing. Also, if the system is not in operation and water is completely drained, turn off the hot water generation system to prevent the pump from running out of water.



Take measures to prevent the water pipes of the cascade unit from freezing, such as by installing a heat retention heater.



2. Operation Flowchart



Note(s)

1. If the thermo OFF while in defrost operation, it will turn off on the completion of the defrost operation.

3. Stop Control

3.1 Stop due to Error

In order to protect compressors, if any of the abnormal state occurs, the system will stop with thermostat OFF and the error will be determined when the retry times reaches certain number. (Refer to **Error Codes and Descriptions** on page 78 of the troubleshooting for the items to determine the error.)

3.2 When System is in Stop Control

The four way valve retains the condition before it was stopped.

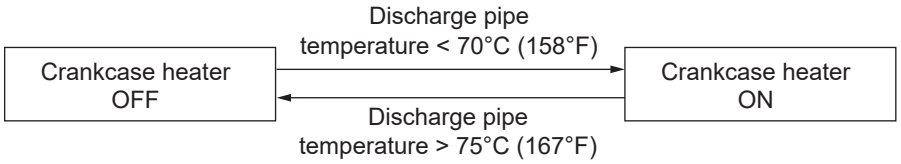
4. Standby Control

4.1 Restart Standby

Used to forcedly stop the compressor for a period of 2 minutes, in order to prevent the frequent ON/OFF of the compressor and equalize the pressure within the refrigerant system.
In addition, the outdoor fan carry out the residual operation for a while to accelerate pressure equalizing and to suppress migration of the refrigerant to the evaporator.

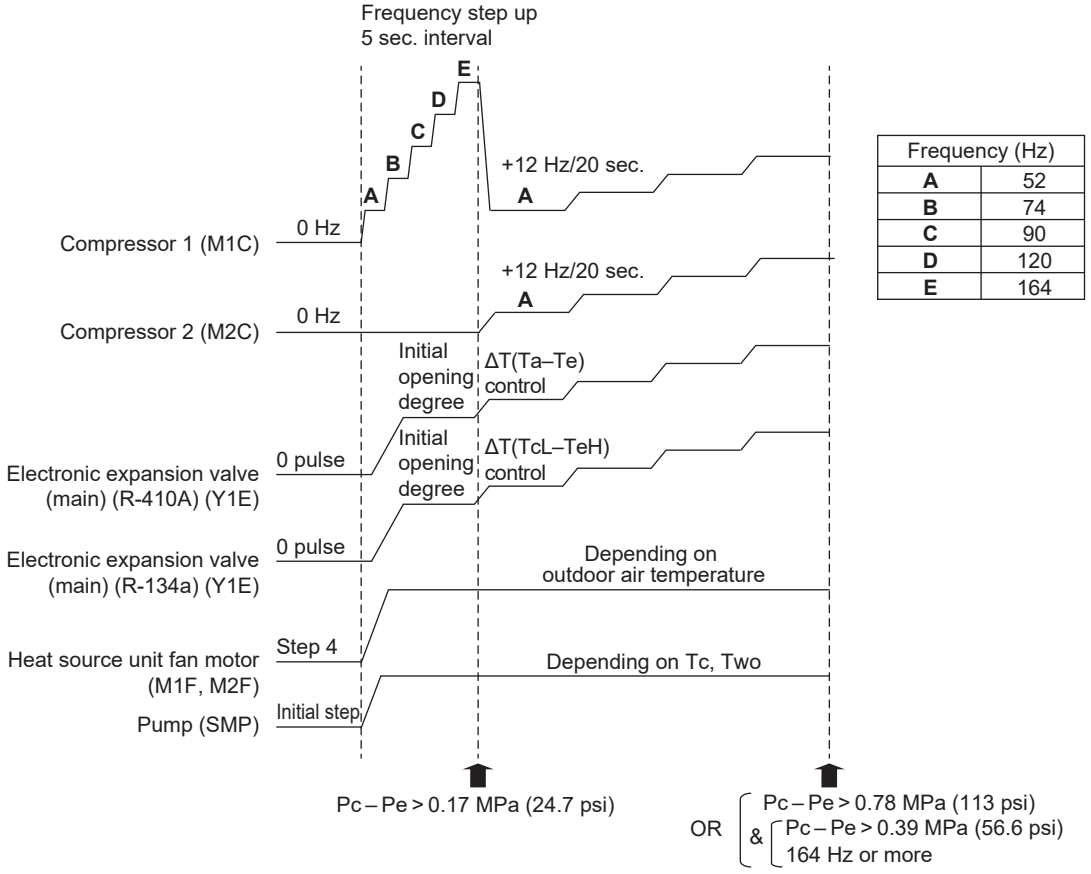
4.2 Crankcase Heater Control

This control works to prevent the refrigerant from migrating into the compressor oil while the system is not in operation.



5. Startup Control

This control is used to equalize the pressure in the suction and discharge sides of the compressor prior to the startup of the compressor, thus reducing startup loads. Furthermore, the inverter is turned ON to charge the capacitor.
To avoid stresses to the compressor due to oil return or else after the startup, the following control is made and the position of the four way valve is also determined.



Frequency (Hz)	
A	52
B	74
C	90
D	120
E	164

Pc: High pressure sensor detection value
Pe: Low pressure sensor detection value
Ta: Outdoor air temperature
Tc: High pressure equivalent saturation temperature
Te: Low pressure equivalent saturation temperature
Two: Water outlet temperature
TcL: High pressure equivalent saturation temperature (R-410A)
TeH: Low pressure equivalent saturation temperature (R-134a)

6. Basic Control

6.1 Normal Control

Heat source unit

Part Name	Electric Symbol	Function of Functional Part
Compressor 1	M1C	Condensation temperature control (High pressure protection) (Low pressure protection) (Discharge pipe temperature protection) (Inverter protection)
Compressor 2	M2C	
Inverter fan 1	M1F	Low pressure control
Inverter fan 2	M2F	
Electronic expansion valve (Main)	Y1E	PFC (model predictive control)
Electronic expansion valve (Injection)	Y2E	PFC (model predictive control)
Four way valve	Y1S	ON
Solenoid valve (Accumulator oil return)	Y2S	ON
Solenoid valve (Oil return 1)	Y3S	ON
Solenoid valve (Oil return 2)	Y4S	ON

Cascade unit

Part Name	Electric Symbol	Function of Functional Part
Compressor 1	M1C	Condensation temperature control (High pressure protection) (Low pressure protection) (Discharge pipe temperature protection) (Inverter protection) The target condensing temperature varies depending on the target outlet water temperature and the current outlet water temperature.
Compressor 2	M2C	
Electronic expansion valve (High side)	Y1E	Subcooling control
Electronic expansion valve (Low side)	Y2E	3,000 pulses
Solenoid valve (Accumulator oil return)	Y3S	ON
Four way valve	Y4S	OFF
Electric three way valve	M2	OFF
Water pump	M1P	Constant capacity (variable flow) control Varies the flow rate to reach the target capacity based on the inlet water temperature and the target outlet water temperature.

6.2 Compressor Capacity Control

Compressor capacity is controlled so that Tc is constant in order to obtain a stable outlet water temperature.

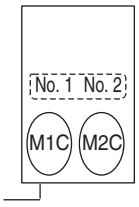
Compressor rotation speed

	Heat source unit		Cascade unit	
	M1C	M2C	M1C	M2C
Min (Hz)	52	52	52	52
Max (Hz)	256	276	201.6	213.6

The compressor capacity is controlled so that Tc becomes the target value (TcS).
TcSH (Tc target value of cascade unit): Determined by the target outlet water temperature.
TcSL (Tc target value of heat source unit): Determined by TcSH and outdoor air temperature.
Tc: High pressure equivalent saturation temperature (°C)
TcS: Tc target value (changes depending on outlet water temperature and water reheating start temperature setting)

6.3 Operating Priority and Rotation of Compressors

Each compressor operates in the following order of priority.
M1C: Compressor 1
M2C: Compressor 2



6.4 Compressor Step Control

The compressor operation varies in the following steps according to information in **Compressor Capacity Control** on page 40.
Depending on the operating conditions of compressors, the compressors may run in patterns other than the following.

Heat source unit, Cascade unit

Step No.	Step up (Hz)		Step down (Hz)	
	M1C	M2C	M1C	M2C
1	52.0	0.0	52.0	0.0
2	52.8	0.0	52.8	0.0
3	53.4	0.0	53.4	0.0
4	54.2	0.0	54.2	0.0
5	54.8	0.0	54.8	0.0
6	55.6	0.0	55.6	0.0
7	56.4	0.0	56.4	0.0
8	57.2	0.0	57.2	0.0
9	57.8	0.0	57.8	0.0
10	58.6	0.0	58.6	0.0
11	59.4	0.0	59.4	0.0
12	60.2	0.0	60.2	0.0
13	61.0	0.0	61.0	0.0
14	61.8	0.0	61.8	0.0
15	62.8	0.0	62.8	0.0
16	63.6	0.0	63.6	0.0
17	64.4	0.0	64.4	0.0
18	65.2	0.0	65.2	0.0
19	66.2	0.0	66.2	0.0
20	67.0	0.0	67.0	0.0
21	68.0	0.0	68.0	0.0
22	68.8	0.0	68.8	0.0
23	69.8	0.0	69.8	0.0
24	70.8	0.0	70.8	0.0
25	71.6	0.0	71.6	0.0
26	72.6	0.0	72.6	0.0
27	73.6	0.0	73.6	0.0
28	74.6	0.0	74.6	0.0
29	75.6	0.0	75.6	0.0
30	76.6	0.0	76.6	0.0
31	77.6	0.0	77.6	0.0
32	78.8	0.0	78.8	0.0
33	79.8	0.0	79.8	0.0
34	80.8	0.0	80.8	0.0
35	82.0	0.0	82.0	0.0
36	83.0	0.0	83.0	0.0
37	84.2	0.0	84.2	0.0
38	85.4	0.0	85.4	0.0
39	86.4	0.0	86.4	0.0
40	87.6	0.0	87.6	0.0
41	88.8	0.0	88.8	0.0
42	90.0	0.0	90.0	0.0
43	91.2	0.0	91.2	0.0
44	92.4	0.0	92.4	0.0
45	93.6	0.0	93.6	0.0
46	95.0	0.0	95.0	0.0
47	96.2	0.0	96.2	0.0
48	97.6	0.0	97.6	0.0
49	98.8	0.0	98.8	0.0
50	100.2	0.0	100.2	0.0
51	101.6	0.0	101.6	0.0
52	103.0	0.0	52.0	52.0
53	104.2	0.0	52.0	53.0
54	105.6	0.0	52.0	54.0
55	107.0	0.0	52.6	54.6
56	108.6	0.0	52.8	56.0
57	110.0	0.0	53.0	57.0
58	111.4	0.0	53.8	57.8
59	113.0	0.0	54.0	59.4
60	114.6	0.0	54.4	60.4
61	116.0	0.0	55.0	61.0
62	117.6	0.0	55.2	62.6
63	119.2	0.0	55.6	63.6
64	120.8	0.0	56.4	64.4
65	122.4	0.0	56.6	66.0
66	124.0	0.0	57.0	67.0
67	125.8	0.0	58.0	68.0
68	127.4	0.0	58.8	68.8
69	129.2	0.0	59.6	69.6
70	130.8	0.0	60.4	70.4

Step No.	Step up (Hz)		Step down (Hz)	
	M1C	M2C	M1C	M2C
71	61.4	71.4	61.4	71.4
72	65.0	75.0	65.0	75.0
73	66.0	76.0	66.0	76.0
74	67.0	77.0	67.0	77.0
75	67.8	77.8	67.8	77.8
76	68.8	78.8	68.8	78.8
77	69.8	79.8	69.8	79.8
78	70.8	80.8	70.8	80.8
79	71.8	81.8	71.8	81.8
80	73.0	83.0	73.0	83.0
81	74.0	84.0	74.0	84.0
82	75.0	85.0	75.0	85.0
83	76.2	86.2	76.2	86.2
84	77.2	87.2	77.2	87.2
85	78.4	88.4	78.4	88.4
86	79.4	89.4	79.4	89.4
87	80.6	90.6	80.6	90.6
88	81.8	91.8	81.8	91.8
89	82.8	92.8	82.8	92.8
90	84.0	94.0	84.0	94.0
91	85.2	95.2	85.2	95.2
92	86.4	96.4	86.4	96.4
93	87.8	97.8	87.8	97.8
94	90.2	100.2	90.2	100.2
95	91.6	101.6	91.6	101.6
96	92.8	102.8	92.8	102.8
97	94.2	104.2	94.2	104.2
98	95.4	105.4	95.4	105.4
99	96.8	106.8	96.8	106.8
100	98.2	108.2	98.2	108.2
101	99.6	109.6	99.6	109.6
102	101.0	111.0	101.0	111.0
103	102.6	112.6	102.6	112.6
104	104.0	114.0	104.0	114.0
105	105.4	115.4	105.4	115.4
106	106.8	116.8	106.8	116.8
107	108.4	118.4	108.4	118.4
108	109.8	119.8	109.8	119.8
109	111.4	121.4	111.4	121.4
110	113.0	123.0	113.0	123.0
111	114.6	124.6	114.6	124.6
112	116.2	126.2	116.2	126.2
113	118.0	128.0	118.0	128.0
114	119.6	129.6	119.6	129.6
115	121.2	131.2	121.2	131.2
116	122.8	132.8	122.8	132.8
117	130.0	140.0	130.0	140.0
118	131.8	141.8	131.8	141.8
119	133.8	143.8	133.8	143.8
120	139.6	149.6	139.6	149.6
121	141.6	151.6	141.6	151.6
122	143.6	153.6	143.6	153.6
123	145.8	155.8	145.8	155.8
124	147.8	157.8	147.8	157.8
125	150.0	160.0	150.0	160.0
126	152.2	162.2	152.2	162.2
127	154.4	164.4	154.4	164.4
128	156.6	166.6	156.6	166.6
129	158.8	168.8	158.8	168.8
130	161.2	171.2	161.2	171.2
131	163.4	173.4	163.4	173.4
132	165.8	175.8	165.8	175.8
133	168.2	178.2	168.2	178.2
134	170.6	180.6	170.6	180.6
135	173.2	183.2	173.2	183.2
136	175.6	185.6	175.6	185.6
137	180.6	190.6	180.6	190.6
138	183.2	193.2	183.2	193.2
139	192.0	202.0	192.0	202.0
140	195.4	205.4	195.4	205.4

Step No.	Step up (Hz)		Step down (Hz)	
	M1C	M2C	M1C	M2C
141	199.0	209.0	199.0	209.0
142 (*1)	201.6	213.6	201.6	213.6
143	205.4	217.4	205.4	217.4
144	207.2	223.2	207.2	223.2
145	211.0	227.0	211.0	227.0
146	215.0	231.0	215.0	231.0
147	218.8	234.8	218.8	234.8
148	223.0	239.0	223.0	239.0
149	227.0	243.0	227.0	243.0
150	229.2	249.2	229.2	249.2
151	233.6	253.6	233.6	253.6
152	237.8	257.8	237.8	257.8
153	242.2	262.2	242.2	262.2
154	246.8	266.8	246.8	266.8
155	251.4	271.4	251.4	271.4
156 (*2)	256.0	276.0	256.0	276.0

*1 Cascade unit upper limit
*2 Heat source unit upper limit

6.5 Electronic Expansion Valve Control

Main electronic expansion valve control (R-410A)

In order to make the best use of the heat source unit heat exchanger (evaporator), the electronic expansion valve (Y1E) is controlled so that the degree of superheating (SH) at the evaporator outlet is constant.

SH = Ts1 – TeL

SH: Evaporator outlet superheating degree (°C)
Ts1: Accumulator inlet temperature (°C)
TeL: Low pressure equivalent saturation temperature (R-410A)(°C)

The initial value of the optimal degree of superheat at the evaporator outlet is 5°C (9°F), but it changes depending on the degree of superheat for the discharge pipe of the compressor.

Subcooling electronic expansion valve control (R-410A)

In order to make the best use of the subcooling heat exchanger, the electronic expansion valve (Y2E) is controlled so that the degree of superheating (SH) at the evaporator outlet gas pipe is constant.

SH = Tsh – Te

SH: Subcooling heat exchanger outlet (evaporation side) superheating degree (°C)
Tsh: Subcooling heat exchanger outlet (evaporation side) temperature (°C)
Te: Low pressure equivalent saturation temperature (°C)

Controls the electronic expansion valve (Y2E) to lower the discharge pipe temperature when the discharge pipe temperature exceeds 95°C (203°F).
The electronic expansion valve (Y2E) is controlled to store excess refrigerant in the accumulator for high pressure control.

Sub electronic expansion valve control (R-410A)

Electronic expansion valve (Y2E) is constant at 3,000 pulses.

Main electronic expansion valve control (R-134a)

In order to make the best use of the water heat exchanger (condenser), the electronic expansion valve (Y1E) is controlled so that the degree of subcooling (SC) at the condenser outlet is constant.

SC = Tch – TscH

SC: Condenser outlet subcooling degree (°C)
TscH: Liquid pipe temperature at outlet of water heat exchanger (°C)
TcH: High pressure equivalent saturation temperature (R-134a)(°C)

6.6 Heat Source Unit Fan Control

Used to control the revolutions of heat source unit fans in the steps listed in table below, according to condition changes.

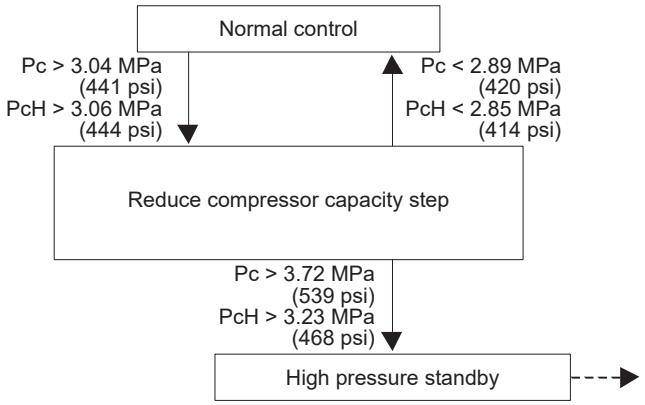
Step	Fan revolutions (rpm)	
	M1F	M2F
0	0	0
1	360	0
2	470	0
3	570	0
4	360	360
5	550	520
6	865	665
7	1,136	1,106
8	1,340	1,160

Note(s) Figures listed above are for standard mode. Values may differ when the system is set to high static pressure mode.

7. Protection Control

7.1 High Pressure Protection Control

This high pressure protection control is used to prevent the activation of protection devices due to abnormal increase of high pressure and to protect compressors against the transient increase of high pressure.

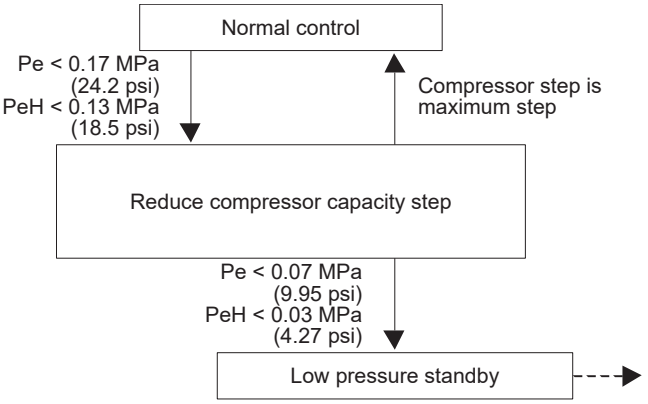


Pc: Heat source unit high pressure sensor detection value
PcH: Cascade unit high pressure sensor detection value

When occurring 3 times within 30 minutes, high pressure switch is activated without high pressure standby, thus outputting the error code **E3**.

7.2 Low Pressure Protection Control

Low pressure protection control is used to protect compressors against the transient decrease of low pressure.

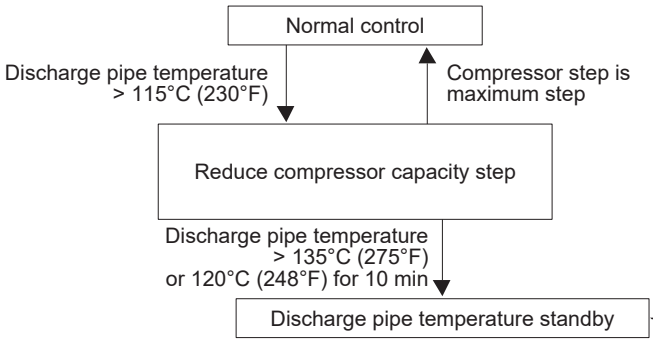


Pe: Heat source unit low pressure sensor detection value
PeH: Cascade unit low pressure sensor detection value

When occurring 4 times within 60 minutes, the error code **E4** is output.

7.3 Discharge Pipe Protection Control

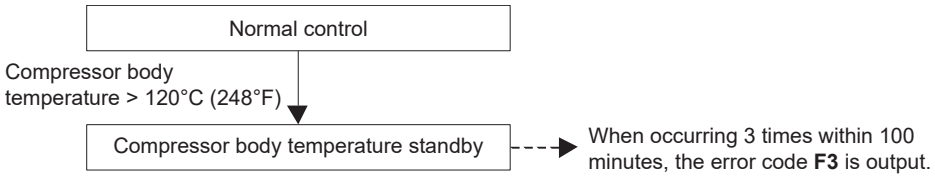
Discharge pipe protection control is used to protect the compressor internal temperature against an error or transient increase of discharge pipe temperature.



When occurring 3 times within 100 minutes, the error code **F3** is output.

7.4 Compressor Body Protection Control (Cascade Unit Only)

This compressor body protection control is used to protect the compressor internal temperature against an error or transient increase of compressor body temperature.

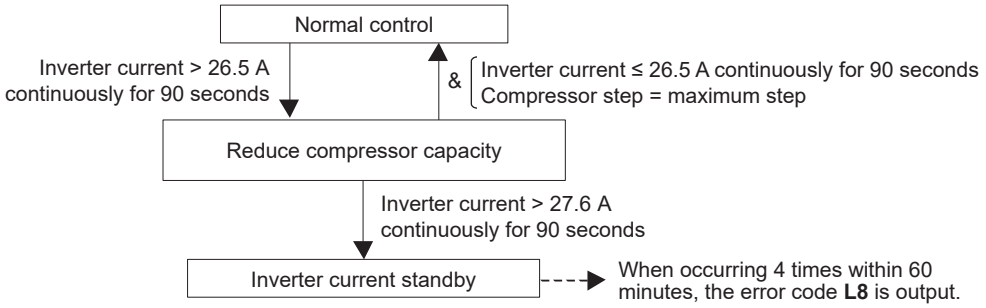


7.5 Inverter Protection Control

Inverter current protection control and radiation fin temperature control are performed to prevent tripping due to an abnormality, or transient inverter overcurrent, and fin temperature increase.

Inverter Current Protection Control

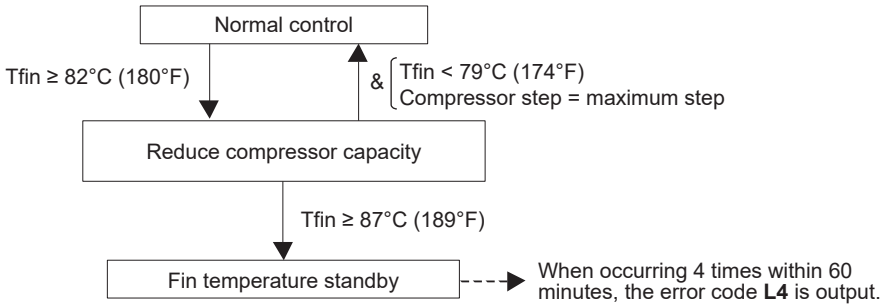
This control is performed for each compressor.



Radiation Fin Temperature Control

This control is performed for each compressor.

Tfin: Inverter radiation fin temperature



8. Special Control

8.1 Defrost Operation

To defrost outdoor heat exchanger, defrost operation is conducted to recover the heating capacity.
Tb: Heat exchanger deicer temperature

Defrost operation starts under the following conditions.
- Every hour after water heating operation
- Every 2 hours after water reheating operation

Heat Source Unit

Part name	Electric symbol	Defrost operation
Compressor 1	M1C	252 Hz + 252 Hz
Compressor 2	M2C	
Fan motor 1	M1F	OFF ↔ Step 4 ↔ Step 6 (depending on high pressure)
Fan motor 2	M2F	
Electronic expansion valve (Main)	Y1E	3,000 pulses
Electronic expansion valve (Injection)	Y2E	0 pulse
Four way valve	Y1S	OFF
Solenoid valve (Accumulator oil return)	Y2S	ON
Solenoid valve (Oil return 1)	Y3S	ON
Solenoid valve (Oil return 2)	Y4S	ON
Ending condition		OR • A lapse of 15 minutes • Tb > 11°C (51.8°F) continues for 30 seconds or more

Cascade Unit

Part name	Electric symbol	Defrost operation
Compressor 1	M1C	52 to 140 Hz (depending on water temperature)
Compressor 2	M2C	
Electronic expansion valve (High side)	Y1E	500 to 1,000 pulses (depending on water temperature)
Electronic expansion valve (Low side)	Y2E	Defrost EV control
Solenoid valve (Accumulator oil return)	Y3S	ON
Four way valve	Y4S	ON
Electric three way valve	M2	OFF
Water pump	M1P	Step 55

Part 5
Field Settings and Test Operation

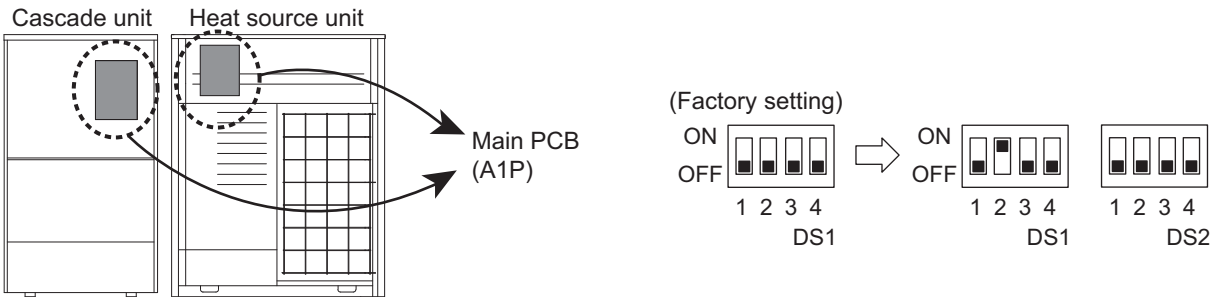
1. Settings by DIP Switches

1.1 Initial PCB Factory Settings

The factory settings for the DIP switches on the main PCB are as follows.

1.2 Setting after Replacing PCB

After replacing the PCB, change the main PCB (A1P) of the heat source unit or cascade unit to the following.



2. Field Settings for Cascade Unit

Note(s) The following settings can be configured using the BS buttons on the main PCB of the cascade unit.
Perform each setting with the cascade unit. (If set with the heat source unit the settings will be disabled.)

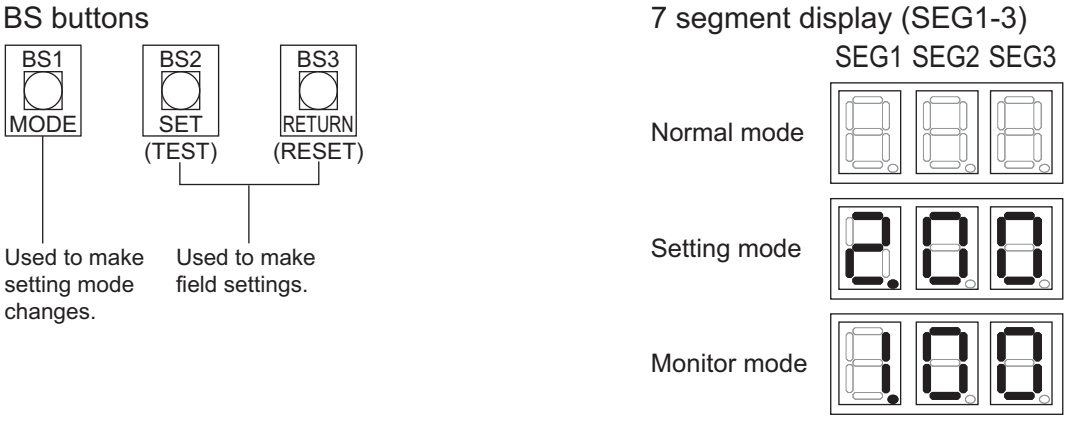
2.1 Function Settings

No.	Setting item	Setting purpose/description	Setting method overview	Reference Page
1	Night-time low noise operation setting	Night-time low noise operation is possible. Start time: Select between 8:00 PM and 12:00 AM End time: Select between 6:00 AM and 8:00 AM (The start time and end time will be estimated based on outdoor air temperatures) (1) Level 1: step 5 or less (2) Level 2: step 5 or less (3) Level 3: step 5 or less	Executed via Setting mode. Select a level in the setting mode No. 22. Select the start time at No. 26 and the end time at No. 27.	53
2	Centralized address	Configures the cascade unit centralized addresses.	Configures the address in the setting mode No.13.	52
3	High static pressure settings	Mount the diffuser duct and configure for operation in high static pressure mode. (Used for concealed installation in high floors and balconies) *: Remove the outdoor fan cover for the diffuser duct.	Turn Mode No. 18 of the Setting mode to ON.	52

2.2 Service Settings

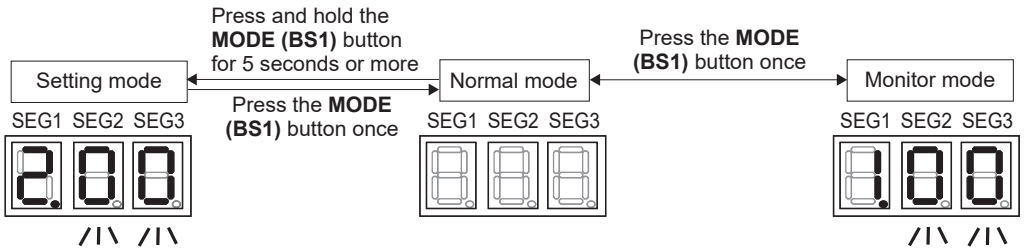
No.	Setting item	Setting purpose/description	Setting method overview	Reference Page
1	Emergency operation	When the compressor fails, operation of the relevant compressor or the relevant unit is prohibited. Only the operable compressor or the unit can be operated in case of an emergency.	Executed via Setting Mode No. 38 and No. 39.	55
2	Airtightness test	Fully opens the electronic expansion valves of the heat source unit/cascade unit and turns ON some of the solenoid valves.	Turn No. 21 of the Setting Mode to ON.	53
3	Refrigerant recovery mode	Used when collecting refrigerant in the field. While prohibiting the operation of the heat source unit/cascade, fully open the expansion valve of the unit.	Turn No. 21 of the Setting Mode to ON.	54
4	Vacuum mode	Used when pulling a vacuum in the field. Fully opens the expansion valves of the heat source unit/cascade unit and turns ON some of the solenoid valves. A vacuum pump is used to pull the vacuum.	Turn No. 21 of the Setting Mode to ON.	54
5	Power transistor check mode	Used to diagnose DC compression unit failure. Inverter waveform output allows whether the fault location is the compressor or PCB to be determined.	Turn No. 28 of the Setting Mode to ON.	52
6	Model setting with replacement PCB	After replacing with a replacement PCB, be sure to set according to the model.	Set DS1-1 to 1-4 and DS2-1 to 2-4 switches on the PCB according to the model.	47

2.3 Settings by BS Buttons (for Cascade Unit)

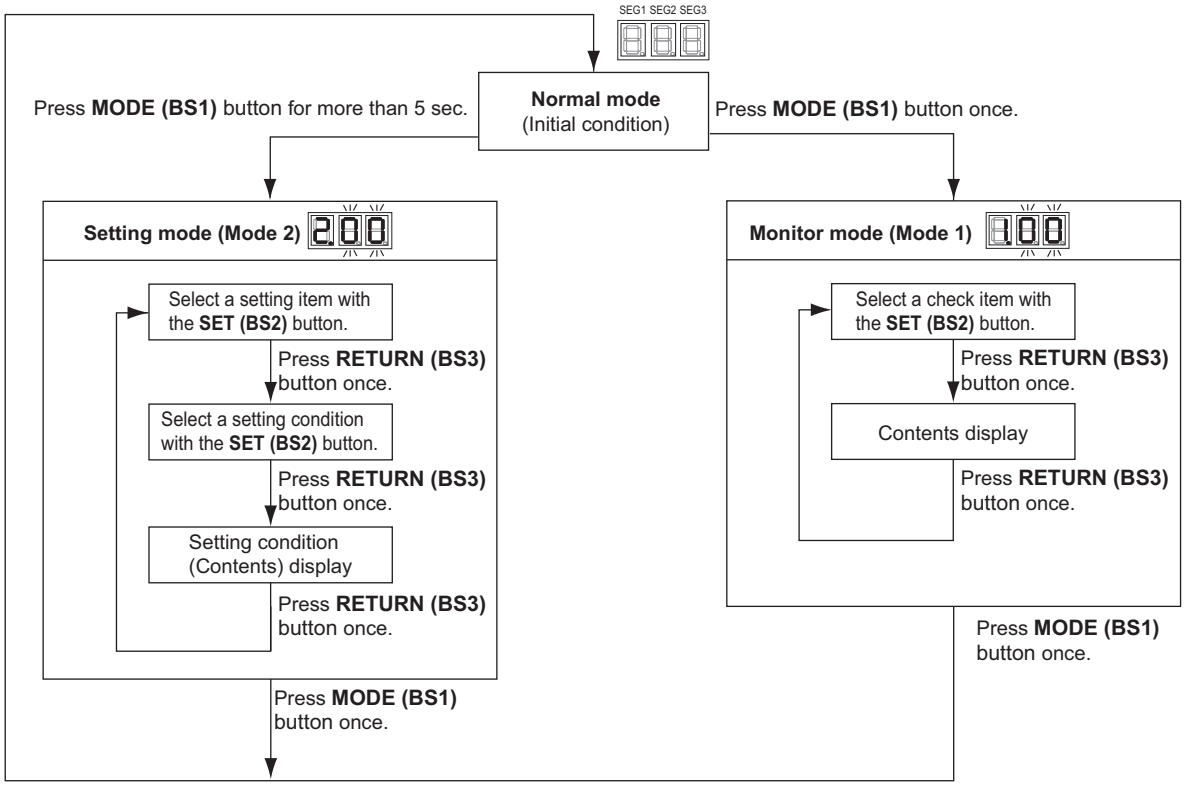


- Normal mode:
  - Blank: If no abnormality is detected and initialization of communication was completed.
  - Flashing combination of letter and number (4 digits): Error code or trouble by communication.
- Setting mode: Used to make changes to operating status, performance settings or address setting.
- Monitor mode: Used to verify contents of settings, quantity of units, current value of some parameters.

- **Mode changing procedure can be selected using the MODE (BS1) button as shown below:**

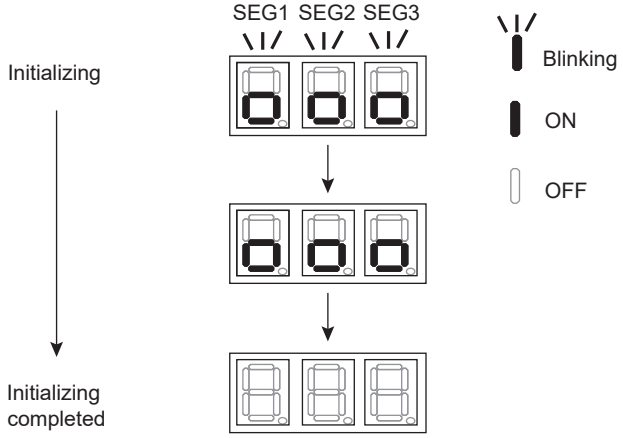


■ **Selection between normal mode, monitor mode (Mode 1) and setting mode (Mode 2).**

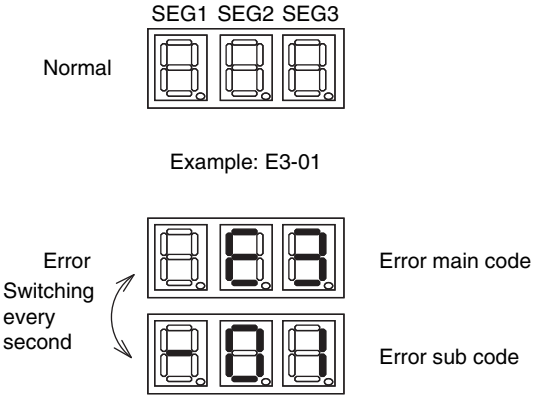


2.3.1 Normal Mode

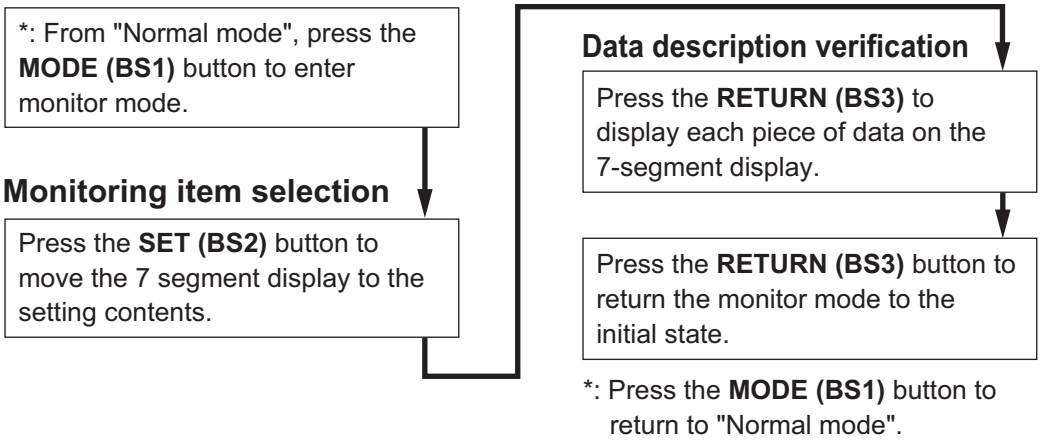
1. Inter-unit transmission status: Used to check for the initial status of inter-unit transmission.



2. Descriptions: Used to display an error content.



2.3.2 Monitor Mode (Mode 1)



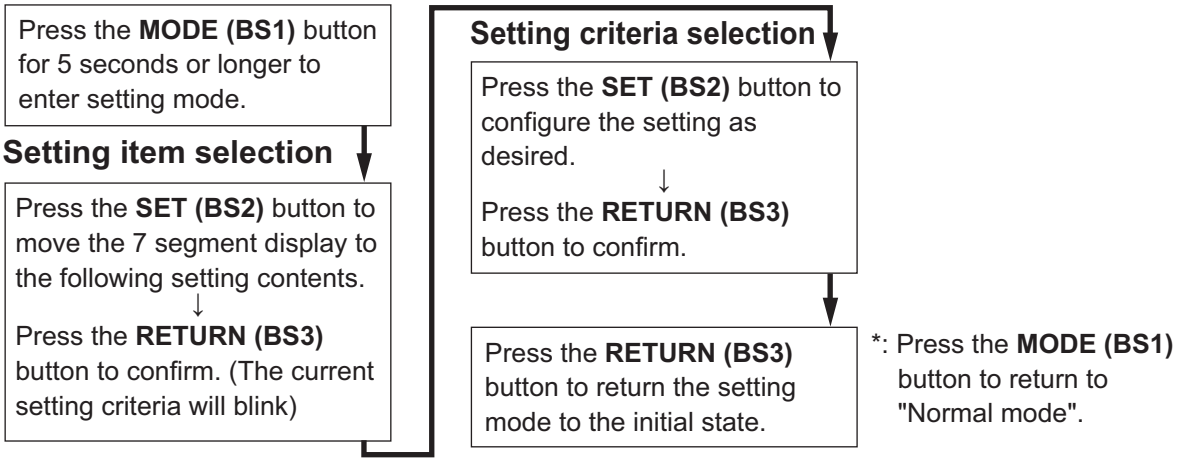
No. *1	Item				Contents			
	Description	Display			Description	Display		
		SEG 1	SEG 2	SEG 3		SEG 1	SEG 2	SEG 3
1	Low noise operation state display	1.	0	1	Normal operation Low noise operation			0 1
3	Automatic backup operation setting	1.	0	3	OFF ON			0 1
9	AirNet address	1.	0	9	Addresses			
17	Error description (latest)	1.	1	7	Refer to information in **Error Code via Cascade Unit PCB** on page 77.			
18	Error description (2nd last)	1.	1	8				
19	Error description (3rd last)	1.	1	9				
23	Retry description (latest)	1.	2	3				
24	Retry description (2nd last)	1.	2	4				
25	Retry description (3rd last)	1.	2	5				

*1: Numbers in the **No.** column represent the number of times to press the BS button.

2.3.3 Setting Mode (Mode 2)

This mode is used to sets the various addresses or change the operation status.

Setting Procedure



No. *1	Item		Display			Contents	Display		
	Description		SEG 1	SEG 2	SEG 3	Description	SEG 1	SEG 2	SEG 3
13	Centralized addresses	Set the centralized addresses.	2.	1	3	Address: **0** ~ 12		 1	 **0** 2
18	High static pressure settings	Mount the diffuser duct and configure when operating in high static pressure mode.	2.	1	8	**OFF** ON			**0** 1
21	Refrigerant recovery/ vacuum mode	Configure the refrigerant recovery/vacuum mode.	2.	2	1	Refrigerant recovery/vacuum **OFF** ON			 **0** 1
22	Night-time low noise operation level setting	Enables automatic night-time low noise operation. Low noise operation levels can be set.	2.	2	2	**OFF** Level 1 Level 2 Level 3			**0** 1 2 3
26	Night-time low noise operation start setting	Sets the start time for night-time low noise operation. (Night-time low noise operation setting is required.)	2.	2	6	About 8:00 PM **About 10:00 PM** About 12:00 AM			1 **2** 3
27	Night-time low noise operation end setting	Sets the end time for night-time low noise operation. (Night-time low noise operation setting is required.)	2.	2	7	About 6:00 AM About 7:00 AM **About 8:00 AM**			1 2 **3**
28	Power transistor check	Used to troubleshoot DC compressor. Inverter waveforms are output without wire connections to the compressor. It is useful to determine whether the relevant trouble has resulted from the compressor or inverter PCB.	2.	2	8	**OFF** ON			**0** 1
38	Emergency operation (Cascade unit)	Set to prohibit cascade unit compressor operation or unit operation. This is a provisional operation. Replace the compressor and parts as soon as possible.	2.	3	8	**OFF** M1C on cascade unit prohibited M2C on cascade unit prohibited			**0** 1 2
39	Emergency operation (Heat source unit)	Set to prohibit heat source unit compressor operation or unit operation. This is a provisional operation. Replace the compressor and parts as soon as possible.	2.	3	9	**OFF** M1C on heat source unit prohibited M2C on heat source unit prohibited			**0** 1 2
80	Intermittent fan operation	Used for intermittent fan operation setting	2.	8	0	**OFF** 30 minutes OFF, 1 minute ON with medium fan speed 30 minutes OFF, 1 minute ON with high fan speed			**0** 1 2

*1. Numbers in the **No.** column represent the number of times to press the BS button.

2.4 Details of Setting Mode (Mode 2)

2.4.1 Night-Time Low Noise Operation

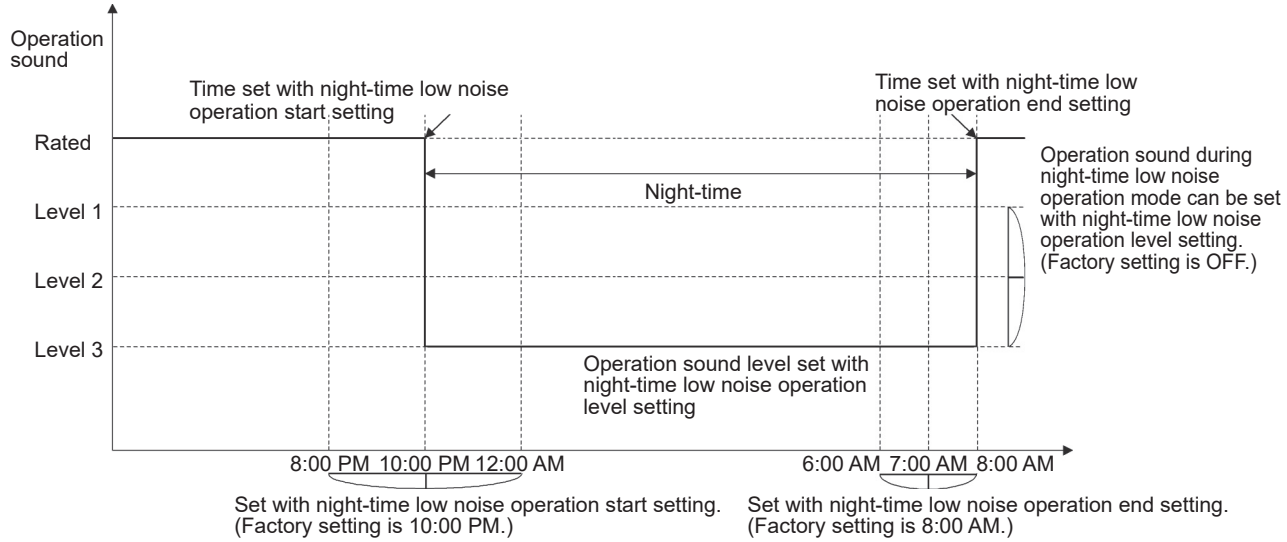
Save capacity and drive with lower noise by enabling low noise operation.

Setting	Content
Level 1	Set the outdoor fan to Step 5 or lower.
Level 2	Set the outdoor fan to Step 5 or lower.
Level 3	Set the outdoor fan to Step 5 or lower.

Automatic Night-time Low Noise Operation

1. Use the setting mode (mode 2) to select setting item No. 22 (Night-time low noise operation level setting) and choose Level 1, Level 2, or Level 3.
2. If required, use the setting mode (mode 2) to select setting item No. 26 (Night-time low noise operation start setting) and choose 8:00 PM, 10:00 PM, or 12:00 AM. (The start time is only an estimate based on the outdoor air temperature.)
3. If required, use the setting mode (mode 2) to select setting item No. 27 (Night-time low noise operation end setting) and choose 6:00 AM, 7:00 AM, or 8:00 AM. (The end time is only an estimate based on the outdoor air temperature.)

Operation Image



2.4.2 Airtightness Testing

After performing equipment service in the field, an airtightness test will be performed. During this test, expansion valves of the heat source unit and cascade unit are fully opened and some of the solenoid valves are turned ON.

Procedure

1. While the system is not in operation, set the setting mode No.21 (Refrigerant recovery/vacuum mode) to ON.
   The expansion valves of the heat source unit and cascade unit are fully opened and some of the solenoid valves are turned ON. (The 7-segment display shows **t01** and operation is prohibited.)
2. Close the gas-side and liquid-side stop valves and perform an airtightness test at 4.0 MPa (580 psi).
3. Press the **RETURN (BS3)** button to release setting mode.

Caution

Do not shut off power to the unit during an airtightness test.
(The solenoid valve will close and airtightness test of the unit cannot be performed.)

2.4.3 Refrigerant Recovery Mode

In order to achieve a free pathway to recovering refrigerant out of the system, it is necessary to apply a setting which will open required valves in the refrigerant circuit so the recovering of refrigerant can be done properly.
Operation of either the heat source unit or the cascade unit is prohibited.

Procedure

1. While the system is not in operation, set the setting mode No.21 (Refrigerant recovery/vacuum mode) to ON.
   The expansion valves of the heat source unit and cascade unit are fully opened and some of the solenoid valves are turned ON. (The 7-segment display shows **t01** and operation is prohibited. After setting, do not release setting mode until refrigerant recovery is completed.)
2. Recover refrigerant with refrigerant recovery equipment. (Refer to the supplied manual for the refrigerant recovery equipment for details.).
3. Press the **RETURN (BS3)** button to release setting mode.

2.4.4 Vacuum Mode

In order to achieve a free pathway to vacuum the system, it is necessary to apply a setting which will open required valves in the refrigerant circuit so vacuuming process can be done properly.

Procedure

1. While the system is not in operation, set the setting mode No.21 (Refrigerant recovery/vacuum mode) to ON.
   The expansion valves of the heat source unit and cascade unit are fully opened and some of the solenoid valves are turned ON. (The 7-segment display shows **t01**, while the remote controller shows "test operation" and “centralized management”, and operation is prohibited. After setting, do not release setting mode until vacuuming is completed.)
2. Use a vacuum pump to create a vacuum.
3. Press the **RETURN (BS3)** button to release setting mode.

2.4.5 Emergency Operation

When one of the compressor fails, operation of that compressor unit gets prohibited. Emergency operation will be run by the remaining operable compressor unit.

Caution

Be sure to perform emergency operation settings if you want to disable compressor operation due to a failure.
Never remove the power cable from the electromagnetic contactor. (Other normal compressors may be damaged as they are operated in conjunction with another and it will not possible to equalize oil between the compressors.)

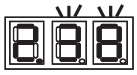
When operation of compressor 1 of the cascade unit needs to be disabled,
set setting mode No. 38 to cascade unit M1C operation prohibited.

7 segment display(: Lights off : Lights on : Blinking)

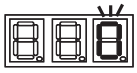
(Procedure)

(1) Press the **MODE (BS1)** button for 5 seconds or longer

(2) Press the **SET (BS2)** button 38 times

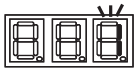


(3) Press the **RETURN (BS3)** button once

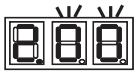


(Factory setting)

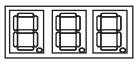
(4) Press the **SET (BS2)** button 1 times



(5) Press the **RETURN (BS3)** button twice



(6) Press the **MODE (BS1)** button once



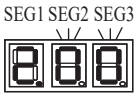
Lights out

When operation of compressor 2 of the cascade unit needs to be disabled,
set setting mode No. 38 to cascade unit M2C operation prohibited.

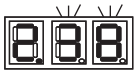
7 segment display(: Lights off : Lights on : Blinking)

(Procedure)

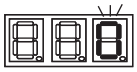
(1) Press the **MODE (BS1)** button for 5 seconds or longer



(2) Press the **SET (BS2)** button 38 times

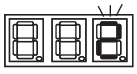


(3) Press the **RETURN (BS3)** button once

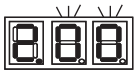


(Factory setting)

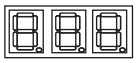
(4) Press the **SET (BS2)** button 2 times



(5) Press the **RETURN (BS3)** button twice



(6) Press the **MODE (BS1)** button once

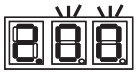
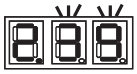
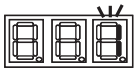
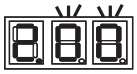
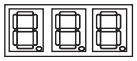


Lights out

When operation of compressor 1 of the heat source unit needs to be disabled,
set setting mode No. 39 to heat source unit M1C operation prohibited.

7 segment display(: Lights off : Lights on : Blinking)

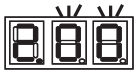
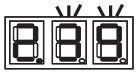
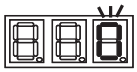
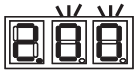
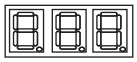
(Procedure)

	SEG1 SEG2 SEG3	
(1) Press the **MODE (BS1)** button for 5 seconds or longer		
(2) Press the **SET (BS2)** button 39 times		
(3) Press the **RETURN (BS3)** button once		(Factory setting)
(4) Press the **SET (BS2)** button 1 times		
(5) Press the **RETURN (BS3)** button twice		
(6) Press the **MODE (BS1)** button once		Lights out

When operation of compressor 2 of the heat source unit needs to be disabled,
set setting mode No. 39 to heat source unit M2C operation prohibited.

7 segment display(: Lights off : Lights on : Blinking)

(Procedure)

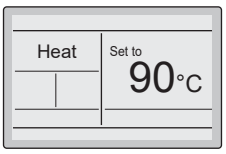
	SEG1 SEG2 SEG3	
(1) Press the **MODE (BS1)** button for 5 seconds or longer		
(2) Press the **SET (BS2)** button 39 times		
(3) Press the **RETURN (BS3)** button once		(Factory setting)
(4) Press the **SET (BS2)** button 2 times		
(5) Press the **RETURN (BS3)** button twice		
(6) Press the **MODE (BS1)** button once		Lights out

3. Field Settings by Controller Kit

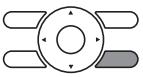
3.1 Monitor Mode

Monitor mode allows to check the water temperature in the sealed tank with the remote controller.

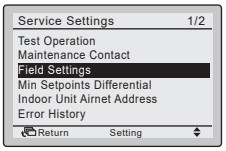
1



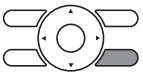
Press and hold Cancel button for 4 seconds or more.
Service settings menu is displayed.



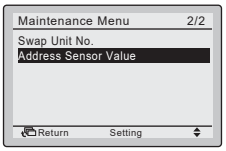
2



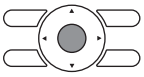
Press and hold Cancel button for 4 seconds or more.
Maintenance menu is displayed.



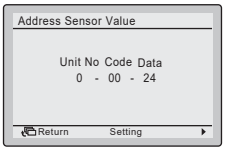
3



Select “Address Sensor Value” and press Menu/OK button.



4



Show each sensor values on the display.
See below table for detail.

Address sensor value display detail

Code	Data
00	Remote controller sensor value
01	Ts3 (High position) sensor value
02	Ts2 (Middle position) sensor value
03	Ts1 (Low position) sensor value

3.2 Field Settings

The following settings are possible with the remote controller.

★: Factory setting

Mode No.	First Code No.	Settings	Second Code No.												
			01	02	03	04	05	06	07	08	09	10	11	12	13
20	8	Test operation	**OFF★**	Setting 1 (Pump operation)	Setting 2 (Test operation)	—	—	—	—	—	—	—	—	—	—
	9	Freeze prevention control setting while not in operation	OFF	**ON★**	—	—	—	—	—	—	—	—	—	—	—
21	3	Water reheating start temperature (Ts3)	50°C (122°F)	55°C (131°F)	**60°C (140°F)★**	65°C (149°F)	70°C (158°F)	75°C (167°F)	80°C (176°F)	—	—	—	—	—	—
	6	Capacity setting	**35★**	40	30	—	—	—	—	—	—	—	—	—	—
	8	Differential between water reheating end temperature and water heating end temperature	1°C (1.8°F)	2°C (3.6°F)	**3°C (5.4°F)★**	4°C (7.2°F)	5°C (9.0°F)	6°C (10.8°F)	7°C (12.6°F)	8°C (14.4°F)	9°C (16.2°F)	10°C (18.0°F)	—	—	—
22	2	Individually forced pump operation (address)	**OFF★**	0	1	2	3	4	5	6	7	8	9	10	11
	3	Individually forced pump operation (rotation speed)	Low	Medium	**High★**	—	—	—	—	—	—	—	—	—	—
23	0	Water heating start detection sensor (Tson)	**Ts1★**	Ts2	—	—	—	—	—	—	—	—	—	—	—
	1	Water heating start temperature (Ton)	30°C (86°F)	35°C (95°F)	**40°C (104°F)★**	45°C (113°F)	50°C (122°F)	55°C (131°F)	60°C (140°F)	65°C (149°F)	70°C (158°F)	75°C (167°F)	80°C (176°F)	—	—
	2	Water heating end detection sensor (Tsoff)	**Ts1★**	Ts2	—	—	—	—	—	—	—	—	—	—	—
	3	Water heating end temperature (Toff)	30°C (86°F)	35°C (95°F)	40°C (104°F)	45°C (113°F)	**50°C (122°F) ★**	55°C (131°F)	60°C (140°F)	65°C (149°F)	70°C (158°F)	75°C (167°F)	80°C (176°F)	—	—
	4	Water temperature sensor error mask setting	**Enabled ★**	Ts1 mask	Ts2 mask	—	—	—	—	—	—	—	—	—	—

3.2.1 Test Operation Mode

Test operation can be configured with Mode No. 20 and First Code No. 8. For details, refer to page 67.

3.2.2 Freeze Prevention Control Setting While Not in Operation

Freeze prevention control setting during stop can be configured with Mode No. 20 and First Code No. 9.

This setting determines whether to perform freeze prevention control while the hot water generation system is not in operation.

The initial value is set as ON, therefore the pump of the cascade unit may operate automatically immediately after turning on the power.

For details about freeze prevention control, refer to page 34.

3.2.3 Water Reheating Start Temperature Setting

Closed tank hot water temperature can be configured with Mode No. 21 and First Code No. 3.

If the temperature of the tank upper temperature thermistor (Ts3) becomes lower than set temperature, water reheating operation is performed.

3.2.4 Capacity Setting

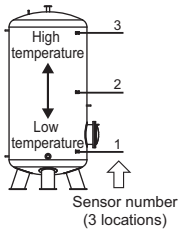
Rated capacity can be configured with Mode No. 21 and First Code No. 6.

3.2.5 Individually Forced Pump Operation

Individually forced pump operation can be configured with Mode No. 22 and First Code No. 2. (The cascade unit at the set address runs.)

The pump rotation speed can be configured with Mode No. 22 and First Code No. 3.

3.2.6 Water Heating Start/End Detection Sensor, Water Heating Start/End Temperature



Water heating start detection sensor (Tson) can be configured with Mode No. 23 and First Code No. 0.
Water heating start temperature (Ton) can be configured with Mode No. 23 and First Code No. 1.
Water heating end detection sensor (Tsoff) can be configured with Mode No. 23 and First Code No. 2.
Water heating end temperature (Toff) can be configured with Mode No. 23 and First Code No. 3.
The water heating operation starts when the hot water temperature at the sensor Tson falls below the temperature Ton, and stops when the sensor Tsoff exceeds the temperature Toff. This setting enables adjustment of the amount of hot water and the frequency of water heating operations.

3.2.7 Water Temperature Sensor Error Mask Setting

Water temperature sensor error mask settings can be configured with Mode No. 23 and First Code No. 4.
This is used to mask water temperature sensor errors when only the lower sensor is used, such as when using a pre-existing closed tank. (Settings to prevent an alarm from being issued even when the connector is not connected)

3.3 External Input/Output

The following contacts can be accessed using the external input/output terminals of the controller kit.

1. Turn off the power to the controller kit.
2. Open the electrical component box cover in the tank control panel and connect the wiring to the terminal block referring to the external input/output table.
3. Make necessary settings using the remote controller according to the 'External input setting table'.

External Input/Output Table (BRP26B2VJU)

I/O classification	Name	Connection location	Contact specifications	Details	Setting
Input	Operation input	Terminal block (X4M) Connection number (1, 2)	Non-voltage contact input for small currents (minimum applicable load 5 VDC, 1 mA or less)	When starting/stopping via an external input, input a signal with specifications as per those listed to the left (normally open).	Set according to the following page. **Forced stop:** The hot water generation system is forcibly stopped when input is ON. **Start/stop:** The hot water generation system starts when the input is ON and stops when the input is OFF. * Input ON does not mean forced thermo-ON.
	Water temperature sensor input	Terminal block (X4M) Connection number (3, 4)	Non-voltage contact input for small currents (minimum applicable load 5 VDC, 1 mA or less)	When changing the storage tank water heating start/end detection sensor, water heating start/end temperature via an external input, input a signal with specifications as per those listed to the left (normally open). Use this when you want to change the amount of hot water storage by the time of day or for holiday periods.	Set according to the following page. **Disabled:** Settings are disabled. **Enabled:** When the external input in ON, water heating start/end detection sensor, water heating start/end temperature are enabled for Mode No. 24 and First Code No. 1 through 4.
	Demand input	Terminal block (X4M) Connection number (5, 6)	Non-voltage contact input for small currents (minimum applicable load 5 VDC, 1 mA or less)	For demand (restriction of the maximum number of operating hot water generation systems) mode via an external input, input a signal with specifications as per those listed to the left (normally open).	Set according to the following page. **Disabled:** Settings are disabled. **Enabled:** When the external input in ON, the number of demand operation units set for Mode No. 24 and First Code No. 6 is enabled. **Always on demand:** Regardless of the ON/OFF status of the external input, the system always runs with the set number of demand operation units.
Output	Operation output	Printed circuit board (A2P [X1M]) Connection number (X1, X2)	Non-voltage contact input (normally open) (200 VAC, 2 A or less)	The operation output is a signal that turns ON (contacts are connected) when the hot water generation system is operating. * Operation output does not mean thermo-ON.	No configuration is required.
	Error output	Printed circuit board (A2P [X1M]) Connection number (X3, X4)	Non-voltage contact input (normally open) (200 VAC, 2 A or less)	The error output is a signal that turns ON (contacts are connected) when the hot water generation system error occurs. * Errors in the alarm rank are also output.	No configuration is required.

External Input Settings

The controller kit must be configured in order to use the external input contacts.
Perform the following settings from the remote controller connected to the controller kit.

Configuring with Remote Controller

1. Press and hold **Cancel** button for 4 seconds or longer during backlight lit.
2. Select **Field Settings** in the Service Settings menu, and press **Menu/OK** button.
3. Highlight the mode, and select desired Mode No. by using **Up/Down** button.
   Highlight the unit No. and select Unit No. to be set by using **Up/Down** button.
   Highlight SECOND CODE NO. of the FIRST CODE NO. to be changed, and select desired SECOND CODE NO. by using **Up/Down** button.
   Multiple identical mode number settings are available.
   Press **Menu/OK** button. Setting confirmation screen is displayed.
4. Select **Yes** and press **Menu/OK** button. Setting details are determined and field settings screen returns.
5. In the case of multiple setting changes, repeat 3 to 4.
   After all setting changes are completed, press **Cancel** button twice.
   Backlight goes out, and **Checking the connection. Please stand by.** is displayed for initialization. After the initialization, the basic screen returns.

External Input Setting Table

★: Factory setting

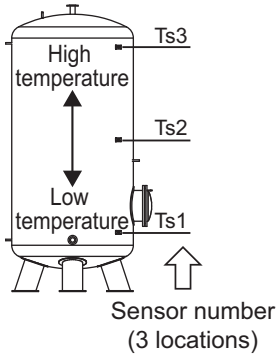
Mode No.	First Code No.	Settings	Second Code No.										
			01	02	03	04	05	06	07	08	09	10	11
22	1	External operation input (∗1)	**Forced stop**★	Start/stop	—	—	—	—	—	—	—	—	—
24	0	Water temperature sensor enabled/disabled	**Disabled**★	Enabled	—	—	—	—	—	—	—	—	—
	1	Water heating start detection sensor (∗2)	Ts1	**Ts2**★	—	—	—	—	—	—	—	—	—
	2	Water heating start temperature (Ton)	30°C (86°F)	35°C (95°F)	**40°C (104°F)**★	45°C (113°F)	50°C (122°F)	55°C (131°F)	60°C (140°F)	65°C (149°F)	70°C (158°F)	75°C (167°F)	80°C (176°F)
	3	Water heating end detection sensor (∗2)	Ts1	**Ts2**★	—	—	—	—	—	—	—	—	—
	4	Water heating end temperature (Toff)	30°C (86°F)	35°C (95°F)	40°C (104°F)	45°C (113°F)	**50°C (122°F)** ★	55°C (131°F)	60°C (140°F)	65°C (149°F)	70°C (158°F)	75°C (167°F)	80°C (176°F)
	5	Demand settings	**Disabled**★	Enabled	Always on demand	—	—	—	—	—	—	—	—
	6	Demand operation units	0%	10%	20%	30%	40%	**50%**★	60%	70%	80%	90%	—

Note(s)

∗1. When the external operation input is set to 22-1-02, the remote controller cannot be operated. Set the outlet water temperature according to the setting table below.

Mode No.	First Code No.	Settings	Second Code No.										
			01	02	03	04	05	06	07	08	09	10	11
21	2	Outlet water temperature setting	60°C (140°F)	**65°C (149°F)**★	70°C (158°F)	75°C (167°F)	80°C (176°F)	85°C (185°F)	90°C (194°F)	—	—	—	—

∗2. Sensor number



4. Field Setting, Release of Air from Water Piping and Test Operation

Before starting work requiring test operation, proceed as follows:

Overview: Commissioning

After installation and once the field settings are defined, the installer is obliged to verify correct operation. Therefore a test operation must be performed according to the procedures described below.
This chapter describes what you have to do and know to commission the system after it is configured.
Commissioning typically consists of the following stages:

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

Precautions when Commissioning

Warning

RISK OF ELECTROCUTION
RISK OF BURNING

Caution

Do not perform the test operation while working on the connected units.

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

Note(s)

During the first running period of the unit, the required power may be higher than stated on the nameplate of the unit. This phenomenon is caused by the compressor that needs a continuous run time of 50 hours before reaching smooth operation and stable power consumption.
Be sure to turn on the power 6 hours before operation in order to have power running to the crankcase heater and to protect the compressor.

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

Checklist before Commissioning

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

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

Workflow

Cascade unit settings

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

Release air from cascade unit and water piping system

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

Test operation

- Perform test operation of the hot water generation system.

Field setting/test operation completed

Cascade Unit Setting

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

Warning

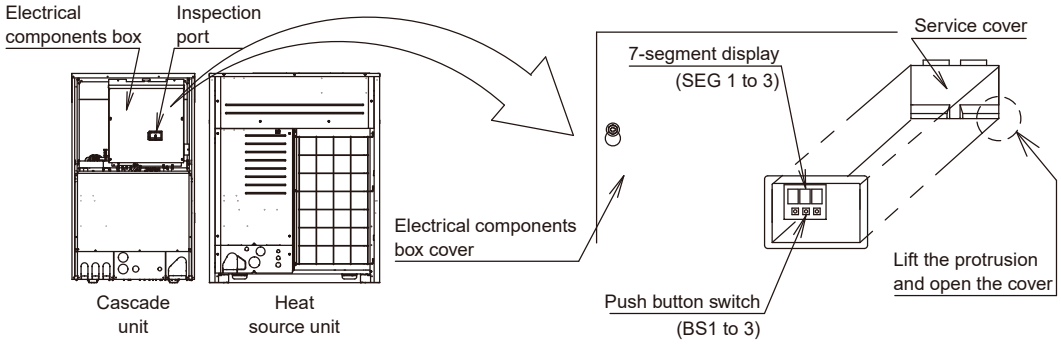
RISK OF ELECTROCUTION

Before turning on the power supply, securely close the cover of the electrical components box (heat source unit, cascade unit, controller kit).

Checking the (A1P) settings/7-segment display on the PCB of the cascade unit after the power supply is turned on is carried out from the inspection port in the cascade unit electrical components box cover (refer to the figure below).

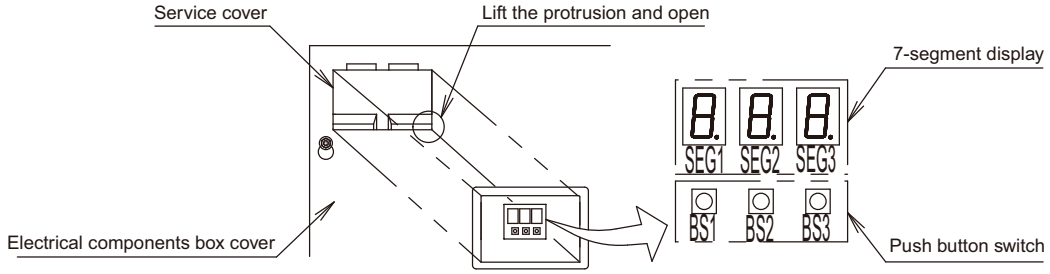
Be sure to operate the push button switch using an insulating rod from the inspection port of the electrical components box cover.

(If you touch a charged part by mistake, there is a risk of electric shock.)



Address setting procedure

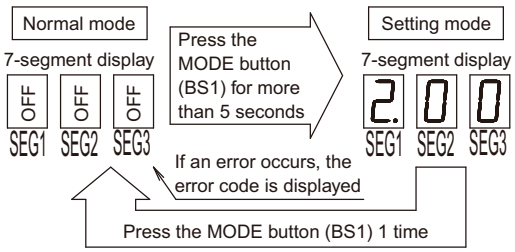
1. Turn on the power supply of the heat source unit, cascade unit, and controller kit.
2. Open the front panel (upper) of the cascade unit and open the service cover of the electrical component box.



3. Setting by push button switch
   1. In Normal mode, press the **MODE (BS1)** button for more than 5 seconds to enter Setting mode.

Function of push button switch

Push button	Button type	Use
BS1	MODE button	Change mode
BS2	SET button	Change settings
BS3	RETURN button	



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

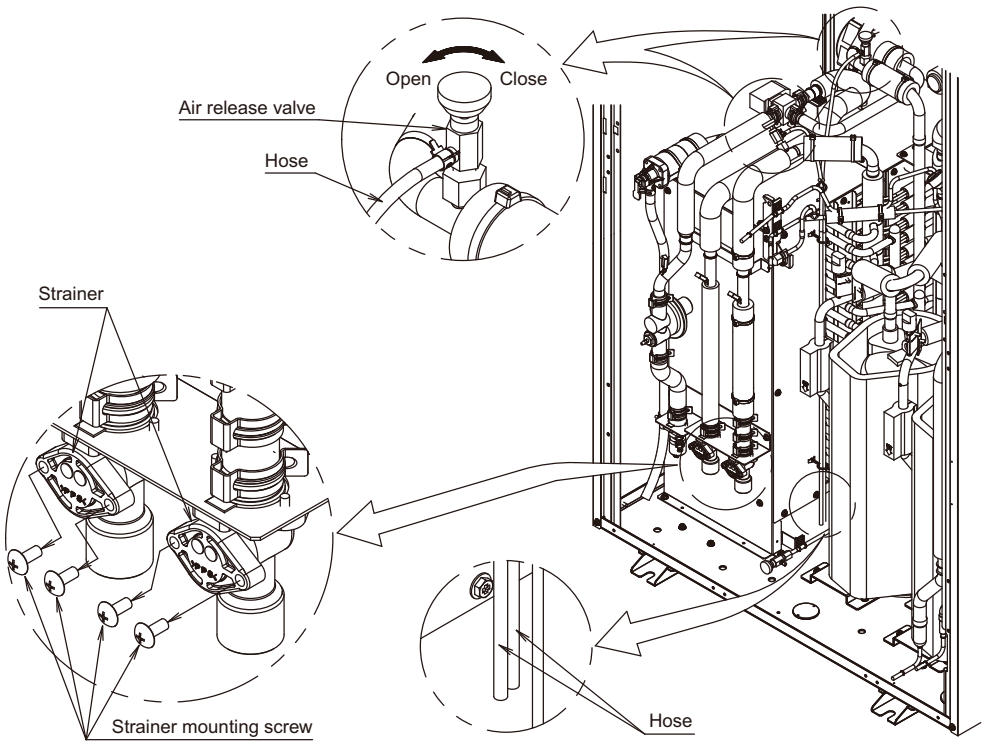
If you become confused during operation, press the **MODE (BS1)** button to return to Normal mode and perform from step 1 again.

4. Close the service cover of the electrical components box.
   If there are multiple cascade units, perform steps 1 to 4 to set addresses for all cascade units.

Release Air from Cascade Unit/Water Piping System

Release air from water piping in cascade unit

1. Open the front panel (lower).
2. Open the gate valve of the circulating water piping and hot water piping between the cascade unit and the hot water storage tank to allow water to flow through the machine.
3. Open both air release valves (refer to the figure below) to release air from the water piping in the cascade unit.
   (If air stops flowing out of the hose and only water comes out, the air release is completed.)
4. After releasing air, be sure to close the valve.



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

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

Set remote controller setting to test operation mode by setting the Mode No. 20, the First Code No. to 8 and the Second Code No. to 02 (setting 1).

Note(s)

If test operation is performed with Second Code No. 03 (setting 2), the hot water generation system will operate, and hot water will come out of the air release valve, so be sure to release air at setting 1 (pump operation).

5. Test Operation of Hot Water Generation System

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

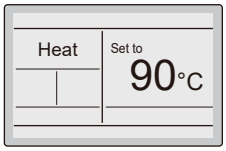
Caution Check that all electrical components box covers and front panels have been attached before delivery.

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

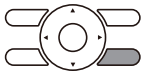
★: Factory setting

Mode No.	First Code No.	Setting contents	Second Code No.		
			01	02	03
20	8	Test operation mode	**OFF**★	Setting 1 (Pump operation)	Setting 2 (Test operation)

1



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



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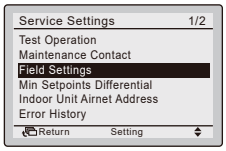
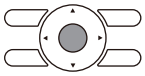


Select Field Settings in the Service Settings menu, and press Menu/OK button.
Field settings screen is displayed.



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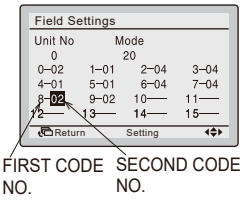
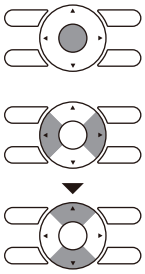


Highlight the mode, and select “20” by using ▲▼ (Up/Down) button.
Highlight the unit No. and select “Unit No.” to be set by using ▲▼ (Up/Down) button.
[Current settings are displayed. And, SECOND CODE NO. “ - ” means no function.]
Highlight SECOND CODE NO. of the FIRST CODE NO. “8”, and select “02” by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



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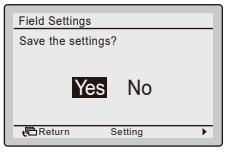
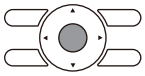


Press Menu/OK button. Setting confirmation screen is displayed.
Select Yes and press Menu/OK button. Setting details are determined and field settings screen returns.



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

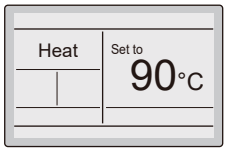
Test Operation

In test operation, water heating operation is performed by running all the hot water generation systems, and the stop valve open, flow, and hot water temperature are automatically checked.
1. Check that the cascade unit settings and cascade unit/water piping system air release have been completed according to the installation manual.
2. Before starting operation, be sure to open the stop valve of the heat source unit. For the handling of the stop valve, refer to **How to operate the stop valve** in the installation manual.
3. Check that the front panel of the heat source unit and cascade unit and the cover of the tank control panel are closed, and that all the hot water generation systems and the controller kit power supply is on.

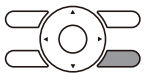
Caution To protect the machine, turn on the power supply 6 hours before starting operation.

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

1



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



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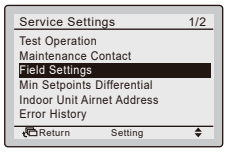
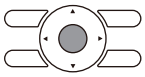


Select Field Settings in the Service Settings menu, and press Menu/OK button.
Field settings screen is displayed.



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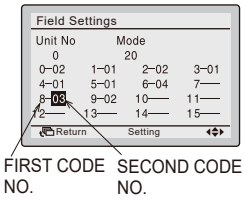
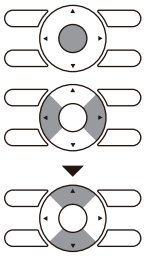


Highlight the mode, and select “20” by using ▲▼ (Up/Down) button.

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



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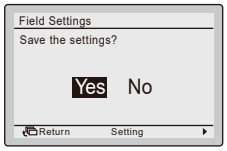
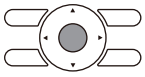


Press Menu/OK button. Setting confirmation screen is displayed.
Select Yes and press Menu/OK button. Setting details are determined and field settings screen returns.

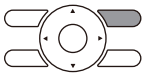


5

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

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

* If an error code is displayed on the remote controller, check the error code, shut off the power supply, and correct the error.
After correcting the problem, perform test operation again.



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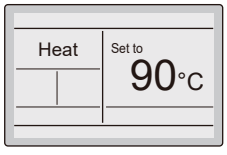
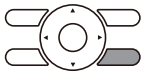


When test operation is completed successfully, press Cancel button to return to the basic screen.



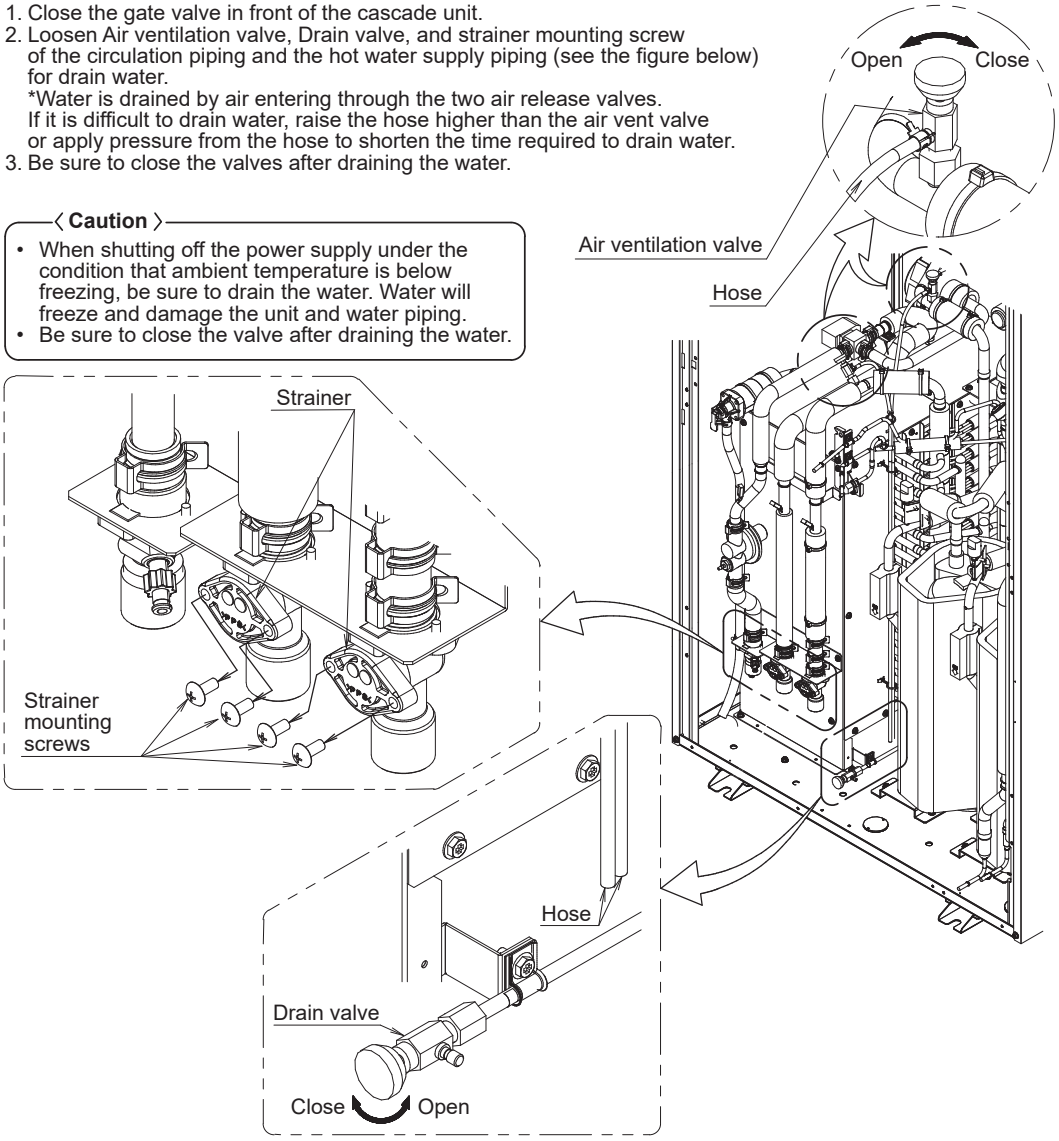
Caution Even if the hot water generation system is not in operation, a pump in the cascade may run to prevent from getting frozen. This is a normal operation and it is not a malfunction.

Caution When shutting off the power supply under the condition that ambient temperature is below freezing, drain the water according to the following **Drainage of Cascade Unit** procedure.

Drainage of Cascade Unit

1. Close the gate valve in front of the cascade unit.
2. Loosen Air ventilation valve, Drain valve, and strainer mounting screw of the circulation piping and the hot water supply piping (see the figure below) for drain water.
   *Water is drained by air entering through the two air release valves. If it is difficult to drain water, raise the hose higher than the air vent valve or apply pressure from the hose to shorten the time required to drain water.
3. Be sure to close the valves after draining the water.

〈 **Caution** 〉
- When shutting off the power supply under the condition that ambient temperature is below freezing, be sure to drain the water. Water will freeze and damage the unit and water piping.
- Be sure to close the valve after draining the water.



Troubleshooting in Test Operation

Symptoms	Item	Confirmation details
UC error	Address duplication	Be sure to set the addresses of the cascade units in with sequential numbering in decreasing order with no duplicates.
A6 error **HJ** error/alarm	Check inlet water pressure	Is the water supply pressure adequate? The cascade unit requires 40 kPa (5.8 psi) or more water supply pressure.
	Check valve	Open all valves (except bypass valves, drain valves, etc.).
	Check distance and height difference between tank and cascade	Has the installation been completed within the scope described in the installation manual?
	Check allowable overhead lift	Has the installation been completed within the allowable external lift specified in the installation manual?
	Strainer cleaning	Clean all strainers and unclog piping.
EC alarm	Tank water temperature drop	It does not affect test operation.
No operation	Check power supply	Turn on all power supplies.
	Check error code	Check for error codes from cascade unit PCB.
Run without permission	Check remote controller	Make sure the system is not in operation.
	Anti-freeze control	In case of low ambient temperature and water temperature condition, the pump operates to prevent freezing even when the system is not in operation. If it is absolutely necessary to stop the system, change the remote controller setting 20-9 to 01 (freeze protection is OFF). *Due to the possibility of freezing inside the unit, remember to change the remote controller setting 20-9 back to 02 (freeze protection is ON).
UE error	Check power supply	Turn on all power supplies.
	Check centralized address	Are all cascade units correctly configured with centralized addresses?
	Check wiring	Is the wiring done according to the installation manual?

Part 6
Service Diagnosis

1. Servicing Items to be Confirmed

1.1 Troubleshooting

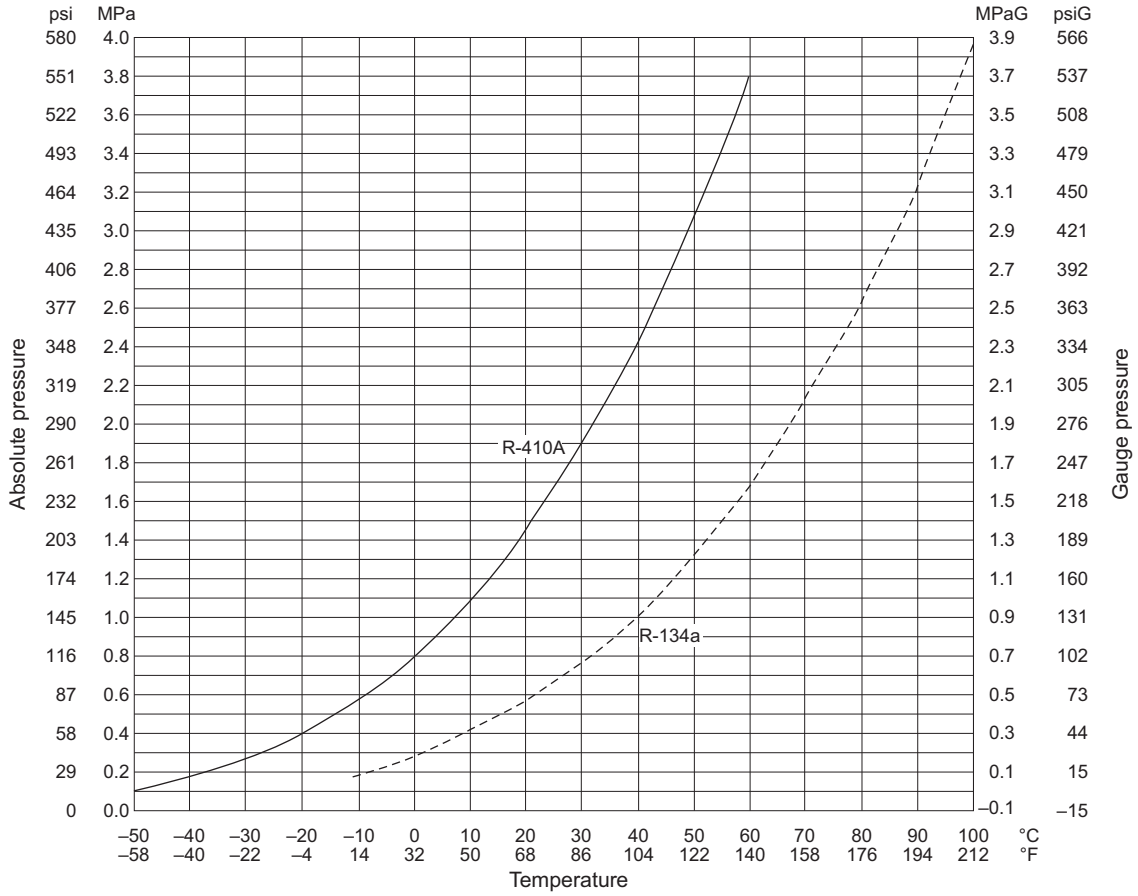
1. Initial verification and troubleshooting
   (1) Properly understand the end user's needs and issues.
   (2) Check the cause of errors according to the description provided by the end user.
   (3) Check if the remote controller displays any error codes.
   (Or use the cascade unit monitor mode to check for errors).
   If there is no display of error codes, refer to **Symptom-Based Troubleshooting** on page 75 for diagnosis.
   If an error code is displayed, refer to troubleshooting flowchart for diagnosis.
2. Take appropriate measures.
   (1) Repair the defect or replace the parts according to the troubleshooting results.
   (2) Turn off the power supply for 10 minutes before disassembling.
   (3) The refrigerant has to be collected before refrigerant system components are replaced.
3. Verification after taking appropriate measures
   (1) Run the unit after repairing the defect to confirm normal unit operation.
   (2) Record the check results and inform the client.

1.2 Precautions for Maintenance

Pay attention to the following matters in servicing.

1. Precaution for maintenance
   Touch the paint-free metal part of the product (electrical box lid) to release static electricity before starting work.
2. Precautions for maintaining the service cover
   After maintenance, make sure to close the service cover.
   (Otherwise, leakage of water or contamination by foreign matter may cause defects)
3. Precautions for maintaining the electrical box
   (1) Turn off the power for 10 minutes before opening the cover of the electrical box.
   (2) After opening the cover, use the multimeter to measure the terminal voltage of the power supply terminal to make sure that the power has been cut.
   Then check if the main circuit capacitor voltage is under 50 VDC.
   (3) To avoid PCB defects, touch the ground terminal of the electrical box with your hand just before unplugging the connector to release static electricity.
   (4) First, unplug the relay connectors, X1A, X2A, X3A, and X4A, of the heat source unit fan motors. When unplugging the relay connectors, do not touch the live parts.
   (When the fan is rotating because of strong wind, there is a risk of electric shock due to main circuit capacitor power storage.)
   (5) After maintenance, reconnect the relay connectors of the fans in their original positions.
   Otherwise, the remote controller will display error code **E7**, preventing normal operation.
4. Precautions for piping work and refrigerant charging:
   The heat source unit uses R-410A refrigerant. Pay attention to the following conditions.
   (1) The charging pipe and the manifold tube use R-410A products for pressure maintenance and avoiding contamination by impurities (SUNISO oil, etc.).
   (2) Be sure to purge with nitrogen when brazing.
   (3) Properly perform airtightness test and vacuum drying. (Airtightness test pressure: 4.0 MPa (580 psi))
   (4) Charge refrigerant in liquid state.
5. Precautions for operating in servicing mode (field setting):
   When a test operation is interrupted or after exiting service mode, please wait for at least one minute before entering service mode again. In case of continuous execution, the main PCB may sometimes display an error code. If any error codes are displayed, press the **RETURN (BS3)** button. If performing the above operation still does not eliminate the error, reconnect the unit to the power supply.

1.3 Refrigerant Properties (R-410A, R-134a)



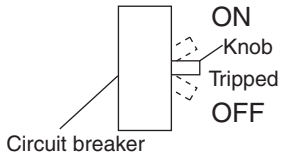
R-410A

Temperature		Absolute pressure		Temperature		Absolute pressure	
°C	°F	MPa	psi	°C	°F	MPa	psi
–50	–58.0	0.11	16.0	8	46.4	1.02	148
–48	–54.4	0.12	17.4	10	50.0	1.09	158
–46	–50.8	0.13	18.9	12	53.6	1.15	167
–44	–47.2	0.15	21.8	14	57.2	1.22	177
–42	–43.6	0.16	23.2	16	60.8	1.29	187
–40	–40.0	0.18	26.1	18	64.4	1.37	199
–38	–36.4	0.19	27.6	20	68.0	1.45	210
–36	–32.8	0.21	30.5	22	71.6	1.53	222
–34	–29.2	0.23	33.4	24	75.2	1.61	234
–32	–25.6	0.25	36.3	26	78.8	1.70	247
–30	–22.0	0.27	39.2	28	82.4	1.79	260
–28	–18.4	0.29	42.1	30	86.0	1.89	274
–26	–14.8	0.32	46.4	32	89.6	1.99	289
–24	–11.2	0.34	49.3	34	93.2	2.09	303
–22	–7.6	0.37	53.7	36	96.8	2.20	319
–20	–4.0	0.40	58.0	38	100.4	2.31	335
–18	–0.4	0.43	62.4	40	104.0	2.42	351
–16	3.2	0.46	66.7	42	107.6	2.54	368
–14	6.8	0.50	72.5	44	111.2	2.67	387
–12	10.4	0.54	78.3	46	114.8	2.80	406
–10	14.0	0.57	82.7	48	118.4	2.93	425
–8	17.6	0.61	88.5	50	122.0	3.07	445
–6	21.2	0.66	95.7	52	125.6	3.21	466
–4	24.8	0.70	102	54	129.2	3.36	487
–2	28.4	0.75	109	56	132.8	3.51	509
0	32.0	0.80	116	58	136.4	3.64	528
2	35.6	0.85	123	60	140.0	3.83	555
4	39.2	0.91	132	62	143.6	4.00	580
6	42.8	0.96	139	64	147.2	4.17	605

R-134a

Temperature		Absolute pressure		Temperature		Absolute pressure	
°C	°F	MPa	psi	°C	°F	MPa	psi
–12	10.4	0.19	27.6	52	126	1.39	202
–8	17.6	0.22	31.9	56	133	1.53	222
–4	24.8	0.25	36.3	60	140	1.68	244
0	32.0	0.29	42.1	62	144	1.76	255
2	35.6	0.31	45.0	64	147	1.85	268
4	39.2	0.34	49.3	66	151	1.93	280
6	42.8	0.36	52.2	68	154	2.02	293
8	46.4	0.39	56.6	70	158	2.12	307
10	50.0	0.41	59.5	72	162	2.21	321
12	53.6	0.44	63.8	74	165	2.31	335
14	57.2	0.47	68.2	76	169	2.42	351
16	60.8	0.50	72.5	78	172	2.52	365
18	64.4	0.54	78.3	80	176	2.63	381
20	68.0	0.57	82.7	82	180	2.75	399
22	71.6	0.61	88.5	84	183	2.87	416
24	75.2	0.65	94.3	86	187	2.99	434
26	78.8	0.69	100	88	190	3.11	451
28	82.4	0.73	106	90	194	3.24	470
30	86.0	0.77	112	92	198	3.38	490
32	89.6	0.82	119	94	201	3.52	511
36	96.8	0.91	132	96	205	3.66	531
40	104	1.02	148	98	208	3.82	554
44	111	1.13	164	100	212	3.97	576
48	118	1.25	181				

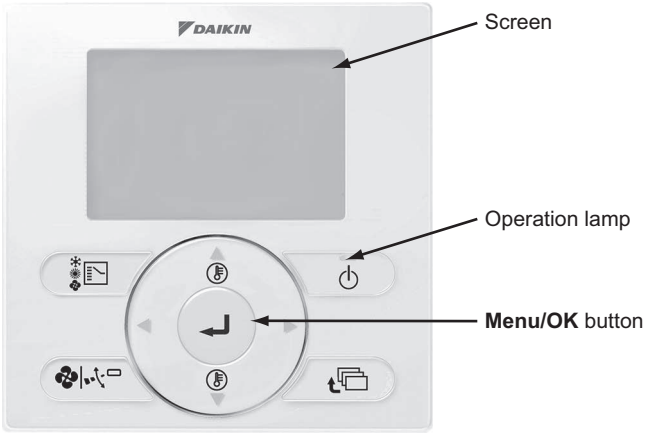
2. Symptom-based Troubleshooting

Symptom	Supposed Cause	Countermeasure
The system does not start operation at all.	Blowout of fuse(s)	Turn OFF the power supply and then replace the fuse (s).
	Cutout of breaker(s)	• If the knob of any breaker is in its OFF position, turn ON the power supply. • If the knob of any circuit breaker is in its tripped position, do not turn ON the power supply. 
	Power failure	After the power failure is reset, restart the system.
The system starts operation but makes an immediate stop.	Blocked air inlet or outlet of heat source unit	Remove obstacle(s).
	Closed valve in the water piping system	Open all valves in the water piping system.
	Clogged strainer in the water piping system	Clean all strainers in the water piping system.
	Improper inlet water pressure	Keep the inlet water pressure within the operating range.

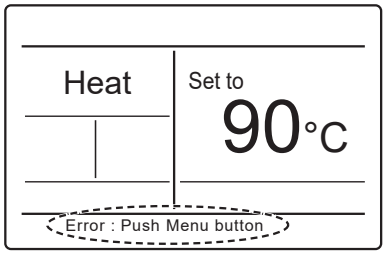
Symptom		Supposed Cause
The system does not operate.	The system stops and immediately restarts operation.	If the operation lamp on the remote controller turns ON, the system will be normal. These symptoms indicate that the system is controlled so as not to put unreasonable loads on the system. The system will automatically start operation after a lapse of 5 minutes.
	The system stops immediately after turning ON the power supply.	The system is in preparation mode of microcomputer operation. Wait for a period of approximately 10 minute.
The system makes intermittent stops.	The remote controller displays error codes **U4,U5, or UE** and the system stops but restarts after a lapse of several minutes.	The system stops due to an interruption in communication between units caused by electrical noises coming from equipment other than hot water generation system. If these causes are removed, the system will automatically restart operation.
White mist comes out from the system.	**Heat source unit** During and after defrosting operation, when switched to normal operation	Defrosted moisture turns into vapor and comes out from the units.
The system produces sounds.	**Heat source unit and cascade unit** Hissing sounds are continuously produced while in defrost operation.	These sounds are produced from gas (refrigerant) flowing respectively through the heat source unit and cascade unit.
	Heat source unit and cascade unit Hissing sounds are produced immediately after the startup or stop of the system, or the startup or stop of defrost operation.	These sounds are produced when the gas (refrigerant) stops or changes flowing.
	Heat source unit Pitch of operating sounds changes.	The reason is that the compressor changes the operating frequency.
Fan does not rotate.	**Heat source unit** In operation	The reason is that fan revolutions are controlled to put the operation to the optimum state.
The compressor, fan, and pump do not stop.	**Heat source unit and cascade unit** After operation has stopped	This is to prevent oil and refrigerant from stagnation. It stops after about 5 to 10 minutes of operation.
The unit gets hot.	**Heat source unit and cascade unit** While the system is not in operation	The reason is that the compressor is warmed up to provide smooth startup of the system.
The pump operates while the system is not in operation.	**Cascade unit** While the system is not in operation	This is to prevent the water piping from freezing. The pump operates automatically when outdoor air and water temperatures are low.
The system consumes power even when not in operation.	**Heat source unit and cascade unit** While the system is not in operation	The system consumes several tens of watts even while the system is not in operation in order to start up the system smoothly.

3. Error Code via Remote Controller

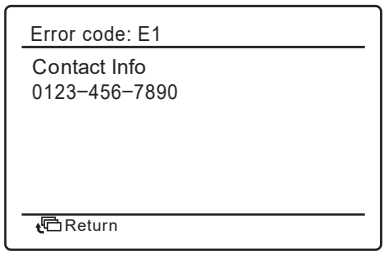
The following message is displayed on the screen when an error (or a warning) occurs during operation.
Check the error code and take the corrective action specified for the particular model.



1. Check the display on the remote controller.
   If an error occurs, either one of the following messages will blink on the basic screen.
   Error: Push Menu button
   The operation lamp blinks.
   Warning: Push Menu button
   The operation lamp does not blink.



2. Press the **Menu/OK** button.
   Error code will blink and contact information may appear.

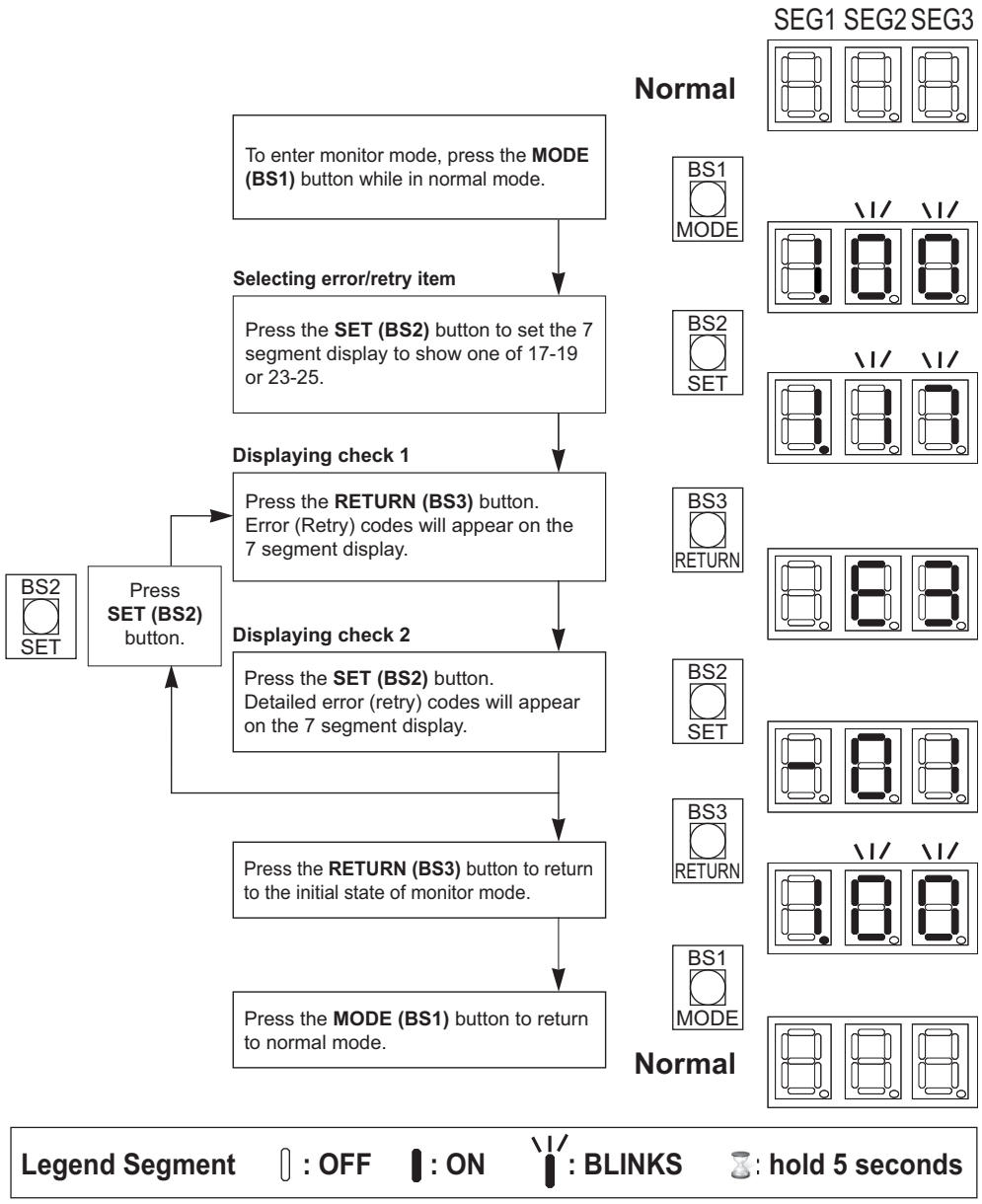


4. Error Code via Cascade Unit PCB

Error code descriptions are accessible on monitor mode (Mode 1). Refer to page 51 for monitor mode.

The error codes for forced stop outdoor or retry are item:

- 17, 18, 19: description of error (outdoor system stopped operation).
- 23, 24, 25: description of retry.



- The tables on the following pages show a full list of possible error codes displayed on the 3 digit 7 segment display of the outdoor unit. The error code contains an upper and lower digit. To scroll between upper and lower error digit, use the **SET (BS2)** button.
- The errors cover problems detected in the cascade unit, heat source unit, or the communication.
- Errors detected on the tank are not shown on the cascade unit display. For inspecting error code on tank, please consult the remote controller display.

5. Troubleshooting by Error Code

5.1 Error Codes and Descriptions

Error code	Error contents	Applicable models			Reference page
		Heat source unit RXHWQ120MQTJA	Cascade unit BWLP120TJU	Controller kit BRP26B2VJU	
42	Electric three way valve abnormality	—	●	—	86
80	Water inlet thermistor abnormality	—	●	—	87
81	Water outlet thermistor abnormality	—	●	—	87
81-01 (∗)	Water temperature sensor 1 abnormality	—	—	●	87
81-02 (∗)	Water temperature sensor 2 abnormality	—	—	●	87
81-03 (∗)	Water temperature sensor 3 abnormality	—	—	●	87
A6	Water outage abnormality (pump lock)	—	●	—	88
E1	Main PCB abnormality	●	●	—	90
E2	Current leakage detection	●	●	—	91
	Missing of leakage detection core	●	●	—	92
E3	Activation of high pressure switch	●	●	—	93
E4	Activation of low pressure sensor	●	●	—	95
E5	Compressor motor lock	●	●	—	96
E6	Compressor damage alarm	●	●	—	98
E7	Fan motor abnormality	●	—	—	100
E9	Electronic expansion valve coil abnormality	●	●	—	102
EC-02 (∗)	Tank water temperature abnormality	—	—	●	103
F3	Discharge pipe temperature abnormality	●	●	—	104
F4	Compressor floodback alarm	●	●	—	106
H3	Harness abnormality (between main PCB and inverter PCB)	●	●	—	108
H7	Fan motor signal abnormality	●	—	—	109
H9	Outdoor air thermistor abnormality	●	—	—	110
HJ-07 (∗)	Piping system abnormality	—	●	—	111
J3	Discharge pipe thermistor abnormality	●	●	—	110
	Compressor overheating protection thermistor abnormality	—	●	—	110
J5	Accumulator inlet thermistor abnormality	●	—	—	110
J6	Heat exchanger deicer thermistor abnormality	●	—	—	110
J7	Subcooling heat exchanger liquid pipe thermistor abnormality	●	●	—	110
J8	Heat exchanger liquid pipe thermistor abnormality	●	—	—	110
J9	Subcooling heat exchanger gas pipe thermistor abnormality	●	—	—	110
JA	High pressure sensor abnormality	●	●	—	112
JC	Low pressure sensor abnormality	●	●	—	113
L1	Inverter PCB abnormality	●	●	—	114
L3	Reactor temperature rise abnormality	●	—	—	116
L4	Inverter radiation fin temperature rise abnormality	●	●	—	117
L5	Compressor instantaneous overcurrent	●	●	—	118
L8	Compressor overcurrent	●	●	—	120
L9	Compressor startup abnormality	●	●	—	122
LC	Transmission error between inverter PCB and main PCB	●	●	—	124
P1	Power supply voltage imbalance	●	●	—	126
P3	Reactor temperature abnormality	●	—	—	128
P4 (∗)	Inverter radiation fin temperature abnormality	●	●	—	129
PJ	Field setting after replacing main PCB abnormality or combination of PCB abnormality	●	●	—	131
U0 (∗)	Refrigerant shortage	●	●	—	132
U1	Reverse phase, open phase	●	●	—	133

Error code	Error contents	Applicable models			Reference page
		Heat source unit RXHWQ120MQTJA	Cascade unit BWLP120TJU	Controller kit BRP26B2VJU	
U2	Power supply insufficient or instantaneous abnormality	●	●	—	134
U3	Test operation not executed	●	●	—	137
U4	Transmission error (incorrect wiring in cascade unit)	—	●	—	138
U7	Transmission error between cascade unit and heat source unit	●	●	—	139
UA-44	Incorrect controller kit setting	—	—	●	141
UC (∗)	Address duplication of centralized controller	—	●	●	142
UE-01	Transmission error between cascade unit and controller kit	—	●	●	143
UE-03 (∗)	Transmission error between cascade unit and controller kit alarm	—	—	●	144

Note(s) ∗: The system can keep operating, however, be sure to check and repair.

5.2 Error Codes (Sub Codes)

Error code	Troubleshooting	
	Error Description	Diagnosis
81 - 01	Water temperature sensor 1 disconnection	X13A on the printed circuit board (A1P) or the relay connector X3A (water temperature sensor 1) is disconnected.
81 - 02	Water temperature sensor 2 disconnection	X17A on the printed circuit board (A1P) or the relay connector X2A (water temperature sensor 2) is disconnected.
81 - 03	Water temperature sensor 3 disconnection	X18A on the printed circuit board (A1P) or the relay connector X1A (water temperature sensor 3) is disconnected.
E1 - 01	Main PCB error	Refer to the **E1** flowchart and make a diagnosis based on the Error code shown to the left.
E1 - 02	Defective main PCB	
E2 - 01	Ground leakage detection error (Cascade unit)	Refer to the **E2** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
E2 - 02	Ground leakage detection error (Heat source unit)	
E2 - 06	Missing of ground leakage detection core (Cascade unit)	
E2 - 07	Missing of ground leakage detection core (Heat source unit)	
E3 - 01 **E3 - 02**	Activation of high pressure switch (Cascade unit)	Refer to the **E3** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
E3 - 03 **E3 - 04**	Activation of high pressure switch (Heat source unit)	
E3 - 07	High pressure standby E3 latch error (system batch)	
E3 - 13	Liquid stop valve check error (Cascade unit)	
E3 - 14	Liquid stop valve check error (Heat source unit)	
E3 - 18	Overall retry of high pressure switch	
E4 - 01	Low pressure sensor error (Cascade unit)	Refer to the **E4** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
E4 - 02	Low pressure sensor error (Heat source unit)	
E5 - 01	Compressor M1C lock (Cascade unit)	Refer to the **E5** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
E5 - 02	Compressor M1C lock (Heat source unit)	
E5 - 07	Compressor M2C lock (Cascade unit)	
E5 - 08	Compressor M2C lock (Heat source unit)	
E6 - 11	Compressor damage error: Compressor M1C (Cascade unit)	Refer to the **E6** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
E6 - 12	Compressor damage error: Compressor M2C (Cascade unit)	
E6 - 13	Compressor damage error: Compressor M1C (Heat source unit)	
E6 - 14	Compressor damage error: Compressor M2C (Heat source unit)	
E6 - 17	Compressor damage warning: Compressor M1C (Cascade unit)	
E6 - 18	Compressor damage warning: Compressor M2C (Cascade unit)	
E6 - 19	Compressor damage warning: Compressor M1C (Heat source unit)	
E6 - 20	Compressor damage warning: Compressor M2C (Heat source unit)	
E7 - 13	Fan motor M1F lock (Heat source unit)	Make a diagnosis of the fan motor based on the following. Fan motor lock: 13, 14 Momentary overcurrent: 17, 18 IPM error: 21, 22
E7 - 14	Fan motor M2F lock (Heat source unit)	
E7 - 17	Fan motor M1F momentary overcurrent (Heat source unit)	
E7 - 18	Fan motor M2F momentary overcurrent (Heat source unit)	
E7 - 21	Fan motor M1F IPM error (Heat source unit)	
E7 - 22	Fan motor M2F IPM error (Heat source unit)	

Error code	Troubleshooting	
	Error Description	Diagnosis
E9 - 01	Electronic expansion valve coil (Y2E) error (Cascade unit)	Refer to the **E9** flowchart and make a diagnosis of the relevant electronic expansion valve of the relevant unit based on the Error code shown to the left.
E9 - 04	Electronic expansion valve coil (Y1E) error (Cascade unit)	
E9 - 05	Electronic expansion valve coil (Y2E) error (Heat source unit)	
E9 - 07	Electronic expansion valve coil (Y1E) error (Heat source unit)	
E9 - 20	Defective electronic expansion valve coil (Y1E) (Cascade unit)	
E9 - 21	Defective electronic expansion valve coil (Y1E) (Heat source unit)	
E9 - 23	Defective electronic expansion valve coil (Y2E) (Cascade unit)	
E9 - 24	Defective electronic expansion valve coil (Y2E) (Heat source unit)	
EC - 02	Tank water temperature abnormality	Refer to the **EC** flowchart and make a diagnosis based on the Error code shown to the left.
F3 - 01	Discharge pipe high temperature error (Cascade unit)	Refer to the **F3** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
F3 - 03	Discharge pipe high temperature error (Heat source unit)	
F3 - 20	Compressor overheat error (Cascade unit)	
F3 - 21	Compressor overheat error (Heat source unit)	
F4 - 01	Compressor floodback alarm	Refer to the **F4** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
F4 - 02	Compressor floodback alarm for compressor M1C (Cascade unit)	
F4 - 03	Compressor floodback alarm for compressor M2C (Cascade unit)	
F4 - 04	Compressor floodback alarm for compressor M1C (Heat source unit)	
F4 - 05	Compressor floodback alarm for compressor M2C (Heat source unit)	
F4 - 08	Compressor floodback error for compressor M1C (Cascade unit)	
F4 - 09	Compressor floodback error for compressor M2C (Cascade unit)	
F4 - 10	Compressor floodback error for compressor M1C (Heat source unit)	
F4 - 11	Compressor floodback error for compressor M2C (Heat source unit)	
H3 - 02	Harness abnormality (Main & inverter PCB 1 (A3P)) - (Cascade unit)	Refer to the **H3** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
H3 - 03	Harness abnormality (Main & inverter PCB 2 (A5P)) - (Cascade unit)	
H3 - 04	Harness abnormality (Main & inverter PCB 1 (A3P)) - (Heat source unit)	
H3 - 05	Harness abnormality (Main & inverter PCB 2 (A6P)) - (Heat source unit)	
H7 - 05	Motor position signal abnormality (Heat source unit): M1F	Refer to the **H7** flowchart and make a diagnosis based on the Error code shown to the left.
H7 - 06	Motor position signal abnormality (Heat source unit): M2F	
H9 - 02	Defective outdoor air thermistor (R1T) (Heat source unit)	Refer to the **H9** flowchart and make a diagnosis based on the Error code shown to the left.
HJ - 07	Piping system abnormality (Cascade unit)	Refer to the **HJ** flowchart and make a diagnosis based on the Error code shown to the left.

Error code	Troubleshooting	
	Error Description	Diagnosis
J3 - 16	Defective discharge pipe thermistor (R21T): Open (Cascade unit)	Refer to the **J3** flowchart and make a diagnosis of the relevant thermistor based on the Error code shown to the left.
J3 - 17	Defective discharge pipe thermistor (R21T): Short (Cascade unit)	
J3 - 18	Defective discharge pipe thermistor (R22T): Open (Cascade unit)	
J3 - 19	Defective discharge pipe thermistor (R22T): Short (Cascade unit)	
J3 - 22	Defective discharge pipe thermistor (R21T): Open (Heat source unit)	
J3 - 23	Defective discharge pipe thermistor (R21T): Short (Heat source unit)	
J3 - 24	Defective discharge pipe thermistor (R22T): Open (Heat source unit)	
J3 - 25	Defective discharge pipe thermistor (R22T): Short (Heat source unit)	
J3 - 38	M2C compressor overheating protection thermistor (R16T): Open (Cascade unit)	
J3 - 39	M2C compressor overheating protection thermistor (R16T): Short (Cascade unit)	
J3 - 47	M1C compressor overheating protection thermistor (R14T): Open (Cascade unit)	
J3 - 48	M1C compressor overheating protection thermistor (R14T): Short (Cascade unit)	
J3 - 57	Discharge pipe warning (Heat source unit)	
J5 - 03	Defective accumulator inlet thermistor (R3T) (Heat source unit)	Refer to the **J5** flowchart and make a diagnosis based on the Error code shown to the left.
J5 - 16	Error detection of accumulator inlet thermistor (R3T) (Heat source unit)	
J6 - 02	Defective heat exchanger deicer thermistor (R7T) (Heat source unit)	Refer to the **J6** flowchart and make a diagnosis based on the Error code shown to the left.
J7 - 07	Defective subcooling heat exchanger liquid pipe thermistor (R5T) (Heat source unit)	Refer to the **J7** flowchart and make a diagnosis of the relevant thermistor of the relevant unit based on the Error code shown to the left.
J7 - 13	Defective R-410A liquid pipe thermistor (R3T) (Cascade unit)	
J7 - 14	Defective R-134a liquid pipe thermistor (R4T) (Cascade unit)	
J8 - 02	Defective heat exchanger liquid pipe thermistor (R4T) (Heat source unit)	Refer to the **J8** flowchart and make a diagnosis based on the Error code shown to the left.
J9 - 02	Defective subcooling heat exchanger gas pipe thermistor (R6T) (Heat source unit)	Refer to the **J9** flowchart and make a diagnosis based on the Error code shown to the left.
J9 - 09	Error detection of subcooling heat exchanger gas pipe thermistor (R6T) (Heat source unit)	
JA - 06	Defective high pressure sensor (S1NPH): Open (Cascade unit)	Refer to the **JA** flowchart and make a diagnosis of the relevant sensor based on the Error code shown to the left.
JA - 07	Defective high pressure sensor (S1NPH): Short (Cascade unit)	
JA - 08	Defective high pressure sensor (S1NPH): Open (Heat source unit)	
JA - 09	Defective high pressure sensor (S1NPH): Short (Heat source unit)	
JC - 06	Defective low pressure sensor (S1NPL): Open (Cascade unit)	Refer to the **JC** flowchart and make a diagnosis of the relevant sensor based on the Error code shown to the left.
JC - 07	Defective low pressure sensor (S1NPL): Short (Cascade unit)	
JC - 08	Defective low pressure sensor (S1NPL): Open (Heat source unit)	
JC - 09	Defective low pressure sensor (S1NPL): Short (Heat source unit)	

Error code	Troubleshooting	
	Error Description	Diagnosis
L1 - 01	IPM error - Compressor M1C (Cascade unit)	Refer to the **L1** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
L1 - 02	Defective current sensor 1 - Compressor M1C (Cascade unit)	
L1 - 03	Defective current sensor 2 - Compressor M1C (Cascade unit)	
L1 - 04	IGBT error - Compressor M1C (Cascade unit)	
L1 - 05	Jumper setting error (Cascade unit)	
L1 - 07	IPM error - Compressor M1C (Heat source unit)	
L1 - 08	Defective current sensor 1 - Compressor M1C (Heat source unit)	
L1 - 09	Defective current sensor 2 - Compressor M1C (Heat source unit)	
L1 - 10	IGBT error - Compressor M1C (Heat source unit)	
L1 - 15	Jumper setting error (Heat source unit)	
L1 - 17	IPM error - Compressor M2C (Cascade unit)	
L1 - 18	Defective current sensor 1 - Compressor M2C (Cascade unit)	
L1 - 19	Defective current sensor 2 - Compressor M2C (Cascade unit)	
L1 - 20	IGBT error - Compressor M2C (Cascade unit)	
L1 - 21	DIP switch setting error (Cascade unit)	
L1 - 22	IPM error - Compressor M2C (Heat source unit)	
L1 - 23	Defective current sensor 1 - Compressor M2C (Heat source unit)	
L1 - 24	Defective current sensor 2 - Compressor M2C (Heat source unit)	
L1 - 25	IGBT error - Compressor M2C (Heat source unit)	
L1 - 26	DIP switch setting error (Heat source unit)	
L1 - 32	Defective fan PCB M1F EEPROM (Heat source unit)	
L1 - 33	Defective fan PCB M2F EEPROM (Heat source unit)	
L1 - 36	Defective inverter PCB M1C EEPROM (Cascade unit)	
L1 - 37	Defective inverter PCB M2C EEPROM (Cascade unit)	
L1 - 38	Defective inverter PCB M1C EEPROM (Heat source unit)	
L1 - 39	Defective inverter PCB M2C EEPROM (Heat source unit)	
L1 - 47	15 V power supply error: M1C (Cascade unit)	
L1 - 48	15 V power supply error: M2C (Cascade unit)	
L1 - 49	15 V power supply error: M1C (Heat source unit)	
L1 - 50	15 V power supply error: M2C (Heat source unit)	
L3 - 03	Reactor fin temperature rise: Inverter PCB 1 (A3P) (Heat source unit)	Refer to the **L3** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
L3 - 04	Reactor fin temperature rise: Inverter PCB 2 (A6P) (Heat source unit)	
L4 - 01	Radiation fin temperature rise: Inverter PCB (A3P) (Cascade unit)	Refer to the **L4** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
L4 - 02	Radiation fin temperature rise: Inverter PCB (A3P) (Heat source unit)	
L4 - 09	Radiation fin temperature rise: Inverter PCB (A5P) (Cascade unit)	
L4 - 10	Radiation fin temperature rise: Inverter PCB (A6P) (Heat source unit)	
L5 - 03	Compressor M1C momentary overcurrent (Cascade unit)	Refer to the **L5** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
L5 - 05	Compressor M1C momentary overcurrent (Heat source unit)	
L5 - 14	Compressor M2C momentary overcurrent (Cascade unit)	
L5 - 15	Compressor M2C momentary overcurrent (Heat source unit)	
L8 - 03	Compressor M1C overcurrent (Cascade unit)	Refer to the **L8** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
L8 - 06	Compressor M1C overcurrent (Heat source unit)	
L8 - 11	Compressor M2C overcurrent (Cascade unit)	
L8 - 12	Compressor M2C overcurrent (Heat source unit)	

Error code	Troubleshooting	
	Error Description	Diagnosis
L9 - 01	Compressor M1C startup error (Cascade unit)	Refer to the **L9** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
L9 - 05	Compressor M1C startup error (Heat source unit)	
L9 - 10	Compressor M2C startup error (Cascade unit)	
L9 - 11	Compressor M2C startup error (Heat source unit)	
LC - 14	Transmission error (Between outdoor units, inverter PCB 1 (A3P)) (Cascade unit)	Refer to the **LC** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
LC - 15	Transmission error (Between outdoor units, inverter PCB 1 (A3P)) (Heat source unit)	
LC - 20	Transmission error (Between outdoor units, fan) (Heat source unit): M1F	
LC - 25	Transmission error (Between outdoor units, fan) (Heat source unit): M2F	
LC - 30	Transmission error (Between outdoor units, inverter PCB 2 (A5P)) (Cascade unit)	
LC - 31	Transmission error (Between outdoor units, inverter PCB 2 (A6P)) (Heat source unit)	
LC - 33	Transmission error (Between outdoor units, sub PCB) (Cascade unit)	
LC - 34	Transmission error (Between outdoor units, sub PCB) (Heat source unit)	
P1 - 01	Inverter 1 power supply unbalanced voltage (Cascade unit)	Refer to the **P1** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
P1 - 02	Inverter 1 power supply unbalanced voltage (Heat source unit)	
P1 - 07	Inverter 2 power supply unbalanced voltage (Cascade unit)	
P1 - 08	Inverter 2 power supply unbalanced voltage (Heat source unit)	
P3 - 02	Defective reactor thermistor 1 (Heat source unit: Inverter PCB 1 (A3P))	Refer to the **P3** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
P3 - 05	Defective reactor thermistor 2 (Heat source unit: Inverter PCB 1 (A3P))	
P3 - 08	Defective reactor thermistor 1 (Heat source unit: Inverter PCB 2 (A6P))	
P3 - 11	Defective reactor thermistor 2 (Heat source unit: Inverter PCB 2 (A6P))	
P4 - 01	Defective radiation fin thermistor (Cascade unit: Inverter PCB 1 (A3P))	Refer to the **P4** flowchart and make a diagnosis of the relevant sensor based on the Error code shown to the left.
P4 - 04	Defective radiation fin thermistor (Heat source unit: Inverter PCB 1 (A3P))	
P4 - 06	Defective Radiation fin thermistor (Cascade unit: Inverter PCB 2 (A5P))	
P4 - 07	Defective Radiation fin thermistor (Heat source unit: Inverter PCB 2 (A6P))	
PJ - 04	Incorrect type of inverter PCB 1 (A3P) (Cascade unit)	Refer to the **PJ** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
PJ - 05	Incorrect type of inverter PCB 1 (A3P) (Heat source unit)	
PJ - 12	Incorrect type of inverter PCB 2 (A5P) (Cascade unit)	
PJ - 13	Incorrect type of inverter PCB 2 (A6P) (Heat source unit)	
PJ - 15	Incorrect type of fan PCB 1 (Heat source unit)	
PJ - 17	Incorrect type of fan PCB 2 (Heat source unit)	
U0 - 06	Refrigerant shortage warning	Refer to the **U0** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
U0 - 08	Refrigerant shortage (Cascade unit)	
U0 - 09	Refrigerant shortage (Heat source unit)	
U1 - 01	Reverse phase/open phase of power supply (Cascade unit)	Refer to the **U1** flowchart and make a diagnosis of the relevant unit based on the Error code shown to the left.
U1 - 04	Reverse phase of power supply (when power ON) (Cascade unit)	
U1 - 05	Reverse phase/open phase of power supply (Heat source unit)	
U1 - 06	Reverse phase of power supply (when power ON) (Heat source unit)	

Error code	Troubleshooting	
	Error Description	Diagnosis
U2 - 01	Shortage of inverter 1 power supply voltage (Cascade unit)	Make a diagnosis of the relevant unit based on the following. **Shortage of power supply voltage** If the other units detect shortage of power supply voltage, power supply voltage during operation may be unstable. Check the power supply condition. If a particular unit detects the error, operation of 52C may be defective. Follow the **U2** flowchart. **Open phase of power supply** The wiring between power supply and inverter PCB may be disconnected. Check that power supply is connected to terminal block, terminal block is connected to PCB without broken wire or disconnection, and reactor wiring is secured. If no abnormality is found, follow the **U2** flowchart. **Defective capacitor in main circuit** P-N on the inverter PCB (electrolytic capacitor, power module) may be damaged and short circuited. Operation of current limiting relay may be defective or the wiring between the reactor and PCB may be disconnected. Measure the resistance between P-N on the inverter PCB and check for short circuit. If no abnormality is found, follow the **U2** flowchart.
U2 - 02	Open phase of inverter 1 power supply (Cascade unit)	
U2 - 03	Defective capacitor in inverter 1 main circuit (Cascade unit)	
U2 - 08	Shortage of inverter 1 power supply voltage (Heat source unit)	
U2 - 09	Open phase of inverter 1 power supply (Heat source unit)	
U2 - 10	Defective capacitor in inverter 1 main circuit (Heat source unit)	
U2 - 22	Shortage of inverter 2 power supply voltage (Cascade unit)	
U2 - 23	Open phase of inverter 2 power supply (Cascade unit)	
U2 - 24	Defective capacitor in inverter 2 main circuit (Cascade unit)	
U2 - 25	Shortage of inverter 2 power supply voltage (Heat source unit)	
U2 - 26	Open phase of inverter 2 power supply (Heat source unit)	
U2 - 27	Defective capacitor in inverter 2 main circuit (Heat source unit)	
U3 - 02	Initial installation warning	Refer to the **U3** flowchart and make a diagnosis based on the Error code shown to the left.
U3 - 03	Test operation not conducted	
U3 - 04	Abnormal end of test operation	
U3 - 05	Premature end of test operation during initial transmission error	
U3 - 06	Premature end of test operation during normal transmission error	
U3 - 07	Premature end of test operation due to transmission error of either unit	
U3 - 08	Premature end of test operation due to transmission error of all units	
U4 - 01	Internal/external transmission error	Refer to the **U4** flowchart and make a diagnosis based on the Error code shown to the left.
U4 - 03	Internal system transmission error	
U7 - 03	Transmission error between cascade unit and heat source unit	Refer to the **U7** flowchart and make a diagnosis based on the Error code shown to the left.
U7 - 05	Multi system error	
UE - 01	Transmission error between cascade unit and controller kit	Refer to the **UE** flowchart and make a diagnosis based on the Error code shown to the left.
UE - 03	Transmission error between cascade unit and controller kit alarm	

5.3 Electric Three Way Valve Abnormality

Applicable Models

BWLP120TJU

Error Code

42

Method of Error Detection

Abnormality is detected from the position indicated by the three way valve and the actual position of the three way valve.

Error Decision Conditions

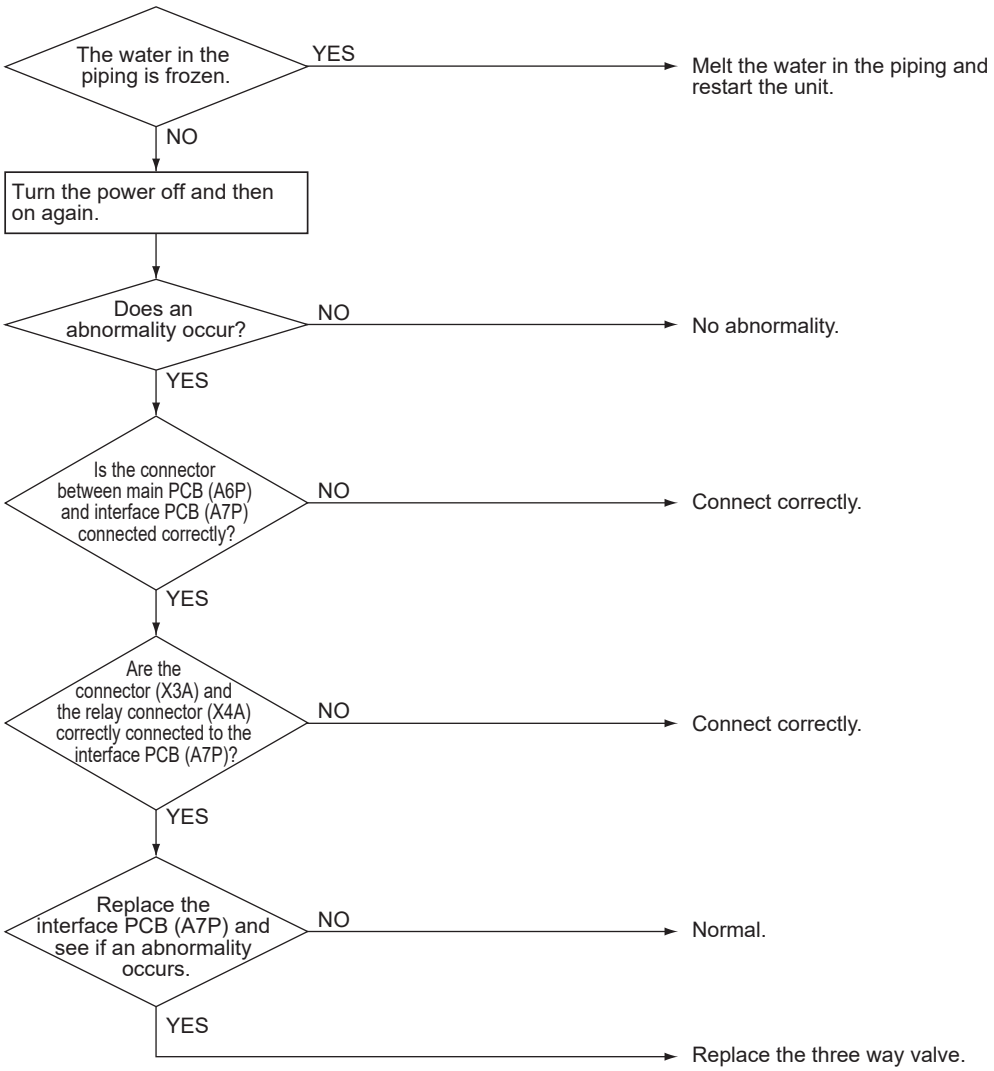
When the position indicated by the three way valve does not match its actual position

Supposed Causes

- Poor connector connection between the main PCB (A6P) and interface PCB (A7P)
- Main PCB (A6P) failure
- Interface PCB (A7P) failure
- Frozen water in piping
- Three way valve failure

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



5.4 Thermistor Abnormality

Applicable Models
BWLP120TJU
BRP26B2VJU

Error Code
80, 81

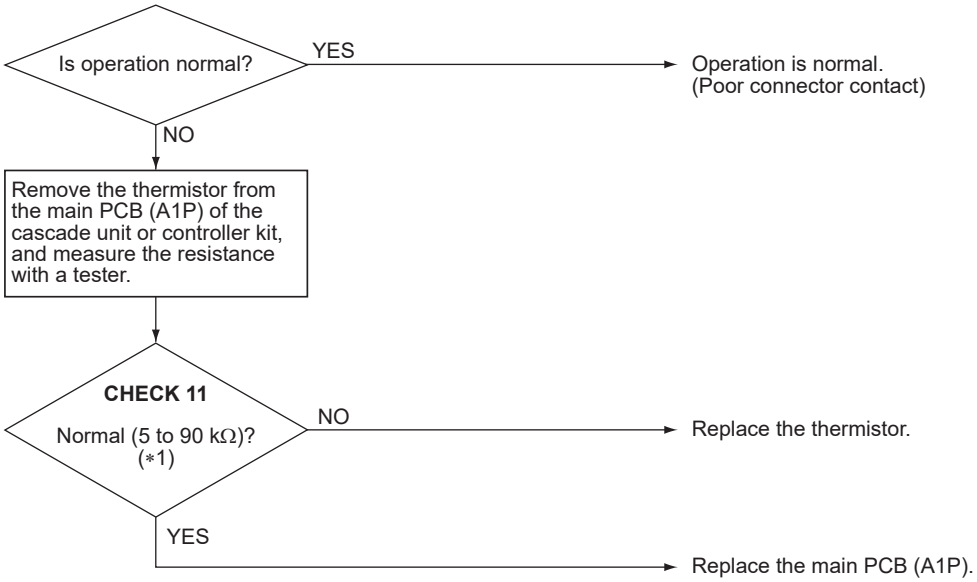
Method of Error Detection
Abnormality is detected based on the temperature detected by each thermistor.

Error Decision Conditions
When the thermistor disconnects or short-circuits during operation.

Supposed Causes
- Poor thermistor connector connection
- Thermistor failure
- Main PCB failure

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Note(s)

∗1. Error code and thermistor

BWLP120TJU

Error code	Thermistor
80	Water inlet thermistor (R5T)
81	Water outlet thermistor (R6T)

BRP26B2VJU

Error code	Thermistor
81-01	Water temperature sensor 1 (R1T)
81-02	Water temperature sensor 2 (R2T)
81-03	Water temperature sensor 3 (R3T)

Reference

CHECK 11 Refer to page 155.

5.5 Water Outage Abnormality (Pump Lock)

Applicable Models

BWLP120TJU

Error Code

A6

Method of Error Detection

Abnormality is detected from the flow rate during pump operation.

Error Decision Conditions

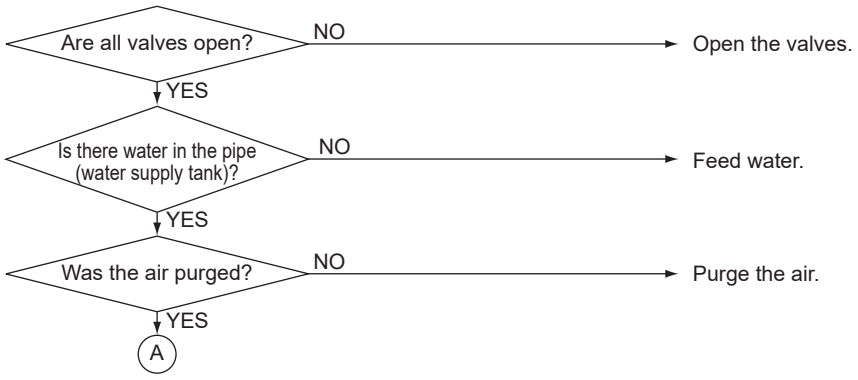
- When the pump speed does not increase
- When the flow rate does not increase while the pump is running

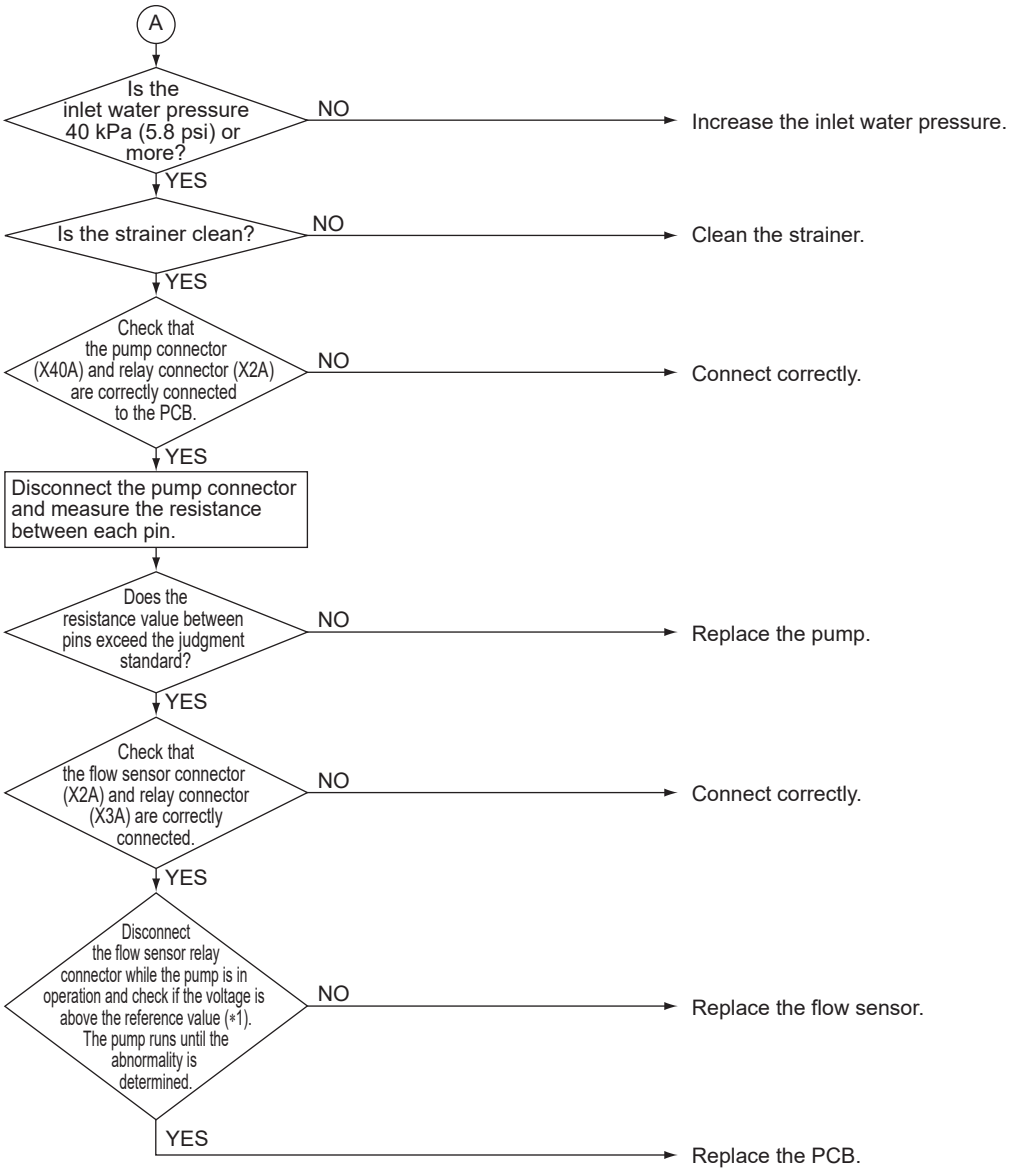
Supposed Causes

- Pump harness breakage, short circuit, or disconnection
- Pump failure (disconnection, insulation failure)
- PCB failure
- Pump lock (external factor)
- The connector between the high-power PCB (A1P) and the low-power PCB (A2P) is disconnected.
- No water in the pipe
- Water does not flow due to foreign matter clogging the strainer in the pipe (including freezing).
- Flow sensor failure
- Insufficient air purge
- Low inlet water pressure

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



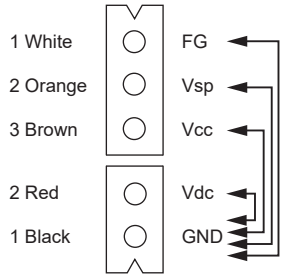


*1. With the pump connector disconnected, measure the resistance between pins twice and check if it is at least the value below. For the first and second measurements, switch the multimeter bars (red/black) for measuring.

First measurement		
Multimeter		Resistance value
Red	Black	Ω
FG	GND	
Vsp	GND	
Vcc	GND	
Vdc	GND	

Second measurement		
Multimeter		Resistance value
Red	Black	Ω
GND	FG	
GND	Vsp	
GND	Vcc	
GND	Vdc	

Judgment criteria
The measured value is 1 Ω or more for both measurements.



5.6 Main PCB Abnormality

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
E1

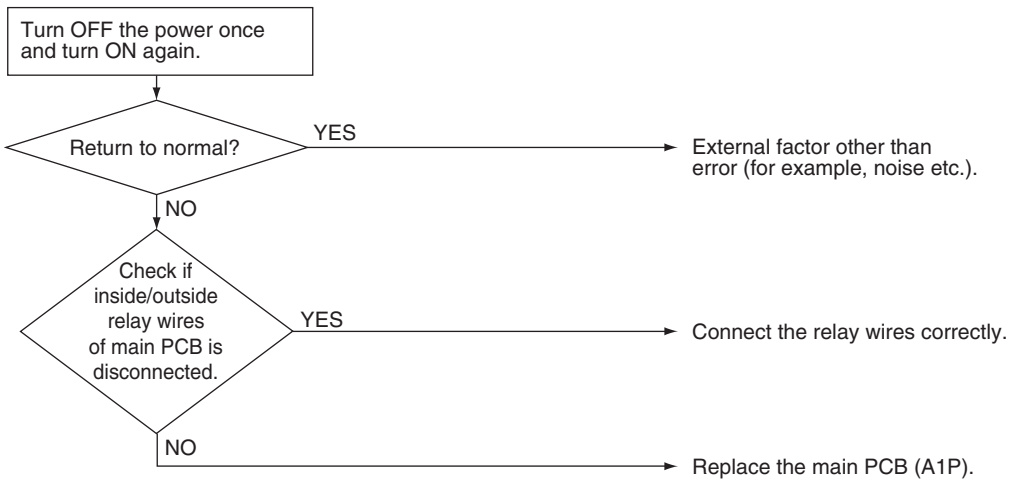
Method of Error Detection
Abnormality is detected under the communication conditions in the hardware section between the heat source unit and cascade unit.

Error Decision Conditions
When the communication conditions in the hardware are not normal.

Supposed Causes
- Defective main PCB (A1P)
- Disconnection of the inside/outside relay wires

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



5.7 Current Leakage Detection

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
E2
Sub code: 01, 02

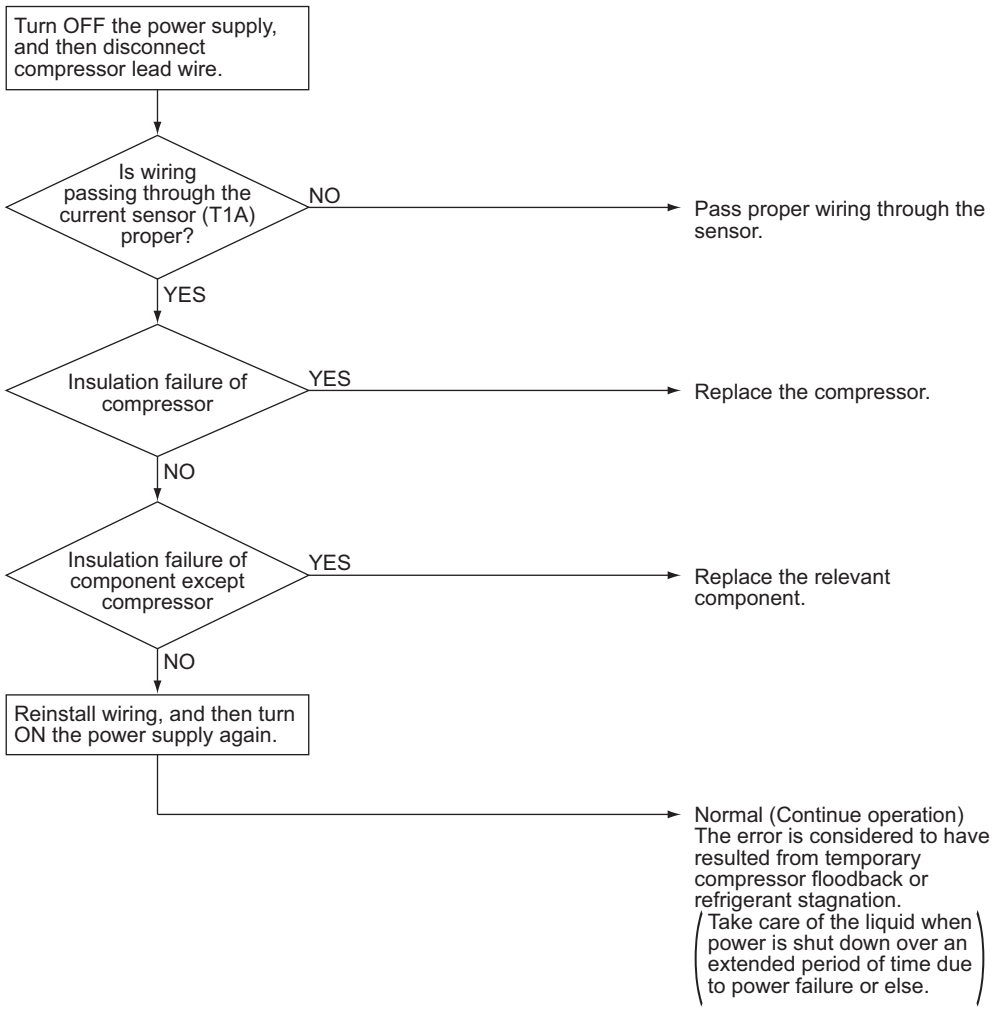
Method of Error Detection
Detect leakage current in the ground leakage detection circuit and detect error on the main PCB (A1P).

Error Decision Conditions
The leakage current is detected.

Supposed Causes
- Ground fault
- Improper wiring passing through the current sensor
- Temporary liquid compression or melting in compressor

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



5.8 Missing of Leakage Detection Core

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
E2
Sub code: 06, 07

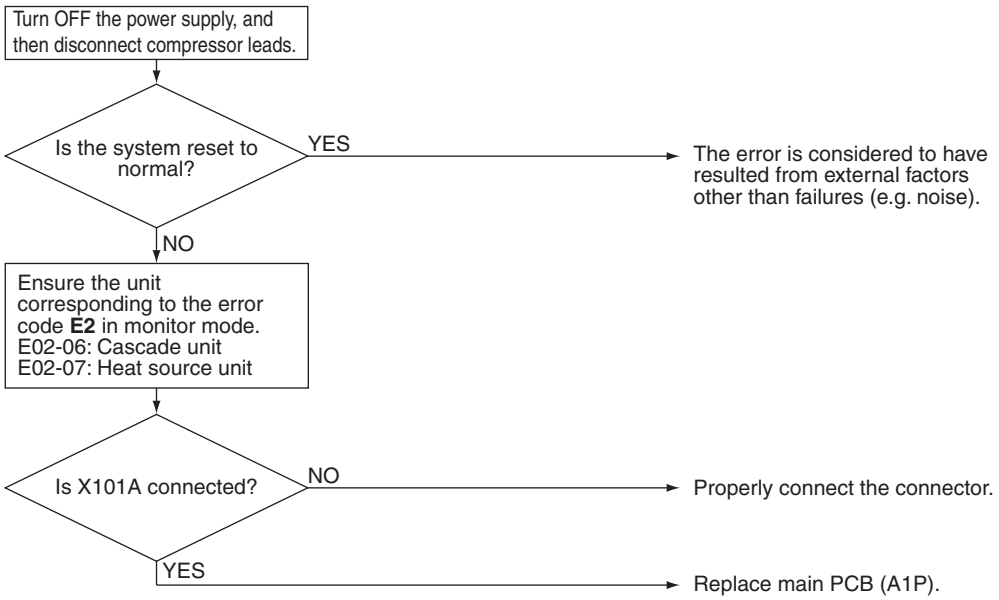
Method of Error Detection
Error is detected according to whether or not there is continuity across the connector X101A for leakage detection circuit (Q1LD).

Error Decision Conditions
No current flows at the time of turning ON the power supply.

Supposed Causes
- Disconnection of connector X101A
- Wiring disconnection
- Defective main PCB (A1P)

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



5.9 Activation of High Pressure Switch

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
E3

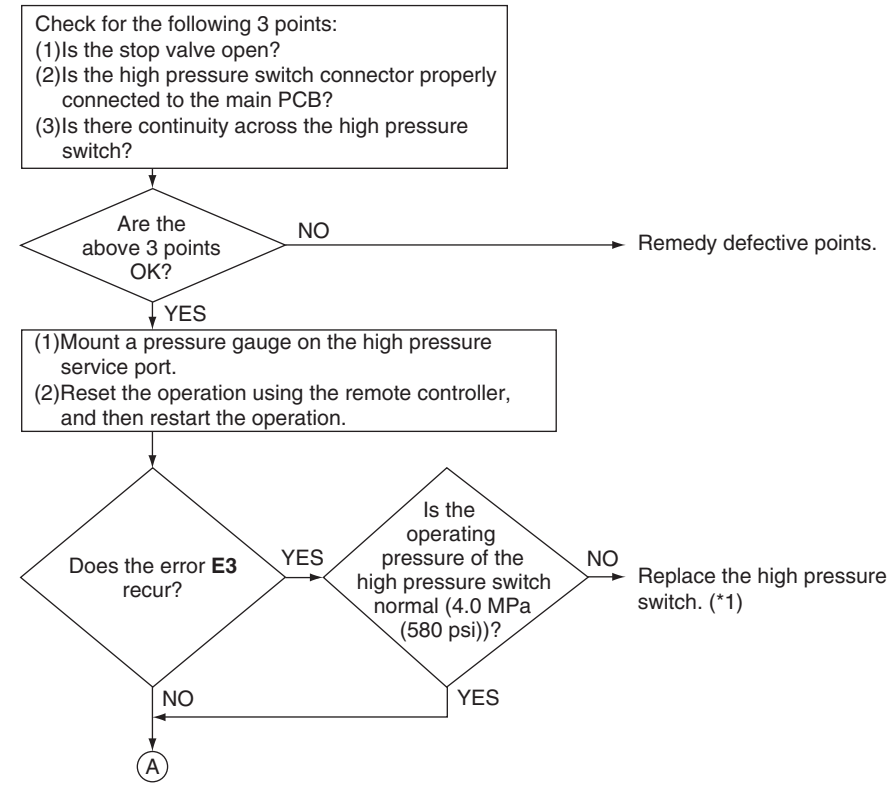
Method of Error Detection
Detect continuity across the high pressure switch in the protection device circuit.

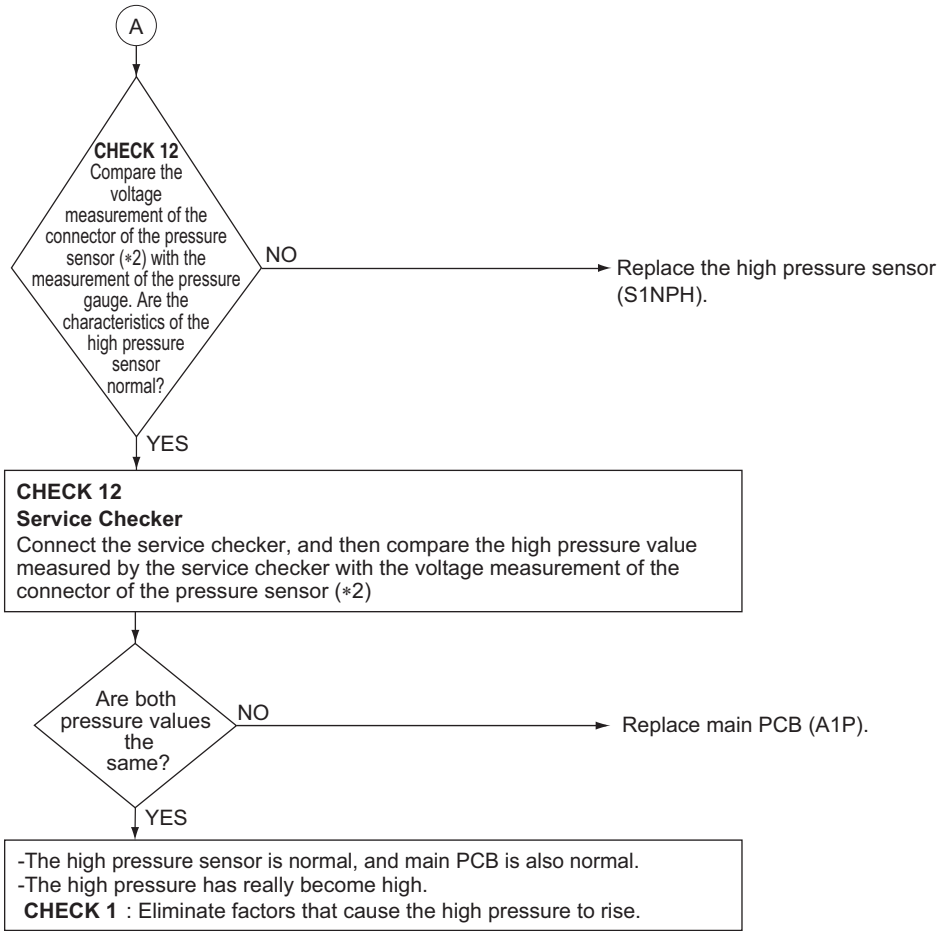
Error Decision Conditions
When part of the protection device circuit opens.
(Reference) Operating pressure of the high pressure switch:
- Operating pressure: 4.0 MPa (580 psi)
- Resetting pressure: 3.0 MPa (435 psi)

Supposed Causes
- Activation of high pressure switch
- Defective high pressure switch
- Defective main PCB (A1P)
- Momentary power failure
- Defective high pressure sensor

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.





Note(s)

*1. S1PH, S2PH

*2. Use the table on **CHECK 12** to convert the voltage measurement into pressure measurement.

Reference **CHECK 1** Refer to page 145.

Reference **CHECK 12** Refer to page 157.

5.10 Activation of Low Pressure Sensor

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

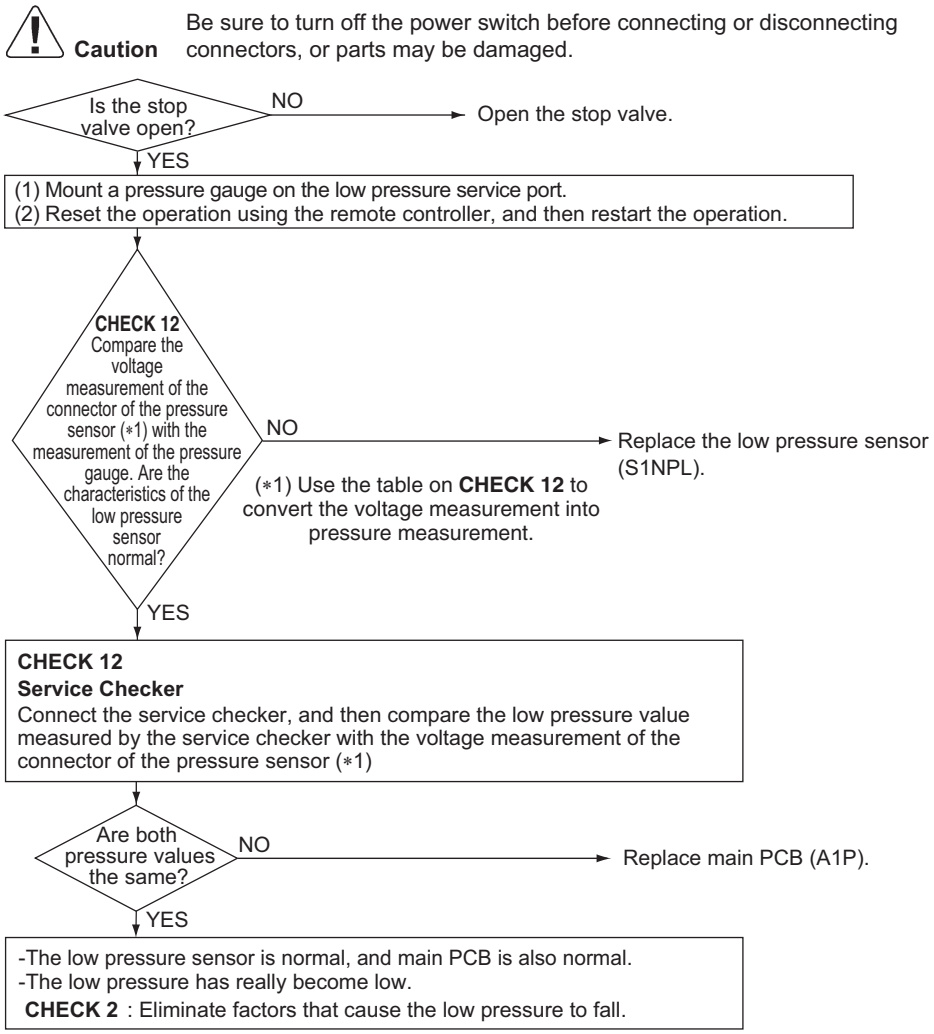
Error Code
E4

Method of Error Detection
Make judgment of pressure detected by the low pressure sensor with the main PCB (A1P).

Error Decision Conditions
When low pressure caused a drop while the compressor is in operation:
- Operating pressure: 0.07 MPa (10.2 psi)

Supposed Causes
- Abnormal drop in low pressure
- Defective low pressure sensor
- Defective main PCB (A1P)
- The stop valve is not opened

Troubleshooting



Reference **CHECK 2** Refer to page 146.

Reference **CHECK 12** Refer to page 157.

5.11 Compressor Motor Lock

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
E5

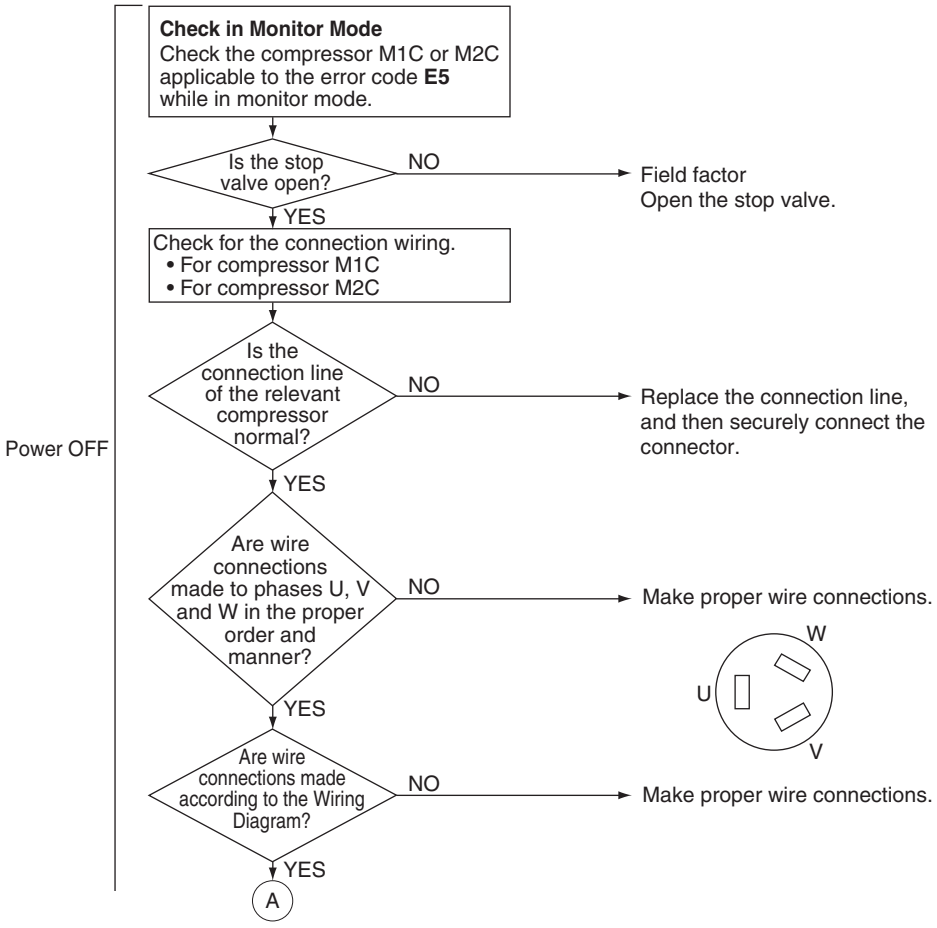
Method of Error Detection
Inverter PCB takes the position signal from UVW line connected between the inverter and compressor, and the error is detected when any abnormality is observed in the phase-current waveform.

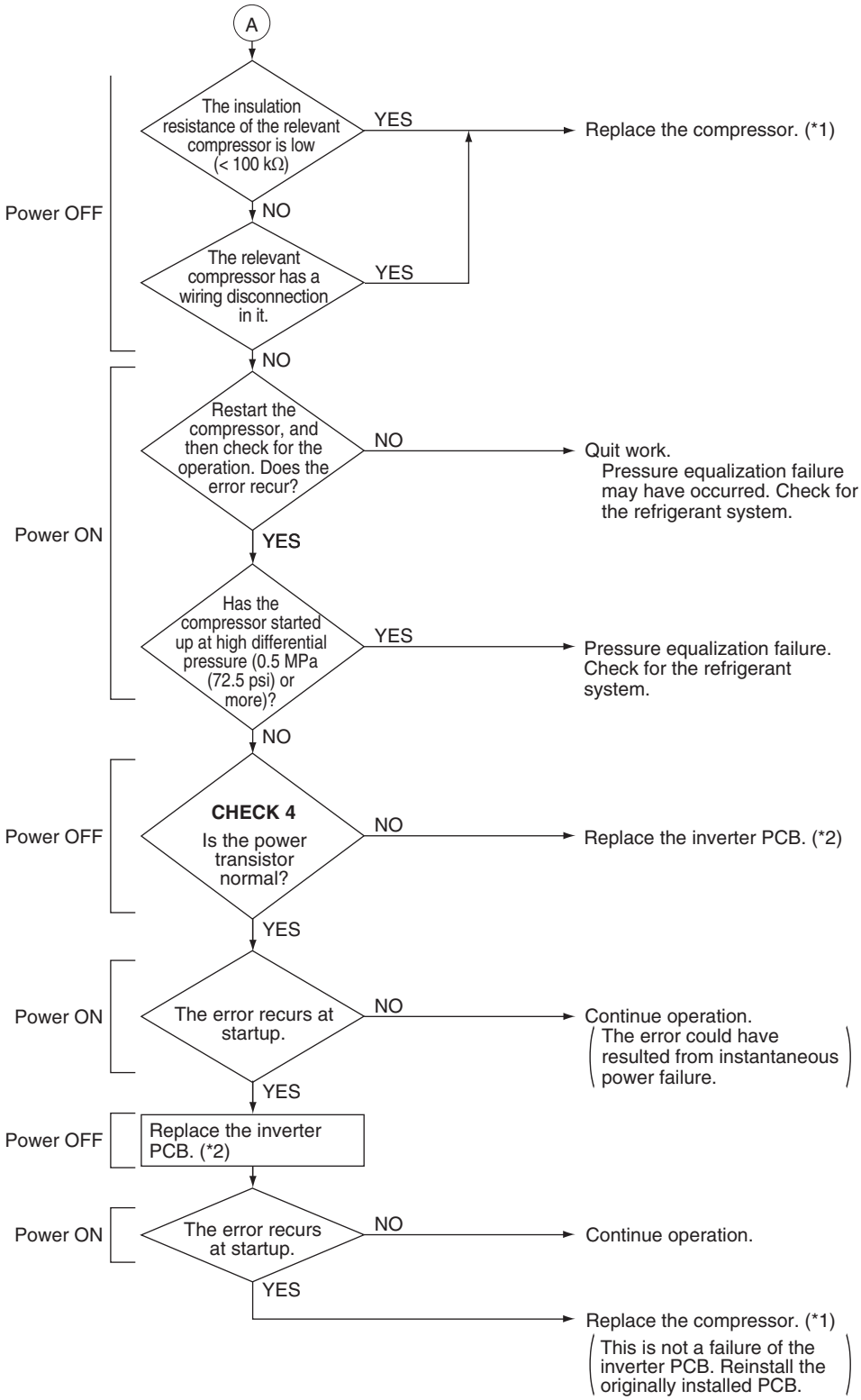
Error Decision Conditions
This error will be output when the compressor motor does not start up even in forced startup mode.

Supposed Causes
- Compressor lock
- High differential pressure (0.5 MPa (72.5 psi) or more)
- UVW connection error
- Defective inverter PCB
- Stop valve is not opened

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.





Note(s)

∗1. M1C, M2C
∗2. RXHWQ120MQTJA: A3P, A6P
BWLP120TJU: A3P, A5P

Reference

CHECK 4 Refer to page 148.

5.12 Compressor Damage Alarm

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
E6

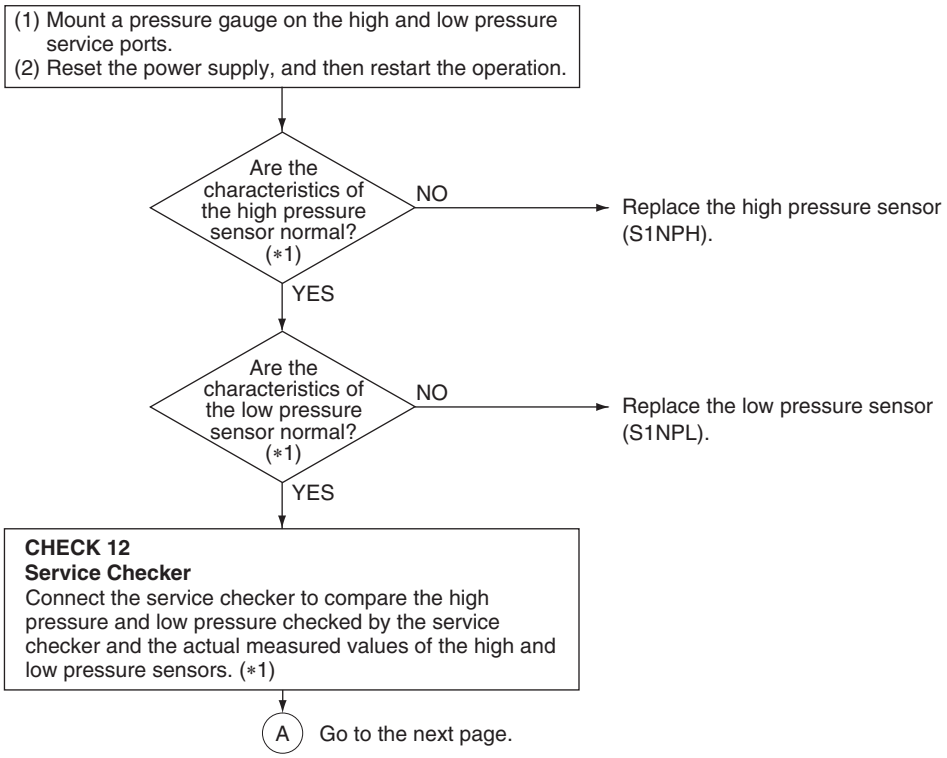
Method of Error Detection
Determine the symptom to be error by detecting the revolutions of the compressor and pressure values detected by the high and low pressure sensors, and further making a comparison between a theoretical current value of the compressor calculated from parameters detected and an actual current value detected by the power transistor.

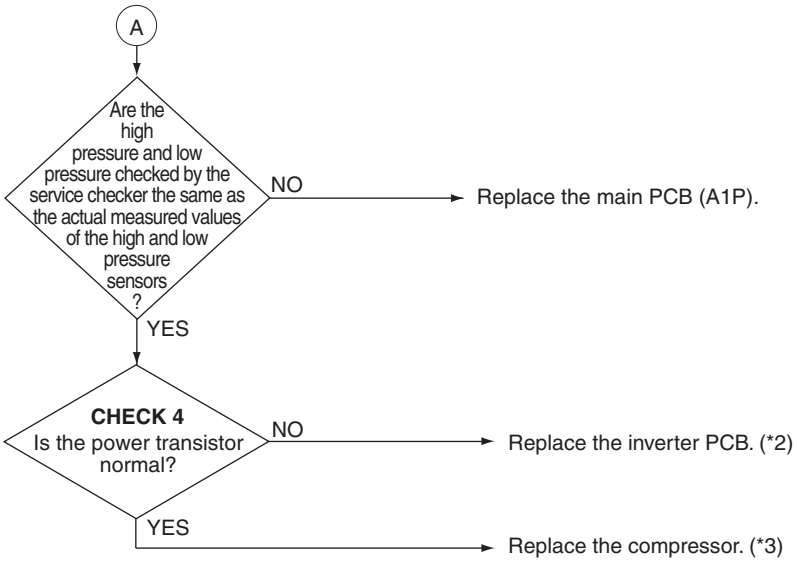
Error Decision Conditions
When a state in which the actual current value of the compressor is abnormally high (by 130% or more) compared to the theoretical current value continues for a period of 30 minutes.
∗ In case of a multi system, the system will return an alarm if there is any operational unit other than that applicable to **E6** or determine to be error if not.

Supposed Causes
- Defective compressor
- Defective high pressure sensor
- Defective low pressure sensor
- Defective main PCB
- Defective inverter PCB

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.





Note(s)

∗1. Use the table on **CHECK 12** to convert the voltage measurement into pressure measurement.
∗2. RXHWQ120MQTJA: A3P, A6P
BWLP120TJU: A3P, A5P
∗3. M1C, M2C

Reference **CHECK 4** Refer to page 148.

Reference **CHECK 12** Refer to page 157.

5.13 Fan Motor Abnormality

Applicable Models

RXHWQ120MQTJA

Error Code

E7

Method of Error Detection

- Detects according to the value of current flowing through the inverter PCB (or fan PCB in case of M2F).
- Detects error of the fan motor system according to the fan revolutions detected by the Hall IC during the fan motor runs.

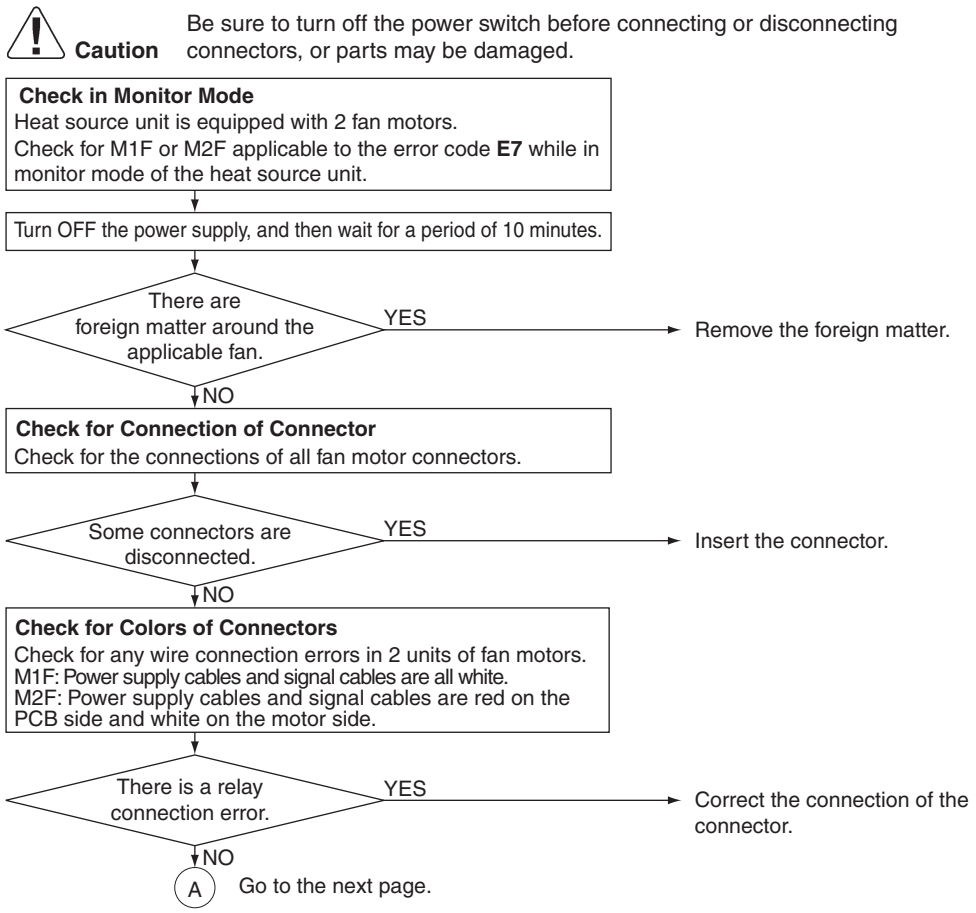
Error Decision Conditions

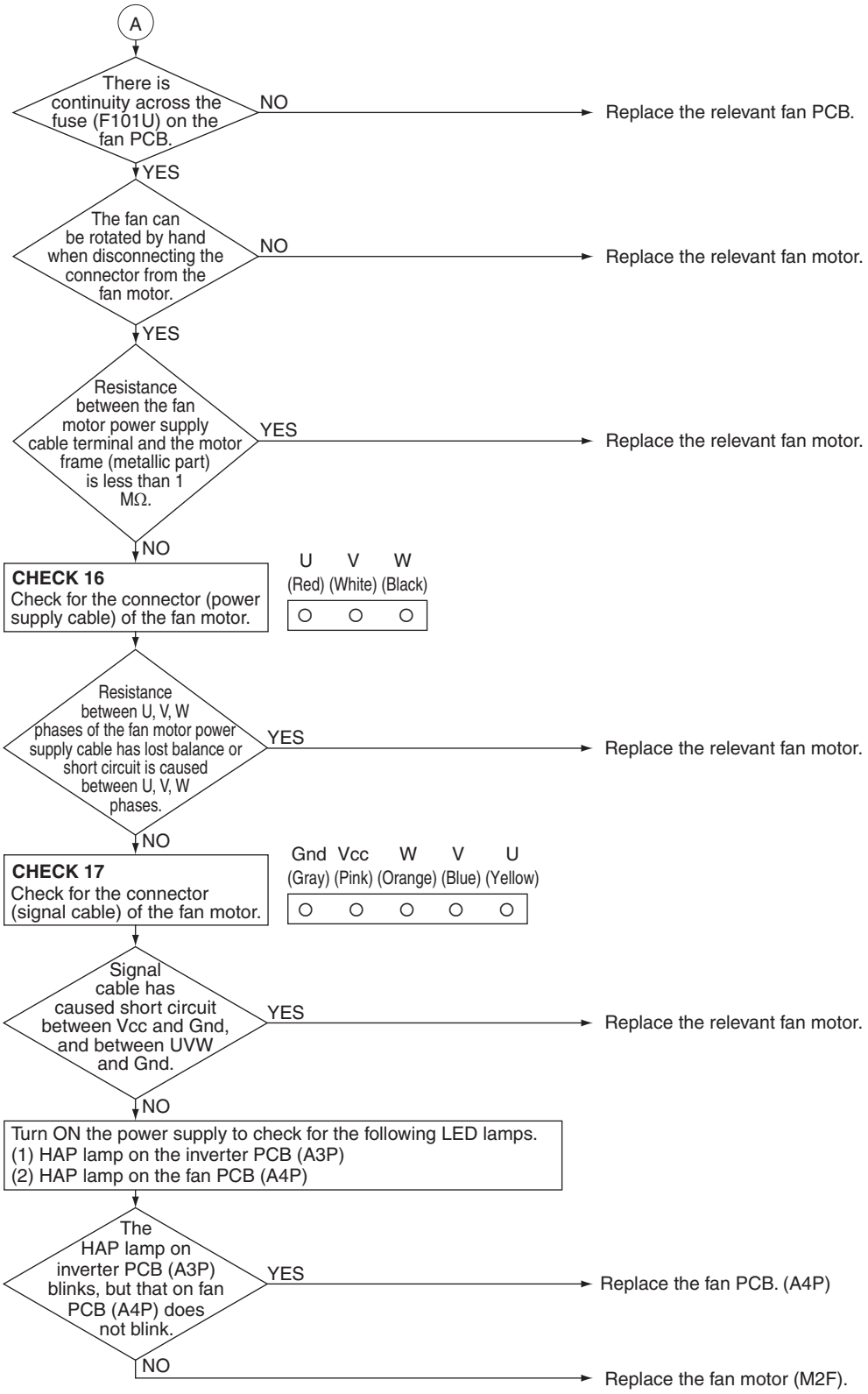
- Overcurrent is detected from the inverter PCB or the fan PCB (Detecting overcurrent 4 times will shut down the system).
- The fan revolutions fall below a given level for a period of 6 seconds while in fan motor rotation mode (Detecting shortage of revolutions 4 times will shut down the system).

Supposed Causes

- Fan motor failure
- Neglect to connect or defective connection of harness/connector between the fan motor and the PCB
- Fan does not rotate due to foreign matter caught in it.
- Clearing condition: fan motor performs normal operation for a period of 5 minutes

Troubleshooting





Reference **CHECK 16** Refer to page 158.

Reference **CHECK 17** Refer to page 158.

5.14 Electronic Expansion Valve Coil Abnormality

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

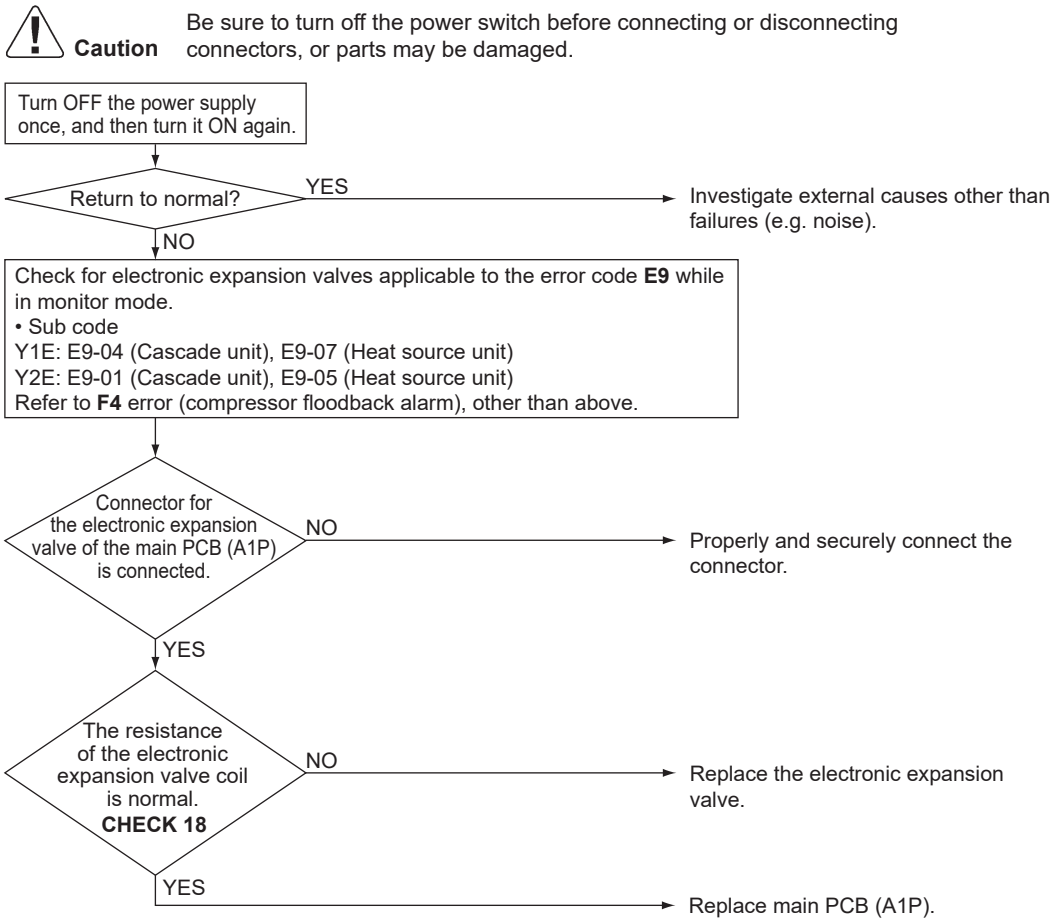
Error Code
E9

Method of Error Detection
Detects according to whether or not there is continuity across the electronic expansion valve coils.

Error Decision Conditions
When no current flows through common (COM[+]) at the time of turning ON the power supply.

Supposed Causes
- Disconnection of connectors from electronic expansion valves
- Defective electronic expansion valve coil
- Defective main PCB (A1P)

Troubleshooting



Reference
CHECK 18 Refer to page 159.

5.15 Tank Water Temperature Abnormality

Applicable Models

BRP26B2VJU

Error Code

EC-02

Method of Error Detection

Abnormality is detected by the thermistor in the tank.

Error Decision Conditions

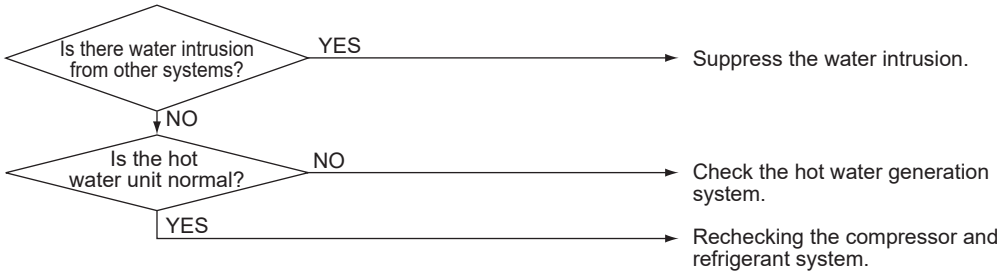
Tank water temperature is 45°C (113°F) or less for 1 hour, or 40°C (104°F) or less for 10 minutes.

Supposed Causes

- Heater failure
- Insufficient hot water generation system capacity
- Tank thermistor error

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.

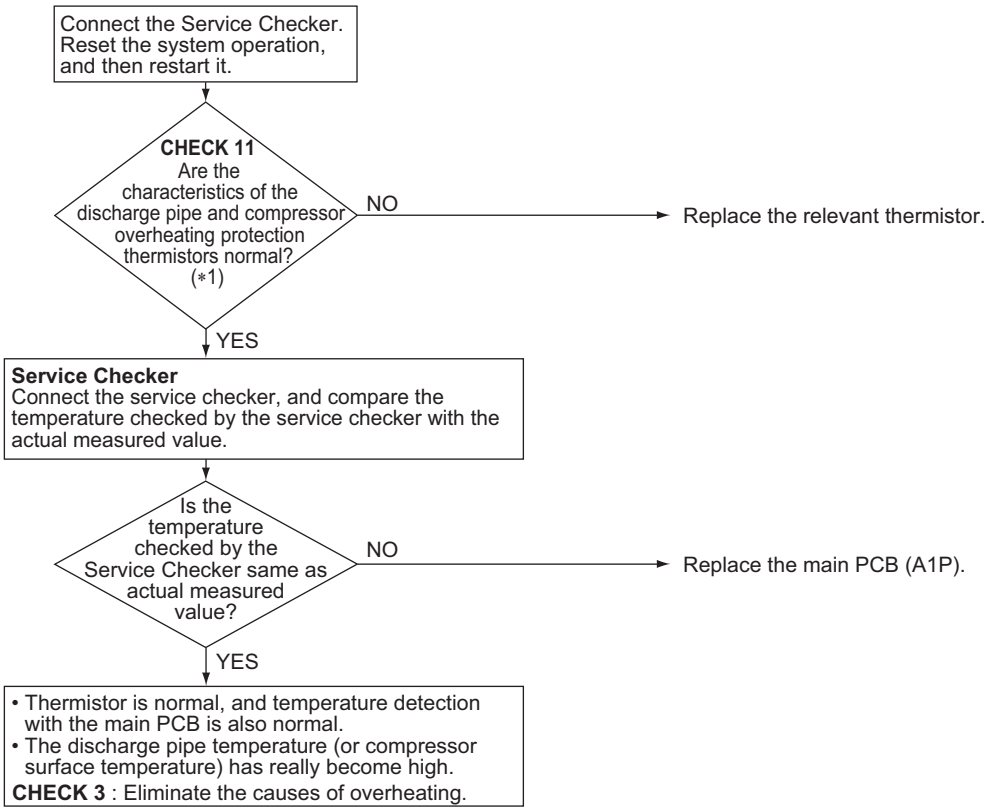


5.16 Discharge Pipe Temperature Abnormality

Applicable Models	RXHWQ120MQTJA BWLP120TJU
Error Code	**F3**
Method of Error Detection	Detect according to temperature detected with the discharge pipe or compressor overheating protection thermistor.
Error Decision Conditions	■ When discharge pipe temperature becomes abnormally high (i.e., 135°C (275°F) or more) ■ When discharge pipe temperature sharply rises (remains at 120°C (248°F) or more for a period of consecutive 10 minutes) ■ When compressor surface temperature becomes abnormally high (i.e., 120°C (248°F) or more) ■ When compressor surface temperature sharply rises (remains at 115°C (239°F) or more for a period of consecutive 10 minutes)
Supposed Causes	■ Abnormal discharge pipe temperature ■ Defective discharge pipe thermistor ■ Abnormal compressor surface temperature ■ Defective compressor overheating protection thermistor ■ Defective main PCB (A1P)

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Note(s) ∗1. Thermistors

Applicable Thermistor	Heat source unit		Cascade unit	
	Electric symbol	Connector	Electric symbol	Connector
Discharge pipe (M1C) thermistor	R21T	X29A (Group connector)	R21T	X29A (Group connector)
Discharge pipe (M2C) thermistor	R22T		R22T	
Compressor overheating protection thermistor (M1C)	—		R14T	
Compressor overheating protection thermistor (M2C)	—		R16T	X19A

Reference **CHECK 3** Refer to page 147.

Reference **CHECK 11** Refer to page 155.

5.17 Compressor Floodback Alarm

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
F4

Method of Error Detection
The state in which the liquid refrigerant returns to the compressor is detected during operation based on the temperature and pressure of each part.

Error Decision Conditions
In each unit, the system determines whether the discharge superheating degree (∆D) is in compressor floodback state or not.
∆D = discharge pipe temperature – condensation temperature

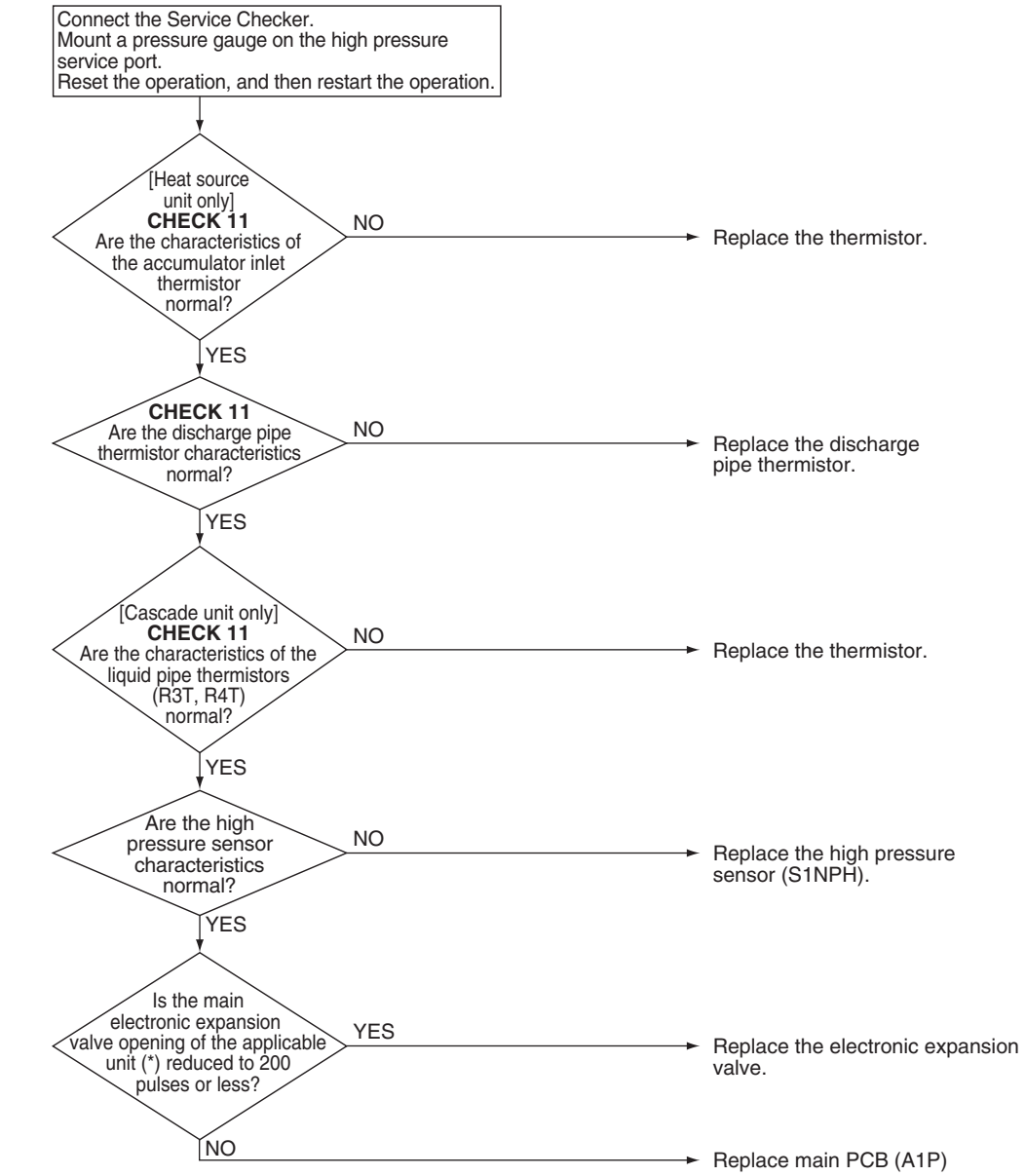
Activation condition
If ∆D stays at **A** or less for 90 minutes, an alarm is output, and if it stayed for 120 minutes, it is determined as an abnormality.
Return condition (alarm)
Reset if ∆D is **B** or more for 15 minutes.
Return condition (abnormality)
Operation reset or power reset

Unit	Model name	**A**	**B**
Heat source unit	RXHWQ120MQTJA	4°C (7.2°F)	8°C (14.4°F)
Cascade unit	BWLP120TJU	7°C (12.6°F)	11°C (19.8°F)

Supposed Causes
- Defective accumulator inlet thermistor
- Defective discharge pipe thermistor
- Defective high pressure sensor

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Note(s) ∗ EVH (cascade unit), EVL (heat source unit)

Reference **CHECK 11** Refer to page 155.

5.18 Harness Abnormality (between Main PCB and Inverter PCB)

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
H3

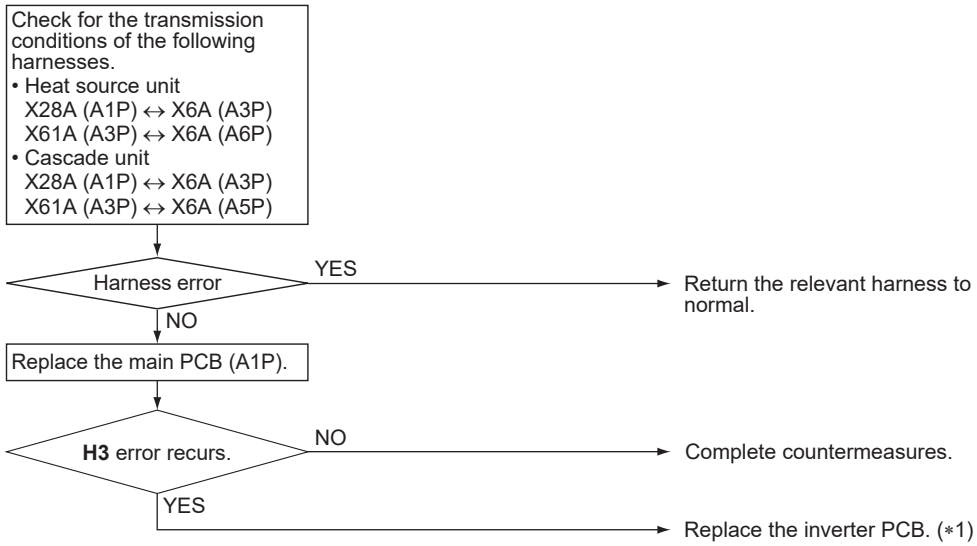
Method of Error Detection
Check for the transmission conditions of the harnesses between the PCBs using microcomputer.

Error Decision Conditions
Normal transmission between the PCBs is disabled while the compressor is not running.

Supposed Causes
- Defective connection of jumpers between PCB
- Defective main PCB (A1P)
- Defective inverter PCB

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Note(s)
∗1. RXHWQ120MQTJA: A3P, A6P
BWLP120TJU: A3P, A5P

5.19 Fan Motor Signal Abnormality

Applicable Models

RXHWQ120MQTJA

Error Code

H7

Method of Error Detection

Detect of abnormal signal from fan motor.

Error Decision Conditions

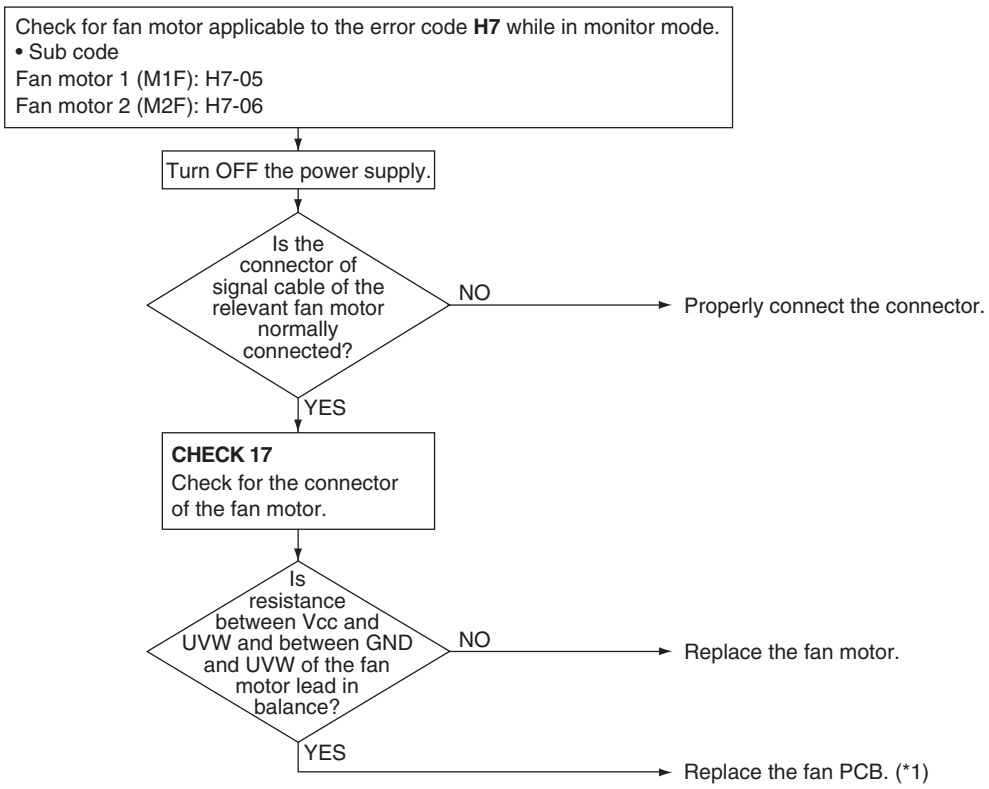
An abnormal signal is detected at startup of the fan motor operation.

Supposed Causes

- Abnormal signal from fan motor (Circuit failure)
- Fan motor leads breakage, short circuit, or disconnection
- Defective fan PCB

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Note(s) ∗1. A4P, A7P

Reference **CHECK 17** Refer to page 158.

5.20 Thermistor Abnormality

Applicable Models RXHWQ120MQTJA
BWLP120TJU

Error Code **H9, J3, J5, J6, J7, J8, J9**

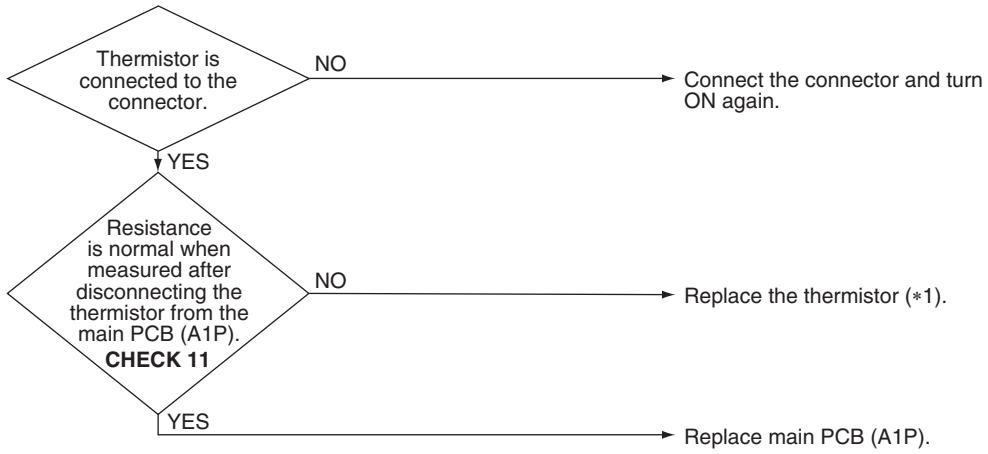
Method of Error Detection Detect according to temperature detected with individual thermistors.

Error Decision Conditions The system is in operation and the thermistor causes wiring disconnection or short circuit in it.

Supposed Causes
- Defective connection of thermistor
- Defective thermistor
- Defective main PCB (A1P)

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Note(s) ∗1. Error codes and thermistors

Error Code	Applicable Thermistor	Heat source unit		Cascade unit	
		Electric symbol	Connector	Electric symbol	Connector
H9	Outdoor air thermistor	R1T	X18A	—	
J3	Discharge pipe (M1C) thermistor	R21T	X29A (Group connector)	R21T	X29A (Group connector)
	Discharge pipe (M2C) thermistor	R22T		R22T	
	M1C compressor overheating protection thermistor	—		R14T	
	M2C compressor overheating protection thermistor	—		R16T	X19A
J5	Accumulator inlet thermistor	R3T	X30A (Group connector)	—	
J6	Heat exchanger deicer thermistor	R7T		—	
J7	Subcooling heat exchanger liquid pipe thermistor	R5T		R3T/R4T	X30A (Group connector)
J8	Heat exchanger liquid pipe thermistor	R4T		—	
J9	Subcooling heat exchanger gas pipe thermistor	R6T		—	

Reference **CHECK 11** Refer to page 155.

5.21 Piping System Abnormality

Applicable Models

BWLP120TJU

Error Code

HJ-07

Method of Error Detection

Abnormality is detected when the flow rate cannot be controlled by the pump step.

Error Decision Conditions

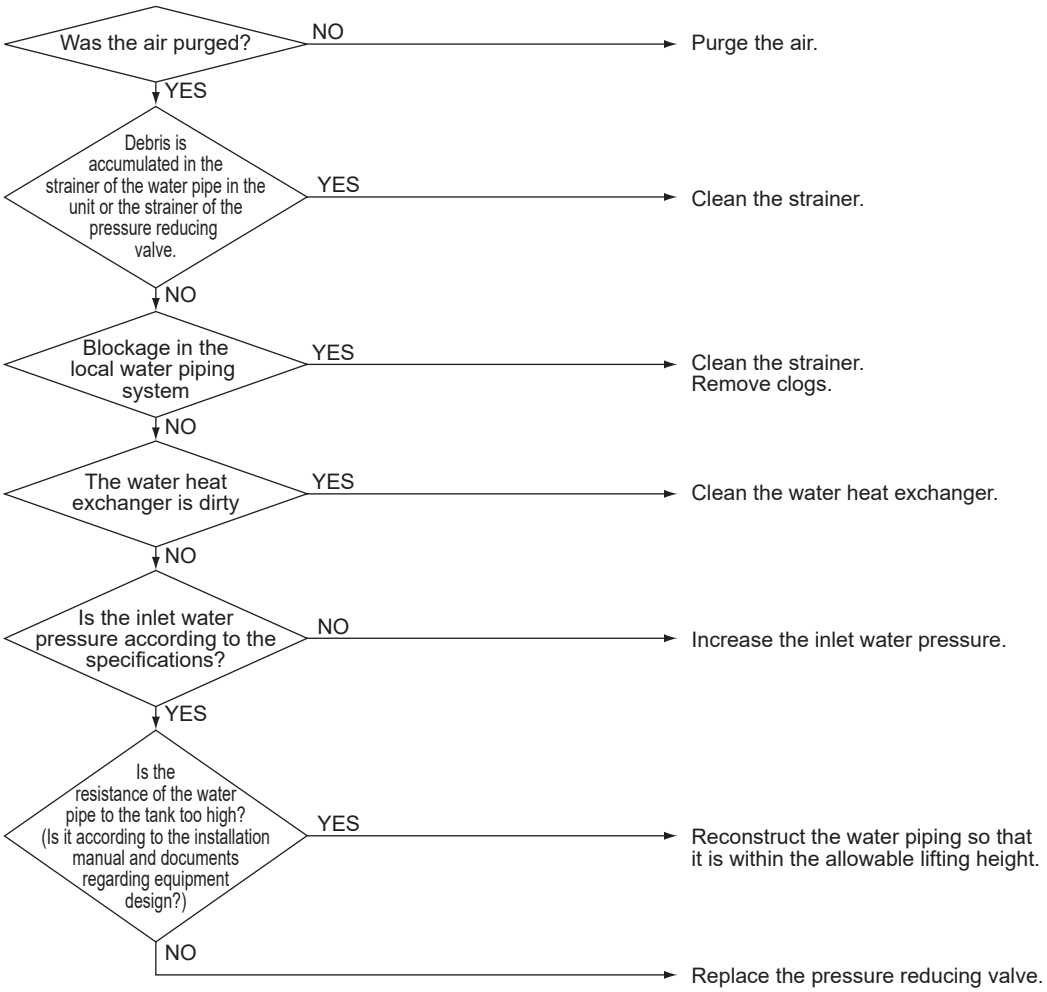
When the pump runs at the maximum capacity but does not reach the constant flow rate (11 L/min) for 10 minutes, or when the pump runs at the minimum capacity but flows more than the constant flow rate (8 L/min) for 10 minutes.

Supposed Causes

- Improperly installed water piping
- Clogging due to foreign matter in the strainer in the water pipe
- Pressure reducing valve failure
- Insufficient air purge
- Low inlet water pressure

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



5.22 High Pressure Sensor Abnormality

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
JA

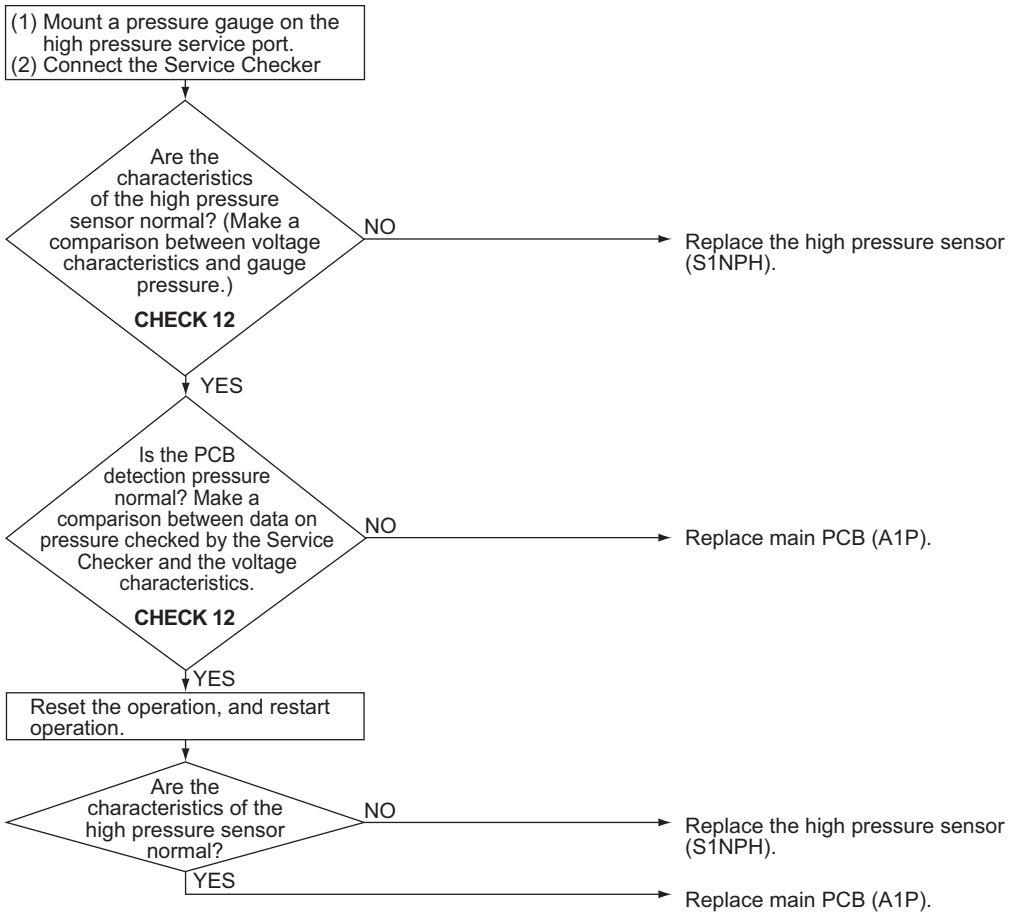
Method of Error Detection
Detects according to pressure detected with the high pressure sensor.

Error Decision Conditions
The high pressure sensor is short circuit or open circuit.
(Above 4.22 MPa (612 psi) or below 0.01 MPa (1.5 psi))

Supposed Causes
- Defective high pressure sensor
- Connection of low pressure sensor in mistake for high pressure sensor
- Defective main PCB (A1P)
- Defective connection of high pressure sensor

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Reference **CHECK 12** Refer to page 157.

5.23 Low Pressure Sensor Abnormality

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
JC

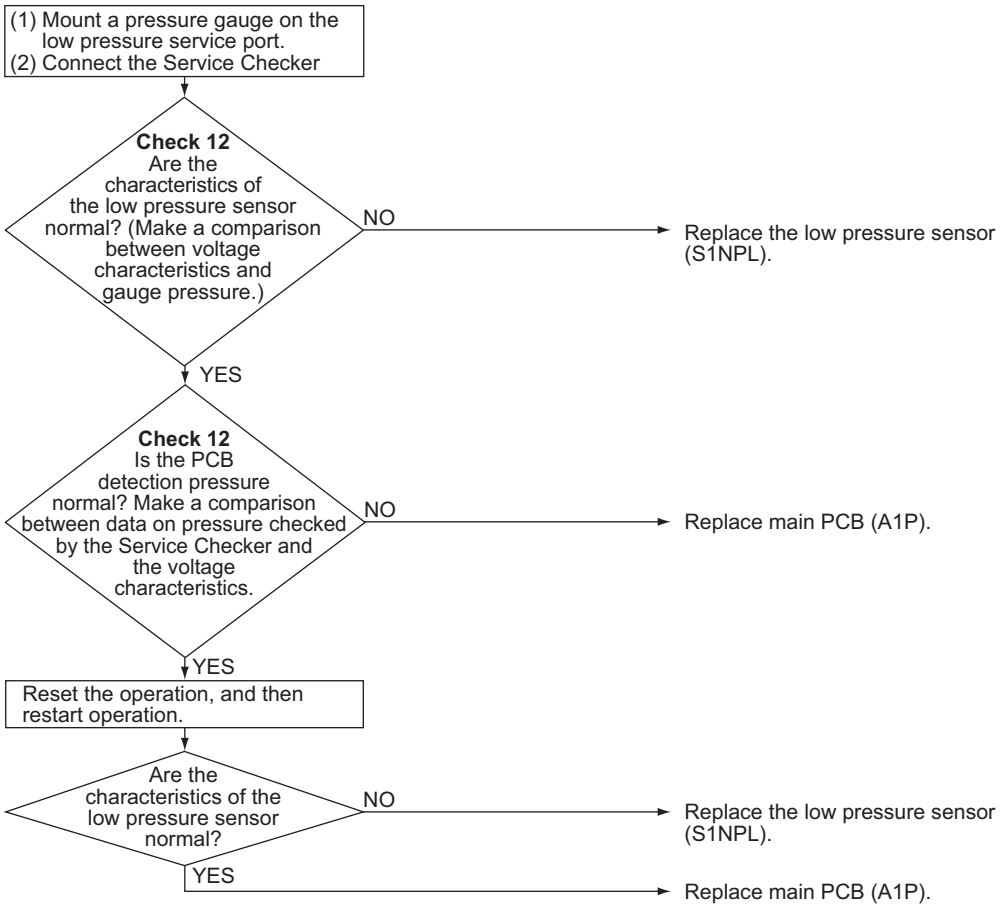
Method of Error Detection
Detect according to pressure detected with the low pressure sensor.

Error Decision Conditions
The low pressure sensor is short circuit or open circuit.
(Above 1.77 MPa (257 psi) or below –0.01 MPa (–1.5 psi))

Supposed Causes
- Defective low pressure sensor
- Connection of high pressure sensor in mistake for low pressure sensor
- Defective main PCB (A1P)
- Defective connection of low pressure sensor

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Reference **CHECK 12** Refer to page 157.

5.24 Inverter PCB Abnormality

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
L1

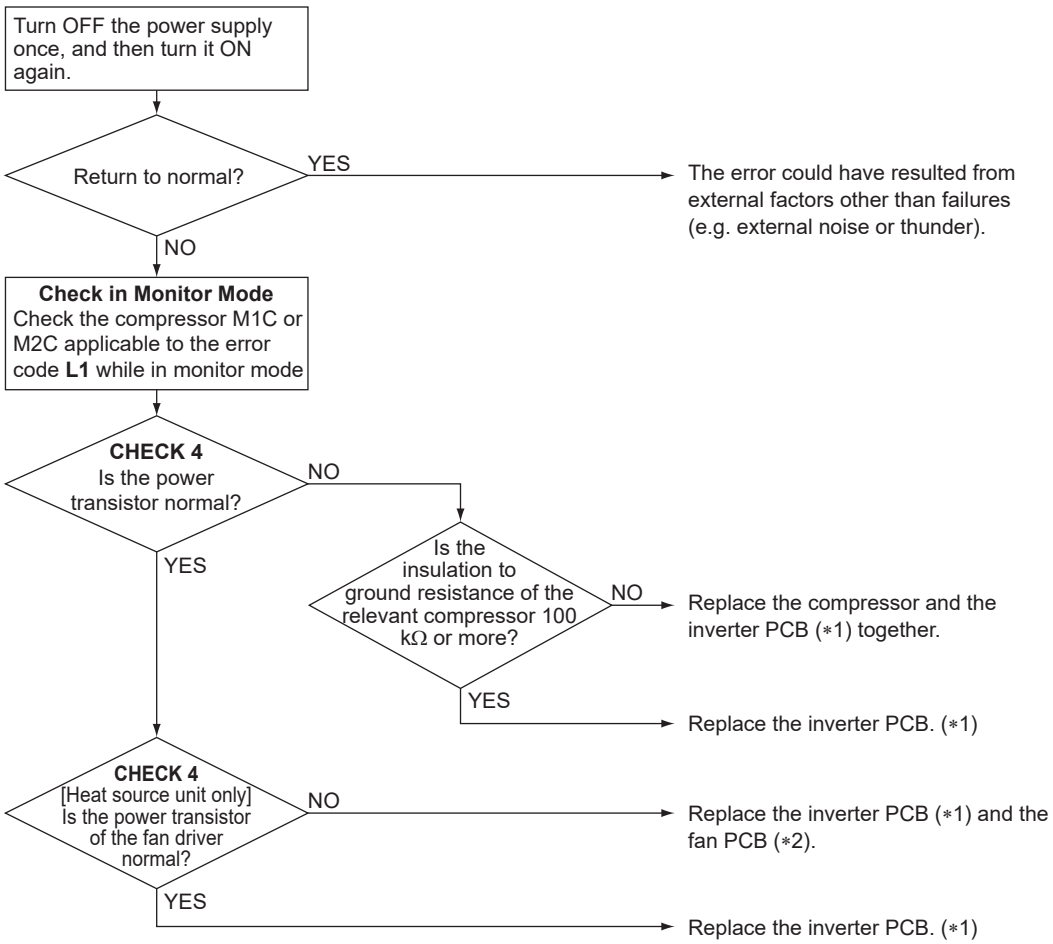
Method of Error Detection
- Detect according to current value during the output of waveform before compressor startup
- Detect according to current sensor value during synchronous operation for startup

Error Decision Conditions
- When overcurrent (OCP) flows during the output of waveform
- When the current sensor error during synchronous operation
- When IPM error occurs

Supposed Causes
- Inverter PCB
  - IPM failure
  - Current sensor failure
  - Drive circuit failure

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Note(s)

∗1. Inverter PCB
RXHWQ120MQTJA: A3P, A6P
BWLP120TJU: A3P, A5P
∗2. Fan PCB
RXHWQ120MQTJA: A4P, A7P

Reference **CHECK 4** Refer to page 148.

5.25 Reactor Temperature Rise Abnormality

Applicable Models

RXHWQ120MQTJA

Error Code

L3

Method of Error Detection

Detect according to the value detected with the reactor surface thermistor.

Error Decision Conditions

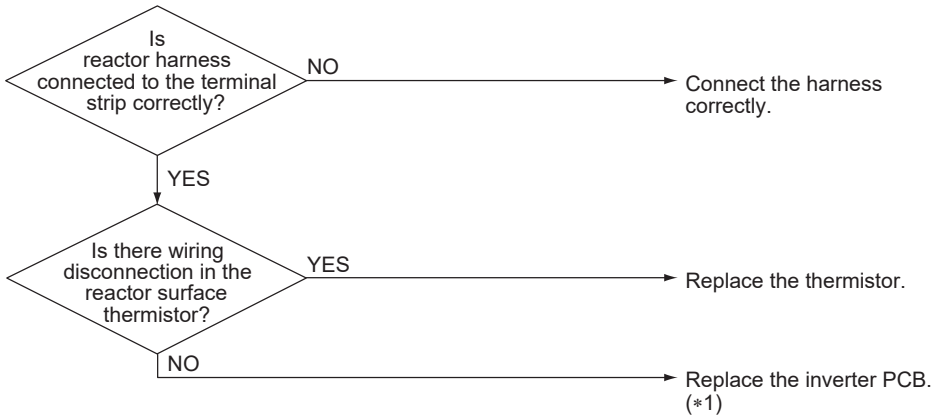
When the temperature detected with the reactor surface thermistor is more than the specified temperature.

Supposed Causes

- Defective connection of harness
- Defective reactor surface thermistor
- Defective inverter PCB

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Note(s) ∗1. RXHWQ120MQTJA: A3P, A6P

5.26 Inverter Radiation Fin Temperature Rise Abnormality

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
L4

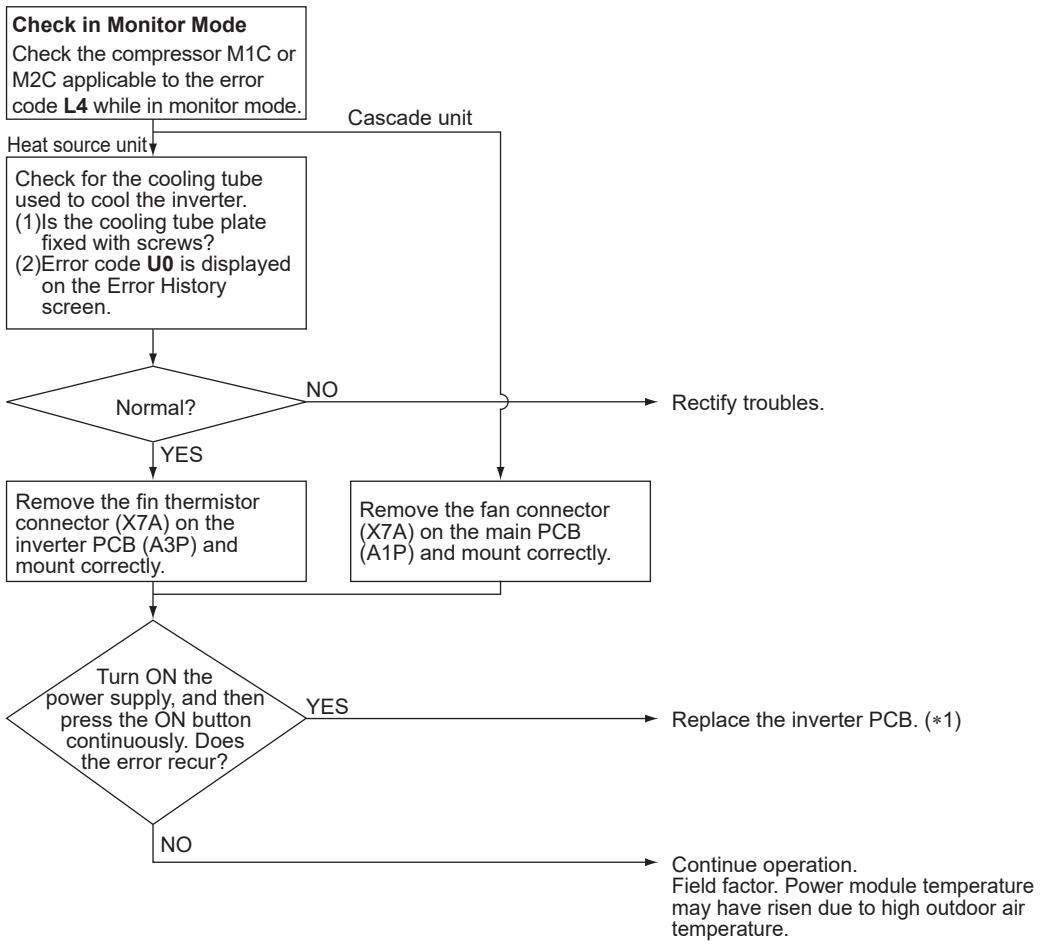
Method of Error Detection
Detect temperature of power module of the inverter PCB.

Error Decision Conditions
Thermistor located inside the power module of the inverter PCB for compressor and fan motor. Cooling tube plate poor heat-exchange.

Supposed Causes
- Cooling tube plate not fixed with screws
- **U0** error
- Defective inverter PCB
- High outdoor air temperature

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Note(s)
*1. RXHWQ120MQTJA: A3P, A6P
BWLP120TJU: A3P, A5P

5.27 Compressor Instantaneous Overcurrent

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
L5

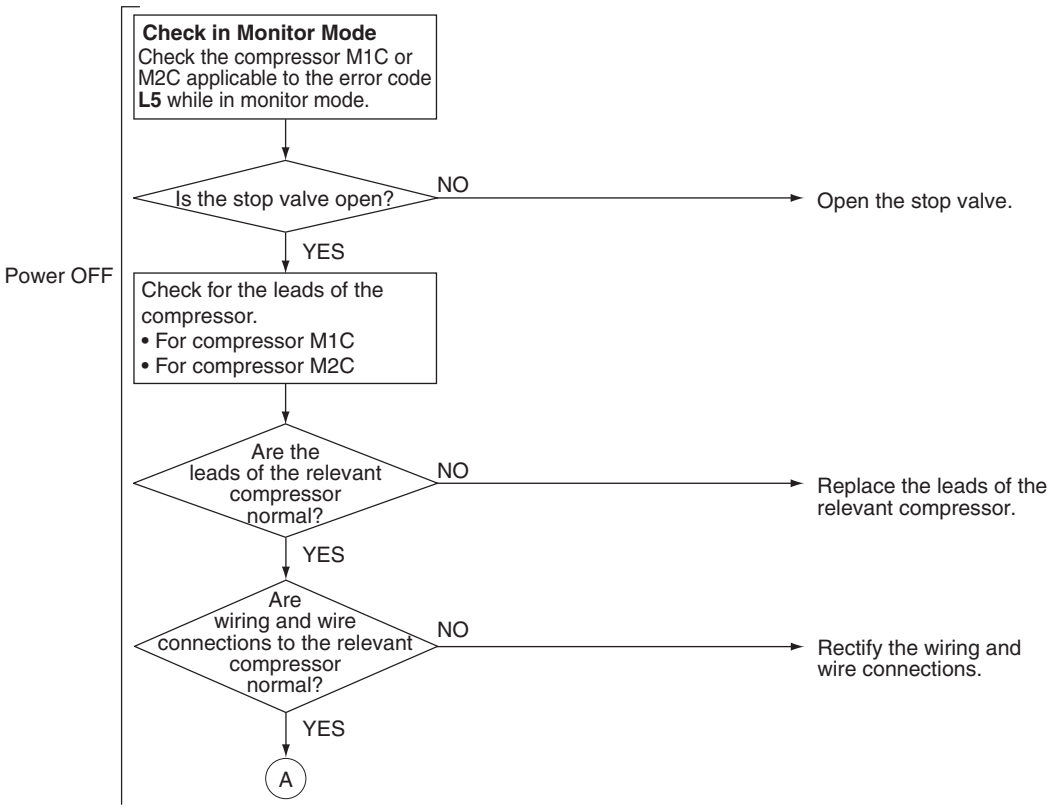
Method of Error Detection
Detect current flowing through the power transistor.

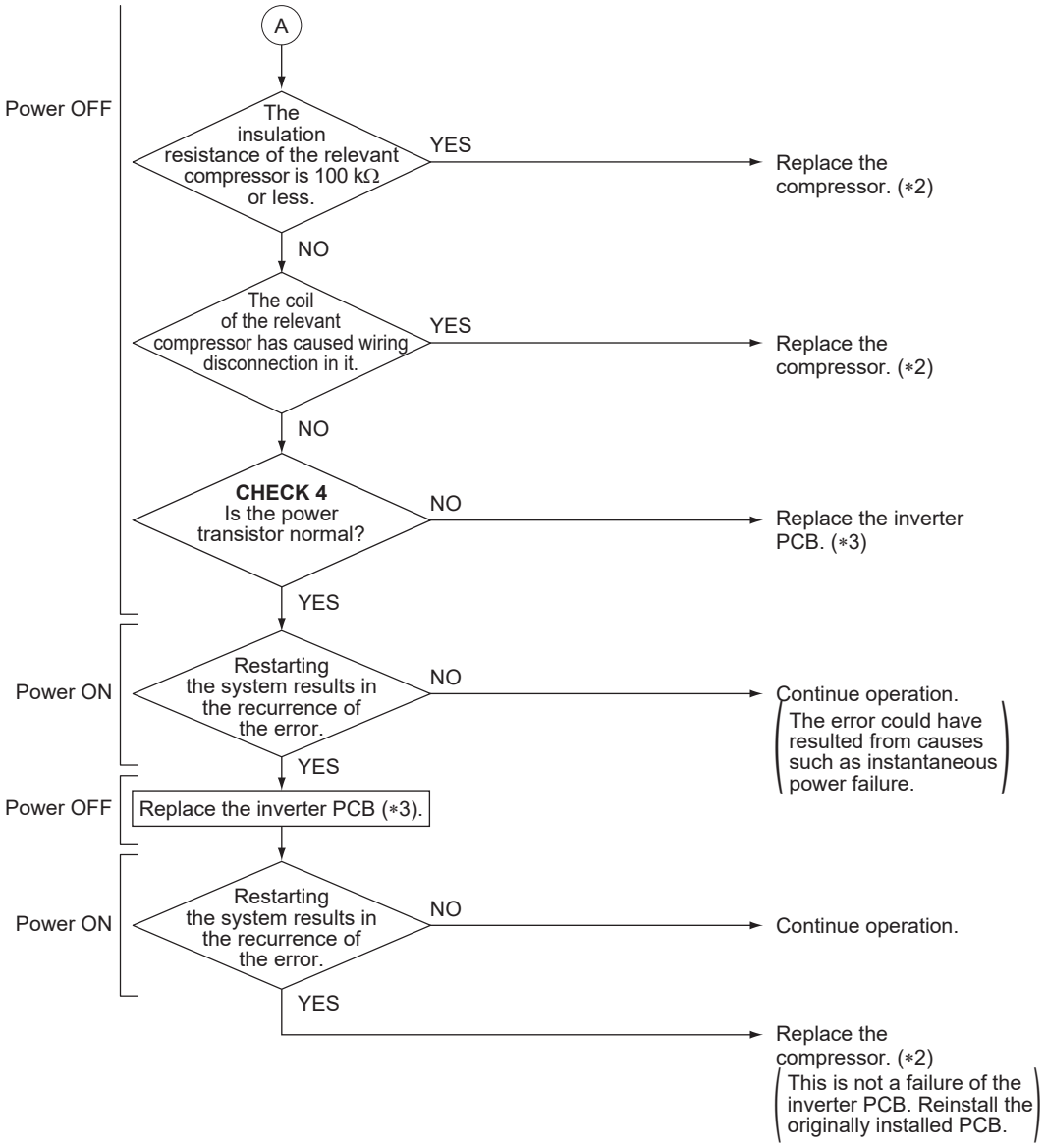
Error Decision Conditions
When overcurrent flows instantaneously through the power transistor (∗1).

Supposed Causes
- Defective compressor coil (such as wiring disconnection or insulation failure)
- Compressor startup failure (mechanical lock)
- Defective inverter PCB

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.





Note(s)

∗1. RXHWQ120MQTJA: 63.2 A
BWLP120TJU: 59.1 A
∗2. M1C, M2C
∗3. RXHWQ120MQTJA: A3P, A6P
BWLP120TJU: A3P, A5P

Reference

CHECK 4 Refer to page 148.

5.28 Compressor Overcurrent

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
L8

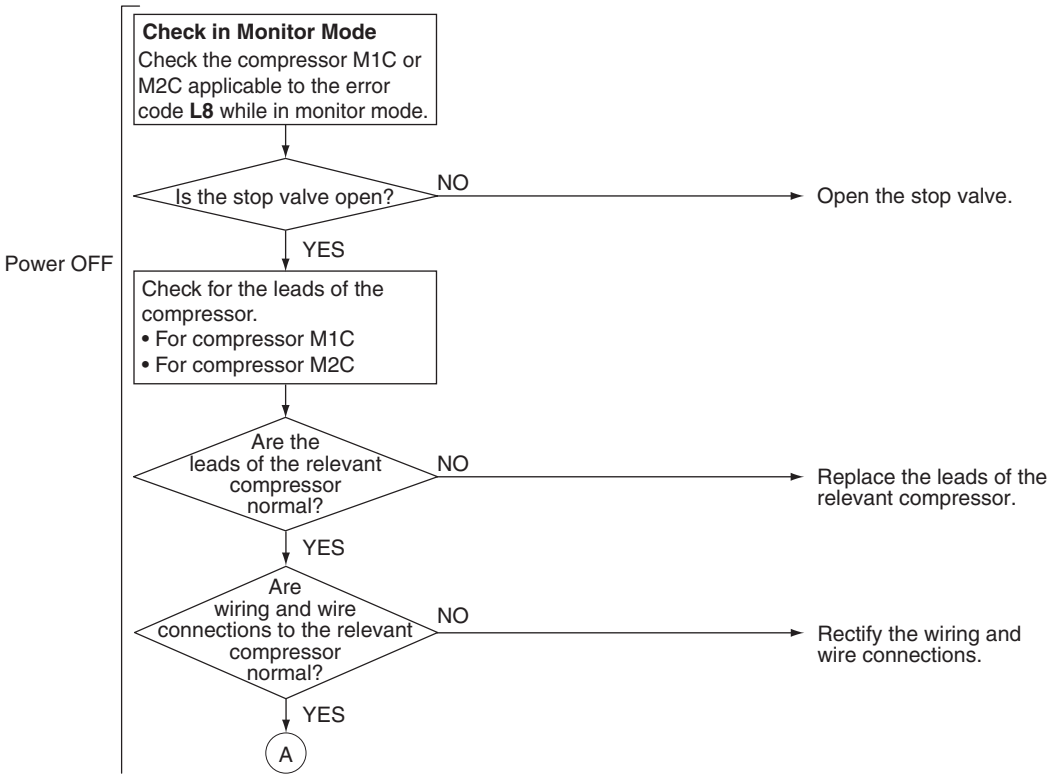
Method of Error Detection
Detect current flowing through the power transistor.

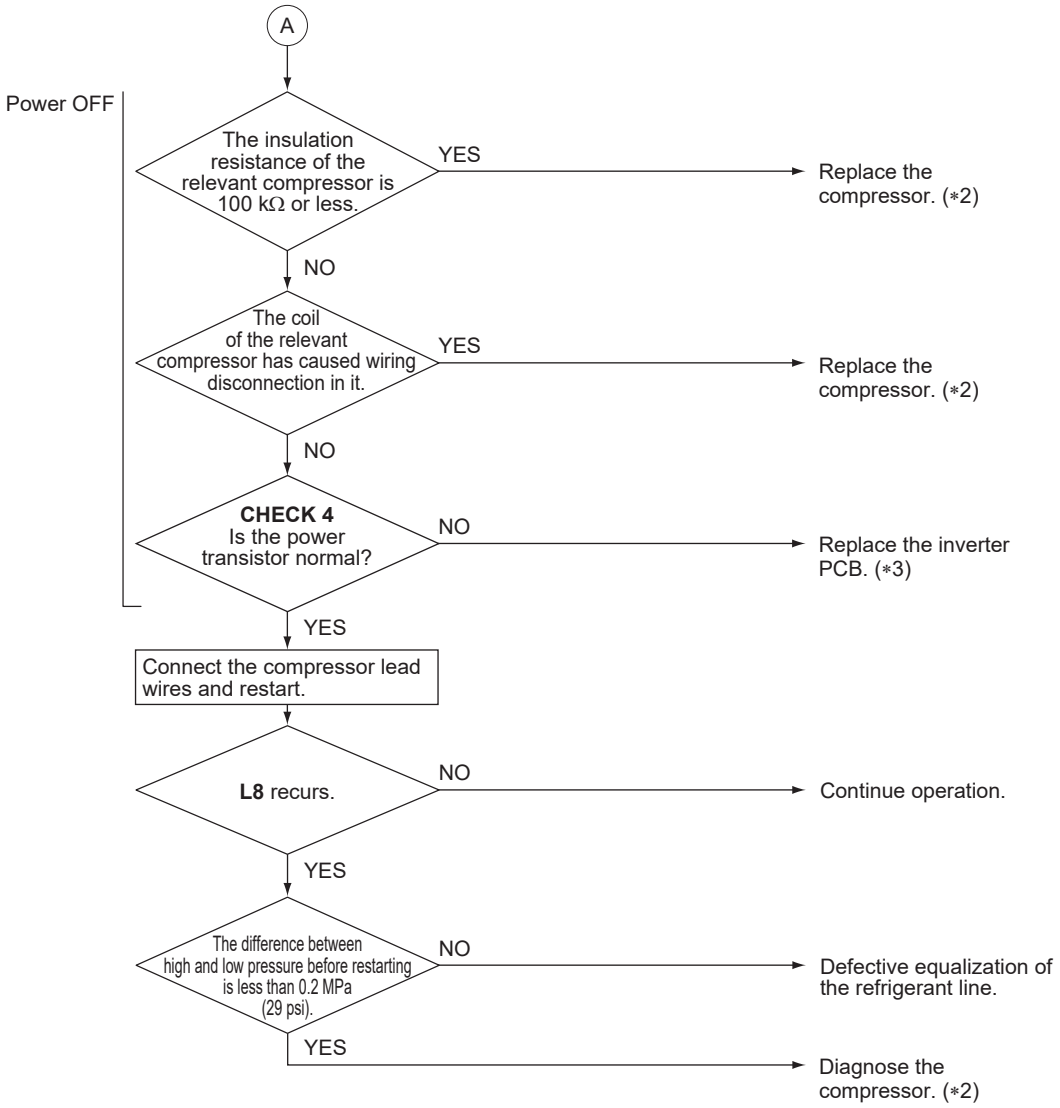
Error Decision Conditions
When the secondary-side inverter current exceeds: ∗1

Supposed Causes
- Compressor overloaded
- Wiring disconnection in compressor coil
- Disconnection of compressor wiring
- Defective inverter PCB

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.





Note(s)

∗1. Above 33.5 A for 5 seconds or above 27.6 A for 260 seconds
∗2. M1C, M2C
∗3. RXHWQ120MQTJA: A3P, A6P
BWLP120TJU: A3P, A5P

Reference

CHECK 4 Refer to page 148.

5.29 Compressor Startup Abnormality

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
L9

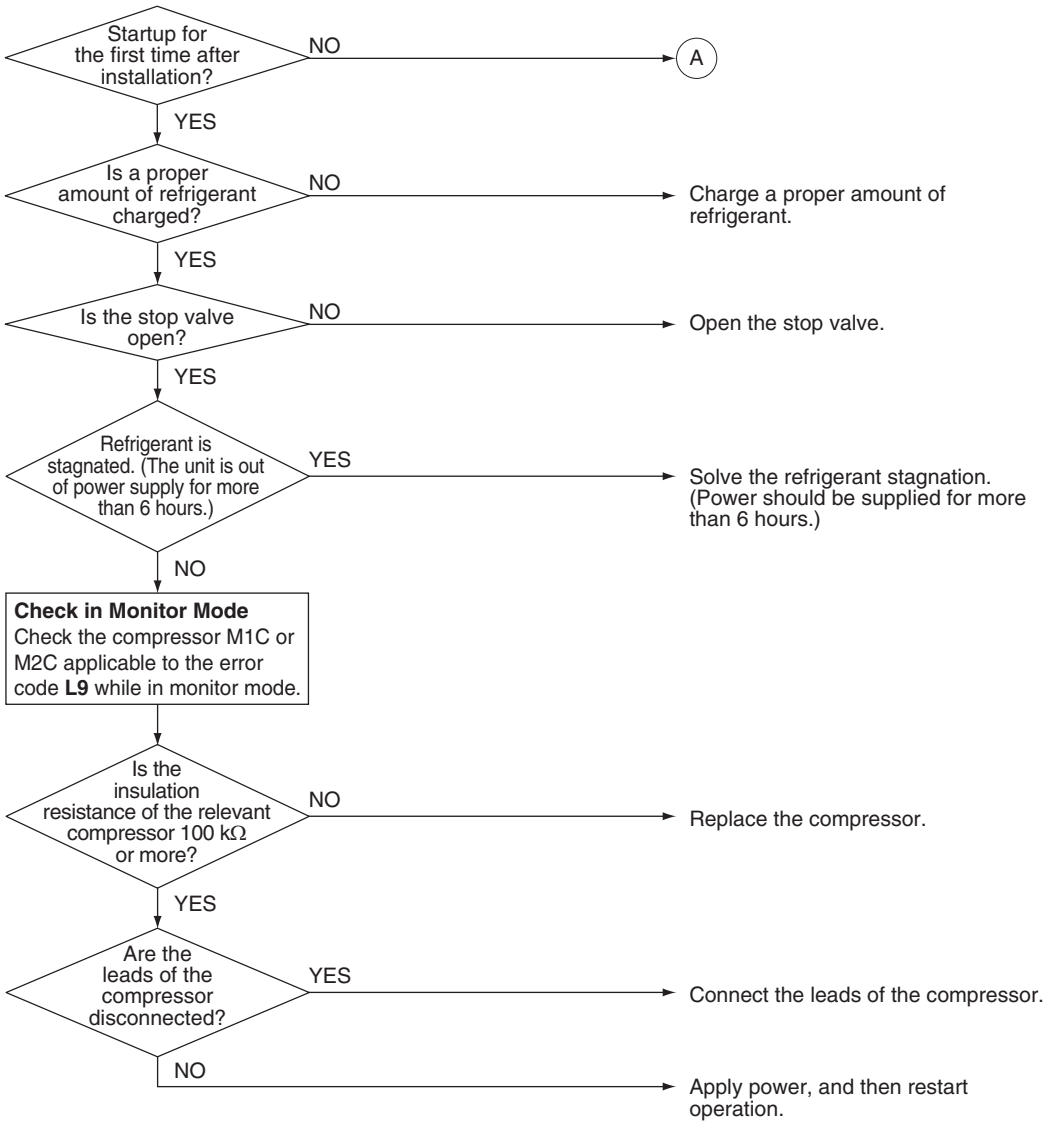
Method of Error Detection
Detect error according to the signal waveform of compressor.

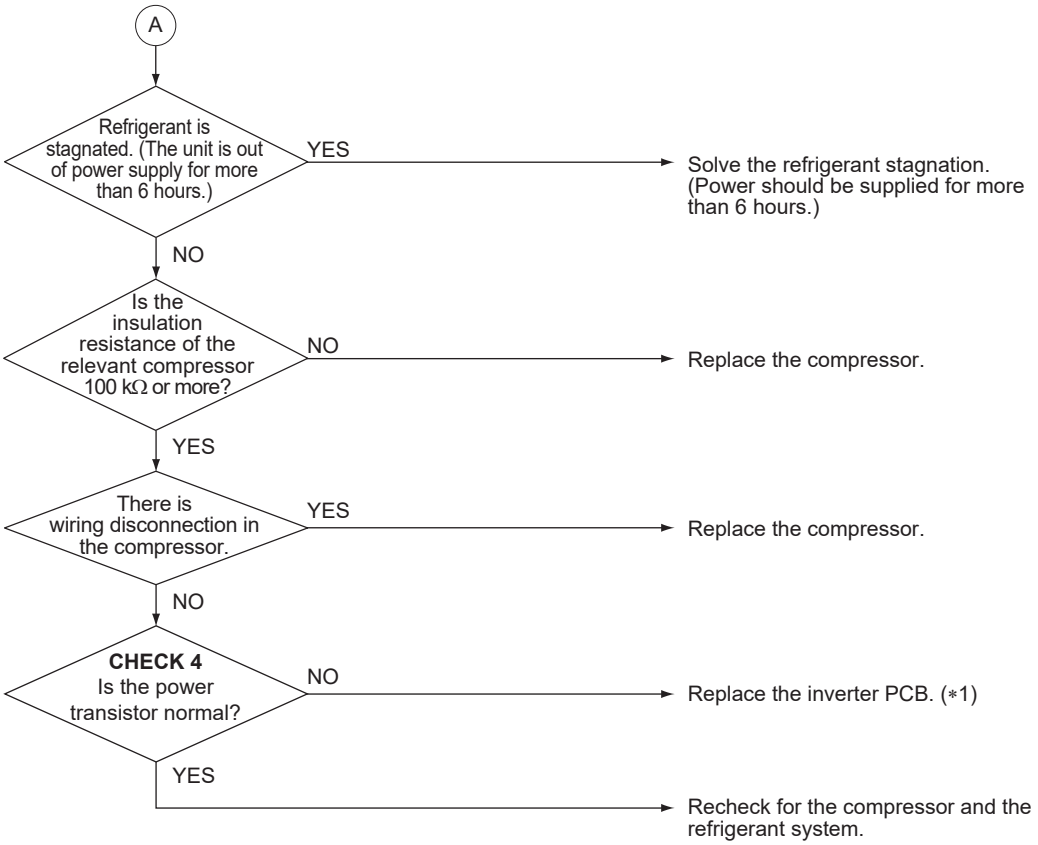
Error Decision Conditions
When compressor startup operation has not been completed.

Supposed Causes
- The stop valve is not opened
- Defective compressor
- Error in wire connections to compressor
- Large differential pressure before compressor startup
- Defective inverter PCB

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.





Note(s) ∗1. RXHWQ120MQTJA: A3P, A6P
BWLP120TJU: A3P, A5P

Reference **CHECK 4** Refer to page 148.

5.30 Transmission Error between Inverter PCB and Main PCB

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

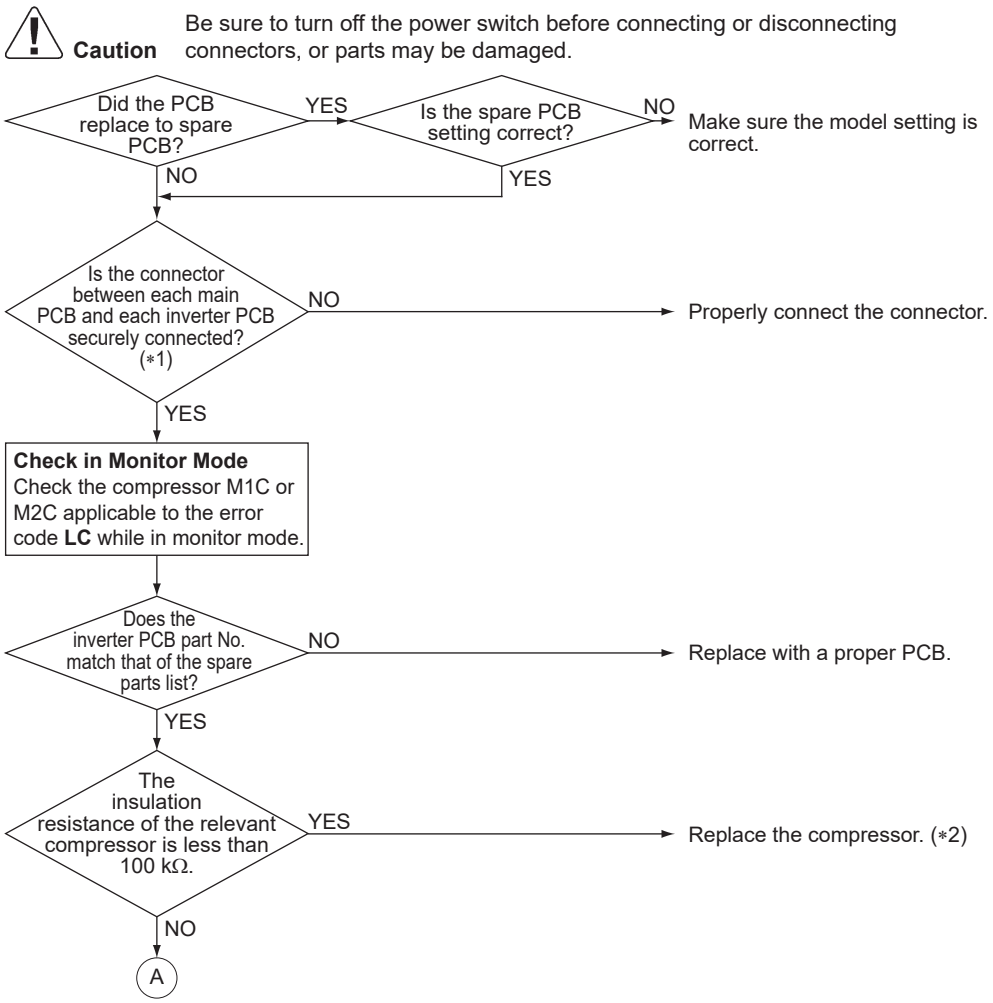
Error Code
LC

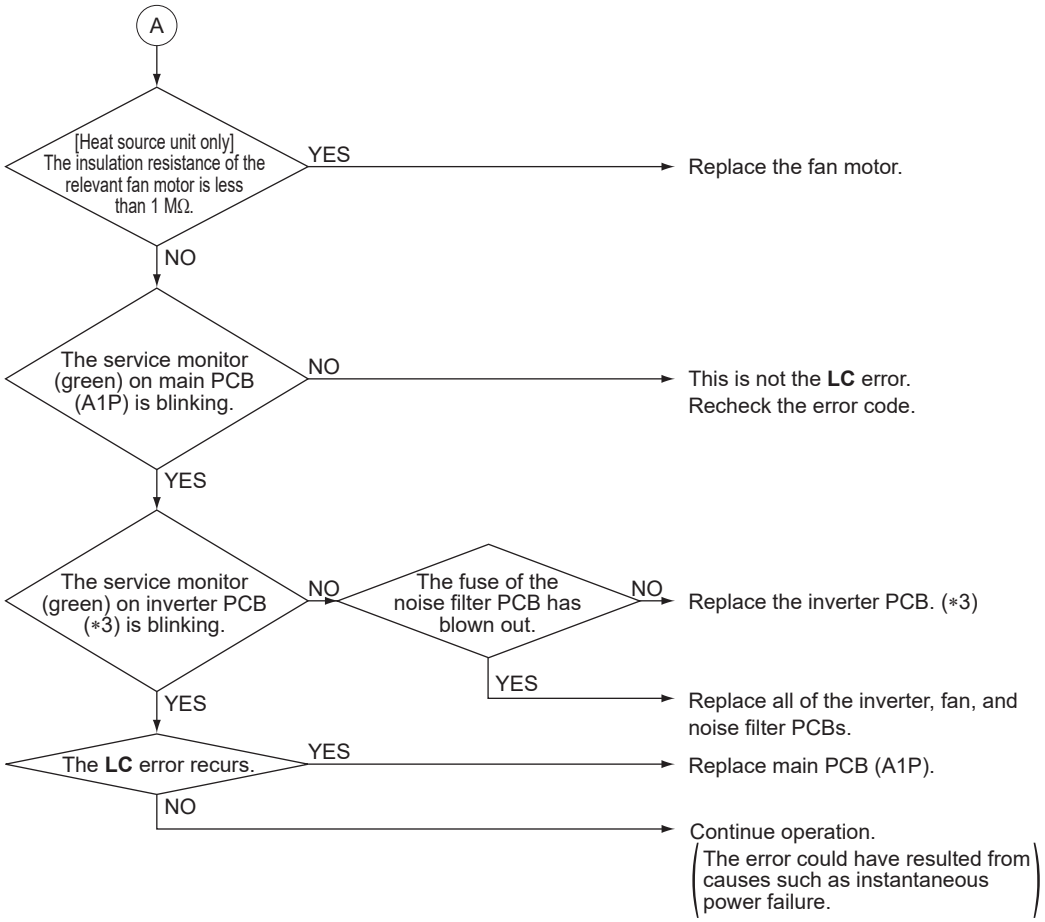
Method of Error Detection
Check for the transmission conditions between the inverter PCB and main PCB using a microcomputer.

Error Decision Conditions
When normal transmission is disabled for a given period of time or more.

Supposed Causes
- Defective connection between the inverter PCB and main PCB (A1P)
- Defective main PCB (A1P)(transmission block)
- Defective inverter PCB
- Defective noise filter PCB
- External factors (e.g. noise)
- Defective compressor
- Defective fan motor

Troubleshooting





Note(s)

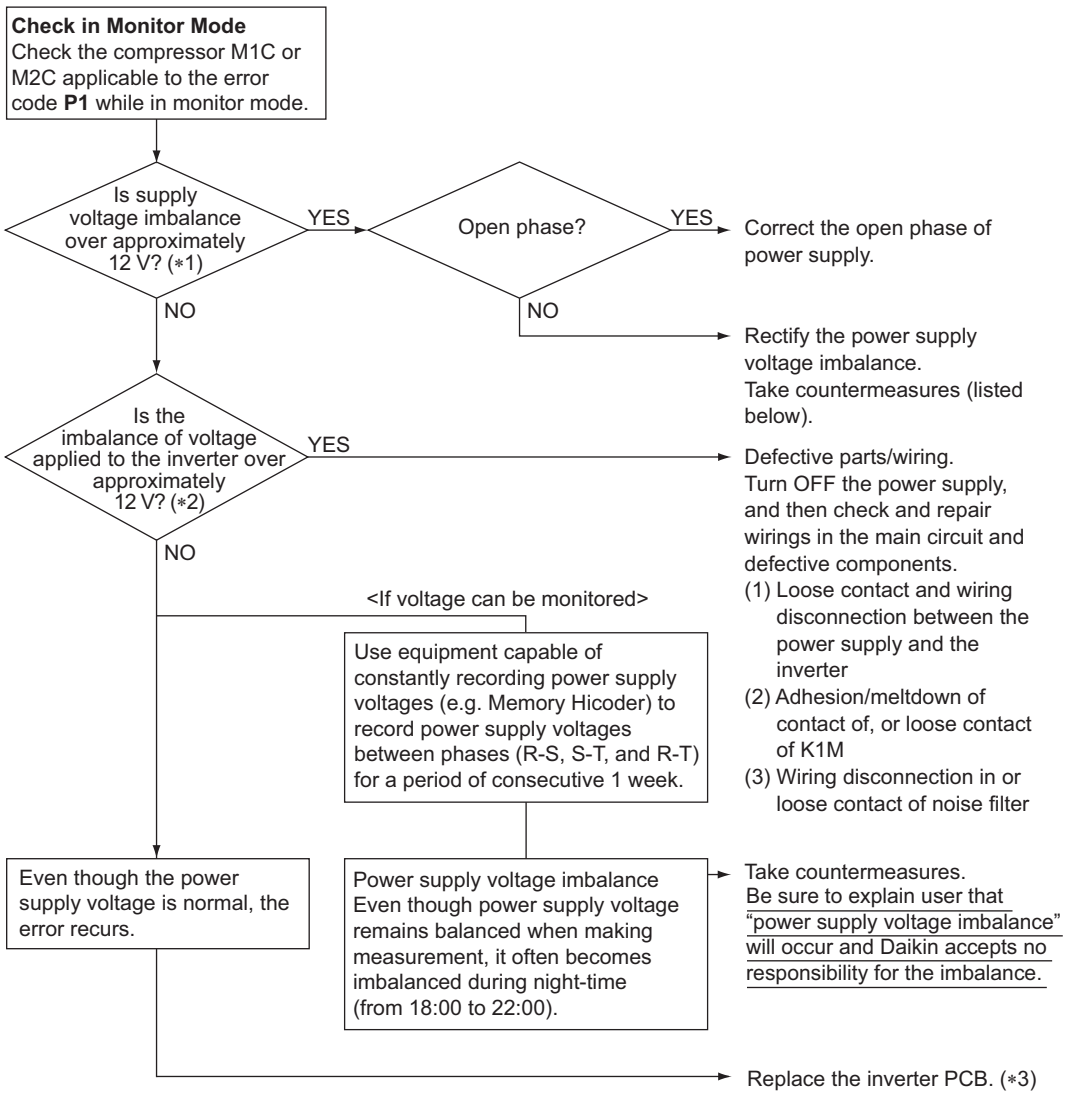
∗1. Connect and disconnect the connector once to ensure that it is securely connected.
∗2. M1C, M2C
∗3. RXHWQ120MQTJA: A3P, A6P
BWLP120TJU: A3P, A5P

5.31 Power Supply Voltage Imbalance

Applicable Models	RXHWQ120MQTJA BWLP120TJU
Error Code	**P1**
Method of Error Detection	Detect voltage imbalance through inverter PCB.
Error Decision Conditions	When power supply voltage imbalance exceeds approximately 12 V. Error is not decided while the unit operation is continued. **P1** will be displayed by pressing the inspection button.
Supposed Causes	■ Open phase ■ Interphase voltage imbalance ■ Defective capacitor in the main circuit ■ Defective inverter PCB ■ Defective K1M, K2M (inverter PCB) ■ Defective wiring in the main circuit

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Note(s)

∗1. Make measurement of voltage at the power supply terminal block (X1M).

∗2. Make measurement of voltage at the L1, L2 and L3 terminals of diode module located on the inverter PCB during the compressor is in operation.

∗3. RXHWQ120MQTJA: A3P, A6P
BWLP120TJU: A3P, A5P

5.32 Reactor Temperature Abnormality

Applicable Models

RXHWQ120MQTJA

Error Code

P3

Method of Error Detection

Detect according to the value detected with the reactor surface thermistor.

Error Decision Conditions

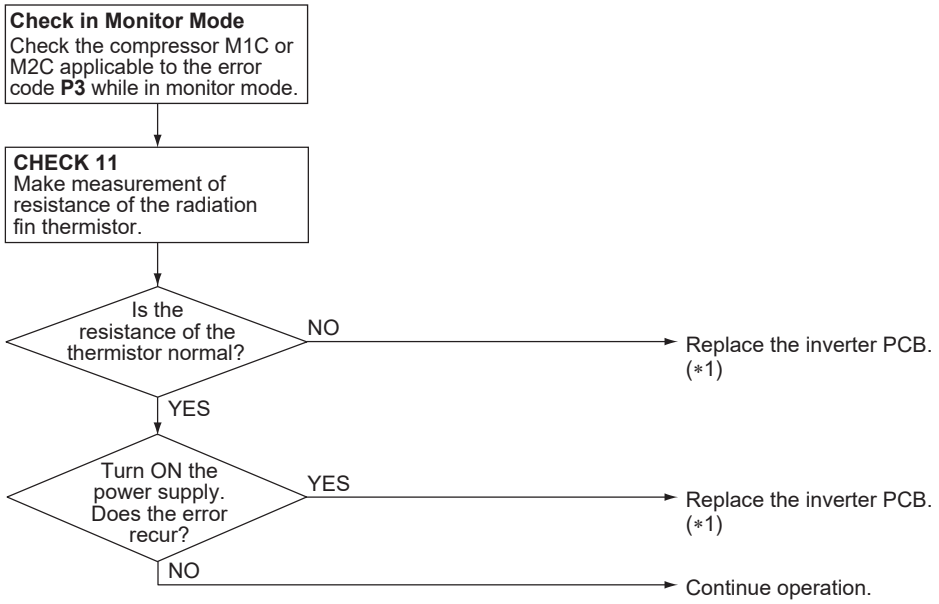
When the system is in operation and the thermistor causes wiring disconnection or short circuit in it.

Supposed Causes

- Defective connection of thermistor
- Defective reactor surface thermistor
- Defective inverter PCB

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Note(s) ∗1. RXHWQ120MQTJA: A3P, A6P

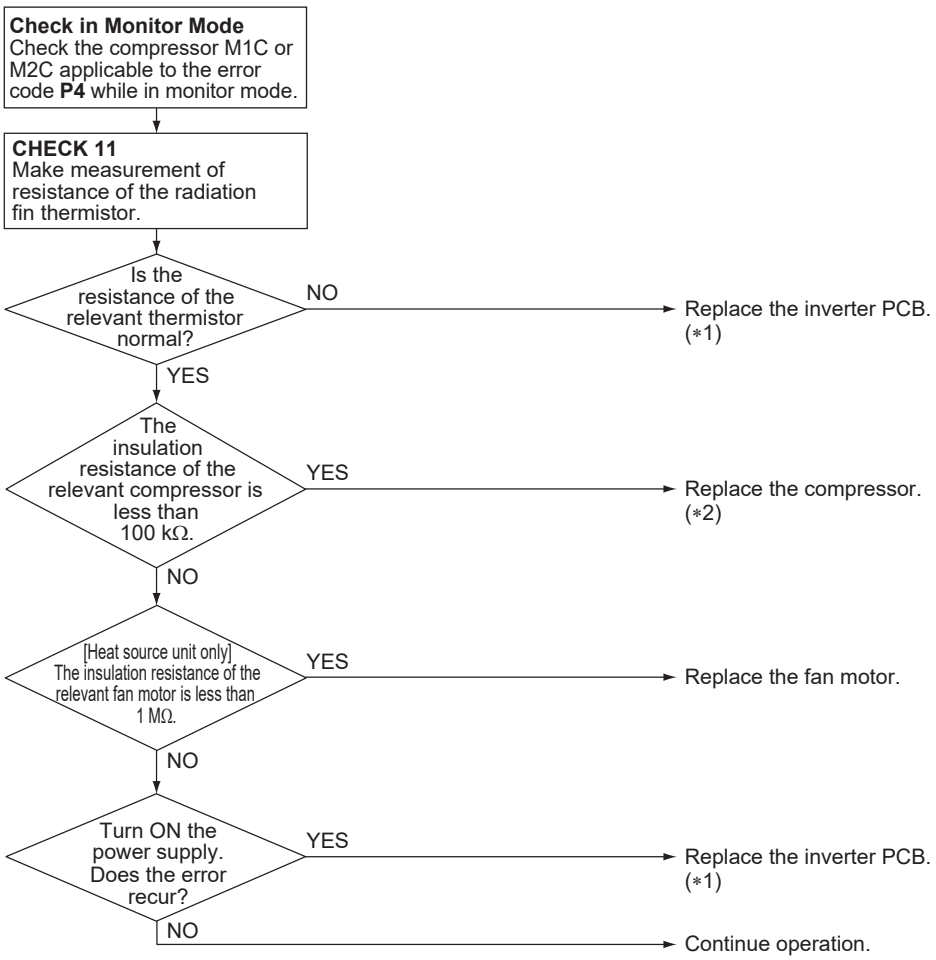
Reference **CHECK 11** Refer to page 155.

5.33 Inverter Radiation Fin Temperature Abnormality

Applicable Models	RXHWQ120MQTJA BWLP120TJU
Error Code	**P4**
Method of Error Detection	Detect the resistance of the following thermistors while the compressor is not running: (1) Radiation fin thermistor (2) Thermistor located in PCB circuit (3) Heat sink thermistor
Error Decision Conditions	When the resistance of the thermistor comes to a value equivalent to open or short circuit. Error is not decided and the unit operation is continued.
Supposed Causes	■ Defective radiation fin temperature thermistor ■ Defective inverter PCB ■ Defective compressor ■ Defective fan motor

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Note(s)

∗1. RXHWQ120MQTJA: A3P, A6P
BWLP120TJU: A3P, A5P

∗2. M1C, M2C

Reference **CHECK 11** Refer to page 155.

5.34 Field Setting after Replacing Main PCB Abnormality or Combination of PCB Abnormality

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
PJ

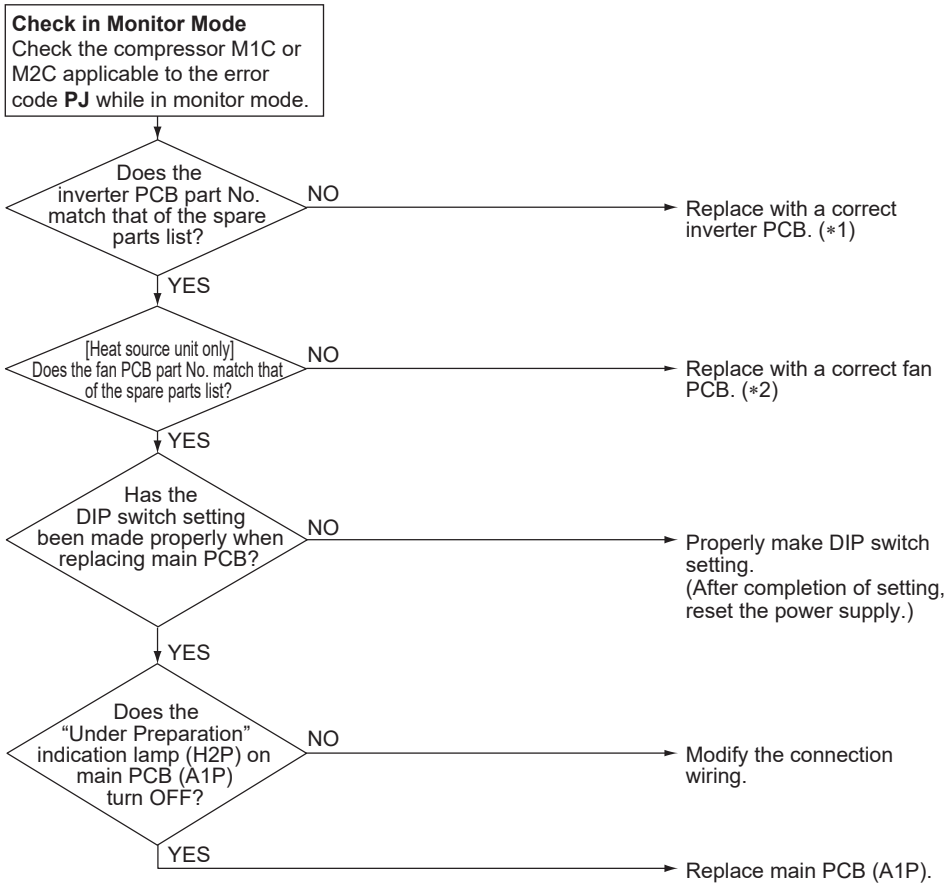
Method of Error Detection
This error is detected according to communications with the inverter PCB.

Error Decision Conditions
Make judgement according to communication data on whether or not the type of the inverter PCB is correct.

Supposed Causes
- Mismatching of type of PCB
- Improper (or no) field setting after replacing main PCB (A1P)

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Note(s)
∗1. RXHWQ120MQTJA: A3P, A6P
BWLP120TJU: A3P, A5P
∗2. RXHWQ120MQTJA: A4P, A7P

5.35 Refrigerant Shortage

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
U0

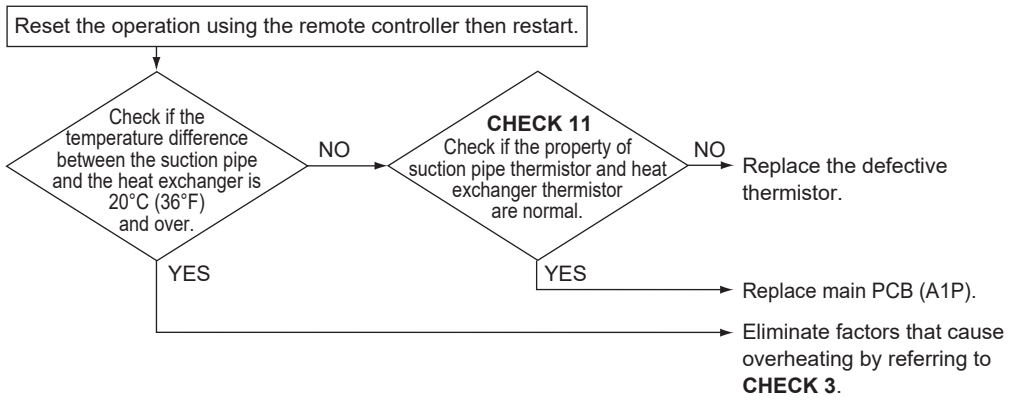
Method of Error Detection
Detect refrigerant shortage according to a low pressure level or a temperature difference between the heat exchanger and the suction pipe.

Error Decision Conditions
When the superheating degree of the suction gas exceeds 20°C (36°F).
SH = Ts1 - Te
Ts1: Temperature detected by the suction pipe thermistor
Te: Saturation temperature equivalent to low pressure
∗ Error is not determined. The unit continues the operation.

Supposed Causes
- Refrigerant shortage or refrigerant clogging (wrong piping)
- Defective thermistor
- Defective low pressure sensor
- Defective main PCB

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Reference **CHECK 3** Refer to page 147.

Reference **CHECK 11** Refer to page 155.

5.36 Reverse Phase, Open Phase

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
U1

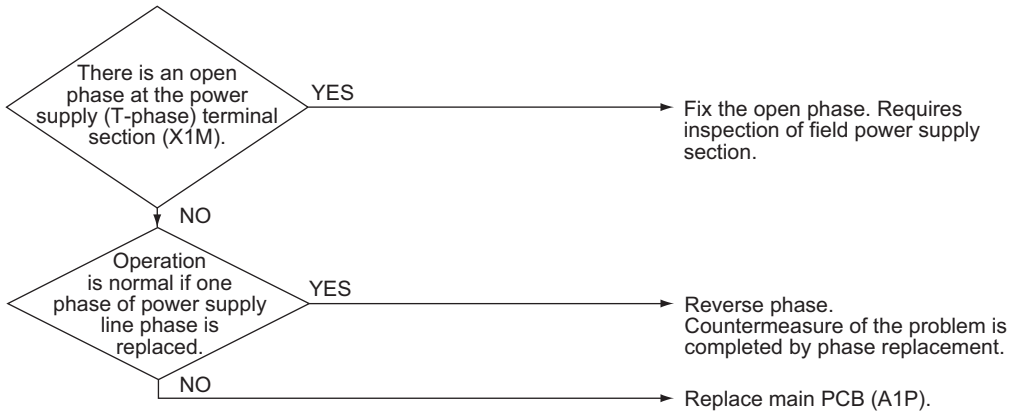
Method of Error Detection
The phase of each phase are detected by reverse phase detection circuit and right phase or reverse phase are judged.

Error Decision Conditions
When a power supply is reverse phase, or T-phase is open phase.

Supposed Causes
- Power supply reverse phase
- T-phase open phase
- Defective main PCB (A1P)

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



5.37 Power Supply Insufficient or Instantaneous Abnormality

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
U2

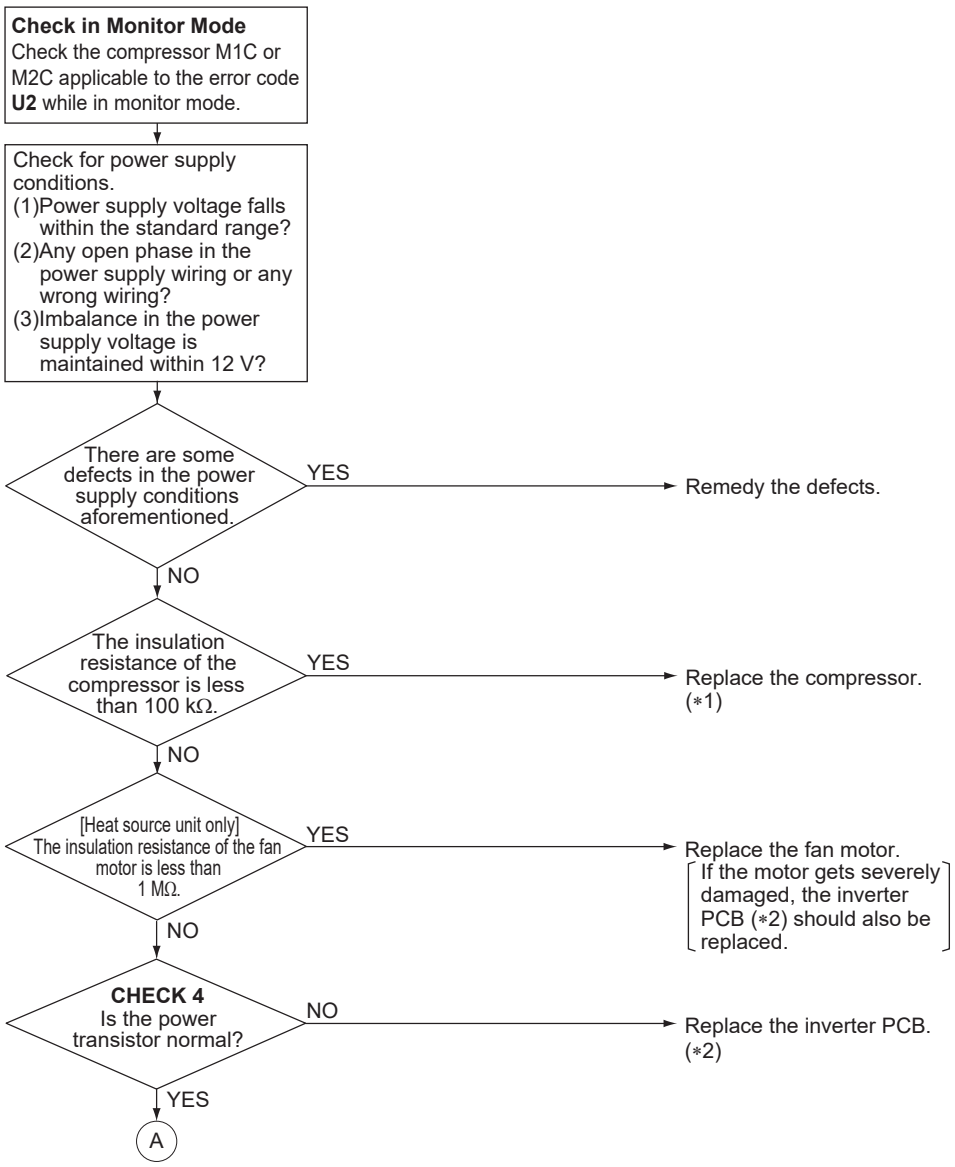
Method of Error Detection
Detect the voltage of capacitor of the main circuit in the inverter PCB.

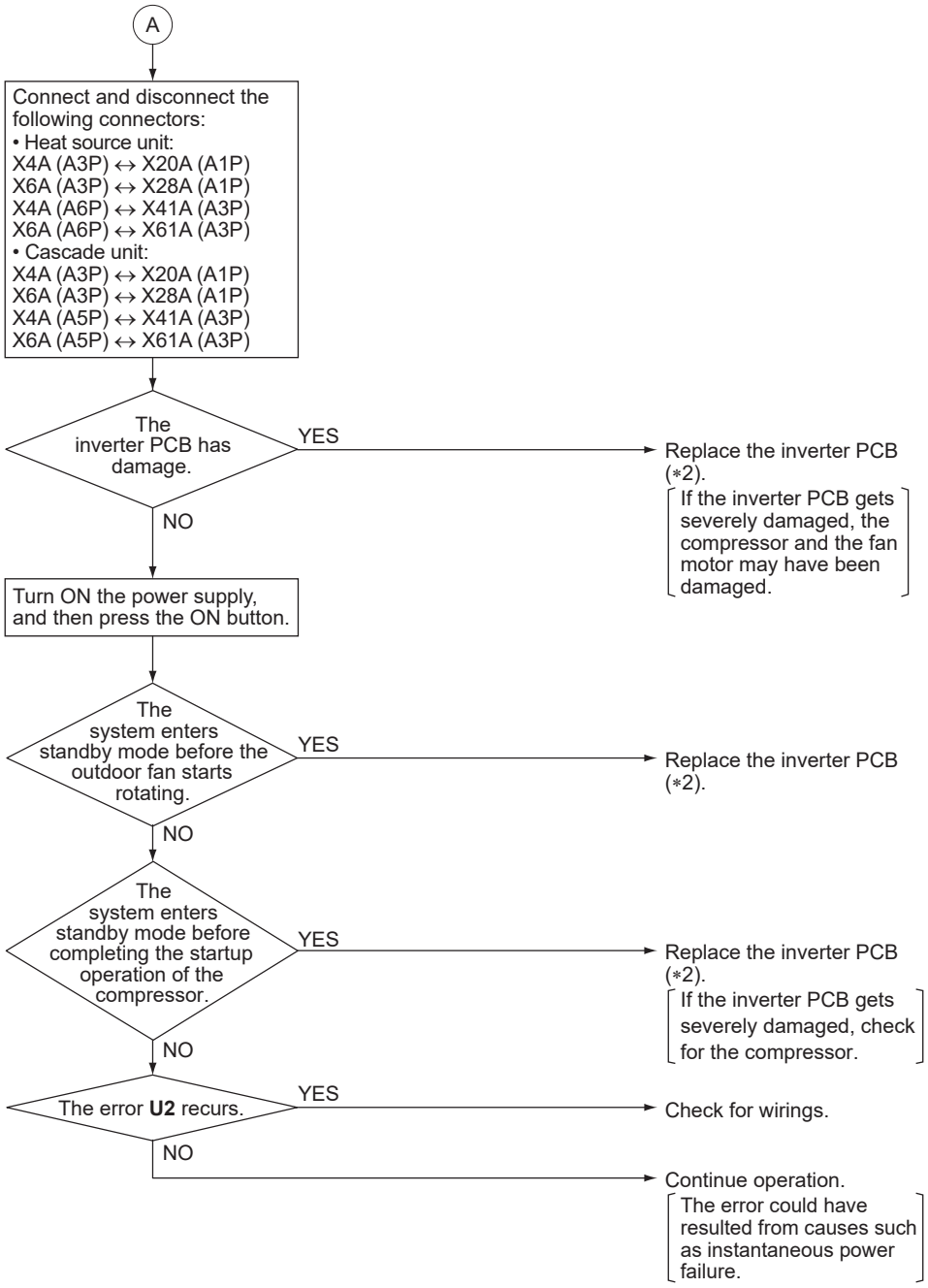
Error Decision Conditions
When the voltage in the DC circuit (between diode module and power module) falls below specified voltage.

Supposed Causes
- Abnormal power supply voltage
- Instantaneous power failure
- Open phase
- Defective inverter PCB
- Defective main PCB (A1P)
- Defective compressor
- Defective main circuit wiring
- Defective fan motor
- Defective connection of signal cable

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.





Note(s)

∗1. M1C, M2C
∗2. RXHWQ120MQTJA: A3P, A6P
BWLP120TJU: A3P, A5P

Reference

CHECK 4 Refer to page 148.

5.38 Test Operation Not Executed

Applicable Models
RXHWQ120MQTJA
BWLP120TJU

Error Code
U3

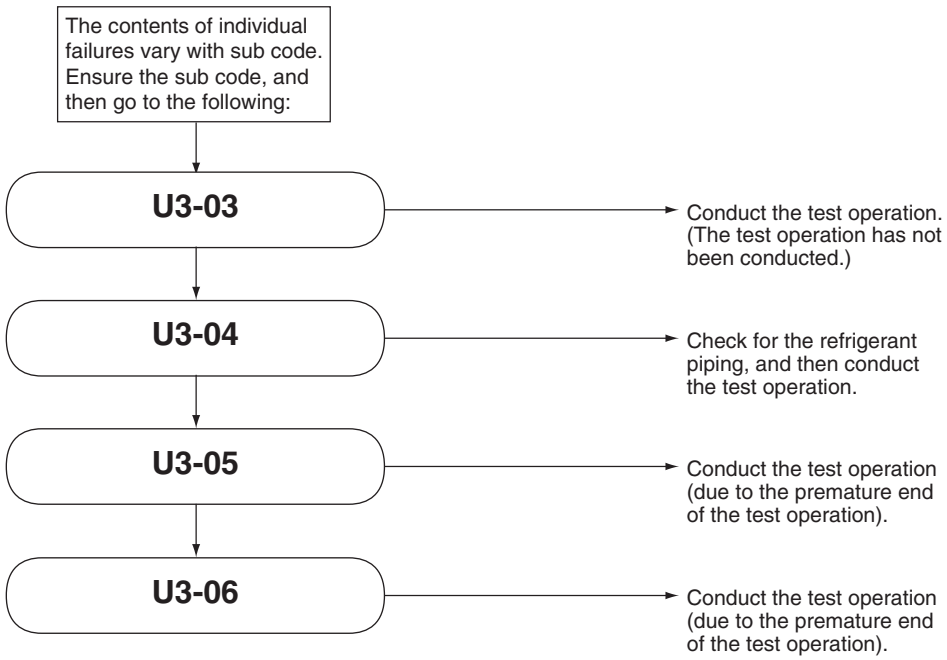
Method of Error Detection
The test operation has not been executed.

Error Decision Conditions
Error is decided when the unit starts operation without test operation.

Supposed Causes
Test operation not executed.

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



5.39 Transmission Error (Incorrect Wiring in Cascade Unit)

Applicable Models

BWLP120TJU

Error Code

U4

Method of Error Detection

Microcomputer checks if transmission between PCBs is normal.

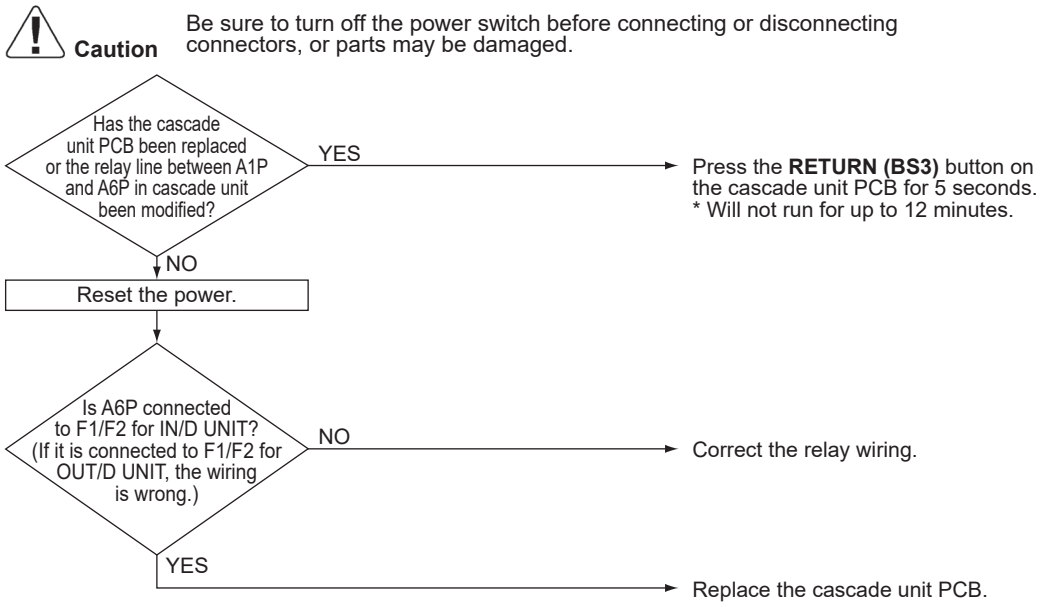
Error Decision Conditions

Transmission is not carried out normally for a certain amount of time.

Supposed Causes

Incorrect wiring in the cascade unit

Troubleshooting

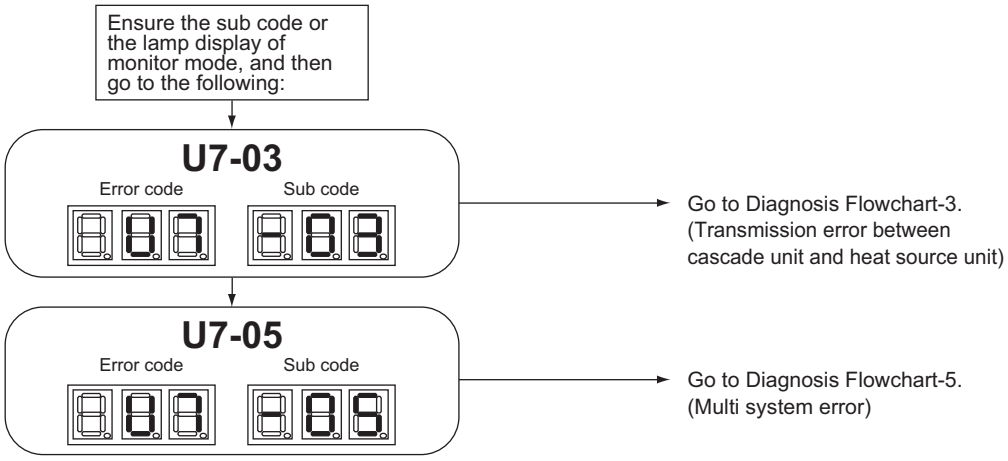


5.40 Transmission Error between Cascade Unit and Heat Source Unit

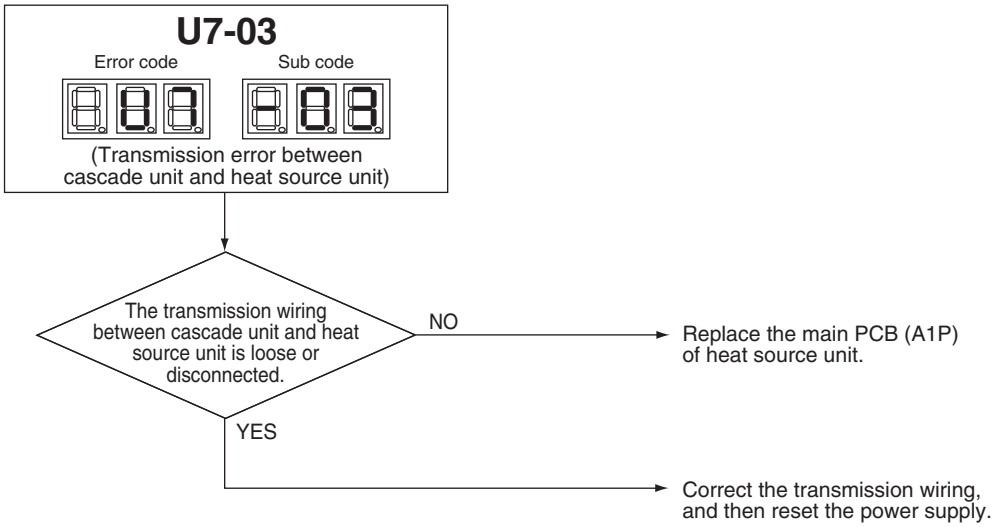
Applicable Models	RXHWQ120MQTJA BWLP120TJU
Error Code	**U7**
Method of Error Detection	Microcomputer checks if transmission between cascade unit and heat source unit is normal.
Error Decision Conditions	Transmission is not carried out normally for a certain amount of time
Supposed Causes	Connection error of transmission wirings between cascade unit and heat source unit

Troubleshooting

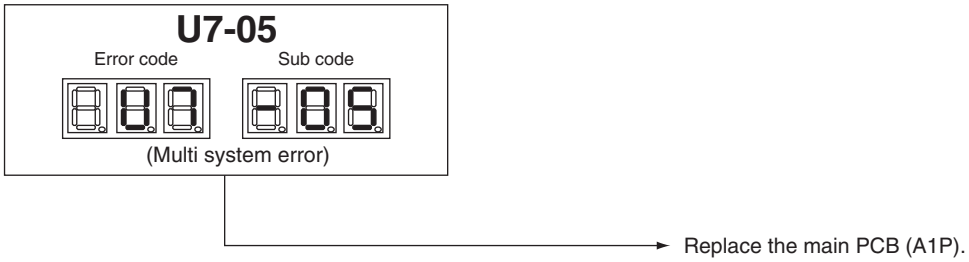
Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



Diagnosis Flowchart-3



Diagnosis Flowchart-5



5.41 Incorrect Controller Kit Setting

Applicable Models

BRP26B2VJU

Error Code

UA-44

Method of Error Detection

Detecting incorrect setting of the controller kit

Error Decision Conditions

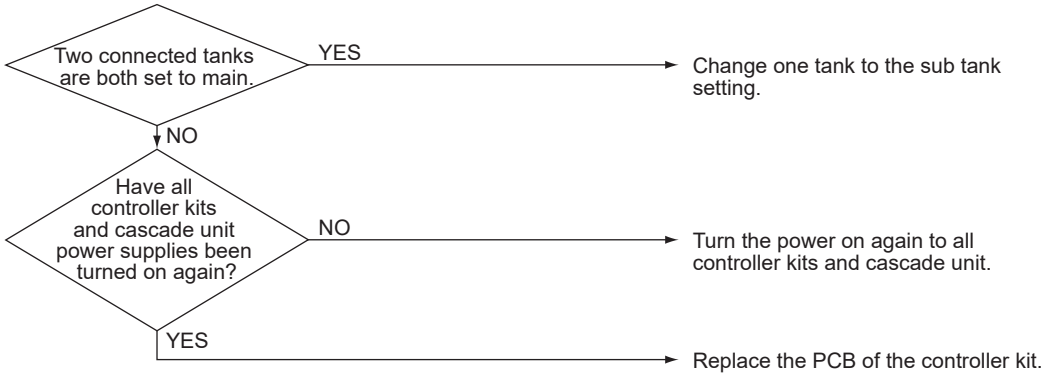
The centralized tank address is set correctly, but the two connected tanks are both set to main.

Supposed Causes

The main tank and sub tank settings are incorrect.

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



5.42 Address Duplication of Centralized Controller

Applicable Models
BWLP120TJU
BRP26B2VJU

Error Code
UC

Method of Error Detection
The principal unit detects the same address as that of its own on any other unit.

Error Decision Conditions
The error decision is made as soon as the abnormality aforementioned is detected.

Supposed Causes
- Address duplication of centralized controller
- Defective PCB

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.

The centralized address is duplicated. → Make setting change so that the centralized address will not be duplicated.

5.43 Transmission Error between Cascade Unit and Controller Kit

Applicable Models
BWLP120TJU
BRP26B2VJU

Error Code
UE-01

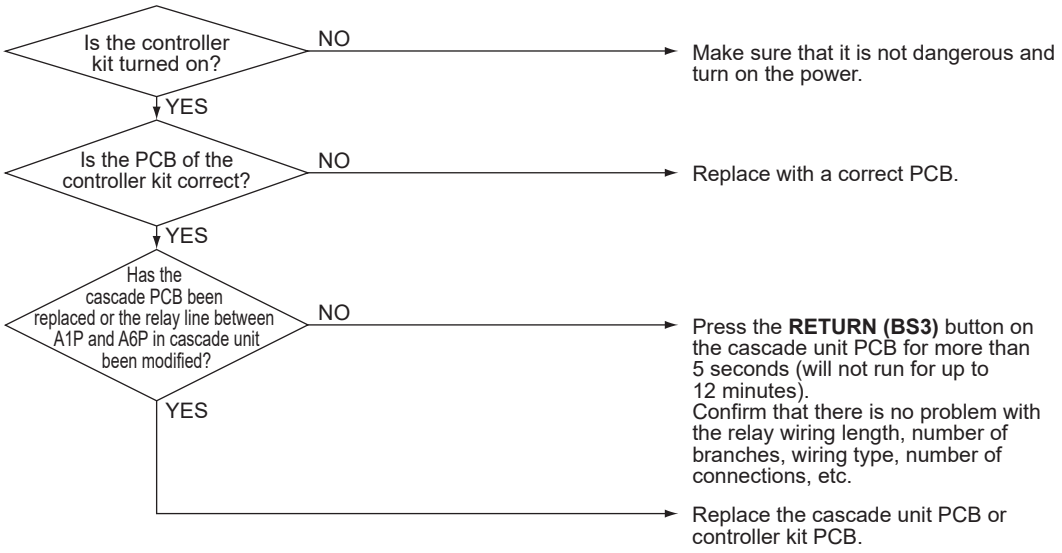
Method of Error Detection
When the cascade unit does not recognize the controller kit.

Error Decision Conditions
When the cascade unit stops recognizing the controller kit for a certain period of time.

Supposed Causes
- Transmission error between cascade unit and controller kit (incorrect wiring of DIII relay wiring)
- The PCB of the controller kit is set as cascade unit PCB.
- The controller kit is not turned on.

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



5.44 Transmission Error between Cascade Unit and Controller Kit Alarm

Applicable Models

BRP26B2VJU

Error Code

UE-03

Method of Error Detection

When the controller kit does not recognize the cascade unit.

Error Decision Conditions

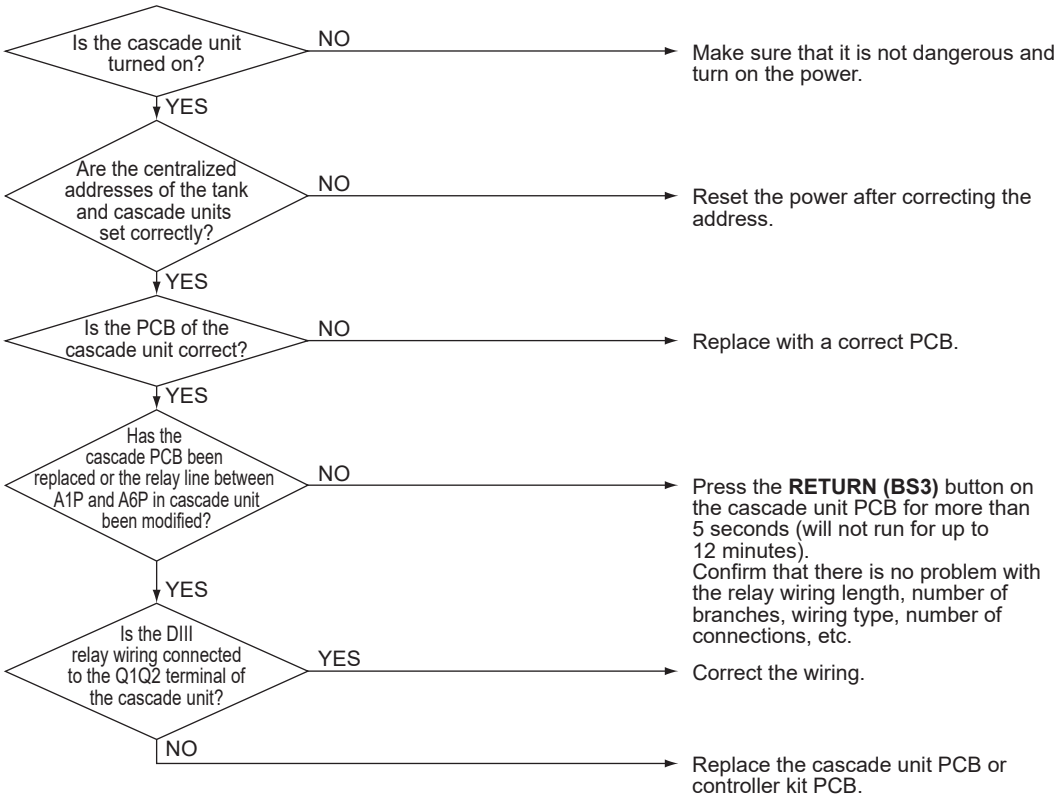
When the controller kit stops recognizing the cascade unit for a certain period of time.

Supposed Causes

- Transmission error between cascade unit and controller kit (incorrect wiring of DIII relay wiring)
- The PCB of the cascade unit is set as controller kit PCB.
- The cascade unit is not turned on.

Troubleshooting

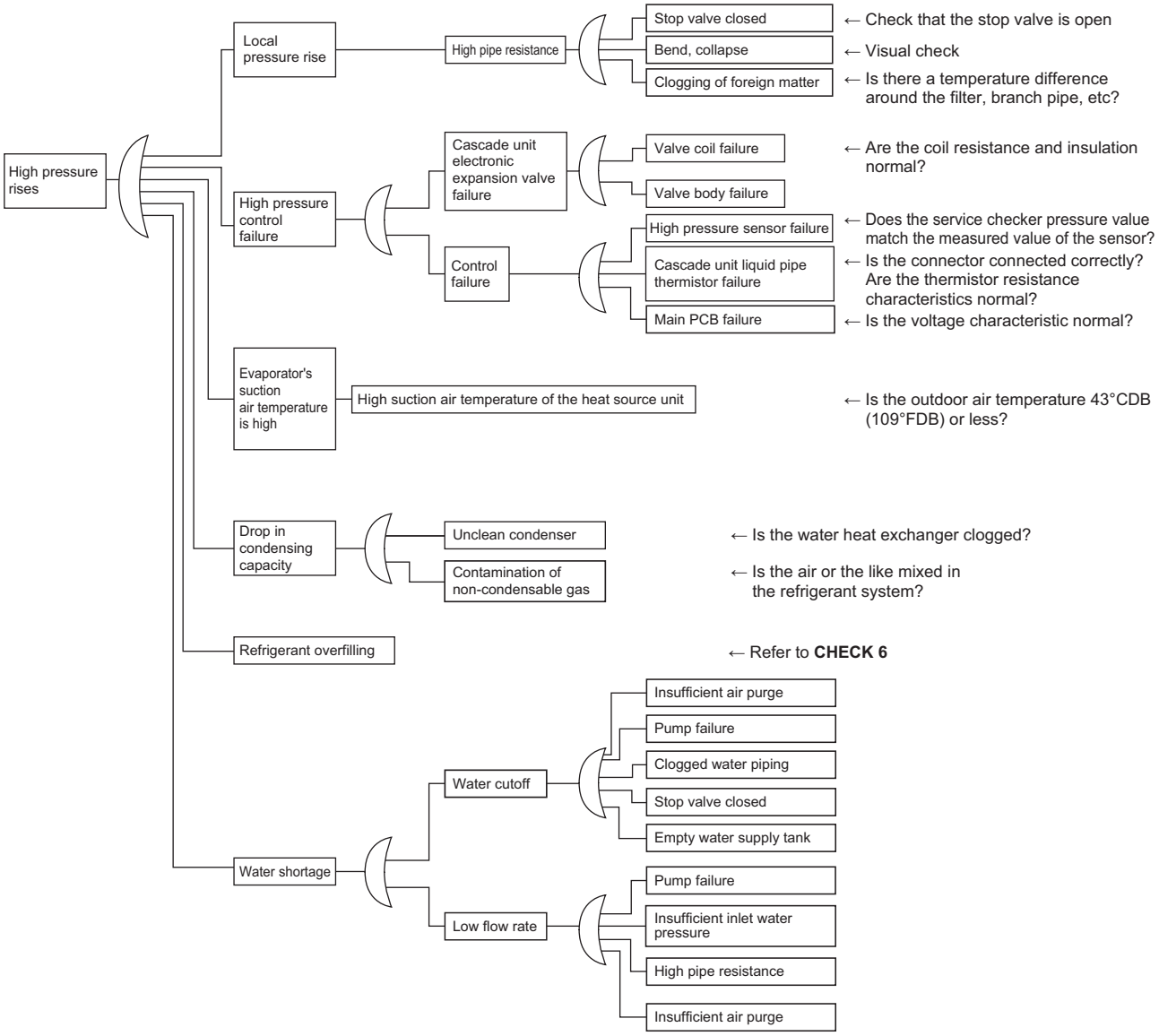
Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



6. Check

6.1 High Pressure Check

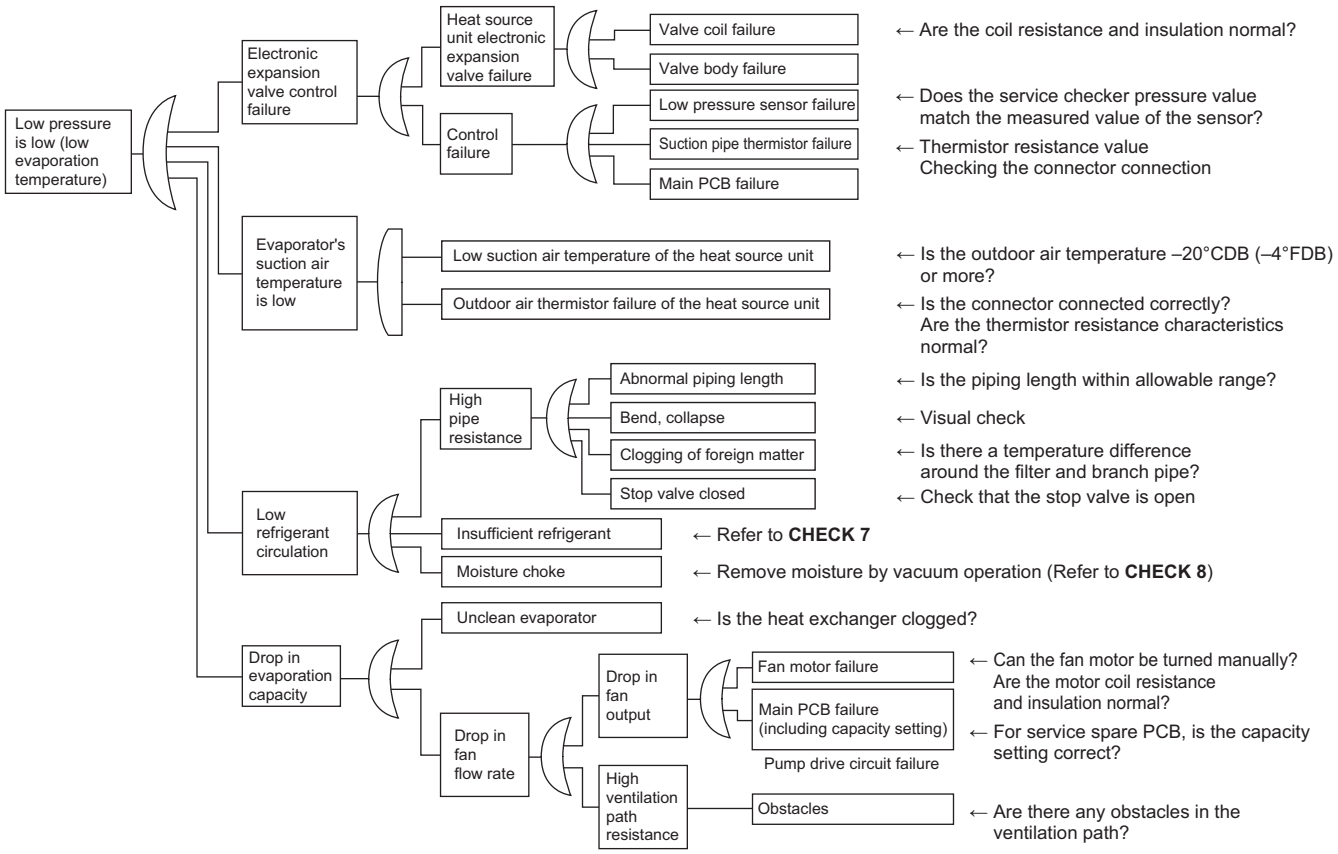
CHECK 1 Referring to the Fault Tree Analysis (FTA) shown below, probe the defective points.



Reference **CHECK 6** Refer to page 150.

6.2 Low Pressure Check

CHECK 2 Referring to the Fault Tree Analysis (FTA) shown below, probe the defective points

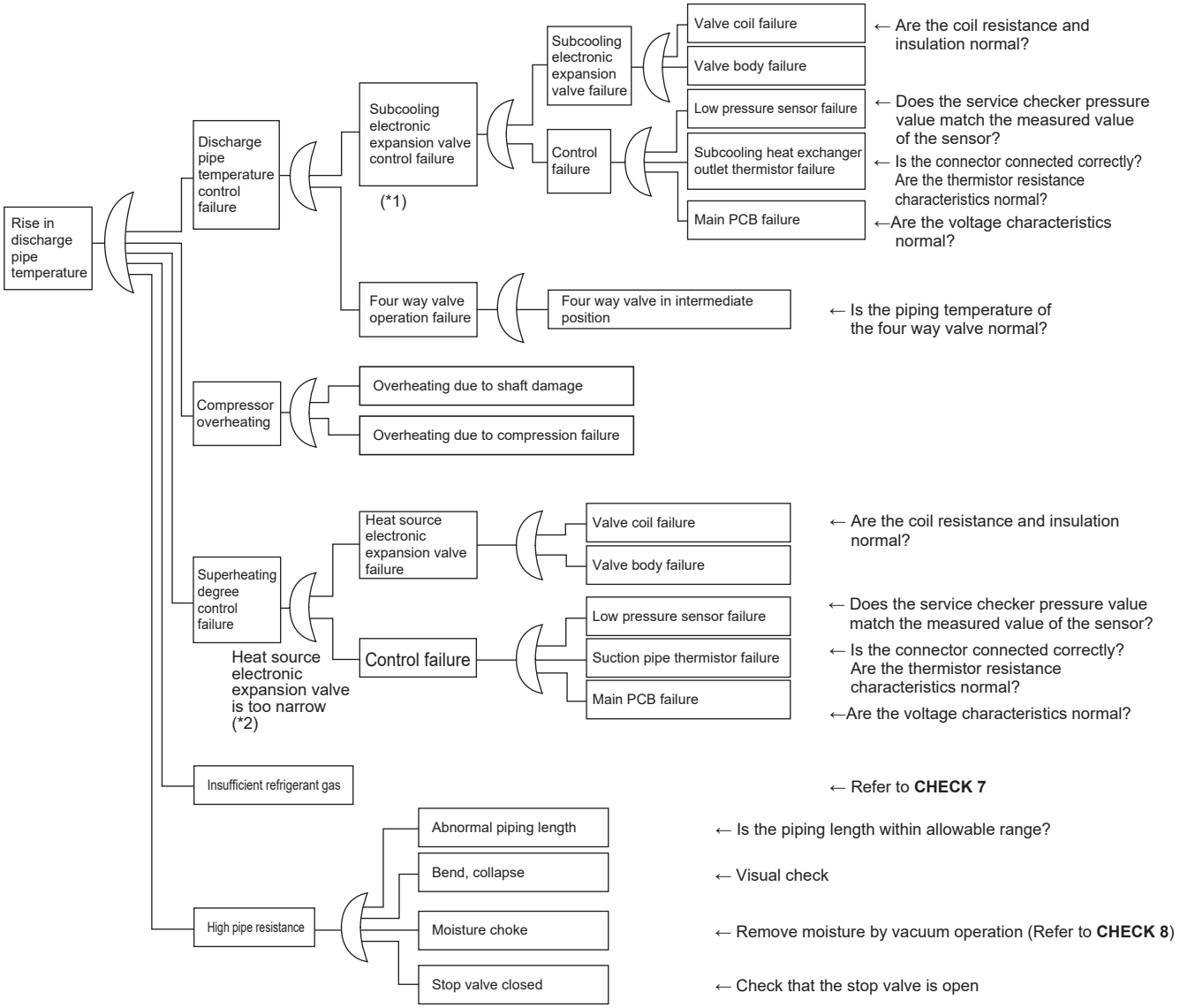


Reference **CHECK 7** Refer to page 151.

Reference **CHECK 8** Refer to page 152.

6.3 Overheating Check

CHECK 3 Identify the defective points referring to the failure factor analysis (FTA) as follows.



*1: For the subcooling electronic expansion valve control, refer to **Electronic Expansion Valve Control**.
*2: Superheating degree control is performed by a heat source unit electronic expansion valve (EVM).
*3: Guideline of superheating degree to judge as overheating:
(1) Superheating degree of suction gas: 10°C (18°F) or more
(2) Superheating degree of discharge gas: 45°C (81°F) or more
Excludes immediately after start-up and during dropping control.
(The above values are only for reference. Even in the above range, it may be normal depending on other conditions)

Reference **CHECK 7** Refer to page 151.

Reference **CHECK 8** Refer to page 152.

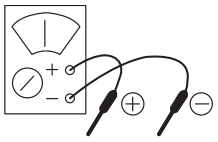
6.4 Power Transistor Check

CHECK 4

Perform the following procedures prior to check.
(1) Power OFF.
(2) Remove all the wiring connected to the PCB where power transistors are mounted on.

Preparation

- Multimeter



* Prepare the analog type of multimeter.
  For the digital type of multimeter, those with diode check function are available for the checking.

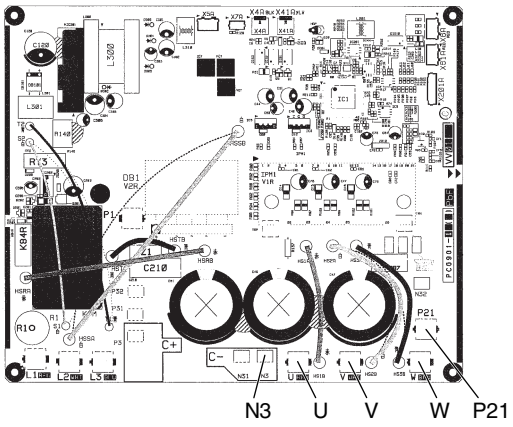
Point of Measurement and Judgment Criteria

Turn OFF the power supply. Then, after a lapse of 10 minutes or more, make measurement of resistance.

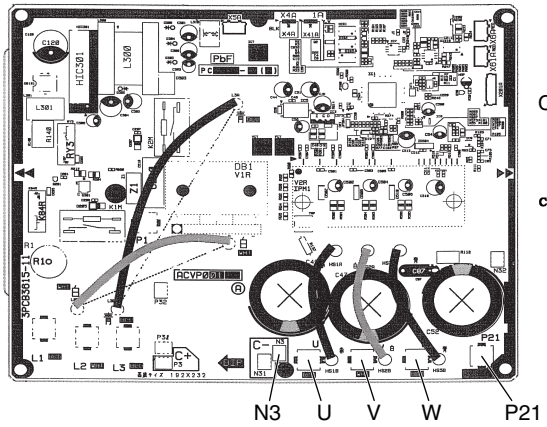
No.	Measuring point		When using the analog type of multimeter, make measurement in resistance measurement mode in the x1 kΩ range.		When using the digital type of multimeter, make measurement in diode check mode (→|—).	
	+	−	Judgement Criteria	Remarks	Judgement Criteria	Remarks
1	P21	U	2 ~ 15 kΩ	—	1.2 V or more	Due to capacitor charge and so on, resistance measurement may require some time.
2	P21	V				
3	P21	W				
4	U	P21	15 kΩ and more (including ∞)	Due to capacitor charge and so on, resistance measurement may require some time.	0.3 ~ 0.7 V	—
5	V	P21				
6	W	P21				
7	N3	U				
8	N3	V				
9	N3	W				
10	U	N3	2 ~ 15 kΩ	—	1.2 V or more	Due to capacitor charge and so on, resistance measurement may require some time.
11	V	N3				
12	W	N3				

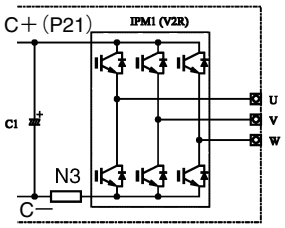
PCB and Circuit Diagram

Heat source unit (A3P)



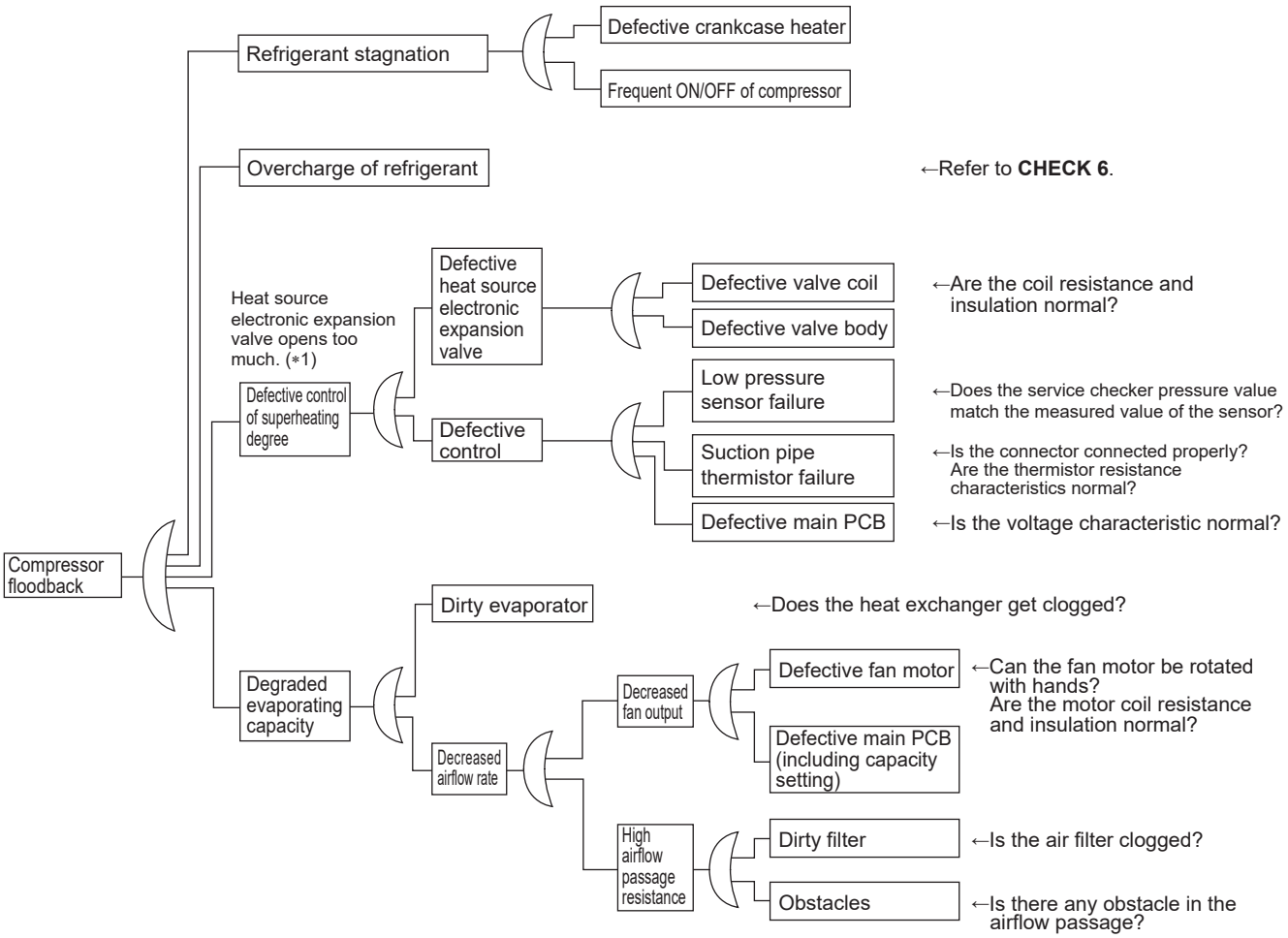
Cascade unit (A3P, A5P), Heat source unit (A6P)





6.5 Compressor Floodback Check

CHECK 5 Referring to the Fault Tree Analysis (FTA) shown below, probe the defective points.



Note(s)

∗1: Superheating degree control is conducted by heat source electronic expansion valve (EVM).
2: Guideline of superheating degree to judge as compressor floodback:
(1) Suction gas superheating degree: Less than 3°C (5.4°F);
(2) Discharge gas superheating degree: Less than 15°C (27°F),
except immediately after compressor starts up or is running under dropping control.
(Use the above values as a guide. Depending on the other conditions, the unit may be normal despite the values within the above range.)

Reference **CHECK 6** Refer to page 150.

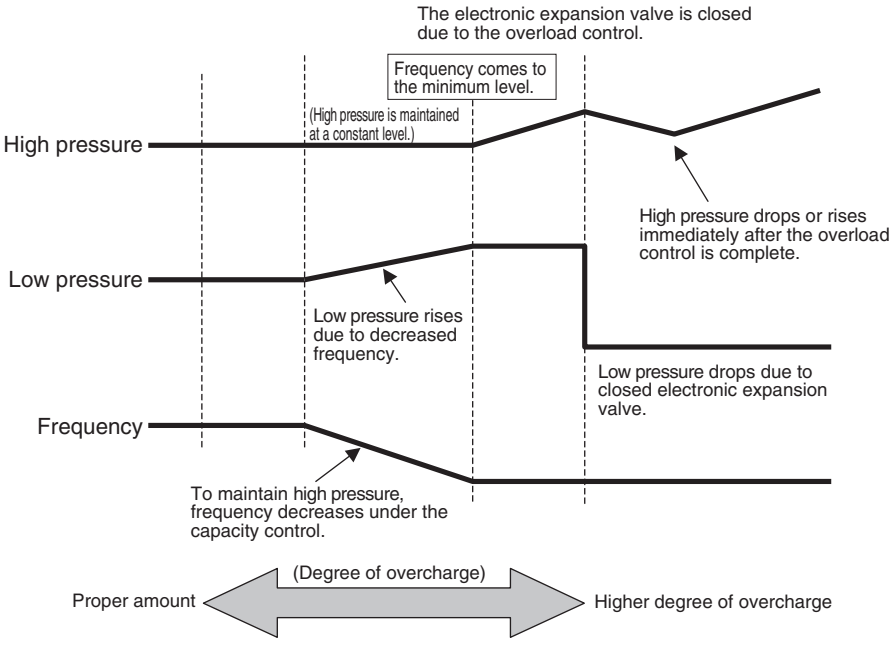
6.6 Refrigerant Overcharge Check

CHECK 6

In this system, the only way to judge as the overcharge of refrigerant is with operating conditions due to the relationship to pressure control and electronic expansion valve control. As information for making a judgment, refer to the information below.

Diagnosis of refrigerant overcharge

1. High pressure rises. Consequently, overload control is conducted to cause insufficient performance.
2. The superheating degree of suction gas lowers (or compressor floodback occurs). Consequently, the discharge pipe temperature becomes lower despite of pressure loads.
3. The subcooling degree of condensate rises.



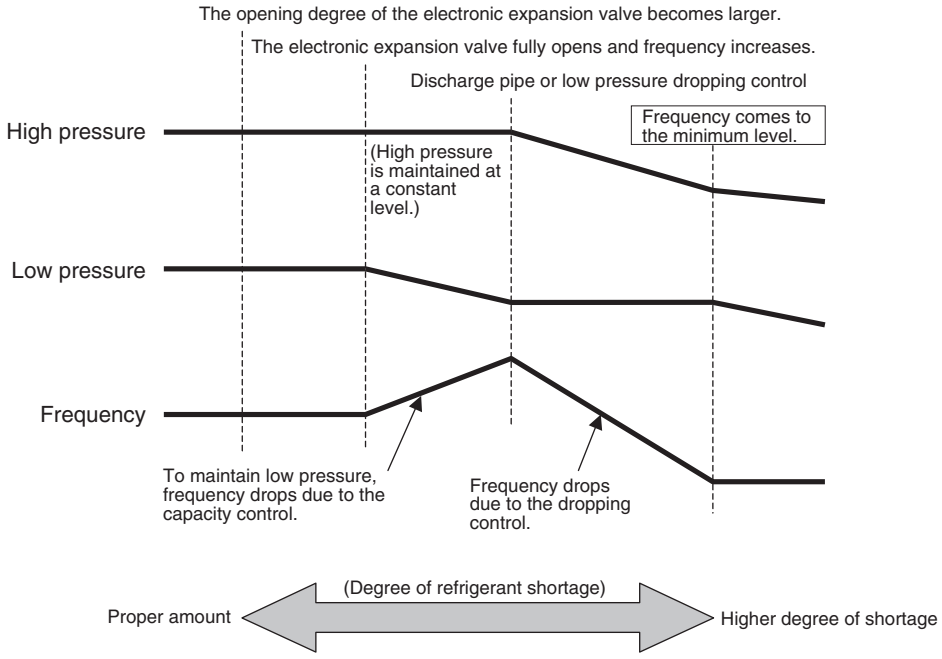
6.7 Refrigerant Shortage Check

CHECK 7

In this system, the only way to judge as the shortage of refrigerant is with operating conditions due to the relationship to pressure control and electronic expansion valve control.
As information for making a judgement, refer to the information below.

Diagnosis of shortage of refrigerant

1. The superheating degree of suction gas rises. Consequently, the compressor discharge gas temperature becomes higher.
2. The superheating degree of suction gas rises. Consequently, the electronic expansion valve turns open.
3. Low pressure drops to cause the unit not to demonstrate capacity.



6.8 Vacuuming and Dehydration Procedure

CHECK 8

Conduct vacuuming and dehydration in the piping system following the procedure for Normal vacuuming and dehydration described below.
Furthermore, if moisture may get mixed in the piping system, follow the procedure for Special vacuuming and dehydration described below.

Normal vacuuming and dehydration

1. Vacuuming and dehydration
   - Use a vacuum pump that enables vacuuming up to 500 microns.
   - Connect manifold gauges to the service ports of liquid pipe and gas pipe and run the vacuum pump for a period of 2 or more hours to conduct evacuation to 500 microns.
   - If the degree of vacuum does not reach 500 microns or less even though evacuation is conducted for a period of 2 hours, moisture will have entered the system or refrigerant leakage will have been caused. In this case, conduct evacuation for a period of another 1 hour.
   - If the degree of vacuum does not reach 500 microns or less even though evacuation is conducted for a period of 3 hours, conduct the leak tests.
2. Leaving in vacuum state
   - Leave the compressor at the degree of vacuum of 500 microns or less for a period of 1 hour or more, and then check to be sure that the vacuum gauge reading does not rise. (If the reading rises, moisture may have remained in the system or refrigerant leakage may have been caused.)
3. Additional refrigerant charge
   - Purge air from the manifold gauge connection hoses, and then charge a necessary amount of refrigerant.

Special vacuuming and dehydration

Use this procedure if moisture may get into the piping, such as construction during the rainy season (dew condensation may occur, or rainwater may enter the piping during construction work).

1. Vacuuming and dehydration
   - Follow the same procedure as that for normal vacuuming and dehydration described above.
2. Vacuum break
   - Pressurize with nitrogen gas up to 375,000 microns.
3. Vacuuming and dehydration
   - Conduct vacuuming and dehydration for a period of 1 hour or more. If the degree of vacuum does not reach 500 microns or less even though evacuation is conducted for a period of 2 hours or more, repeat vacuum break - vacuuming and dehydration.
4. Leaving in vacuum state
   - Leave the compressor at the degree of vacuum of 500 microns or less for a period of 1 hour or more, and then check to be sure that the vacuum gauge reading does not rise.
5. Additional refrigerant charge
   - Purge air from the manifold gauge connection hoses, and then charge a necessary amount of refrigerant.

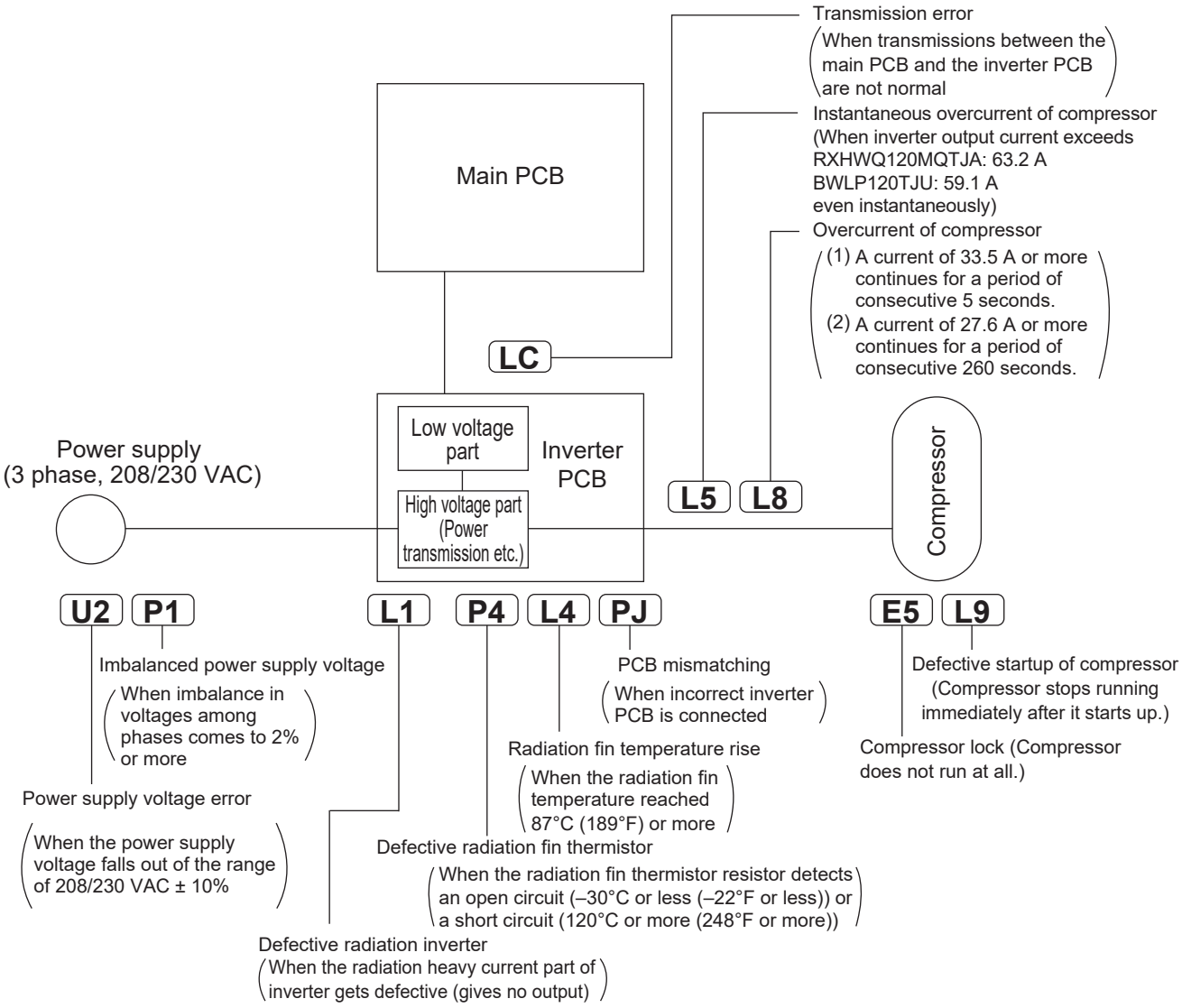
6.9 Inverter-Related Error Codes

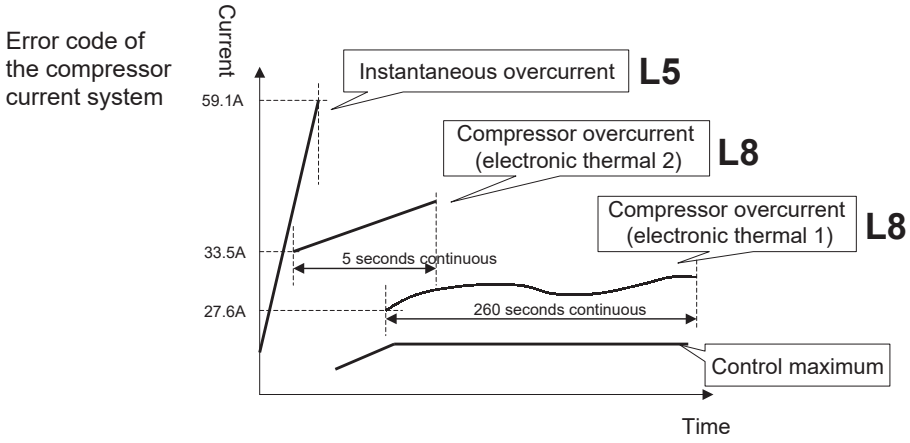
CHECK 9

	Code	Name	Condition for determining error	Major cause
Compressor current	**L5**	Instantaneous overcurrent of compressor	• Inverter output current exceeds RXHWQ120MQTJA: 63.2 A BWLP120TJU: 59.1 A even instantaneously.	• Liquid sealing • Defective compressor • Defective inverter PCB
	L8	Overcurrent of compressor (Electronic overload protection sensor)	• Compressor overload running A current of 33.5 A or more continues for a period of consecutive 5 seconds or that of 27.6 A or more continues for a period of consecutive 260 seconds. • The inverter loses synchronization.	• Back-flow of compressor liquid • Sudden changes in loads • Disconnected compressor wiring • Defective inverter PCB
Protection device and others	**E5**	Compressor lock	• The compressor is in the locked status (does not rotate).	• Defective compressor
	L1	Defective inverter PCB	• No output is given.	• Defective heavy current part of compressor
	L4	Radiation fin temperature rise	• The radiation fin temperature reaches 87°C (189°F) or more (while in operation).	• Defective fan • Running in overload for an extended period of time • Defective inverter PCB
	L9	Defective startup of compressor	• The compressor motor fails to start up.	• Liquid sealing or defective compressor • Excessive oil or refrigerant • Defective inverter PCB
	LC	Transmission error (between microcomputers on main PCB)	• No communications are carried out across main PCB - inverter PCB - fan PCB.	• Broken wire in communication line • Defective main PCB • Defective inverter PCB • Defective fan PCB
	P1	Imbalanced power supply	• Power supply voltages get significantly imbalanced among three phases.	• Power supply error (imbalanced voltages of 2% or more) • Defective inverter PCB • Dead inverter PCB
	P4	Defective radiation fin thermistor	• The radiation fin thermistor gets short circuited or open.	• Defective radiation fin thermistor
	PJ	PCB mismatching	• Any PCB of specification different from that of the product is connected.	• PCB of different specification mounted
	U2	Power supply voltage error	• The inverter power supply voltage is high or low.	• Power supply error • Defective inverter PCB

6.10 Concept of Inverter-Related Error Codes

CHECK 10





6.11 Thermistor Check

CHECK 11

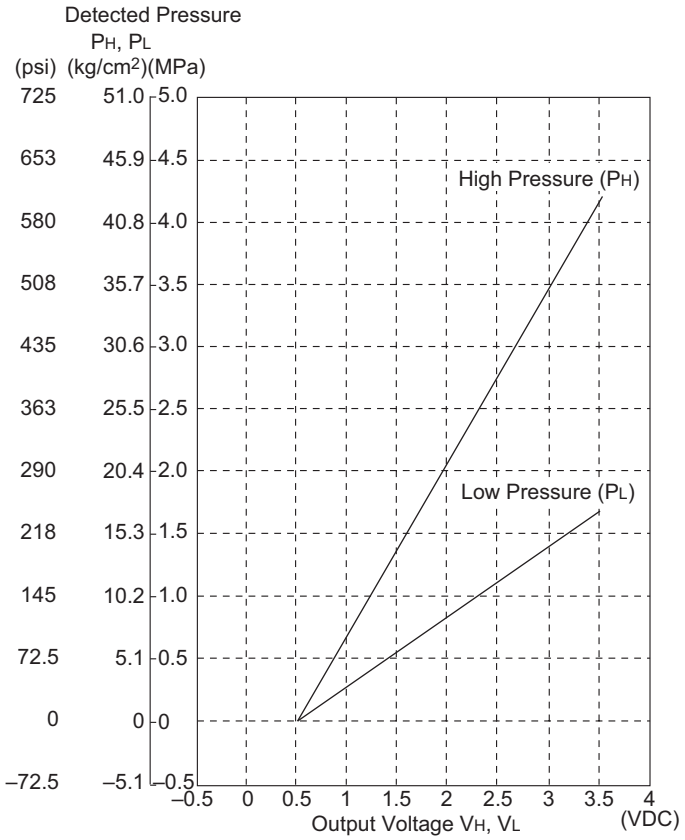
Model	Thermistor		Type
Heat source unit RXHWQ120MQTJA	R1T	Outdoor air (A1P)	A
	R1T	Radiation fin (A3P)	B
	R21T	M1C discharge pipe	C
	R22T	M2C discharge pipe	C
	R3T	Accumulator inlet	A
	R4T	Heat exchanger liquid pipe	A
	R5T	Subcooling heat exchanger liquid pipe	A
	R6T	Subcooling heat exchanger gas pipe	A
	R7T	Heat exchanger deicer	A
Cascade unit BWLP120TJU	R1T	Inverter fin (A3P)	B
	R21T	M1C discharge pipe	C
	R22T	M2C discharge pipe	C
	R3T	Heat exchanger liquid pipe (R-410A)	A
	R4T	Heat exchanger liquid pipe (R-134a)	A
	R5T	Water inlet	A
	R6T	Water outlet	A
	R14T	M1C compressor overheating protection	C
	R16T	M2C compressor overheating protection	C
Controller kit BRP26B2VJU	R1T	Water temperature sensor 1: lower	D
	R2T	Water temperature sensor 2: middle	D
	R3T	Water temperature sensor 3: upper	D

Thermistor temperature		Resistance (kΩ)			
(°C)	(°F)	Type A	Type B	Type C	Type D
−10.0	14.0	112.0	111.4	1403.8	111.8
−8.0	17.6	100.4	99.4	1253.0	100.7
−6.0	21.2	90.2	88.8	1120.0	90.4
−4.0	24.8	81.1	79.6	1002.5	81.2
−2.0	28.4	73.0	71.4	898.6	73.1
0.0	32.0	65.8	64.1	806.5	65.8
2.0	35.6	59.4	57.7	724.8	59.3
4.0	39.2	53.7	52.0	652.2	53.4
6.0	42.8	48.6	46.9	587.6	48.8
8.0	46.4	44.0	42.4	530.1	44.3
10.0	50.0	40.0	38.4	478.8	40.0
12.0	53.6	36.3	34.8	432.9	36.6
14.0	57.2	33.0	31.6	392.0	33.3
16.0	60.8	30.1	28.7	355.3	30.4
18.0	64.4	27.4	26.1	322.4	27.7
20.0	68.0	25.0	23.8	292.9	25.1
22.0	71.6	22.9	21.7	266.3	23.0
24.0	75.2	20.9	19.8	242.5	21.0
26.0	78.8	19.1	18.1	221.0	19.2
28.0	82.4	17.5	16.6	201.6	17.6
30.0	86.0	16.1	15.2	184.1	16.2
32.0	89.6	14.8	14.0	168.3	14.7
34.0	93.2	13.6	12.8	154.0	13.5
36.0	96.8	12.5	11.8	141.1	12.6
38.0	100.4	11.5	10.9	129.3	11.7
40.0	104.0	10.6	10.0	118.7	10.7
42.0	107.6	9.8	9.2	109.0	9.9
44.0	111.2	9.1	8.5	100.2	9.2

Thermistor temperature		Resistance (kΩ)			
(°C)	(°F)	Type A	Type B	Type C	Type D
46.0	114.8	8.4	7.9	92.2	8.5
48.0	118.4	7.7	7.3	84.9	7.8
50.0	122.0	7.2	6.8	78.3	7.2
52.0	125.6	6.7	6.3	72.2	6.7
54.0	129.2	6.2	5.8	66.7	6.2
56.0	132.8	5.7	5.4	61.6	5.8
58.0	136.4	5.3	5.0	57.0	5.4
60.0	140.0	5.0	4.7	52.8	5.0
62.0	143.6	4.6	4.4	48.9	4.7
64.0	147.2	4.3	4.1	45.3	4.4
66.0	150.8	4.0	3.8	42.0	4.1
68.0	154.4	3.7	3.5	39.0	3.8
70.0	158.0	3.5	3.3	36.3	3.5
72.0	161.6	3.3	3.1	33.7	3.3
74.0	165.2	3.1	2.9	31.4	3.1
76.0	168.8	2.9	2.7	29.2	2.9
78.0	172.4	2.7	2.5	27.2	2.7
80.0	176.0	2.5	2.4	25.4	2.5
82.0	179.6	2.4	2.2	23.7	2.4
84.0	183.2	2.2	2.1	22.1	2.2
86.0	186.8	2.1	2.0	20.7	2.1
88.0	190.4	2.0	1.9	19.3	2.0
90.0	194.0	1.8	1.7	18.1	1.9
92.0	197.6	1.7	1.6	16.9	1.8
94.0	201.2	1.6	1.6	15.8	1.6
96.0	204.8	1.5	1.5	14.8	1.6
98.0	208.4	1.4	1.4	13.9	1.5
100.0	212.0	1.4	1.3	13.5	1.4

6.12 Pressure Sensor Check

CHECK 12



$$P_H\ (MPa) = \frac{4.15}{3.0} \times V_H - \frac{4.15}{3.0} \times 0.5$$

$$P_L\ (MPa) = \frac{1.7}{3.0} \times V_L - \frac{1.7}{3.0} \times 0.5$$

1 MPa = 145 psi

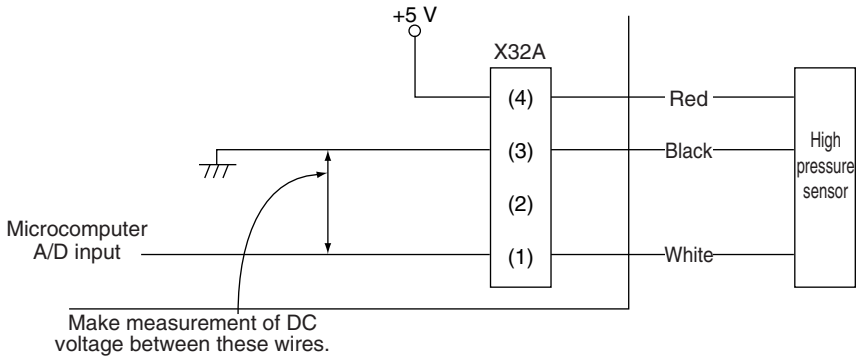
P_H : High pressure (MPa)

P_L : Low pressure (MPa)

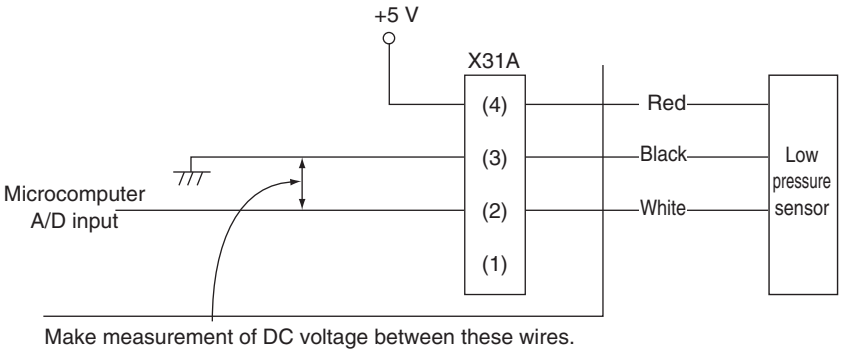
V_H : Output Voltage (High Side) (VDC)

V_L : Output Voltage (Low Side) (VDC)

Voltage Measurement Point of the High Pressure Sensor



Voltage Measurement Point of the Low Pressure Sensor

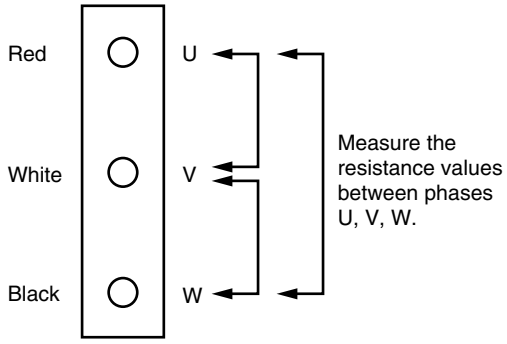


6.13 Fan Motor Connector Check (Power Supply Cable)

CHECK 16 Check the fan motor connector according to the following procedure.

Heat Source Unit

1. Turn OFF the power supply.
2. Measure the resistance between phases of U, V, W at the motor side connectors (3-core wire) to check that the values are balanced and there is no short circuiting, while connector or relay connector is disconnected.

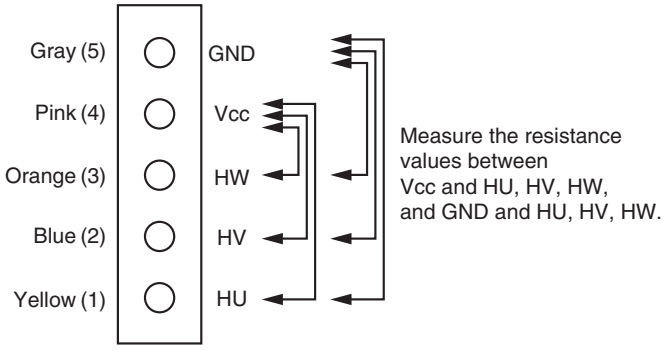


6.14 Fan Motor Connector Check (Signal Cable)

CHECK 17 Resistance measuring points and judgment criteria.

Heat Source Unit

1. Turn OFF the power supply.
2. Measure the resistance between Vcc and each phase of HU, HV, HW, and GND and each phase at the motor side connectors (5-core wire) to check that the values are balanced within the range of ± 20%, while connector or relay connector is disconnected. Furthermore, to use a multimeter for measurement, connect the probe of negative pole to Vcc and that of positive pole to GND.

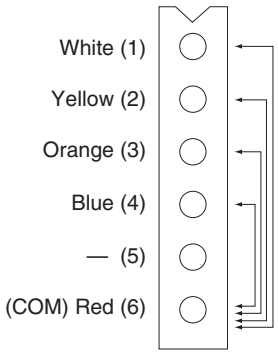


6.15 Electronic Expansion Valve Coil Check

CHECK 18

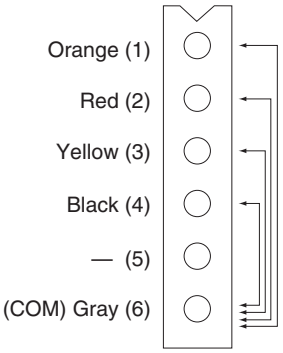
Measure the connector pin-to-pin resistance and make sure that the resistance value is within the range listed in the table below.
Determine the type according to the connector wire color and measure the resistance.

Y1E (RXHWQ120MQTJA)
Y1E, Y2E (BWLP120TJU)



Measuring points	Judgment criteria
1 - 6	120-180 Ω
2 - 6	
3 - 6	
4 - 6	

Y2E (RXHWQ120MQTJA)



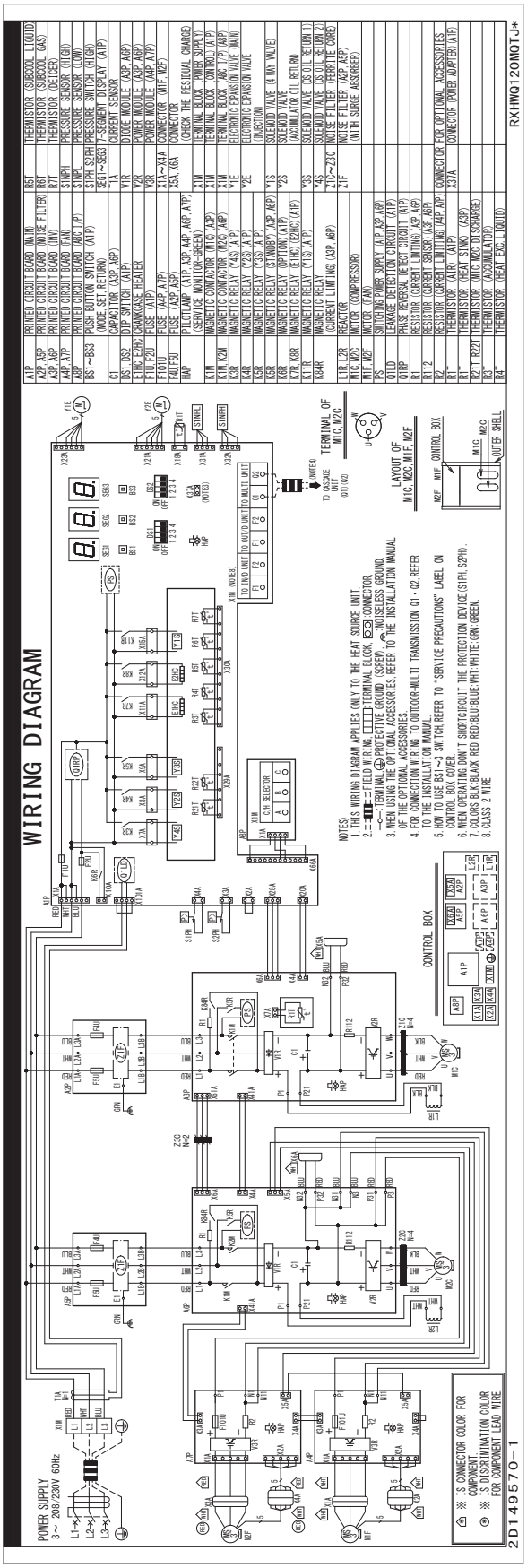
Measuring points	Judgment criteria
1 - 6	35-55 Ω
2 - 6	
3 - 6	
4 - 6	

Part 7 Appendix

1. Wiring Diagrams

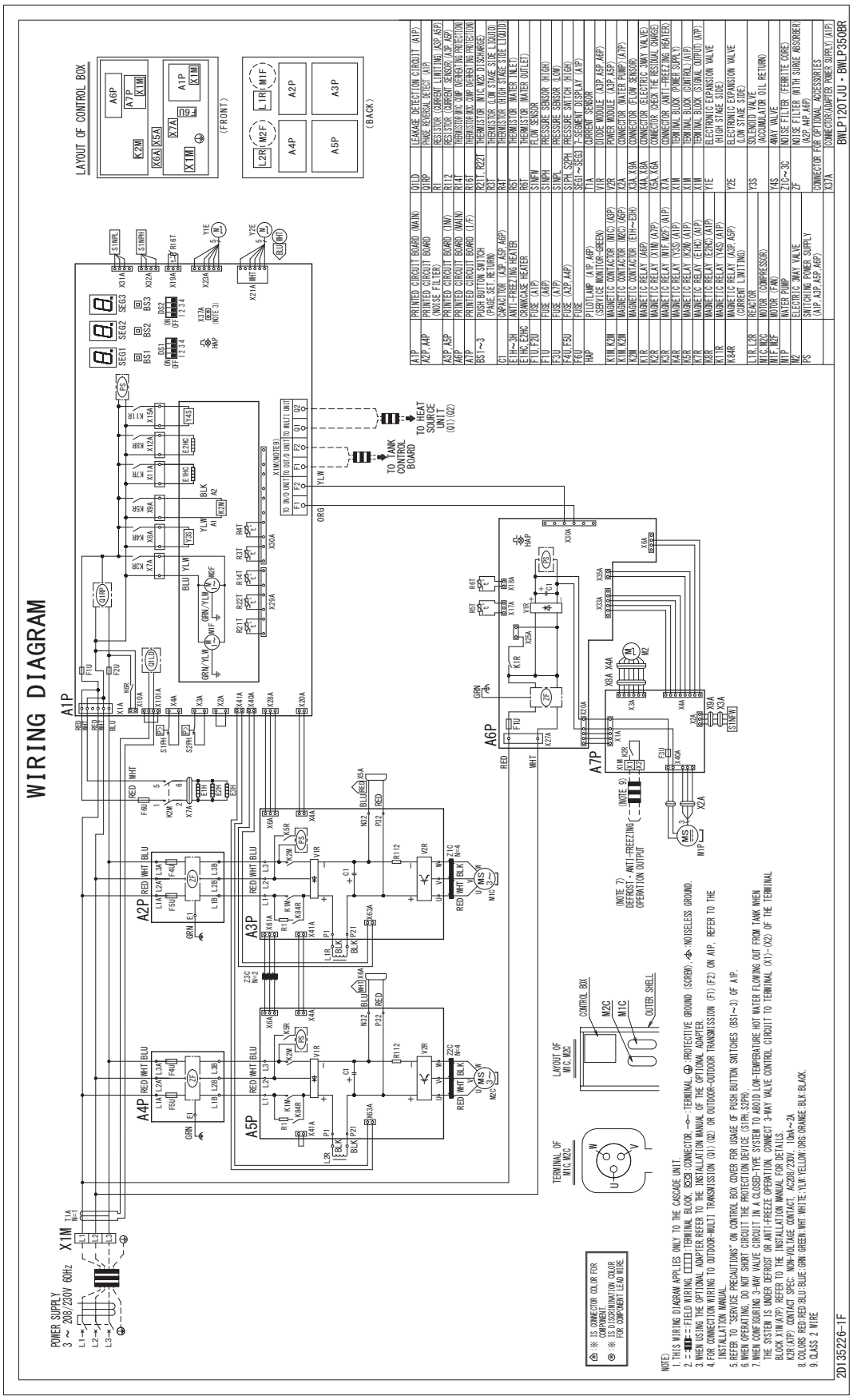
1.1 Heat Source Unit

RXHWQ120MQTJA



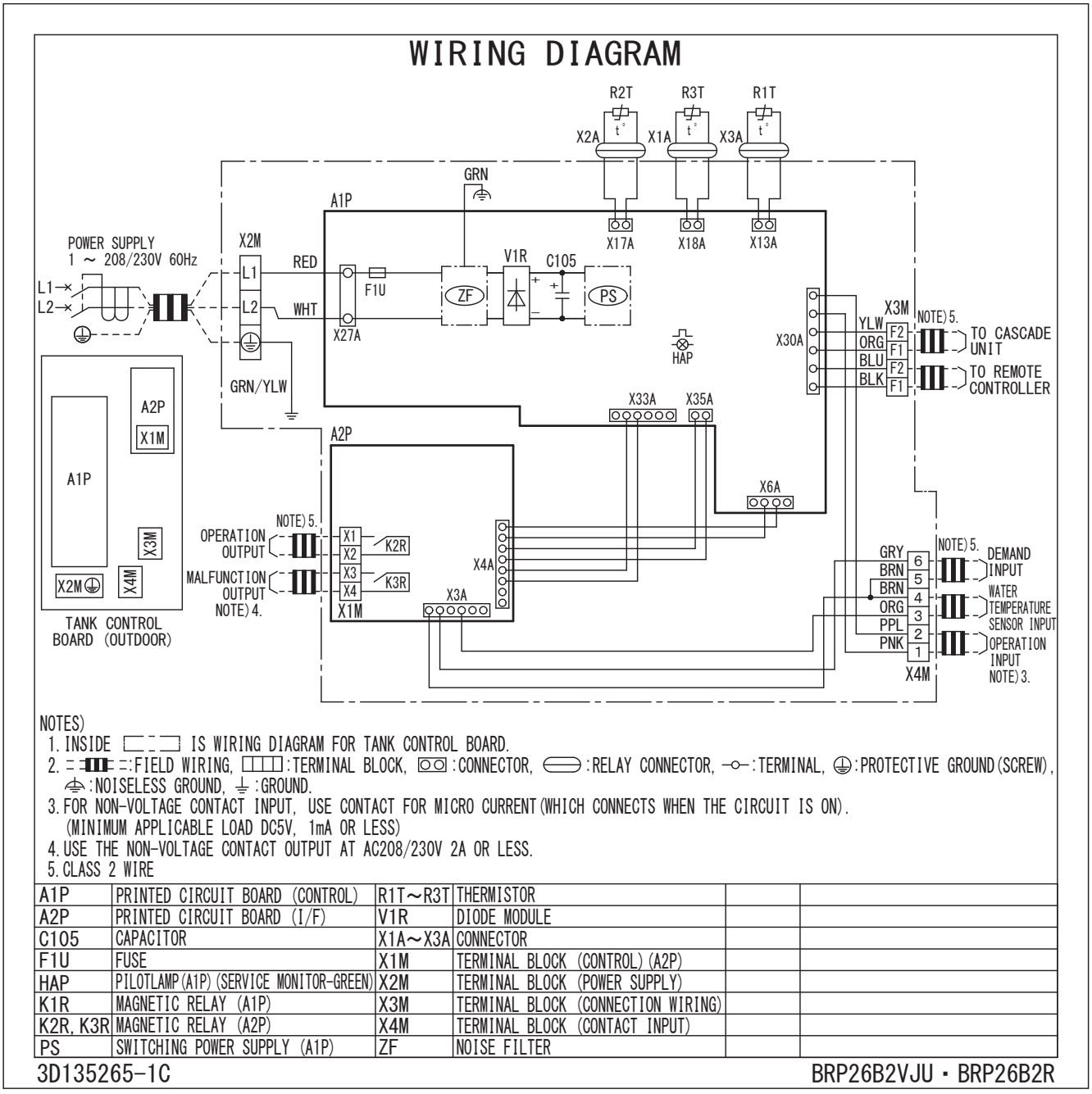
1.2 Cascade Unit

BWLP120TJU



1.3 Controller Kit

BRP26B2VJU



NOTES)
1. INSIDE ⊏⋮⋮⊐ IS WIRING DIAGRAM FOR TANK CONTROL BOARD.
2. ⋮▮▮⋮:FIELD WIRING, ⊏⊐:TERMINAL BLOCK, ⊙⊙:CONNECTOR, ⬭:RELAY CONNECTOR, —o—:TERMINAL, ⏚:PROTECTIVE GROUND(SCREW), ⏚:NOISELESS GROUND, ⏚:GROUND.
3. FOR NON-VOLTAGE CONTACT INPUT, USE CONTACT FOR MICRO CURRENT(WHICH CONNECTS WHEN THE CIRCUIT IS ON). (MINIMUM APPLICABLE LOAD DC5V, 1mA OR LESS)
4. USE THE NON-VOLTAGE CONTACT OUTPUT AT AC208/230V 2A OR LESS.
5. CLASS 2 WIRE

A1P	PRINTED CIRCUIT BOARD (CONTROL)	R1T~R3T	THERMISTOR		
A2P	PRINTED CIRCUIT BOARD (I/F)	V1R	DIODE MODULE		
C105	CAPACITOR	X1A~X3A	CONNECTOR		
F1U	FUSE	X1M	TERMINAL BLOCK (CONTROL) (A2P)		
HAP	PILOTLAMP(A1P)(SERVICE MONITOR-GREEN)	X2M	TERMINAL BLOCK (POWER SUPPLY)		
K1R	MAGNETIC RELAY (A1P)	X3M	TERMINAL BLOCK (CONNECTION WIRING)		
K2R, K3R	MAGNETIC RELAY (A2P)	X4M	TERMINAL BLOCK (CONTACT INPUT)		
PS	SWITCHING POWER SUPPLY (A1P)	ZF	NOISE FILTER		

3D135265-1C BRP26B2VJU・BRP26B2R

3D135265C

2. Reference Materials

2.1 Check Sheet for Confirmation of Construction Classification

① Hot water generation system (heat source unit, cascade unit)

▪ Foundation work	Main construction	Separate work( )
▪ Installation work	Main construction	Separate work ( )
▪ Refrigerant piping	Main construction	Separate work ( )
▪ Connection of water supply piping	Main construction	Separate work ( )
▪ Hot water piping equipment connection	Main construction	Separate work ( )
▪ Control wiring work	Main construction	Separate work ( )
▪ Power supply work	Main construction	Separate work ( )

② Hot water tank

▪ Foundation work	Main construction	Separate work ( )
▪ Installation work	Main construction	Separate work ( )
▪ Panel (main body) assembly work	Main construction	Separate work ( )
▪ Controller kit installation	Main construction	Separate work ( )
▪ Hot water piping equipment connection	Main construction	Separate work ( )
▪ Control wiring work	Main construction	Separate work ( )
▪ Power supply work	Main construction	Separate work ( )

③ Water tank ~ Cascade unit water supply piping work

▪ Plumbing	Main construction	Separate work ( )
▪ Insulation work	Main construction	Separate work ( )
▪ Anti-freezing treatment work	Main construction	Separate work ( )

④ Cascade unit ~ hot water tank hot water supply piping work

▪ Plumbing	Main construction	Separate work ( )
▪ Insulation work	Main construction	Separate work ( )
▪ Anti-freezing treatment work	Main construction	Separate work ( )

⑤ Hot water tank drainage piping work

▪ Plumbing	Main construction	Separate work ( )
▪ Insulation work	Main construction	Separate work ( )

⑥ Hot water circulating circuit

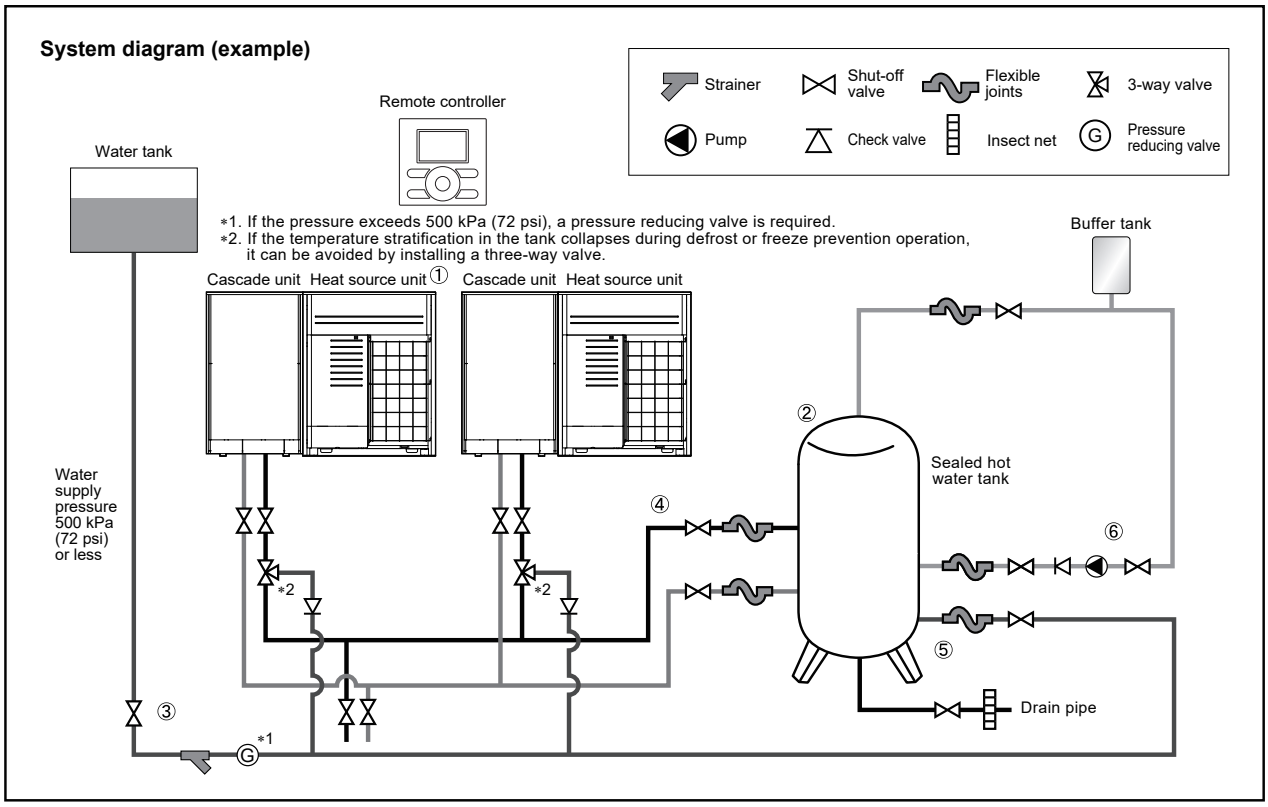
▪ Circulation pump main unit	Main construction	Separate work ( )
▪ Foundation work	Main construction	Separate work ( )
▪ Installation of equipment	Main construction	Separate work ( )
▪ Plumbing	Main construction	Separate work ( )
▪ Insulation work	Main construction	Separate work ( )
▪ Control wiring work	Main construction	Separate work ( )
▪ Power supply work	Main construction	Separate work ( )

⑦ Commissioning adjustment

▪ Cleaning and inspection of hot water	Main construction	Separate work ( )
▪ Cleaning of hot water tank	Main construction	Separate work ( )
▪ Hot water generation system (MEGA·Q system) hot water test operation	Main construction	Separate work ( )
▪ Hot water generation system test operation	Main construction	Separate work ( )

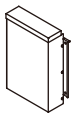
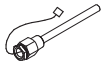
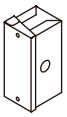
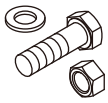
Note) ▪ The construction details in each item are rough construction details. Please confirm the details of construction work at the site each time. Some items may not be included in the construction work. Please confirm the details on site.

System diagram (example)



2.2 Service Category Table

The following parts are for Daikin Industries' controller kit.
All other parts will be supplied by the tank manufacturer or by the local construction company.

Name	Note	Number	Appearance
Controller panel set	Heater control panel is arranged by tank manufacturer.	1	
Water temperature sensors	For water temperature sensors	3	
Storage box	For water temperature sensors	3	
Relay harness	For water temperature sensors	3	
Bolt (M12) Nut (M12) Flat washer (M12)	For controller kit panel mounting	4 of each	
Small screw M4×8	For storage box mounting	12	
Tapping screw M4×8	For storage box lid mounting	6	
Plate (M12)	For conduit mounting	2	
Clamp	For bundling electric wires	7	
Remote controller	For constant setting	1	

Warning

- Daikin products are manufactured for export to numerous countries throughout the world. Prior to purchase, please confirm with your local authorized importer, distributor and/or retailer whether this product conforms to the applicable standards, and is suitable for use, in the region where the product will be used. This statement does not purport to exclude, restrict or modify the application of any local legislation.
- Ask a qualified installer or contractor to install this product. Do not try to install the product yourself. Improper installation can result in water or refrigerant leakage, electrical shock, fire or explosion.
- Use only those parts and accessories supplied or specified by Daikin. Ask a qualified installer or contractor to install those parts and accessories. Use of unauthorized parts and accessories or improper installation of parts and accessories can result in water or refrigerant leakage, electrical shock, fire or explosion.
- Read the user's manual carefully before using this product. The user's manual provides important safety instructions and warnings. Be sure to follow these instructions and warnings.

If you have any inquiries, please contact your local importer, distributor and/or retailer.

Cautions on product corrosion

1. Air conditioners should not be installed in areas where corrosive gases, such as acid gas or alkaline gas, are produced.
2. If the outdoor unit is to be installed close to the sea shore, direct exposure to the sea breeze should be avoided. If you need to install the outdoor unit close to the sea shore, contact your local distributor.

●Specifications, designs and other content appearing in this brochure are current as of April 2025 but subject to change without notice.

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