DAIKIN

SiUS28-902_B

Service Manual

SkyAir

RZR-P, RZQ-P(9) Series
Cooling Only / Heat Pump
R-410A 60Hz

SkyAir

RZR-P, RZQ-P(9) Series Cooling Only / Heat Pump R-410A 60Hz

ED Reference

For items below, please refer to Engineering Data.

No.	Item	ED No.	Page	Remarks
1	Specification - Cooling Only	EDUS281104	p. 7-11	
2	Specification - Heat Pump	EDUS281104	p. 12-16	
3	Option List	EDUS281104	p. 66-67	

RZR-P, RZQ-P(9) Series

Cooling Only / Heat Pump R-410A 60Hzi

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1. Safety Considerations

Read these ***SAFETY CONSIDERATIONS*** carefully before performing any repair work. Comply with these safety symbols without fail.Meanings of **DANGER**, **WARNING**, **CAUTION**, and **NOTE** Symbols:

Meanings of **DANGER**, **WARNING**, **CAUTION**, and **NOTE** Symbols:

⚠ **DANGER** ..... Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ **WARNING** ..... Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ **CAUTION** ..... Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

⚠ **NOTE** ..... Indicates situations that may result in equipment or property-damage accidents only.

1.1 Safety Considerations for Repair

- **If refrigerant gas leaks during repair or service, ventilate the area immediately. Refrigerant gas may produce toxic gas if it comes into contact with flames. Refrigerant gas is heavier than air and replaces oxygen. In the event of an accident, a massive leak could lead to oxygen depletion, especially in basements, and an asphyxiation hazard could occur leading to serious injury or death.**
- **Do not start or stop the air conditioner or heat pump operation by plugging or unplugging the power cable plug if a plug is used. Plugging or unplugging the power cable plug to operate the equipment may cause an electrical shock or fire.**
- **Use parts listed in the service parts list and appropriate tools to conduct repair work. The use of inappropriate parts or tools may cause an electrical shock or fire.**
- **Disconnect power before disassembling the equipment for repairs. Working on the equipment that is connected to the power supply may cause an electric shock. If it is necessary to supply power to the equipment to conduct repairs or to inspect the circuits, do not touch any electrically charged sections of the equipment.**
- **The step-up capacitor supplies high-voltage electricity to the electrical components of the outdoor unit. Discharge the capacitor completely before conducting repair work. A charged capacitor may cause an electrical shock.**
- **If refrigerant gas is discharged during repair work, do not touch the discharged refrigerant gas. The refrigerant gas may cause frostbite.**
- **Use only pipes, flare nuts, tools, and other materials designed specifically for R410A refrigerant systems. Never use tools or materials designed for R22 refrigerant systems on an R410A refrigerant system. Doing so can cause a serious accident or an equipment failure.**
- **Check to see if the parts and wires are mounted and connected properly, and if the connections at the soldered or crimped terminals are secure. Improper installation and connections may cause excessive heat generation, fire, or electrical shock.**
- **Prior to disconnecting the suction or discharge pipe from the compressor at the welded section, pump-down the refrigerant gas completely in a well-ventilated place first. If there is refrigerant gas or oil remaining inside the compressor, the refrigerant gas or oil can discharge when the pipe is being disconnected and it may cause an injury.**
- **Wear a safety helmet, gloves, and a safety belt when working at an elevated height of more than 6.5 ft (2 m). Insufficient safety measures may cause a fall resulting in injury.**
- **Do not mix air or gas other than the specified refrigerant R410A to the refrigerant system. If air enters the refrigerant systems, it can cause an excessive high pressure resulting in equipment damage and injury.**
- **When relocating the equipment, check if the new installation site has sufficient strength to withstand the weight of the equipment. If the installation site does not have sufficient strength and the equipment is not properly secured, the equipment may fall and cause injury.**
- **Securely fasten the outside unit terminal cover (panel). If the terminal cover/panel is not fastened properly, dust or water may enter the outside unit causing fire or electric shock.**
- **When relocating the system, keep the refrigerant circuit free from substances other than the specified refrigerant (R-410A) such as air. Any presence of air or other foreign substance in the refrigerant circuit can cause an abnormal pressure rise or rupture, resulting in injury.**
- **If refrigerant gas leaks, locate the leaking point and repair it before charging refrigerant. After charging refrigerant, check for refrigerant leaks. If the leaking point cannot be located and the repair work must be stopped, perform a**

pump-down and close the service valve to prevent the refrigerant gas from leaking into the room. The refrigerant gas itself is harmless, but it may generate toxic gases if it comes into contact with flames.

- **Do not repair the electrical components with wet hands. Working on the equipment with wet hands may cause an electrical shock.**
- **Do not clean the air conditioner or heat pump by splashing water on it. Washing the unit with water may cause an electrical shock.**
- **Turn off the power when cleaning the equipment to prevent internal fans that rotate at high speed from starting suddenly as they can cause injury.**
- **Let the refrigerant lines cool down before performing any repair work. Working on the unit when the refrigerant lines are hot may cause burns.**
- **All welding and cutting operations must be done in a well-ventilated place to prevent the accumulation of toxic fumes or possibly oxygen deficiency to occur.**
- **Check the grounding before repairing equipment in a humid or wet place to avoid electrical shocks. Improper grounding may cause an electrical shock.**
- **Measure the insulation resistance after the repair. The resistance must be 1MΩ or higher. Faulty insulation may cause an electrical shock.**
- **Check the drainage of the indoor unit after finishing repair work. Faulty drainage may cause water to enter the room resulting in wet floors and furniture.**
- **Do not tilt the unit when removing it. The water inside the unit may spill resulting in wet floors and furniture.**
- **Dismantling of the unit, disposal of the refrigerant, oil, and additional parts, should be done in accordance with the relevant local, state, and national regulations.**

1.2 Safety Considerations for Users

- **Never attempt to modify the equipment. Doing so can cause electrical shock, excessive heat generation, or fire.**
- **If the power cable and lead wires have scratches or have become deteriorated, have them replaced. Damaged cable and wires may cause an electrical shock or fire.**
- **Do not use a joined power cable or an extension cord, or share the same power outlet with other electrical appliances as it may cause an electrical shock or fire.**
- **Use an exclusive power circuit for the equipment. Insufficient circuit amperage capacity may cause an electrical shock 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 pulling the power cable may damage the cable.**
- **Check the unit foundation for damage on a continual basis, especially if it has been in use for a long time. If left in a damaged condition, the unit may fall and cause injury. If the installation platform or frame has corroded, have it replaced. A corroded platform or frame may cause the unit to fall resulting in injury.**
- **If the unit has a power cable plug and it is dirty, clean the plug before securely inserting it into a power outlet. If the plug has a loose connection, tighten it or it may cause electrical shock or fire.**
- **After replacing the battery in the remote controller, dispose of the old battery to prevent children from swallowing it. If a child swallows the battery, see a doctor immediately.**
- **Never remove the fan guard of the unit. A fan rotating at high speed without the fan guard is very dangerous.**
- **Before cleaning the unit, stop the operation of the unit by turning the power off or by pulling the power cable plug out from its receptacle. Otherwise an electrical shock or injury may result.**
- **Do not wipe the controller operation panel with benzene, thinner, chemical dust cloth, etc. The panel may get discolored or the coating can peel off. If it is extremely dirty, soak a cloth in a water-diluted neutral detergent, squeeze it well, and wipe the panel clean. Then wipe it with another dry cloth.**

1.3 Preface

Thank you for your continued patronage of Daikin products.

This is the new service manual for Daikin's Year 2011 SkyAir series Cooling Only and Heat Pump System.
Daikin offers a wide range of models to respond to building and office air conditioning needs.
We are confident that customers will be able to find the models that best suit their needs.

This service manual contains information regarding the servicing of SkyAir series Cooling Only and Heat Pump System.

May, 2011
After Sales Service Division

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1. Model Names and Power Supply

1.1 Cooling Only

Indoor unit		Outdoor unit	Power supply, Compatibility symbol
Ceiling mounted cassette type (Multi flow)	FCQ18PVJU	RZR18PVJU*	VJU
	FCQ24PVJU	RZR24PVJU*	
	FCQ30PVJU	RZR30PVJU*	
	FCQ36MVJU	RZR36PVJU*	
	FCQ42MVJU	RZR42PVJU*	
Ceiling suspended type	FHQ18PVJU	RZR18PVJU*	
	FHQ24PVJU	RZR24PVJU*	
	FHQ30PVJU	RZR30PVJU*	
	FHQ36MVJU	RZR36PVJU*	
	FHQ42MVJU	RZR42PVJU*	
Wall mounted type	FAQ18PVJU	RZR18PVJU*	
	FAQ24PVJU	RZR24PVJU*	

Note:
1. * : New model or changed model
2. Power supply intake : outdoor unit
3. VJ: 1 phase, 208/230V, 60Hz
   U(VJU, TJU): Standard Compatibility Symbol

1.2 Heat Pump

Indoor unit		Outdoor unit	Power supply, Compatibility symbol
Ceiling mounted cassette type (Multi flow)	FCQ18PVJU	RZQ18PVJU9	VJU
	FCQ24PVJU	RZQ24PVJU9	
	FCQ30PVJU	RZQ30PVJU	
	FCQ36MVJU	RZQ36PVJU9*	
	FCQ42MVJU	RZQ42PVJU9*	
Ceiling suspended type	FHQ18PVJU	RZQ18PVJU9	
	FHQ24PVJU	RZQ24PVJU9	
	FHQ30PVJU	RZQ30PVJU	
	FHQ36MVJU	RZQ36PVJU9*	
	FHQ42MVJU	RZQ42PVJU9*	
Wall mounted type	FAQ18PVJU	RZQ18PVJU9	
	FAQ24PVJU	RZQ24PVJU9	
Air handling unit	FTQ18PAVJU	RZQ18PVJU	
	FTQ24PAVJU	RZQ24PVJU	

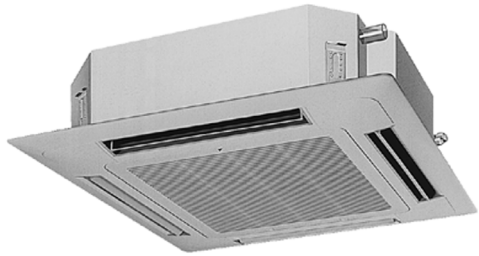
Note:
1. * : New model or changed model
2. Power supply intake : outdoor unit
3. VJ: 1 phase, 208/230V, 60Hz
   U(VJU, TJU): Standard Compatibility Symbol

2. External Appearance

2.1 Indoor Units

Ceiling Mounted Cassette Type (Multi Flow)

FCQ18PVJU
FCQ24PVJU
FCQ30PVJU
FCQ36MVJU
FCQ42MVJU



Ceiling Suspended Type

FHQ18PVJU
FHQ24PVJU
FHQ30PVJU
FHQ36MVJU
FHQ42MVJU

Wall Mounted Type

FAQ18PVJU
FAQ24PVJU

Air Handling Unit

FTQ18PAVJU
FTQ24PAVJU

2.2 Remote Controller

Wired Type

BRC1D71

BRC1E71

2.3 Outdoor Units

RZR18PVJU
RZR24PVJU
RZR30PVJU
RZQ18PVJU9
RZQ24PVJU9
RZQ30PVJU

RZR36PVJU
RZR42PVJU
RZQ36PVJU9
RZQ42PVJU9

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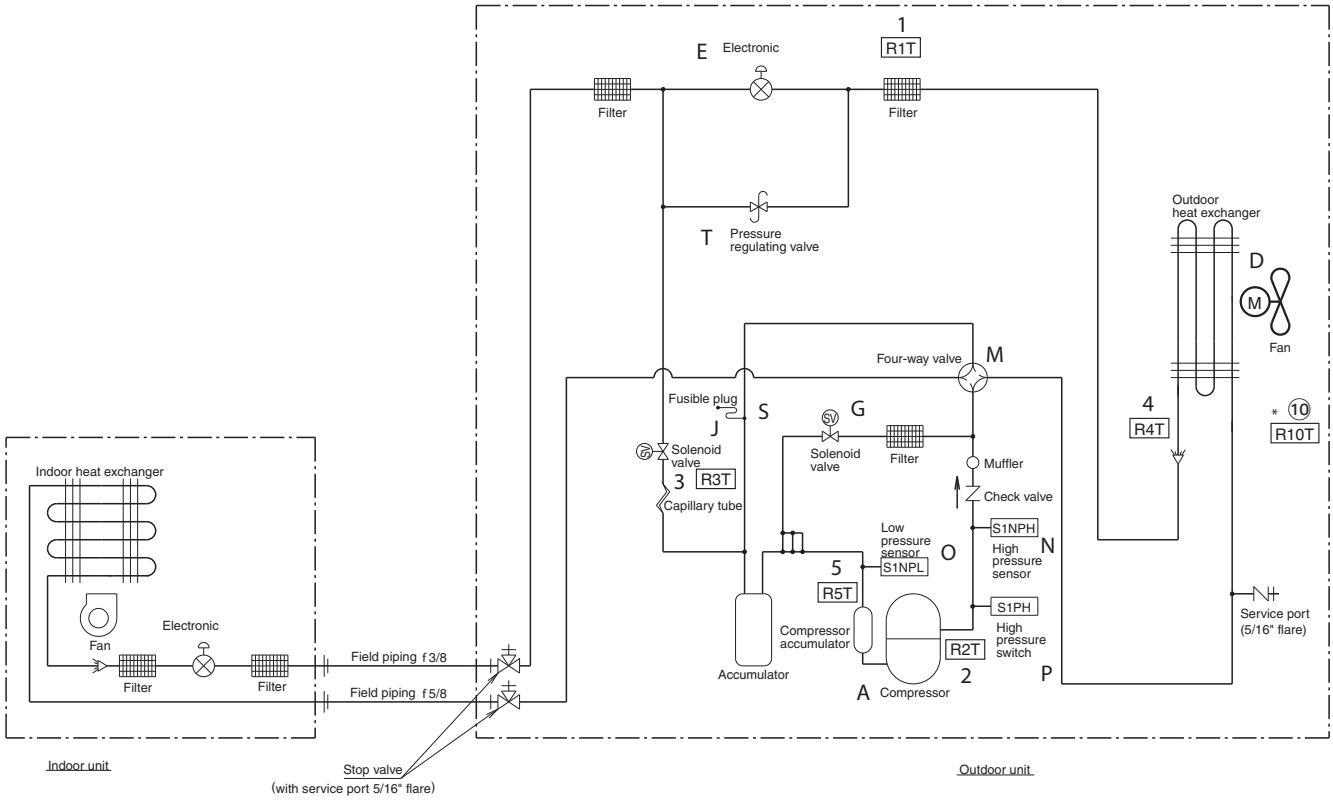
1. Refrigerant Circuit

1.1 RZR18 / 24 / 30PVJU RZQ18 / 24 / 30PVJU(9)

No. in refrigerant system diagram	Symbol	Name	Major Function
A	M1C	Inverter compressor (INV.)	Inverter compressor is operated on frequencies between 52 Hz and 177 Hz by using the inverter. 17 steps
D	M1F	Inverter fan	Because the system is an air heat exchange type, the fan is operated at 8-step rotation speed by using the inverter.
E	Y1E	Electronic expansion valve (Main: EV1)	While in heating operation, PI control is applied to keep the outlet superheated degree of air heat exchanger constant.
G	Y1S	Solenoid valve (Hot gas: SVP)	Prevents the low pressure from transient falling.
J	Y2S	Solenoid valve (Receiver gas discharging: SVG)	Collects refrigerant to receiver.
M	Y3S	Four-way valve	Switches the operation mode between cooling and heating.
N	S1NPH	High-pressure sensor	Detects high pressure.
O	S1NPL	Low-pressure sensor	Detects low pressure.
P	S1PH	High-pressure switch (For INV. compressor)	In order to prevent the increase of high pressure when an error occurs, this switch is activated at high pressure of 580 psi or more to stop the compressor operation.
S	—	Fusible plug	In order to prevent the increase of pressure when abnormal heating is caused by fire or others, the fusible part of the plug is molten at a temperature of 158 to 167°F to release the pressure into the atmosphere.
T	—	Pressure regulating valve 1 (Receiver to discharge pipe)	This valve opens at a pressure of 290 to 390 psi for prevention of pressure increase, thus resulting in no damage of functional parts due to the increase of pressure in transportation or storage.
1	R1T	Thermistor (Outdoor air: Ta)	Detects outdoor air temperature, correct discharge pipe temperature, and others.
2	R2T	Thermistor (Discharge pipe: Tdi)	Detects discharge pipe temperature, make the temperature protection control of compressor, and others.
3	R3T	Thermistor (Suction pipe: Ts1)	Detects suction pipe temperature, keep the suction superheated degree constant in heating operation, and others.
4	R4T	Thermistor (Heat exchanger deicer: Tb)	Detects liquid pipe temperature of air heat exchanger, determine defrosting operation, and others.
5	R5T	Thermistor (Suction pipe: Ts2)	Calculates internal temperature of compressor.
10	R10T	Thermistor (Radiation fin)	• Outdoor unit fan speed control. • Inverter radiation fin temperature control. • Pressure difference control.

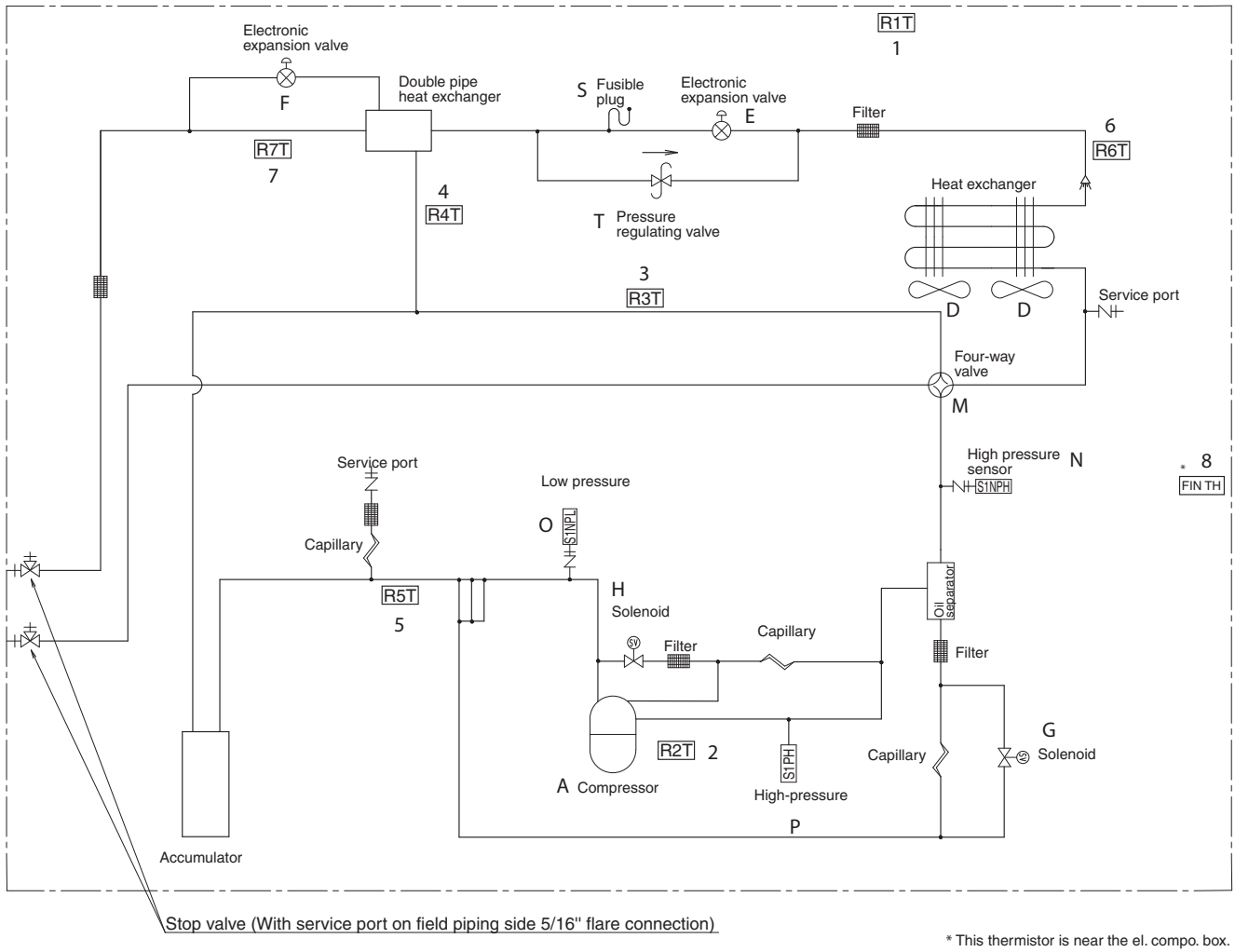


* This thermistor is near the electrical compon

C: 3D062238C

1.2 RZR36 / 42PVJU RZQ36 / 42PVJU(9)

No. in refrigerant system diagram	Symbol	Name	Major Function
A	M1C	Inverter compressor (INV)	Inverter compressor is operated on frequencies between 36 Hz and 195 Hz by using the inverter. 31 steps
D	M1F M2F	Inverter fan	Because the system is of an air heat exchange type, the fan is operated at 8-step rotation speed by using the inverter.
E	Y1E	Electronic expansion valve (Main: EV1)	While in heating operation, PI control is applied to keep the outlet superheated degree of air heat exchanger constant.
F	Y3E	Electronic expansion valve (Subcooling: EV3)	PI control is applied to keep the outlet superheated degree of subcooling heat exchanger constant.
G	Y2S	Solenoid valve (Hot gas: SVP)	Prevents the low pressure from transient falling.
H	Y3S	Solenoid valve (Unload circuit: SVUL)	Unloading operation of compressor.
M	Y1S	Four-way valve	Switches the operation mode between cooling and heating.
N	S1NPH	High- pressure sensor	Detects high pressure.
O	S1NPL	Low-pressure sensor	Detects low pressure.
P	S1PH	HP pressure switch (For INV compressor)	In order to prevent the increase of high pressure when an error occurs, this switch is activated at high pressure of 580 PSI or more to stop the compressor operation.
S	—	Fusible plug	In order to prevent the increase of pressure when abnormal heating is caused by fire or others, the fusible part of the plug is molten at a temperature of 158 to 167°F to release the pressure into the atmosphere.
T	—	Pressure regulating valve 1 (Receiver to discharge pipe)	This valve opens at a pressure of 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.
1	R1T	Thermistor (Outdoor air: Ta)	Detects outdoor air temperature, correct discharge pipe temperature, and others.
2	R2T	Thermistor (INV discharge pipe: Tdi)	Detects discharge pipe temperature, make the temperature protection control of compressor, and others.
3	R3T	Thermistor (Suction pipe1: Ts1)	Detects suction pipe temperature, keep the suction superheated degree constant in heating operation, and others.
4	R4T	Thermistor (Subcooling heat exchanger gas pipe: Tsh)	Controls subcooling electronic expansion valve.
5	R5T	Thermistor (Suction pipe2: Ts2)	Calculates internal temperature of compressor.
6	R6T	Thermistor (Heat exchanger deicer: Tb)	Detects liquid pipe temperature of air heat exchanger, determine defrosting operation, and others.
7	R7T	Thermistor (Liquid pipe: Tl)	Detects refrigerant over charge in check operation, and others.
8	FIN TH	Thermistor (Radiation fin)	• Used for outdoor unit fan speed control. • Used for inverter radiation fin temperature control. • Used for pressure difference control.

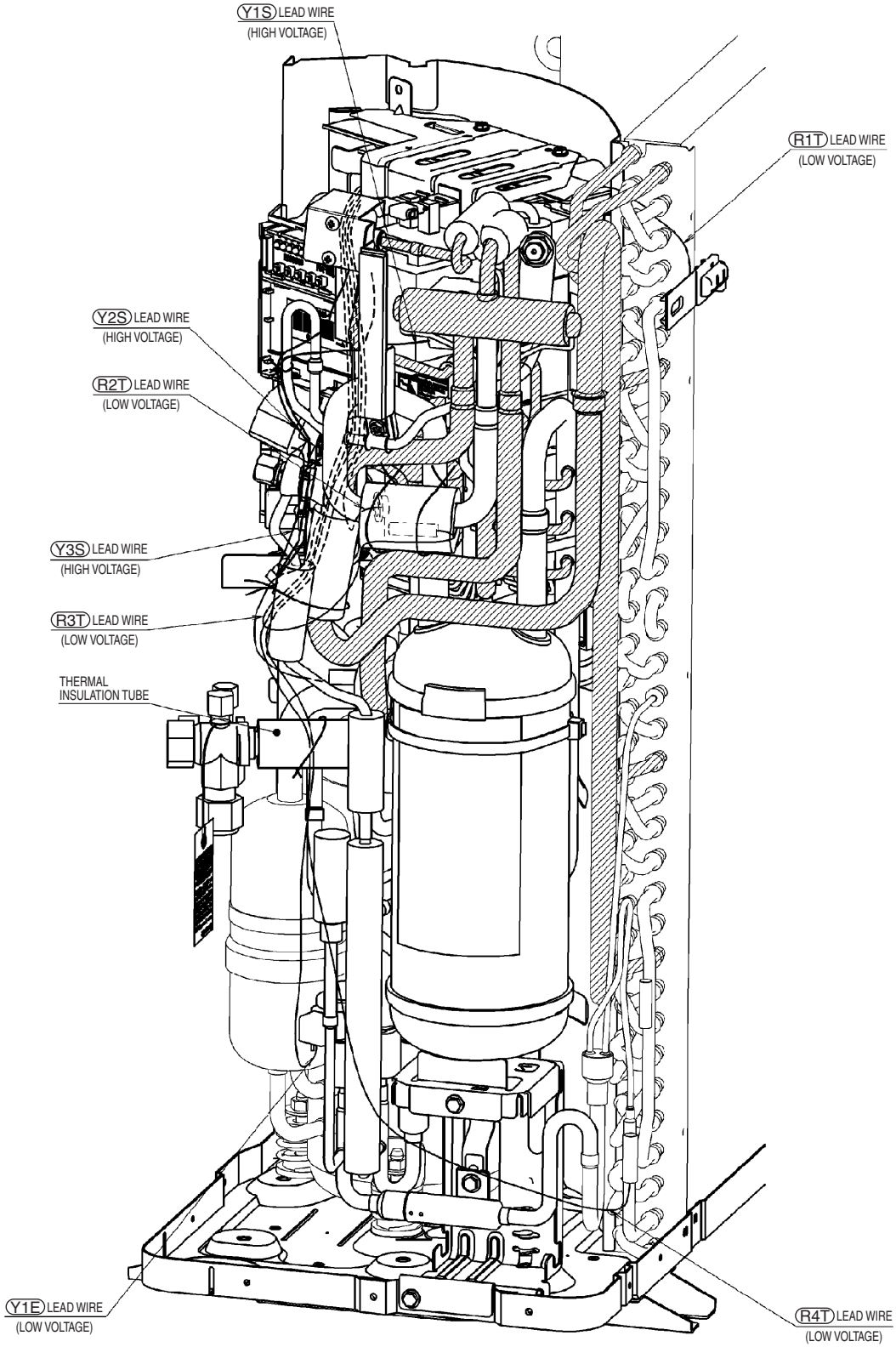


* This thermistor is near the el. compo. box.

3D065366A

2. Functional Parts Layout

2.1 RZR18 / 24 / 30PVJU RZQ18 / 24 / 30PVJU (9)



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Function

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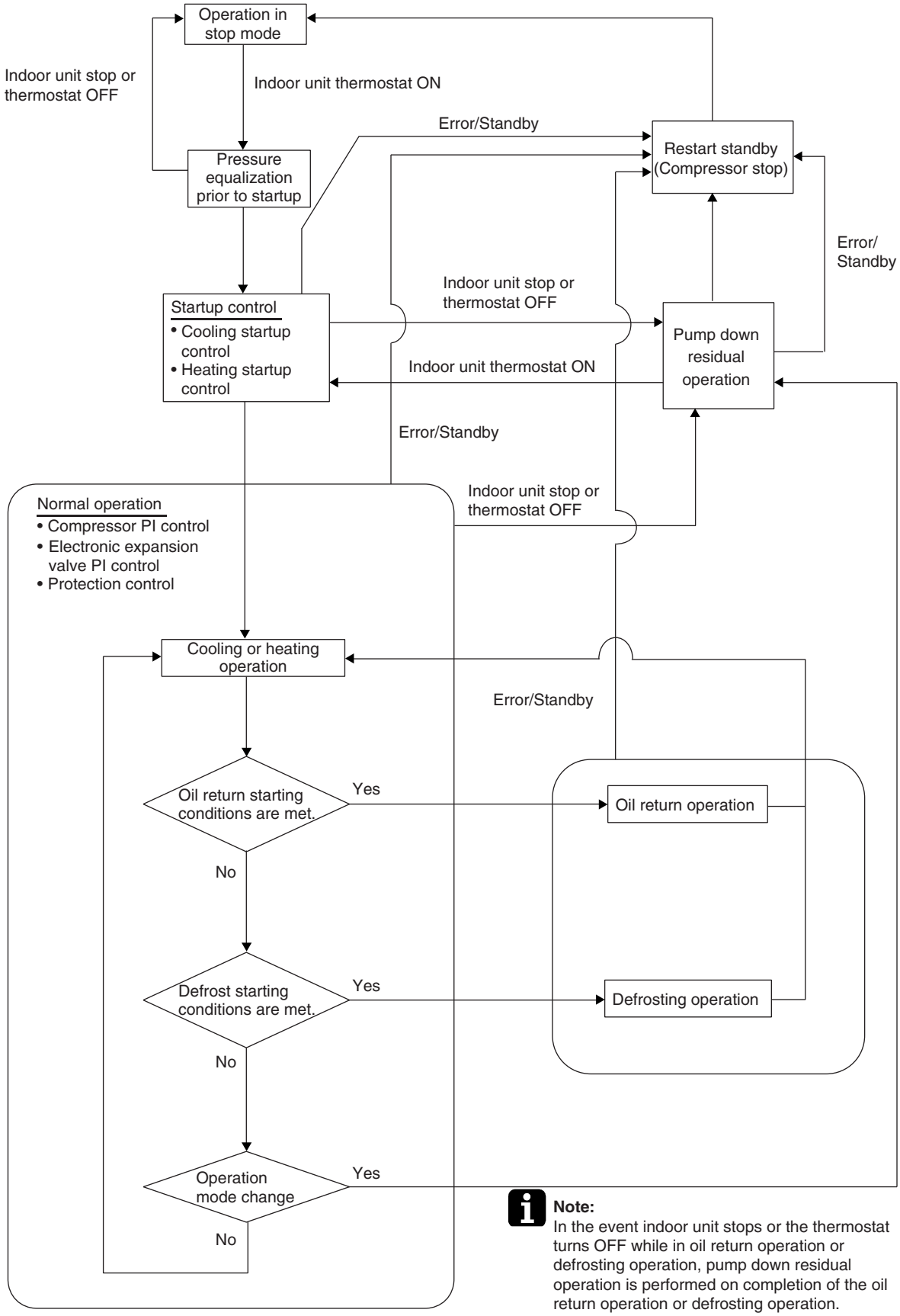
1. Operation Mode



Note:
In the event indoor unit stops or the thermostat turns OFF while in oil return operation or defrosting operation, pump down residual operation is performed on completion of the oil return operation or defrosting operation.

2. Basic Control

2.1 Normal Operation

■ **Cooling**

Parts Name	Symbol	Electric Symbol		Operation		Remarks
		RZR18/24/30P RZQ18/24/30P	RZR36/42P RZQ36/42P	RZR18/24/30P RZQ18/24/30P	RZR36/42P RZQ36/42P	
Compressor (INV.)	—	M1C	M1C	Compressor PI control	Compressor PI control	Used for high pressure protection control, low pressure protection control, discharge pipe temperature protection control, and compressor operating frequency upper limit control with inverter protection control.
Outdoor unit fan	—	M1F	M1F M2F	Cooling fan control	Cooling fan control	—
Four-way valve	20S1	Y1S	Y1S	OFF	OFF	—
Electronic expansion valve (Main)	EV1	Y1E	Y1E	1400 pls	480 pls	—
Electronic expansion valve (Subcooling)	EV3	—	Y3E	—	PI control	—
Solenoid valve (Hot gas)	SVP	Y2S	Y2S	OFF	OFF	This valve turns on with low pressure protection control.
Solenoid valve (Receiver gas discharging)	SVG	Y3S	—	OFF	—	—

■ **Heating**

Parts Name	Symbol	Electric Symbol		Operation		Remarks
		RZQ18/24/30P	RZQ36/42P	RZQ18/24/30P	RZQ36/42P	
Compressor (INV.)	—	M1C	M1C	Compressor PI control	Compressor PI control	Used for high pressure protection control, low pressure protection control, discharge pipe temperature protection control, and compressor operating frequency upper limit control with inverter protection control.
Outdoor unit fan	—	M1F	M1F M2F	STEP 8	Step 7 or 8	The fan step changes to STEP 1 with high pressure > 454 psi.
Four-way valve	20S1	Y1S	Y1S	ON	ON	—
Electronic expansion valve (Main)	EV1	Y1E	Y1E	PI control	PI control	—
Electronic expansion valve (Subcooling)	EV3	—	Y3E	—	PI control	—
Solenoid valve (Hot gas)	SVP	Y2S	Y2S	OFF	OFF	This valve turns on with low pressure protection control.
Solenoid valve (Receiver gas discharging)	SVG	Y3S	—	OFF	—	—

∗ Heating operation is not functional at an outdoor air temperature of 82°FDB or more.

2.2 Compressor PI Control

Compressor PI Control

Te: Low pressure equivalent saturation temperature
TeS: Target Te value
(Varies depending on Te setting, operating frequency, etc.)
Tc: High pressure equivalent saturation temperature
TcS: Target Tc value
(Varies depending on Tc setting, operating frequency, etc.)

Carries out the compressor capacity PI control to maintain Te at constant during cooling operation and Tc at constant during heating operation to ensure stable unit performance.

[Cooling]

Controls compressor capacity to adjust Te to achieve target value (TeS).

Te setting (Set in Set-up mode 2)

L	M (Normal) (factory setting)	H
37.5	43	48

[Heating]

Controls compressor capacity to adjust Tc to achieve target value (TcS).

Tc setting

L	M (Normal) (factory setting)	H
109.5	115	120

RZR18/24/30P, RZQ18/24/30P

STEP	Inverter
1	52Hz
2	57Hz
3	62Hz
4	68Hz
5	74Hz
6	81Hz
7	88Hz
8	96Hz
9	104Hz
10	110Hz
11	116Hz
12	124Hz
13	133Hz
14	143Hz
15	158Hz
16	165Hz
17	177Hz

* Compressors may operate in a pattern other than those listed in above tables subject to the operating conditions.

RZR36/42P, RZQ36/42P

STn	INV(Fullload)	INV(Unload)
1		36.0Hz
2		39.0Hz
3		43.0Hz
4		47.0Hz
5		52.0Hz
6	52.0Hz	57.0Hz
7	57.0Hz	64.0Hz
8	62.0Hz	71.0Hz
9	68.0Hz	78.0Hz
10	74.0Hz	

STn	INV(Fullload)	INV(Unload)
11	80.0Hz	
12	86.0Hz	
13	92.0Hz	
14	98.0Hz	
15	104.0Hz	
16	110.0Hz	
17	116.0Hz	
18	122.0Hz	
19	128.0Hz	
20	134.0Hz	

STn	INV(Fullload)	INV(Unload)
21	140.0Hz	
22	146.0Hz	
23	152.0Hz	
24	158.0Hz	
25	164.0Hz	
26	170.0Hz	
27	175.0Hz	
28	180.0Hz	
29	185.0Hz	
30	190.0Hz	
31	195.0Hz	

∗ Compressors may operate in a pattern other than those listed in above tables subject to the operating conditions. Selection of full load operation to/from unload operation is made with the unload circuit solenoid valve (Y3S=SVUL). The full load operation is performed with the SVUL set to OFF, while the unload operation is performed with the SVUL set to ON.

2.3 Electronic Expansion Valve PI Control

Main Electronic Expansion Valve EV1 Control

Carries out the electronic expansion valve (Y1E) PI control to maintain the evaporator outlet superheated degree (SH) at constant during heating operation to make maximum use of the outdoor unit heat exchanger (evaporator).

SH = Ts1 - Te

SH: Evaporator outlet superheated degree

Ts1: Suction pipe temperature detected by thermistor

Te: Low pressure equivalent saturation temperature

The optimum initial value of the evaporator outlet superheated degree is 9°F, but varies depending on the discharge pipe superheated degree of inverter compressor.

Subcooling Electronic Expansion Valve EV3 Control

Makes PI control of the electronic expansion valve (Y3E) to keep the superheated degree (SH) of the outlet gas pipe on the evaporator side for the full use of the subcooling heat exchanger.

SH = Tsh - Te

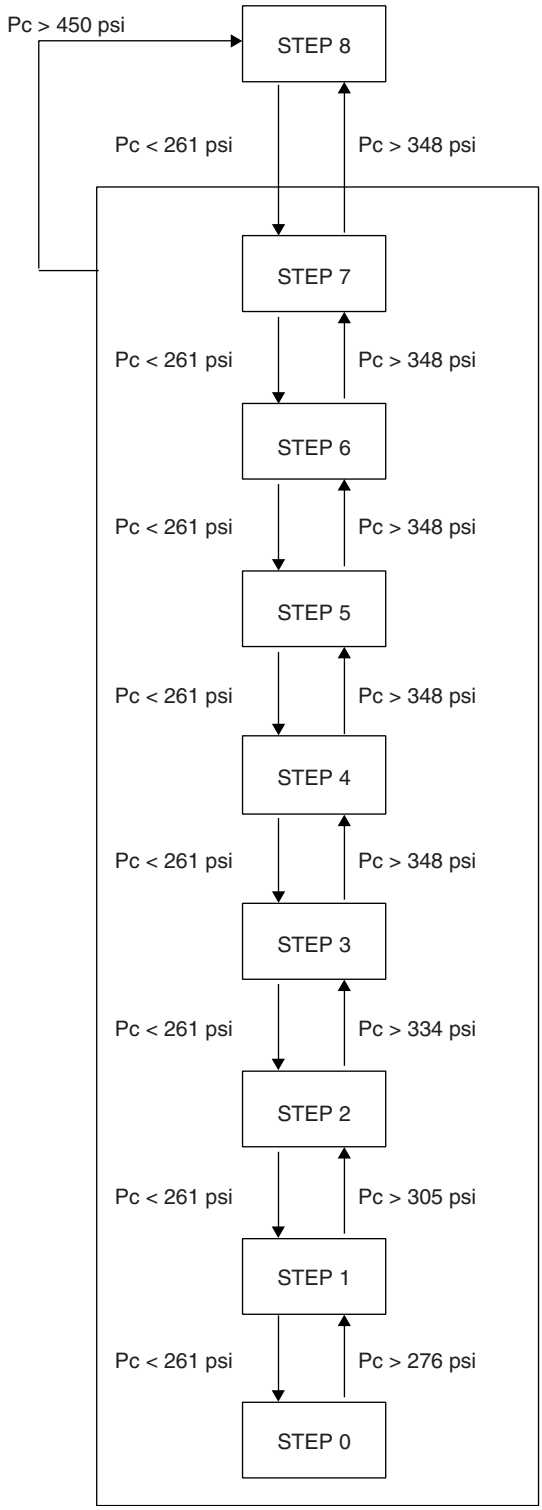
SH: Evaporator outlet superheated degree

Tsh: Suction pipe temperature detected with the thermistor

Te: Low pressure equivalent saturation temperature

2.4 Cooling Operation Fan Control

In cooling operation with low outdoor air temperature, this control is used to provide the adequate amount of circulation air with liquid pressure secured by high pressure control using outdoor unit fan.



Pc: High pressure sensor detection value

Fan Steps

Cooling	M1F
STEP 0	0 rpm
STEP 1	250 rpm
STEP 2	400 rpm
STEP 3	285 rpm
STEP 4	360 rpm
STEP 5	445 rpm
STEP 6	580 rpm
STEP 7	715 rpm
STEP 8	850 rpm

Reference

Heating	M1F
STEP 1	250 rpm
STEP 8	850 rpm

There are 2 steps in heating operation.

3. Special Control

3.1 Startup Control

On activation, following control is performed to lighten load of the compressor by back liquid and the like. Also, the position of the four-way valve is defined.
Pc: High pressure sensor detection value
Pe: Low pressure sensor detection value

3.1.1 Startup Control in Cooling

Actuator	Operation	Remarks
Compressor	Differential pressure control	Compressor operating frequency increases by 2 step / 20 seconds until Pc – Pe > 58 psi.
Outdoor unit fan	High pressure control	Initial fan speed is set to STEP 0. 1-step increase with Pc > 305 psi 1-step decrease with Pc < 261 psi
Four-way valve	OFF	—
Main electronic expansion valve (EV1)	1400 pls	—
Hot gas bypass valve (SVP)	ON	—
Receiver gas discharging valve (SVG)	OFF	—
Ending conditions	OR (• 230 seconds & (• Pc – Pe > 58 psi • 45 seconds))	

3.1.2 Startup Control in Heating

Actuator	Operation	Remarks
Compressor	Differential pressure control	Compressor operating frequency increases by 2 step / 20 seconds until Pc – Pe > 58 psi
Outdoor unit fan	STEP 8	—
Four-way valve	ON	—
Main electronic expansion valve (EV1)	180 pls	—
Hot gas bypass valve (SVP)	ON	—
Receiver gas discharging valve (SVG)	OFF	—
Ending conditions	OR (• 145 seconds & (• Pc – Pe > 58 psi • 15 seconds))	

3.2 Oil Return Operation

Oil flown from the compressor to the side of system is collected by oil-returning operation, in case of that oil in the compressor runs down.

3.2.1 Oil Return Operation in Cooling

Tc: High pressure equivalent saturation temperature
Te: Low pressure equivalent saturation temperature
Ts: Suction pipe temperature detected by thermistor

[Conditions to start]

The cooling oil-returning operation is started referring following conditions.

- Integrated amount of displaced oil
- Timer
  (After the power is turned ON, integrated operating-time is 2 hours and subsequently every 8 hours.)
  In addition, integrated amount of displaced oil is derived from Tc, Te, and the compressor load.

Outdoor unit actuator	Oil return preparation operation	Oil return operation	Post-oil-return operation
Compressor	Upper limit control	124 Hz	124 Hz
Outdoor unit fan	Fan control	Fan control	Fan control
Four-way valve	OFF	OFF	OFF
Main electronic expansion valve (EV1)	1400 pls	1400 pls	1400 pls
Hot gas bypass valve (SVP)	OFF	ON	ON
Receiver gas discharging valve (SVG)	OFF	OFF	OFF
Ending conditions	20 seconds	OR • 6 minutes • Ts – Te < 9°F	3 minutes

Indoor unit actuator		Cooling oil return operation
Fan	Thermostat ON unit	Set air volume
	Stopping unit	OFF
	Thermostat OFF unit	OFF
Electronic expansion valve	Thermostat ON unit	Normal opening
	Stopping unit	200 pls
	Thermostat OFF unit	200 pls

3.2.2 Oil Return Operation in Heating

Pc: High pressure sensor detection value
Pe: Low pressure sensor detection value
Tc: High pressure equivalent saturation temperature
Te: Low pressure equivalent saturation temperature
Ts: Suction pipe temperature detected by thermistor

[Conditions to start]

The heating oil-returning operation is started referring following conditions.

- Integrated amount of displaced oil
- Timer
  (After the power is turned on, integrated operating-time is 2 hours and subsequently every 8 hours.)
  In addition, integrated amount of displaced oil is derived from Tc, Te, and the compressor load.

Outdoor Unit Actuator	Oil return preparation operation	Oil return operation	Post-oil-return operation
Compressor	Upper limit control	124 Hz	2-step increase from 52 Hz to (Pc – Pe > 58 psi) time
Outdoor unit fan	STEP 8	OFF	STEP 8
Four-way valve	ON	OFF	ON
Main electronic expansion valve (EV1)	SH control	1400 pls	200~400 pls
Hot gas bypass valve (SVP)	OFF	ON	ON
Receiver gas discharging valve (SVG)	ON	ON	OFF
Ending conditions	130 seconds	OR • 6 minutes • Ts – Te < 9°F	OR • 160 seconds • Pc – Pe > 58 psi

∗ From the preparing oil-returning operation to the oil-returning operation, and from the oil-returning operation to the operation after oil-returning, the compressor stops for 1 minute to reduce noise on changing of the four-way valve.

Indoor unit actuator		Heating oil return operation
Fan	Thermostat ON unit	OFF
	Stopping unit	OFF
	Thermostat OFF unit	OFF
Electronic expansion valve	Thermostat ON unit	500 pls
	Stopping unit	500 pls
	Thermostat OFF unit	500 pls

3.3 Defrosting Operation

Pc: High pressure sensor detection value
Pe: Low pressure sensor detection value
Tc: High pressure equivalent saturation temperature
Te: Suction pipe equivalent saturation temperature
The defrost operation is performed to solve frost on the outdoor unit heat exchanger when heating, and the heating capacity is recovered.

[Conditions to start]

The defrost operation is started referring following conditions.

- Outdoor heat exchanger heat transfer co-efficiency
- Temperature of heat exchanger (Tb)
- Timer (2 hours at the minimum)
  In addition, outdoor heat exchanger co-efficiency is derived from Tc, Te, and the compressor load.

Outdoor unit actuator	Defrost preparation operation	Defrost operation	Post Defrost operation
Compressor	52 Hz	177 Hz	2-step increase from 52 Hz to (Pc – Pe > 58 psi) every 20 seconds
Outdoor unit fan	STEP 8	OFF	STEP 8
Four-way valve	ON	OFF	ON
Main electronic expansion valve (EV1)	SH control	1400 pls	200~400 pls
Hot gas bypass valve (SVP)	OFF	ON	ON
Receiver gas discharging valve (SVG)	ON	ON	OFF
Ending conditions	130 seconds	OR • 15 minutes • Tb > 51.8°F	OR • 160 seconds • Pc – Pe > 58 psi

∗ From the preparing operation to the defrost operation, and from the defrost operation to the operation after defrost, the compressor stops for 1 minute to reduce noise on changing of the four-way valve.

Indoor unit actuator		During defrost
Fan	Thermostat ON unit	OFF
	Stopping unit	OFF
	Thermostat OFF unit	OFF
Electronic expansion valve	Thermostat ON unit	500 pls
	Stopping unit	500 pls
	Thermostat OFF unit	500 pls

3.4 Pump Down Residual Operation

Pe: Low pressure sensor detection value
Td: Discharge pipe temperature
When activating compressor, if the liquid refrigerant remains in the heat-exchanger, the liquid enters into the compressor and dilutes oil therein resulting in decrease of lubricity.
Therefore, the pump down residual operation is performed to collect the refrigerant in the heat-exchanger when the compressor is down.

3.4.1 Pump Down Residual Operation in Cooling

Actuator	Master unit operation
Compressor	124 Hz
Outdoor unit fan	Fan control
Four-way valve	OFF
Main electronic expansion valve (EV1)	2000 pls
Hot-gas bypass valve (SVP)	OFF
Receiver gas discharging valve (SVG)	ON → OFF
Ending conditions	OR (• 30 seconds • Pe < 73 psi • Td > 230°F)

3.4.2 Pump Down Residual Operation in Heating

Actuator	Master unit operation
Compressor	124 Hz
Outdoor unit fan	STEP 8
Four-way valve	ON
Main electronic expansion valve (EV1)	0 pls
Hot-gas bypass valve (SVP)	OFF
Receiver gas discharging valve (SVG)	ON → OFF
Ending conditions	OR (• 3 minutes • Pe < 36 psi • Td > 230°F)

3.5 Restart Standby

Ta : Outdoor air temperature
Restart is stood by force to prevent frequent power-on/off and to equalize pressure in the refrigerant system.

Actuator	Operation	Remarks
Compressor	OFF	—
Outdoor unit fan	Ta > 86°F: STEP 4 Ta ≤ 86°F: OFF	—
Four-way valve	Keep former condition.	—
Main electronic expansion valve (EV1)	0 pls	—
Hot-gas bypass valve (SVP)	ON	—
Receiver gas discharging valve (SVG)	OFF	—
Ending conditions	5 minutes	—

3.6 Stopping Operation

Operation of the actuator when the system is down, is cleared up.

3.6.1 When System is in Stop Mode

Actuator	Operation
Compressor	OFF
Outdoor unit fan	OFF
Four-way valve	Keep former condition.
Main electronic expansion valve (EV1)	0 pls
Hot-gas bypass valve (SVP)	OFF
Receiver gas discharging valve (SVG)	OFF
Ending conditions	Indoor unit thermostat is turned ON.

3.7 Pressure Equalization Prior to Startup

Ta: Outdoor air temperature
Pc: High-pressure sensor detection value
Pe: Low-pressure sensor detection value
Before activating the compressor, the activation load is lightened by equalization across the compressor. In addition, inverters turn on electricity and capacitors are charged.

Actuator	Operation	Remarks
Compressor	OFF	—
Outdoor unit fan	Cooling: OFF Heating: Ta > 78.8°F; STEP 8, Ta ≤ 78.8°F; OFF	—
Four-way valve	Keep former condition.	—
Main electronic expansion valve (EV1)	0 pls	—
Hot gas bypass valve (SVP)	ON	—
Receiver gas discharging valve (SVG)	OFF	—
Ending conditions	OR (• 3 minutes • Pc – Pe < 29 psi	—

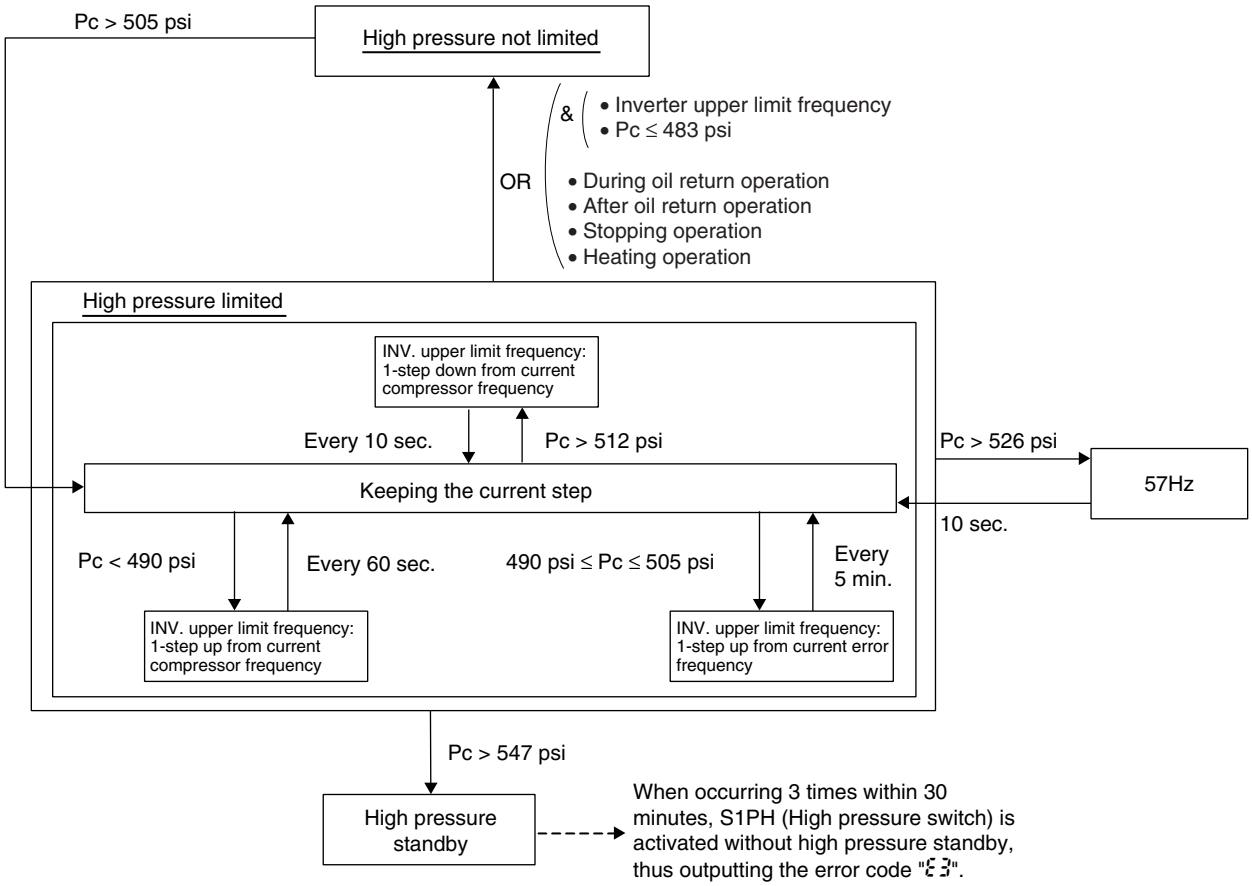
4. Protection Control

4.1 High Pressure Protection Control

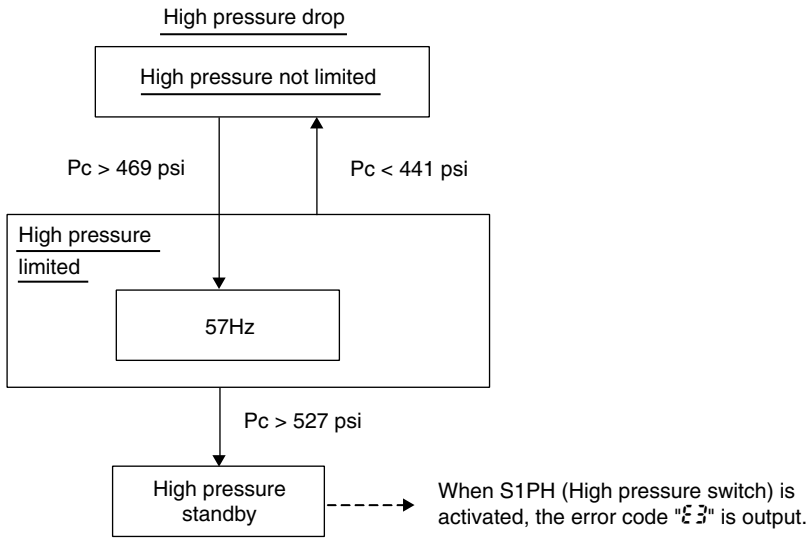
Pc: High-pressure sensor detection value

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.

[Cooling]



[Heating]

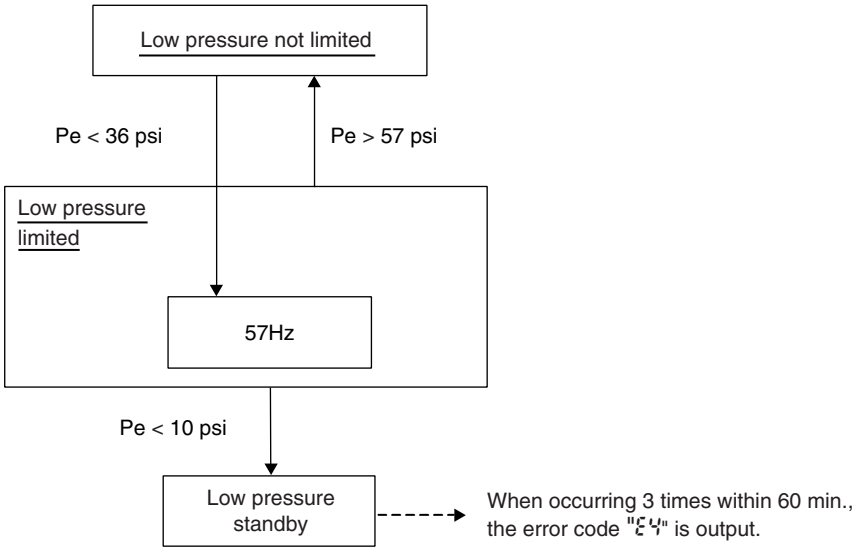


4.2 Low Pressure Protection Control

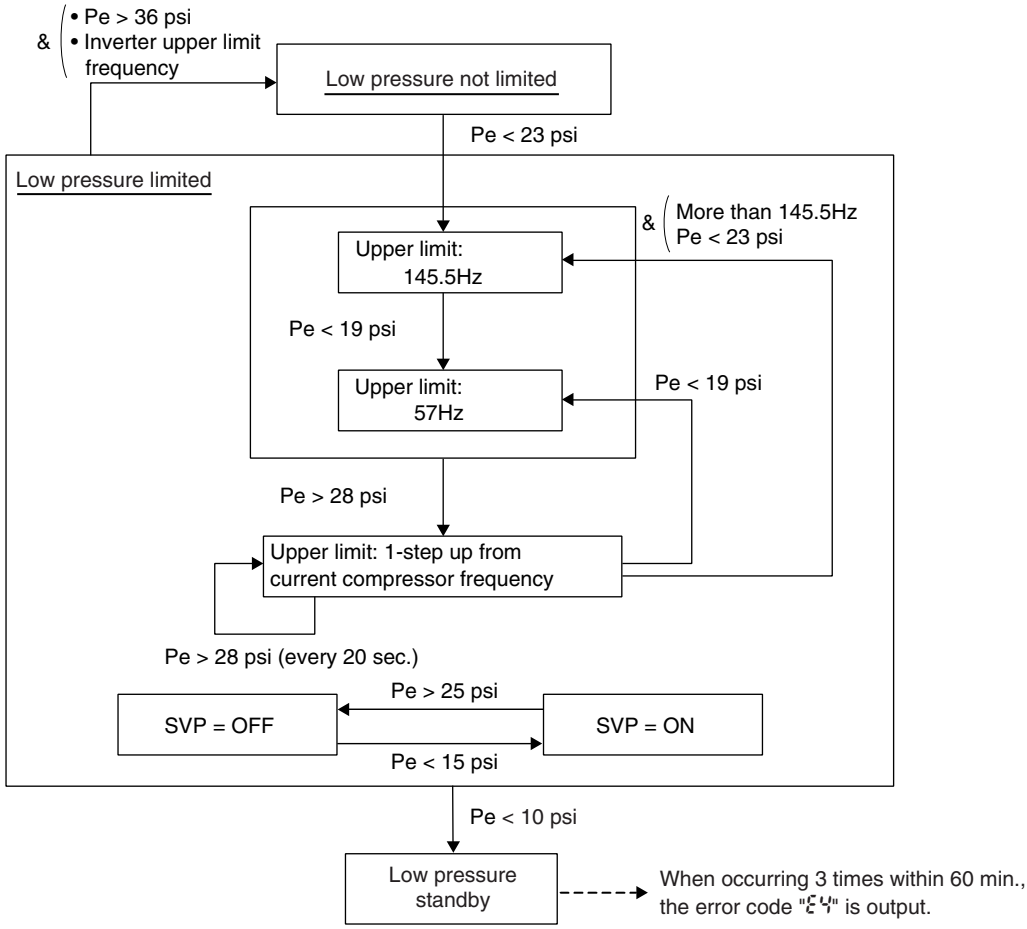
Pe: Low-pressure sensor detection value

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

[Cooling]



[Heating]



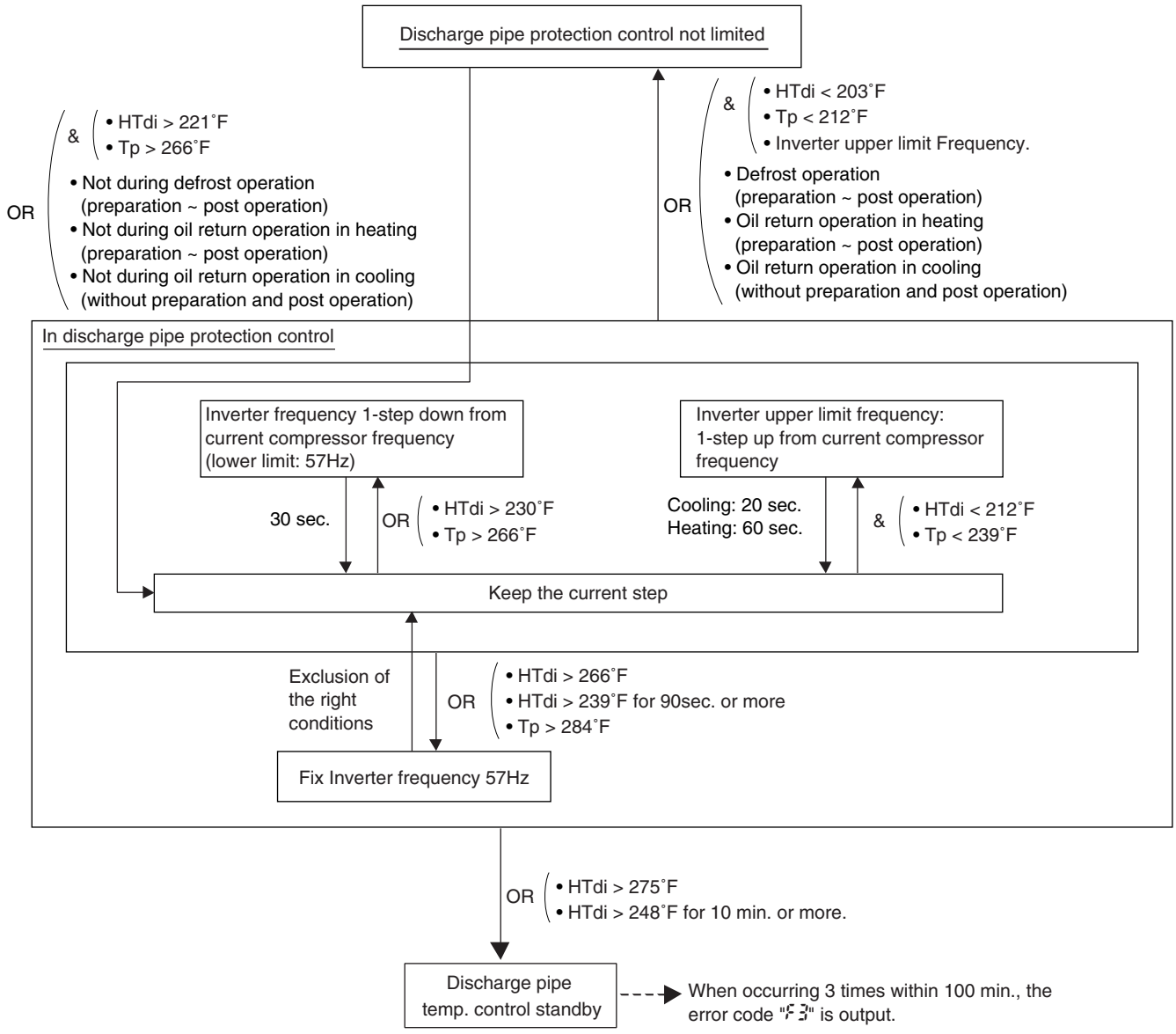
4.3 Discharge Pipe Protection Control

HTdi: Value of INV. compressor discharge pipe temperature (Tdi) compensated with outdoor air temperature

Tp: Value of compressor port temperature calculated by Tc and Te, and suction superheated degree.

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

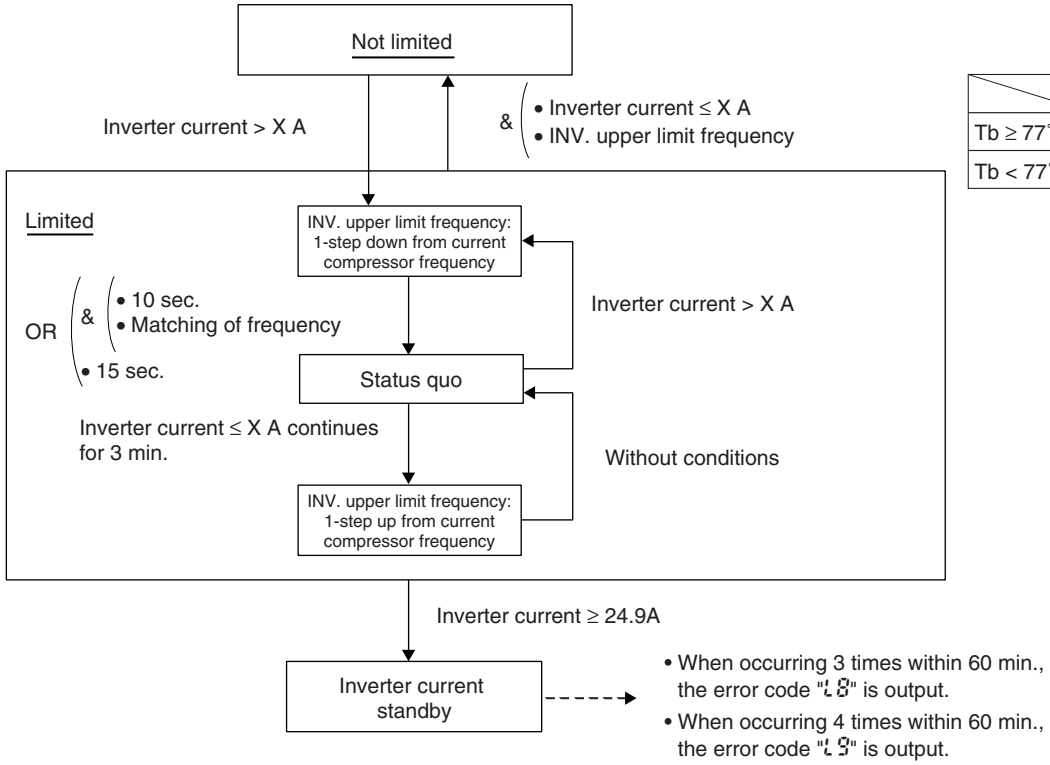
[INV. compressor]



4.4 Inverter Protection Control

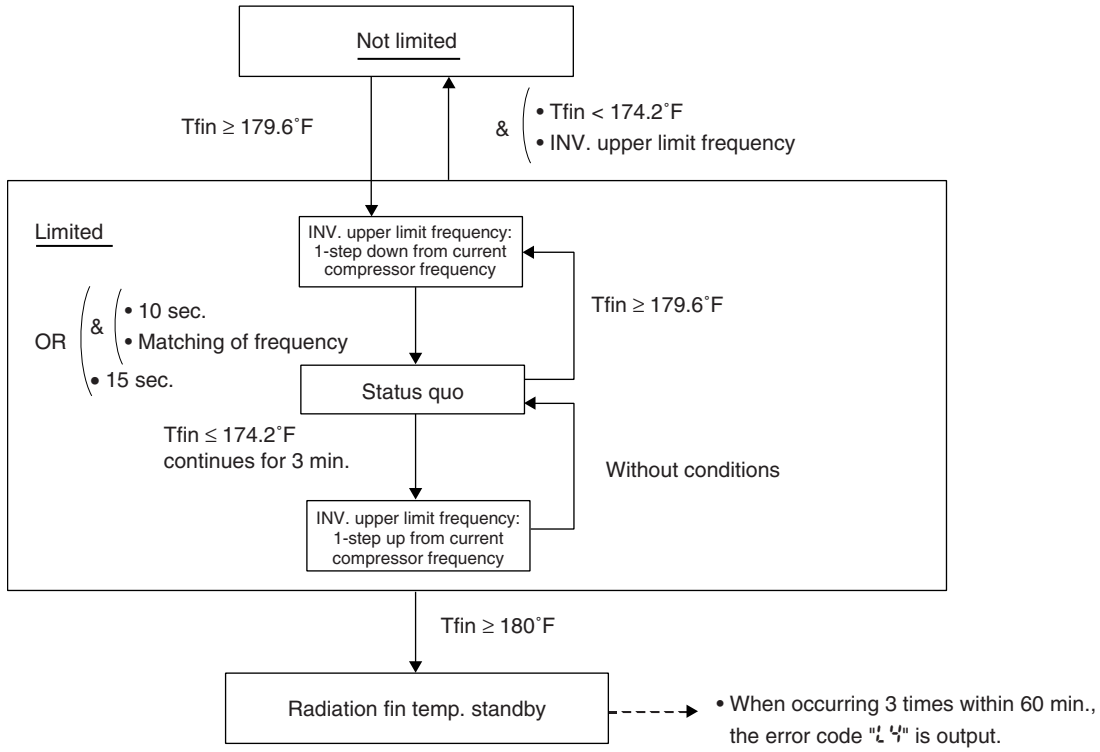
Tb: Outdoor unit heat exchanger temperature
Tfin: Radiation fin temperature
Inverter current protection control and radiation fin temperature control are performed to prevent tripping due to an error, or transient inverter overcurrent, and radiation fin temperature increase.

[Inverter overcurrent protection control]



	X A
Tb ≥ 77˚F	13.7
Tb < 77˚F	12.7

[Inverter radiation fin temperature control]



5. Other Control

5.1 Heating Operation Prohibition

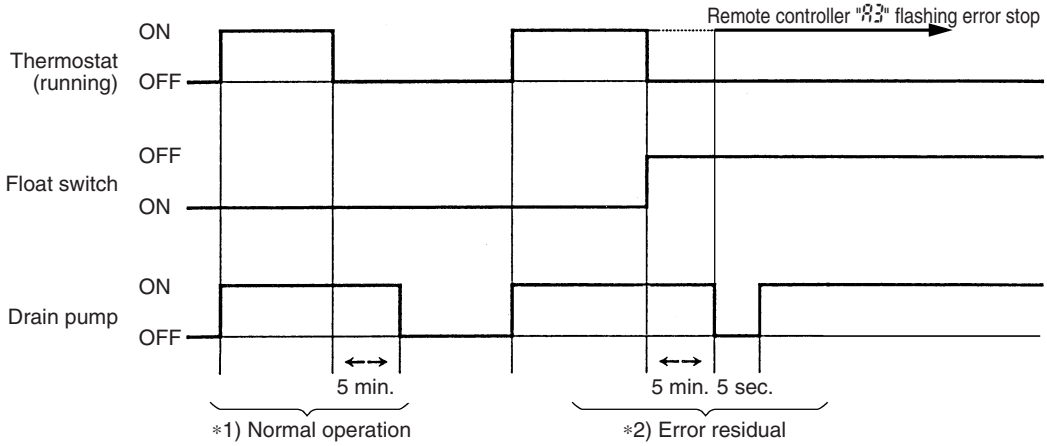
Heating operation is prohibited above 82°FDB outdoor air temperature.

6. Outline of Control (Indoor Unit)

6.1 Drain Pump Control

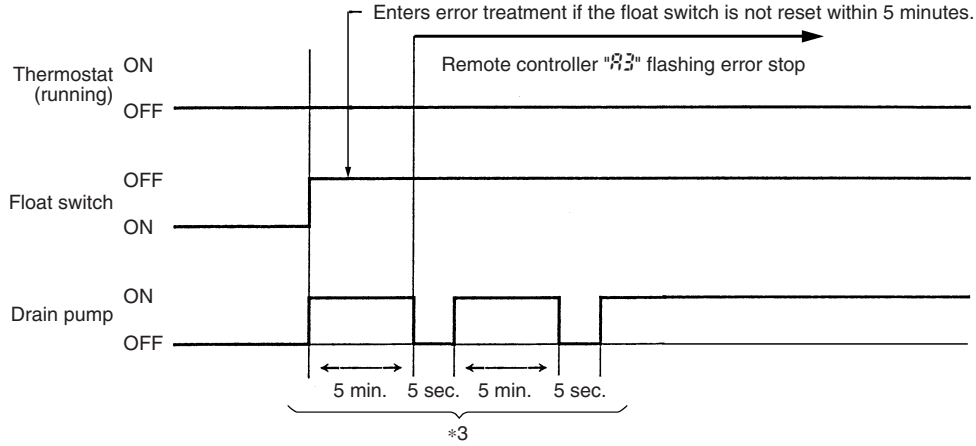
The drain pump is controlled by the ON/OFF buttons (4 button (1) - (4) given in the figure below).

6.1.1 When the Float Switch is Tripped while the Cooling Thermostat is ON:



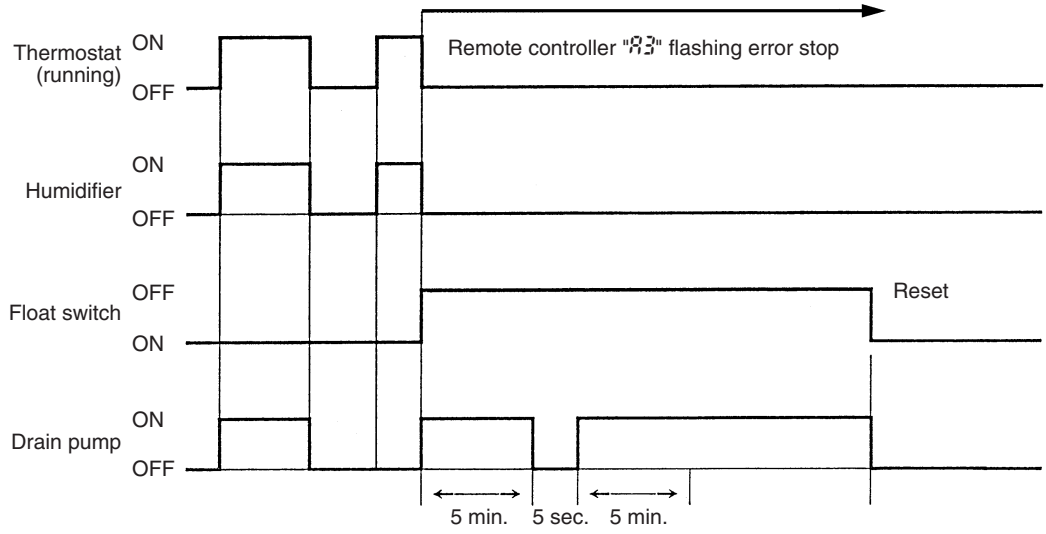
Note: ∗1. (Normal operation):
The objective of residual operation is to completely drain any moisture adhering to the fin of the indoor unit heat exchanger when the thermostat goes off during cooling operation.
∗2. (Error residual):
The remote controller will display "A3" and the air conditioner will come to an abnormal stop in 5 minutes if the float switch is turned OFF while the cooling thermostat is ON.

6.1.2 When the Float Switch is Tripped while the Cooling Thermostat is OFF:



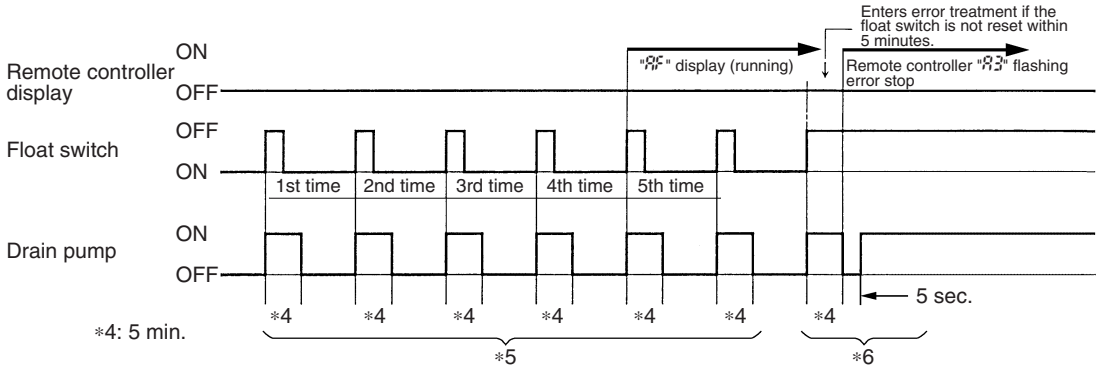
Note: ∗3. (Error residual): The remote controller will display "A3" and the air conditioner will come to an abnormal stop if the float switch is turned OFF and not turned ON again within 5 minutes while the cooling thermostat is OFF.

6.1.3 When the Float Switch is Tripped during Heating Operation:



Note: During heating operation, if the float switch is not reset even after the 5 minutes operation, 5 seconds stop, 5 minutes operation cycle ends, operation continues until the switch is reset.

6.1.4 When the Float Switch is Tripped and "AF" is Displayed on the Remote Controller:

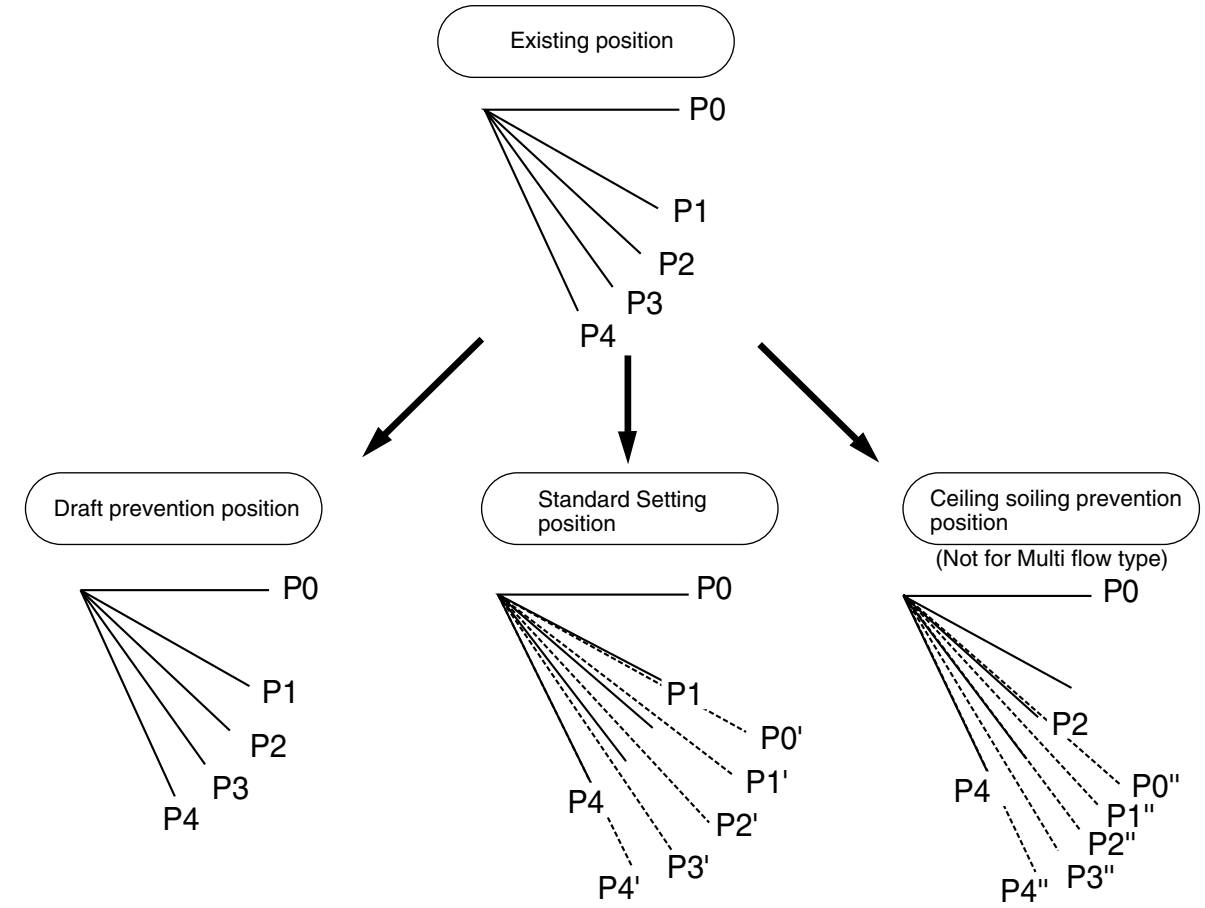


Note: ∗5. (Error residual):
If the float switch is tripped 5 times in succession, a drain error is determined to have occurred. "AF" is then displayed as operation continues.

∗6. (Error residual):
The remote controller will display "A3" and the air conditioner will come to an abnormal stop if the float switch is OFF for more than 5 minutes in the case of ∗5.

6.2 Louver Control for Preventing Ceiling Dirt

We have added a control feature that allows you to select the range of in which air direction can be adjusted in order to prevent the ceiling surrounding the air discharge outlet of ceiling mounted cassette type units from being soiled.



Draft prevention position	P0	P1	P2	P3	P4		Same as existing position
			Range of direction adjustment				
Standard position	Prohibited	P0'	P1'	P2'	P3'	P4'	Separated into 5 positions (P1 - 4)
			Range of direction adjustment				
Dirt prevention position	Prohibited		P0"	P1"	P2"	P3"	P4"	Separated into 5 positions (P2 - 4)

The factory setting position is standard position.

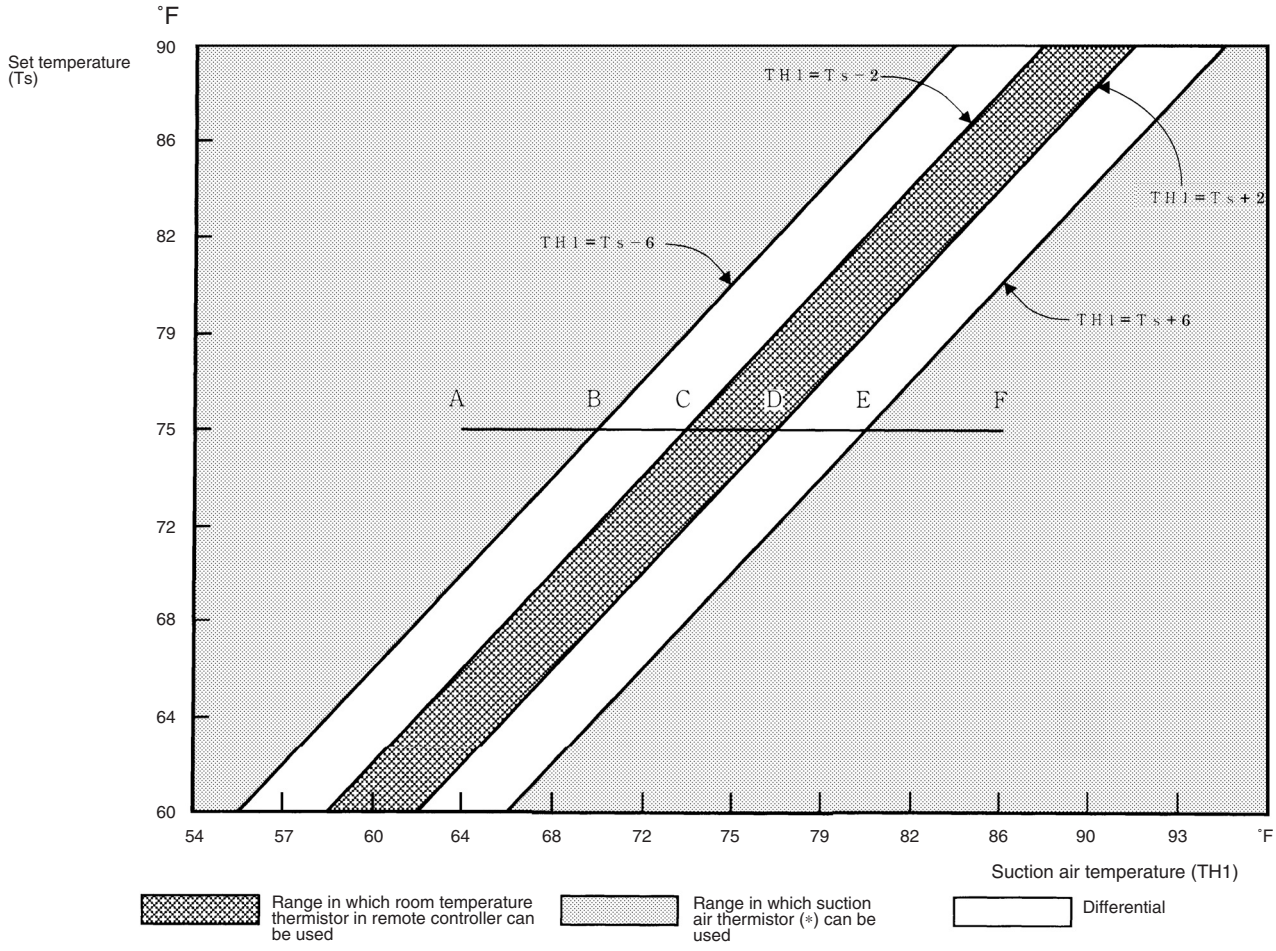
6.3 Room Temperature Thermistor in Remote Controller

Temperature is controlled by both the room temperature thermistor in remote controller and suction air thermistor (∗) in the indoor unit. (This is however limited to when the field setting for the room temperature thermistor in remote controller is set to “Use.”)

Note: When outdoor air is introduced to the air conditioner with mixed into indoor air, the room temperature may fail to be set temperature, since TS and TH1 do not enter the area of “use range of remote control thermistor.” In such a case, put the remote sensor (optional accessory) in your room, and use it with setting “do not use remote control thermostat.”
∗ For FTQ: Remote sensor (Optional accessory)

Cooling

If there is a significant difference in the set temperature and the suction air temperature, fine adjustment control is carried out using suction air thermistor (∗) in the indoor unit, or using the room temperature thermistor in the remote controller near the position of the user when the suction air temperature is near the set temperature.



■ **Ex: When cooling**

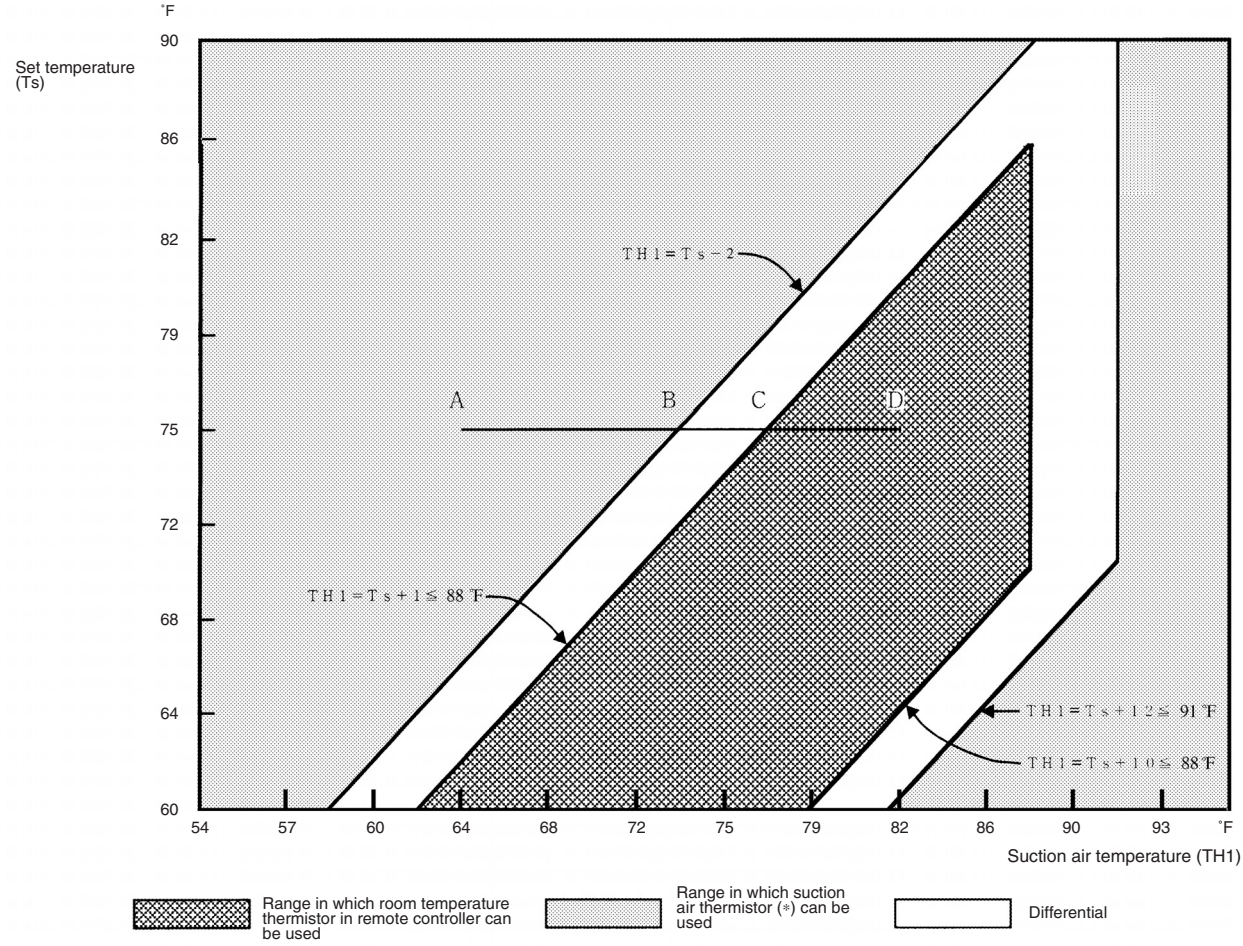
Assuming the set temperature in the figure above is 75°F, and the suction air temperature has changed from 64°F to 86°F (A → F):
(This example also assumes there are several other air conditioners, the system is off, and that temperature changes even when the thermostat is off.)
Suction air thermistor (∗) is used for temperatures from 64°F to 73°F (A → C).
Room temperature thermistor in remote controller is used for temperatures from 73°F to 81°F (C → E).
Suction air thermistor (∗) is used for temperatures from 81°F to 86°F (E → F).

And, assuming suction air temperature has changed from 86°F to 64°F (F → A):
Suction air thermistor (∗) is used for temperatures from 86°F to 77°F (F → D).
Room temperature thermistor in remote controller is used for temperatures from 77°F to 70°F (D → B).
Suction air thermistor (∗) is used for temperatures from 70°F to 64°F (B → A).

Note: ∗ For FTQ: Remote sensor (Optional accessory)

Heating

When heating, the hot air rises to the top of the room, resulting in the temperature being lower near the floor where the occupants are. When controlling by suction air thermistor (∗) only, the unit may therefore be turned off by the thermostat before the lower part of the room reaches the set temperature. The temperature can be controlled so that the occupied lower part of the room does not become cold by using the remote controller thermistor to widen the range so that the suction air temperature is higher than that of the set temperature.



■ **Ex: When heating**

Assuming the set temperature in the figure above is 75°F, and the suction air temperature has changed from 64°F to 82°F (A → D):

(This example also assumes there are several other air conditioners, the system is off, and that temperature changes even when the thermostat is off.)

Suction air thermistor (∗) is used for temperatures from 64°F to 77°F (A → C).

Room temperature thermistor in remote controller is used for temperatures from 77°F to 82°F (C → D).

And, assuming suction air temperature has changed from 82°F to 64°F (D → A):

Room temperature thermistor in remote controller is used for temperatures from 82°F to 73°F (D → B).

Suction air thermistor (∗) is used for temperatures from 73°F to 64°F (B → A).

Note: ∗ For FTQ: Remote sensor (Optional accessory)

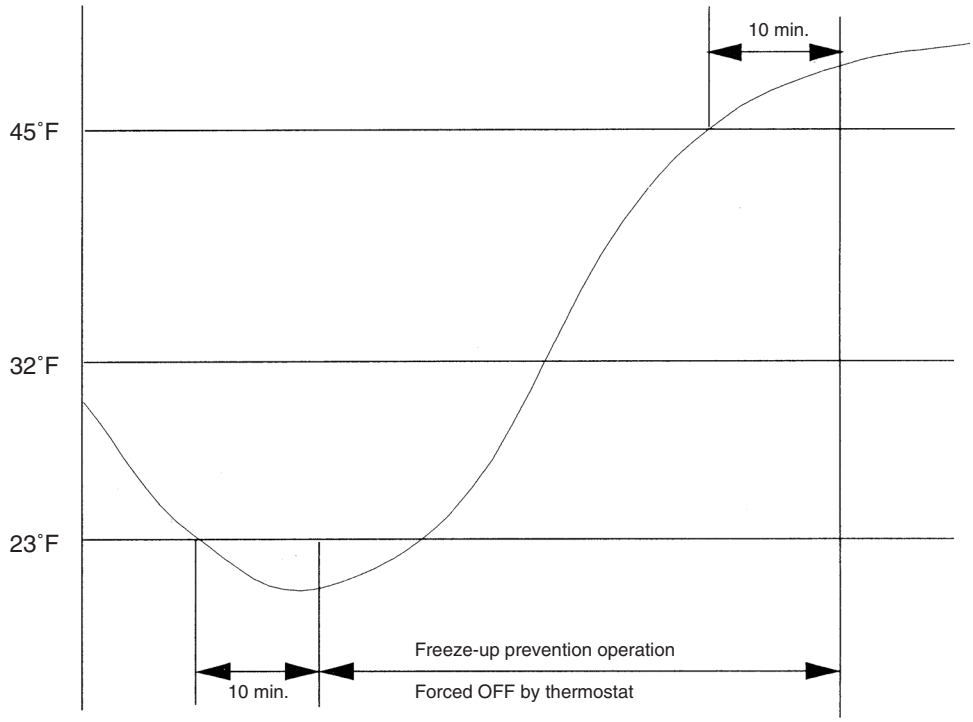
6.4 Freeze-up Prevention

Freeze-up Prevention by Off Cycle (Indoor Unit)

When the temperature detected by liquid pipe temperature thermistor of the indoor unit heat exchanger drops too low, the unit enters freeze-up prevention operation in accordance with the following conditions, and is also set in accordance with the conditions given below.

Conditions for starting freeze-up prevention: Temperature is 30°F or less for total of 40 minutes, or temperature is 23°F or less for a total of 10 minutes.
Conditions for stopping freeze-up prevention: Temperature is 45°F or more for 10 minutes. continuously.

Ex: Case where temperature is 23°F or less for total of 10 minutes.



6.5 View of Operations of Swing Flaps

Swing flaps work as following.

			Fan	Flap Control		
				FCQ	FHQ	FAQ
Heating	Hot-start from defrosting	Swinging	OFF	Level	Level	Level
		Setting the wind direction	OFF	Level	Level	Level
	Defrosting	Swinging	OFF	Level	Level	Level
		Setting the wind direction	OFF	Level	Level	Level
	Thermostat is off	Swinging	LL	Level	Level	Level
		Setting the wind direction	LL	Level	Level	Level
	Hot-start from the state that the thermostat is off	Swinging	LL	Level	Level	Level
		Setting the wind direction	LL	Level	Level	Level
	Halt	Swinging	OFF	Level	Level	Level
		Setting the wind direction	OFF	Level	Level	Level
Cooling	Thermostat of program dry is on	Swinging	L[*1]	Swinging	Swinging	Swinging
		Setting the wind direction	L[*1]	Set up	Set up	Set up
	Thermostat of program dry is off	Swinging	OFF or L	Swinging	Swinging	Swinging
		Setting the wind direction		Set up	Set up	Set up
	Cooling thermostat is off	Swinging	Set up	Swinging	Swinging	Swinging
		Setting the wind direction	Set up	Set up	Set up	Set up
	Halt	Swinging	OFF	Level	Level	Level
		Setting the wind direction	OFF	Set up	Level	Level
	Micro-computer is controlled (including the cooling state)	Swinging	L	Swinging	Swinging	Swinging
		Setting the wind direction	L	Set up	Set up	Set up

* 1. Only in FCQ case, L or LL.

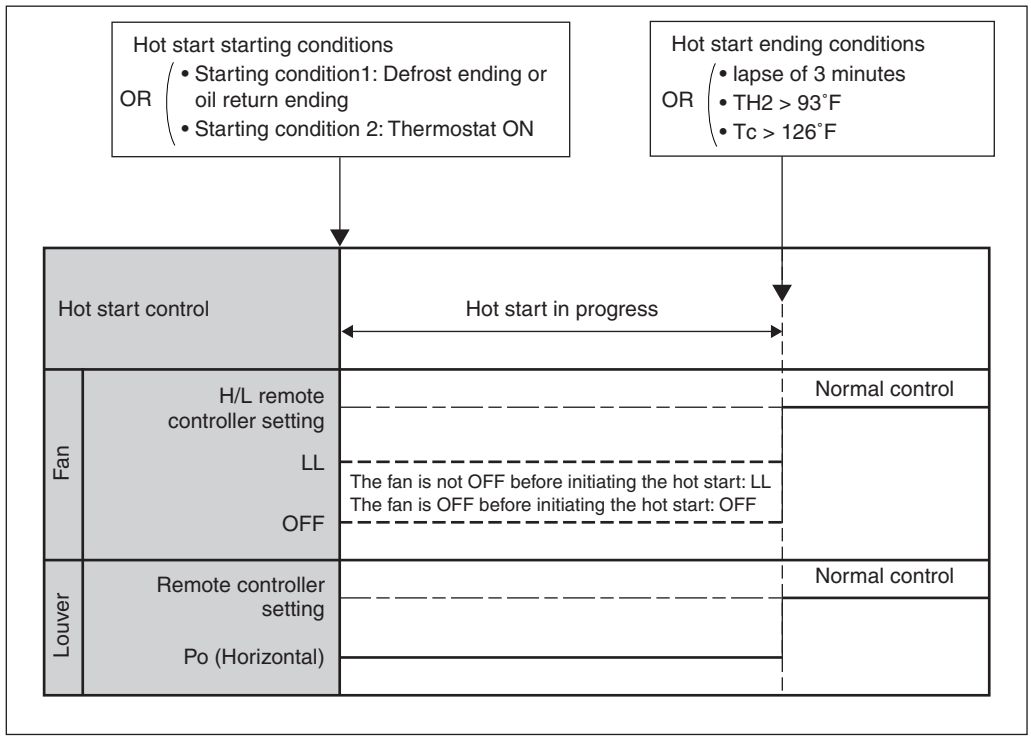
6.6 Hot Start Control (In Heating Operation Only)

■ **FCQ, FHQ, FAQ**

At startup with thermostat ON or after the completion of defrosting in heating operation, the indoor unit fan is controlled to prevent cold air from blasting out and ensure startup capacity.

[Detail of operation]

When either the **starting condition 1** or the **starting condition 2** is established, the operations shown below will be conducted.



TH_2: Temperature detected with the gas thermistor

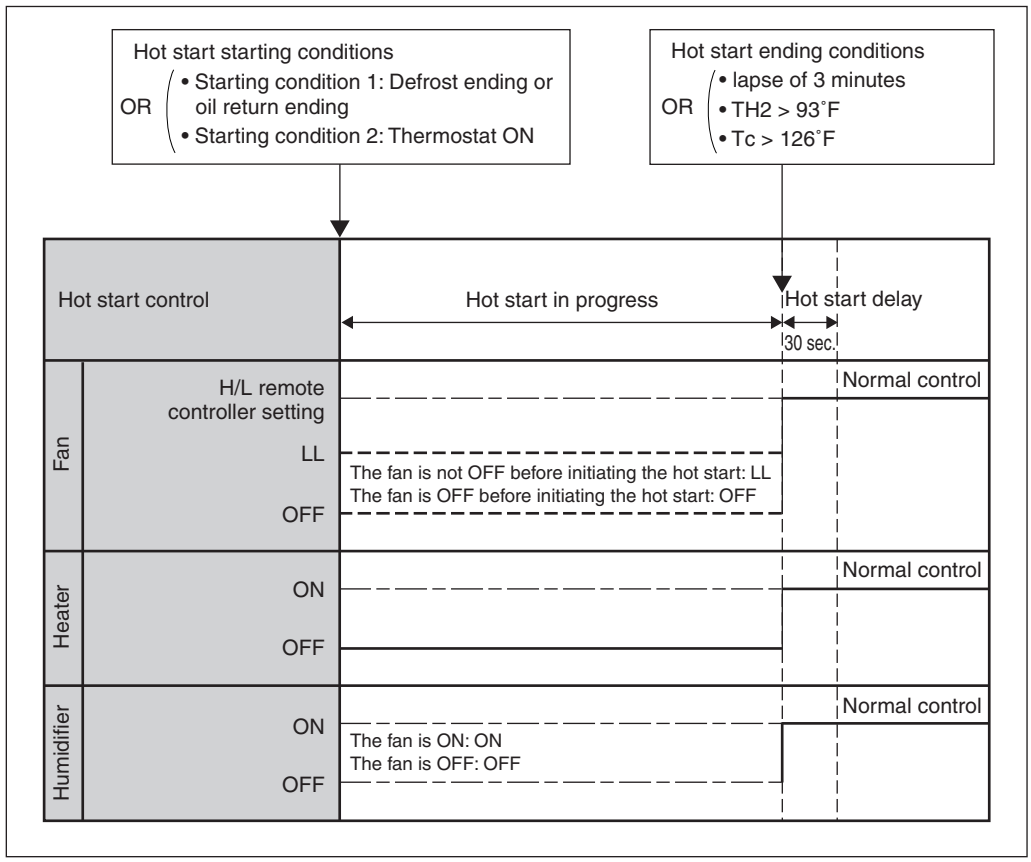
TC: High pressure equivalent saturated temperature

■ **FTQ**

At startup with thermostat ON or after the completion of defrosting in heating operation, the indoor unit fan is controlled to prevent cold air from blasting out and ensure startup capacity.

[Detail of operation]

When either the **starting condition 1** or the **starting condition 2** is established, the operations shown below will be conducted.



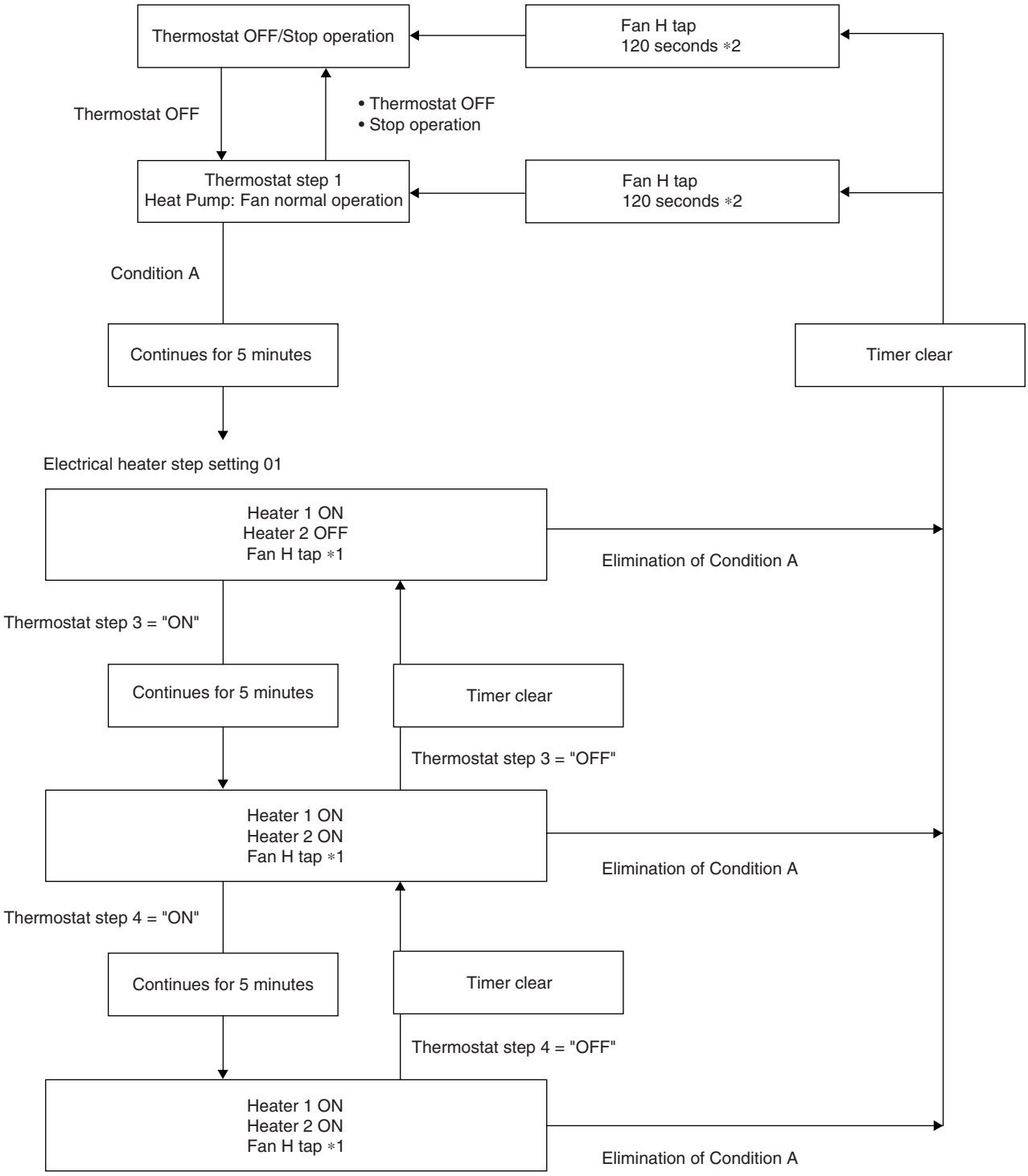
TH_2: Temperature detected with the gas thermistor

TC: High pressure equivalent saturated temperature

6.7 Heater Control (Only for FTQ)

6.7.1 Auxiliary Electric Heater

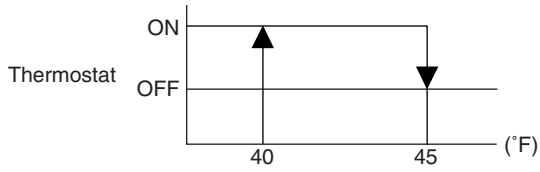
If heating is insufficient in the heat pump system alone, an electrical heater is to be used as the auxiliary heater. The following shows the ON/OFF conditions for the electric heater.



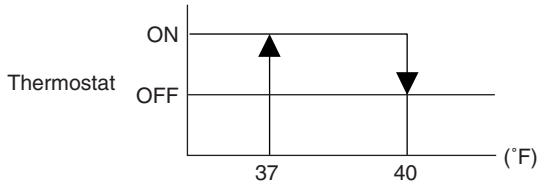
Condition A

& (
- Thermostat step 2 = "ON"
- Heating mode
- Not during test operation
- Not during control operation
- High pressure condition = "ON" ∗3
- Liquid pipe temperature condition = "ON" ∗4
- Electrical heater setting = "3"
)

Note: ∗1: Fixing of the fan H tap
∗2: The operation should continue for a certain period of time after the heater turns OFF.
∗3: High pressure condition

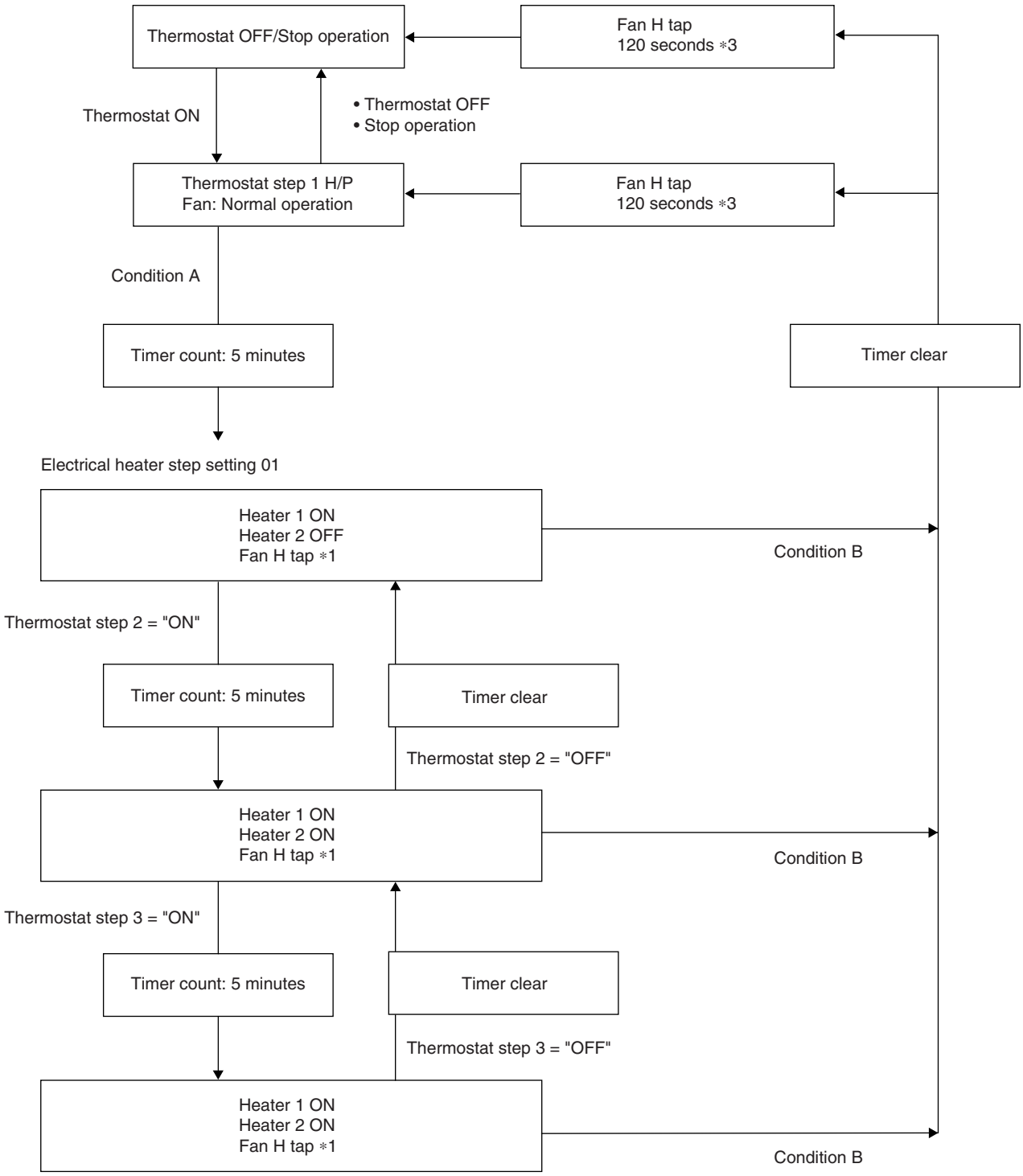


∗4: Liquid pipe temperature condition



6.7.2 Heat Pump Lockout Mode

During heating operation, users can select an electrical heater for heating. For this, signals are sent using ABC terminal of outdoor unit PCB.
When the hot-water heating signal is received from the outdoor unit PCB, heating operation is performed only with the heater as manual backup operation. The ON/OFF conditions for this electrical heater are shown below.



Condition A

& (
- Heating mode
- Thermostat step 1 = "ON"
- Not during fan residual operation
- & (OR (• [Electrical heater setting] = "01" • [Electrical heater setting] = "03") • Hot-water heater = "1" (ON))
)

Condition B

OR (
- Elimination of Condition A
- Indoor unit error [Stop due to error]
- Indoor unit error [Abnormal stop]
- Indoor unit error [Remote control thermistor error]
- Indoor unit error [Suction air thermistor error]
- During defrosting or oil return operation
)

} Heater backup prohibiting conditions ∗2

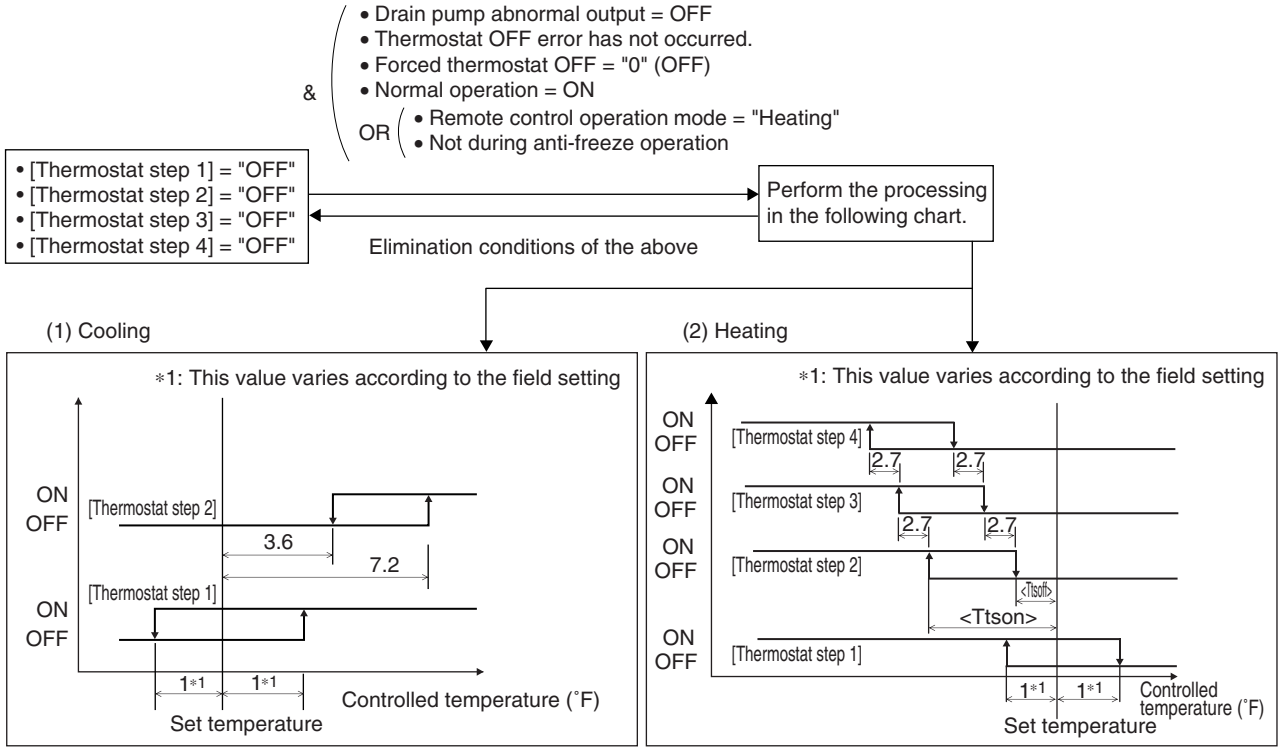
Note: ∗1: Fixing of the fan H tap.
∗2: The heater backup prohibiting conditions are prioritized. Even when the heater ON conditions are met, the heater is turned OFF when the prohibiting conditions are met.
∗3: The operation must continue for a certain period of time after the heater turns OFF.
4: The thermostat steps for this control comply with the “6.8 4 Step Thermostat Processing (Only for FTQ)”.

6.8 4 Step Thermostat Processing (Only for FTQ)

[Outline]

The thermostat ON/OFF for the indoor unit is controlled in accordance with [Thermostat Step 1]. The heater ON/OFF operation during heating is controlled in accordance with [Thermostat Step 2, 3, or 4] or [Thermostat Step 1, 2, or 3].
For more details of the heater, see 6.7 Heater control.

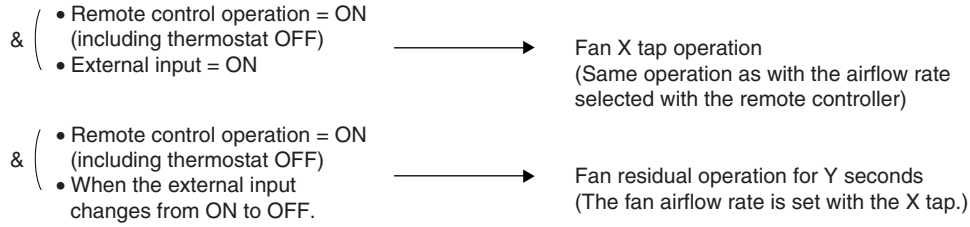
[Detail]



6.9 Interlocked with External Equipment (Only for FTQ)

6.9.1 Humidifier

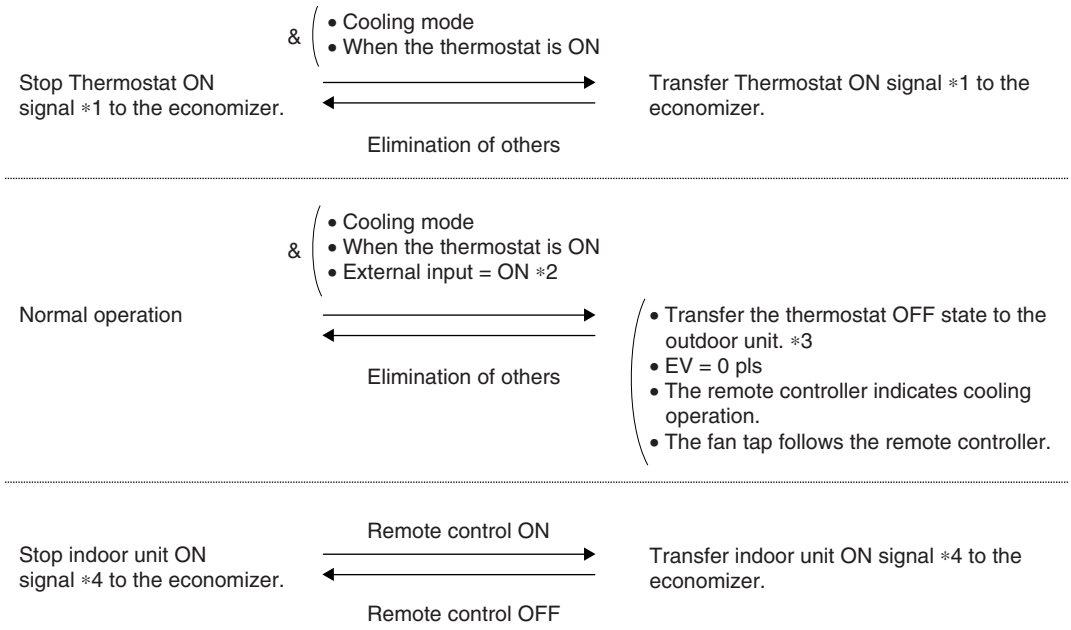
When a humidifier is connected onsite, the fan operates with the airflow rate set of the remote controller or with the H tap.



Note:
1. This control is different from connection of humidifier and it is used for humidifiers locally connected in North America.
2. External input ON is an input signal to the “X12A” terminal on the PCB for additional I/O.

6.9.2 Economizer

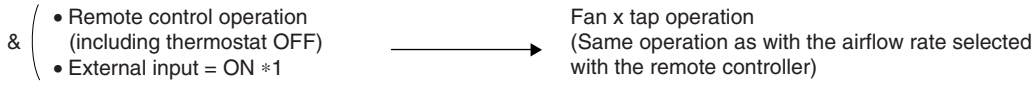
When indoor and outdoor temperatures are reversed, the compressor is stopped to let in the outdoor air to save energy.
This operation is called economizer operation, and the equipment to detect indoor and outdoor temperatures and open and close the damper to perform this operation is called an economizer.
The economizer detects indoor and outdoor temperatures, informs the air conditioner that the economizer operation is ready, and opens and closes the damper.
The indoor unit stops the outdoor unit when it receives a signal from the economizer and performs air supply operation.
When the indoor temperature is cooled down sufficiently by the economizer operation, and it is no longer necessary (thermostat OFF), the indoor unit outputs a signal to the economizer to close the damper.



Note:
∗1 Thermostat ON signal: A signal to turn ON the indoor unit thermostat and allow the economizer to open the damper.
It turns ON the relay on the “X8A side of X23A” on the PCB for additional I/O.
∗2 External input ON is an input signal to the “X11A” terminal on the PCB for additional I/O.
∗3 To stop the compressor while the economizer is in operation to save energy.
∗4 Remote control ON signal: Contact output which shows the operating status of the indoor unit. This signal turns on the relay “on the opposite side of X8A of X23A” on the PCB for additional I/O.

6.9.3 Air Purifier

When an air purifier is connected onsite, the fan is operated with the airflow rate set of the remote controller or with the H tap.



Note:
∗1 External input ON is an input signal to the “X25A” terminal on the PCB for additional I/O.

Part 4
Test Operation

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1. Test Operation

1.1 Procedure and Outline

Follow the following procedure to conduct the initial test operation after installation.

1.1.1 Check Work Prior to Turn Power Supply ON

Check the below items.
- Power wiring
- Control transmission wiring between units
- Ground wire

⇩

Check on refrigerant piping

⇩

Check on amount of refrigerant charge

- ○ Is the power supply single-phase 208-230V / 60Hz?
- ○ Have you completed the drain piping?
- ○ Have you detach transport fitting?
- ○ Is the wiring performed as specified?
- ○ Are the designated wires used?
- ○ Is the grounding work completed?
  Use a 500V megger tester to measure the insulation.
  - Do not use a megger tester for other circuits than 200-230V circuit.
- ○ Are the setscrews of wiring not loose?
- ○ Is the electrical component box covered with an insulation cover completely?

- ○ Is pipe size proper? (The design pressure of this product is 478 psi.)
- ○ Are pipe insulation materials installed securely?
  Liquid and gas pipes need to be insulated. (Otherwise causes water leak.)
- ○ Are respective stop valves on liquid and gas line securely open?

- ○ Is refrigerant charged up to the specified amount?
  If insufficient, charge the refrigerant from the service port of stop valve on the liquid side with outdoor unit in stop mode after turning power ON.
- ○ Has the amount of refrigerant charge been recorded on “Record Chart of Additional Refrigerant Charge Amount”?

1.1.2 Turn Power On

Turn outdoor unit power ON.

⇩

Turn indoor unit power ON.

⇩

Carry out field setting on outdoor unit PCB

- ○ Be sure to turn the power on 6 hours before starting operation to protect compressors.
- ○ Close outside panels of the outdoor unit.

1.1.3 Check Operation

* During check operation, mount front panel to avoid the misjudging.
* Check operation is mandatory for normal unit operation.
  (When the check operation is not executed, alarm code "U3" will be displayed.)

Press and hold the TEST button (BS4) on outdoor unit PCB for 5 seconds.

↓

Check on operation

○ The test operation is started automatically.
The following judgements are conducted within 15 minutes (about 30 minutes at the maximum).
- "Check for wrong wiring"
- "Check stop valve for not open"
- "Check for refrigerant charge"
- "Pipe length automatic judgement"

The following indications are conducted while in test operation.
- LED lamp on outdoor unit PCB — H2P blinks (test operation)
- Remote controller — Indicates "Under Centralized Control" on upper right.
  Indicates "Test Operation" on lower left

On completion of test operation, LED on outdoor unit PCB displays the following.
H3P ON: Normal completion
H2P and H3P ON: Abnormal completion → Check the indoor unit remote controller for abnormal display and correct it.

	H1P	H2P	H3P	H4P	H5P	H6P	H7P
(For normal completion)	●	●	○	●	●	●	●
(For abnormal completion)	●	○	○	●	●	●	●

Error code

In case of an error code displayed on remote controller:

Error code	Nonconformity during installation	Remedial action
E3	The stop valve of outdoor unit is left closed.	Open the gas-side stop valve and the liquid-side stop valve.
	Refrigerant overcharge.	Recalculate the required amount of refrigerant from the piping length and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.
E4	The stop valve of outdoor unit is left closed.	Open the gas-side stop valve and the liquid-side stop valve.
	Insufficient refrigerant.	Check if the additional refrigerant charge has been finished correctly.
		Recalculate the required amount of refrigerant from the piping length and add an adequate amount of refrigerant.
F3	Refrigerant overcharge.	Recalculate the required amount of refrigerant from the piping length and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.
	The stop valve of outdoor unit is left closed.	Open the gas-side stop valve and the liquid-side stop valve.
	Insufficient refrigerant.	Check if the additional refrigerant charge has been finished correctly.
		Recalculate the required amount of refrigerant from the piping length and add an adequate amount of refrigerant.
F6	Refrigerant overcharge	Recalculate the required amount of refrigerant from the piping length and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.
U2	Insufficient supply voltage	Check to see if the supply voltage is supplied properly.
U3	If a check operation has not been performed.	Perform a check operation.
U4	No power is supplied to outdoor unit.	Turn the power on for the outdoor unit.
UF	The stop valve of outdoor unit is left closed.	Open the gas-side stop valve and the liquid-side stop valve.
	If the right indoor unit piping and wiring are not properly connected to the outdoor unit.	Make sure that the right indoor unit piping and wiring are properly connected to the outdoor unit.
UH	If the interunit wiring has not be connected or it has shorted.	Make sure the interunit wiring is correctly attached to terminals (X2M) F1/F2 (TO IN/D UNIT) on the outdoor unit PCB.

1.1.4 Confirmation on Normal Operation

- Conduct normal unit operation after the check operation has been completed.
  (When outdoor air temperature is 82°FDB or higher, the unit can not be operated with heating mode. See the installation manual attached.)
- Confirm that the indoor/outdoor units can be operated normally.
  (When an abnormal noise due to liquid compression by the compressor can be heard, stop the unit immediately, and then on the crankcase heater to heat up it sufficiently, then start operation again.)
- Operate indoor unit one by one to check that the corresponding outdoor unit operates.
- Confirm that the indoor unit discharges cold air (or warm air).
- Operate the air direction control button and airflow rate control button to check the function of the devices.

1.2 Operation when Power is Turned ON

1.2.1 When Turning ON Power First Time

The unit cannot be run for up to 12 minutes to automatically set the master power and address (indoor-outdoor address, etc.).

Status

Outdoor unit	Test lamp H2P .... Blinks Can also be set during operation described above.
Indoor unit	If ON button is pressed during operation described above, the "UH" error indicator blinks. (Returns to normal when automatic setting is complete.)

1.2.2 When Turning ON Power the Second Time and Subsequent

Tap the RESET(BS5) button on the outdoor unit PCB. Operation becomes possible for about 2 minutes. If you do not press the RESET button, the unit cannot be run for up to 10 minutes to automatically set master power.

Status

Outdoor unit	Test lamp H2P .... Blinks Can also be set during operation described above.
Indoor unit	If ON button is pressed during operation described above, the operation lamp lights but the compressor does not operate. (Returns to normal when automatic setting is complete.)

1.2.3 When an Indoor Unit or Outdoor Unit has been Added, or Indoor or Outdoor Unit PCB has been Changed

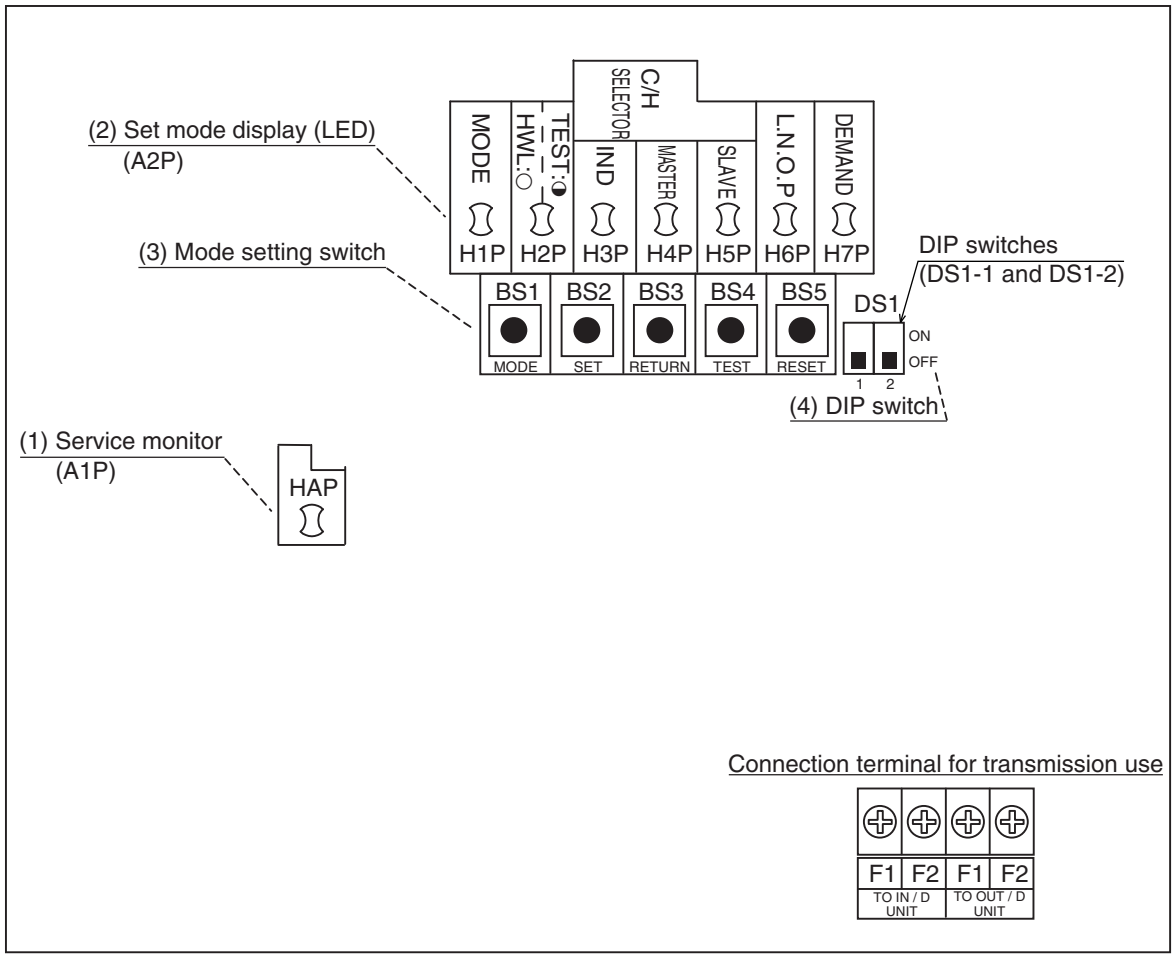
Be sure to press and hold the RESET button for 5 seconds. If not, the addition cannot be recognized. In this case, the unit cannot be run for up to 12 minutes to automatically set the address (indoor-outdoor address, etc.)

Status

Outdoor unit	Test lamp H2P .... ON Can also be set during operation described above.
Indoor unit	If ON button is pressed during operation described above, the "UH" or "U4" error indicator blinks. (Returns to normal when automatic setting is complete.)

2. Outdoor Unit PCB Layout

Outdoor unit PCB



(1) Service monitor (LED Green)
This LED blinks while in normal operation, and turns on or off when an error occurs.

(2) Set mode display (LED Orange)
LEDs display mode according to the setting.

(3) Mode setting switch
Used to change mode.

(4) DIP switch
Used to make field setting

3. Field Setting

3.1 Field Setting from Remote Controller

Individual function of indoor unit can be changed from the remote controller. At the time of installation or after service inspection / repair, make the local setting in accordance with the following description.
Wrong setting may cause error.
(When optional accessory is mounted on the indoor unit, setting for the indoor unit may be required to change. Refer to information in the option handbook.)

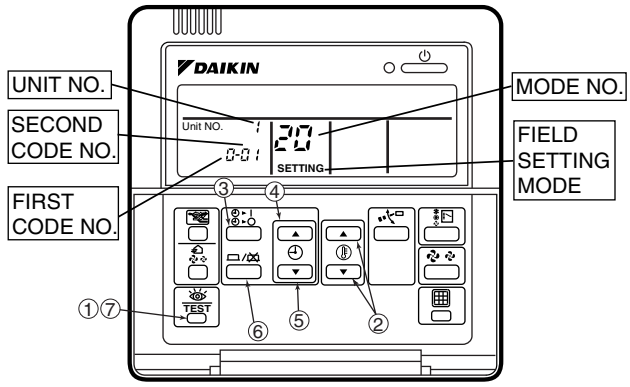
3.1.1 Wired Remote Controller

■ **Applicable Models**

Model Series	FCQ	FHQ	FAQ	FTQ
Wired Remote Controller with Weekly Schedule Timer	BRC1D71			
Navigation Remote Controller	BRC1E71			

■ **BRC1D71**

If optional accessories are mounted on the indoor unit, the indoor unit setting may have to be changed. Refer to the instruction manual for each optional accessory.



1. When in the normal mode, press the “ ” button (①) for 4 seconds or more, and the FIELD SETTING MODE is entered.
2. Select the desired MODE NO. with the “ ” button (②).
3. During group control, when setting by each indoor unit (mode No. 20, 22 and 23 have been selected), press the “ ” button (③) and select the INDOOR UNIT NO. to be set. (This operation is unnecessary when setting by group.)
4. Press the “ ” upper button (④) and select FIRST CODE NO.
5. Press the “ ” lower button (⑤) and select the SECOND CODE NO.
6. Press the “ ” button (⑥) once and the present settings are SET.
7. Press the “ ” button (⑦) to return to the NORMAL MODE.

■ **Example**

When setting the filter sign time to “Filter Contamination Heavy” in all group unit setting, set the Mode No. to “10”, first code No. to “0” and second code No. to “02”.

■ **BRC1E71**

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

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

3 Highlight the mode, and select desired “Mode No.” by using ▲▼ (Up/Down) button.

4 In the case of setting per indoor unit during group control (When Mode No. such as 20 , 21 , 22 , 23 , 25 are selected), highlight the unit No. and select “Indoor unit No.” to be set by using ▲▼ (Up/Down) button.
(In the case of group total setting, this operation is not needed.)

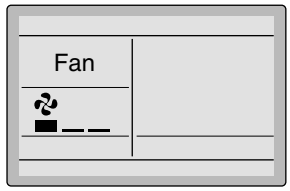
In the case of individual setting per indoor unit, current settings are displayed. And, SECOND CODE NO. “ - ” means no function.

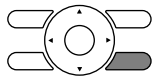
5 Highlight SECOND CODE NO. of the FIRST CODE NO. to be changed, and select desired “SECOND CODE NO.” by using ▲▼ (Up/Down) button. Multiple identical mode number settings are available.

In case of setting for all indoor units in the remote control group, available SECOND CODE NO. is displayed as “ ∗ ” which means it can be changed.
When SECOND CODE NO. is displayed as “ - ”, there is no function.

<Basic screen>

1

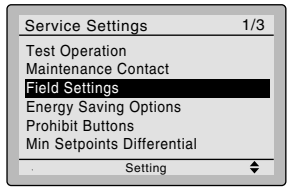


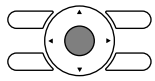


Press and hold Cancel button for 4 seconds or more during backlight lit.

<Service Settings menu screen>

2



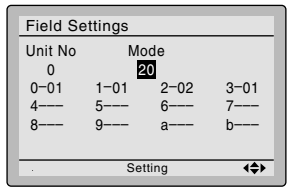


Press Menu/OK button.

<Service Settings screen>

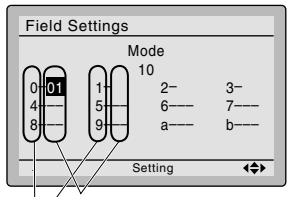
In the case of individual setting per indoor unit

3
4
5

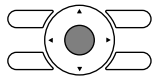


In the case of group total setting

3
5



SECOND CODE NO.
FIRST CODE (SW) NO.



Press Menu/OK button.

6 Press Menu/OK button. Setting confirmation screen is displayed.

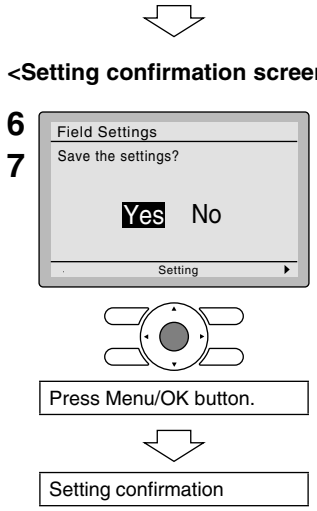
7 Select Yes and press Menu/OK button. Setting details are determined and field settings screen returns.

8 In the case of multiple setting changes, repeat "**3**" to "**7**".

9 After all setting changes are completed, press Cancel button twice.

10 Backlight goes out, and "Checking the connection. Please standby." is displayed for initialization. After the initialization, the basic screen returns.

<Setting confirmation screen>

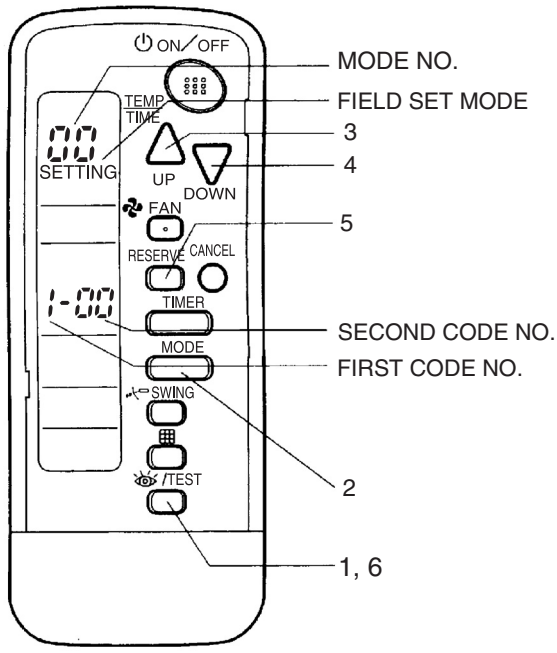


NOTE

- Installation of optional accessories on the indoor unit may require changes to field settings. See the manual of the optional accessory.
- For field setting details related to the indoor unit, see installation manual shipped with the indoor unit.

3.1.2 Wireless Remote Controller

BRC7C812
BRC7E83
BRC7E818



1. When in the normal mode, press the /TEST button for 4 seconds or more, and operation then enters the “field setting mode.”
2. Select the desired “mode No.” with the MODE button.
3. Pressing the UP button, select the first code No.
4. Pressing the DOWN button, select the second code No.
5. Press the timer RESERVE button and check the settings.
6. Press the /TEST button to return to the normal mode.

(Example)
When setting the filter sign time to “Filter Dirtiness-High” in all group unit setting, set the Mode No. to “10”, Mode setting No. to “0” and second code No. to “02”.

3.2 Field Setting from Remote Controller (Indoor Unit)

3.2.1 Setting Contents and Code No.

: Factory setting

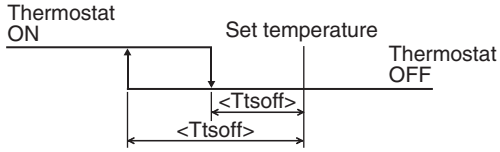
Mode No.	First Code No.	Description of Setting	Second Code No.			
			01	02	03	04
10 (20)	0	Filter cleaning sign time	Light	Heavy	—	—
	0 ∗5	Filter dirt	Light	Heavy	—	—
	1	Filter type	Long-life filter	Ultra-long-life filter	—	—
	1 ∗5	Filter cleaning sign time (Light/Heavy)	2,500/1,250	10,000/5,000	—	—
	2	Remote controller thermistor	Use	Not use	—	—
	2 ∗5	Remote sensor and remote controller thermistor	Both	Remote thermistor	Remote controller thermistor	—
	3	Filter sign display	ON	OFF	—	—
	7	4-step thermostat processing	Symbol ∗6: 01	02	03	04 / 05 / 06
			Ttson: -7.2°F	-6.3°F	-5.4°F	-4.5°F / -3.6°F / -2.7°F
			Ttsoff: -3.6°F	-2.7°F	-1.8°F	-0.9°F / 0°F / -0.9°F
11 (21)	3 ∗5	Electric heater setting	Heat Pump lockout mode	—	Auxiliary electric heater + Heat Pump lockout mode	—
	5 ∗5	Electric heater step setting	With heater	—	Without heater	—
12 (22)	0	Optional accessories output selection (Field selection of output for adaptor for wiring)	Indoor Unit turned ON by thermostat	—	Operation output	Error output
	1	ON/OFF Input from outside (Set when ON/OFF is to be controlled from outside.)	Forced Off	ON/OFF control	External protection device input	—
	2	Thermostat differential changeover (Set when remote sensor is to be used.)	2 °F	1 °F ∗7	—	—
	3	Set fan speed when thermostat OFF	LL	Set fan speed	—	—
	5	Power failure automatic reset (Auto restart)	No equipped	Equipped	—	—
13 (23)	0	Airflow adjustment ceiling height	N	H	S	—
	1	Airflow direction	F (4 directions)	T (3 directions)	W (2 directions)	—
	4	Field setting airflow position setting	Draft prevention	Standard	Ceiling soiling prevention	—
14 (24)	4 ∗5	Setting of humidifier / air purifier fan tap	Remote controller setting	H tap	—	—
	5 ∗5	Humidifier residual operation time	30 sec.	60 sec.	120 sec.	—

Note:

1. Settings are made simultaneously for the entire group, however, if you select the mode No. inside parentheses, you can also set by each individual unit. Setting changes however cannot be checked except in the individual mode for those in parentheses.
2. The mode numbers inside parentheses cannot be used by wireless remote controllers, so they cannot be set individually. Setting changes also cannot be checked.
3. Do not make settings other than those described above. Nothing is displayed for functions the indoor unit is not equipped with.
4. "88" may be displayed to indicate the remote controller is resetting when returning to the normal mode.

∗5. Only for FTQ

∗6.



∗7. For FTQ: Factory setting is "02".

3.2.2 Applicable Range of Field Setting

Mode No.	First Code No.	Description of Setting	FCQ	FHQ	FAQ	FTQ
10 (20)	0	Filter cleaning sign time	○	○	○	—
	0	Filter dirt	—	—	—	○
	1	Filter type	○	—	—	—
	1	Filter cleaning sign time	—	—	—	○
	2	Remote controller thermistor	○	○	○	—
	2	Remote sensor and remote controller thermistor	—	—	—	○
	3	Filter sign display	○	○	○	○
	7	4-step thermostat processing	—	—	—	○
11 (21)	3	Electric heater setting	—	—	—	○
	5	Electric heater step setting	—	—	—	○
12 (22)	0	Optional accessories output selection	○	○	○	○
	1	ON/OFF Input from outside	○	○	○	○
	2	Thermostat differential changeover	○	—	—	—
	3	Set fan speed when thermostat OFF	○	○	○	○
	5	Power failure automatic reset (Auto Restart)	○	○	○	○
13 (23)	0	Airflow adjustment ceiling height	○	○	—	—
	1	Airflow direction	○	—	—	—
	4	Field setting airflow position setting	○	—	—	—
14 (24)	4	Setting of humidifier / air purifier fan tap	—	—	—	○
	5	Humidifier residual operation time	—	—	—	○

3.2.3 Detailed Explanation of Setting Modes

Filter Sign Setting

If switching the filter sign ON time, set as given in the table below.

Filter Specs. / Setting	Mode No.	First Code No.	Second Code No.	Lighting interval of the filter sign (hours)		
				Standard	Long Life	Ultra Long Life Filter
Contamination Light	10(20)	0	01	200 hrs.	2,500 hrs.	10,000 hrs.
Contamination Heavy			02	100 hrs.	1,250 hrs.	5,000 hrs.

Electrical Heater Setting

Selection of the heater

The capacity of the electrical heater should be selected locally.

Mode No.	First Code No.	Second Code No.	Setting
11(21)	3	01	Heat Pump lockout mode
		03	Auxiliary electric heater + Heat Pump lockout mode

01: When the heating capacity of the heat pump is insufficient during heating, the heat pump is stopped and heating operation is performed with an electrical heater. (It is switched by a hot-water heating instruction from the outdoor unit.)

03: If heating is insufficient in heat pump system alone, an electrical heater is used as the auxiliary electric heater.

Electrical Heater Step Setting

Mode No.	First Code No.	Second Code No.	Setting
11(21)	5	01	With heater
		03	Without heater

01: Controls ON/OFF of the heater in accordance with the thermostat step.

03: Without heater

Fan Speed Changeover when Thermostat is OFF

By setting to “Set Fan Speed,” you can switch the fan speed to the set fan speed when the heating thermostat is OFF.

∗ Since there is concern about draft if using “fan speed up when thermostat is OFF,” you should take the setup location into consideration.

On warming, the priority is given to this over "airflow OFF switch on thermostat off".

◎This is used to correspond with the improvement of the electrical collection capability.

Mode No.	First Code No.	Second Code No.	Setting
12(22)	3	01	LL Fan Speed
		02	Set Fan Speed

Auto Restart after Power Failure Reset

For the air conditioners with no setting for the function, the units will be left in the stop condition when the power supply is reset automatically after power failure reset or the main power supply is turned on again after once turned off. However, for the air conditioners with the setting (same as factory setting), the units may start automatically after power failure reset or the main power supply turned on again (return to the same operation condition as that of before power failure).

For the above reasons, when the unit is set enabling to utilize “Auto restart function after power failure reset”, utmost care should be taken in the following circumstances:

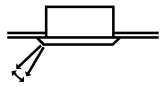
⚠ Caution

1. The air conditioner starts operation suddenly after power failure reset or the main power supply turned on again..

2. During servicing, if the main power switch is turned off, and then back on again after completion, the unit will startup and the fan will rotate.

Setting of Airflow Direction Adjustment Range

Make the following airflow direction setting according to the respective purpose.



Mode No.	First Code No.	Second Code No.	Setting
13 (23)	4	01	Upward (Draft prevention)
		02	Standard
		03	Downward (Ceiling soiling prevention)

3.2.4 Setting of Operation Control Mode from Remote Controller (Local Setting)

The operation control mode is compatible with a variety of controls and operations by limiting the functions of the operation remote controller. Furthermore, operations such as remote controller ON/OFF can be limited in accordance with the combination conditions. (Refer to information in the next page.)
Centralized controller is normally available for operations. (Except when centralized monitor is connected)

3.2.5 Contents of Control Modes

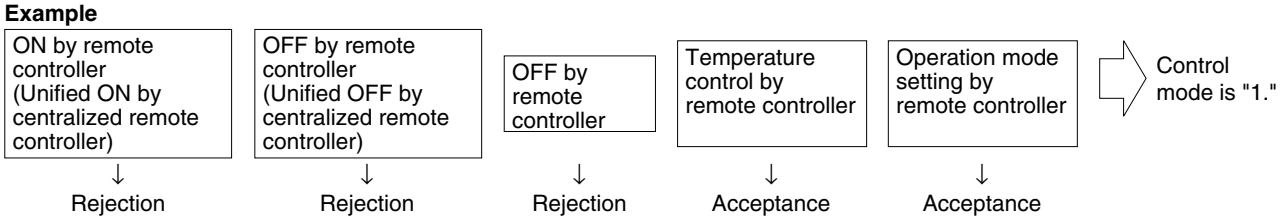
Twenty modes consisting of combinations of the following 5 operation modes with temperature and operation mode setting by remote controller can be set and displayed by operation modes 0 through 19.

- ON/OFF control impossible by remote controller
  Used when you want to turn ON/OFF by centralized remote controller only.
  (Cannot be turned ON/OFF by remote controller.)
- OFF control only possible by remote controller
  Used when you want to turn ON by centralized remote controller only, and OFF by remote controller only.
- Centralized
  Used when you want to turn ON by centralized remote controller only, and turn ON/OFF freely by remote controller during set time.
- Individual
  Used when you want to turn ON/OFF by both centralized remote controller and remote controller.
- Timer operation possible by remote controller
  Used when you want to turn ON/OFF by remote controller during set time and you do not want to start operation by centralized remote controller when time of system start is programmed.

How to Select Operation Mode

Whether operation by remote controller will be possible or not for turning ON/OFF, controlling temperature or setting operation mode is selected and decided by the operation mode given on the right edge of the table below.

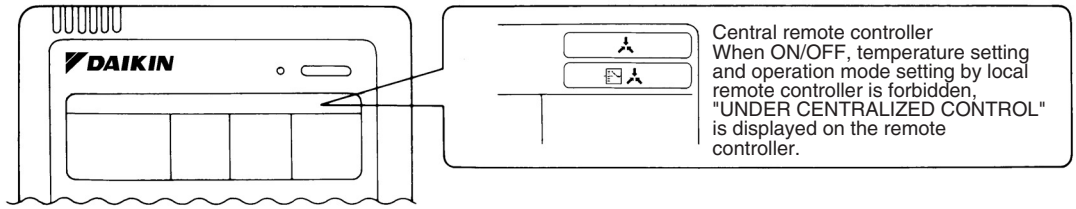
Example



Control mode	Control by remote controller					Control mode
	Operation		OFF	Temperature control	Operation mode setting	
	Unified operation, individual operation by centralized remote controller, or operation controlled by timer	Unified OFF, individual stop by centralized remote controller, or timer stop				
ON/OFF control impossible by remote controller	Rejection (Example)	Rejection (Example)	Rejection (Example)	Rejection	Acceptance	0
					Rejection	10
				Acceptance (Example)	Acceptance (Example)	1(Example)
					Rejection	11
OFF control only possible by remote controller			Acceptance	Rejection	Acceptance	2
					Rejection	12
				Acceptance	Acceptance	3
					Rejection	13
Centralized	Acceptance			Rejection	Acceptance	4
					Rejection	14
				Acceptance	Acceptance	5
					Rejection	15
Individual		Acceptance		Rejection	Acceptance	6
					Rejection	16
				Acceptance	Acceptance	7 ∗1
					Rejection	17
Timer operation possible by remote controller	Acceptance (During timer at ON position only)	Rejection (During timer at OFF position)		Rejection	Acceptance	8
					Rejection	18
				Acceptance	Acceptance	9
					Rejection	19

Do not select “timer operation possible by remote controller” if not using a remote controller. Operation by timer is impossible in this case.

∗1. Factory setting



3.3 Field Setting from Outdoor Unit

3.3.1 Setting by DIP Switches

The following field settings are made by DIP switches on PCB.

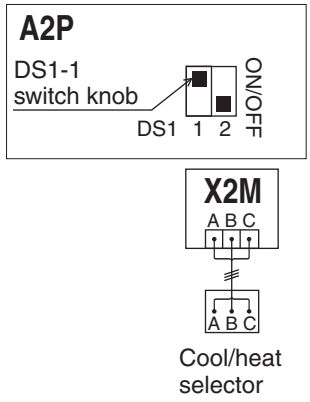
DIPswitch		Setting item	Description
No.	Setting		
DS1-1	ON	Cool/Heat changeover setting	Used to set cool/heat changeover setting by remote controller equipped with outdoor unit. (Note 1)
	OFF (Factory set)		
DS1-2	ON	Not used	Do not change the factory settings.
	OFF (Factory set)		

Cool/heat selector connection procedure

- Set the remote controller only when changing over the operation mode between cooling and heating using the remote controller installed in the outdoor.

① Connect the cool/heat selector (optional accessory) to the terminals (A, B and C) on the outdoor X2M Terminal board (A, B and C).

② Set the cool/heat selector switch DS1-1 from “OFF” (which is selected at the factory before shipment) to “ON”.

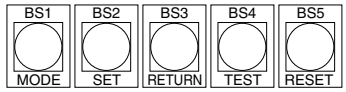


3.3.2 Setting by Branch Selector Buttons

The following settings are made by Branch Selector buttons on PCB

	H1P	H2P	H3P	H4P	H5P	H6P	H7P
LED display	●	●	○	●	●	●	●

(Factory setting)



There are the following 3 setting modes.

(1) Setting mode 1 (H1P OFF)

Initial status (when normal) : Also indicates during “abnormal”.

(2) Setting mode 2 (H1P ON)

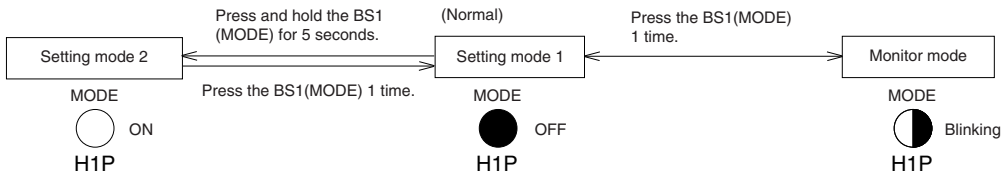
Used to modify the operating status and to set program addresses, etc. Usually used in servicing the system.

(3) Monitor mode (H1P blinks)

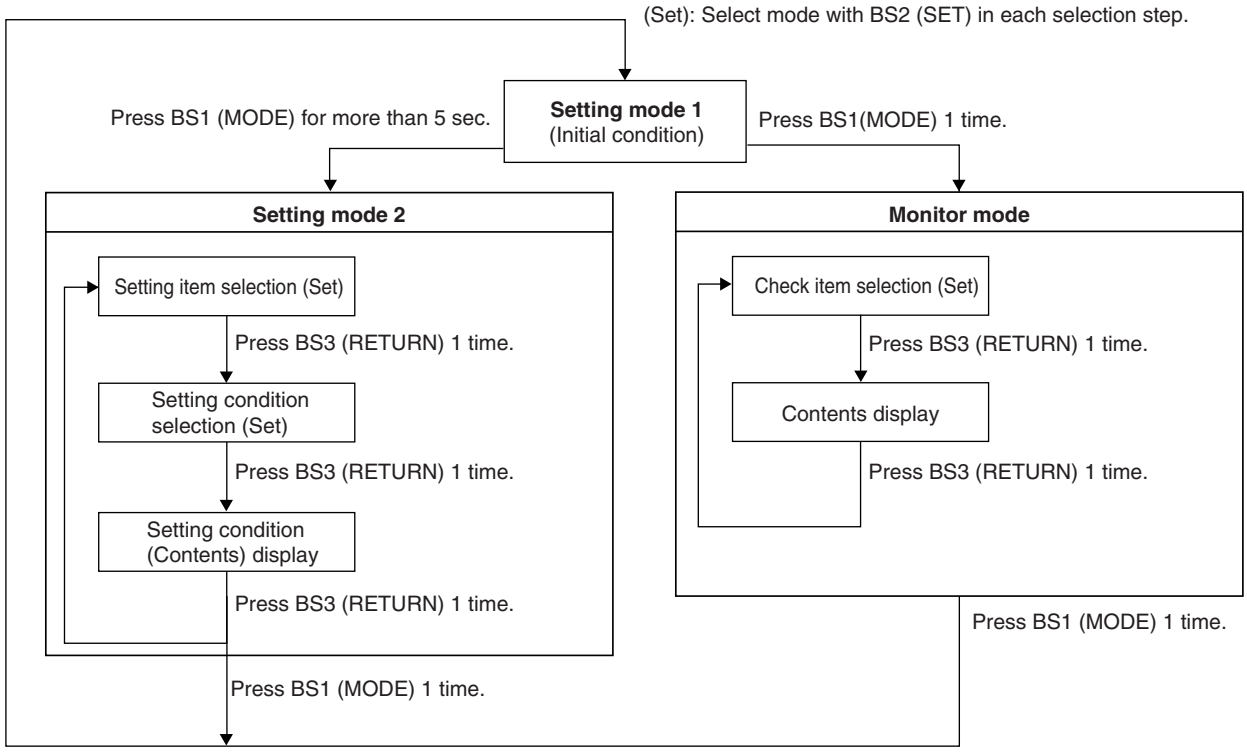
Used to check the program made in Setting mode 2.

■ Mode changing procedure

Using the MODE button, the modes can be changed as follows.



■ Mode changing procedure



a. “Setting mode 1”

This mode is used to set and check the current operating conditions (Normal / Abnormal / In check operation)

Normally, “Setting mode 1” is set. In case of other status, press MODE button (BS1) 1 time and set to “Setting mode 1”.

∗ The current state is displayed.

Display for error / preparing / test-run

Setting (displaying) item	LED display example						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P
Normal	●	●	○	●	●	●	●
Error	●	○	○	●	●	●	●
Preparing/Test-run	●	◑	○	●	●	●	●

○: ON ●: OFF ◑: Blink

Current operating conditions
● Normal ○ Abnormal
◑ In preparation or in check operation

b. “Setting mode 2”

Press and hold the MODE button (BS1) for 5 seconds and set to “Setting mode 2”.

<Selection of setting items>

Press the SET button (BS2) and set the LED display to a setting item shown in the table on the right.
↓
Press the RETURN button (BS3) and decide the item. (The present setting condition is blinked.)

<Selection of setting conditions>

Press the SET button (BS2) and set to the setting condition you want.
↓
Press the RETURN button (BS3) and decide the condition.

Press the RETURN button (BS3) and set to the initial status of “Setting mode 2”.

* If you become unsure of how to proceed, press the MODE button (BS1) and return to setting mode 1.

No.	Setting item	Description
5	Indoor unit forced fan H	Allows forced operation of indoor unit fan while unit is stopped. (H tap)
6	Indoor unit forced operation	Allows forced operation of indoor unit.
8	Te setting	Target evaporation temperature for cooling
9	Tc setting	Target condensation temperature for heating
10	Defrost changeover setting	Changes the temperature condition for defrost and sets to quick defrost or slow defrost.
12	External low noise setting / Demand setting	Reception of external low noise or demand signal
16	Setting of hot water heater	Make this setting to conduct heating operation with hot water heater.
21	Refrigerant recovery / vacuuming mode setting	Sets to refrigerant recovery / vacuuming mode.
22	Low night noise operation setting	Sets automatic low night noise operation in a simple way. The operating time is based on “Starting set” and “Ending set”.
26	Low night noise operation start setting	Sets starting time of low night noise operation. (Low night noise operation setting is also required.)
27	Low night noise operation end setting	Sets ending time of low night noise operation. (Low night noise setting is also required.)
29	Capacity priority setting	If the capacity control is required, the low noise control is automatically released by this setting during carrying out
30	Demand setting 1	Changes target value of power consumption when demand control 1 is input.
32	Normal demand setting	Normally enables demand control 1 without external input. (Effective to prevent a problem that circuit breaker

○: ON ●: OFF ◑: Blink

No.	Setting item display: Setting item	MODE H1P	TEST H2P	C/H selection: IND H3P	C/H selection: Master H4P	C/H selection: Slave H5P	Low noise H6P	Demand H7P	Setting condition display (∗ Factory setting)	
5	Indoor unit forced fan H	○	●	●	●	○	●	○	Normal operation	○ ● ● ● ● ● ○ ∗
									Indoor forced fan H	○ ● ● ● ● ○ ●
6	Indoor unit forced operation	○	●	●	●	○	○	●	Normal operation	○ ● ● ● ● ● ○ ∗
									Indoor forced operation	○ ● ● ● ● ○ ●
8	Te setting	○	●	●	○	●	●	●	High	○ ● ● ● ○ ● ●
									Normal	○ ● ● ● ● ○ ● ∗
									Low	○ ● ● ● ● ● ○
9	Tc setting	○	●	●	○	●	●	○	High	○ ● ● ● ○ ● ●
									Normal	○ ● ● ● ● ○ ● ∗
									Low	○ ● ● ● ● ● ○
10	Defrost changeover setting	○	●	●	○	●	○	●	Quick defrost	○ ● ● ● ○ ● ●
									Normal	○ ● ● ● ● ○ ● ∗
									Slow defrost	○ ● ● ● ● ● ○
12	External low noise setting / Demand setting	○	●	●	○	○	●	●	External low noise/demand: NO	○ ● ● ● ● ● ○ ∗
									External low noise/demand: YES	○ ● ● ● ● ○ ●
16	Setting of hot water heater	○	●	○	●	●	●	●	OFF	○ ● ● ● ● ● ○ ∗
									ON	○ ● ● ● ● ○ ●
21	Refrigerant recovery / vacuuming mode setting	○	●	○	●	○	●	○	Refrigerant recovery/ vacuuming: OFF	○ ● ● ● ● ● ○ ∗
									Refrigerant recovery/ vacuuming: ON	○ ● ● ● ● ○ ●
22	Low night noise operation setting	○	●	○	●	○	○	●	OFF	○ ● ● ● ● ● ● ∗
									Level 1	○ ● ● ● ● ● ○
									Level 2	○ ● ● ● ● ○ ●
									Level 3	○ ● ● ● ● ○ ○
26	Low night noise operation start setting	○	●	○	○	●	○	●	About PM 8:00	○ ● ● ● ● ● ○
									About PM 10:00	○ ● ● ● ● ○ ● ∗
									About PM 0:00	○ ● ● ● ○ ● ●
27	Low night noise operation end setting	○	●	○	○	●	○	○	About AM 6:00	○ ● ● ● ● ● ○
									About AM 7:00	○ ● ● ● ● ○ ●
									About AM 8:00	○ ● ● ● ○ ● ● ∗
29	Capacity priority setting	○	●	○	○	○	●	○	OFF	○ ● ● ● ● ● ○ ∗
									ON	○ ● ● ● ● ○ ●
30	Demand setting 1	○	●	○	○	○	○	●	60 % demand	○ ● ● ● ● ● ○
									70 % demand	○ ● ● ● ● ○ ● ∗
									80 % demand	○ ● ● ● ○ ● ●
32	Normal demand setting	○	○	●	●	●	●	●	OFF	○ ● ● ● ● ● ○ ∗
									ON	○ ● ● ● ● ○ ●

c. Monitor mode

To enter the monitor mode, press the MODE button (BS1) when in "Setting mode 1".

<Selection of setting item>

Press the SET button (BS2) and set the LED display to a setting item.

<Confirmation on setting contents>

Press the RETURN button (BS3) to display different data of set items.

Press the RETURN button (BS3) and switches to the initial status of "Monitor mode".

∗ Press the MODE button (BS1) and returns to "Setting mode 1".

○: ON ●: OFF ◑: Blink

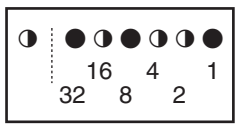
No.	Setting item	LED display							Data display
		H1P	H2P	H3P	H4P	H5P	H6P	H7P	
0	Various settings	◑	●	●	●	●	●	●	See below
5	Number of connected indoor units	◑	●	●	●	○	●	○	Lower 6 digits
14	Contents of error (the latest)	◑	●	●	○	○	○	●	Error code table
15	Contents of error (1 cycle before)	○	●	●	○	○	○	○	
16	Contents of error (2 cycle before)	○	●	○	●	●	●	●	
20	Contents of retry (the latest)	○	●	○	●	○	●	●	
21	Contents of retry (1 cycle before)	○	●	○	●	○	●	○	
22	Contents of retry (2 cycle before)	○	●	○	●	○	○	●	

Setting item 0 Display contents of "Various settings"

Defrost select setting	Short	◑	●	●	●	○	●	●
	Medium	◑	●	●	●	◑	●	●
	Long	◑	●	●	●	●	●	●
Te setting	H	◑	●	●	●	●	○	●
	M	◑	●	●	●	●	◑	●
	L	◑	●	●	●	●	●	●
Tc setting	H	◑	●	●	●	●	●	○
	M	◑	●	●	●	●	●	◑
	L	◑	●	●	●	●	●	●

Press the SET button and match with the LEDs No. 1 - 15, press the RETURN button, and enter the data for each setting.

∗ Data such as addresses and number of units is expressed as binary numbers; the 2 ways of expressing are as follows:



The No. 5 cool/heat unified address is expressed as a binary number consisting of the lower 6 digits. (0 - 63)

In ① the address is 000110 (binary number), which translates to 4 + 2 = 6 (base 10 number). In other words, the address is 6.

3.4 Detail of Setting Mode

3.4.1 Cool / Heat Mode Switching

The Cool / Heat Mode switching is carried out by remote controller fitted to indoor unit.
This setting is not required for normal operation. (Factory setting)

3.4.2 Setting of Low Noise Operation and Demand Operation

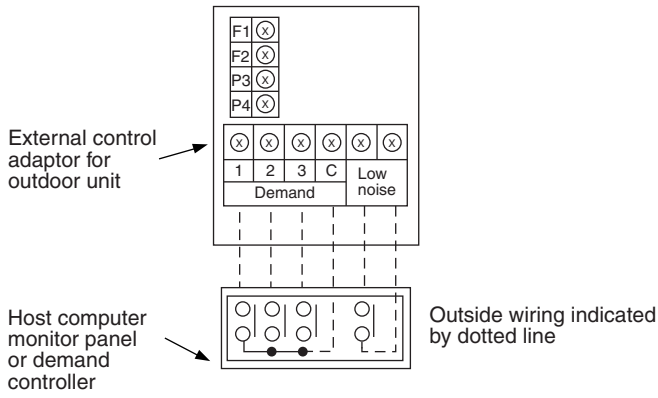
Setting of Low Noise Operation

By connecting the external contact input to the low noise input of the outdoor unit external control adaptor (optional), you can lower operating noise by 2-3 dB.

Setting	Content
Mode 1	Set the outdoor unit fan to Step 6 or lower.
Mode 2	Set the outdoor unit fan to Step 5 or lower.
Mode 3	Set the outdoor unit fan to Step 4 or lower.

A. When the low noise operation is carried out by external contact (with the use of the external control adaptor for outdoor unit)

1. Connect external control adaptor for outdoor unit and short-circuit terminal of low noise (Refer below figure).
   If carrying out demand or low noise input, connect the adaptor's terminals as shown below.



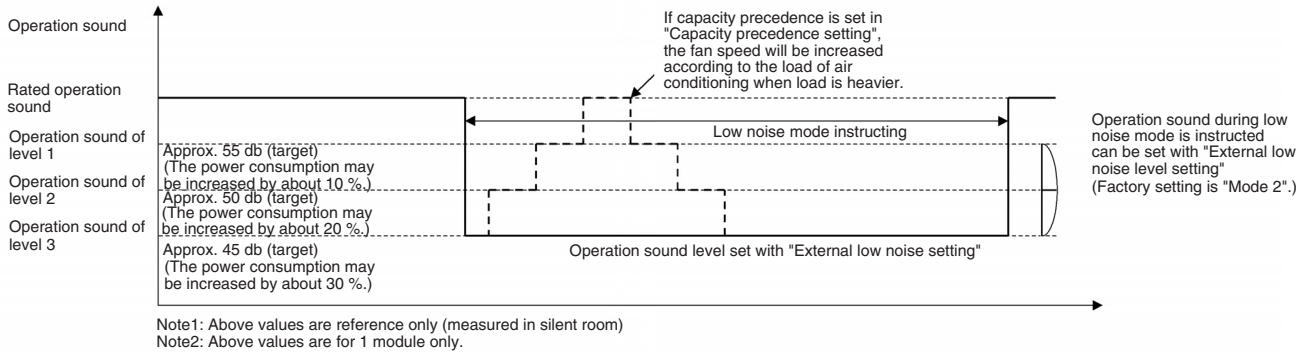
2. While in "Setting mode 2", set the setting condition for set item No. 12 (Setting of external low noise/demand operation) to "YES".
3. If necessary, while in "Setting mode 2", select the setting condition (i.e., "Mode 1", "Mode 2", or "Mode 3") for set item No. 25 (Setting of external low noise level).
4. If necessary, while in "Setting mode 2", set the setting condition for the set item No. 29 (Setting of capacity precedence) to "ON".
   (If the condition is set to "ON", when the air conditioning load reaches a high level, the low noise operation command will be ignored to put the system into normal operation mode.)

B. When the low noise operation is carried out automatically at night (The external control adaptor for outdoor unit is not required)

1. While in "Setting mode 2", select the setting condition (i.e., "Mode 1", "Mode 2", or "Mode 3") for set item No. 22 (Setting of low night noise level).
2. If necessary, while in "Setting mode 2", select the setting condition (i.e., "20:00", "22:00", or "24:00") for set item No. 26 (Setting of start time of low night noise operation).
   (Use the start time as a guide since it is estimated according to outdoor temperatures.)

3. If necessary, while in "Setting mode 2", select the setting condition (i.e., "06:00", "07:00", or "08:00") for set item No. 27 (Setting of end time of low night noise operation).
   (Use the end time as a guide since it is estimated according to outdoor temperatures.)
4. If necessary, while in "Setting mode 2", set the setting condition for set item No. 29 (Setting of capacity precedence) to "ON".
   (If the condition is set to "ON", when the air conditioning load reaches a high level, the system will be put into normal operation mode even during night-time.)

Image of operation in the case of A



Note1: Above values are reference only (measured in silent room)
Note2: Above values are for 1 module only.

Image of operation in the case of B

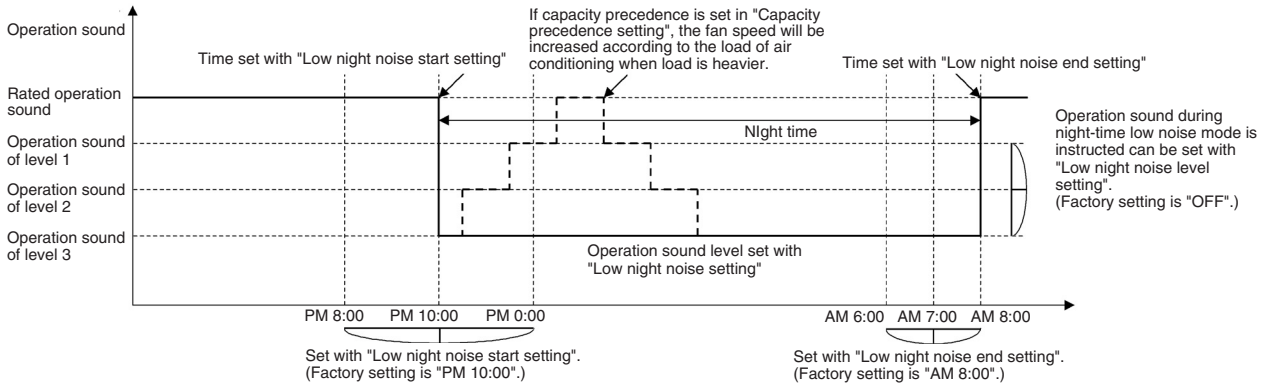
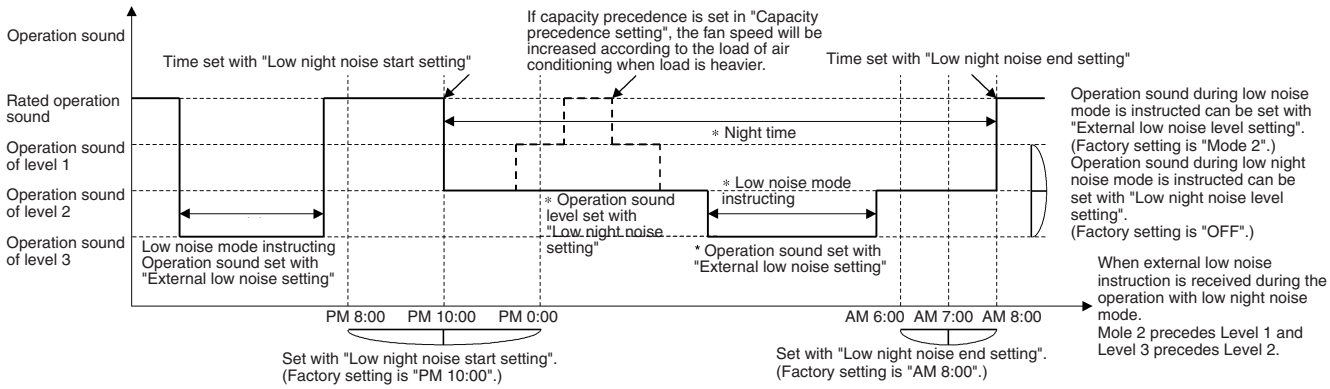


Image of operation in the case of A and B



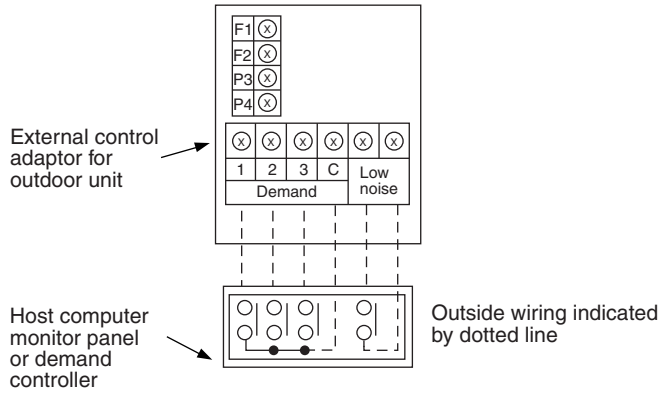
3.4.3 Setting of Demand Operation

By connecting the external contact input to the demand input of the outdoor unit external control adaptor (optional), the power consumption of unit operation can be saved suppressing the compressor operating condition.

Setting content			Setting method	
Set item	Condition	Content	External control adaptor	Outdoor unit PCB
Demand 1	Mode 1	The compressor operates at approx. 60% or less of rating.	Short circuit "1" and "C" on the terminal strip (TeS1).	Set item No. 32 to "Demand 1", and item No. 30 to "Level 1".
	Mode 2	The compressor operates at approx. 70% or less of rating.		Set item No. 32 to "Demand 1", and item No. 30 to "Level 2".
	Mode 3	The compressor operates at approx. 80% or less of rating.		Set item No. 32 to "Demand 1", and item No. 30 to "Level 3".
Demand 2	—	The compressor operates at approx. 40% or less of rating.	Short circuit "2" and "C".	Set item No. 32 to "Demand 2".
Demand 3	—	Forced thermostat OFF.	Short circuit "3" and "C".	—

∗: However the demand operation does not occur in the following operation modes.
① Startup control ② Oil return operation
③ Defrosting operation ④ Pump down residual operation

If carrying out demand or low noise input, connect the adaptor's terminals as shown below.



A. When the demand operation is carried out by external contact (with the use of the external control adaptor for outdoor unit).

1. Connect external control adaptor for outdoor unit and short-circuit terminals as required (Refer above figure).
2. While in "Setting mode 2", set the setting condition for set item No. 12 (Setting of external low noise/demand operation) to "YES".
3. If necessary, while in "Setting mode 2", select the set item No. 30 (Setting of Demand 1 level) and then set the setting condition to targeted mode.

B. When the normal demand operation is carried out. (Use of the external control adaptor for outdoor unit is not required.)

1. While in "Setting mode 2", make setting of the set item No. 32 (Setting of alternate demand) to "ON".
2. While in "Setting mode 2", select the set item No. 30 (Setting of Demand 1 level) and then set the setting condition to targeted mode.

Image of operation in the case of A

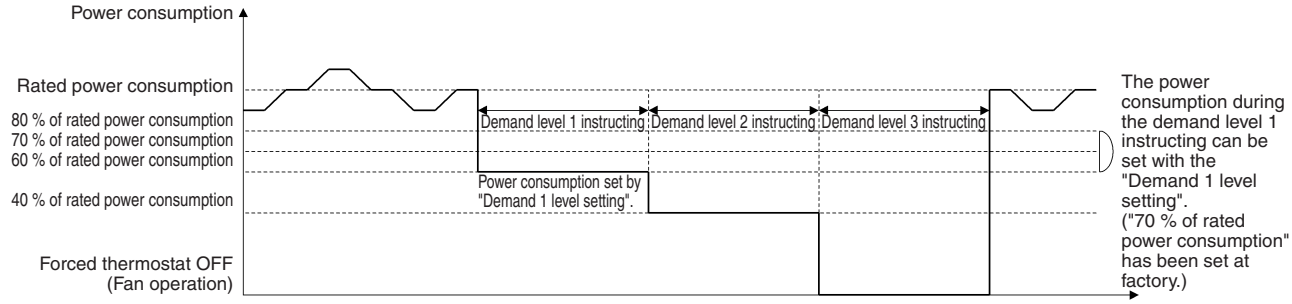


Image of operation in the case of B

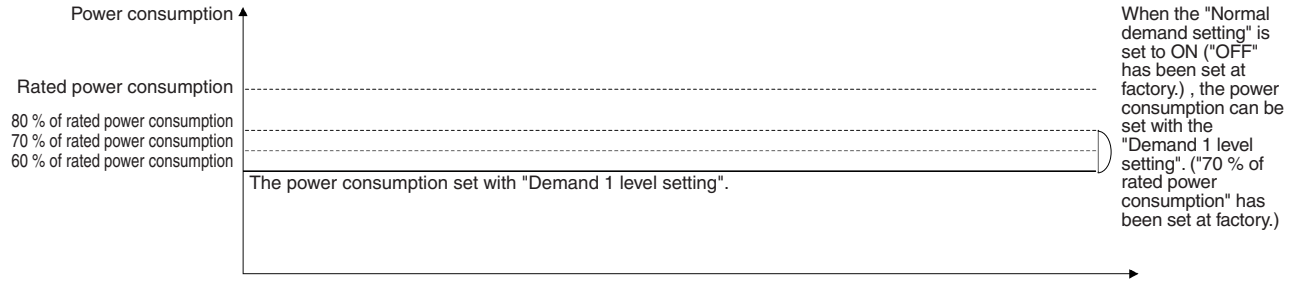
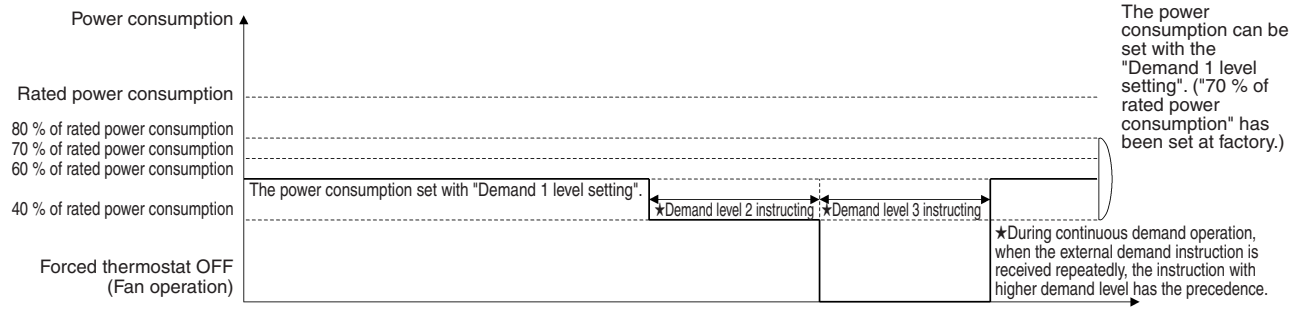


Image of operation in the case of A and B



Detailed Setting Procedure of Quiet Operation and Demand Control

1. Setting mode 1 (H1P off)

(1) In setting mode 2, press the BS1 (MODE button) 1 time. → Setting mode 1 is entered and H1P off.
During the setting mode 1 is displayed, “In quiet operation” and “In demand control” are displayed.

2. Setting mode 2 (H1P on)

(1) In setting 1, press and hold the BS1 (MODE button) for more than 5 seconds. → Setting mode 2 is entered and H1P lights.
(2) Press the BS2 (SET button) several times and match the LED display with the Setting No. you want.
(3) Press the BS3 (RETURN button) 1 time, and the present setting content is displayed.
→ Press the BS2 (SET button) several times and match the LED display with the setting content (as shown on next page) you want.
(4) Press the BS3 (RETURN button) 2 times. → Returns to ①.
(5) Press the BS1 (MODE button) 1 time. → Returns to the setting mode 1 and turns H1P off.

○: ON ●: OFF ◑: Blink

(1) (2) (3) : Factory setting

Setting No.	Setting contents	Setting No. indication (1)							Setting No. indication (2)							Setting contents	Setting contents indication (Initial setting) (3)						
		H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P		H1P	H2P	H3P	H4P	H5P	H6P	H7P
12	External low noise / Demand setting	○	●	●	●	●	●	●	○	●	●	○	○	●	●	NO	○	●	●	●	●	●	◑
																YES	○	●	●	●	●	◑	●
22	Low night noise operation setting								○	●	○	●	○	○	●	OFF	○	●	●	●	●	●	●
																Mode 1	○	●	●	●	●	●	◑
																Mode 2	○	●	●	●	●	◑	●
																Mode 3	○	●	●	●	●	◑	◑
26	Low night noise operation start setting								○	●	○	○	●	○	●	PM 8:00	○	●	●	●	●	●	◑
																PM 10:00	○	●	●	●	●	◑	●
																PM 0:00	○	●	●	●	◑	●	●
27	Low night noise operation end setting								○	●	○	○	●	○	○	AM 6:00	○	●	●	●	●	●	◑
																AM 7:00	○	●	●	●	●	◑	●
																AM 8:00	○	●	●	●	◑	●	●
29	Capacity priority setting								○	●	○	○	○	●	○	Low noise precedence	○	●	●	●	●	●	◑
																Capacity precedence	○	●	●	●	●	◑	●
30	Demand setting 1								○	●	○	○	○	○	●	60 % of rated power consumption	○	●	●	●	●	●	◑
																70 % of rated power consumption	○	●	●	●	●	◑	●
																80 % of rated power consumption	○	●	●	●	◑	●	●
32	Normal demand setting								○	○	●	●	●	●	●	OFF	○	●	●	●	●	●	◑
																ON	○	●	●	●	●	◑	●

Setting mode indication section Setting No. indication section Set contents indication section

3.4.4 Setting of Refrigerant Recovery Mode

When carrying out the refrigerant collection on site, fully open the respective electronic expansion valve of indoor and outdoor units.
Both the outdoor unit and the indoor unit cannot be operated at this time.

[Operation procedure]

(1) In **setting mode 2** with units in stop mode, set “Refrigerant Recovery / Vacuuming mode” to ON. The respective electronic expansion valve of indoor and outdoor units are fully opened. (H2P turns to display “TEST OPERATION” (blinks), “TEST OPERATION” and “UNDER CENTRALIZED CONTROL” are displayed on the remote controller, and the operation is prohibited.
(2) Collect the refrigerant using a refrigerant recovery unit. (See the instruction attached to the refrigerant recovery unit for more detail.)
(3) Press Mode button “BS1” once and reset “Setting Mode 2”.

3.4.5 Setting of Vacuuming Mode

In order to perform vacuuming operation at site, fully open the electronic expansion valves of indoor and outdoor units to turn on some solenoid valves.
Both the outdoor unit and the indoor unit cannot be operated at this time.

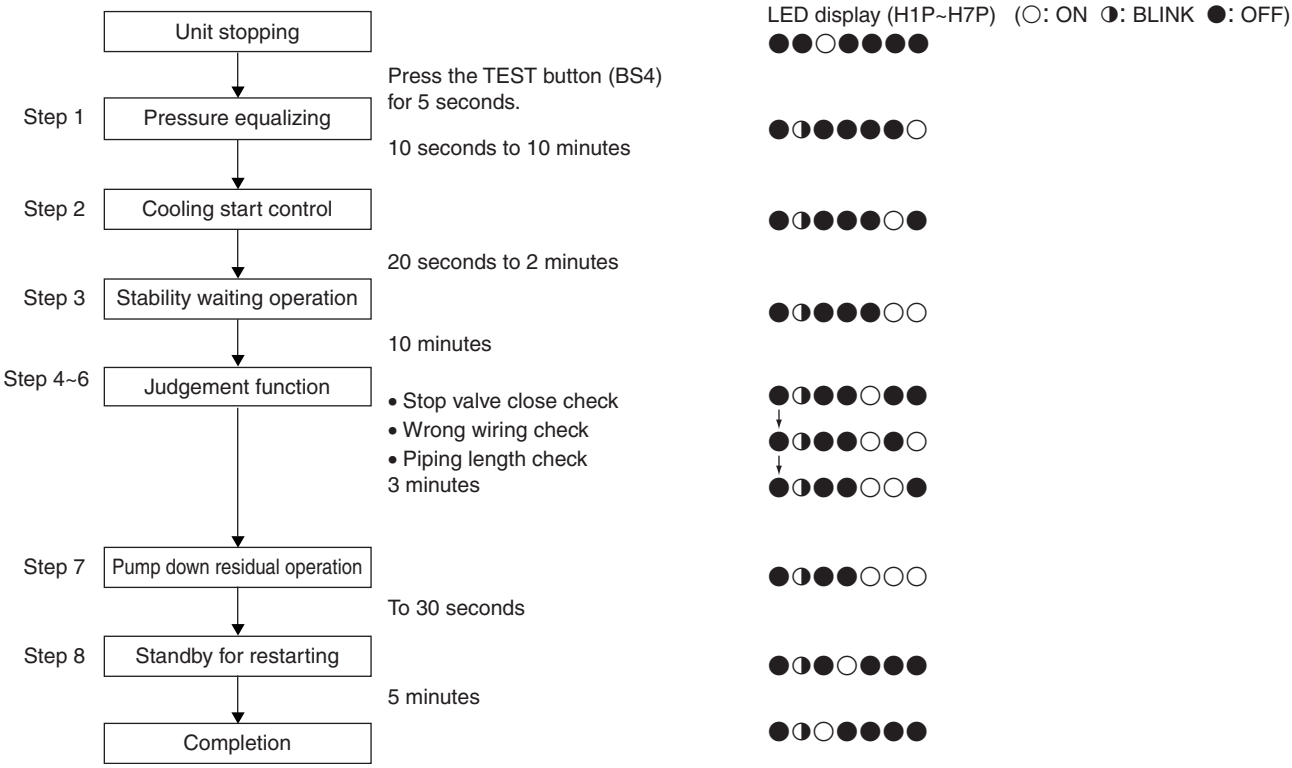
[Operating procedure]

(1) With **Setting Mode 2** while the unit stops, set “Refrigerant recovery / Vacuuming mode” to ON. The electronic expansion valves of indoor and outdoor units fully open and some of solenoid valves open.
(H2P blinks to indicate the test operation, and the remote controller displays “TEST OPERATION” and “UNDER CENTRALIZED CONTROL”, thus prohibiting operation.)
After setting, do not cancel “Setting Mode 2” until completion of Vacuuming operation.
(2) Use the vacuum pump to perform vacuuming operation.
(3) Press Mode button “BS1” once and reset “Setting Mode 2”.

3.4.6 Check Operation

To prevent any trouble in the period of installation at site, the system is provided with a test operation mode enabling check for incorrect wiring, stop valve left in closed, and judgement of piping length.

CHECK OPERATION FUNCTION



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Service Diagnosis

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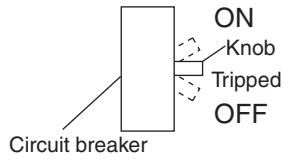
1. Symptom-based Troubleshooting

	Symptom		Supposed Cause	Countermeasure
1	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. 
2	The system starts operation but makes an immediate stop.		Blocked air inlet or outlet of indoor or outdoor unit	Remove obstacle(s).
			Clogged air filter(s)	Clean the air filter(s).
3	The system does not cool or heat air well.		Blocked air inlet or outlet of indoor or outdoor unit	Remove obstacle(s).
			Clogged air filter(s)	Clean the air filter(s).
			Enclosed outdoor unit(s)	Remove the enclosure.
			Improper set temperature	Set the temperature to a proper degree.
			Airflow rate set to "LOW"	Set it to a proper airflow rate.
			Improper direction of air diffusion	Set it to a proper direction.
			Open window(s) or door(s)	Shut it tightly.
		[In cooling]	Direct sunlight received	Hang curtains or shades on windows.
		[In cooling]	Too many persons staying in a room	The model must be selected to match the air conditioning load.
		[In cooling]	Too many heat sources (e.g. OA equipment) located in a room	
4	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.	Normal operation. The system will automatically start operation after a lapse of 5 minutes.
		Pressing the TEMP ADJUST button immediately resets the system.		
		The remote controller displays "UNDER CENTRALIZED CONTROL", which blinks for a period of several seconds when the OPERATION button is depressed.	The system is controlled with centralized controller. Blinking display indicates that the system cannot be operated using the remote controller.	Operate the system using the COOL/HEAT centralized remote controller.
		The system stops immediately after turning ON the power supply.	The system is in preparation mode of micro-computer operation.	Wait for a period of approximately 1 minute.
5	The system makes intermittent stops.	The remote controller displays error codes "U4" and "U5", 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 air conditioners.	Remove causes of electrical noises. If these causes are removed, the system will automatically restart operation.

	Symptom		Supposed Cause	Countermeasure
6	COOL-HEAT selection is disabled.	The remote controller displays "UNDER CENTRALIZED CONTROL".	This remote controller has no option to select cooling operation.	Use a remote controller with option to select cooling operation.
		The remote controller displays "UNDER CENTRALIZED CONTROL", and the COOL-HEAT selection remote controller is provided.	COOL-HEAT selection is made using the COOL-HEAT selection remote controller.	Use the COOL-HEAT selection remote controller to select cool or heat.
7	The system conducts fan operation but not cooling or heating operation.	This symptom occurs immediately after turning ON the power supply.	The system is in preparation mode of operation.	Wait for a period of approximately 10 minutes.
8	The airflow rate is not reproduced according to the setting.	Even pressing the AIRFLOW RATE SET button makes no changes in the airflow rate.	In heating operation, when the room temperature reaches the set degree, the outdoor unit will stop while the indoor unit is brought to fan LL operation so that no one gets cold air. (The fan LL operation is also enabled while in oil return mode in cooling operation.)	Normal operation.
9	The airflow direction is not reproduced according to the setting.	The airflow direction is not corresponding to that displayed on the remote controller. The flap does not swing.	Automatic control	Normal operation.
10	A white mist comes out from the system.	<Indoor unit> In cooling operation, the ambient humidity is high. (This indoor unit is installed in a place with oil or dust.)	Uneven temperature distribution due to heavy stain of the inside of the indoor unit	Clean the inside of the indoor unit.
		<Indoor unit> Immediately after cooling operation stopping, the ambient temperature and humidity are low.	Hot gas (refrigerant) flown in the indoor unit results to be vapor from the unit.	Normal operation.
		<Indoor and outdoor units> After the completion of defrosting operation, the system is switched to heating operation.	Defrosted moisture turns to be vapor and comes out from the units.	Normal operation.

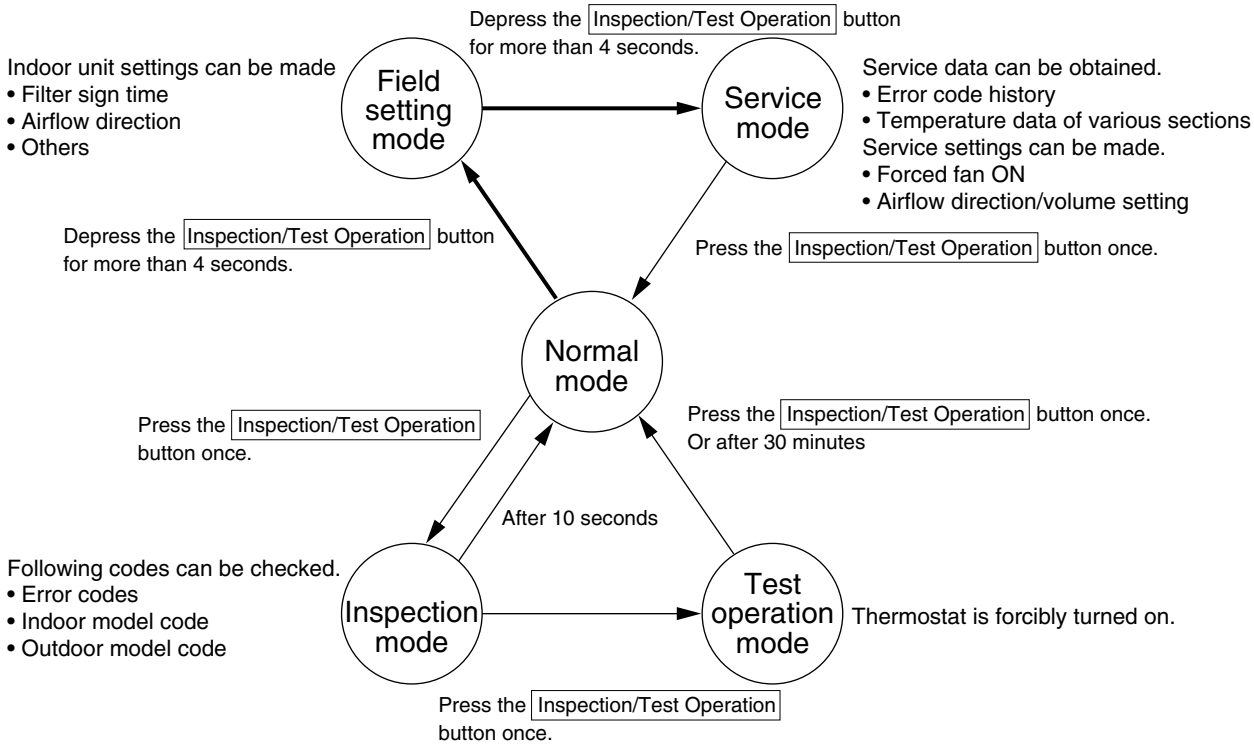
	Symptom		Supposed Cause	Countermeasure
11	The system produces sounds.	<Indoor unit> Immediately after turning ON the power supply, indoor unit produces "ringing" sounds.	Operating sounds of the electronic expansion valve of the indoor unit.	Normal operation. This sound lowers after approximately 1 minute.
		<Indoor and outdoor units> "Hissing" sounds are continuously produced while in cooling or defrosting operation.	Gas (refrigerant) is flowing respectively through the indoor and outdoor units.	Normal operation.
		<Indoor and outdoor units> "Hissing" sounds are produced immediately after the startup or stop of the system, or the startup or stop of defrosting operation.	Gas (refrigerant) stops or changes direction of flow.	Normal operation.
		<Indoor unit> Faint sounds are continuously produced while in cooling operation or after stopping the operation.	The drain discharge device is in operation.	Normal operation.
		<Indoor unit> "Creaking" sounds are produced while in heating operation or after stopping the operation.	Resin parts are expanding and contracting with temperature changes.	Normal operation.
		<Outdoor unit> Pitch of operating sounds changes.	The compressor changes the operating frequency.	Normal operation.
12	The system emits dust.	The system emits dust after being stopped and then restarted after an extended time.	Dust, which has deposited on the inside of indoor unit, is blown out from the system.	Normal operation.
13	The system emits odors.	In operation	Cigarette or other room odors have been adsorbed into the system and are emitted upon starting operation.	The inside of the indoor unit should be cleaned.
14	Outdoor unit fan does not rotate.	In operation	Fan revolutions are controlled to put the operation to the optimum state.	Normal operation.
15	LCD display "88" appears on the remote controller.	Immediately after turning ON the power supply	The system is checking to be sure the remote controller is normal.	Normal operation. This code is displayed for a period of approximately one minute at maximum.
16	The outdoor unit compressor or the outdoor unit fan does not stop.	After stopping operation	Stops in order to prevent oil or refrigerant from dwelling.	Normal operation. It stops after a lapse of approximately 5 to 10 minutes.
17	The outdoor unit gets hot.	While stopping operation	Compressor is warmed up to provide smooth startup of the system.	Normal operation.
18	The system does not cool air well.	The system is in dry operation.	Dry operation serves not to reduce the room temperature where possible.	Change the system to cooling operation.

2. Troubleshooting by Remote Controller

2.1 The INSPECTION / TEST Button

2.1.1 BRC1D71

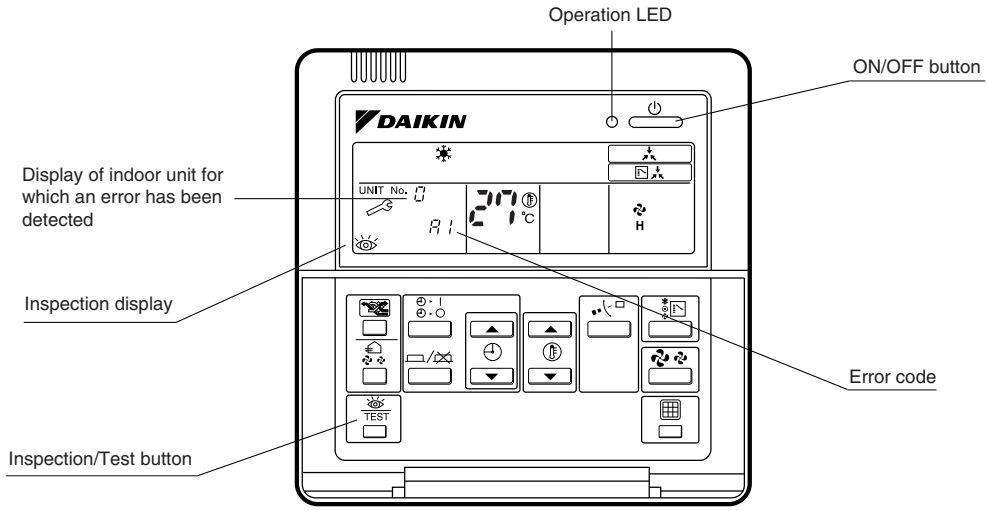
The following modes can be selected by using the [Inspection/Test Operation] button on the remote control.



2.2 Self-diagnosis by Wired Remote Controller

2.2.1 BRC1D71

If operation stops due to error, the remote controller's operation LED blinks, and error code is displayed. (Even if stop operation is carried out, error contents are displayed when the inspection mode is entered.) The error code enables you to tell what kind of error caused operation to stop. Refer to P.86 for error code and error contents.

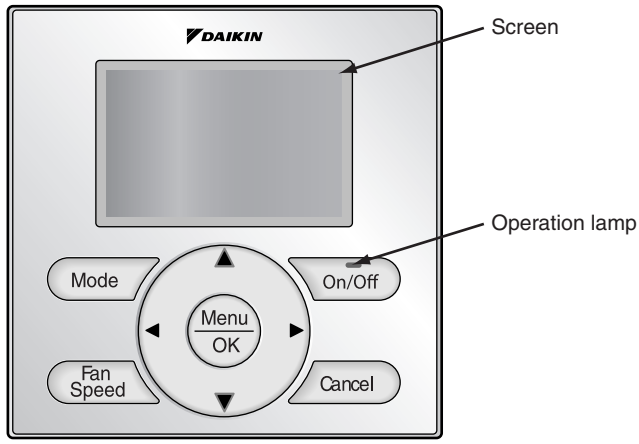


Note:

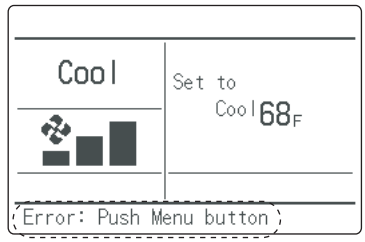
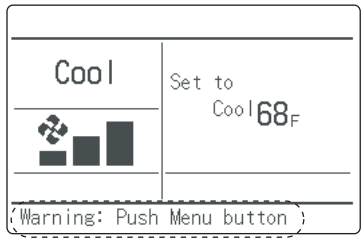
1. Pressing the INSPECTION/TEST button will blink the check indication.
2. While in check mode, pressing and holding the ON/OFF button for a period of 5 seconds or more will clear the failure history indication shown above. In this case, on the codes display, the error code will blink twice and then change to "00" (=Normal), the Unit No. will change to "0", and the operation mode will automatically switch from check mode to normal mode (displaying the set temperature).

2.2.2 BRC1E71

The following will be 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.



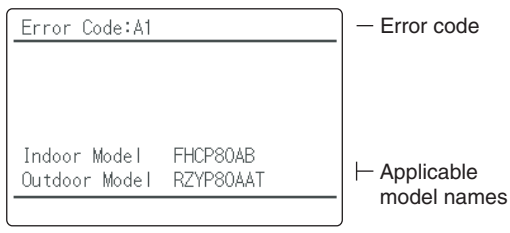
(1) Checking an error or warning

	Operation Status	Display	
Abnormal shutdown	The system stops operating.	The operation lamp (green) starts to blink. The message "Error: Press Menu button" is displayed and blinking at the bottom of the screen.	
Warning	The system continues its operation.	The operation lamp (green) remains on. The message "Warning: Press Menu button" is displayed and blinking at the bottom of the screen.	

(2) Taking corrective action

· Press the Menu/OK button to check the error code.

· Take the corrective action specific to the model.



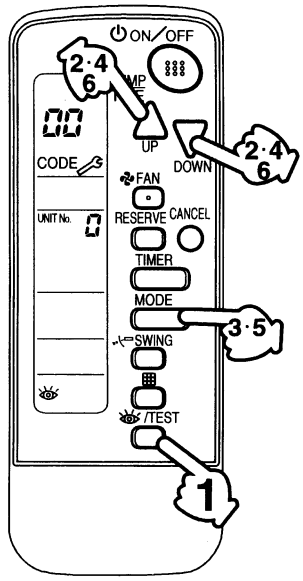
2.3 Self-diagnosis by Wireless Remote Controller

In the Case of BRC7C Type BRC7E Type

If equipment stops due to an error, the operation indicating LED on the light reception section flashes.

The error code can be determined by following the procedure described below. (The error code is displayed when an operation error has occurred. In normal condition, the error code of the last problem is displayed.)

1. Press the INSPECTION/TEST button to select "Inspection."
   The equipment enters the inspection mode. The "Unit" indication lights and the Unit No. display shows flashing "0" indication.
2. Set the Unit No.
   Press the UP or DOWN button and change the Unit No. display until the buzzer (*1) is generated from the indoor unit.
   *1 Number of beeps
   3 short beeps: Conduct all of the following operations.
   1 short beep: Conduct steps 3 and 4.
   Continue the operation in step 4 until a buzzer remains ON. The continuous buzzer indicates that the error code is confirmed.
   Continuous beep: No abnormality.
3. Press the MODE selector button.
   The left "0" left digit) indication of the error code flashes.
4. Error code left digit diagnosis
   Press the UP or DOWN button and change the error code left digit until the error code matching buzzer (*2) is generated.



■ The left digit of the code changes as shown below when the UP and DOWN buttons are pressed.

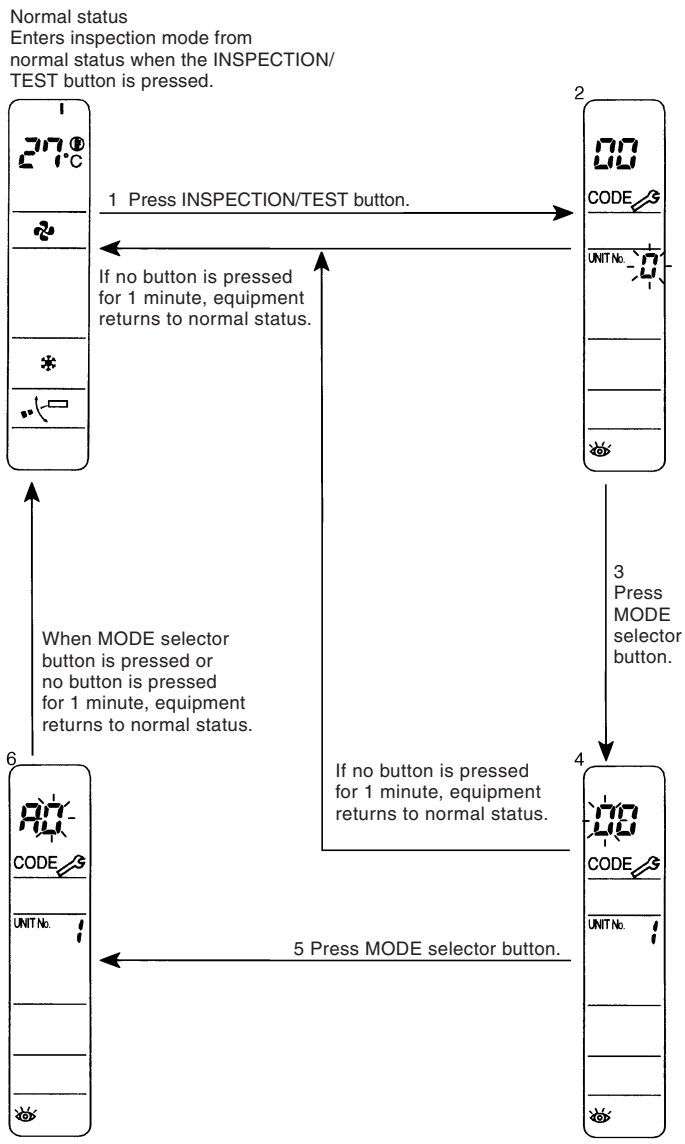
⇨ **"UP" button** ⬅ **"DOWN" button**

*2 Number of beeps
Continuous beep: Both left and right digits matched. (Error code confirmed)
2 short beeps: Left digit matched.
1 short beep: Right digit matched.

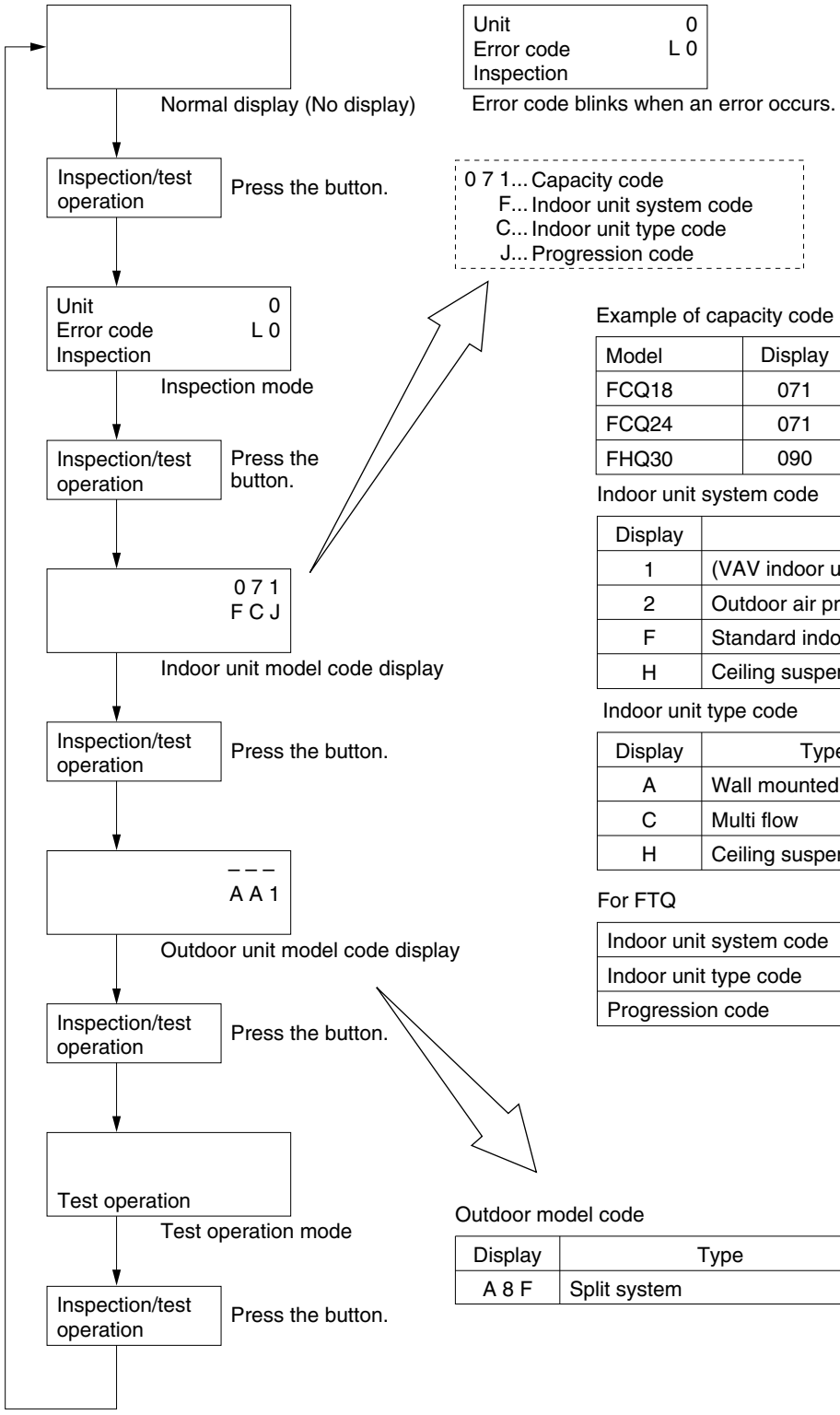
5. Press the MODE selector button.
   The right "0" (right digit) indication of the error code flashes.
6. Error code right digit diagnosis
   Press the UP or DOWN button and change the error code right digit until the continuous error code matching buzzer (*2) is generated.

■ The right digit of the code changes as shown below when the UP and DOWN buttons are pressed.

⇨ **"UP" button** ⬅ **"DOWN" button**


Normal status
Enters inspection mode from
normal status when the INSPECTION/
TEST button is pressed.
2
1 Press INSPECTION/TEST button.
If no button is pressed
for 1 minute, equipment
returns to normal status.
CODE
UNIT No.
3
Press
MODE
selector
button.
When MODE selector
button is pressed or
no button is pressed
for 1 minute, equipment
returns to normal status.
6
4
If no button is pressed
for 1 minute, equipment
returns to normal status.
5 Press MODE selector button.

2.4 Inspection Mode



Example of capacity code display

Model	Display
FCQ18	071
FCQ24	071
FHQ30	090

Model	Display
FHQ18/FAQ18	056
FHQ24/FAQ24	071
FHQ30	090

Indoor unit system code

Display	System classification
1	(VAV indoor unit)
2	Outdoor air processing unit
F	Standard indoor unit
H	Ceiling suspended cassette

Indoor unit type code

Display	Type	Model
A	Wall mounted	FAQ
C	Multi flow	FCQ
H	Ceiling suspended	FHQ

For FTQ

Indoor unit system code	E
Indoor unit type code	9
Progression code	1

Outdoor model code

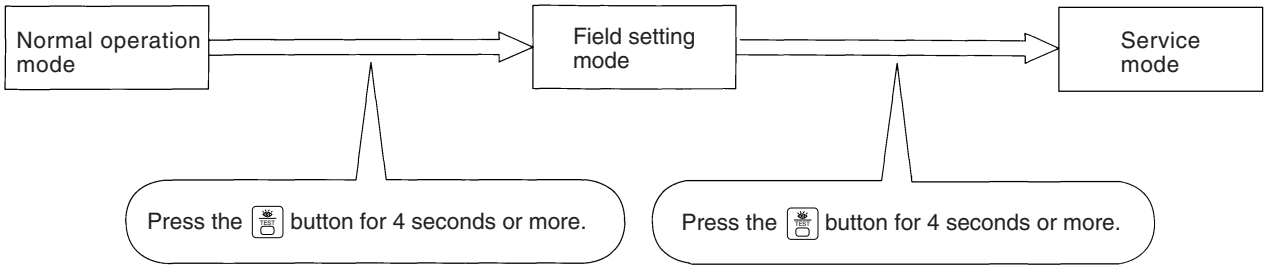
Display	Type	Model
A 8 F	Split system	RZQ-P

Note: Inspection mode is not available for BRC1E71.

2.5 Remote Controller Service Mode

2.5.1 BRC1D71

How to Enter the Service Mode



Service Mode Operation Method

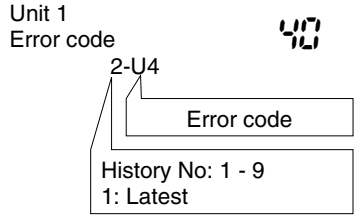
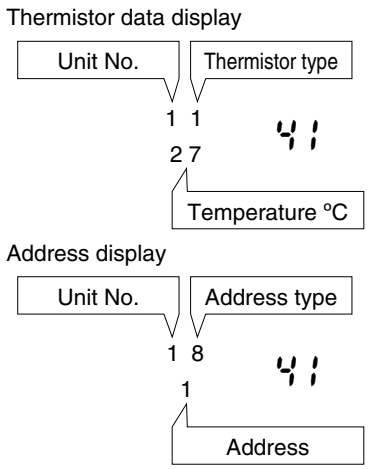
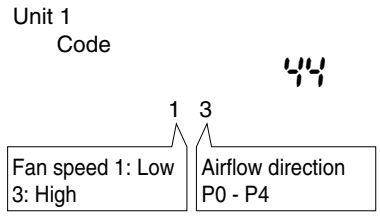
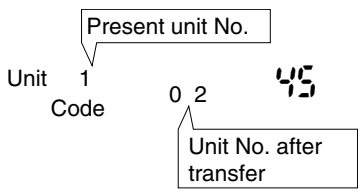
1. Select the mode No.
Set the desired mode No. with the " " button.
(For wireless remote controller, Mode 43 only can be set.)

2. Select the unit No. (For group control only)
Select the indoor unit No. to be set with the time mode " ". (For wireless remote controller, " " " " button.)

3. Make the settings required for each mode. (Modes 41, 44, 45)
In case of Mode 44, 45, press the " " button to be able to change setting before setting work. (LCD "code" blinks.)
For details, refer to the table in next page.

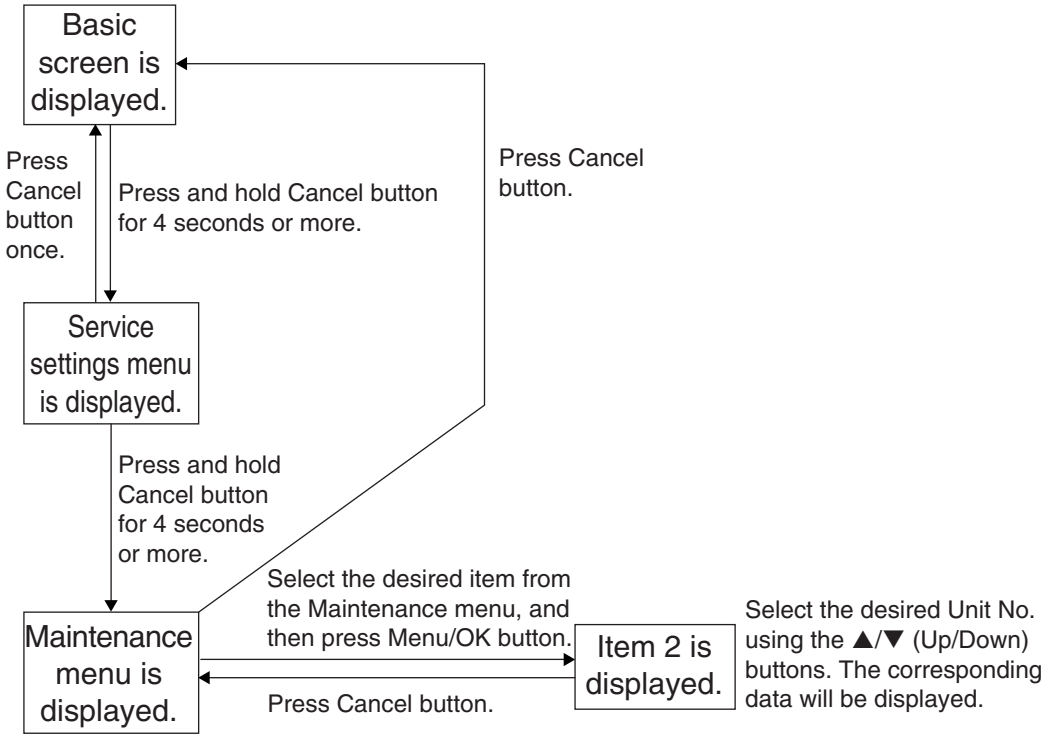
4. Define the setting contents. (Modes 44, 45)
Define by pressing the timer " " button.
After defining, LCD "code" changes blinking to ON.

5. Return to the normal operation mode.
Press the " " button 1 time.

Mode No	Function	Contents and operation method	Remote controller display example
40	Error history display	Display error history. The history No. can be changed with the button.	
41	Display of sensor and address data	Display various types of data. Select the data to be displayed with the button. Sensor data 0: Thermistor in remote controller. 1: Suction 2: Liquid pipe 3: Gas pipe Address data 4: Indoor unit address 5: Outdoor unit address 6: Zone control address 7: Cool/heat group address 8: Demand / low noise address	
43	Forced fan ON	Manually turn the fan ON by each unit. (When you want to search for the unit No.) By selecting the unit No. with the button, you can turn the fan of each indoor unit on (forced ON) individually.	
44	Individual setting	Set the fan speed and airflow direction by each unit Select the unit No. with the time mode button. Set the fan speed with the button. Set the airflow direction with the button.	
45	Unit No. transfer	Transfer unit No. Select the unit No. with the button. Set the unit No. after transfer with the button.	

2.5.2 BRC1E71

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



Maintenance Menu	Item 2	Remarks
1. Model Name	1. Unit No.	Select the Unit No. you want to check.
	2. Indoor unit	
	3. Outdoor unit	
2. Operating Hours	1. Unit No.	Select the Unit No. you want to check.
	2. Indoor unit operating time	All of these are displayed in hours.
	3. Indoor fan operation	
	4. Indoor unit energized time	
	5. Outdoor operating time	
	6. Outdoor fan 1 operation	
	7. Outdoor fan 2 operation	
	8. Outdoor comp. 1 operation	
	9. Outdoor comp. 2 operation	
3. Indoor Unit Status	1. Unit No.	Select the Unit No. you want to check.
	2. FAN	Fan tap
	3. FLAP	Swing, fixed
	4. Speed	Fan speed (rpm)
	5. EV	Degree that electronic expansion valve is open (pls)
	6. MP	Drain pump ON/OFF
	7. EH	Electric heater ON/OFF
	8. Hu	Humidifier ON/OFF
	9. TBF	Anti-freezing control ON/OFF

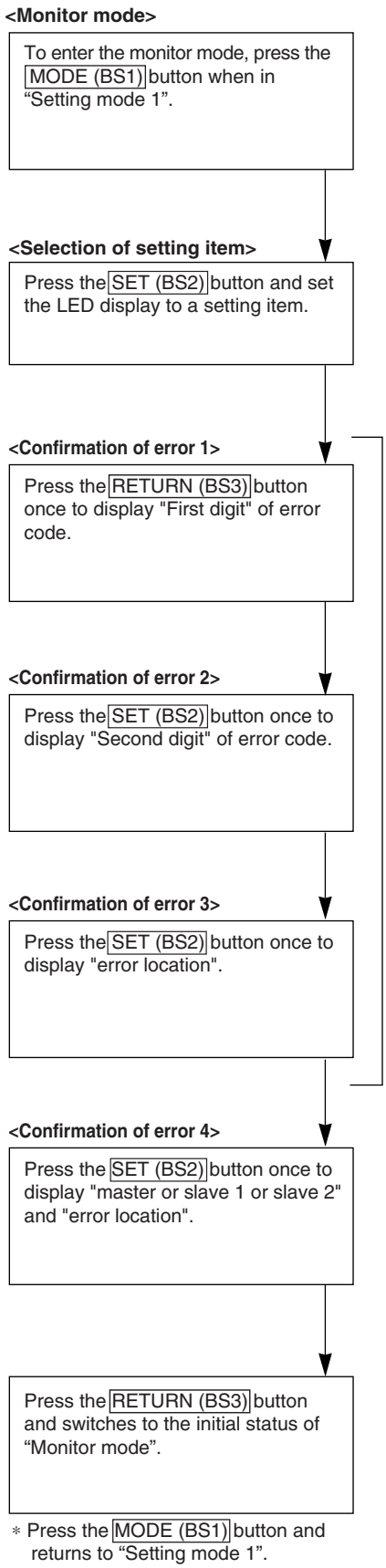
Maintenance Menu	Item 2	Remarks
3. Indoor Unit Status	10.FLOAT	
	11.T1/T2	
	12.Unit No.	Select the Unit No. you want to check.
		SkyAir
	13.Th1	Suction air thermistor
	14.Th2	Heat exchanger thermistor
	15.Th3	—
	16.Th4	Discharge air thermistor
	17.Th5	—
	18.Th6	—
4. Outdoor Unit Status	1. Unit No.	Select the Unit No. you want to check.
	2. FAN step	Fan tap
	3. COMP	Compressor power supply frequency (Hz)
	4. EV1	Degree that electronic expansion valve is open (pls)
	5. SV1	Solenoid valve ON/OFF
		SkyAir
	6. Th1	Outdoor air thermistor
	7. Th2	Heat exchanger thermistor
	8. Th3	Discharge pipe thermistor
	9. Th4	Heat exchanger deicer thermistor
	10.Th5	Heat exchanger gas pipe thermistor
	11.Th6	Liquid pipe thermistor
5. Forced Defrost (SkyAir only)	1. Forced defrost ON	Enables the forced defrost operation.
	2. Forced defrost OFF	Disables the forced defrost operation.
6. Error Display	1. Display Warning ON	Displays a warning on the screen if an error occurs.
	2. Display Warning OFF	No warning is displayed.
	3. Display Error ON	Displays the error on the screen.
	4. Display Error OFF	Displays neither errors nor warnings.
7. Swap Unit No.	1. Current Unit No.	A unit No. can be transferred to another.
	2. Transfer Unit No.	
8. Addressed Sensor Value	○ Unit No.: 0 - 15	Select the Unit No. you want to check.
	○ Code 00: 01: 02: 03: 04: 05: 06: 07: 08: 09:	 Remote controller thermistor (°F) Suction air thermistor (°F) Heat exchanger liquid pipe thermistor (°F) Heat exchanger gas pipe thermistor (°F) Indoor unit address No. Outdoor unit address No. Branch Selector unit address No. (Only for VRV System) 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.

2.6 Error Codes and Description

	Error code	Contents of Error	Page Referred
Indoor Unit	A0	External Protection Device Abnormality	89
	A1	PCB Abnormality	90
	A3	Drain Water Level System Abnormality	91
	A6	Indoor Unit Fan Motor Abnormality	93
	A7	Swing Flap Motor Abnormality / Lock	94
	A9	Electronic Expansion Valve Coil Abnormality	96
	AF	Drain System Abnormality	98
	AJ	Capacity Setting Device Abnormality	99
	C4	Heat Exchanger (Liquid pipe) Thermistor Abnormality	100
	C5	Heat Exchanger (Gas Pipe) Thermistor Abnormality	101
	C9	Suction Air Thermistor Abnormality Remote Sensor Abnormality	102, 103
	CJ	Room Temperature Thermistor in Remote Controller Abnormality	104
Outdoor Unit	E1	Outdoor Unit PCB Abnormality	105
	E3	High Pressure Abnormality	106
	E4	Actuation of Low Pressure Sensor	108
	E5	Inverter Compressor Motor Lock	110
	E7	Outdoor Unit Fan Motor Abnormality	112
	E9	Electronic Expansion Valve Coil Abnormality	113
	F3	Discharge Pipe Temperature Control	115
	F6	Refrigerant Overcharged	116
	H3	High Pressure Switch Abnormality	117
	H7	Outdoor Unit Fan Motor Signal Abnormality	118
	H9	Outdoor Air Thermistor Abnormality	119
	J3	Discharge Pipe Thermistor Abnormality	120
	J5	Suction Pipe Thermistor Abnormality	121
	J6	Outdoor Unit Heat Exchanger Thermistor Abnormality	122
	JA	High Pressure Sensor Abnormality	123
	JC	Low Pressure Sensor Abnormality	125
	L1	Outdoor Unit PCB Abnormality	127
	L4	Radiation Fin Temperature Rise	128
	L5	Momentary Overcurrent of Inverter Compressor	129
	L8	Electronic Thermal (Time Lag)	130
	L9	Inverter Startup Error	132
	LC	Transmission Error (between Control and Inverter PCB)	133
	P4	Radiation Fin Thermistor Abnormality	134
System	U0	Refrigerant Shortage	135
	U2	Power Supply Voltage Abnormality	136
	U3	Check Operation not Executed	138
	U4	Transmission Error (between Indoor Units and Outdoor Units)	139
	U5	Transmission Error (between Remote Controller and Indoor Unit)	142
	U8	Transmission Error (between Main and Sub Remote Controllers)	143
	UE	Transmission Error (between Centralized Remote Controller and Indoor Unit)	144
	UF	System is not Set yet	146

The system operates for error codes indicated in black squares, however, be sure to check and repair.

Error Code Indication by Outdoor Unit PCB



Contents of Error		Error code
In-phase error of DIII-Net	Detection of DIII-Net	E1
Discharge pressure Abnormality	HPS activated	E3
Suction pressure Abnormality	Pe abnormality	E4
Compressor lock	Detection of INV. compressor lock	E5
Over load, overcurrent,	Detection of DC fan 1 motor lock	E7
Electronic expansion valve abnormality	EV1	E9
Defective sensor of outdoor air temperature	Defective Ta sensor (short)	H9
Discharge pipe temperature abnormality	Td abnormality	F3
Heat exchanger temperature abnormality	Refrigerant overcharge	F6
Defective sensor of discharge pipe temperature	Defective Tdi sensor (short)	J3
Defective sensor of suction pipe temperature	Defective Ts1 sensor (short)	J5
	Defective Ts2 sensor (short)	
Defective sensor of heat exchanger temperature	Defective Tb sensor (short)	J6
Defective sensor of discharge	Defective Pc sensor (short)	JA
Defective sensor of suction pressure	Defective Pe sensor (short)	JC
Defective Inverter PCB	Defective IPM	L1
	Current sensor offset abnormality	
	IGBT abnormality	
	Defective Current sensor	
	SP-PAM overvoltage abnormality	
Inverter radiation fin temperature rising	Over heating of inverter radiation fin temperature	L4
DC output overcurrent	Inverter instantaneous overcurrent	L5
Electronic thermal	Electronic thermal switch 1	L8
	Electronic thermal switch 2	
	Out-of-step	
	Speed down after startup	
	Lightening detection	
Stall prevention (Limit time)	Stall prevention (Current increasing)	L9
	Stall prevention (Start up error)	
	Wave form in startup abnormality	
	Out-of-step	
Transmission error between inverter and outdoor unit	Inverter transmission error	LC
Defective temperature sensor of inverter radiation fin	Faulty radiation fin thermistor of inverter fin	P4
Refrigerant shortage	Refrigerant shortage alarm	U0
Power supply voltage abnormality	Insufficient Inverter voltage	U2
	Faulty charge of capacitor in main inverter circuit	
	Error due to SP-PAM overvoltage	
	Error due to P-N short circuit	
No implementation of test-run		U3
Transmission error between indoor and outdoor unit	I/O transmission error	U4
	I/O transmission error	
Conflict in wiring and piping, no setting for system	Conflict in wiring and piping	UF

○: ON ●: OFF ◑: Blink

Error Code	Confirmation of Error 1							Confirmation of Error 2							Confirmation of Error 3							Confirmation of Error 4						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P
E1	◑	◑	●	●	●	◑	◑	◑	●	○	●	●	●	◑	◑	○	●	●	●	●	●	◑	○	○	●	●	◑	◑
E3								◑			●	●	◑	◑	◑			●	●	●	●	◑			●	●		
E4								◑			●	◑	●	●	◑			●	●	●	●	◑			●	●		
E5								◑			●	◑	●	◑	◑			●	●	●	●	◑			●	●	*1	
E7								◑			●	◑	◑	◑	◑			●	●	●	●	◑			●	◑		
E9								◑			◑	●	●	◑	◑			●	●	●	●	◑			●	●		
H9	◑	◑	●	●	◑	●	●	◑			◑	●	●	◑	◑			●	●	●	●	◑			●	●	*1	
F3	◑	◑	●	●	◑	●	◑	◑			●	●	◑	◑	◑			●	●	●	●	◑			●	●	*1	
F6								◑			●	◑	◑	●	◑			●	●	●	●	◑			●	●	◑	◑
J3	◑	◑	●	●	◑	◑	●	◑			●	●	◑	◑	◑			●	●	●	●	◑			●	●		
J5								◑			●	◑	●	◑	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	●	◑			●	◑	*1	
J6								◑			●	◑	◑	●	◑			●	●	●	●	◑			●	●		
JA								◑			◑	●	◑	●	◑			●	●	●	●	◑			●	●		
JC								◑			◑	◑	●	●	◑			●	●	●	●	◑			●	●		
L1	◑	◑	●	●	◑	◑	◑	◑			●	●	●	◑	◑			●	●	●	●	◑			●	●	●	●
								◑			●	●	●	◑	◑			●	●	●	●	◑			●	●	●	◑
								◑			●	●	●	◑	◑			●	●	●	●	◑			●	●	◑	●
								◑			●	●	●	◑	◑			●	●	●	●	◑			●	●	◑	◑
								◑			●	●	●	◑	◑			●	●	●	●	◑			●	◑	●	●
L4								◑			●	◑	●	●	◑			●	●	●	●	◑			●	●		
L5								◑			●	◑	●	◑	◑			●	●	●	●	◑			●	●		
L8								◑			◑	●	●	●	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	●	◑			●	◑		
															◑			●	●	●	●	◑			◑	●	*1	
															◑			●	●	●	◑	◑			●	●		
L9								◑			◑	●	●	◑	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	●	◑			●	◑		
															◑			●	●	●	●	◑			◑	●		
LC								◑			◑	◑	●	●	◑			●	●	●	●	◑			●	◑		
P4	◑	◑	●	◑	●	●	●	◑			●	◑	●	●	◑			●	●	●	●	◑			●	●	*1	
U0	◑	◑	●	◑	●	●	◑	◑			●	●	●	●	◑			●	●	●	●	◑			●	●	◑	◑
U2								◑			●	●	◑	●	◑			●	●	●	●	◑			●	●	*1	
															◑			●	●	●	●				●	◑		
															◑			●	●	●	●	◑			●	●	◑	●
															◑			●	●	●	●	◑			●	●	●	◑
U3								◑			●	●	◑	◑	◑			●	●	●	●	◑			●	●	◑	◑
															◑			●	●	●	●	◑			●	◑	◑	◑
U4								◑			●	◑	●	●	◑			●	●	●	●	◑			●	●	◑	◑
															◑			●	●	●	●	◑			●	◑	◑	◑
UF								◑			◑	◑	◑	◑	◑			●	●	●	●	◑			●	●	◑	◑

Display of contents of error (first digit)

Display of contents of error (second digit)

Display 1 of error in detail

Display 2 of error in detail

※1		
	●	● Master
	●	◑ Slave1
	◑	● Slave2
	◑	◑ System

3. Troubleshooting by Indication on the Remote Controller

3.1 External Protection Device Abnormality

Remote Controller Display

A0

Applicable Models

All indoor models

Method of Error Detection

Detect open or short circuit between external input terminals in indoor unit.

Error Decision Conditions

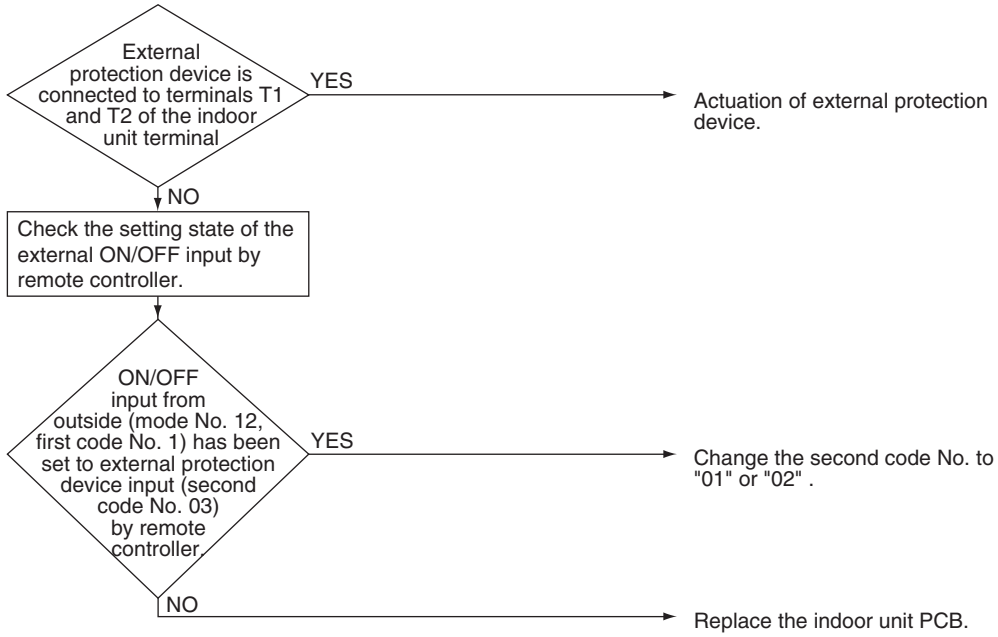
When an open circuit occurs between external input terminals with the remote controller set to "external ON/OFF terminal".

Supposed Causes

- Actuation of external protection device
- Improper field setting
- Defective indoor unit PCB

Troubleshooting

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



3.2 PCB Abnormality

Remote Controller Display

A1

Applicable Models

All indoor models

Method of Error Detection

Check data from E²PROM.

Error Decision Conditions

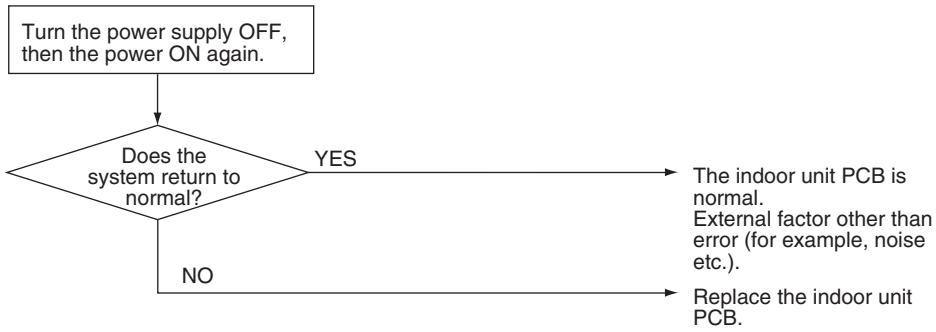
When data could not be correctly received from the E²PROM
E²PROM: Type of nonvolatile memory. Maintains memory contents even when the power supply is turned OFF.

Supposed Causes

- Defective indoor unit PCB
- External factor (Noise etc.)

Troubleshooting

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



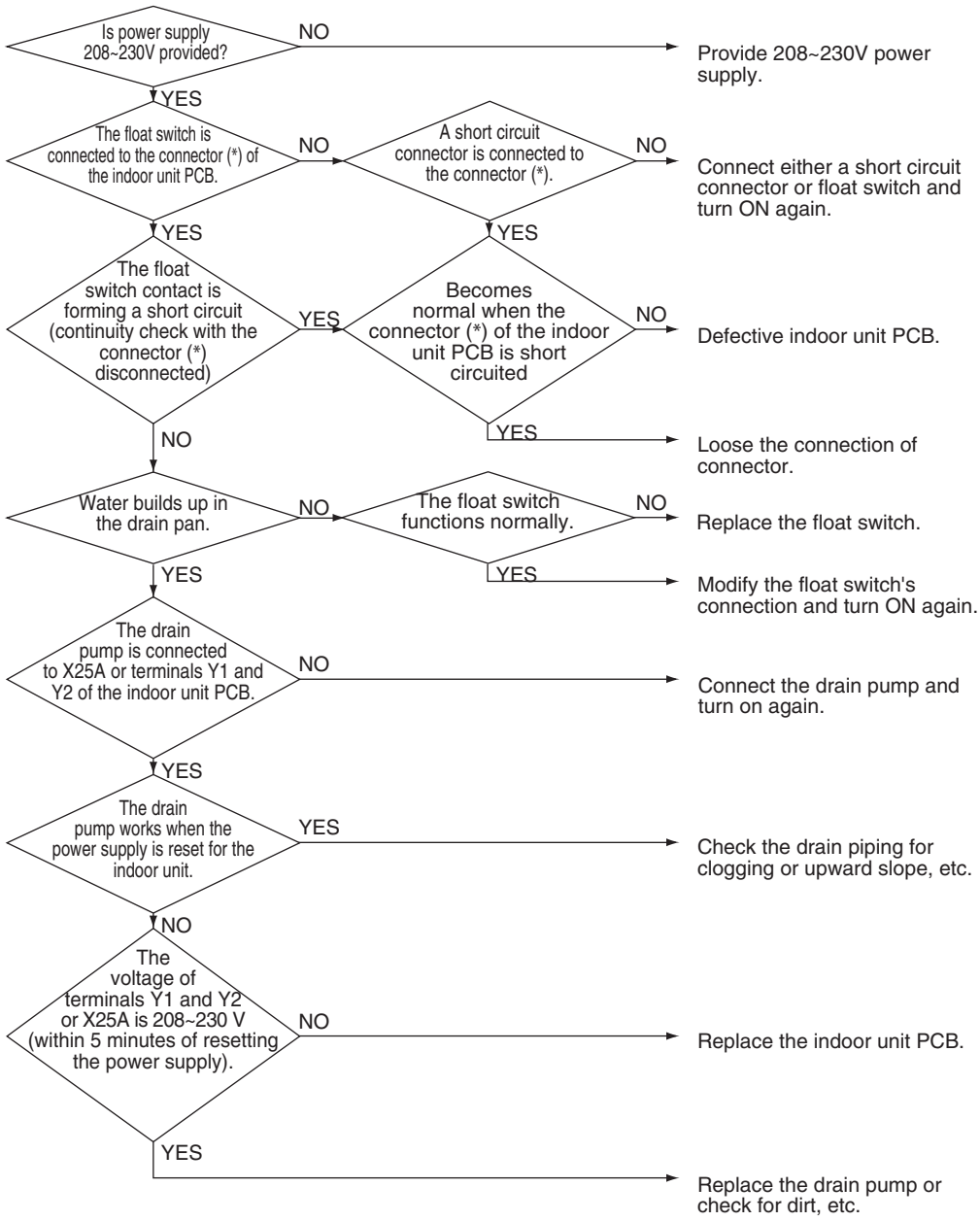
3.3 Drain Water Level System Abnormality

Remote Controller Display	A3
Applicable Models	FCQ, FHQ (Option), FAQ (Option), FTQ
Method of Error Detection	By float switch OFF detection
Error Decision Conditions	When rise of water level is not a condition and the float switch goes OFF
Supposed Causes	■ 208~230V power supply is not provided ■ Defective float switch or short circuit connector ■ Defective drain pump ■ Drain clogging, upward slope, etc. ■ Defective indoor unit PCB ■ Loose connection of connector

Troubleshooting

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

- **For FTQ**
  Connect a short circuit connector (∗)
- **For FCQ, FHQ, FAQ**



Note: ∗ The float switch connector

Model	Connector	PCB
FCQ	X8A	A1P
FHQ	X8A	A1P
FAQ	X15A	A1P
FTQ	X15A	A1P

3.4 Indoor Unit Fan Motor Abnormality

Remote Controller Display

A6

Applicable Models

FCQ, FHQ, FAQ, FTQ

Method of Error Detection

Detection by failure of signal for detecting number of turns to come from the fan motor

Error Decision Conditions

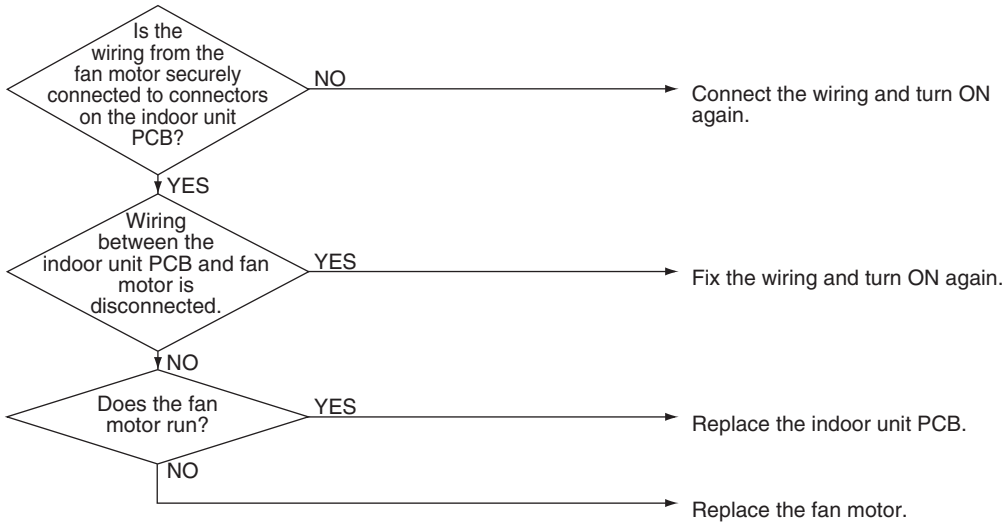
When revolutions cannot be detected even when output voltage to the fan is maximum

Supposed Causes

- Fan motor lock
- Disconnected or wrong wiring between fan motor and PCB

Troubleshooting

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

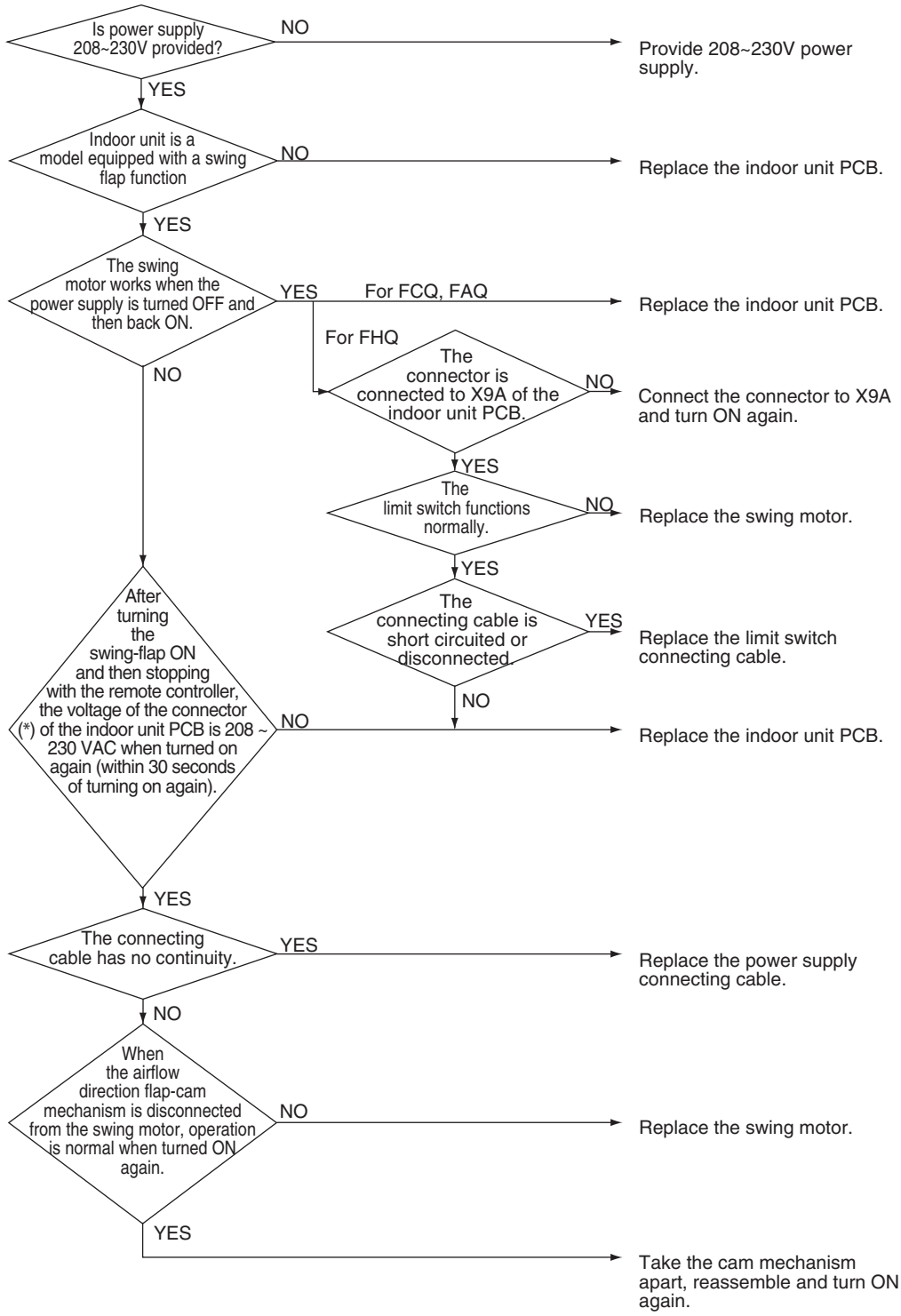


3.5 Swing Flap Motor Abnormality / Lock

Remote Controller Display	A7
Applicable Models	FCQ, FHQ, FAQ
Method of Error Detection	Utilizes ON/OFF of the limit switch when the motor turns.
Error Decision Conditions	When ON/OFF of the micro-switch for positioning cannot be reversed even though the swing flap motor is energized for a specified amount of time (about 30 seconds). * Error code is displayed but the system operates continuously.
Supposed Causes	■ Defective swing motor ■ Defective connection cable (power supply and limit switch) ■ Defective airflow direction adjusting flap-cam ■ Defective indoor unit PCB

Troubleshooting

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



Note: * Connector and indoor unit PCB

Model	Connector for Swing Flap	PCB
FCQ	X28A	A1P
FHQ	X6A	A1P
FAQ	X36A	A1P

3.6 Electronic Expansion Valve Coil Abnormality

Remote Controller Display

A9

Applicable Models

FCQ, FHQ, FAQ, FTQ

Method of Error Detection

Check the coil condition of electronic expansion valve by using micro-computer.

Error Decision Conditions

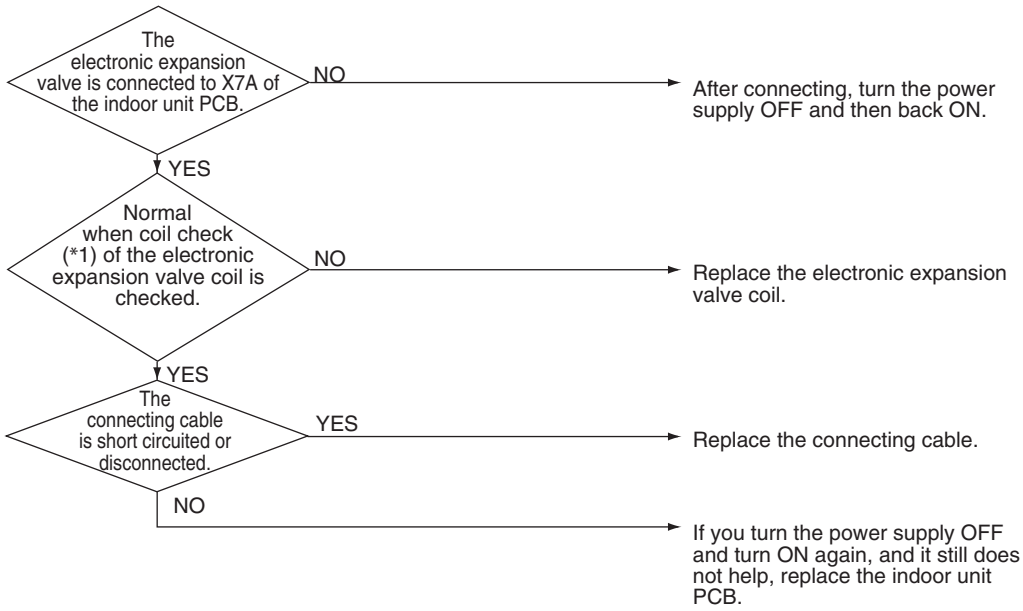
Pin input for electronic expansion valve coil is abnormal when initializing micro-computer.

Supposed Causes

- Defective electronic expansion valve coil
- Defective indoor unit PCB
- Defective connecting cable

Troubleshooting

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



∗1: Coil check method for the electronic expansion valve coil
Discount the electronic expansion valve from the PCB and check the continuity between the connector pins.

(Normal)

Pin No.	1. White	2. Yellow	3. Orange	4. Blue	5. Red	6. Brown
1. White		×	○ Approx. 300Ω	×	○ Approx. 150Ω	×
2. Yellow			×	○ Approx. 300Ω	×	○ Approx. 150Ω
3. Orange				×	○ Approx. 150Ω	×
4. Blue					×	○ Approx. 150Ω
5. Red						×
6. Brown						

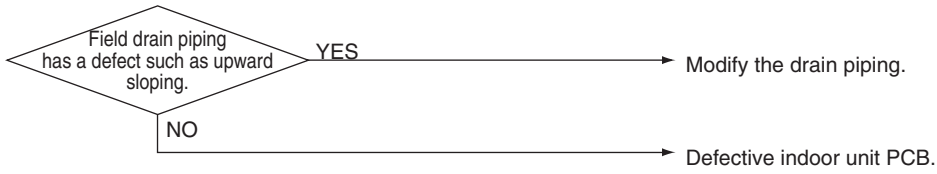
○: Continuity
×: No continuity

3.7 Drain System Abnormality

Remote Controller Display	A5
Applicable Models	FCQ, FHQ, FAQ, FTQ
Method of Error Detection	Water leakage is detected based on float switch ON/OFF operation while the compressor is in non-operation.
Error Decision Conditions	The float switch changes from ON to OFF while the compressor is OFF.
Supposed Causes	■ Defective drain pipe (upward slope, etc.) ■ Defective indoor unit PCB

Troubleshooting

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



3.8 Capacity Setting Device Abnormality

Remote controller display

A1

Applicable Models

FCQ, FHQ, FAQ, FTQ

Method of Error Detection

Capacity is determined according to resistance of the capacity setting adaptor and the memory inside the IC memory on the indoor unit PCB, and whether the value is normal or abnormal is determined.

Error Decision Conditions

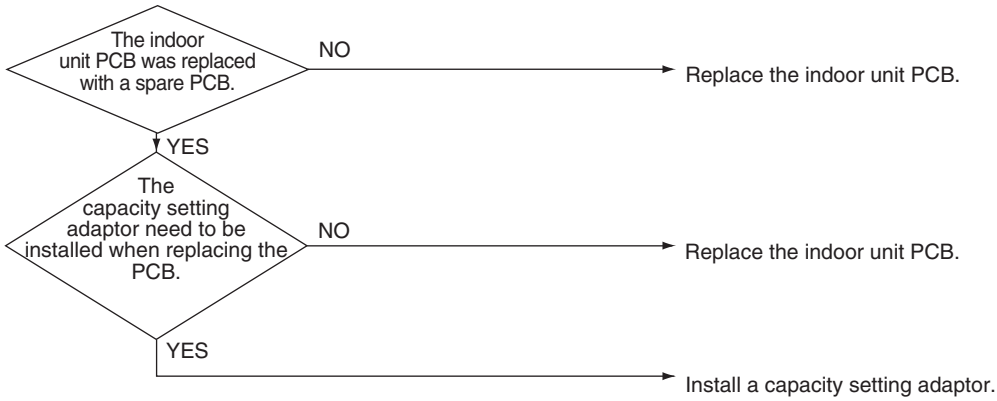
When the capacity code is not saved to the PCB, and the capacity setting adaptor is not connected.
When a capacity that does not exist for that unit is set.

Supposed Causes

- The capacity setting adaptor was not installed.
- Defective indoor unit PCB

Troubleshooting

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



3.9 Heat Exchanger (Liquid pipe) Thermistor Abnormality

Remote Controller Display

E4

Applicable Models

All indoor models

Method of Error Detection

The error is detected by temperature detected by heat exchanger thermistor.

Error Decision Conditions

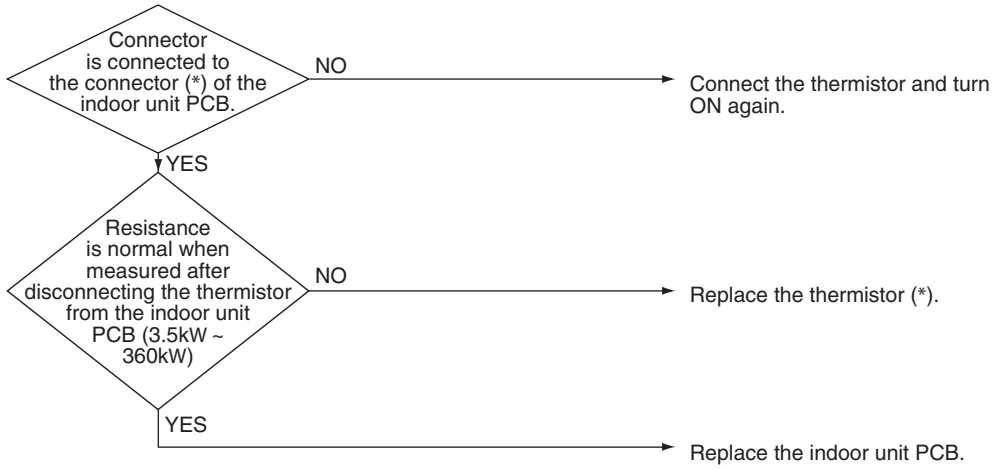
When the heat exchanger thermistor becomes disconnected or shorted while the unit is running

Supposed Causes

- Defective thermistor for heat exchanger (liquid pipe)
- Defective indoor unit PCB

Troubleshooting

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



Note: * Connector and indoor unit PCB

Model	Connector for the heat exchanger (liquid pipe) thermistor	Symbol	PCB
FCQ	X12A	R2T	A1P
FHQ	X12A	R2T	A1P
FAQ	X18A	R2T	A1P
FTQ	X18A	R1T	A1P

* Refer to “Thermistor Resistance / Temperature Characteristics” table on P.161.

3.10 Heat Exchanger (Gas Pipe) Thermistor Abnormality

Remote Controller Display

C5

Applicable Models

All indoor models

Method of Error Detection

The error is detected by temperature detected by gas pipe thermistor.

Error Decision Conditions

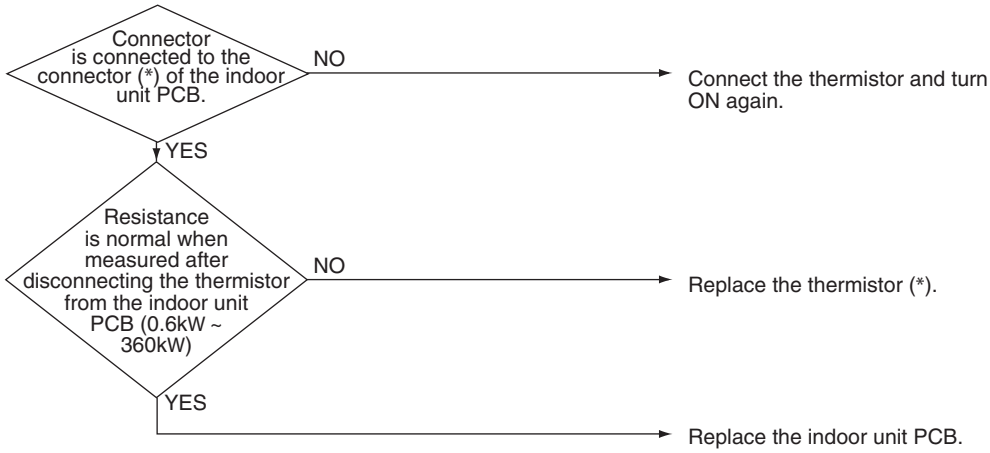
When the gas pipe thermistor becomes disconnected or shorted while the unit is running

Supposed Causes

- Defective indoor unit thermistor for heat exchanger (gas pipe)
- Defective indoor unit PCB

Troubleshooting

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



Note: * Connector and indoor unit PCB

Model	Connector for the heat exchanger (gas pipe) thermistor	Symbol	PCB
FCQ	X11A	R3T	A1P
FHQ	X11A	R3T	A1P
FAQ	X14A	R3T	A1P
FTQ	X17A	R2T	A1P

* Refer to “Thermistor Resistance / Temperature Characteristics” table on P.161.

3.11 Suction Air Thermistor Abnormality

Remote Controller Display

C9

Applicable Models

FCQ, FHQ, FAQ

Method of Error Detection

The error is detected by temperature detected by suction air temperature thermistor.

Error Decision Conditions

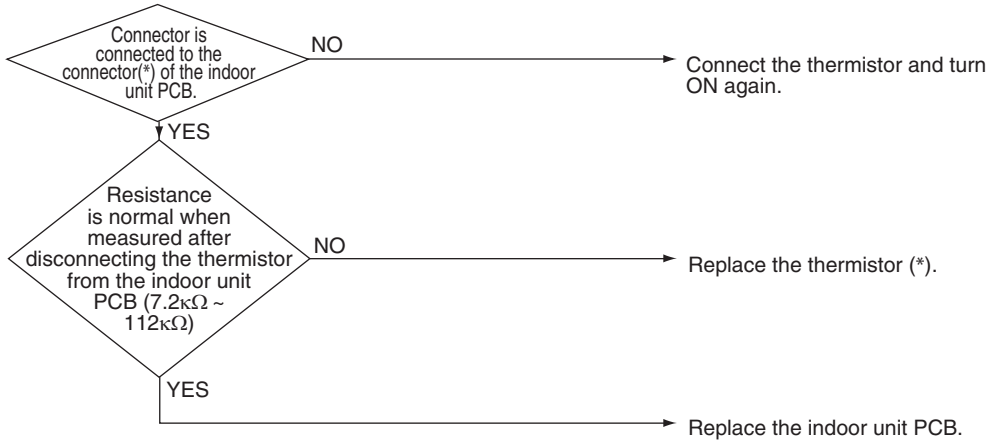
When the suction air temperature thermistor becomes disconnected or shorted while the unit is running

Supposed Causes

- Defective indoor unit thermistor for suction air
- Defective indoor unit PCB

Troubleshooting

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



Note: * Connector and indoor unit PCB

Model	Connector for the suction air thermistor	Symbol	PCB
FCQ	X13A	R1T	A1P
FHQ	X13A	R1T	A1P
FAQ	X19A	R1T	A1P

* Refer to “Thermistor Resistance / Temperature Characteristics” table on P.161.

3.12 Remote Sensor Abnormality

Remote Controller Display

C9

Applicable Models

FTQ

Method of Error Detection

The error is detected out by temperature detected by remote sensor.

Error Decision Conditions

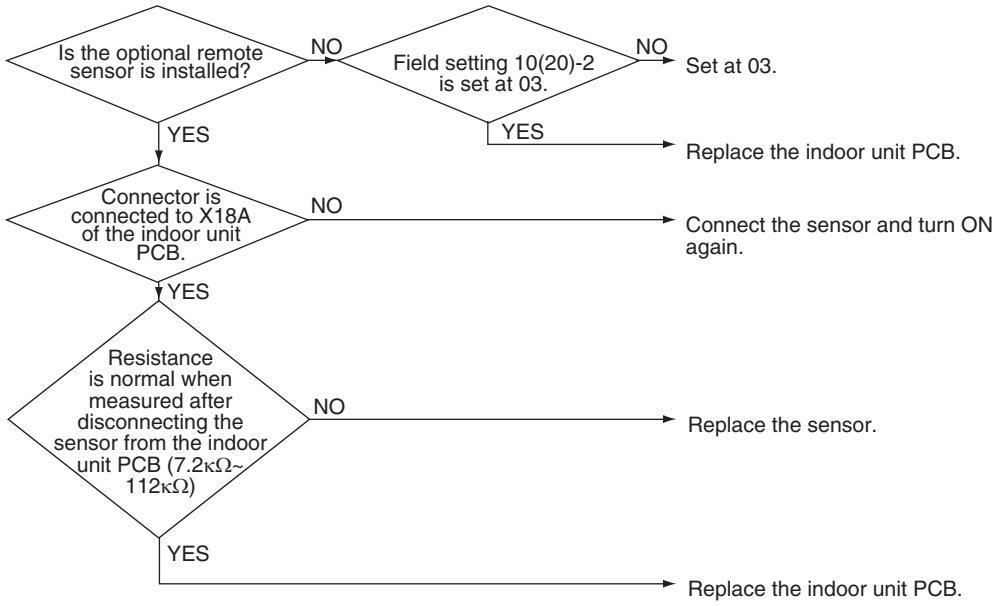
When the remote sensor becomes disconnected or shorted while the unit is running

Supposed Causes

- Defective indoor unit thermistor (R1T) for suction air
- Defective indoor unit PCB

Troubleshooting

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



∗ Refer to “Thermistor Resistance / Temperature Characteristics” table on P.161.

3.13 Room Temperature Thermistor in Remote Controller Abnormality

Remote Controller Display

C J

Applicable Models

All indoor models

Method of Error Detection

Error detection is carried out by temperature detected by room temperature thermistor in remote controller. (Note:)

Error Decision Conditions

When the room temperature thermistor in remote controller becomes disconnected or shorted while the unit is running.

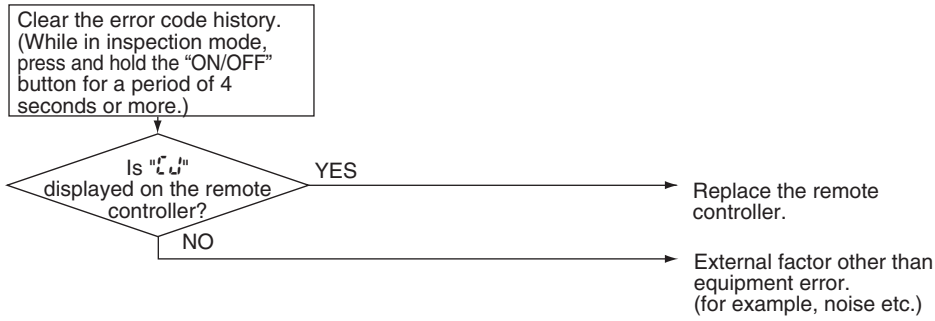
* Error code is displayed but the system operates continuously.

Supposed Causes

- Defective room temperature thermistor in remote controller
- Defective remote controller PCB

Troubleshooting

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



Note: *1: How to delete "history of error codes".
Press the "ON/ OFF" button for 4 seconds and more while the error code is displayed in the inspection mode.

* Refer to "Thermistor Resistance / Temperature Characteristics" table on P.161.

3.14 Outdoor Unit PCB Abnormality

Remote Controller Display

E 1

Applicable Models

RZR, RZQ

Method of Error Detection

Micro-computer checks whether E^2PROM is normal.

Error Decision Conditions

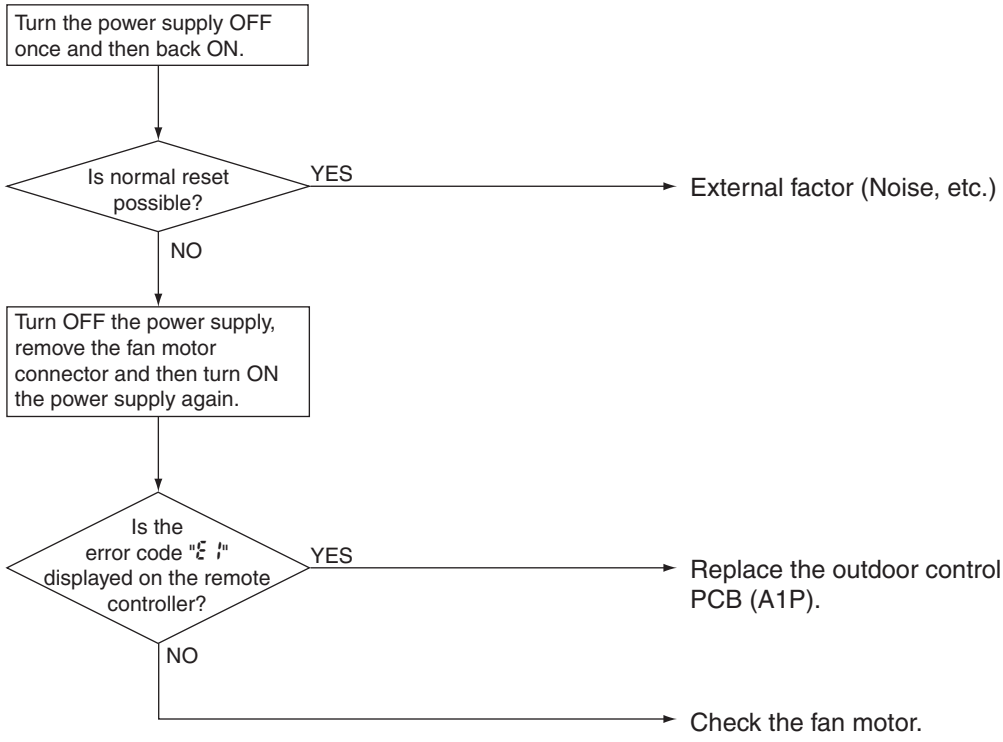
When E^2PROM error when turning the power supply ON

Supposed Causes

- Defective outdoor unit PCB
- Defective fan motor
- External factor (Noise, etc.)

Troubleshooting

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



3.15 High Pressure Abnormality

Remote Controller Display	E3
Applicable Models	RZR, RZQ
Method of Error Detection	Abnormality is detected when the contact of the high pressure protection switch opens.
Error Decision Conditions	Error is generated when the S1PH (High pressure switch) activation count reaches the number specific to the operation mode. (Reference) Operating pressure of high pressure switch Operating pressure: 580 psi Reset pressure: 435 psi
Supposed Causes	■ Actuation of outdoor unit high pressure switch ■ Defective high pressure switch ■ Defective outdoor unit PCB ■ Instantaneous power failure ■ Defective high pressure sensor

Troubleshooting

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

Check for the points shown below.
(1) Is the stop valve open?
(2) Is the high pressure switch connector properly connected to the main PCB?
(3) Does the high pressure switch have continuity?

Are the 3 points above OK?
NO → Rectify defective points, if any.
YES

· Mount a pressure gauge on the high pressure service port.
· Connect the Service Checker.
· Reset the operation using the remote controller, and then restart the operation.

Does the stop due to error (E3) recur?
YES → Is the high pressure switch operating value normal (i.e., 580psi)?
NO → Replace the high pressure switch.
YES
NO

Are the characteristics of the high pressure sensor normal? (*1)
NO → Replace the high pressure sensor.
YES

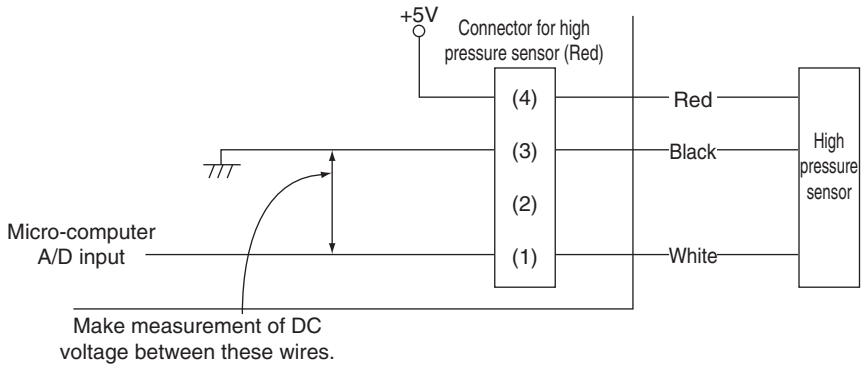
Is the pressure detected with the PCB normal? (*2)
NO → Replace the main PCB.
YES

· The high pressure sensor is normal, and the pressure detected with the PCB is also normal.
· The high pressure has really become high.

CHECK 1

Remove the causes by which the high pressure has become high.

*1: Make a comparison between the voltage of the pressure sensor and that read by the pressure gauge.
(As to the voltage of the pressure sensor, make measurement of voltage at the connector, and then convert it to pressure according to information on P.164.)
*2: Make a comparison between the high pressure value checked with the Service Checker and the voltage of the pressure sensor (*1).
*3: Make measurement of voltage of the pressure sensor.



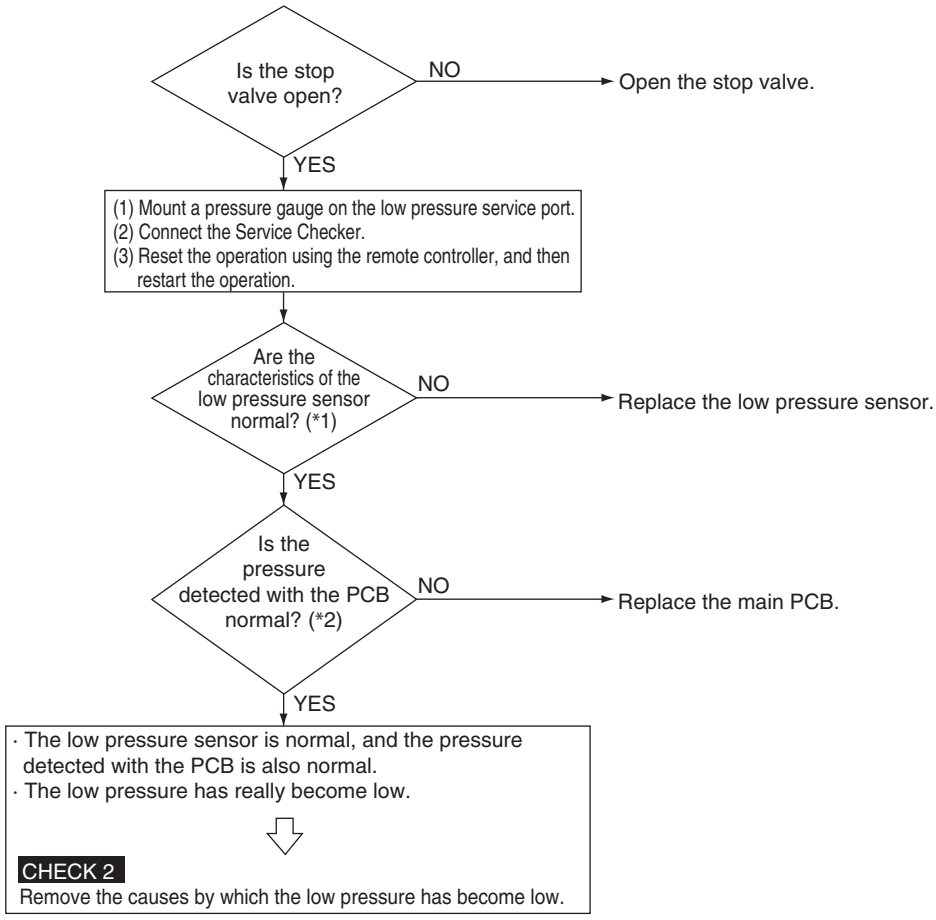
CHECK 1 Refer to P.147.

3.16 Actuation of Low Pressure Sensor

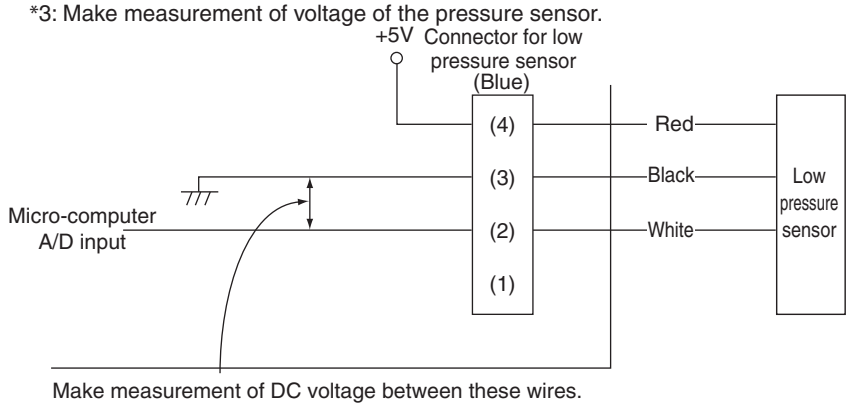
Remote Controller Display	E4
Applicable Models	RZR, RZQ
Method of Error Detection	Abnormality is detected by the pressure value with the low pressure sensor.
Error Decision Conditions	Error is generated when the low pressure is dropped during compressor operating. Operating pressure: 10 psi
Supposed Causes	■ Abnormal drop of low pressure (Lower than 10 psi) ■ Defective low pressure sensor ■ Defective outdoor unit PCB ■ Stop valve is not opened

Troubleshooting

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



*1: Make a comparison between the voltage of the pressure sensor and that read by the pressure gauge.
(As to the voltage of the pressure sensor, make measurement of voltage at the connector, and then convert it to pressure according to information on P.164.)
*2: Make a comparison between the low pressure value checked with the Service Checker and the voltage of the pressure sensor (*1).
*3: Make measurement of voltage of the pressure sensor.



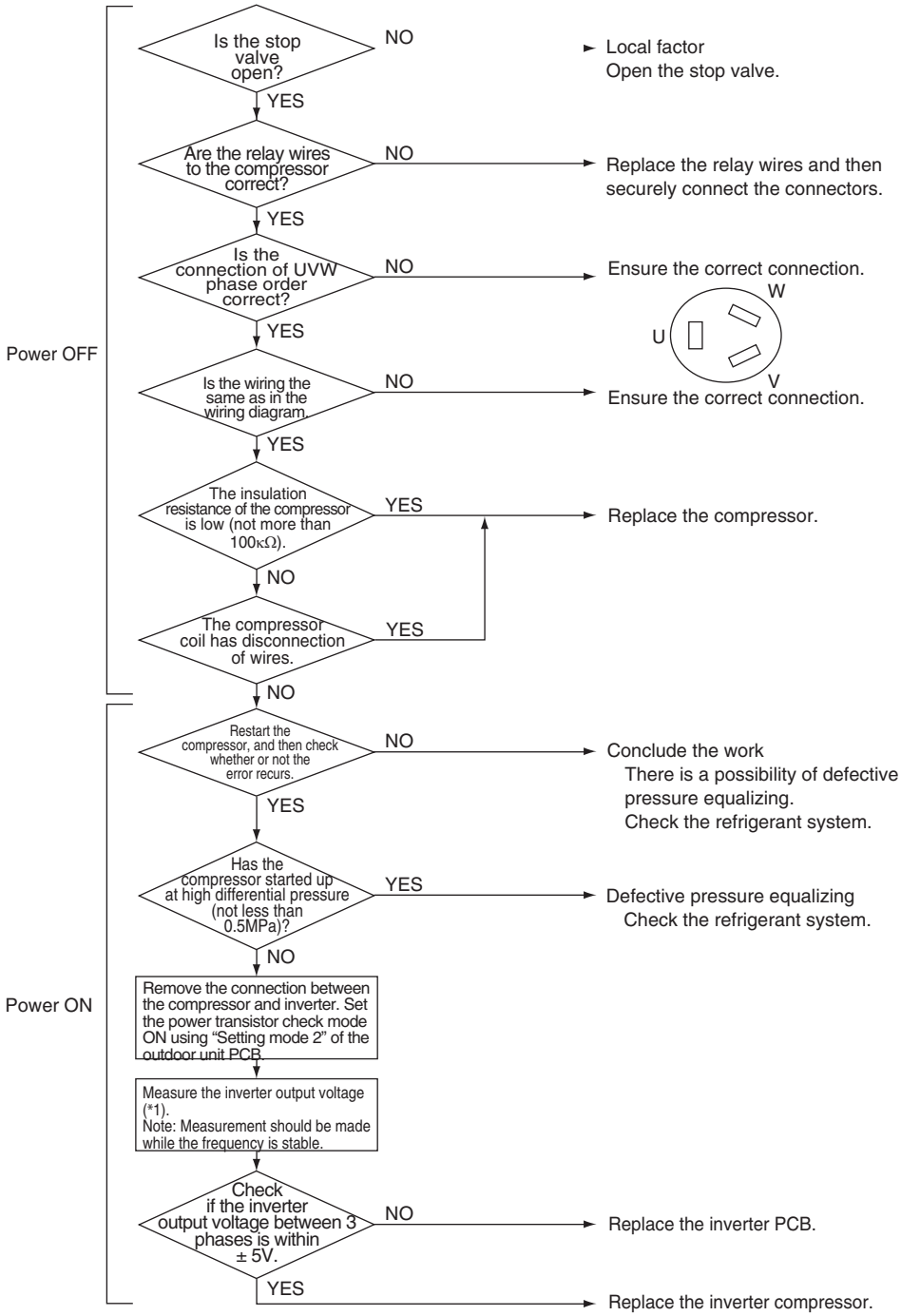
CHECK 2 Refer to P.148.

3.17 Inverter Compressor Motor Lock

Remote Controller Display	E5
Applicable Models	RZR, RZQ
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 inverter compressor motor does not start up even in forced startup mode.
Supposed Causes	■ Inverter Compressor lock ■ High differential pressure (72 psi or more) ■ Incorrect UVW wiring ■ Defective inverter PCB ■ Stop valve is not opened

Troubleshooting

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



Note: *1: The quality of power transistors/ diode modules can be judged by executing **CHECK 4** .

CHECK 4 Refer to P.149.

3.18 Outdoor Unit Fan Motor Abnormality

Remote Controller Display

E7

Applicable Models

RZR, RZQ

Method of Error Detection

The error is detected according to the revolution speed detected by hall IC when the fan motor runs.

Error Decision Conditions

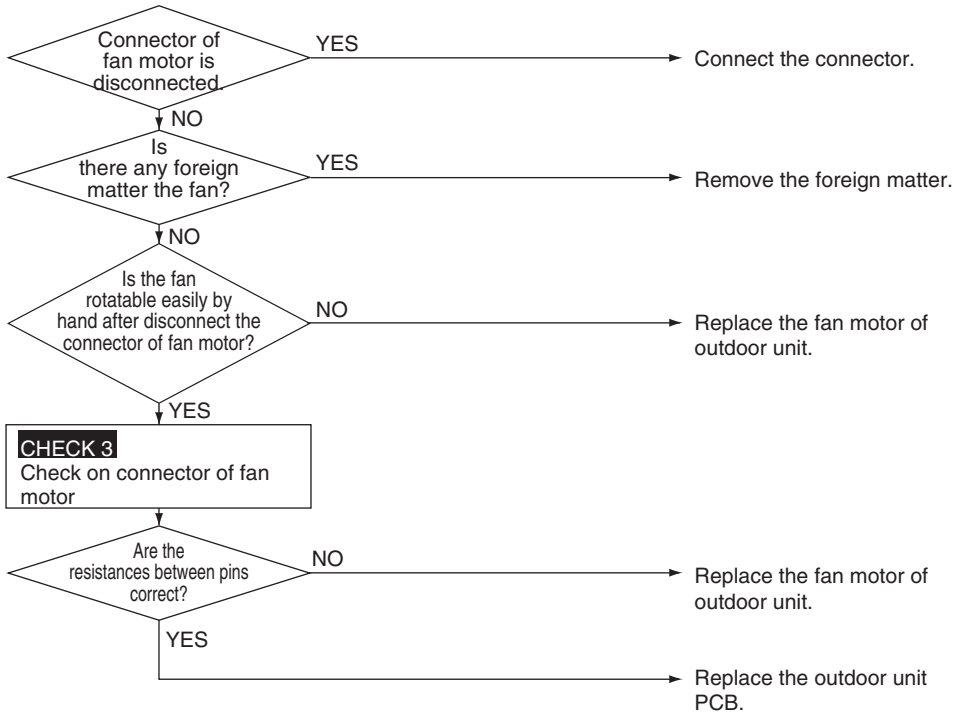
- When the fan runs with revolution speed less than a specified one for 6 seconds or more when the fan motor running conditions are met
- When the error is generated 4 times, the system shuts down.

Supposed Causes

- Defective fan motor
- The harness connector between fan motor and PCB is left in disconnected, or defective connector
- Fan does not run due to foreign matters tangled
- Clearing condition: Operate for 5 minutes (normal)

Troubleshooting

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



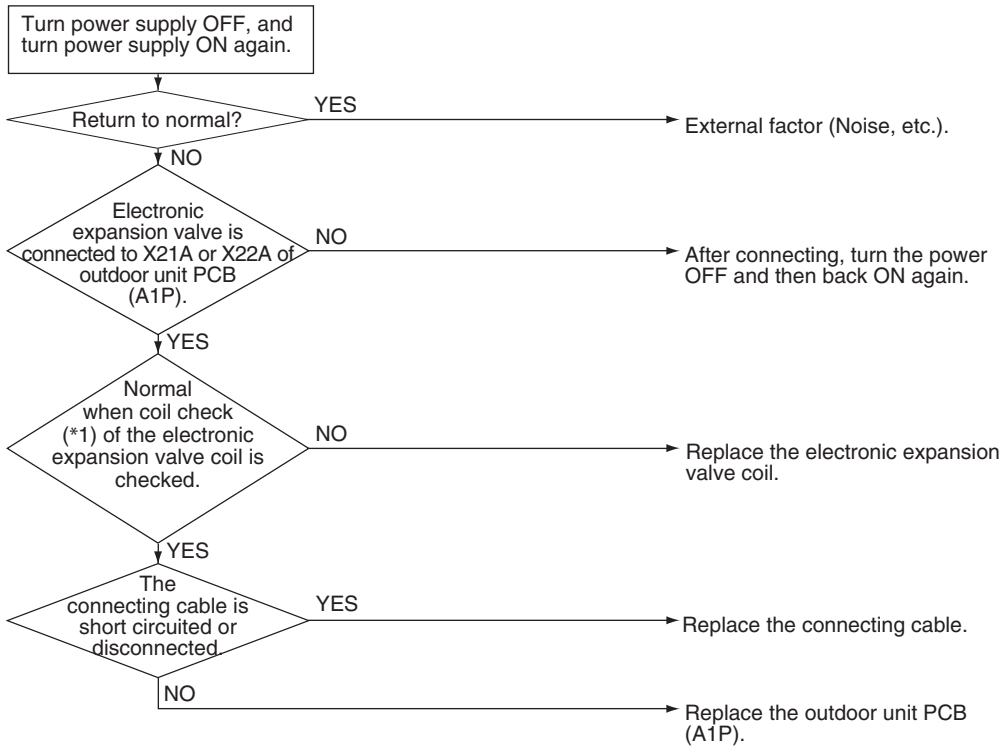
CHECK 3 Refer to P.149.

3.19 Electronic Expansion Valve Coil Abnormality

Remote Controller Display	E9
Applicable Models	RZR, RZQ
Method of Error Detection	Check disconnection of connector Check continuity of electronic expansion valve coil
Error Decision Conditions	Error is generated under no common power supply when the power is on.
Supposed Causes	■ Defective electronic expansion valve coil ■ Defective outdoor unit PCB (A1P) ■ Defective connection of electronic expansion valve connector

Troubleshooting

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



*Make measurement of resistance between the connector pins, and then make sure the resistance falls in the range of 40 to 50W.

Measuring points
1 - 6
2 - 6
3 - 6
4 - 6

3.20 Discharge Pipe Temperature Control

Remote Controller Display

F3

Applicable Models

RZR, RZQ

Method of Error Detection

Abnormality is detected according to the temperature detected by the discharge pipe temperature thermistor.

Error Decision Conditions

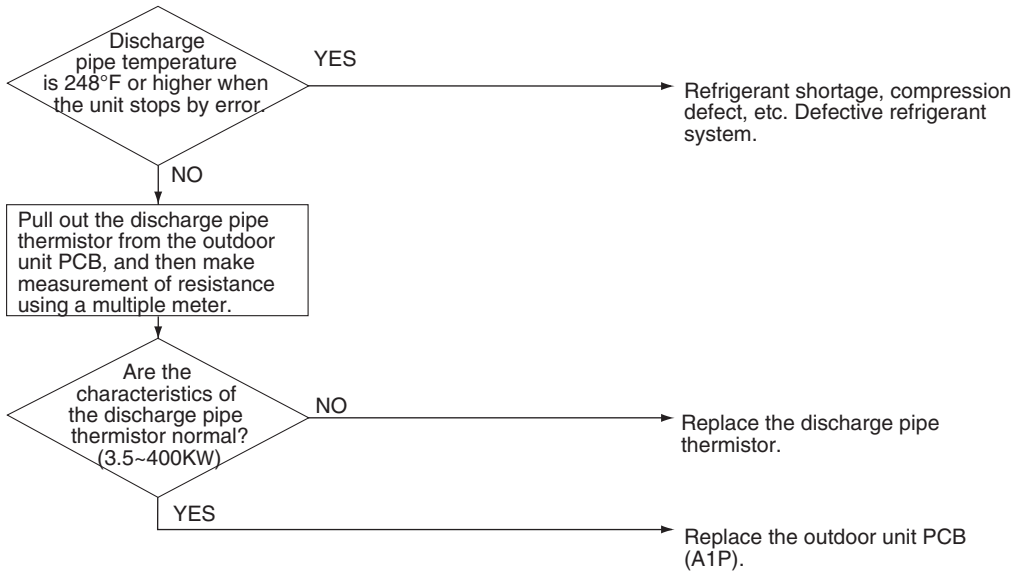
When the discharge pipe temperature rises to an abnormally high level
When the discharge pipe temperature rises suddenly

Supposed Causes

- Defective discharge pipe temperature thermistor
- Defective connection of discharge pipe temperature thermistor
- Defective outdoor unit PCB

Troubleshooting

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



Refer to “Thermistor Resistance / Temperature Characteristics” table on P.162.

3.21 Refrigerant Overcharged

Remote Controller Display

F6

Applicable Models

RZR, RZQ

Method of Error Detection

Excessive charging of refrigerant is detected by using the outdoor air temperature and heat exchanger deicer temperature during check operation.

Error Decision Conditions

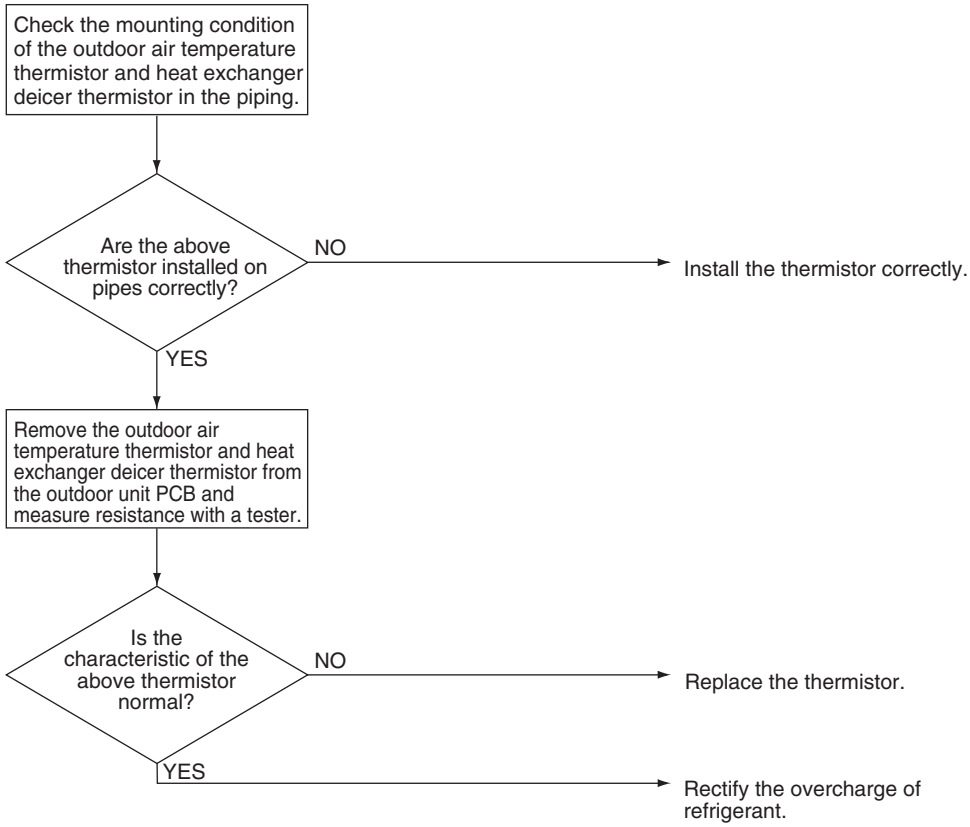
When the amount of refrigerant, which is calculated by using the outdoor air temperature and heat exchanging deicer temperature during check operation, exceeds the criteria.

Supposed Causes

- Refrigerant overcharge
- Disconnection of outdoor air thermistor
- Disconnection of heat exchanger deicer thermistor

Troubleshooting

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



Refer to “Thermistor Resistance / Temperature Characteristics” table on P.161.

3.22 High Pressure Switch Abnormality

Remote Controller Display

H3

Applicable Models

RZR, RZQ

Method of Error Detection

The protection device circuit checks continuity in the high pressure switch.

Error Decision Conditions

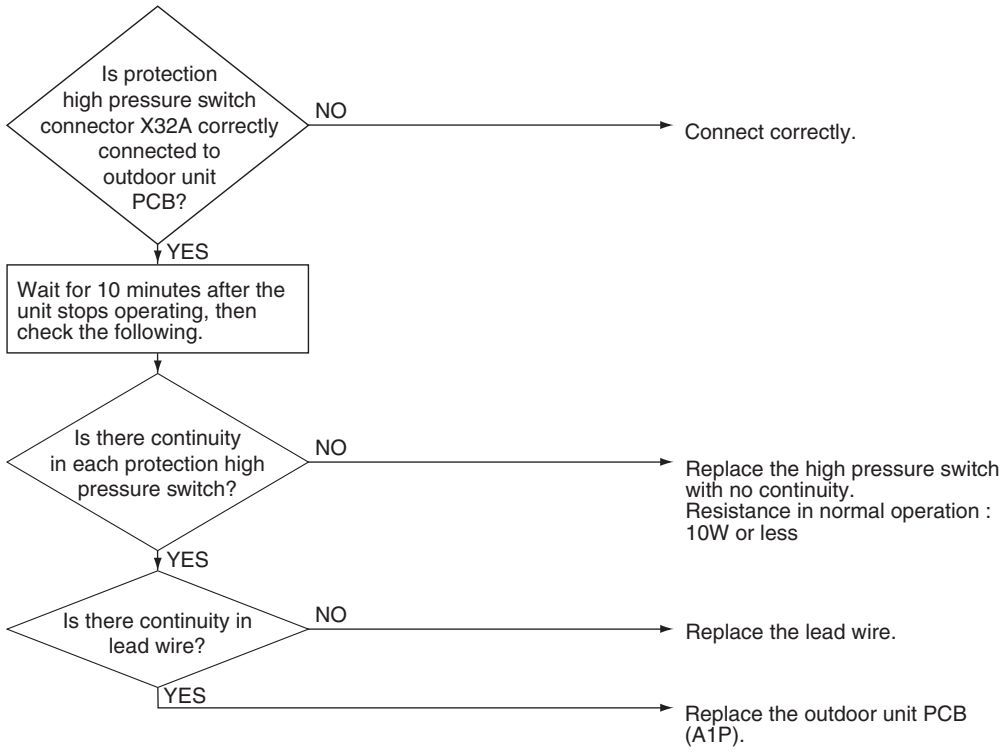
When there is no continuity in the high pressure switch during compressor stops operating

Supposed Causes

- Defective high pressure switch
- Disconnection in high pressure switch harness
- Defective connection of high pressure switch connector
- Defective outdoor unit PCB
- Disconnected lead wire

Troubleshooting

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



3.23 Outdoor Unit Fan Motor Signal Abnormality

Remote Controller Display

H07

Applicable Models

RZR, RZQ

Method of Error Detection

Detection of abnormal signal from fan motor

Error Decision Conditions

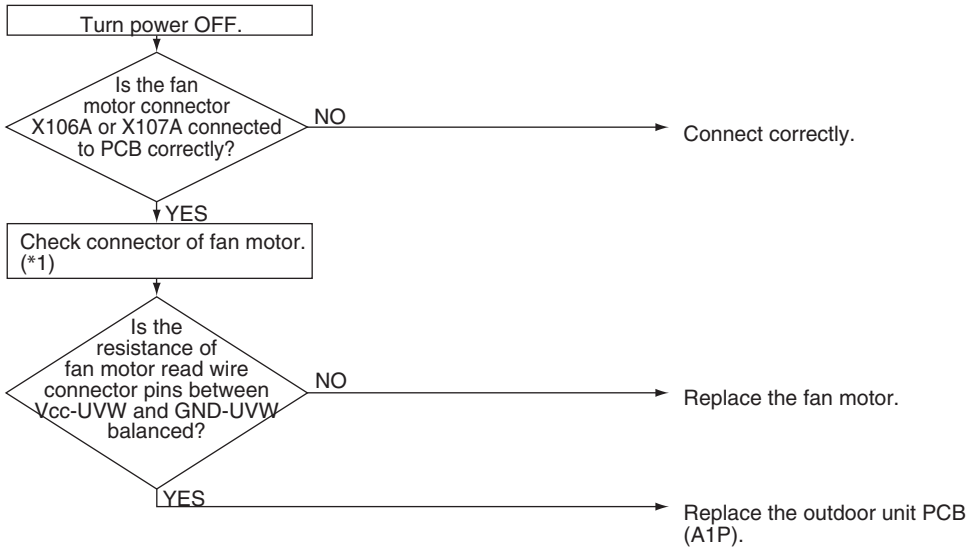
In case of detection of abnormal signal at starting fan motor

Supposed Causes

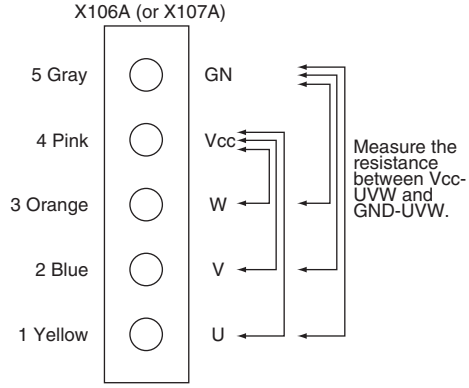
- Defective fan motor signal (circuit error)
- Broken, short or disconnection connector of fan motor connection cable
- Inverter PCB abnormality

Troubleshooting

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



Note: ∗1: Disconnect connector and measure the following resistance.



3.24 Outdoor Air Thermistor Abnormality

Remote Controller Display

H9

Applicable Models

RZR, RZQ

Method of Error Detection

The error is detected from the temperature detected by the outdoor air thermistor.

Error Decision Conditions

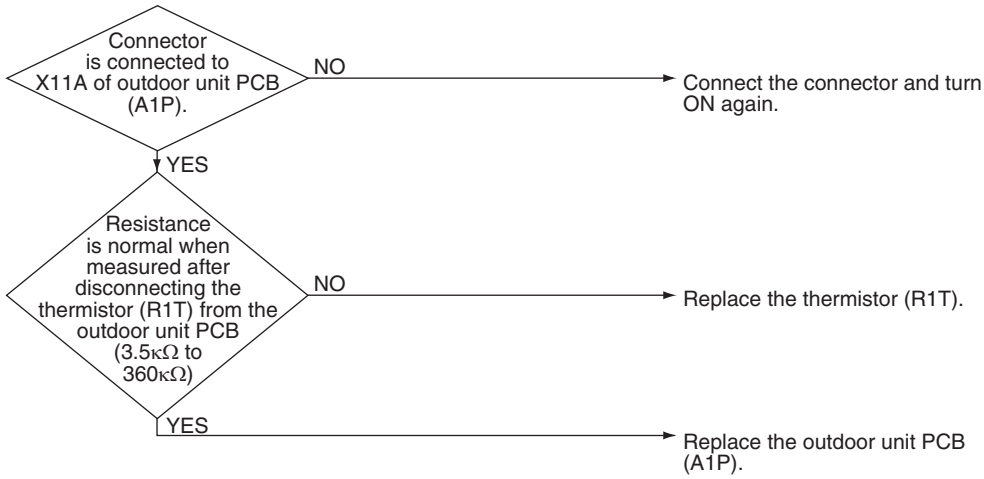
When the outdoor air temperature thermistor has short circuit or open circuit

Supposed Causes

- Defective thermistor (R1T) for outdoor air
- Defective outdoor unit PCB (A1P)

Troubleshooting

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



Refer to “Thermistor Resistance / Temperature Characteristics” table on P.161.

3.25 Discharge Pipe Thermistor Abnormality

Remote Controller Display

d3

Applicable Models

RZR, RZQ

Method of Error Detection

The error is detected from the temperature detected by discharge pipe temperature thermistor.

Error Decision Conditions

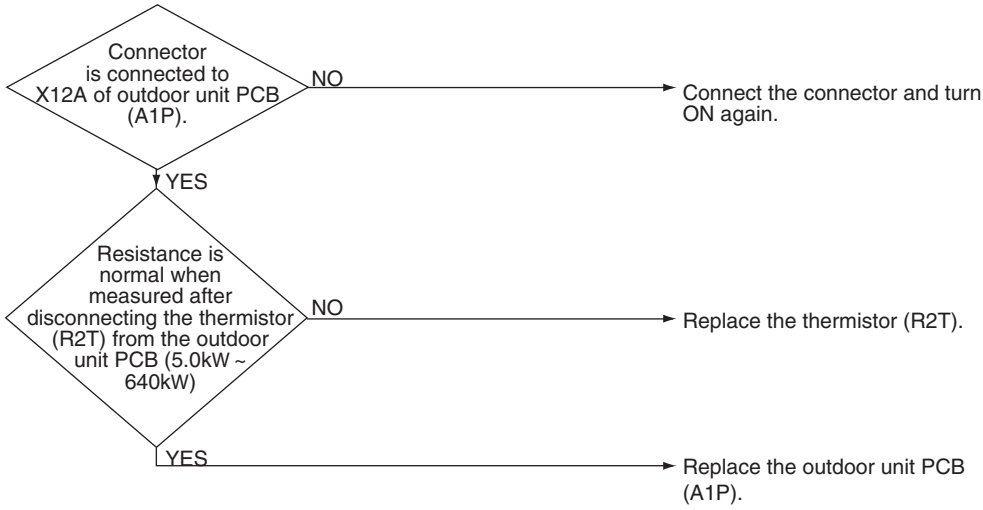
When a short circuit or an open circuit in the discharge pipe temperature thermistor is detected

Supposed Causes

- Defective thermistor (R2T) for outdoor unit discharge pipe
- Defective outdoor unit PCB (A1P)

Troubleshooting

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



Refer to “Thermistor Resistance / Temperature Characteristics” table on P.162.

3.26 Suction Pipe Thermistor Abnormality

Remote Controller Display

05

Applicable Models

RZR, RZQ

Method of Error Detection

The error is detected from the temperature detected by the thermistor for suction pipe 1, 2.

Error Decision Conditions

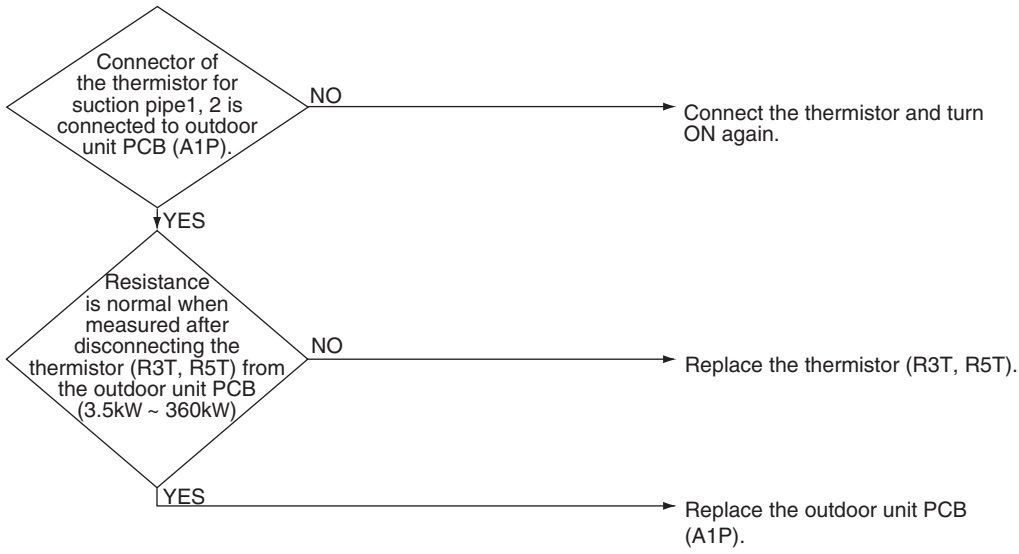
When a short circuit or an open circuit in the thermistor for suction pipe 1, 2 are detected

Supposed Causes

- Defective thermistor (R3T, R5T) for outdoor unit suction pipe
- Defective outdoor unit PCB (A1P)

Troubleshooting

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



Refer to “Thermistor Resistance / Temperature Characteristics” table on P.161.

3.27 Outdoor Unit Heat Exchanger Thermistor Abnormality

Remote Controller Display

Applicable Models

RZR, RZQ

Method of Error Detection

The error is detected from the temperature detected by the heat exchanger thermistor.

Error Decision Conditions

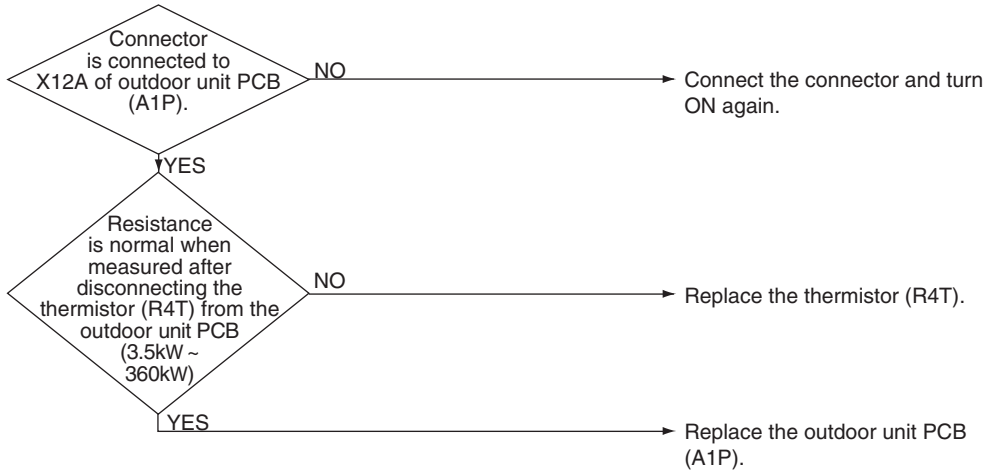
When a short circuit or an open circuit in the heat exchanger thermistor is detected

Supposed Causes

- Defective thermistor (R4T) for outdoor unit heat exchanger
- Defective outdoor unit PCB (A1P)

Troubleshooting

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



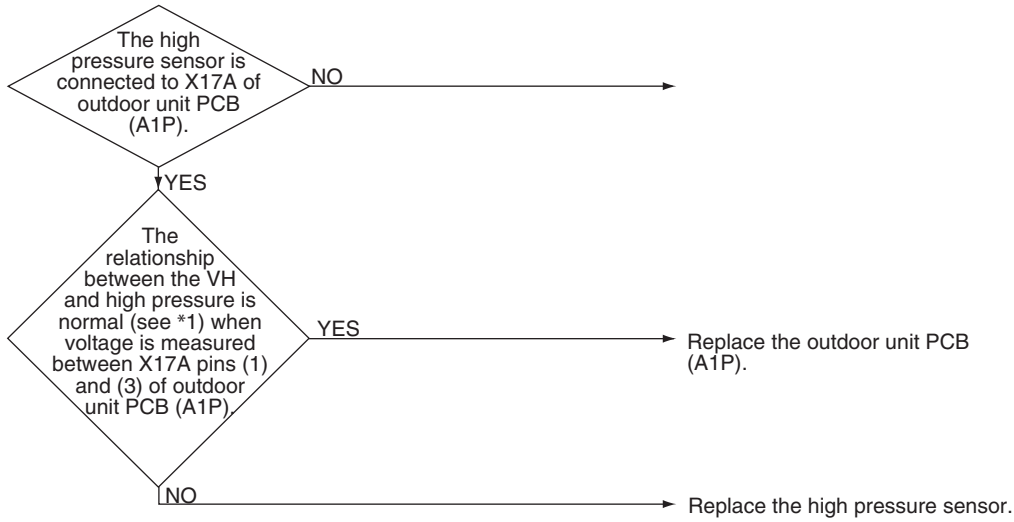
Refer to “Thermistor Resistance / Temperature Characteristics” table on P.161.

3.28 High Pressure Sensor Abnormality

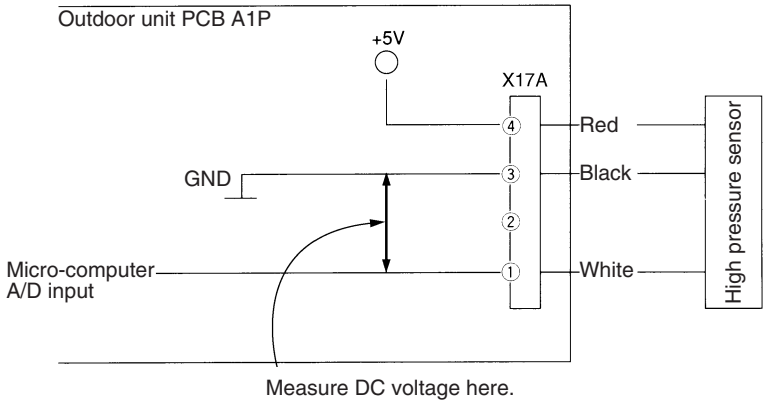
Remote Controller Display	
Applicable Models	RZR, RZQ
Method of Error Detection	The error is detected from the pressure detected by the high pressure sensor.
Error Decision Conditions	When the high pressure sensor is short circuit or open circuit
Supposed Causes	■ Defective high pressure sensor ■ Connection of low pressure sensor with wrong connection ■ Defective outdoor unit PCB

Troubleshooting

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



∗1: Voltage measurement point



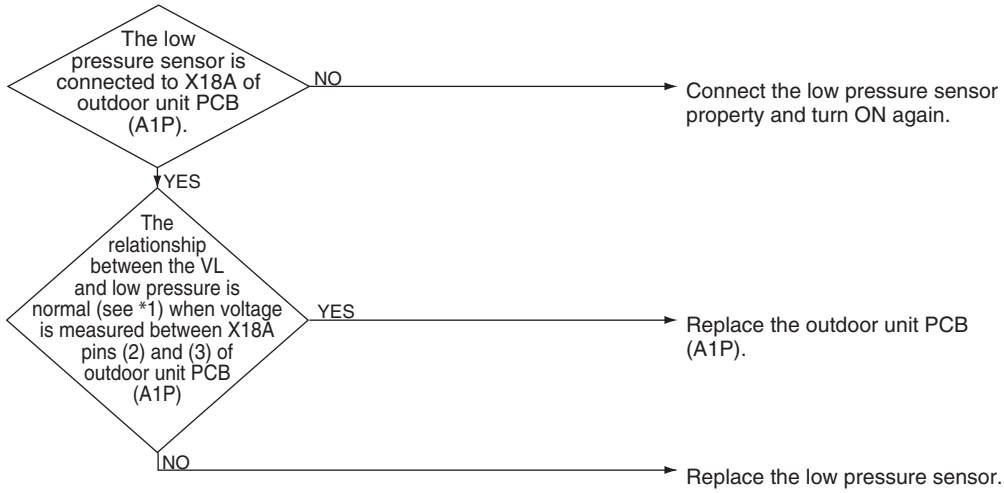
Refer to “Pressure Sensor, Pressure / Voltage Characteristics” table on P.163.

3.29 Low Pressure Sensor Abnormality

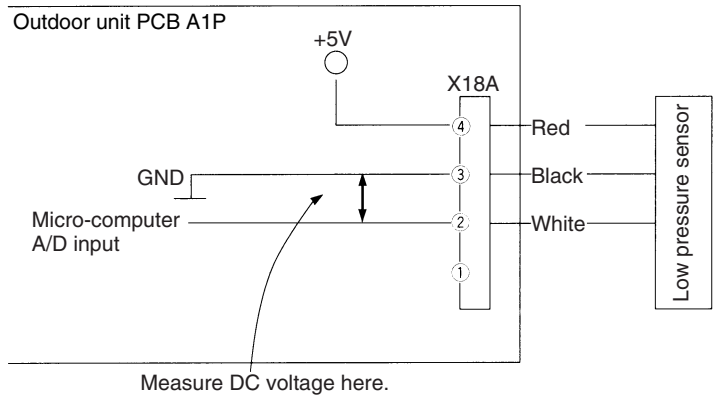
Remote Controller Display	
Applicable Models	RZR, RZQ
Method of Error Detection	The error is detected from the pressure detected by the low pressure sensor.
Error Decision Conditions	When the low pressure sensor is short circuit or open circuit
Supposed Causes	■ Defective low pressure sensor ■ Connection of high pressure sensor with wrong connection. ■ Defective outdoor unit PCB

Troubleshooting

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



∗1: Voltage measurement point



Refer to “Pressure Sensor, Pressure / Voltage Characteristics” table on P.163.

3.30 Outdoor Unit PCB Abnormality

Remote Controller Display

L1

Applicable Models

RZR, RZQ

Method of Error Detection

- The error is detected by current value during waveform output before compressor startup.
- The error is detected by current sensor value during synchronized operation at the time of startup.
- The error is detected using an SP-PAM series capacitor overvoltage sensor.

Error Decision Conditions

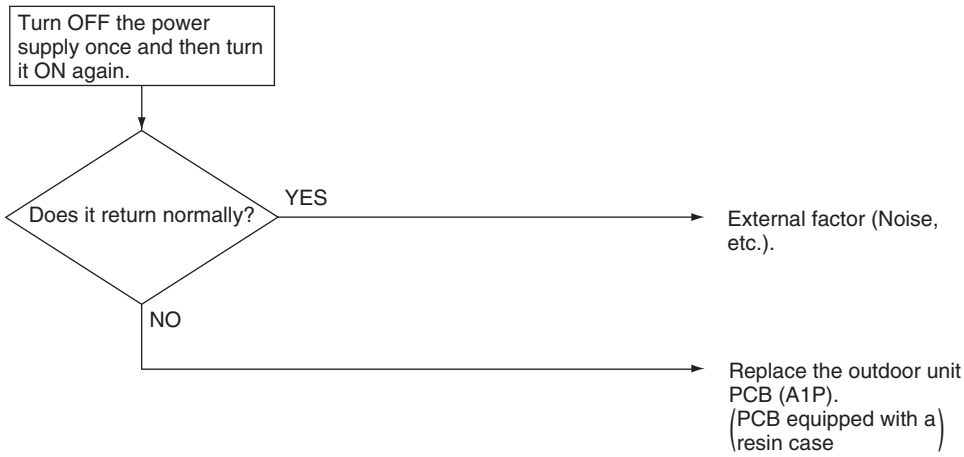
- In case of overcurrent (OCP) during waveform output
- When the current sensor errors during synchronized operation
- When overvoltage occurs in SP-PAM
- In case of IGBT error

Supposed Causes

- Defective outdoor unit PCB (A1P)
  - •IPM failure
  - •Current sensor failure
  - •SP-PAM failure
  - •Defective IGBT or drive circuit

Troubleshooting

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



3.31 Radiation Fin Temperature Rise

Remote Controller Display

L4

Applicable Models

RZR, RZQ

Method of Error Detection

Radiation fin temperature is detected by radiation fin thermistor.

Error Decision Conditions

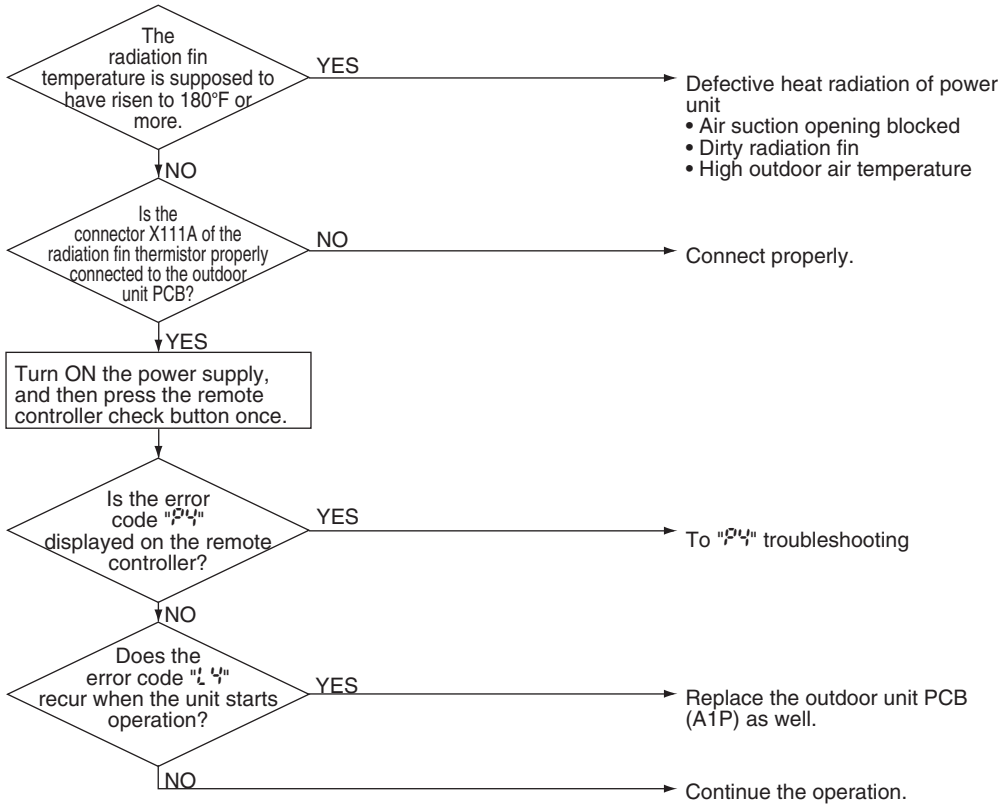
When the temperature of the inverter radiation fin rises abnormally due to faulty heat dissipation.

Supposed Causes

- Actuation of fin thermal (Actuates 180°F or more)
- Defective inverter PCB
- Defective radiation fin thermistor
- High outdoor air temperature
- Air suction opening blocked

Troubleshooting

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



3.32 Momentary Overcurrent of Inverter Compressor

Remote Controller Display

L5

Applicable Models

RZR, RZQ

Method of Error Detection

The error is detected from current flowing in the power transistor.

Error Decision Conditions

When overcurrent flows in the power transistor
(Instantaneous overcurrent also causes activation)

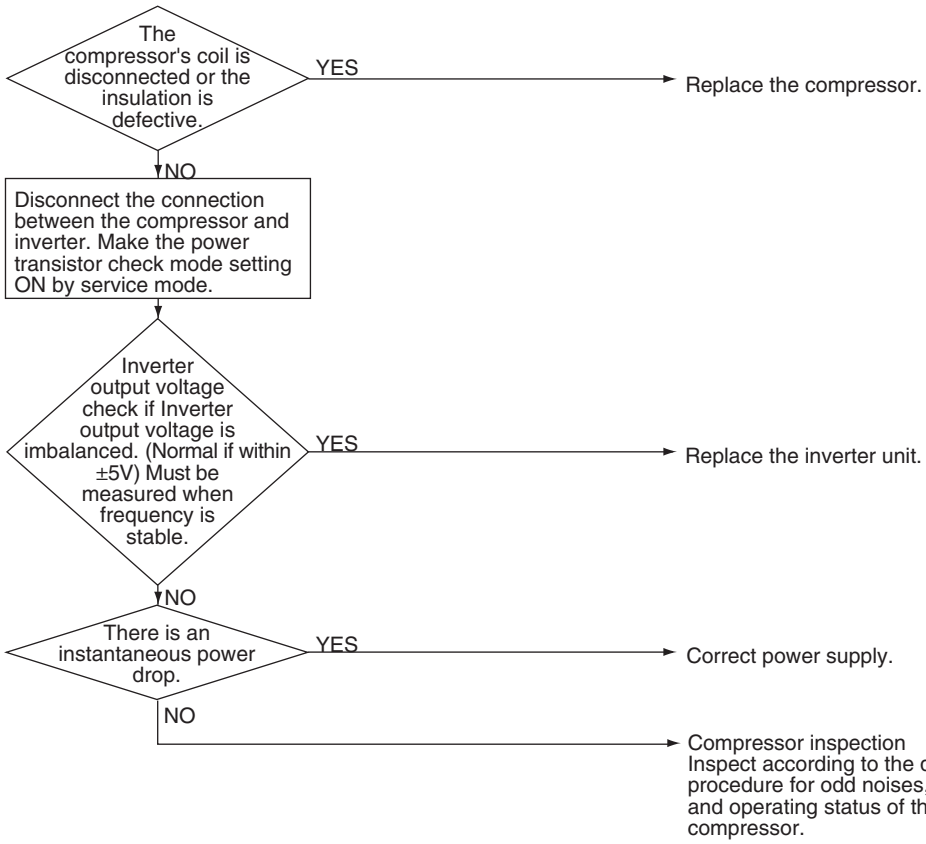
Supposed Causes

- Defective compressor coil (disconnected, defective insulation)
- Compressor startup error (mechanical lock)
- Defective inverter PCB

Troubleshooting

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

Compressor inspection



Higher voltage than actual is displayed when the inverter output voltage is checked by tester.

3.33 Electronic Thermal (Time Lag)

Remote Controller Display

L8

Applicable Models

RZR, RZQ

Method of Error Detection

The error is detected from the current flowing to power transistor into voltage with CT1 (DC current sensor).

Error Decision Conditions

When compressor overload (except for when startup) is detected.

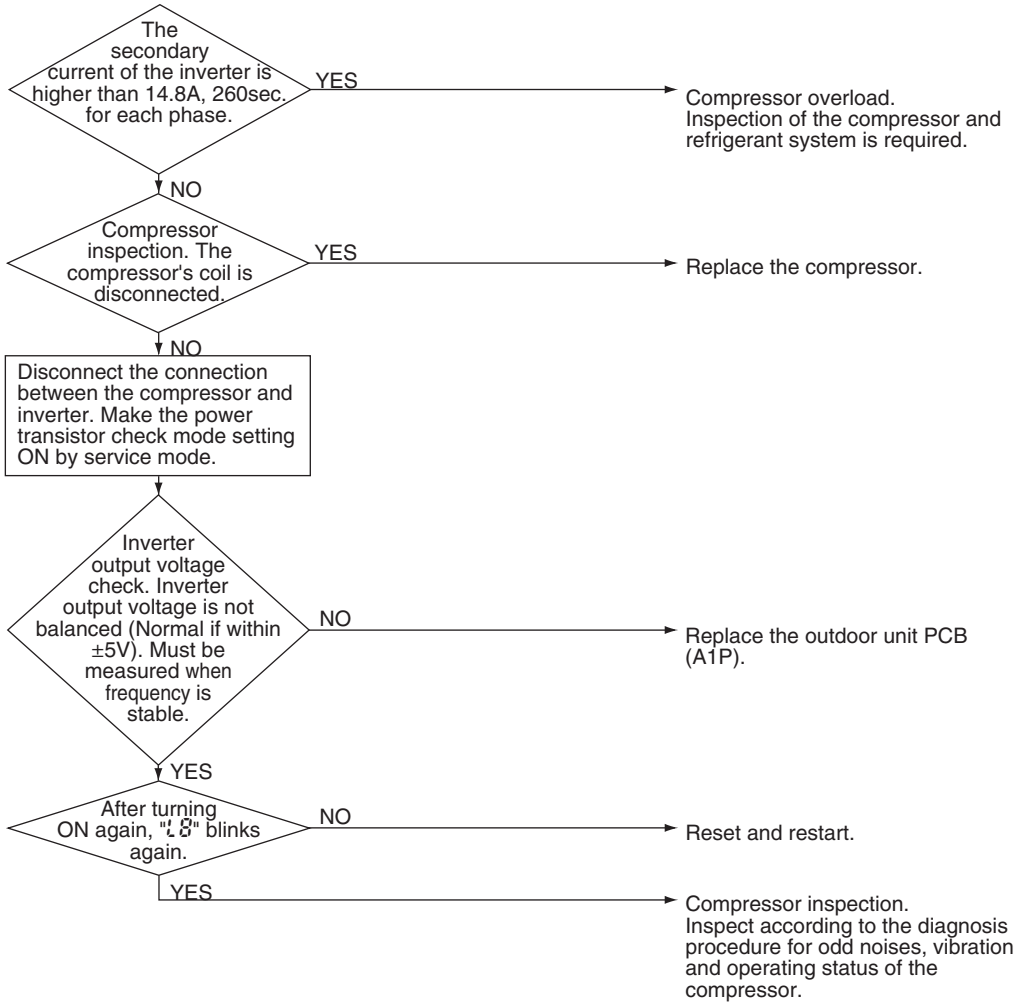
Supposed Causes

- Compressor overload (during operation)
- Disconnected compressor coil
- Defective inverter
- Defective compressor (if bearing is scratched)
- Defective outdoor unit PCB

Troubleshooting

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

Output current check



3.34 Inverter Startup Error

Remote Controller Display

L9

Applicable Models

RZR, RZQ

Method of Error Detection

The error is detected from current flowing in the power transistor.

Error Decision Conditions

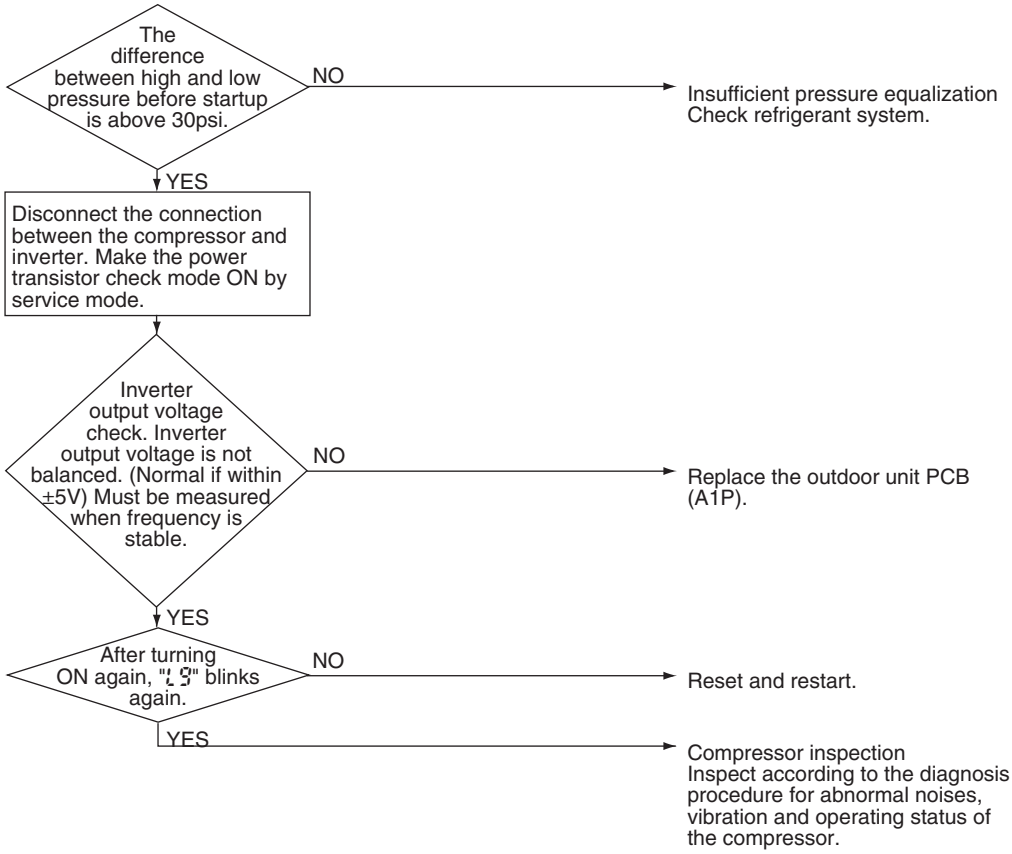
When overload in the compressor is detected during startup

Supposed Causes

- Stop valve is not opened.
- Overcharge of refrigerant
- Defective compressor (lock)
- Pressure differential startup
- Defective outdoor unit PCB (A1P)

Troubleshooting

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



3.35 Transmission Error (between Control and Inverter PCB)

Remote Controller Display

Applicable Models

RZR, RZQ

Method of Error Detection

Check the communication state between inverter PCB and control PCB by micro-computer.

Error Decision Conditions

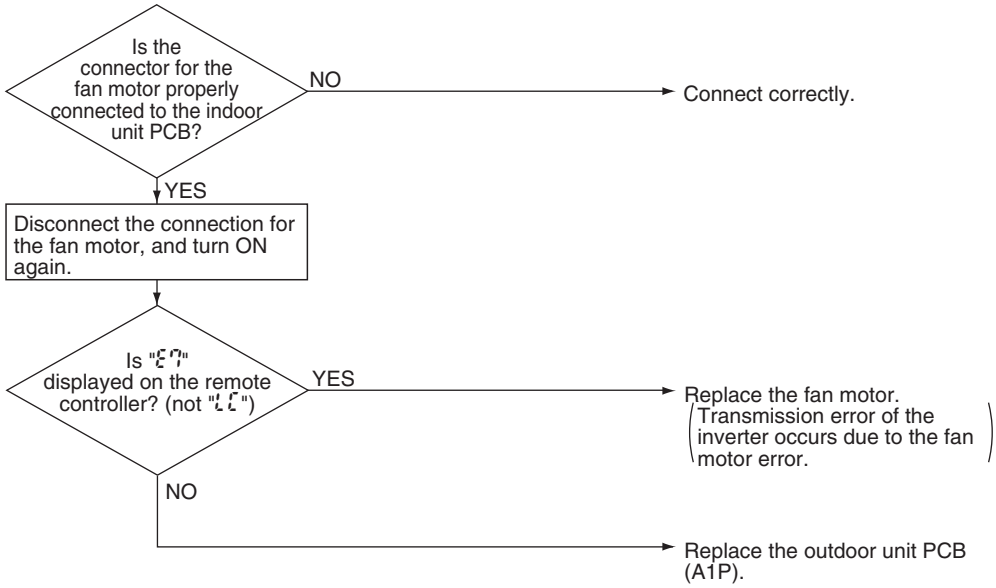
When the correct communication is not conducted in certain period

Supposed Causes

- Incorrect transmission wiring between control and inverter PCB/Insufficient contact in wiring
- Defective outdoor unit PCB
- Defective outdoor unit fan motor
- External factor (Noise etc.)
- Defective fan motor connector contact

Troubleshooting

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



3.36 Radiation Fin Thermistor Abnormality

Remote Controller Display

P4

Applicable Models

RZR, RZQ

Method of Error Detection

Detection by open or short circuit of the radiation fin thermistor during the compressor stops operating.

Error Decision Conditions

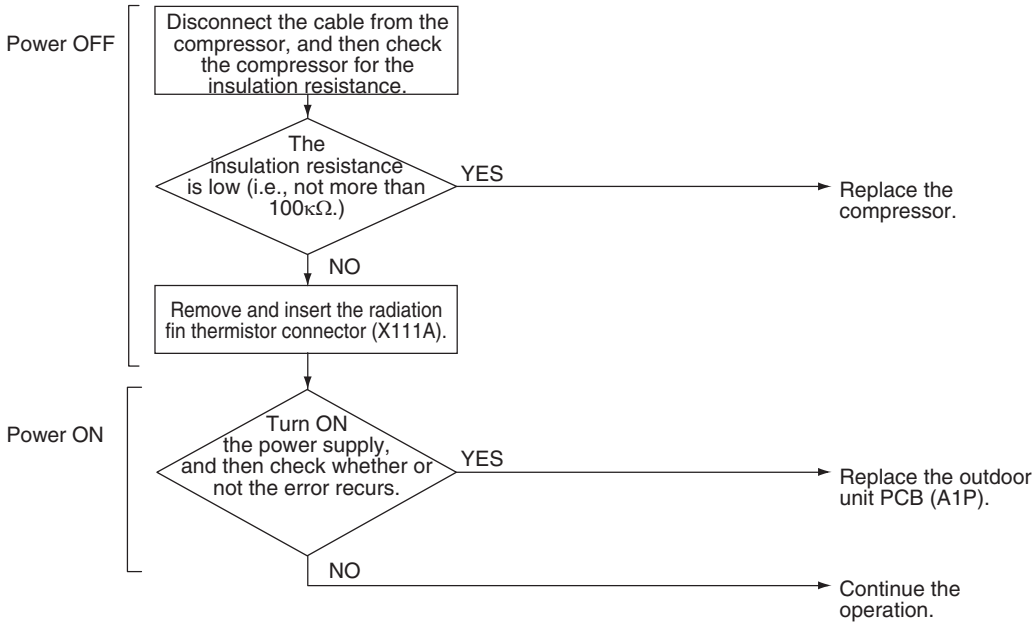
When open or short circuit of the radiation fin thermistor is detected during the compressor stops operating

Supposed Causes

- Defective radiation fin temperature sensor
- Defective outdoor unit PCB (A1P)
- External factor (Noise, etc.)

Troubleshooting

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



3.37 Refrigerant Shortage

Remote Controller Display

U0

Applicable Models

RZR, RZQ

Method of Error Detection

(In normal operation)
Gas shortage is detected according to the electronic expansion valve opening degree and measured temperatures and pressures.

Error Decision Conditions

(In cooling operation)
When the electronic expansion valve opens fully and low pressure is below 14.5 psi continuously for 30 minutes.

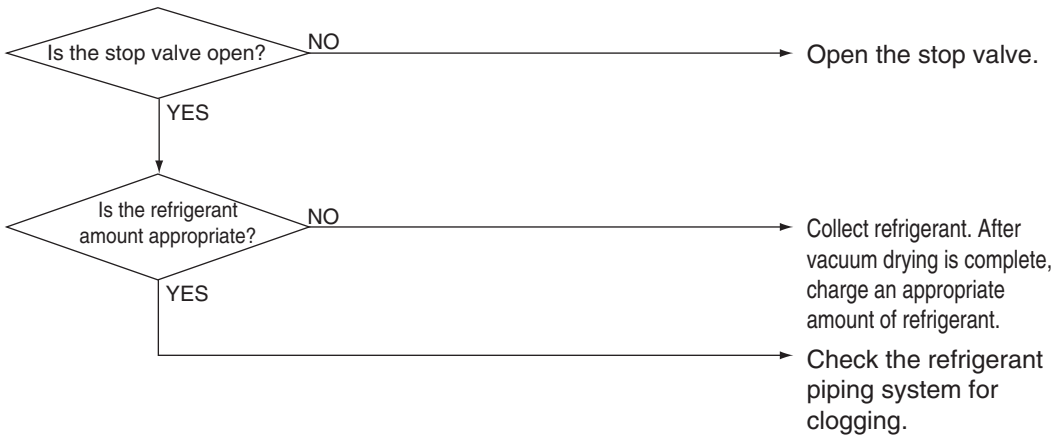
(In heating operation)
When the electronic expansion valve opens fully and the suction superheat is large (more than 68°F) continuously for 30 minutes.

Supposed Causes

- The stop valve is not opened.
- Insufficient refrigerant amount
- Clogged refrigerant piping system

Troubleshooting

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

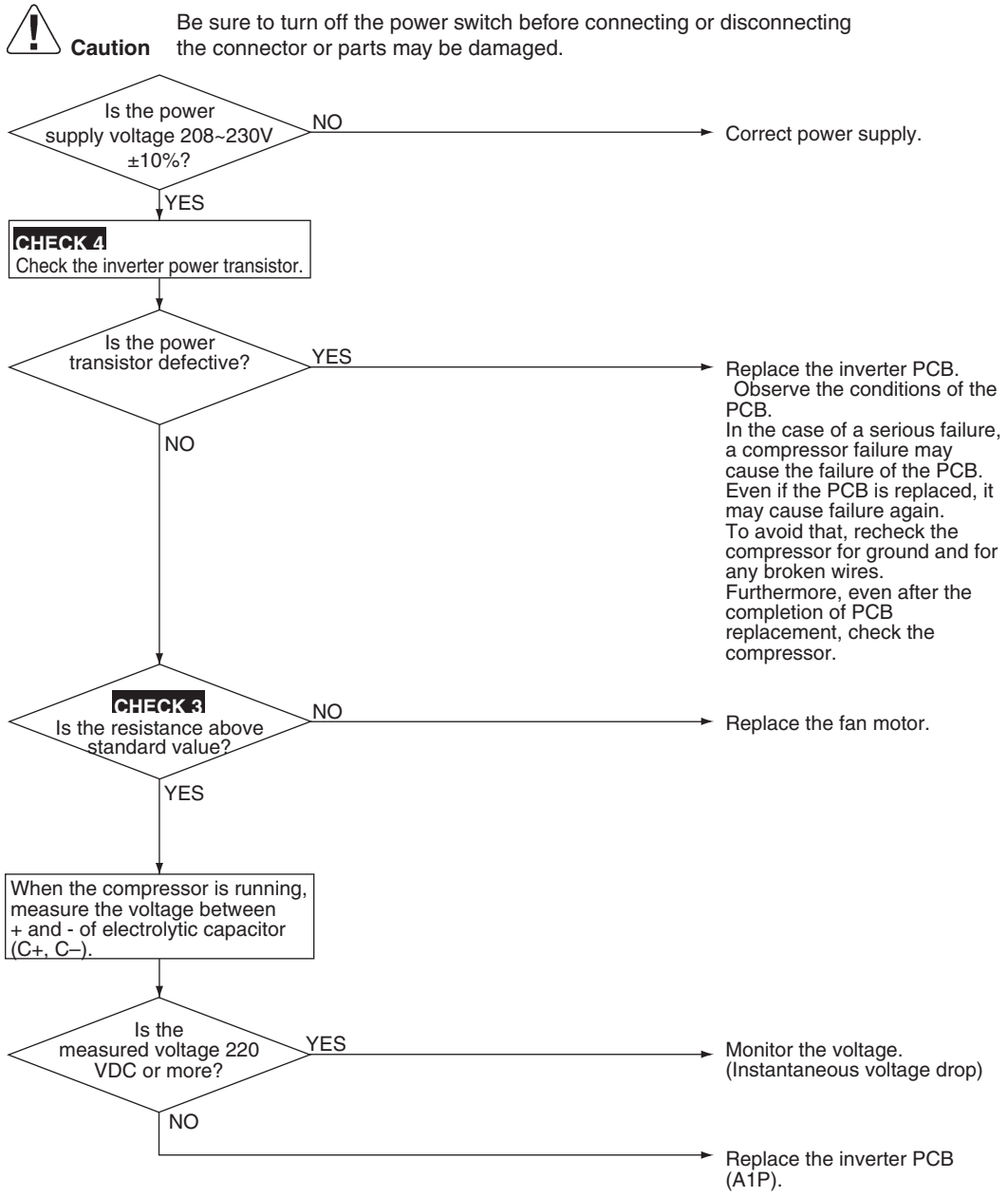


Note: * Gas shortage alarm is indicated but the operation continues.

3.38 Power Supply Voltage Abnormality

Remote Controller Display	U2
Applicable Models	RZR, RZQ
Method of Error Detection	The error is detected according to the voltage of main circuit capacitor built in the inverter and power supply voltage.
Error Decision Conditions	When the abnormal voltage of main circuit capacitor built in the inverter and abnormal power supply voltage are detected
Supposed Causes	■ Power supply insufficient ■ Instantaneous power failure ■ Defective outdoor unit fan motor ■ Defective outdoor control PCB (A1P) ■ Defective main circuit wiring

Troubleshooting



CHECK 3 Refer to P.149.

CHECK 4 Refer to P.149.

3.39 Check Operation not Executed

Remote Controller Display

U3

Applicable Models

RZQ

Method of Error Detection

Check operation is executed or not.

Error Decision Conditions

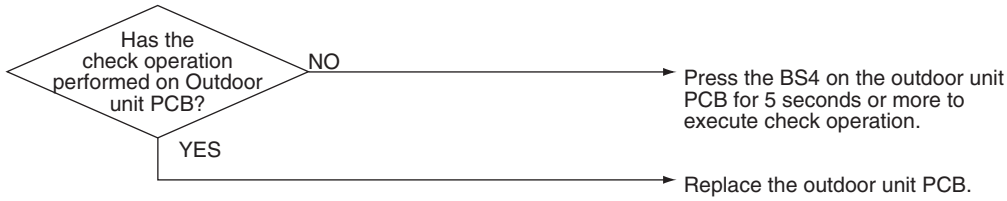
The error is decided when the unit starts operation without check operation.

Supposed Causes

- Check operation is not executed.

Troubleshooting

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

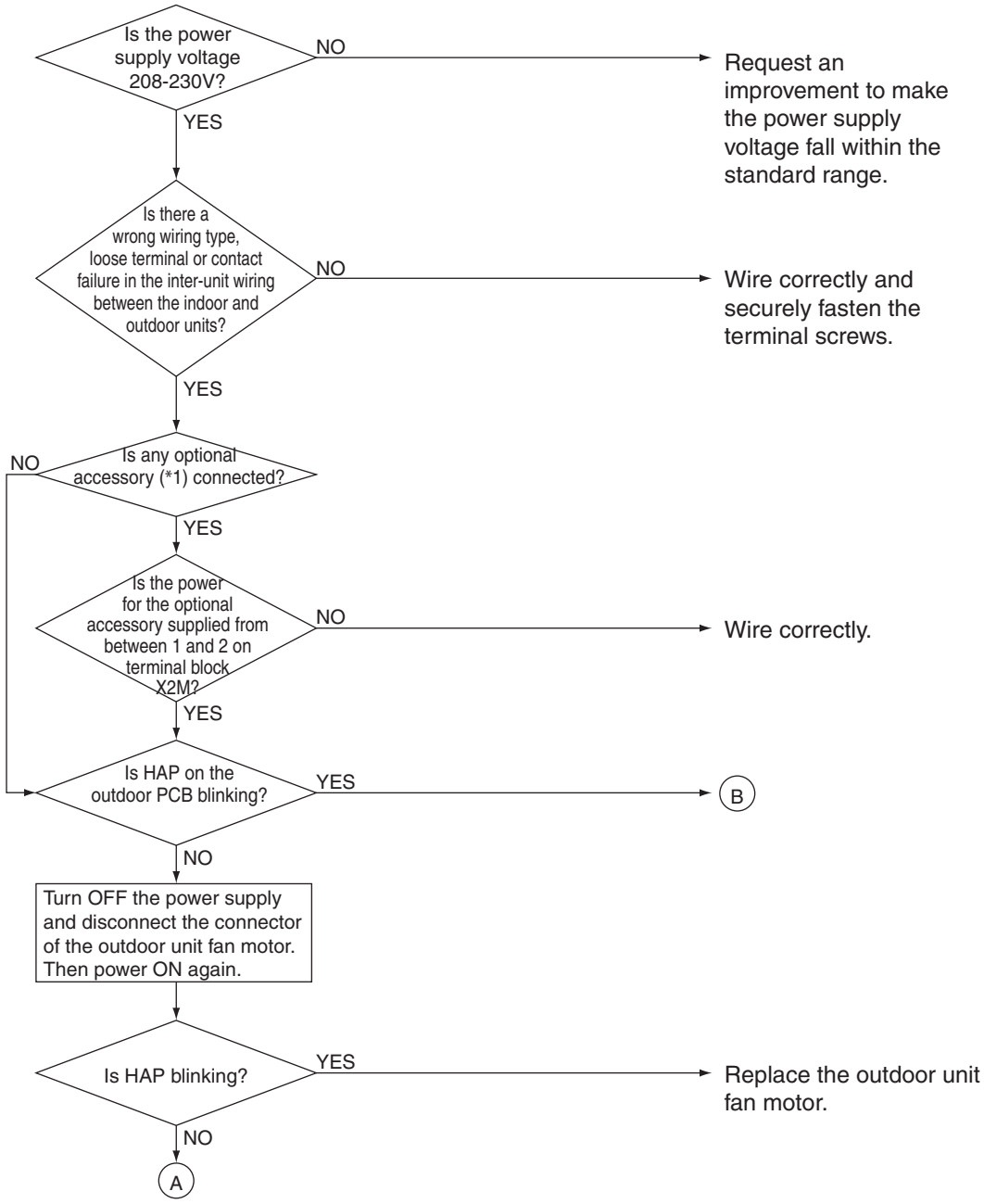


3.40 Transmission Error (between Indoor Units and Outdoor Units)

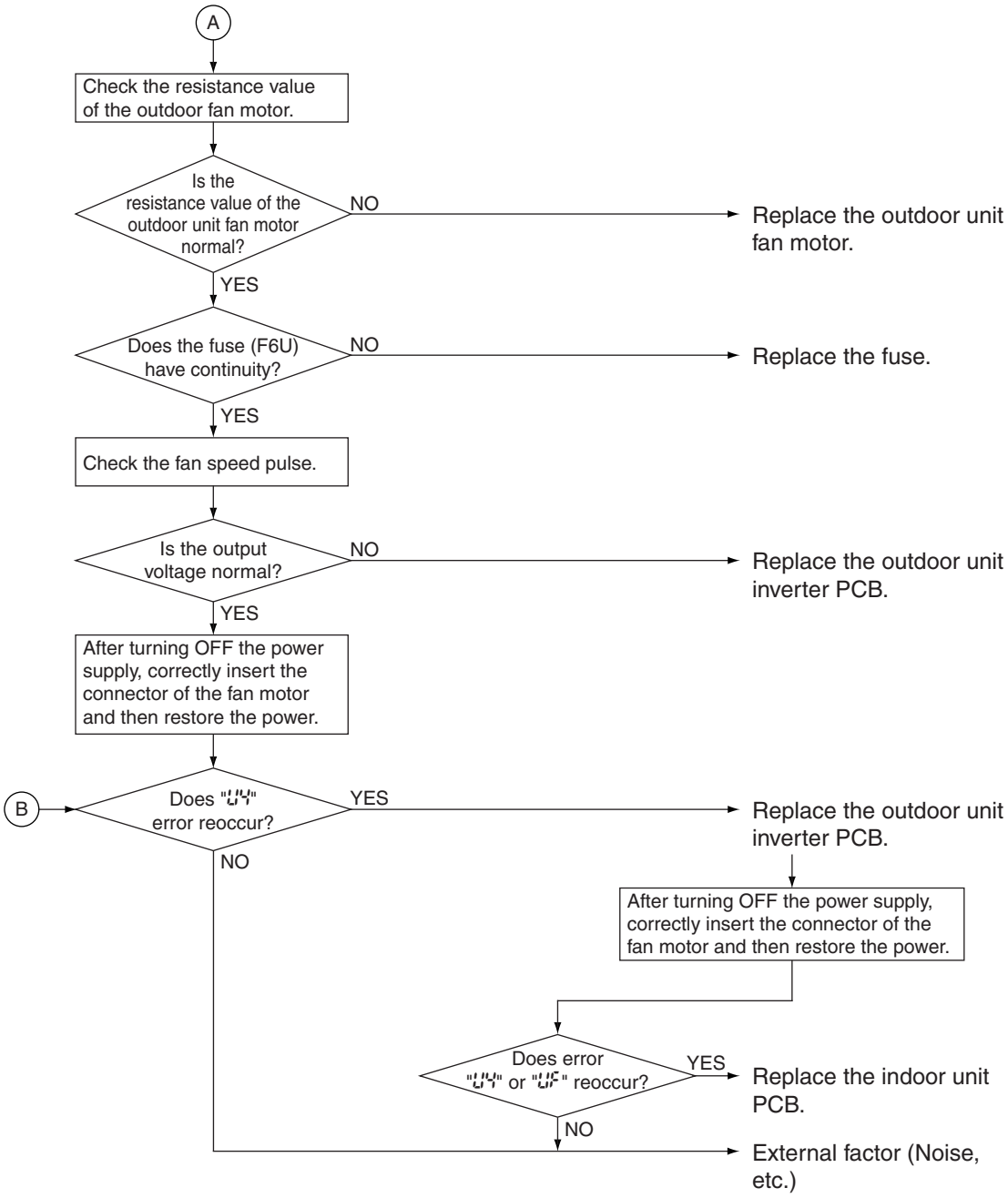
Remote Controller Display	U4
Applicable Models	FCQ, FHQ, FAQ, FTQ RZR, RZQ
Method of Error Detection	Micro-computer checks if transmission between indoor and outdoor units is normal.
Error Decision Conditions	When transmission is not carried out normally for a certain amount of time
Supposed Causes	■ Wiring indoor-outdoor transmission wire is incorrect. ■ Defective power supply ■ Burning out fuse ■ Defective outdoor unit PCB ■ Defective indoor unit PCB ■ Defective outdoor unit fan motor ■ External factor (Noise, etc.)

Troubleshooting

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



Note: * 1 Optional accessories refer to adptor for wiring, auto grill and other accessories.


A
Check the resistance value of the outdoor fan motor.
Is the resistance value of the outdoor unit fan motor normal?
NO
Replace the outdoor unit fan motor.
YES
Does the fuse (F6U) have continuity?
NO
Replace the fuse.
YES
Check the fan speed pulse.
Is the output voltage normal?
NO
Replace the outdoor unit inverter PCB.
YES
After turning OFF the power supply, correctly insert the connector of the fan motor and then restore the power.
B
Does "U4" error reoccur?
YES
Replace the outdoor unit inverter PCB.
NO
After turning OFF the power supply, correctly insert the connector of the fan motor and then restore the power.
Does error "U4" or "UF" reoccur?
YES
Replace the indoor unit PCB.
NO
External factor (Noise, etc.)

3.41 Transmission Error (between Remote Controller and Indoor Unit)

Remote Controller Display

05

Applicable Models

All indoor unit models

Method of Error Detection

In case of controlling with 2-remote controller, check the system using micro-computer is signal transmission between indoor unit and remote controller (main and sub) is normal.

Error Decision Conditions

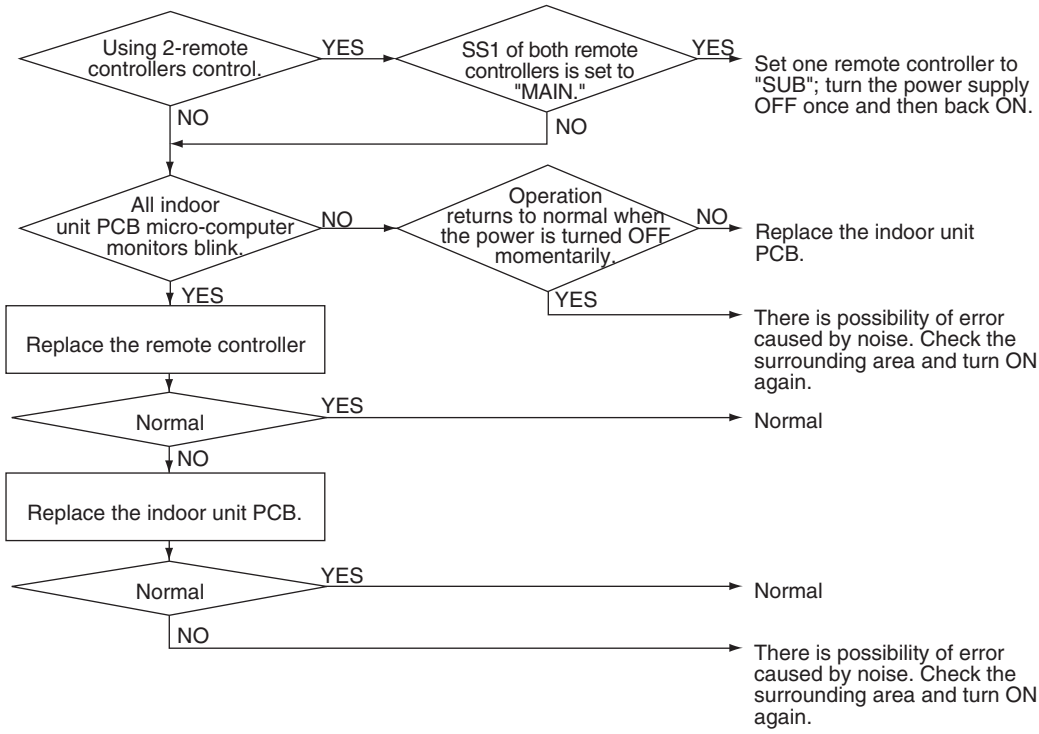
Normal transmission does not continue for specified period.

Supposed Causes

- Connection of 2 main remote controllers (when using 2 remote controllers)
- Defective indoor unit PCB
- Defective remote controller PCB
- External factor (Noise, etc.)

Troubleshooting

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



3.42 Transmission Error (between Main and Sub Remote Controllers)

Remote Controller Display

U8

Applicable Models

All indoor models

Method of Error Detection

In case of controlling with 2-remote controller, check the system using micro-computer if signal transmission between indoor unit and remote controller (main and sub) is normal.

Error Decision Conditions

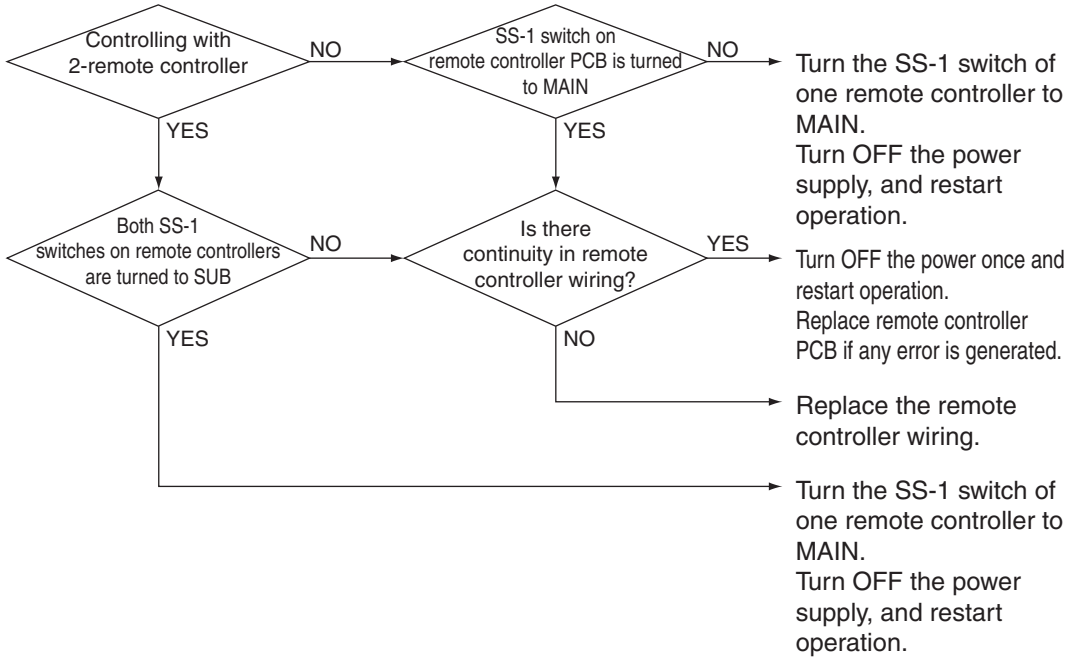
Normal transmission does not continue for specified period.

Supposed Causes

- Transmission error between main and sub remote controller
- Connection between sub remote controllers
- Defective remote controller PCB

Troubleshooting

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

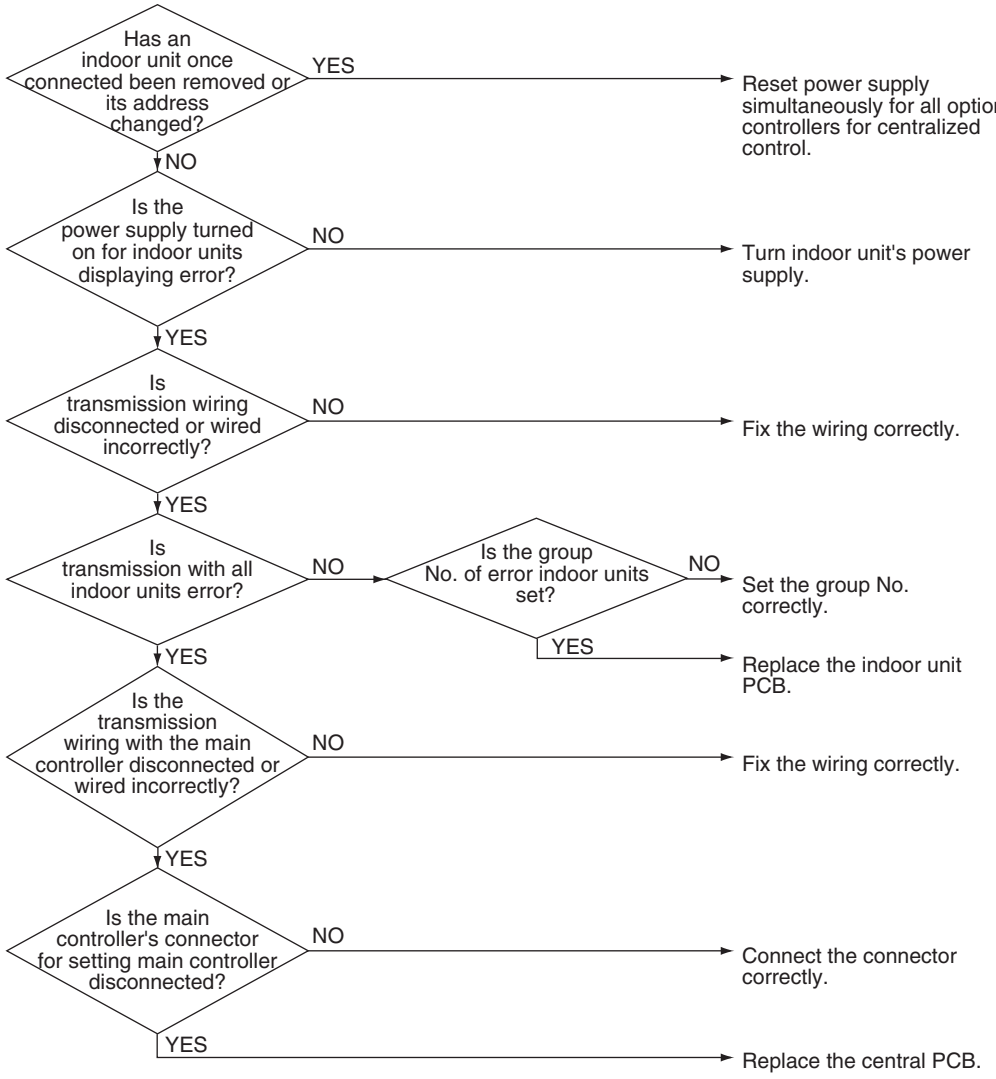


3.43 Transmission Error (between Centralized Remote Controller and Indoor Unit)

Remote Controller Display	UE
Applicable Models	FCQ, FHQ, FAQ, FTQ Centralized controller
Method of Error Detection	Micro-computer checks if transmission between indoor unit and centralized remote controller is normal.
Error Decision Conditions	When transmission is not carried out normally for a certain amount of time
Supposed Causes	■ Transmission error between optional controllers for centralized control and indoor unit ■ Connector for setting main controller is disconnected. ■ Defective PCB for centralized remote controller ■ Defective indoor unit PCB

Troubleshooting

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



3.44 System is not Set yet

Remote Controller Display

UF

Applicable Models

FCQ, FHQ, FAQ, FTQ
RZQ18~30PVJU

Method of Error Detection

On check operation, the capacity of indoor units in terms of transmission is not corresponding to that of indoor units that have made changes in temperature.

Error Decision Conditions

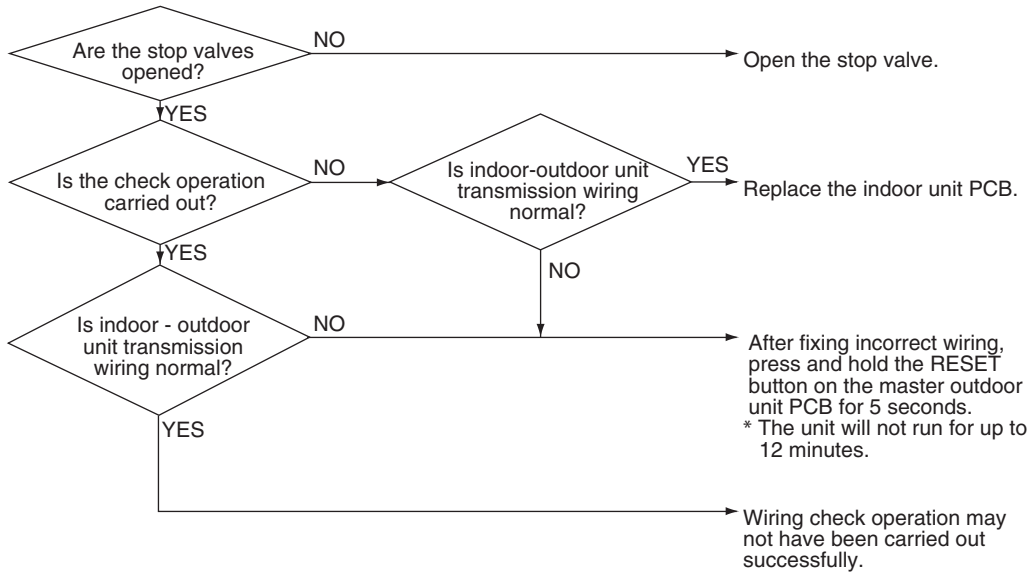
The error is determined as soon as the abnormality aforementioned is detected through checking the system for any erroneous connection of units on the check operation.

Supposed Causes

- Improper connection of transmission wiring between indoor-outdoor units
- Failure to execute check operation
- Defective indoor unit PCB
- Stop valve is left in closed

Troubleshooting

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

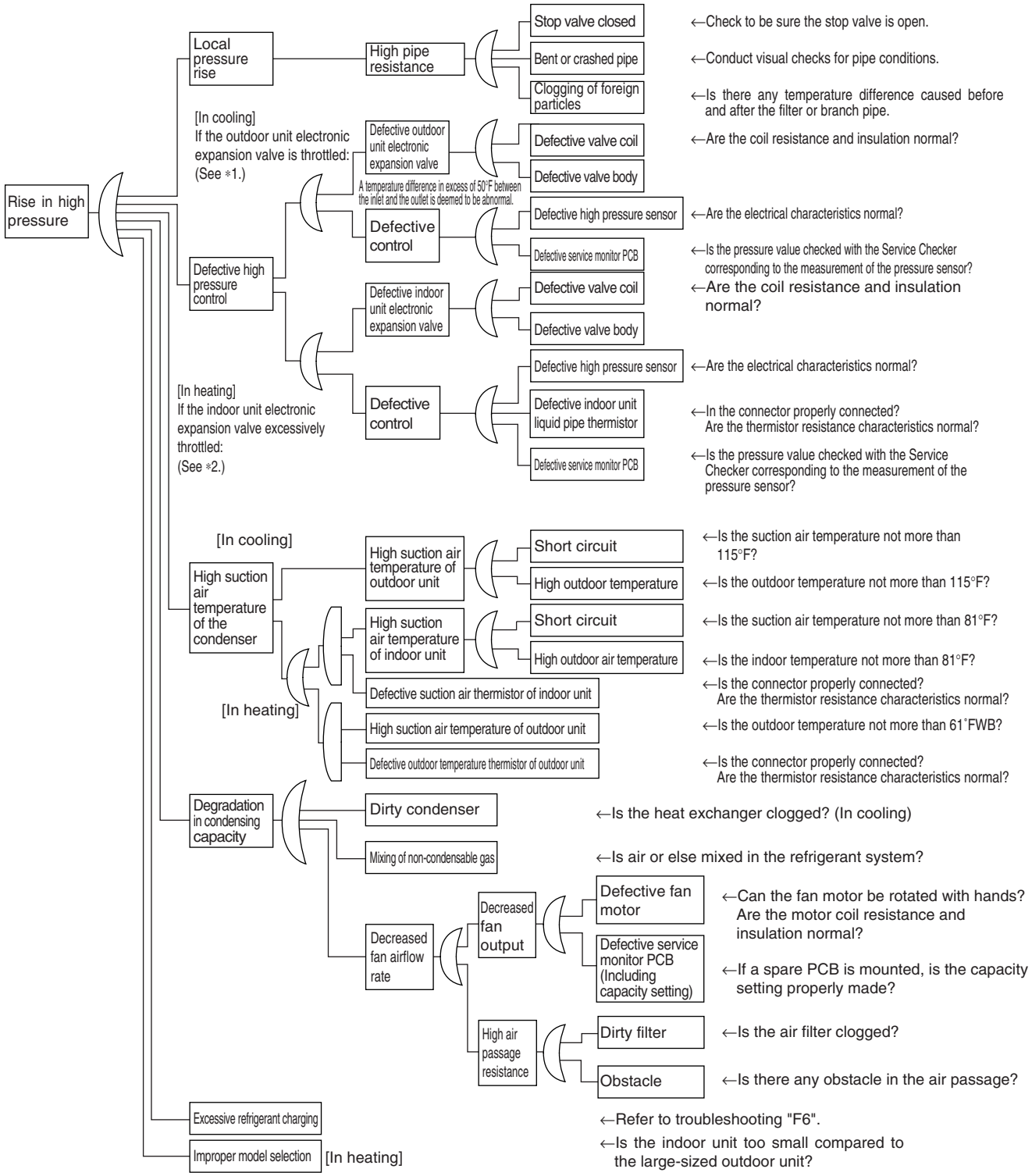


Note: Wiring check operation may not be successful if carried out after the outdoor unit has been off for more than 12 hours, or if it is not carried out after running all connected indoor units in the fan mode for at least an hour.

4. Check

CHECK 1 **Check for causes of rise in high pressure**

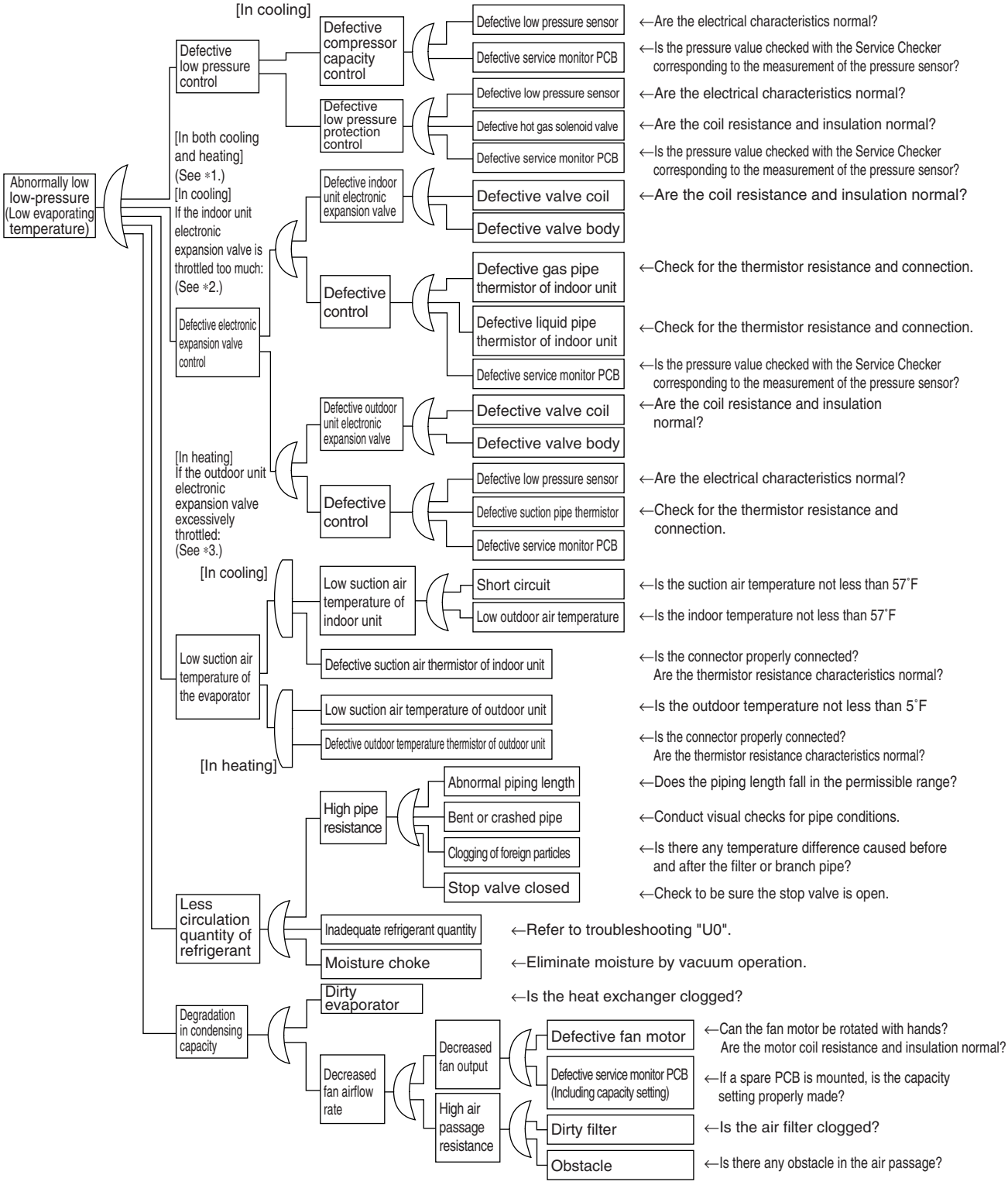
Referring to the Fault Tree Analysis (FTA) shown below, probe the error points.



Note: ∗1: In cooling, it is normal if the outdoor unit electronic expansion valve (EV1) is fully open.
∗2: In heating, the indoor unit electronic expansion valve is used for “subcooled degree control”.

CHECK 2 Check for causes of drop in low pressure

Referring to the Fault Tree Analysis (FTA) shown below, probe the error points.



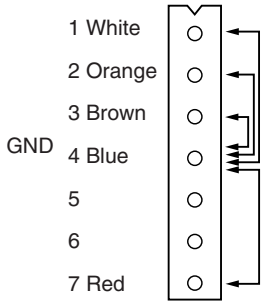
Note: ∗1: The “low pressure protection control” includes low pressure protection control and hot gas bypass control.

∗2: In cooling, the indoor unit electronic expansion valve is used for “superheated degree control”.

∗3: In heating, the outdoor unit electronic expansion valve (EV1) is used for “superheated degree control of outdoor unit heat exchanger”.

CHECK 3 Check for Fan Motor Connector

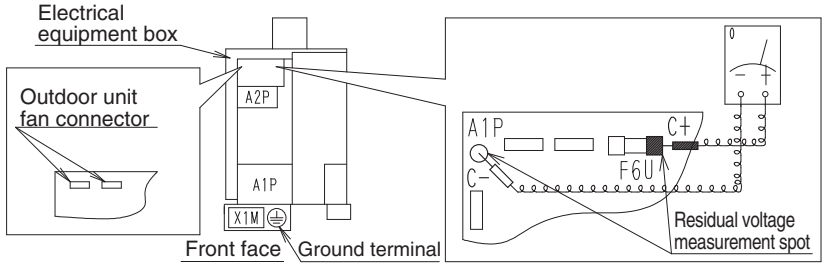
(1) Turn the power supply off.
(2) With the fan motor connector disconnected, measure the resistance between each pin, then make sure that the resistance is more than the value mentioned in the following table.



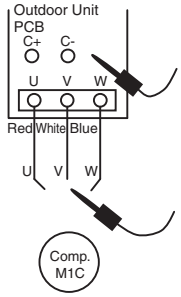
Measurement point	Judgement
1 - 4	1MΩ or more
2 - 4	100kΩ or more
3 - 4	100Ω or more
4 - 7	100kΩ or more

CHECK 4 Check for Power Transistor

Judgement is made through cable check with an analog tester.
(1) Do not touch the energized part (high voltage part) for at least 10 minutes after the power is turned OFF.
(2) Be sure to touch the ground terminal with a hand to release static electricity from the body (to prevent PCB from being damaged).
(3) With a tester, take measurements at the following spots and confirm that residual electric charge of the power transistor is DC 50V or less.



(4) After checking the residual electric charge, remove the connector of the outdoor unit fan motor. When the outdoor unit fan is rotated by strong headwind, remove the connector of the outdoor unit fan motor after confirming that the outdoor unit fan has stopped because electrical energy is stored in the capacitor and there may be a risk of electric shock.
(5) Remove the wire connecting the power transistor and the compressor. Remove it from the compressor terminal side.
During this work, be careful not to deform Faston terminal at the end of the connecting wire.
(6) Using an analog tester, measure resistance and fill in the blanks in the following table.
In case of unbalanced resistance for one of the 3 phases in each table (when the resistance value is equal to 5 times or more than the other resistance values), the power transistor is broken.
In normal cases, each phase shows a similar resistance value.



Tester		Resistance
(+)	(-)	Ω
C+	U	
C+	V	
C+	W	
U	C+	∞
V	C+	∞
W	C+	∞

Tester		Resistance
(+)	(-)	Ω
C-	U	∞
C-	V	∞
C-	W	∞
U	C-	
V	C-	
W	C-	

Part 6
Appendix

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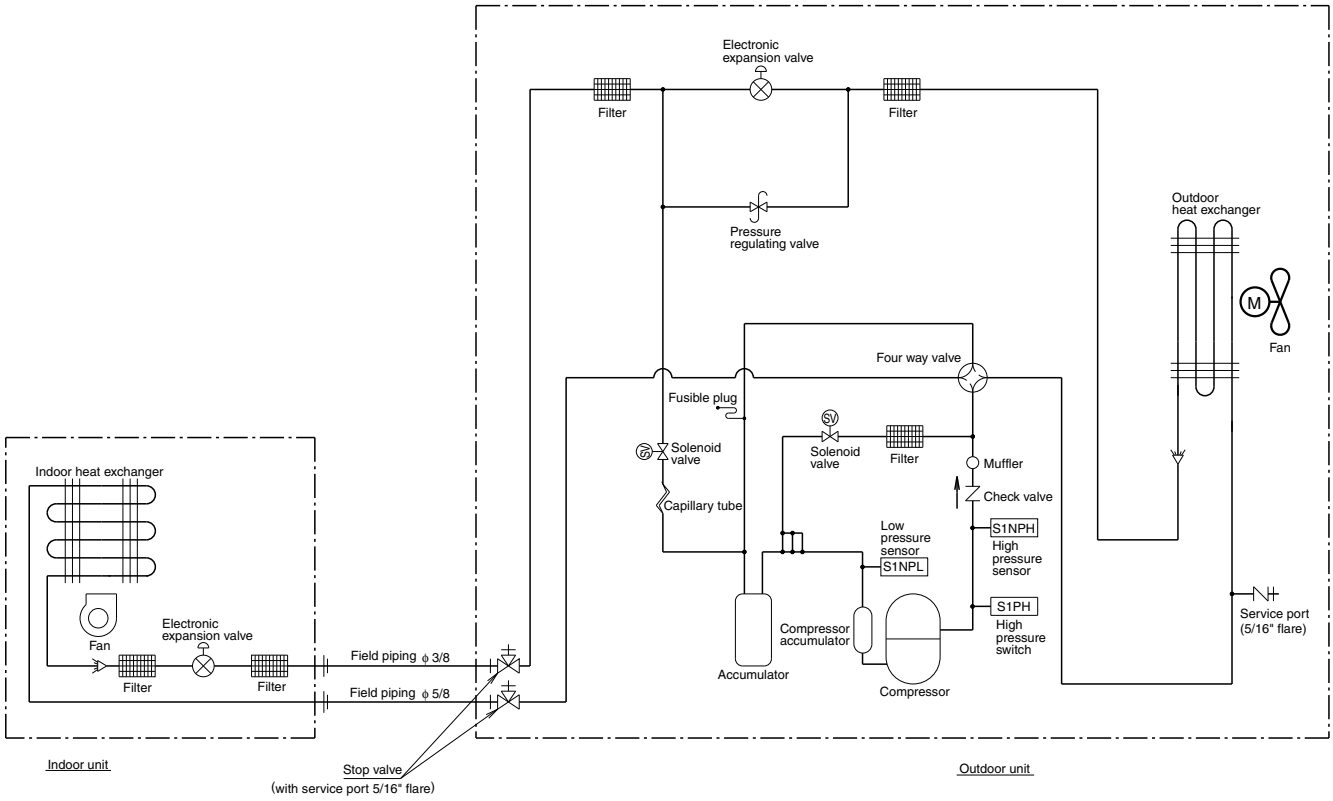
1. Piping Diagrams

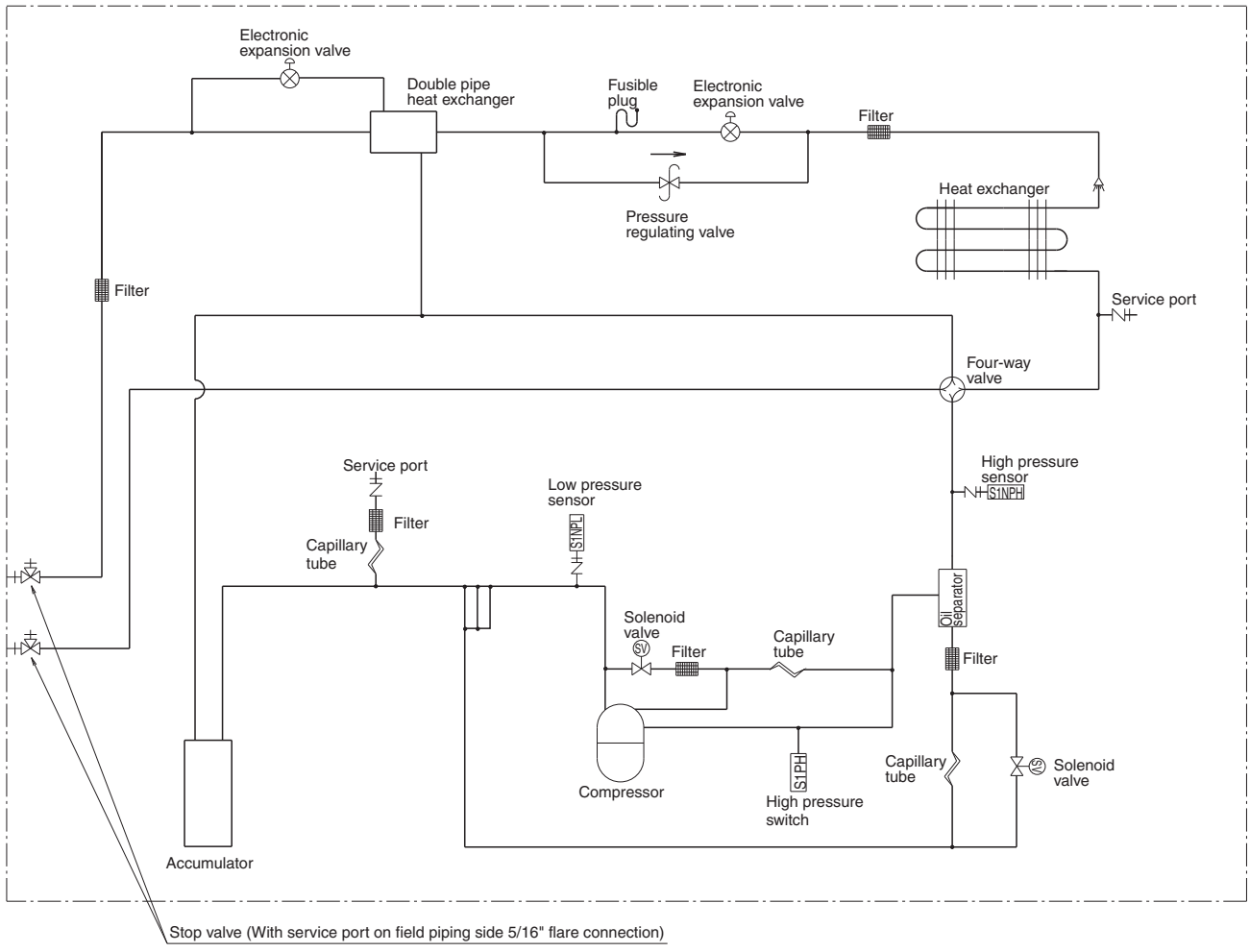
1.1 Outdoor Unit

RZR18PVJU/RZQ18PVJU9
RZR24PVJU/RZQ24PVJU9
RZR30PVJU/RZQ30PVJU



C: 3D062238C

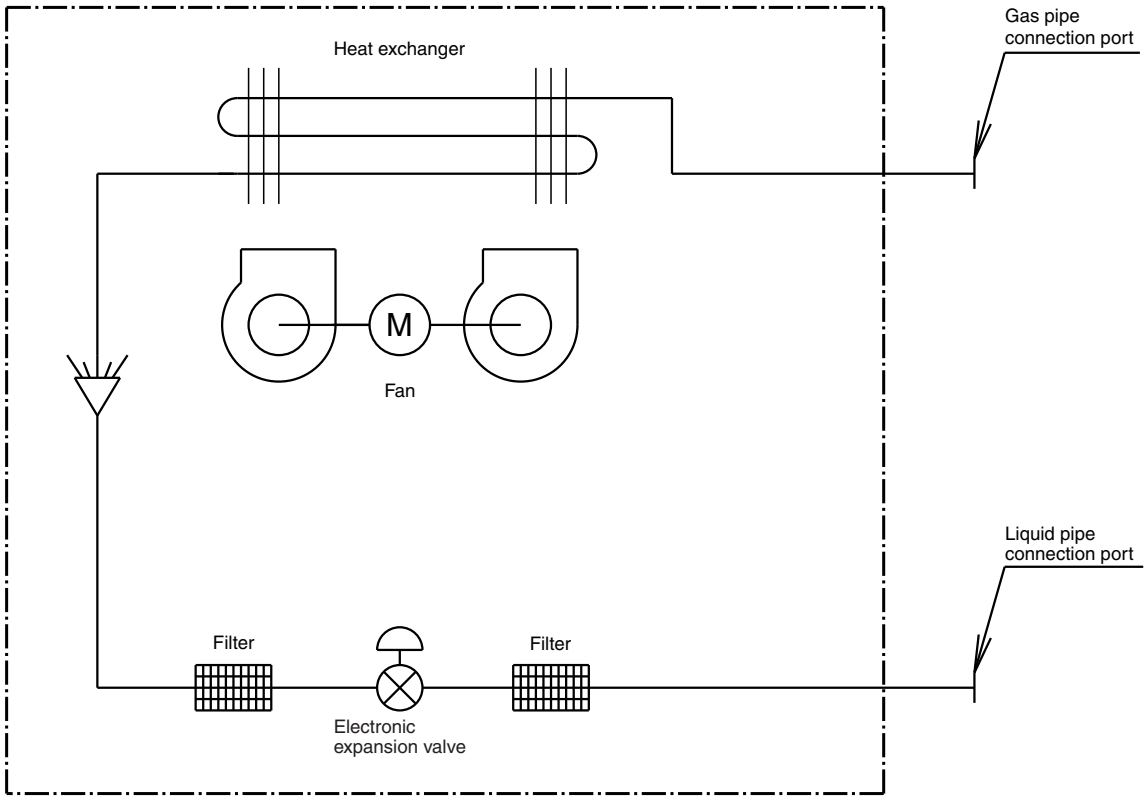
RZQ30PVJU9
RZQ36PVJU9/RZR36PVJU
RZQ42PVJU9/RZR42PVJU



3D065366A

1.2 Indoor Unit

FCQ18P / 24P / 30PVJU
FHQ18P / 24P / 30PVJU
FAQ18P / 24PVJU



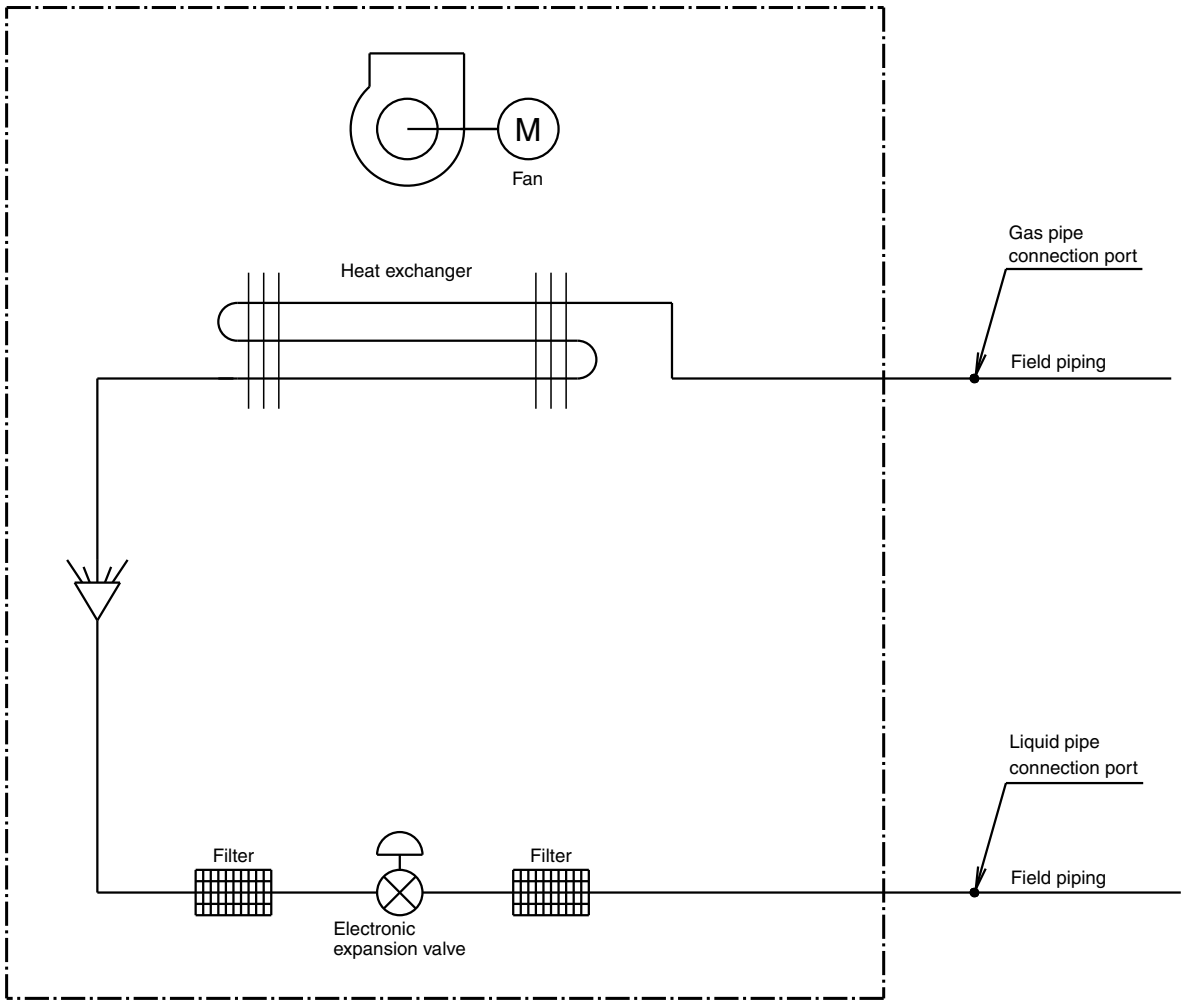
C: 4D024460E

R1T: Thermistor for suction air temperature
R2T: Thermistor for liquid line temperature
R3T: Thermistor for gas line temperature

(in)

Capacity	GAS	Liquid
18/24/30P	ϕ5/8	ϕ3/8

FTQ18PAVJU
FTQ24PAVJU



■ **Refrigerant pipe connection port diameters**

(in.)

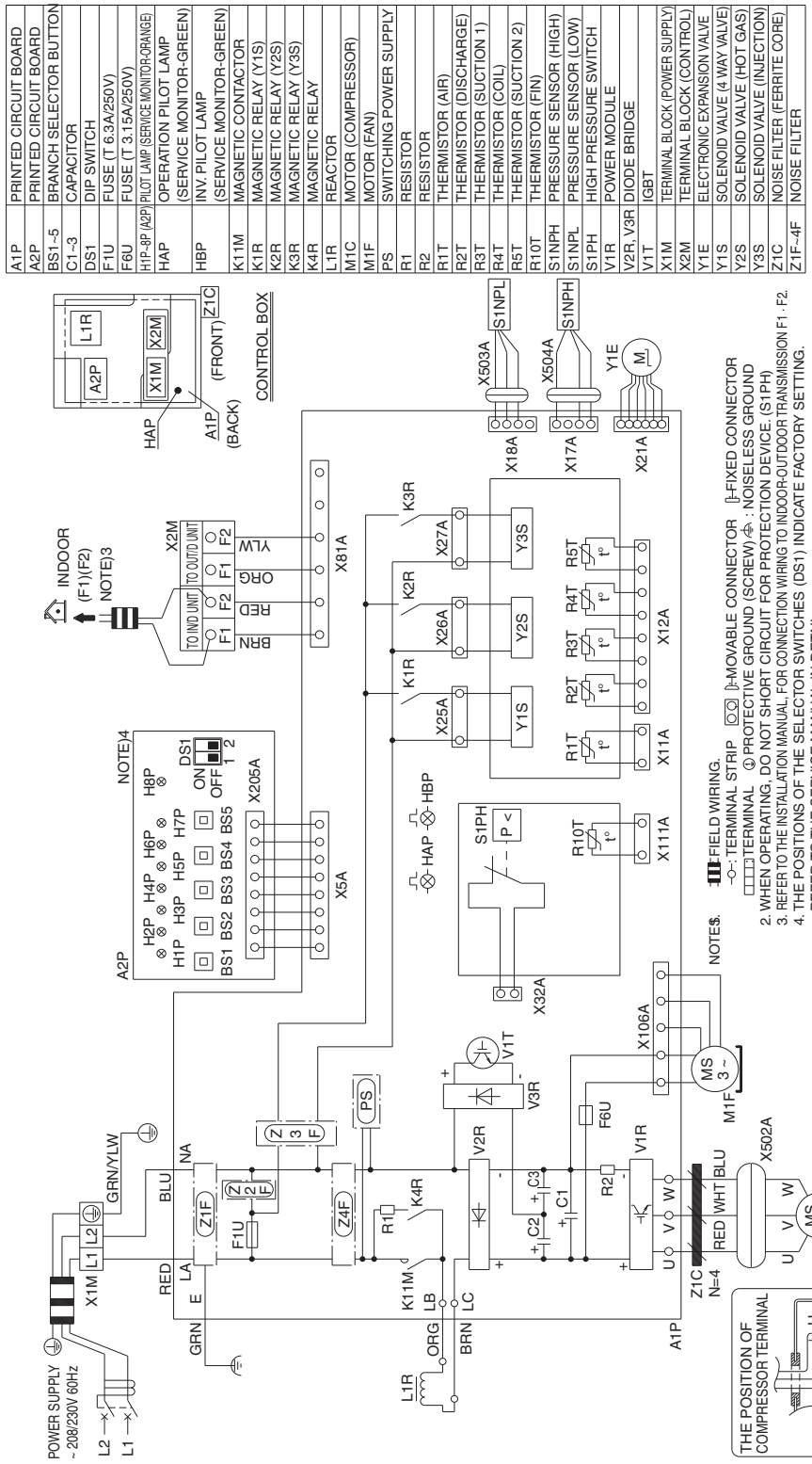
Model	Gas	Liquid
FTQ18PAVJU/FTQ24PAVJU	ϕ5/8	ϕ3/8

C: 4D068194

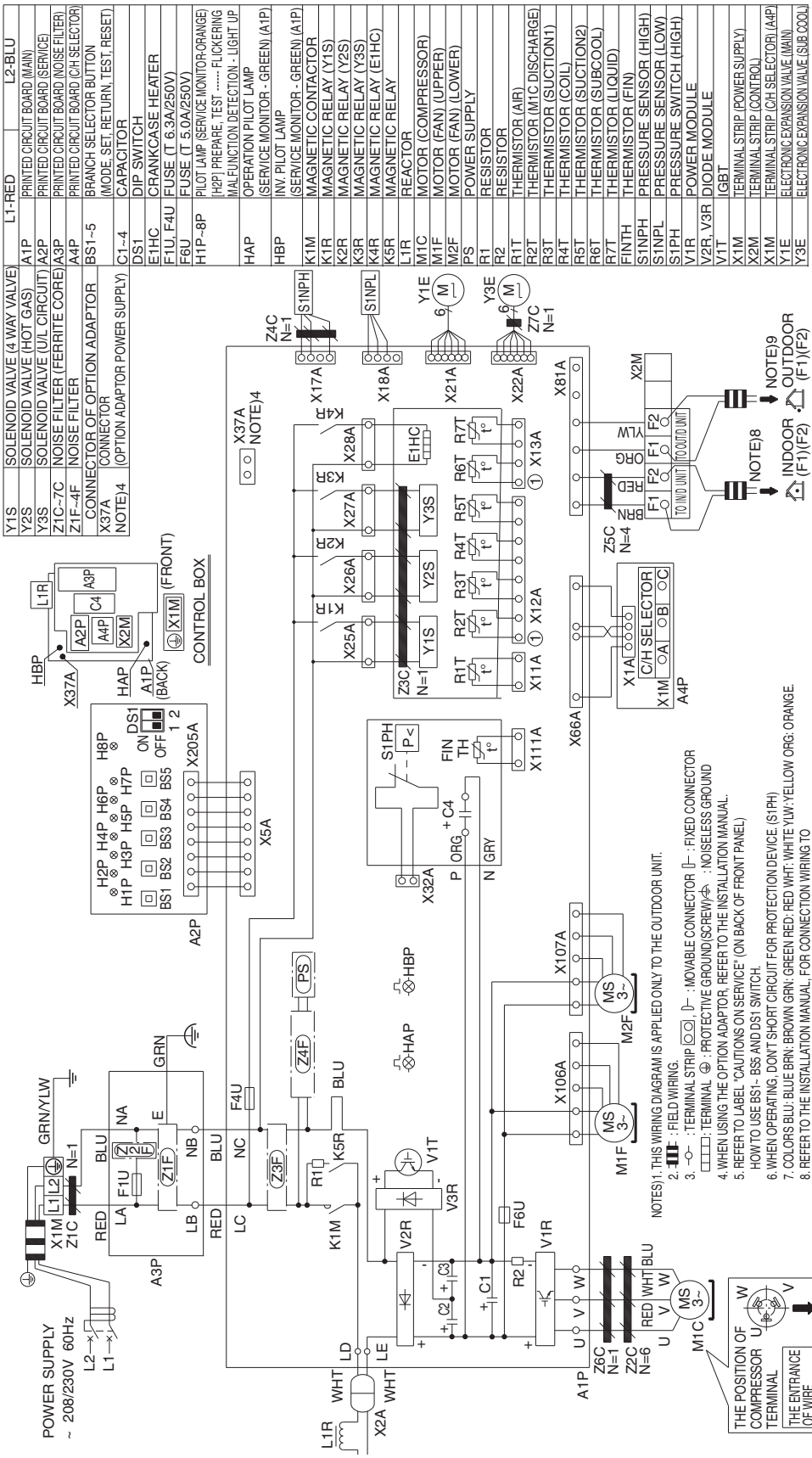
2. Wiring Diagrams for Reference

2.1 Outdoor Unit

RZR18PVJU/RZQ18PVJU9
RZR24PVJU/RZQ24PVJU9
RZR30PVJU/RZQ30PVJU

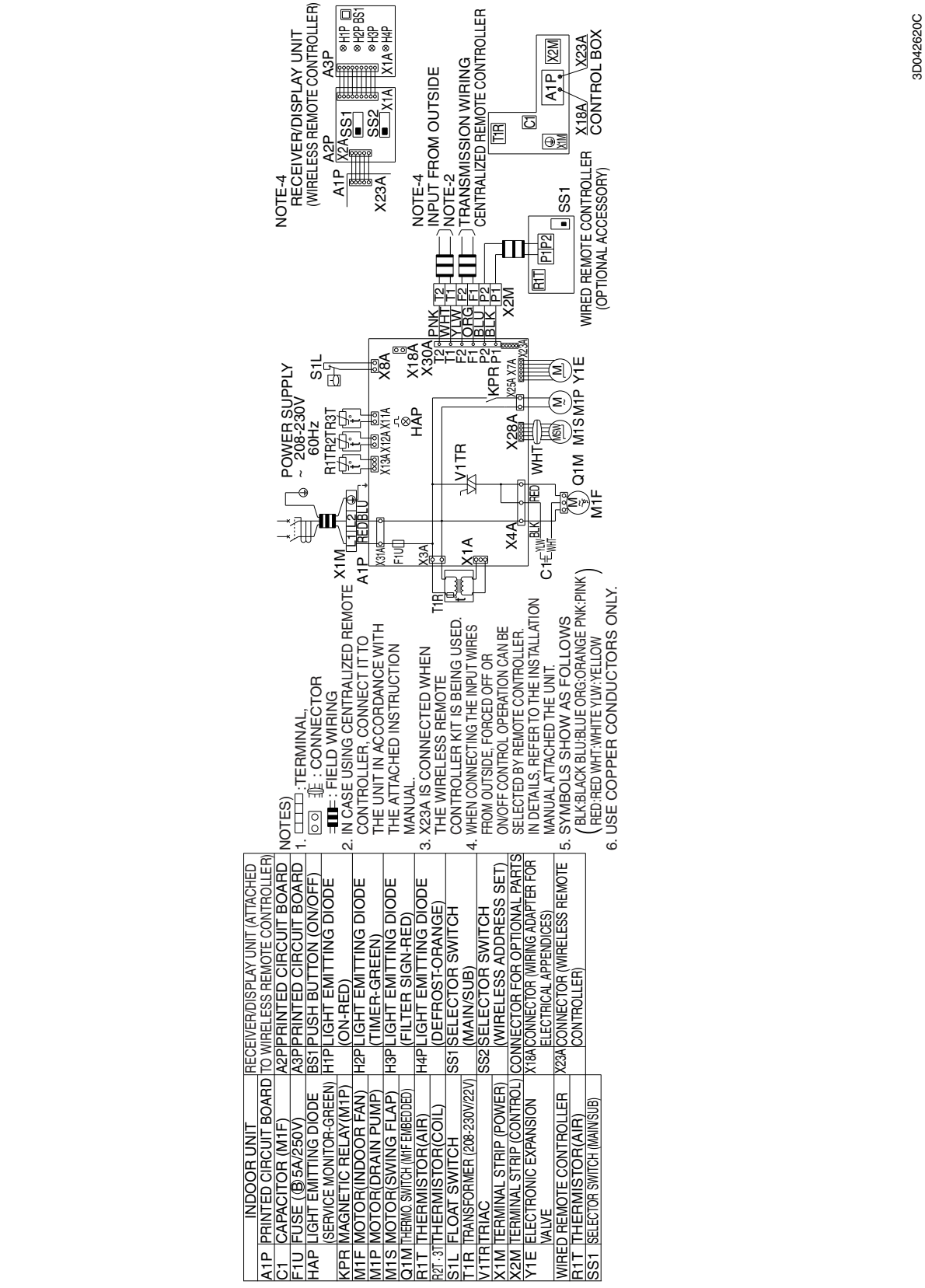


RZQ30PVJU9
RZQ36PVJU9/RZR36PVJU
RZQ42PVJU9/RZR42PVJU

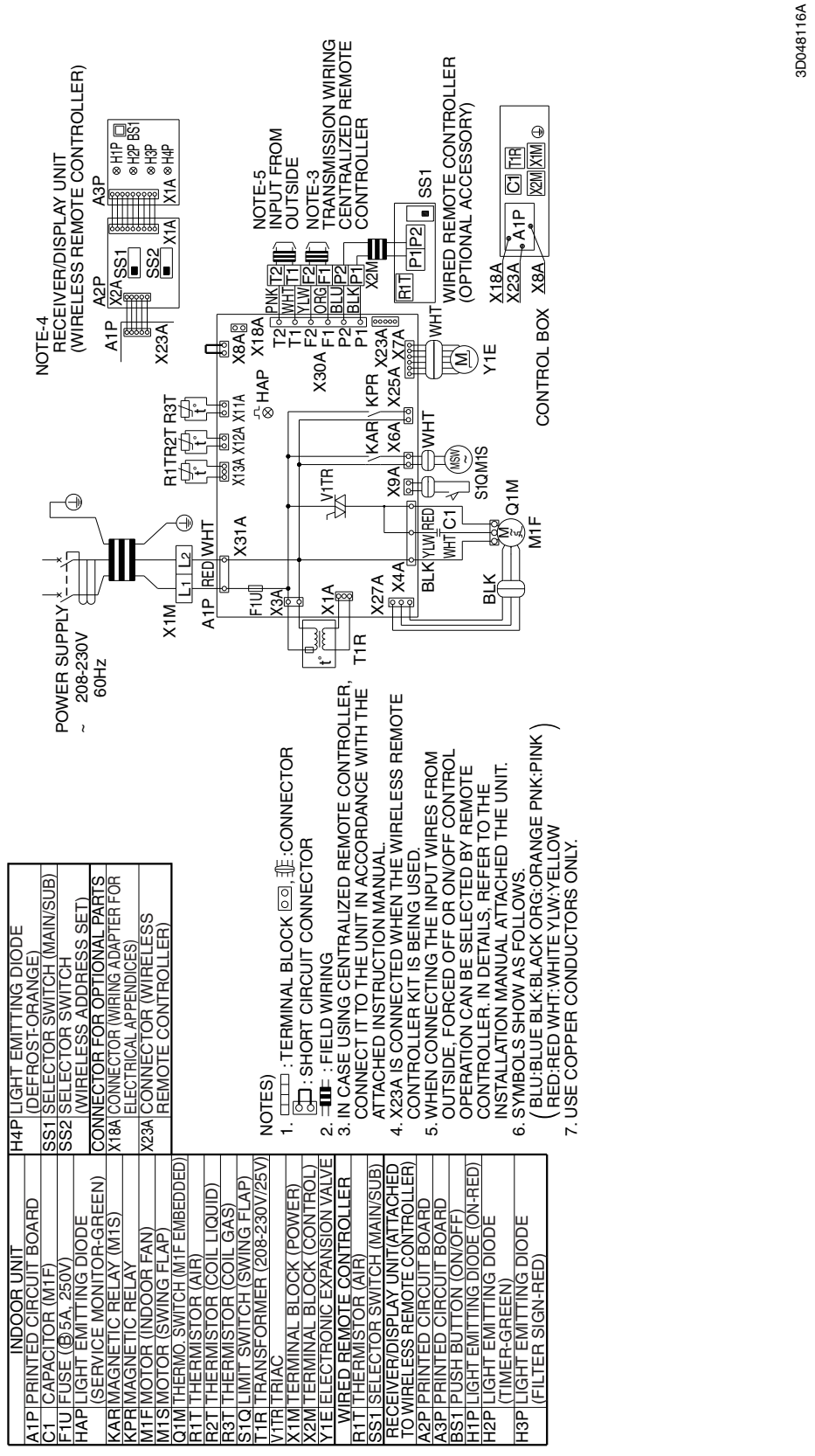


2.2 Indoor Unit

FCQ18PVJU
FCQ24PVJU
FCQ30PVJU



FHQ18PVJU
FHQ24PVJU
FHQ30PVJU



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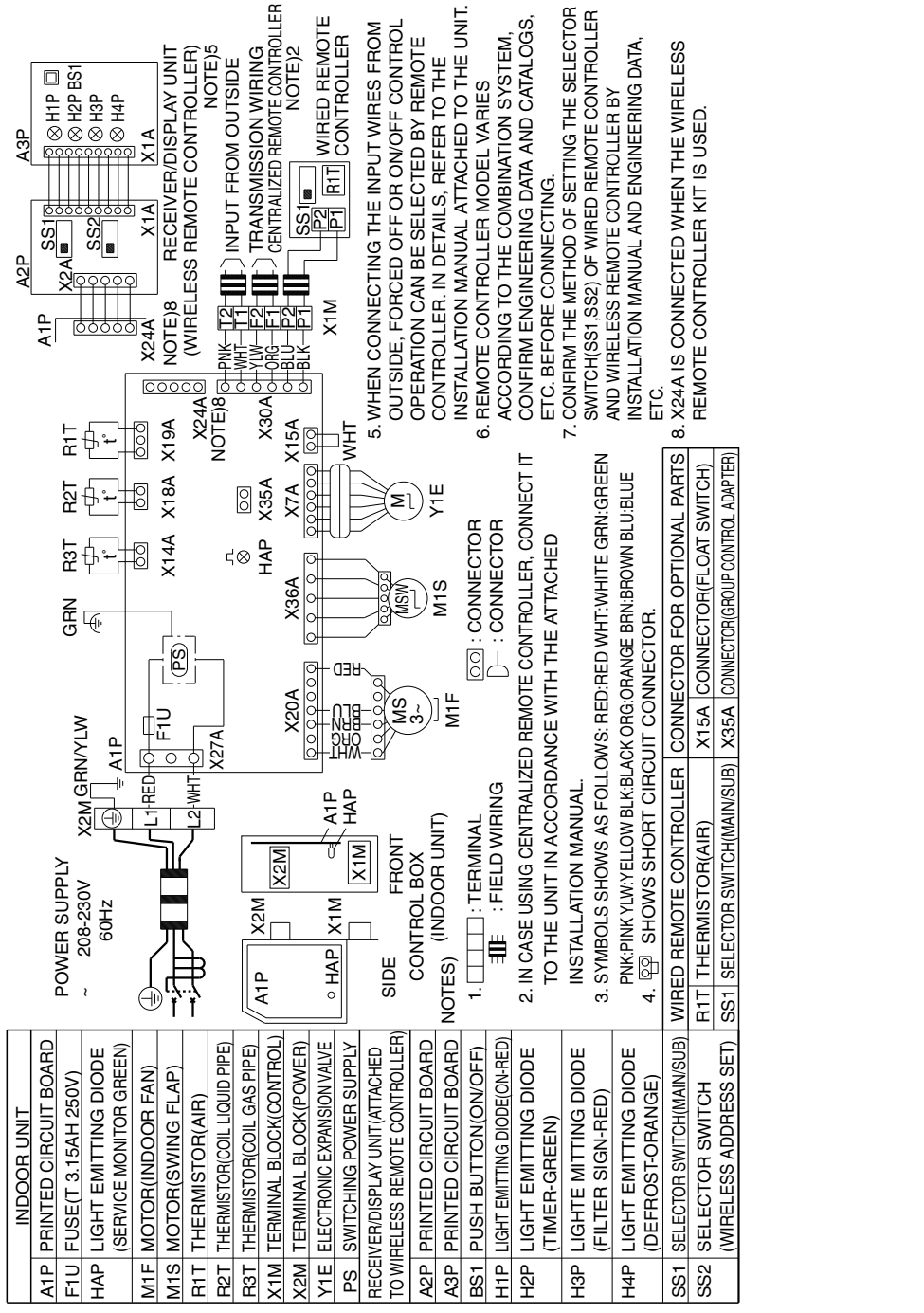
3D046039D



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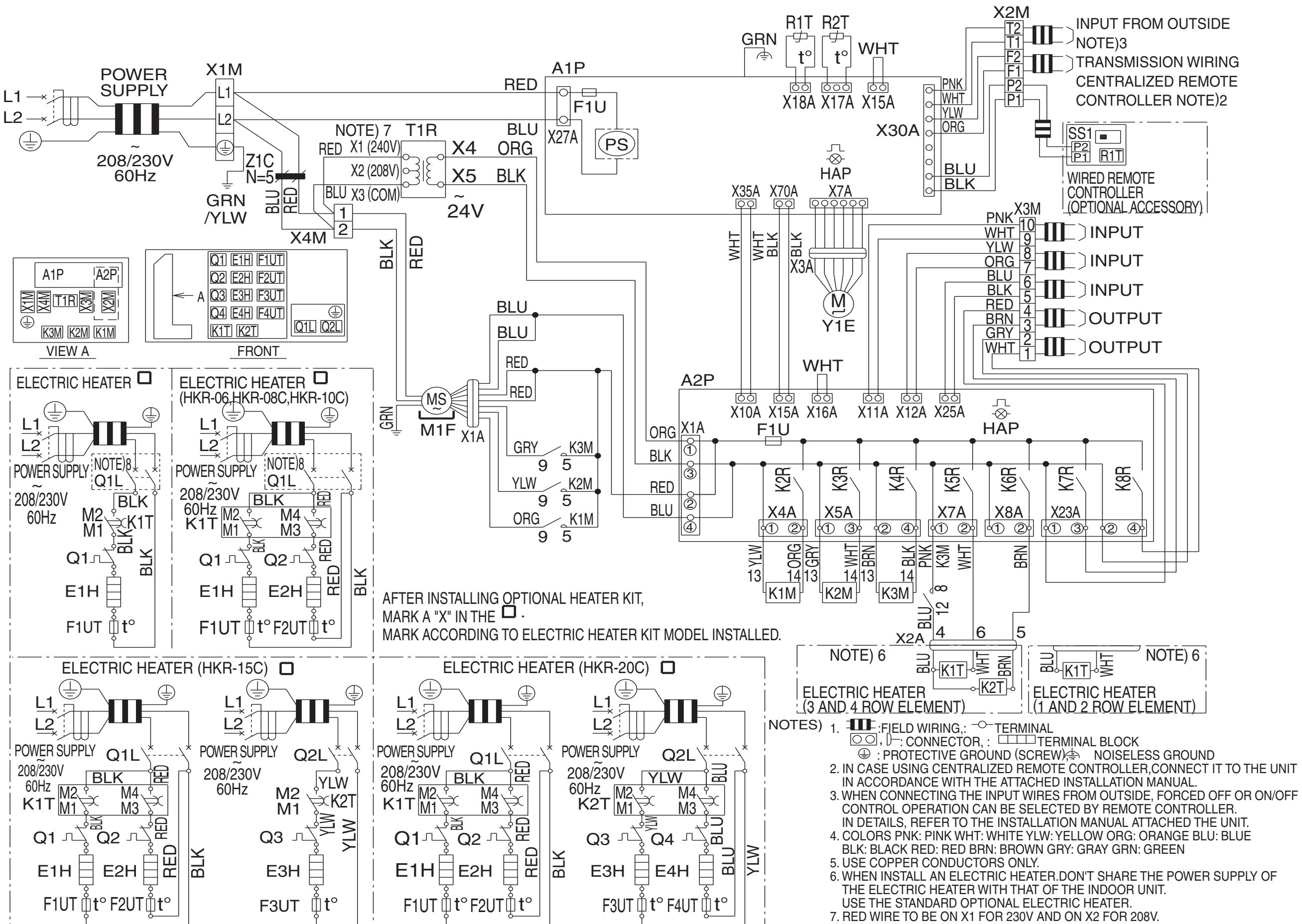


INDOOR UNIT							
		K2R ~	MAGNETIC RELAY (A2P)	X1M	TERMINAL STRIP (POWER SUPPLY)	SS1	SELECTOR SWITCH (MAIN/SUB)
A1P	PRINTED CIRCUIT BOARD (MAIN)			X2M	TERMINAL STRIP (CONTROL)	ELECTRIC HEATER	
A2P	PRINTED CIRCUIT BOARD (SUB)	M1F	MOTOR (FAN)	X3M	TERMINAL STRIP (CONTROL)	E1H~E4H	ELECTRIC HEATER
F1U	FUSE (T, 3.15A, 250V) FOR (A1P, A2P)	PS	SWITCHING POWER SUPPLY (A1P)	X4M	TERMINAL STRIP (POWER SUPPLY)	F1UT~F4UT	TEMPERATURE FUSE (199.4°F)
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN)(A1P, A2P)	R1T	THERMISTOR (LIQUID)	Y1E	ELECTRONIC EXPANSION VALVE	K1T, K2T	TIME DELAY RELAY
		R2T	THERMISTOR (GAS)	Z1C	NOISE FILTER (FERRITE CORE)	Q1~Q4	THERMAL LIMIT
K1M ~ K3M	MAGNETIC RELAY	T1R	TRANSFORMER 208V/24V, 240V/24V	WIRED REMOTE CONTROLLER		Q1L, Q2L	CIRCUIT BREAKERS
		X1A~X3A	CONNECTOR	R1T	THERMISTOR (AIR)		

3D065036F

3. Thermistor Resistance / Temperature Characteristics

Indoor unit

	FCQ, FHQ, FAQ	FTQ
For suction air	R1T	—
For liquid pipe	R2T	R1T
For gas pipe	R3T	R2T

Outdoor unit

For outdoor air	R1T
For heat exchanger deicer	R4T
For suction air	R3T, R5T

Outdoor unit radiation fin thermistor R10T

T°F	T°C	kΩ
14	-10	—
18	-8	—
21	-6	88.0
25	-4	79.1
28	-2	71.1
32	0	64.1
35	2	57.8
39	4	52.3
43	6	47.3
46	8	42.9
50	10	38.9
54	12	35.3
57	14	32.1
61	16	29.2
64	18	26.6
68	20	24.3
72	22	22.2
75	24	20.3
79	26	18.5
82	28	17.0
86	30	15.6
90	32	14.2
93	34	13.1
97	36	12.0
100	38	11.1
104	40	10.3
108	42	9.5
111	44	8.8
115	46	8.2
118	48	7.6
122	50	7.0
126	52	6.7
129	54	6.0
133	56	5.5
136	58	5.2
140	60	4.79
144	62	4.46
147	64	4.15
151	66	3.87
154	68	3.61
158	70	3.37
162	72	3.15
165	74	2.94
169	76	2.75
172	78	2.51
176	80	2.41
180	82	2.26
183	84	2.12
187	86	1.99
190	88	1.87
194	90	1.76
198	92	1.65
201	94	1.55
205	96	1.46
208	98	1.38

T°F	T°C	kΩ
-4.0	-20	197.81
-2.2	-19	186.53
-0.4	-18	175.97
1.4	-17	166.07
3.2	-16	156.80
5.0	-15	148.10
6.8	-14	139.94
8.6	-13	132.28
10.4	-12	125.09
12.2	-11	118.34
14.0	-10	111.99
15.8	-9	106.03
17.6	-8	100.41
19.4	-7	95.14
21.2	-6	90.17
23.0	-5	85.49
24.8	-4	81.08
26.6	-3	76.93
28.4	-2	73.01
30.2	-1	69.32
32.0	0	65.84
33.8	1	62.54
35.6	2	59.43
37.4	3	56.49
39.2	4	53.71
41.0	5	51.09
42.8	6	48.61
44.6	7	46.26
46.4	8	44.05
48.2	9	41.95
50.0	10	39.96
51.8	11	38.08
53.6	12	36.30
55.4	13	34.62
57.2	14	33.02
59.0	15	31.50
60.8	16	30.06
62.6	17	28.70
64.4	18	27.41
66.2	19	26.18
68.0	20	25.01
69.8	21	23.91
71.6	22	22.85
73.4	23	21.85
75.2	24	20.90
77.0	25	20.00
78.8	26	19.14
80.6	27	18.32
82.4	28	17.54
84.2	29	16.80
86.0	30	16.10

T°F	T°C	kΩ
86.0	30	16.10
87.8	31	15.43
89.6	32	14.79
91.4	33	14.18
93.2	34	13.59
95.0	35	13.04
96.8	36	12.51
98.6	37	12.01
100.4	38	11.52
102.2	39	11.06
104.0	40	10.63
105.8	41	10.21
107.6	42	9.81
109.4	43	9.42
111.2	44	9.06
113.0	45	8.71
114.8	46	8.37
116.6	47	8.05
118.4	48	7.75
120.2	49	7.46
122.0	50	7.18
123.8	51	6.91
125.6	52	6.65
127.4	53	6.41
129.2	54	6.65
131.0	55	6.41
132.8	56	6.18
134.6	57	5.95
136.4	58	5.74
138.2	59	5.14
140.0	60	4.96
141.8	61	4.79
143.6	62	4.62
145.4	63	4.46
147.2	64	4.30
149.0	65	4.16
150.8	66	4.01
152.6	67	3.88
154.4	68	3.75
156.2	69	3.62
158.0	70	3.50
159.8	71	3.38
161.6	72	3.27
163.4	73	3.16
165.2	74	3.06
167.0	75	2.96
168.8	76	2.86
170.6	77	2.77
172.4	78	2.68
174.2	79	2.60
176.0	80	2.51

Outdoor Unit Thermistors for Discharge Pipe (R2T)

T°F	T°C	kΩ
32.0	0	640.44
33.8	1	609.31
35.6	2	579.96
37.4	3	552.00
39.2	4	525.63
41.0	5	500.66
42.8	6	477.01
44.6	7	454.60
46.4	8	433.37
48.2	9	413.24
50.0	10	394.16
51.8	11	376.05
53.6	12	358.88
55.4	13	342.58
57.2	14	327.10
59.0	15	312.41
60.8	16	298.45
62.6	17	285.18
64.4	18	272.58
66.2	19	260.60
68.0	20	249.00
69.8	21	238.36
71.6	22	228.05
73.4	23	218.24
75.2	24	208.90
77.0	25	200.00
78.8	26	191.53
80.6	27	183.46
82.4	28	175.77
84.2	29	168.44
86.0	30	161.45
86.0	31	154.79
87.8	32	148.43
89.6	33	142.37
91.4	34	136.59
93.2	35	131.06
95.0	36	125.79
96.8	37	120.76
98.6	38	115.95
100.4	39	111.35
102.2	40	106.96
104.0	41	102.76
105.8	42	98.75
107.6	43	94.92
109.4	44	91.25
111.2	45	87.74
113.0	46	84.38
114.8	47	81.16
116.6	48	78.09
118.4	49	75.14
120.2	50	72.32

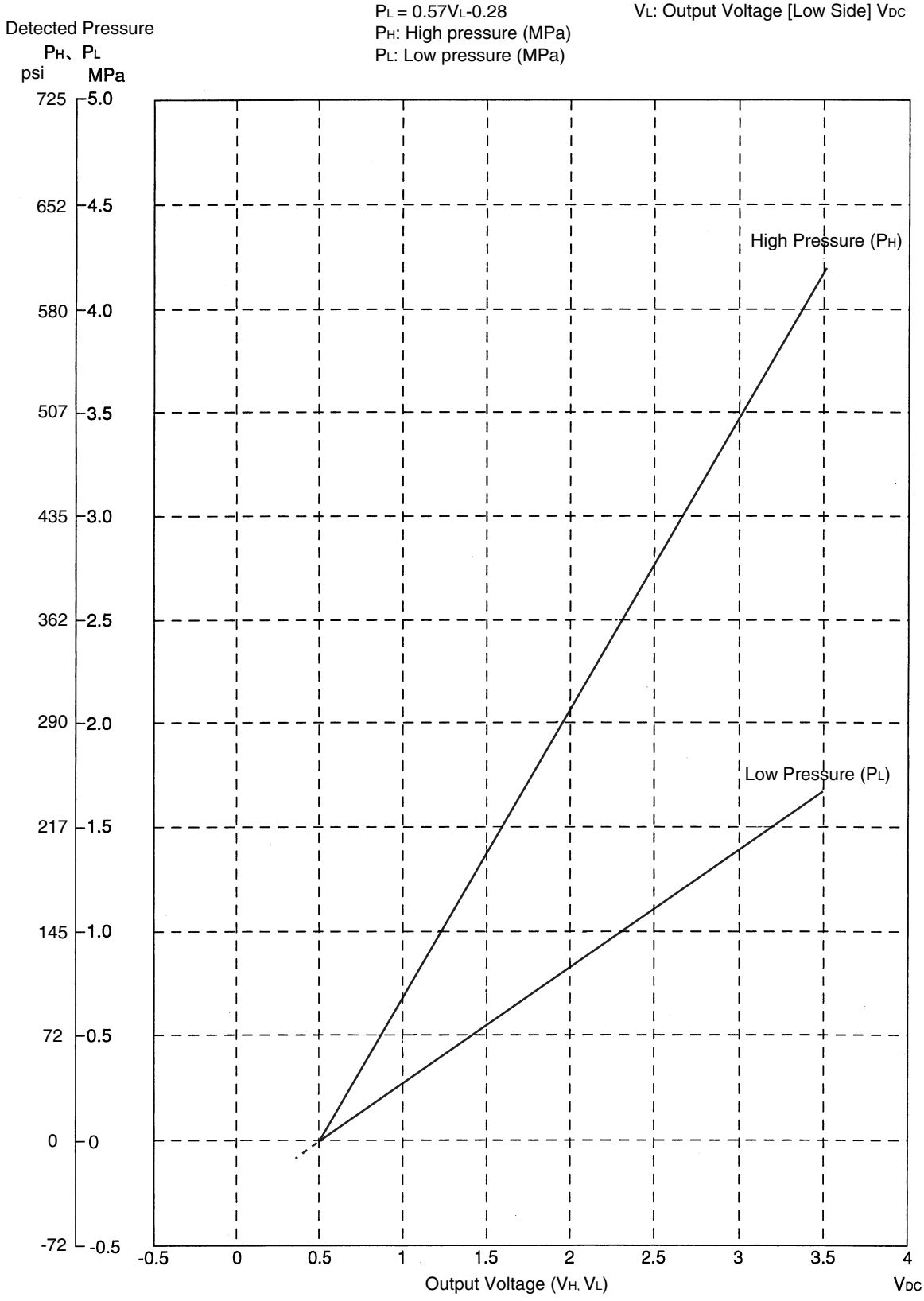
T°F	T°C	kΩ
122.0	50	72.32
123.8	51	69.64
125.6	52	67.06
127.4	53	64.60
129.2	54	62.24
131.0	55	59.97
132.8	56	57.80
134.6	57	55.72
136.4	58	53.72
138.2	59	51.98
140.0	60	49.96
141.8	61	48.19
143.6	62	46.49
145.4	63	44.86
147.2	64	43.30
149.0	65	41.79
150.8	66	40.35
152.6	67	38.96
154.4	68	37.63
156.2	69	36.34
158.0	70	35.11
159.8	71	33.92
161.6	72	32.78
163.4	73	31.69
165.2	74	30.63
167.0	75	29.61
168.8	76	28.64
170.6	77	27.69
172.4	78	26.79
174.2	79	25.91
176.0	80	25.07
177.8	81	24.26
179.6	82	23.48
181.4	83	22.73
183.2	84	22.01
185.0	85	21.31
186.8	86	20.63
188.6	87	19.98
190.4	88	19.36
192.2	89	18.75
194.0	90	18.17
195.8	91	17.61
197.6	92	17.07
199.4	93	16.54
201.2	94	16.04
203.0	95	15.55
204.8	96	15.08
206.6	97	14.62
208.4	98	14.18
210.2	99	13.76
212.0	100	13.35

T°F	T°C	kΩ
212.0	100	13.35
213.8	101	12.95
215.6	102	12.57
217.4	103	12.20
219.2	104	11.84
221.0	105	11.49
222.8	106	11.15
224.6	107	10.83
226.4	108	10.52
228.2	109	10.21
230.0	110	9.92
231.8	111	9.64
233.6	112	9.36
235.4	113	9.10
237.2	114	8.84
239.0	115	8.59
240.8	116	8.35
242.6	117	8.12
244.4	118	7.89
246.2	119	7.68
248.0	120	7.47
249.8	121	7.26
251.6	122	7.06
253.4	123	6.87
255.2	124	6.69
257.0	125	6.51
258.8	126	6.33
260.6	127	6.16
262.4	128	6.00
264.2	129	5.84
266.0	130	5.69
267.8	131	5.54
269.6	132	5.39
271.4	133	5.25
273.2	134	5.12
275.0	135	4.98
276.8	136	4.86
278.6	137	4.73
280.4	138	4.61
282.2	139	4.49
284.0	140	4.38
285.8	141	4.27
287.6	142	4.16
289.4	143	4.06
291.2	144	3.96
293.0	145	3.86
294.8	146	3.76
296.6	147	3.67
298.4	148	3.58
300.2	149	3.49
302.0	150	3.41

4. Pressure Sensor

$P_H = 1.38V_H-0.69$
$P_L = 0.57V_L-0.28$
P_H: High pressure (MPa)
P_L: Low pressure (MPa)

V_H: Output Voltage [High Side] V_{DC}
V_L: Output Voltage [Low Side] V_{DC}



5. Precautions for New Refrigerant (R-410A)

5.1 Outline

5.1.1 About Refrigerant R-410A

■ Characteristics of new refrigerant, R-410A

1. Performance
   Almost the same performance as R-22 and R-407C
2. Pressure
   Working pressure is approx. 1.4 times more than R-22 and R-407C.
3. Refrigerant composition
   Few problems in composition control, since it is a Quasi-azeotropic mixture refrigerant.

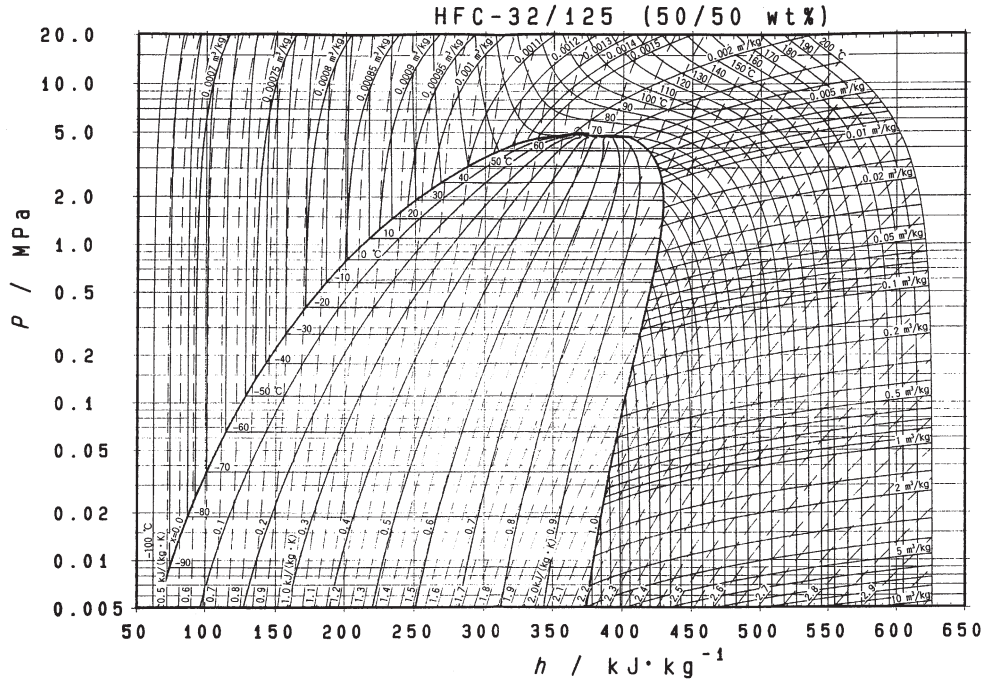
	HFC units (Units using new refrigerants)		HCFC units
Refrigerant name	R-407C	R-410A	R-22
Composing substances	Non-azeotropic mixture of HFC32, HFC125 and HFC134a (*1)	Quasi-azeotropic mixture of HFC32 and HFC125 (*2)	Single-component refrigerant
Design pressure (*3)	3.2 MPa (gauge pressure) = 32.6 kgf/cm^2 = 464 psi	4.0 MPa (gauge pressure) = 40.8 kgf/cm^2 = 580 psi	2.75MPa (gauge pressure) = 28.0 kgf/cm^2 = 399 psi
Refrigerant oil	Synthetic oil (Ether)		Mineral oil (Suniso)
Ozone destruction factor (ODP)	0	0	0.05
Combustibility	None	None	None
Toxicity	None	None	None

∗1. Non-azeotropic mixture refrigerant: mixture of two or more refrigerants having different boiling points.

∗2. Quasi-azeotropic mixture refrigerant: mixture of two or more refrigerants having similar boiling points.

∗3. The design pressure is different at each product. Please refer to the installation manual for each product.

(Reference) 1 MPa≒ 10.19716 kgf / cm^2
1 MPa≒ 145 psi



Pressure-Enthalpy curves of HFC-32/125 (50/50wt%)

■ Thermodynamic characteristic of R-410A

DAIREP ver2.0

Temperature (°F)	Steam pressure (psi)		Density (kg/m³)		Specific heat at constant pressure (kJ/kgK)		Specific enthalpy (kJ/kg)		Specific entropy (kJ/KgK)	
	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor
-94	5.24	5.24	1410.7	1.582	1.372	0.695	100.8	390.6	0.649	2.074
-90	5.92	5.92	1404.7	1.774	1.374	0.700	103.6	391.8	0.663	2.066
-87	6.68	6.67	1398.6	1.984	1.375	0.705	106.3	393.0	0.676	2.058
-83	7.50	7.50	1392.5	2.213	1.377	0.710	109.1	394.1	0.689	2.051
-80	8.41	8.40	1386.4	2.463	1.378	0.715	111.9	395.3	0.702	2.044
-76	9.41	9.40	1380.2	2.734	1.379	0.720	114.6	396.4	0.715	2.037
-72	10.50	10.49	1374.0	3.030	1.380	0.726	117.4	397.6	0.728	2.030
-69	11.69	11.67	1367.8	3.350	1.382	0.732	120.1	398.7	0.741	2.023
-65	12.98	12.96	1361.6	3.696	1.384	0.737	122.9	399.8	0.754	2.017
-62	14.39	14.36	1355.3	4.071	1.386	0.744	125.7	400.9	0.766	2.010
-61	14.70	14.68	1354.0	4.153	1.386	0.745	126.3	401.1	0.769	2.009
-58	15.91	15.88	1349.0	4.474	1.388	0.750	128.5	402.0	0.779	2.004
-54	17.56	17.53	1342.7	4.909	1.391	0.756	131.2	403.1	0.791	1.998
-51	19.34	19.31	1336.3	5.377	1.394	0.763	134.0	404.1	0.803	1.992
-47	21.27	21.22	1330.0	5.880	1.397	0.770	136.8	405.2	0.816	1.987
-44	23.34	23.29	1323.5	6.419	1.401	0.777	139.6	406.2	0.828	1.981
-40	25.56	25.51	1317.0	6.996	1.405	0.785	142.4	407.3	0.840	1.976
-36	27.95	27.89	1310.5	7.614	1.409	0.792	145.3	408.3	0.852	1.970
-33	30.51	30.44	1304.0	8.275	1.414	0.800	148.1	409.3	0.864	1.965
-29	33.26	33.17	1297.3	8.980	1.419	0.809	150.9	410.2	0.875	1.960
-26	36.19	36.09	1290.6	9.732	1.424	0.817	153.8	411.2	0.887	1.955
-22	39.31	39.21	1283.9	10.53	1.430	0.826	156.6	412.1	0.899	1.950
-18	42.64	42.52	1277.1	11.39	1.436	0.835	159.5	413.1	0.911	1.946
-15	46.19	46.06	1270.2	12.29	1.442	0.844	162.4	414.0	0.922	1.941
-11	49.96	49.81	1263.3	13.26	1.448	0.854	165.3	414.9	0.934	1.936
-8	53.97	53.80	1256.3	14.28	1.455	0.864	168.2	415.7	0.945	1.932
-4	58.22	58.03	1249.2	15.37	1.461	0.875	171.1	416.6	0.957	1.927
0	62.72	62.51	1242.0	16.52	1.468	0.886	174.1	417.4	0.968	1.923
3	67.48	67.25	1234.8	17.74	1.476	0.897	177.0	418.2	0.980	1.919
7	72.51	72.27	1227.5	19.04	1.483	0.909	180.0	419.0	0.991	1.914
10	77.83	77.56	1220.0	20.41	1.491	0.921	182.9	419.8	1.003	1.910
14	83.44	83.14	1212.5	21.86	1.499	0.933	185.9	420.5	1.014	1.906
18	89.36	89.03	1204.9	23.39	1.507	0.947	189.0	421.2	1.025	1.902
21	95.59	95.23	1197.2	25.01	1.516	0.960	192.0	421.9	1.036	1.898
25	102.14	101.75	1189.4	26.72	1.524	0.975	195.0	422.6	1.048	1.894
28	109.03	108.61	1181.4	28.53	1.533	0.990	198.1	423.2	1.059	1.890
32	116.26	115.81	1173.4	30.44	1.543	1.005	201.2	423.8	1.070	1.886
36	123.86	123.37	1165.3	32.46	1.552	1.022	204.3	424.4	1.081	1.882
39	131.82	131.30	1157.0	34.59	1.563	1.039	207.4	424.9	1.092	1.878
43	140.16	139.60	1148.6	36.83	1.573	1.057	210.5	425.5	1.103	1.874
46	148.90	148.30	1140.0	39.21	1.584	1.076	213.7	425.9	1.114	1.870
50	158.04	157.40	1131.3	41.71	1.596	1.096	216.8	426.4	1.125	1.866
54	167.60	166.91	1122.5	44.35	1.608	1.117	220.0	426.8	1.136	1.862
57	177.59	176.85	1113.5	47.14	1.621	1.139	223.2	427.2	1.147	1.859
61	188.02	187.24	1104.4	50.09	1.635	1.163	226.5	427.5	1.158	1.855
64	198.90	198.07	1095.1	53.20	1.650	1.188	229.7	427.8	1.169	1.851
68	210.24	209.37	1085.6	56.48	1.666	1.215	233.0	428.1	1.180	1.847
72	222.06	221.15	1075.9	59.96	1.683	1.243	236.4	428.3	1.191	1.843
75	234.38	233.42	1066.0	63.63	1.701	1.273	239.7	428.4	1.202	1.839
79	247.02	246.19	1055.9	67.51	1.721	1.306	243.1	428.6	1.214	1.834
82	260.55	259.49	1045.5	71.62	1.743	1.341	246.5	428.6	1.225	1.830
86	274.43	273.31	1034.9	75.97	1.767	1.379	249.9	428.6	1.236	1.826
90	288.85	287.67	1024.1	80.58	1.793	1.420	253.4	428.6	1.247	1.822
93	303.81	302.61	1012.9	85.48	1.822	1.465	256.9	428.4	1.258	1.817
97	319.36	318.18	1001.4	90.68	1.855	1.514	260.5	428.3	1.269	1.813
100	335.50	334.20	989.5	96.22	1.891	1.569	264.1	428.0	1.281	1.808
104	352.25	350.91	977.3	102.1	1.932	1.629	267.8	427.7	1.292	1.803
108	369.61	368.23	964.6	108.4	1.979	1.696	271.5	427.2	1.303	1.798
111	387.61	386.19	951.4	115.2	2.033	1.771	275.3	426.7	1.315	1.793
115	406.25	404.80	937.7	122.4	2.095	1.857	279.2	426.1	1.327	1.788
118	425.54	424.08	923.3	130.2	2.168	1.955	283.2	425.4	1.339	1.782
122	445.53	444.04	908.2	138.6	2.256	2.069	287.3	424.5	1.351	1.776
126	466.20	464.69	892.2	147.7	2.362	2.203	291.5	423.5	1.363	1.770
129	487.58	486.07	875.1	157.6	2.493	2.363	295.8	422.4	1.376	1.764
133	509.69	508.20	856.8	168.4	2.661	2.557	300.3	421.0	1.389	1.757
136	532.54	531.07	836.9	180.4	2.883	2.799	305.0	419.4	1.403	1.749
140	556.15	554.71	814.9	193.7	3.191	3.106	310.0	417.6	1.417	1.741
144	580.52	579.16	790.1	208.6	3.650	3.511	315.3	415.5	1.433	1.732
147	605.70	604.41	761.0	225.6	4.415	4.064	321.2	413.0	1.450	1.722

5.2 Service Tools

R-410A is used under higher working pressure, compared to previous refrigerants (R-22, R-407C). Furthermore, the refrigerating machine oil has been changed from Suniso oil to Ether oil, and if oil mixing is occurred, sludge results in the refrigerants and causes other problems. Therefore, gauge manifolds and charge hoses that are used with a previous refrigerant (R-22, R-407C) can not be used for products that use new refrigerants.
Be sure to use dedicated tools and devices.

■ Tool compatibility

Tool	Compatibility			Reasons for change
	HFC		HCFC	
	R-410A	R-407C	R-22	
Gauge manifold Charge hose	×			• Do not use the same tools for R-22 and R-410A. • Thread specification differs for R-410A and R-407C.
Charging cylinder	×		○	• Weighting instrument used for HFCs.
Gas detector	○		×	• The same tool can be used for HFCs.
Vacuum pump (pump with reverse flow preventive function)	○			• To use existing pump for HFCs, vacuum pump adaptor must be installed.
Weighting instrument	○			
Charge mouthpiece	×			• Seal material is different between R-22 and HFCs. • Thread specification is different between R-410A and others.
Flaring tool (Clutch type)	○			• For R-410A, flare gauge is necessary.
Torque wrench	○			• Torque-up for 1/2 and 5/8
Pipe cutter	○			
Pipe expander	○			
Pipe bender	○			
Pipe assembling oil	×			• Due to refrigerating machine oil change. (No Suniso oil can be used.)
Refrigerant recovery device	Check your recovery device.			
Refrigerant piping	See the chart below.			• Only ϕ19.1 is changed to 1/2H material while the previous material is "O".

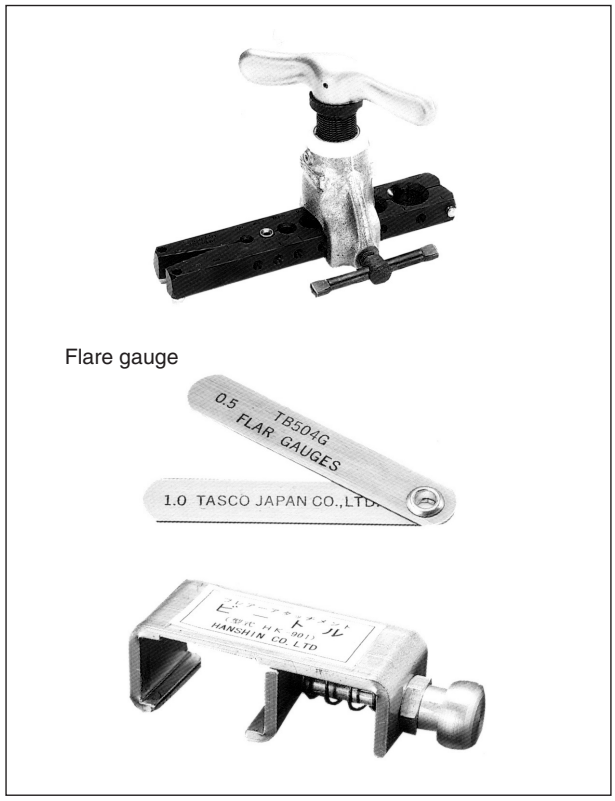
As for the charge mouthpiece and packing, 1/2UNF20 is necessary for mouthpiece size of charge hose.

■ Copper tube material and thickness

Pipe size	R-407C		R-410A	
	Material	Thickness t (in.)	Material	Thickness t (in.)
ϕ1/4"	O	0.031	O	0.031
ϕ3/8"	O	0.031	O	0.031
ϕ1/2"	O	0.031	O	0.031
ϕ5/8"	O	0.039	O	0.039
ϕ3/4"	O	0.039	1/2H	0.039
ϕ7/8"	1/2H	0.039	1/2H	0.039
ϕ1	1/2H	0.039	1/2H	0.039
ϕ1'1/8"	1/2H	0.039	1/2H	0.039
ϕ1'1/4"	1/2H	0.047	1/2H	0.043
ϕ1'1/2"	1/2H	0.055	1/2H	0.055
ϕ1'3/4"	1/2H	0.063	1/2H	0.063

∗ O: Soft (Annealed)
H: Hard (Drawn)

1. Flaring tool



■ Specifications

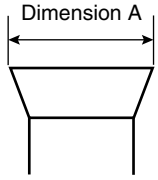
• Dimension A

Unit:in.

Nominal size	Tube O.D.	$A^{+0}_{-0.4}$	
	Do	Class-2 (R-410A)	Class-1 (Conventional)
1/4	1/4	0.36	0.35
3/8	3/8	0.52	0.51
1/2	1/2	0.65	0.64
5/8	5/8	0.78	0.76
3/4	3/4	0.94	0.92

■ Differences

• Change of dimension A



For class-1: R-407C
For class-2: R-410A

Conventional flaring tools can be used when the work process is changed.
(change of work process)
Previously, a pipe extension margin of 0 to 0.02in. was provided for flaring. For R-410A air conditioners, perform pipe flaring with a pipe extension margin of 0.04 to 0.06in.
(For clutch type only)
Conventional tool with pipe extension margin adjustment can be used.

2. Torque wrench

■ Specifications

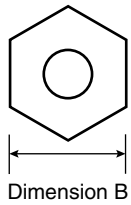
• Dimension B Unit:in.

Nominal size	Class-1	Class-2	Previous
1/2	0.94	1.02	0.94
5/8	1.06	1.14	1.06

No change in tightening torque
No change in pipes of other sizes

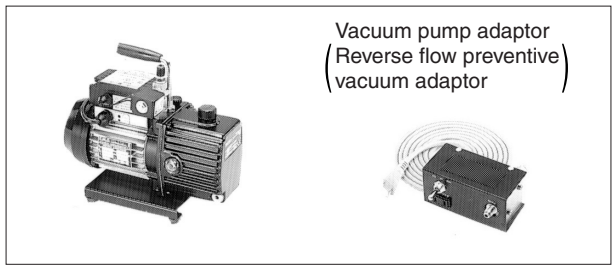
■ Differences

• Change of dimension B
Only 1/2", 5/8" are extended



For class-1: R-407C
For class-2: R-410A

3. Vacuum pump with check valve



■ Specifications

• Discharge speed
50 l/min (50Hz)

60 l/min (60Hz)

• Suction port UNF7/16-20(1/4 Flare)
UNF1/2-20(5/16 Flare) with adaptor

● Maximum degree of vacuum
Select a vacuum pump which is able to keep the vacuum degree
of the system in excess of – 14.6 psi (5 torr – 755 mmHg).

■ Differences

• Equipped with function to prevent reverse oil flow
• Previous vacuum pump can be used by installing adaptor.

4. Leak tester

■ Specifications
- Hydrogen detecting type, etc.
- Applicable refrigerants
  R-410A, R-407C, R-404A, R-507A, R-134a, etc.

■ Differences
- Previous testers detected chlorine. Since HFCs do not contain chlorine, new tester detects hydrogen.

5. Refrigerant oil

■ Specifications
- Contains synthetic oil, therefore it can be used for piping work of every refrigerant cycle.
- Offers high rust resistance and stability over long period of time.

■ Differences
- Can be used for R-410A and R-22 units.

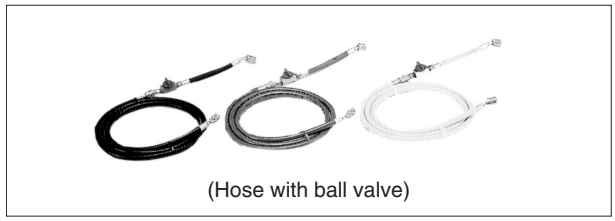
6. Gauge manifold for R-410A

■ Specifications
- High pressure gauge
  15 to 770 psi (-76 cmHg to 53 kg/cm^2)
- Low pressure gauge
  15 to 550 psi (-76 cmHg to 38 kg/cm^2)

- 1/4" → 5/16" (2min → 2.5min)
- No oil is used in pressure test of gauges.
  → For prevention of contamination
- Temperature scale indicates the relationship between pressure and temperature in gas saturated state.

■ Differences
- Change in pressure
- Change in service port diameter

7. Charge hose for R-410A



(Hose with ball valve)

■ Specifications
- Working pressure 737 psi (51.8 kg/cm^2)
- Rupture pressure 3685 psi (259 kg/cm^2)
- Available with and without hand-operate valve that prevents refrigerant from outflow.

■ Differences
- Pressure proof hose
- Change in service port diameter
- Use of nylon coated material for HFC resistance

8. Weigher for refrigerant charge

■ Specifications
- High accuracy
  TA101A (for 10-kg cylinder) = ± 2g
  TA101B (for 20-kg cylinder) = ± 5g
- Equipped with pressure-resistant sight glass to check liquid refrigerant charging.
- A manifold with separate ports for HFCs and previous refrigerants is equipped as standard accessories.

■ Differences
- Measurement is based on weight to prevent change of mixing ratio during charging.

Regarding purchasing of service tools, please contact following address.
Daikin U. S. Corporation (Dallas Office)
1645 Wallace Dr, Ste 110 Carrollton, TX 75006
“Tel : 1-972-245-1510 Fax : 1-972-245-1038”

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.

JMI-0107

Organization:
DAIKIN INDUSTRIES, LTD.
AIR CONDITIONING MANUFACTURING DIVISION

Scope of Registration:
THE DESIGN/DEVELOPMENT AND MANUFACTURE OF COMMERCIAL AIR CONDITIONING, HEATING, COOLING, REFRIGERATING EQUIPMENT, COMMERCIAL HEATING EQUIPMENT, RESIDENTIAL AIR CONDITIONING EQUIPMENT, HEAT RECLAIM VENTILATION, AIR CLEANING EQUIPMENT, MARINE TYPE CONTAINER REFRIGERATION UNITS, COMPRESSORS AND VALVES.

JQA-1452

Organization:
DAIKIN INDUSTRIES (THAILAND) LTD.

Scope of Registration:
THE DESIGN/DEVELOPMENT AND MANUFACTURE OF AIR CONDITIONERS AND THE COMPONENTS INCLUDING COMPRESSORS USED FOR THEM

EC99J2044

All of the Daikin Group's business facilities and subsidiaries in Japan are certified under the ISO 14001 international standard for environment management.

Dealer

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Specifications, designs, and other content appearing in this document are current as of August 2011 but subject to change without notice.

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