

Service Manual *Sky Air R407C*

RYEP~L-series

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1 Introduction

1.1 About This Manual

Target group This service manual is intended for and should only be used by qualified engineers.

Purpose of this manual This service manual contains all the information you need to do the necessary repair and maintenance tasks for the Sky Air RYEP~L-series room air conditioners.

Five parts This service manual consists of an introduction, five parts and an index:

Part	See page
Part 1–System Outline	1–1
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Part 3–Troubleshooting	3–1
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Part 5–Disassembly and Maintenance	5–1

Introduction overview The introduction contains the following topics:

Topic	See page
1.2–Combination Overview: Outdoor Units of the Sky Air RYEP~L-Series	viii

1.2 Combination Overview: Outdoor Units of the Sky Air RYEP~L-Series

Introduction

In the tables in this section:

- “P” stands for pair combination.
- “T” stands for twin, triple or double twin combination.

FHYCP, FHYKP and FHYP

The table below contains the possible combinations between indoor units (FHYCP, FHYKP and FHYP) and outdoor units of the Sky Air RYEP~L-series.

Indoor unit \ Outdoor unit		FHYCP35B7V1	FHYCP45B7V1	FHYCP60B7V1	FHYCP71B7V1	FHYCP100B7V1	FHYCP125B7V1	FHYKP35B17	FHYKP45B17	FHYKP60B17	FHYKP71B17	FHYP35B1	FHYP45B1	FHYP60B1	FHYP71B1	FHYP100B1	FHYP125B1
		HP	RYEP71L7V1	T	—	—	P	—	—	T	—	—	P	T	—	—	P
RYEP71L7W1	T		—	—	P	—	—	T	—	—	P	T	—	—	P	—	—
RYEP100L7V1	T		T	T	T	P	—	T	T	T	T	T	T	T	T	P	—
RYEP100L7W1	T		T	T	T	P	—	T	T	T	T	T	T	T	T	P	—
RYEP125L7W1	T		T	T	T	—	P	T	T	T	T	T	T	T	T	—	P

FUYP, FAYP, FHYBP, FDYMP and FDYP

The table below contains the possible combinations between indoor units (FUYP, FAYP, FHYBP, FDYMP and FDYP) and outdoor units of the Sky Air RYEP~L-series.

Indoor unit \ Outdoor unit		FUYP71B17	FUYP100B17	FUYP125B17	FAYP71LV1	FAYP100BV1	FHYBP35B7V1	FHYBP45B7V1	FHYBP60B7V1	FHYBP71B7V1	FHYBP100B7V1	FHYBP125B7V1	FDYMP71L7V1	FDYMP100L7V1	FDYMP125L7V1	FDYP125B7V1
		HP	RYEP71L7V1	P	—	—	P	—	T	—	—	P	—	—	P	—
RYEP71L7W1	P		—	—	P	—	T	—	—	P	—	—	P	—	—	—
RYEP100L7V1	T		P	—	T	P	T	T	T	T	P	—	T	P	—	—
RYEP100L7W1	T		P	—	T	P	T	T	T	T	P	—	T	P	—	—
RYEP125L7W1	T		—	P	T	—	T	T	T	T	—	P	T	—	P	P

Part 1

System Outline

What is in this part? This part contains the following chapters:

Chapter	See page
1-General Outline: Outdoor Units	1-3
2-General Outline: Indoor Units	1-13
3-Specifications	1-15
4-Functional Diagrams	1-17
5-Switch Box Layout	1-23
6-Wiring Diagrams: Outdoor Units	1-27
7-PCB Layout	1-31

1

1 General Outline: Outdoor Units

1.1 What Is in This Chapter?

Introduction

This chapter contains the following information on the outdoor units:

- Outlook and dimensions
- Installation and service space
- Components.

General outline

This chapter contains the following general outlines:

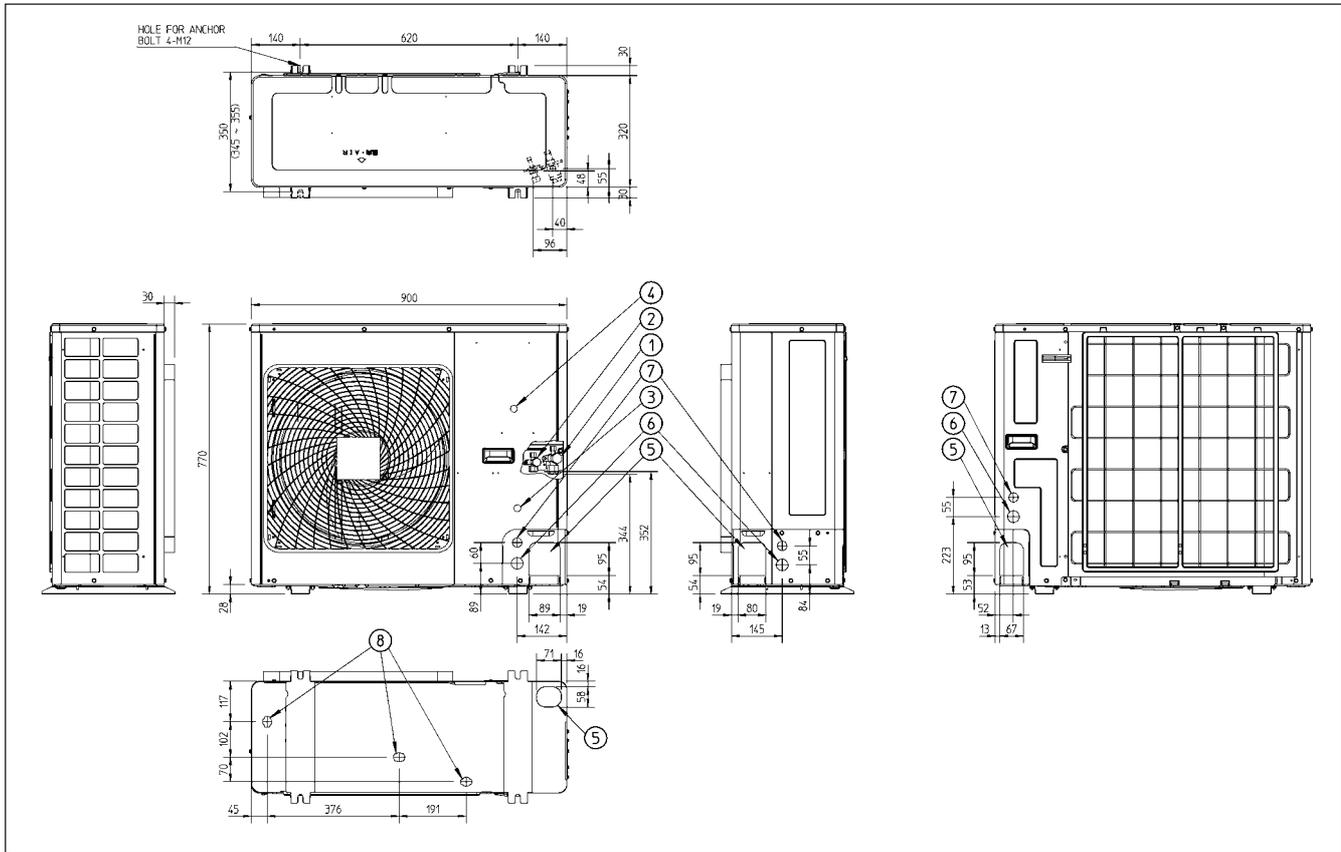
General outline	See page
1.2-RYEP71L7V1 and RYEP71L7W1	1-4
1.3-RYEP100L7V1 and RYEP100L7W1	1-6
1.4-RYEP125L7W1	1-8
1.5-RYEP71L7V1, RYEP71L7W1, RYEP100L7V1, RYEP100L7W1 and RYEP125L7W1: Installation and Service Space	1-10

1

1.2 RYEP71L7V1 and RYEP71L7W1

Outlook and dimensions

The illustration below shows the outlook and the dimensions of the unit (mm).



Installation and service space

See page 1-10.

Components

The table below contains the different components of the unit.

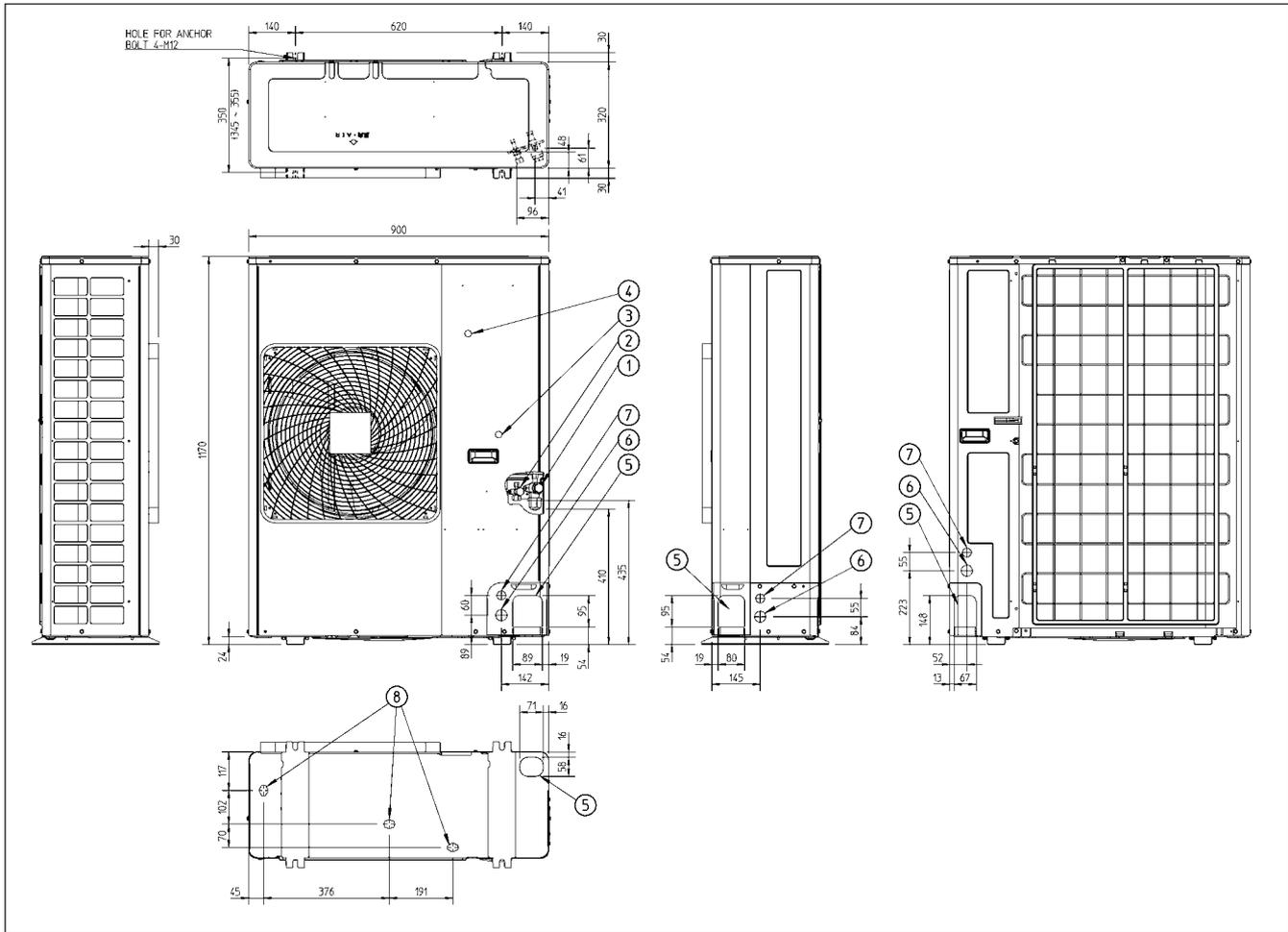
No.	Component
1	Gas pipe connection
2	Liquid pipe connection
3	Service port (inside the unit)
4	Grounding terminal M5 (inside the switch box)
5	Refrigerant piping intake
6	Power supply wiring intake
7	Control wiring intake
8	Drain outlet

1

1.3 RYEP100L7V1 and RYEP100L7W1

Outlook and dimensions

The illustration below shows the outlook and the dimensions of the unit (mm).



Installation and service space

See page 1-10.

Components

The table below contains the different components of the unit.

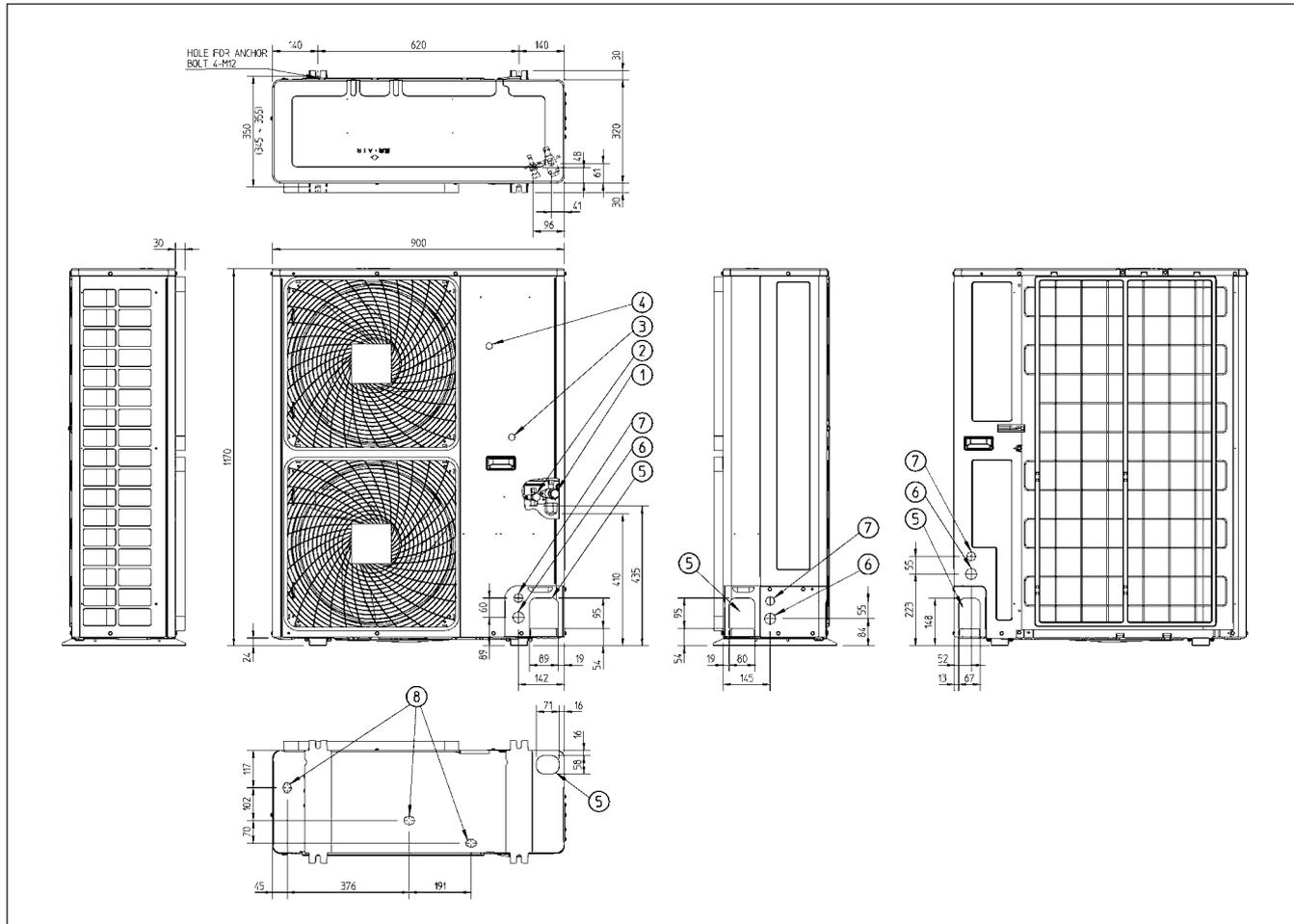
No.	Component
1	Gas pipe connection
2	Liquid pipe connection
3	Service port (inside the unit)
4	Grounding terminal M5 (inside the switch box)
5	Refrigerant piping intake
6	Power supply wiring intake
7	Control wiring intake
8	Drain outlet

1

1.4 RYEP125L7W1

Outlook and dimensions

The illustration below shows the outlook and the dimensions of the unit (mm).



Installation and service space

See page 1-10.

Components

The table below contains the different components of the unit.

No.	Component
1	Gas pipe connection
2	Liquid pipe connection
3	Service port (inside the unit)
4	Grounding terminal M5 (inside the switch box)
5	Refrigerant piping intake
6	Power supply wiring intake
7	Control wiring intake
8	Drain outlet

1

1.5 RYEP71L7V1, RYEP71L7W1, RYEP100L7V1, RYEP100L7W1 and RYEP125L7W1: Installation and Service Space

Non stacked

The illustrations and table below show the required installation and service space (mm). The values in brackets are for the 100 and 125 class.

	←	→	↖	↗		A	B1	B2	C	D1	D2	E	L1/L2	
	✓						≥50(100)							
	✓		✓	✓		≥100	≥100		≥100					
	✓				✓		≥100				≤500	≥1000		
	✓		✓	✓	✓	≥150	≥150		≥150		≤500	≥1000		
		✓									≥500			
		✓									≤500	≥500	≥1000	
	✓	✓				L1<L2	≥50(100)				≥500			
						L2<L1	≥50(100)				≥500			
						L1<L2	L1≤H	≥150(250)	≤500		≥750		≥1000	0<L1≤1/2H 0<L1≤1/2H
	✓	✓			✓	L2<L1	L2≤H	≥50(100) ≥100(200)			≥500	≥500	≥1000	0<L2≤1/2H 1/2H<L2≤H
	✓		✓	✓		≥200	≥200(300)		≥1000					
	✓		✓	✓	✓	≥200	≥200(300)		≥1000		≤500	≥1000		
		✓			✓						≥1000			
		✓				L1<L2	≥200(300)		≤500		≥1000			
	✓	✓				L2<L1	≥150(250) ≥200(300)			≥1000			0<L2≤1/2H 1/2H<L2≤H	
						L1<L2	L1≤H	≥200(300)	≤500		≥1000		≥1000	0<L1≤1/2H 1/2H<L1≤H
	✓	✓			✓	L2<L1	L2≤H	≥150(250) ≥200(300)			≥1000	≤500	≥1000	0<L2≤1/2H 1/2H<L2≤H
						L1<L2	L1≤H	≥200(300)	≤500		≥1000		≥1250	0<L1≤1/2H 1/2H<L1≤H
						L2<L1	L2≤H	≥150(250) ≥200(300)			≥1000	≤500	≥1000	0<L2≤1/2H 1/2H<L2≤H
						L1<L2	L1≤H	≥200(300)	≤500		≥1000		≥1250	0<L1≤1/2H 1/2H<L1≤H

- ← Suction side obstacle
- Discharge side obstacle
- ↖ Left side obstacle
- ↗ Right side obstacle
- ↘ Top side obstacle
- ✓ Obstacle is present

1 In these cases, close the bottom of the installation frame to prevent discharged air from being bypassed

2 In these cases, only 2 units can be installed

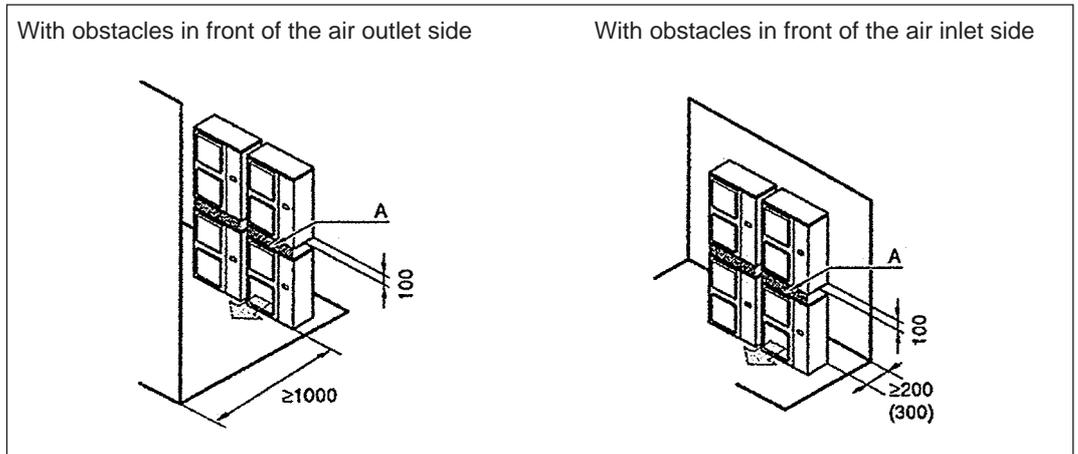


This situation is not allowed

Stacked

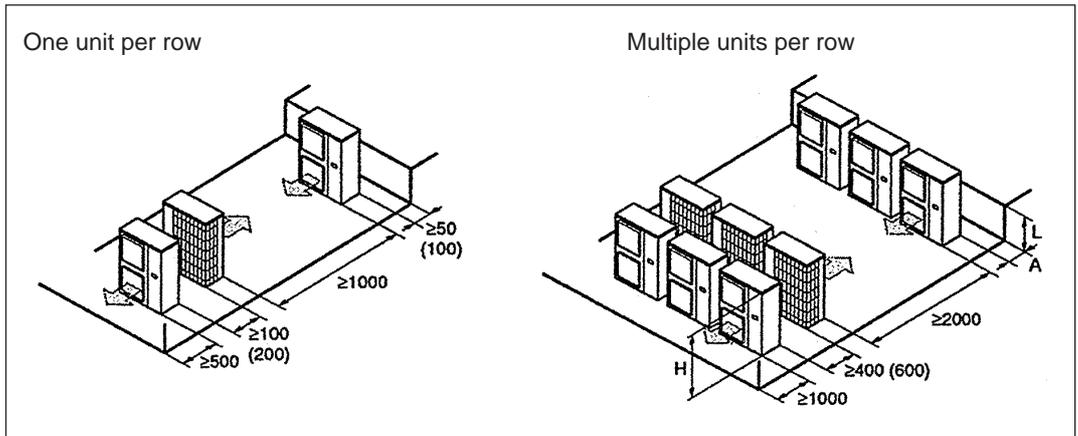
The illustration below shows the required installation and service space (mm). The values in brackets are for the 100 and 125 class.

- Do not stack more than one unit.
- ± 100 mm is required for the drain pipe.
- Seal A in order to prevent outlet air from bypassing.



Multiple rows

The illustration below shows the required installation and service space (mm). The values in brackets are for the 100 and 125 class.



	L	A
L ≤ H	0 < L ≤ 1/2H	150 (250)
	1/2H < L	200 (300)
H < L	installation impossible	

1

2 General Outline: Indoor Units

2.1 What Is in This Chapter?

Introduction

This chapter contains the following information on the indoor units:

- Outlook and dimensions
- Installation and service space
- Components.

General outline

For the General Outline from the indoor units, please refer to the Service manual for Sky Air L-series ESIE03-04.

1

3 Specifications

3.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- Technical specifications
- Electrical specifications.

Options

For possible options, refer to OHE03-2 or the installation manual.

Outdoor units

This chapter contains the following specifications:

Specifications	See page
3.2-RYEP71, RYEP100 and RYEP125	1-16

3.2 RYEP71, RYEP100 and RYEP125

Technical specifications

The table below contains the technical specifications.

Specification		RYEP71L7V1	RYEP71L7W1	RYEP100L7V1	RYEP100L7W1	RYEP125L7W1
Compressor	Model x No.	ZR34K3E-PFJ	ZR34K3E-TFD	ZR47K3E-PFJ	ZR47K3E-TFD	JT160FA-YE
	Type	Hermetically sealed scroll type				
	Crankcase heater	33 W				—
	Refrigerant oil type	3MAWPOE				DAPHNE FVC68D
	No. x motor output	1 x 2110 W		1 x 2920 W		1 x 3750 W
	Speed	—				
	Oil charge	1242 cc			1360 cc	1500 cc
Outdoor Heat exchanger	Length	859 mm				
	Rows x stages x fin pitch	2 x 34 x 2.0 mm		2 x 52 x 2.0 mm		
	No of passes	6		10		
	Face area	0.364 m ²		0.983 m ²		
	Tube type	HI-XSS Cooling tube				
	Fin type	Non sym. waffle louver				
	Empty tubeplate hole	0				
No. of fans	1				2	
Fan	Nominal air flow (230 V) cooling	48 m ³ /min		55 m ³ /min		89 m ³ /min
	Nominal air flow (230 V) heating	43 m ³ /min		50 m ³ /min		80 m ³ /min
	Fan motor model	P47L11S				P47L11S X2
	Fan speed	3 steps				
Refrigerant circuit	Type	R407C				
	Charge	2.2 kg		3.5 kg		
Safety and functional devices	See page 1-17 and 3-18					
Heat insulation	Both liquid and gas pipes					
Weight	75 kg	73 kg	93 kg	91 kg	106 kg	

Electrical specifications

The table below contains the electrical specifications.

Specification		RYP71L7V1	RYP71L7W1	RYP100L7V1	RYP100L7W1	RYP125L7W1
Unit	Phase	1~	3N~	1~	3N~	3N~
	Voltage	230 V	400 V	230 V	400 V	400 V
	Frequency	50 Hz				
	No. of wire connections	3 wires for power supply (including earth wire) 4 wires for connection with indoor (including earth wire)	5 wires for power supply (including earth wire) 4 wires for connection with indoor (including earth wire)	3 wires for power supply (including earth wire) 4 wires for connection with indoor (including earth wire)	5 wires for power supply (including earth wire) 4 wires for connection with indoor (including earth wire)	5 wires for power supply (including earth wire) 4 wires for connection with indoor (including earth wire)
	Power supply intake	Outdoor unit only				
Compressor	Phase	1~	3~	1~	3~	
	Voltage	230 V	400 V	230 V	400 V	
	Starting method	Direct				
Fan motor	Phase	1~				
	Voltage	230 V				
	No. of motors x output	1 x 65 W		90 W		85 + 65 W

4 Functional Diagrams

4.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- Functional diagrams
- Pipe connection diameters.

Functional diagrams

This chapter contains the following functional diagrams:

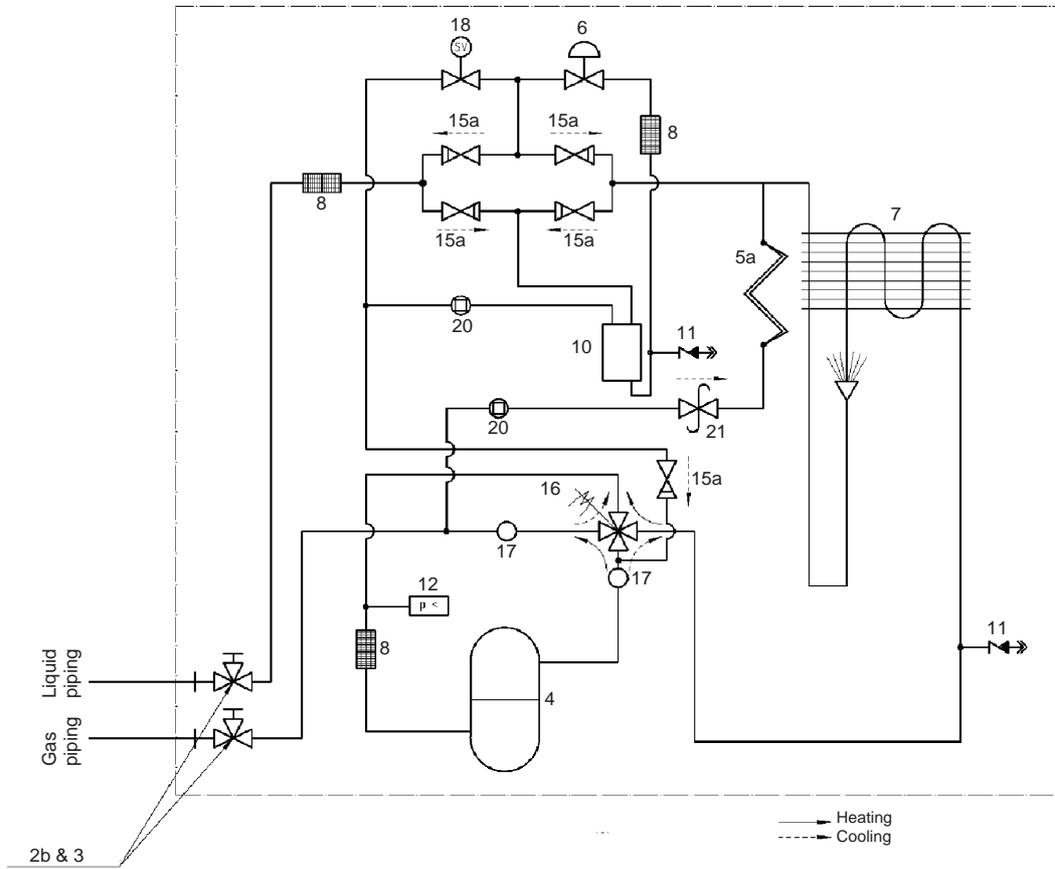
Functional diagram	See page
4.2–RYEP71L7V1, RYEP71L7W1, RYEP100L7V1 and RYEP100L7W1	1–18
4.3–RYEP125L7W1	1–20
4.4–Piping Components	1–21

1

4.2 RYEP71L7V1, RYEP71L7W1, RYEP100L7V1 and RYEP100L7W1

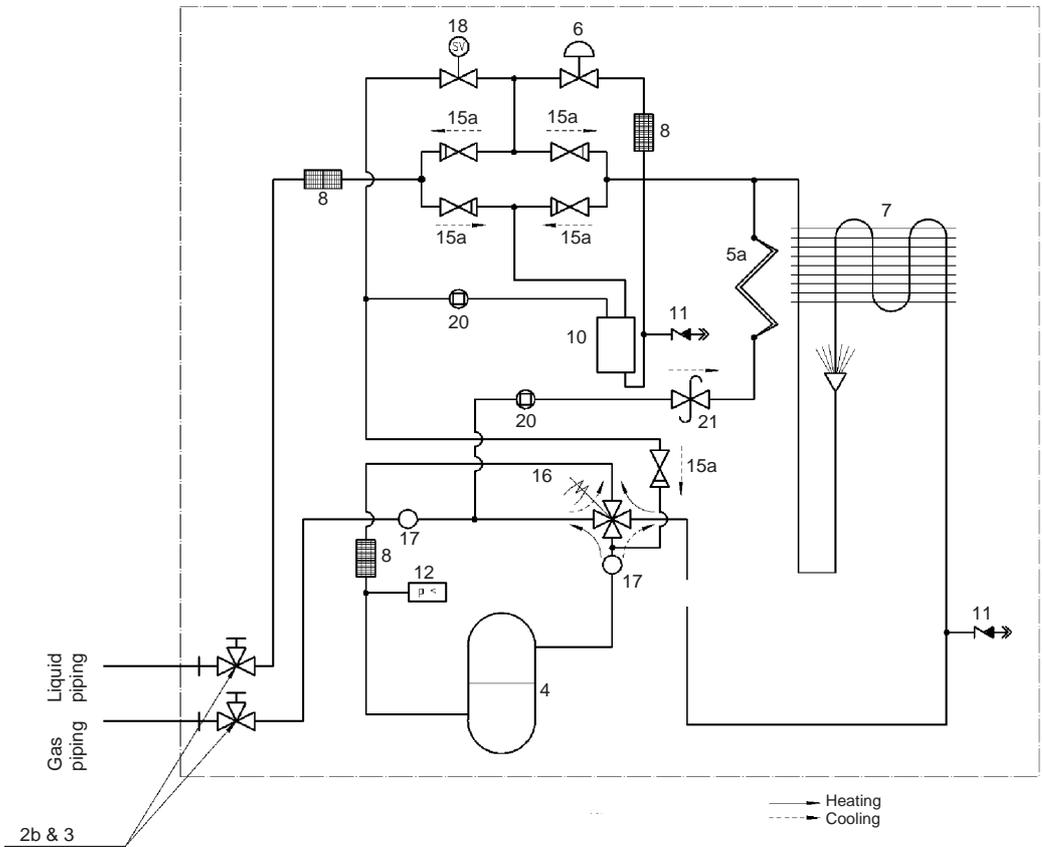
Functional diagram
RYEP71L7V1 and
RYEP71L7W1

The illustration below shows the functional diagram of the refrigeration circuit.



**Functional diagram
RYEP100L7V1 and
RYEP100L7W1**

The illustration below shows the functional diagram of the refrigeration circuit.



Components

For a description of the components, see 'Piping Components' on page 1-21.

**Pipe connection
diameters**

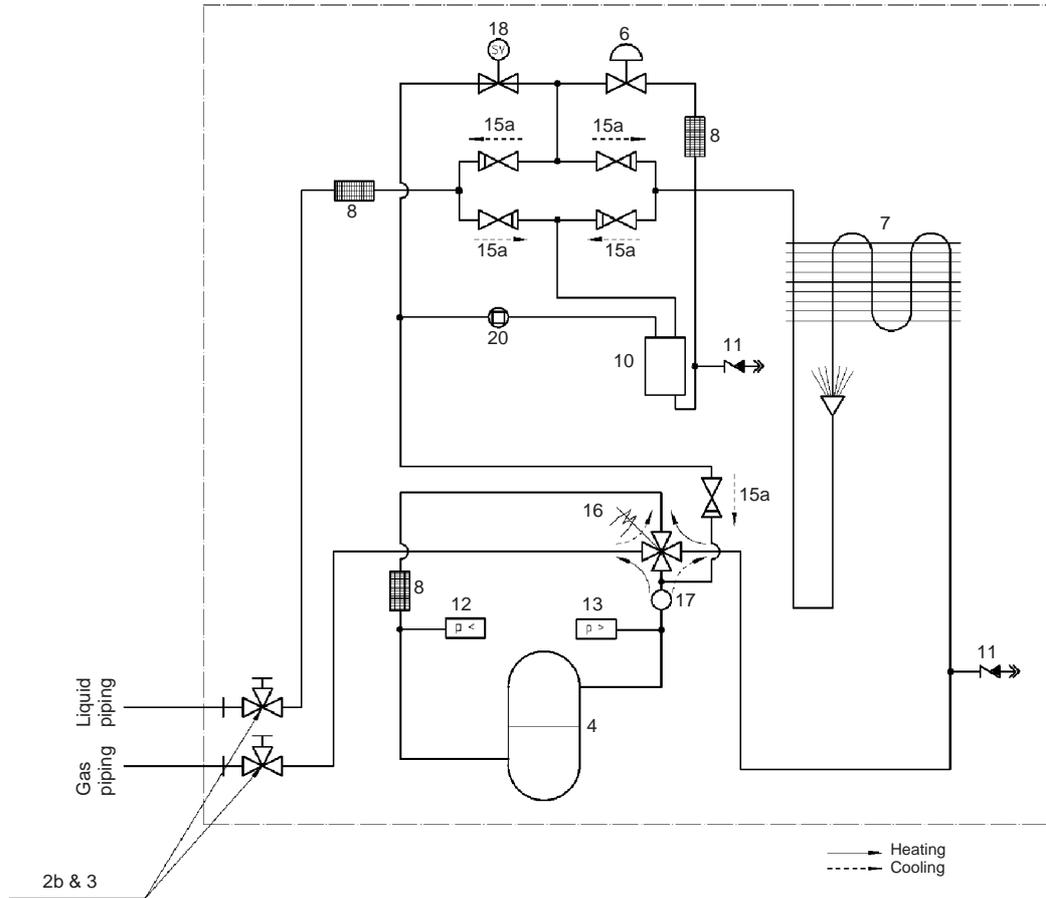
The table below contains the refrigerant pipe connection diameters.

Model	Ø Gas pipe (flare)	Ø Liquid pipe (flare)
RYEP71L7V1	15.9 mm	9.5 mm
RYEP71L7W1		
RYEP100L7V1	19.1 mm	
RYEP100L7W1		

1

4.3 RYEP125L7W1

Functional diagram The illustration below shows the functional diagram of the refrigeration circuit.



Components

For a description of the components, see 'Piping Components' on page 1-21.

Pipe connection diameters

The table below contains the refrigerant pipe connection diameters.

Model	Ø Gas pipe (flare)	Ø Liquid pipe (flare)
RYEP125L7W1	19.1 mm	9.5 mm

4.4 Piping Components

Components

The table below contains the different components of the functional diagrams.

No.	Component	Function / remark
1a	Flare connection	See pipe connection diameter.
1b	Flange connection	
2a	Liquid stop valve	The liquid stop valve is used as shut-off valve in case of a pump-down.
2b	Liquid stop valve with service port	
3	Gas stop valve with service port	The gas stop valve is used as shut-off valve in case of a pump-down.
4	Compressor	The compressor can restart after 3 min from last stop.
5a	Capillary tube	The capillary tube allows pressure equalization during a compressor OFF-cycle.
5b		The capillary tube expands the liquid to enable evaporation in the evaporator.
6	Electronic expansion valve	The expansion valve expands the liquid to enable evaporation in the evaporator. The opening degree is controlled to obtain the optimum discharge temperature.
7	Heat exchanger	The heat exchanger is of the multi louvre fin type. Hi-X -tubes and coated waffle louvre fins are used.
8	Filter	The filter is used to collect impurities, which may enter the system during installation and is also used to avoid blockage of the capillaries and other fine mechanical parts of the unit.
9	Accumulator	The accumulator is used to separate the gas from the liquid in order to protect the compressor against liquid pumping.
10	Liquid receiver	The liquid receiver is used to make sure only completely liquefied refrigerant is sent to the expansion valve. It is also used as a container in which surplus refrigerant is stored.
11	Check valve with service port	The check valve allows you to connect a gauge.
12	Low-pressure switch	The low-pressure switch stops the operation of the unit when the pressure becomes abnormally low.
13	High-pressure switch	The high-pressure switch stops the operation of the unit when the pressure becomes abnormally high.
14	Propeller fan and fan motor	The propeller fan creates air displacement across the heat exchanger.
15a	One-way valve	The one-way valve is used to force the refrigerant liquid to flow through the receiver and the expansion valve in the same direction both in cooling and heating.
15b		The one-way valve is used to release overpressure in the liquid receiver during stand-still.
16	4-way valve (reversing solenoid valve)	The 4-way valve is used to select refrigerant flow in cooling or heating mode. When the 4-way valve switches from ON to OFF, a timer starts counting up to 150 as soon as the cooling or defrosting operation is stopped. This delay time is to eliminate the switching sound.
17	Muffler	The muffler is used to absorb the refrigerant noise from the compressor.
18	Solenoid valve	<ul style="list-style-type: none"> ■ Y1S: Capacity control solenoid valve ■ Y3S: Liquid injection solenoid valve ■ SV: Solenoid valve (Purge liquid receiver)
19	Thermistor	<ul style="list-style-type: none"> ■ R1T: Air thermistor ■ R2T: Coil thermistor ■ R3T: Discharge pipe thermistor
20	Strainer	
21	Discharge pressure regulator	

1

5 Switch Box Layout

5.1 What Is in This Chapter?

Introduction

This chapter shows the switch box components.

Outdoor units

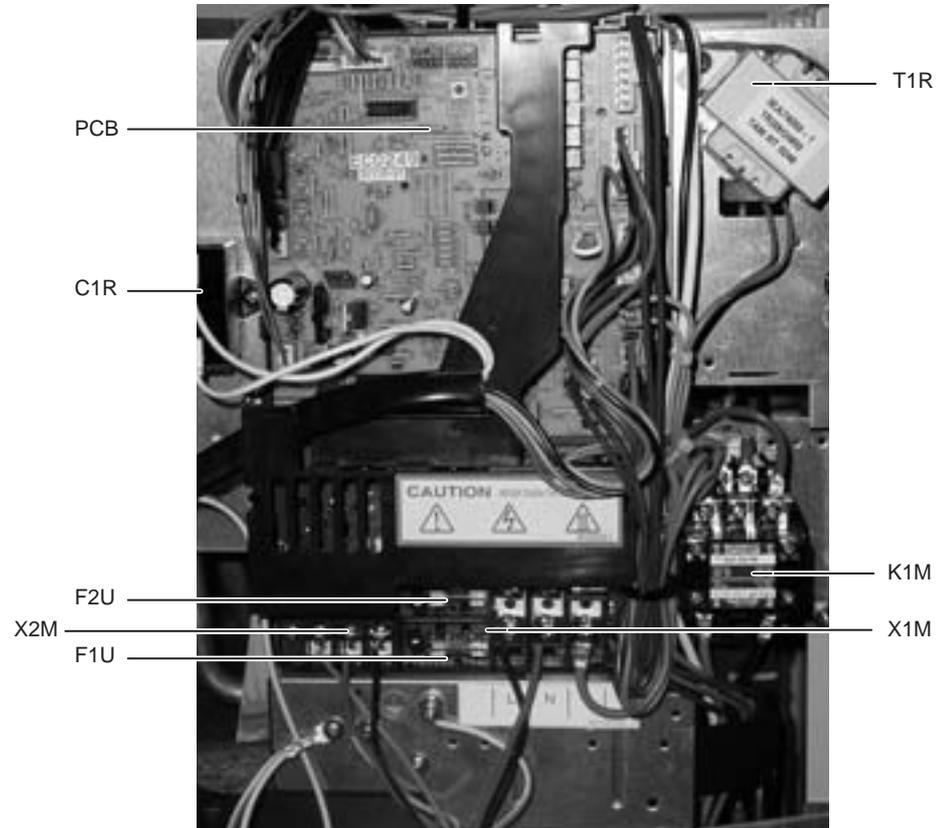
This chapter contains the following switch box layouts:

Switch box layout	See page
5.2-RYEP71L7V1 and RYEP100L7V1	1-24
5.3-RYEP71L7W1 and RYEP100L7W1	1-25
5.4-RYEP125LW1	1-26

5.2 RYEP71L7V1 and RYEP100L7V1

Switch box

The illustration below shows the switch box layout.



Components

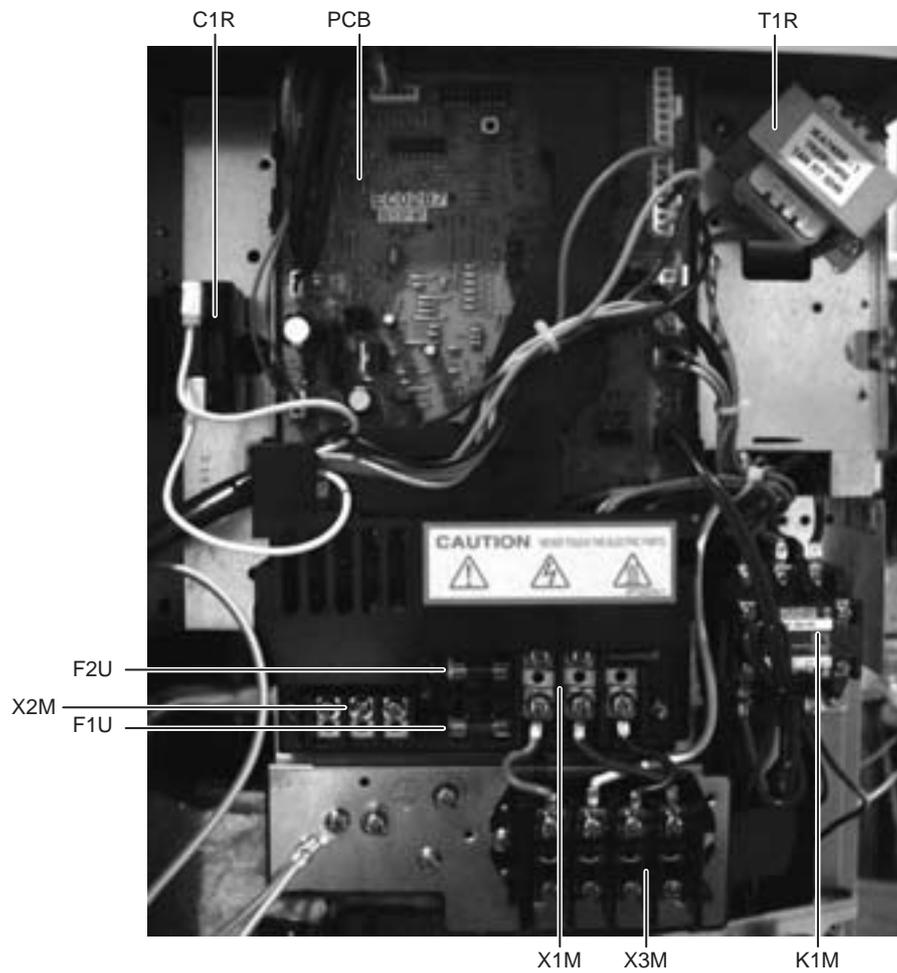
The table below contains the components of the switch box.

Symbol	Component
T1R	Transformer
C1R	Fan motor capacitor
K1M	Magnetic contactor
X1M	Terminal strip
X2M	Terminal strip interconnection wiring
F1U/F2U	Fuses
PCB	Printed circuit board

5.3 RYEP71L7W1 and RYEP100L7W1

Switch box

The illustration below shows the switch box layout.



Components

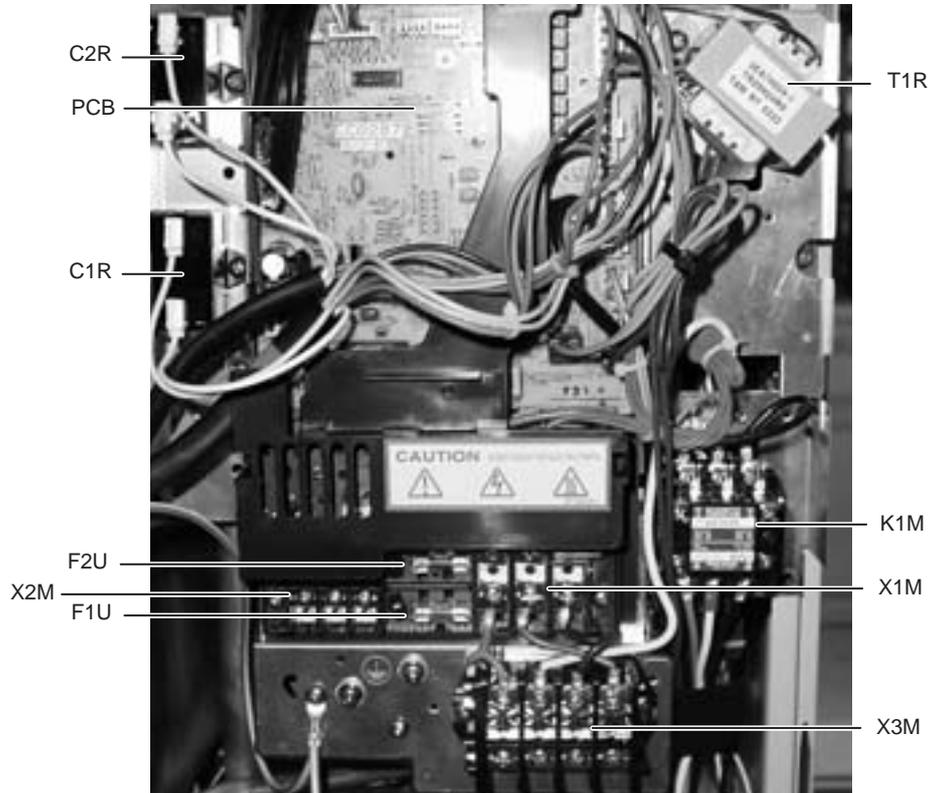
The table below contains the components of the switch box.

Symbol	Component
X1M	Terminal strip
X2M	Terminal strip interconnection wiring
X3M	Terminal strip
F1U/F2U	Fuses
PCB	Printed circuit board
T1R	Transformer
C1R	Fan motor capacitor
K1M	Magnetic contactor

5.4 RYEP125LW1

Switch box

The illustration below shows the switch box layout.



Components

The table below contains the components of the switch box.

Symbol	Component
T1R	Transformer
C1R	Fan motor capacitor 1
C2R	Fan motor capacitor 2
K1M	Magnetic contactor
X1M	Terminal strip
X2M	Terminal strip interconnection wiring
X3M	Terminal strip
F1U/F2U	Fuses
PCB	Printed circuit board

6 Wiring Diagrams: Outdoor Units

6.1 What Is in This Chapter?

Introduction

This chapter contains the wiring diagrams of the outdoor units.

Wiring diagrams

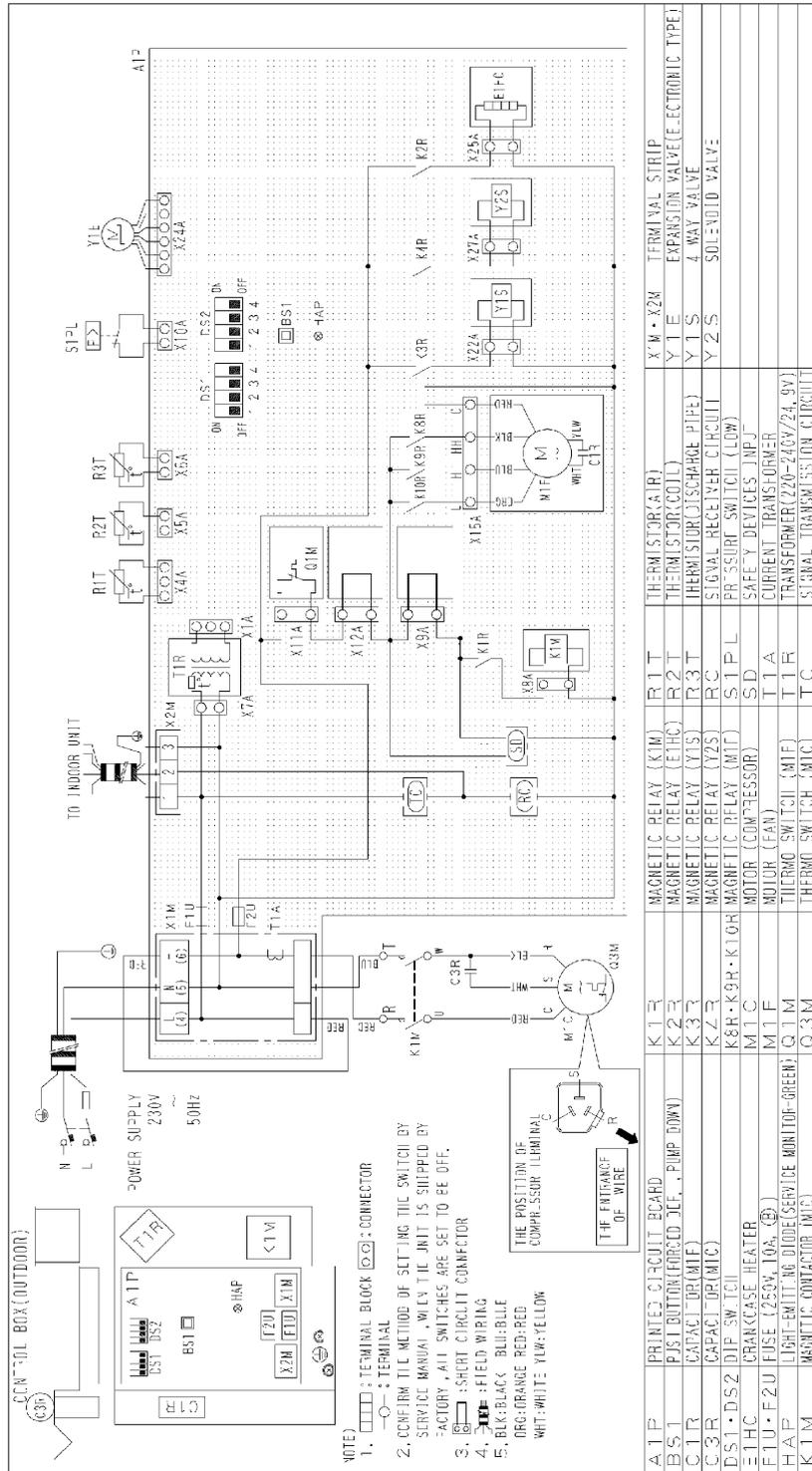
This chapter contains the following wiring diagrams:

Wiring diagram	See page
6.2-RYEP71L7V1 and RYEP100L7V1	1-28
6.3-RYEP71L7W1 and RYEP100L7W1	1-29
6.4-RYEP125L7W1	1-30

6.2 RYEP71L7V1 and RYEP100L7V1

Wiring diagram

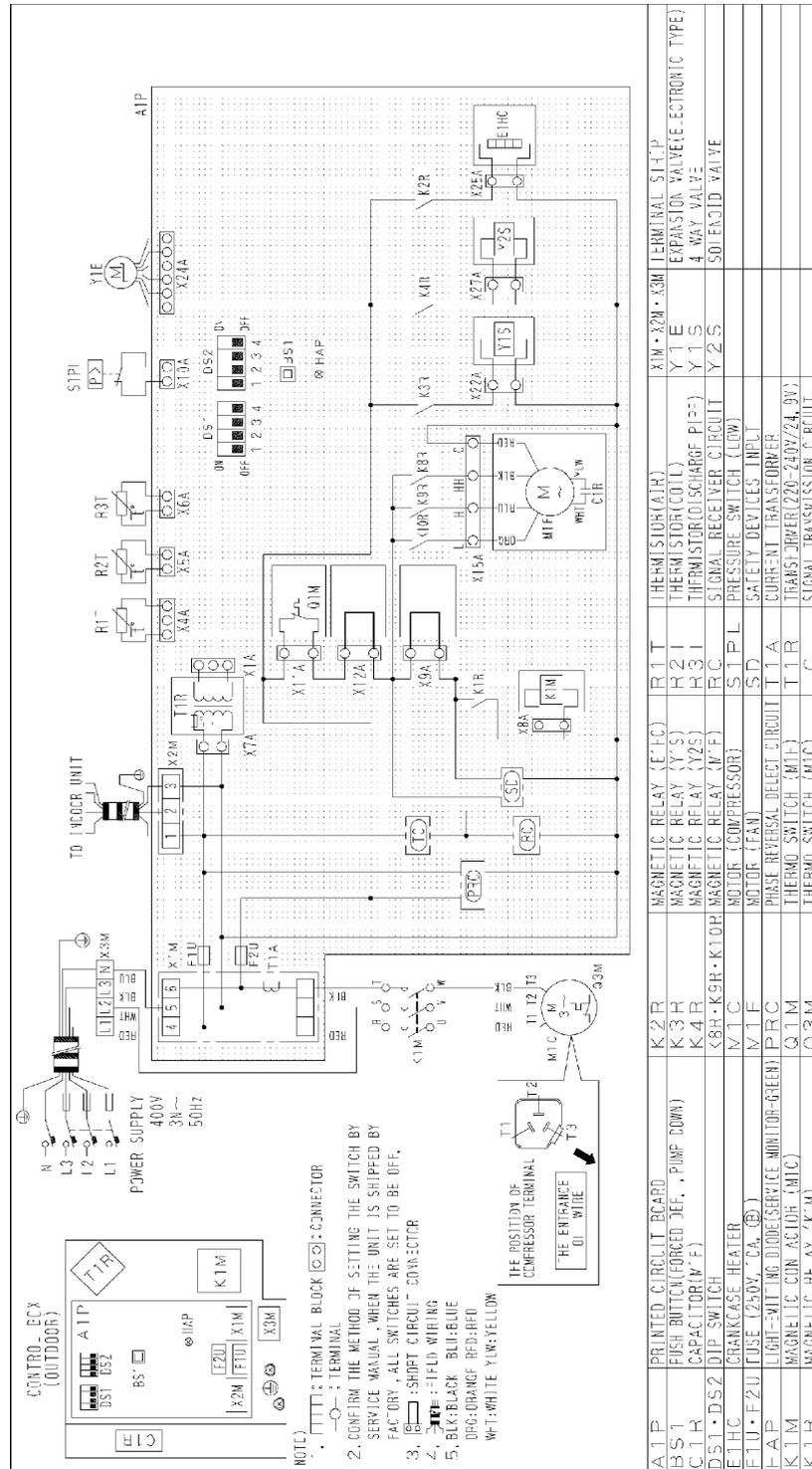
The illustration below shows the wiring diagram of the unit.



6.3 RYEP71L7W1 and RYEP100L7W1

Wiring diagram

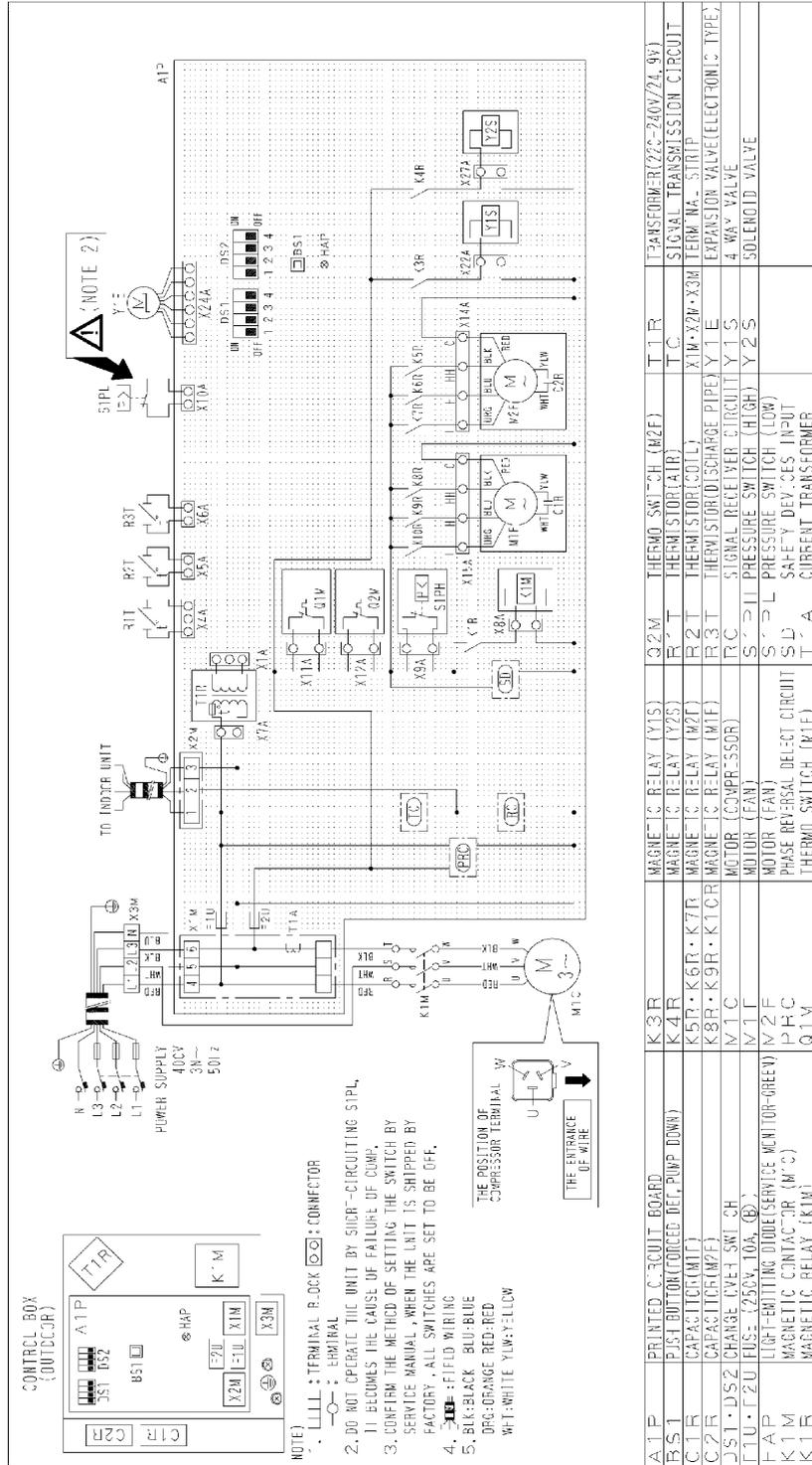
The illustration below shows the wiring diagram of the unit.



6.4 RYEP125L7W1

Wiring diagram

The illustration below shows the wiring diagram of the unit.



7 PCB Layout

7.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- It describes which unit uses which PCB types
- It shows the PCB connectors.

PCB layouts

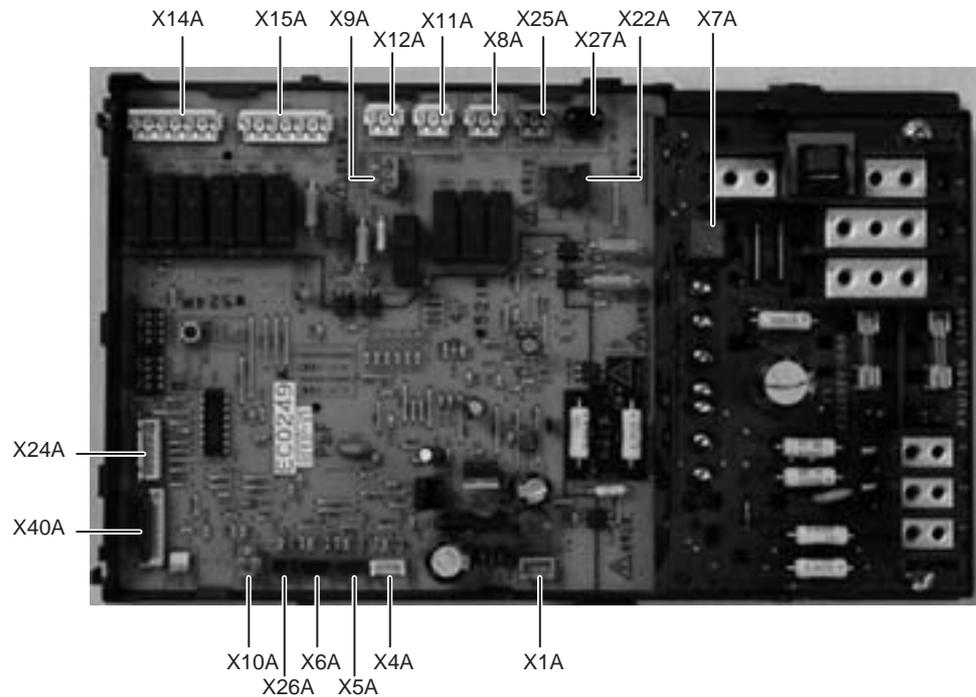
This chapter contains the following PCB layouts:

PCB layout	See page
7.2-RYEP71L7V1, RYEP71L7W1, RYEP100L7V1, RYEP100L7W1and RYEP125L7W1	1-32

7.2 RYEP71L7V1, RYEP71L7W1, RYEP100L7V1, RYEP100L7W1 and RYEP125L7W1

PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

Connector	Connected to	Description
X4A	R1T	Air thermistor
X5A	R2T	Coil thermistor
X6A	R3T	Discharge pipe thermistor
X7A-X1A	T1R	Transformer (220-240V/24,9V)
X8A	K1M	Magnetic contactor (M1C)
X9A	S1PH	High pressure switch
X10A	S1PL	Low pressure switch
X11A	Q1M	Thermo switch (M1F)
X12A	Q2M	Thermo switch (M2F)
X14A	M2F	Fan motor 2
X15A	M1F	Fan motor 1
X22A	Y1S	4-way valve
X24A	Y1E	Electronic expansion valves
X25A	E1HC	Crankcase heater
X26A	—	Connector for capacity setting adapter
X27A	Y2S	Solenoid valve
X40A	—	Connector for VRV service checker

Part 2

Functional Description

What is in this part? This part contains the following chapters:

Chapter	See page
1-General Functionality	2-3
2-Overview of the cooling mode functions	2-27
3-Overview of the heating mode functions	2-39

2

1 General Functionality

1.1 What Is in This Chapter?

Introduction

This chapter contains information on the functions used to control the system. Understanding these functions is vital when diagnosing a malfunction that is related to the functional control.

Overview

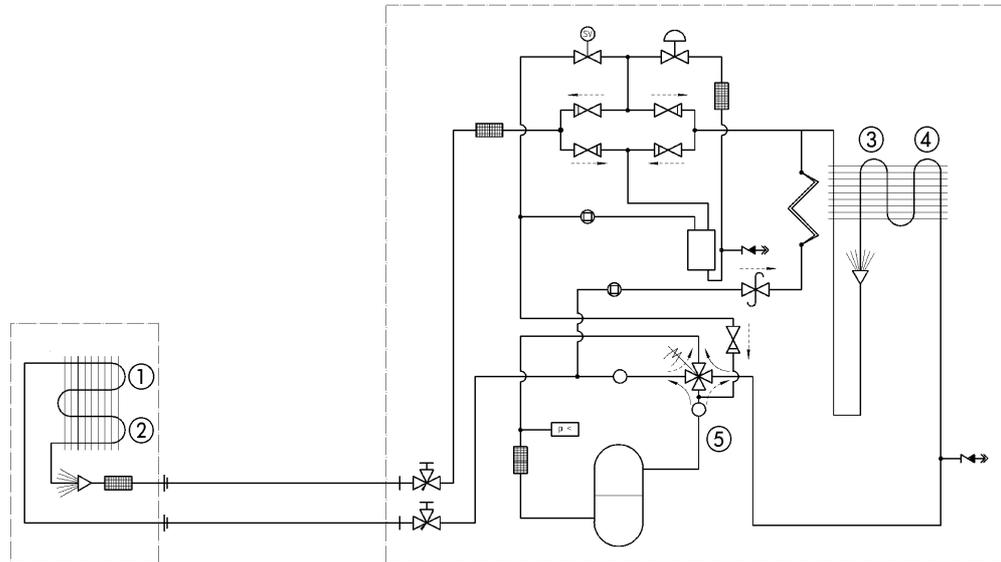
This chapter contains the following topics:

Topic	See page
1.2-Functions of Thermistors	2-4
1.3-Operating Modes and Control Modes	2-6
1.4-Forced Operating Mode (Emergency Operation)	2-7
1.5-Outdoor Unit Identification Function	2-10
1.6-Thermostat Control	2-11
1.7-Forced Thermostat OFF	2-13
1.8-HPS and LPS Function	2-14
1.9-Simulated Operation Function	2-15
1.10-Discharge Pipe Temperature Control	2-16
1.11-Gas Shortage Function	2-17
1.12-Drain Pump Control	2-18
1.13-Fan and Flap Operations	2-20
1.14-Auto-Restart Function	2-21
1.15-Using Conditions for Remote Controller Thermostat	2-22
1.16-Overcurrent Protection Function	2-23
1.17-Expansion Valve Control	2-24

1.2 Functions of Thermistors

Locating the thermistors

The thermistors on the illustration below are used to control the system. This control secures a proper operation and prevents problems of the unit.



Functions of the thermistors

The table below contains the thermistor functions of the large h/p.

Thermistor	Location	Wiring symbol	Mode	Function
1	Indoor heat exchanger	R2T	Cooling	<ul style="list-style-type: none"> ■ Optimise discharge temp. (evap. temp.) ■ Freeze-up thermostat
			Heating	<ul style="list-style-type: none"> ■ Optimise discharge temp. (cond. temp.) ■ Integral capacity calculation (to determine defrost) ■ Hot start indoor fan ■ Peak cut-off ■ Outdoor unit fan control
2	Indoor air return	R1T	Cooling	<ul style="list-style-type: none"> ■ Thermostat control ■ Start-up control expansion valve and outdoor unit fan ■ Outdoor fan speed control
			Heating	<ul style="list-style-type: none"> ■ Thermostat control ■ Start-up control expansion valve and outdoor unit fan ■ Integral capacity calculation (to determine defrost) ■ Peak cut-off

Ther-mistor	Location	Wiring symbol	Mode	Function
3	Outdoor heat exchanger	R2T	Cooling	<ul style="list-style-type: none"> ■ Optimise discharge temp. (cond. temp.) ■ Outdoor fan speed control (O.L.)
			Heat-ing	<ul style="list-style-type: none"> ■ Optimise discharge temp. (evap. temp.) ■ Defrost start/stop
4	Outdoor air return	R1T	Cooling	<ul style="list-style-type: none"> ■ Outdoor fan speed control ■ Start-up control expansion valve and outdoor unit fan
			Heat-ing	<ul style="list-style-type: none"> ■ Integral capacity calculation (to determine defrost) ■ Start-up control expansion valve and outdoor unit fan
5	Discharge pipe compressor	R3T	Cooling	<ul style="list-style-type: none"> ■ Cooling overload ■ Check refrigerant shortage/too much refrigerant ■ Expansion valve control
			Heat-ing	<ul style="list-style-type: none"> ■ Heating overload ■ Check refrigerant shortage/too much refrigerant ■ Expansion valve control

1.3 Operating Modes and Control Modes

Operating modes The two operating modes are:

- Normal operating mode
- Forced operating mode.

Control modes The table below contains the different control modes.

Operating mode	Control mode
Normal operating mode	Cooling
	Dry keep
	Heating
	Defrosting (automatic)
	Freeze-up
	Pump down
	Stop mode
Forced operating mode	Forced cooling
	Forced heating
	Forced defrosting

1.4 Forced Operating Mode (Emergency Operation)

Applicable units

The forced operating mode is applicable for the following units:

Model type	For this unit, you can go to...
RYEP71-125L7	<ul style="list-style-type: none"> ■ Forced cooling mode ■ Forced heating mode

Purpose

The table below describes the purpose of the forced operating mode.

If...	Then...
<ul style="list-style-type: none"> ■ Remocon is malfunctioning, or ■ Indoor PCB is off line, or ■ Outdoor PCB is off line 	Forced operating mode can be used to go to cooling or heating. In forced operating mode, the compressor is forced to operate until the malfunctioning indoor or outdoor PCB is back online.

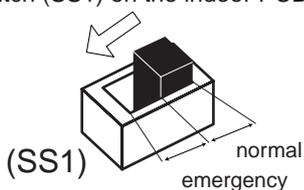
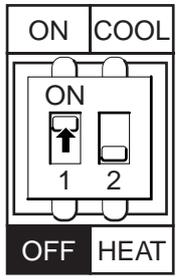
Before switching

Before moving the switches to emergency operation, make sure to turn OFF the power firstly.

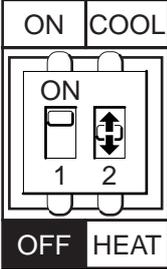
During emergency operation, do not attempt to operate the equipment from the remote controller. The remote controller displays BB while the emergency operation is active on the indoor unit.

Switching

To switch to forced operating mode, proceed as follows:

Step	Action
1	Turn OFF the power.
2	Switch ON the emergency switch (SS1) on the indoor PCB. <div style="text-align: center; margin-top: 10px;">  <p>The diagram shows a rectangular switch labeled (SS1). An arrow points to the top of the switch, which is labeled 'normal'. The bottom of the switch is labeled 'emergency'.</p> </div>
3	Switch ON the emergency switch on the outdoor PCB. <div style="text-align: center; margin-top: 10px;">  <p>The diagram shows a rectangular switch with two positions. The top position is labeled 'ON' and 'COOL'. The bottom position is labeled 'OFF' and 'HEAT'. The switch is currently in the 'ON' position. Below the switch, there are two labels '1' and '2'.</p> </div> <p>Switch 2 is not applicable for the c/o units.</p>

2

Step	Action
4	<p>Switch the emergency switch on the outdoor PCB to the forced mode you prefer.</p>  <p>Switch 2 is not applicable for the c/o units.</p>
5	Turn ON the power.

Before switching back

Before moving the switches back to normal operating mode, make sure to turn OFF the power firstly.

Starting conditions

You can operate the system manually by changing the emergency switch on the indoor and outdoor PCB from “normal” to “emergency”. However, when in emergency operation, the equipment cannot control the temperature.

Make sure to set both indoor and outdoor unit to emergency.

Ending conditions

You can end the emergency operation by changing the emergency switch back to “normal” while the power is OFF.

Emergency operation

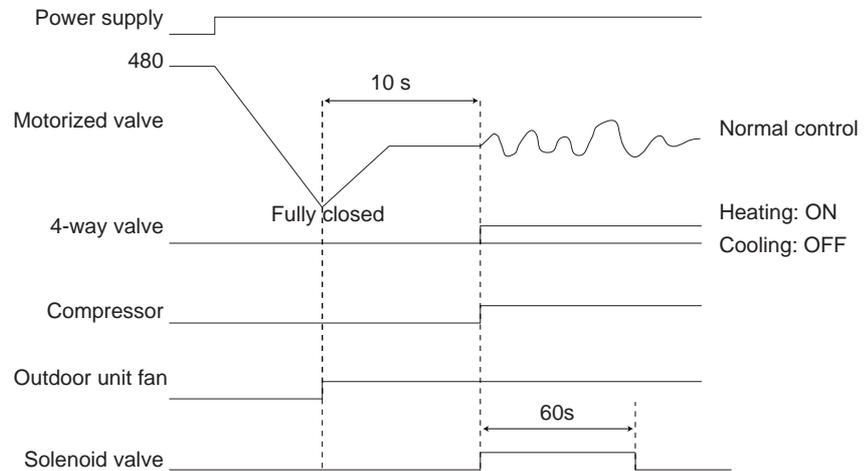
The table below describes what happens when you change the emergency switch to “emergency”.

Changing the emergency switch to “emergency” for the...	Switches ON...
Indoor unit	<ul style="list-style-type: none"> ■ Indoor fan ■ Drain pump
Outdoor unit	<ul style="list-style-type: none"> ■ Compressor ■ Outdoor fan(s)

Time chart

The time chart below illustrates emergency operation.

- In cooling, the unit runs for 20 min and then stops for 10 min in order to avoid freeze-up of the indoor coil.
- During emergency operation, do not attempt to operate the equipment from the remote controller. The remote controller shows BB while the emergency operation is active on the indoor unit.



Active components

The table below shows when the most important components are active in the different forced operating modes.

Component	Forced cooling	Forced heating	Forced defrosting
Compressor	ON	ON	ON
4-way valve	RYEP71-125L: OFF	RYEP71-125L: ON	RYEP71-125L: OFF
Outdoor unit fan	H fan speed	H fan speed	OFF
Indoor unit fan	H fan speed	H fan speed	H fan speed
Drain pump	ON	OFF	ON

Additional info

To avoid misunderstandings, take the following into account:

- If the PCB or the motorized valve is malfunctioning, emergency operation cannot be carried out.
- No signal is transmitted between the indoor and outdoor units and remote controller. "BB" is displayed on the remote controller.
- If a safety device should be activated during emergency operation, all actuators are turned OFF.
- "Heat" cannot be set for c/o air conditioners.
- Emergency operation uses (and switches ON) both indoor and outdoor control PCBs. The outdoor control PCB determines the changeover.
- In heating, defrosting is activated once every hour.

1.5 Outdoor Unit Identification Function

Purpose

The purpose of the outdoor unit identification function is to enable the indoor unit to automatically determine which operating mode has to be set in function of the outdoor unit type (c/o or h/p).

Operating modes

The possible operating modes are:

Outdoor unit	Operating modes
h/p	<ul style="list-style-type: none"> ■ Fan ■ Cooling ■ Dry keep ■ Heating ■ Auto
c/o	<ul style="list-style-type: none"> ■ Fan ■ Cooling ■ Dry keep

Used input

The outdoor unit identification function uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Indoor PCB	TC & RC	—
Outdoor PCB	—	TC & RC

TC: Transmission circuit
RC: Receiving circuit

1.6 Thermostat Control

Applicable units

All units

Purpose

The purpose of thermostat control is to control the compressor operation, by sensing the suction air.

Preventing thermostat OFF conditions

The thermostat control prevents the thermostat from turning OFF in the following conditions:

- Initial operation for the first 2.5 min, or
- Defrosting, or
- Forced operating mode.

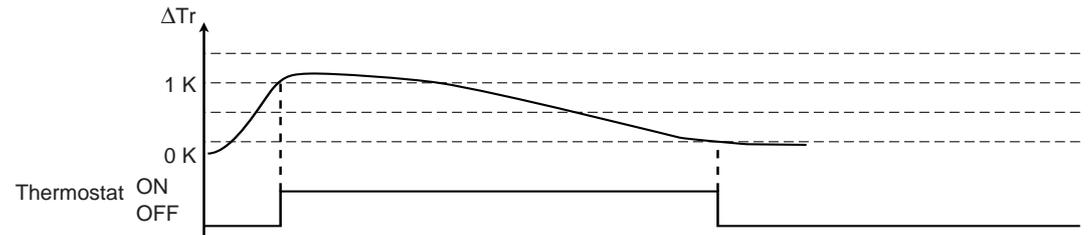
ΔTr

The table below shows how to calculate ΔTr .

In...	$\Delta Tr =$	Remark
Cooling	$Tr - Ts$	<ul style="list-style-type: none"> ■ Tr = indoor unit suction air temp.
Heating	$Ts - Tr$	<ul style="list-style-type: none"> ■ Ts = temp. set by the remote controller

Time chart

The time chart below illustrates the thermostat control.



Thermostat

The table below describes when the thermostat turns ON and OFF.

When...	Then the thermostat turns...
<ul style="list-style-type: none"> ■ $\Delta Tr \geq 1 K$ ■ Guard timer of the compressor has counted down (3 min) 	ON
<ul style="list-style-type: none"> ■ $\Delta Tr \leq 0 K$ ■ Thermostat is ON for min. 2 min 	OFF

Preset temp. range

The table below illustrates the preset temperature range.

		16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34																			
Cooling	Display	←————— 25 —————→ Initial setting																			
	Setting	←————— 25 —————→																			
Heating	Display	←————— 25 —————→																			
	Setting	←————— 25 —————→																			
Remote controller	Cooling	←————— 25 —————→																			
	Heating	←————— 25 —————→																			
Automatic change-over	Wired	←————— 25 —————→																			
	Wireless	Example ←—————→ L ■ (M) ■ H (19) (21) (22) (23) (25)																			
Cool/heat selection			(When the display is "25" or "H") 																		
	Thermostat ON/OFF	Cooling																			
Heating																					

2

1.7 Forced Thermostat OFF

Applicable units All indoor units

Purpose The outdoor unit independently turns its thermostat OFF by means of control other than thermostat OFF commands from the indoor unit.

Method The table below contains the different conditions for which the thermostat is turned OFF by the outdoor unit.

Thermostat OFF control	Indicator	Starting conditions	Result	Reset
Freeze-up function: See page 2-29.				
Cooling overload	Outdoor heat exchanger temperature Tc	Tc > 62.5°C for A s continuously A = 120 s for FUYP A = 0 s for FAYP A = 30 s for all indoor models except FUYP & FAYP (min. 59.5 - max. 65.5°C for practice function)	The thermostat is turned OFF. Next start, initial opening E.V.: + 70 pulses (cooling) + 80 pulses (heating)	Remocon OFF
Heating overload (peak cut-off)	Indoor heat exchanger temperature Tc	Tc > 63°C for 90 s continuously (min. 60°C - max. 66°C for practice function)		
Discharge pipe high temperature	Discharge pipe temperature T2	Td > 125°C for 20 s continuously		
Td disconnection	Discharge pipe thermistor T2	Td is determined to be disconnected from the piping 5 min after the compressor starts. Td < 55°C Td < Ta + 10°C ΔTd ≤ 5 K within 5 min after start	Retry 6 x until final error "F3"	
Ta outdoor ambient	Ambient sensor Ta	Ta > 30°C	Forced off	Ta ≤ 27°C

- Remarks**
- In case of O.L. operation, O.L. will be activated +1K next time.
 - In case of H.P. operation, O.L. will be activated -1K next time.

Used input The forced thermostat OFF control uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Outdoor heat exchanger thermistor	—	R2T
Indoor heat exchanger thermistor	R2T	—
Discharge pipe thermistor	—	R3T

- Remark**
- In case of twin/triple applications the highest Tc is used.

1.8 HPS and LPS Function

Applicable units RYEP71-125L

Remark HPS is only applicable for RYEP125L.

Purpose **HPS (High-Pressure Switch)**

If the pressure at the discharge side of the compressor becomes abnormally high, the HPS stops the unit automatically in order to prevent it from breaking down.

LPS (Low-Pressure Switch)

If the pressure at the suction side of the compressor becomes abnormally low, the LPS stops the unit automatically in order to prevent it from breaking down.

Method The table below describes what happens in case of HPS or LPS activation.

If the... is activated	Then...	Remark
HPS	The compressor stops and stands by for 3 min.	If this is activated an additional 6 times from the first detection and before it is turned OFF by the remote controller, the operation stops due to malfunction. 20 sec's are added after each restart.
LPS	The compressor stops and stands by for 3 min. However, depending on the operating conditions, the compressor may not turn OFF.	

Used input The HPS and LPS detection function uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
High-pressure switch	—	X9A
Low-pressure switch	—	X10A

Parameters The HPS and LPS detection function uses the following inputs:

Input	Opens at...	Closes at...
HPS	33 Bar	25.5 Bar
LPS	-0.3 Bar	0.5 Bar

1.9 Simulated Operation Function

Applicable units RYEP71-125L

Purpose The purpose of the simulated operation function is to avoid the unit from stopping if the heat exchanger thermistor or air thermistor is malfunctioning.

Method If the air thermistor (for all models listed) or the heat exchanger thermistor is malfunctioning (out of its normal range), simulated operation is carried out while malfunction is displayed on the remote controller. If the air or heat exchanger thermistor becomes normal again, the simulated operation function is interrupted and the normal operation restarts. The malfunctioning error disappears.

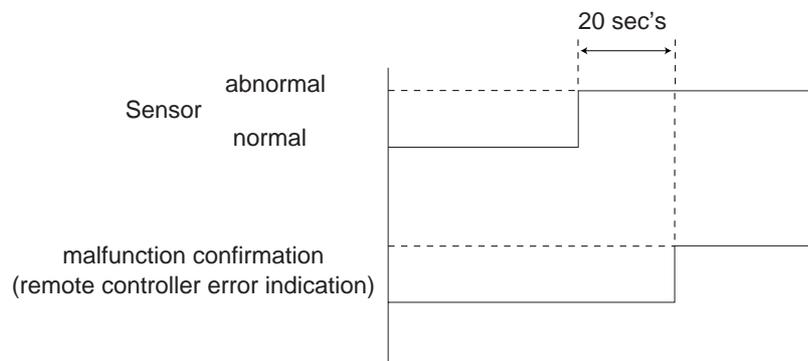
Used input The simulated operation function uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Outdoor air thermistor	—	R1T-X4A
Outdoor heat exchanger thermistor	—	R2T-X5A
Indoor air thermistor	R1T-X19A	—
Indoor heat exchanger thermistor	R2T-X18A	—

Parameters

- Check sensor value every 500 msec's.
- Abnormal values are sensor values out of below range :

Sensor	Lower than...	Higher than...
Indoor coil and air sensor	-23°C	120°C
Outdoor coil and air sensor	-40°C	127°C
Discharge pipe sensor	-12°C	165°C



1.10 Discharge Pipe Temperature Control

Applicable units RYEP71-125L

Purpose The purpose of the discharge pipe temperature control is to prevent a discharge pipe temperature that is too high or too low.

Low temp. starting conditions The table below contains the low temperature conditions to start the discharge pipe temperature control.

Function	Description	Starting conditions	F3-error occurs if the conditions...
Wet operation	Prevents liquid suction to the compressor.	<ul style="list-style-type: none"> ■ Change in E.V. opening < 50 pulses ■ $T_d < T_c + 10^\circ\text{C}$ 	Are met for 15 min continuously.
Thermistor out	Detects if the discharge thermistor is not in the correct position.	<ul style="list-style-type: none"> ■ $T_d < 55^\circ\text{C}$ ■ After start-up + 5 min: <ul style="list-style-type: none"> - $\Delta T_d \leq 5\text{ K}$ - $T_d < T_a + 10^\circ\text{C}$ 	Are repeated 6 times.

High temp. starting conditions The table below contains the high temperature conditions to start the discharge pipe temperature control.

Function / description	Starting conditions	F3-error occurs if the conditions...
Detects too high discharge gas temperatures.	$T_d \geq 125^\circ\text{C}$ for 20 s continuously	Are repeated 6 times.

Used input The discharge pipe temperature control uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Outdoor discharge thermistor	—	R3T-X6A
Outdoor heat exchanger thermistor	—	R2T-X5A
Indoor heat exchanger thermistor	R2T-X18A	—

1.11 Gas Shortage Function

Applicable units RYEP71-125L

Purpose The purpose of the gas shortage function is to detect refrigerant shortage before the unit stops due to a discharge temperature that is too high.

Method When the thermostat is turned OFF due to a discharge pipe temperature that is too high and the E.V. opening is 450 pulses or more, the gas shortage error is activated. However, operation does not stop due to gas shortage.

To check the gas shortage error (U0), see page 3-64.

Used input The gas shortage function uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Outdoor discharge thermistor	—	R3T-X6A
Outdoor expansion valve	—	Y1E-X24A

1.12 Drain Pump Control

Applicable units

The drain pump control is applicable for the following units:

Model type	Model name
Cassette	FHYCP (standard) and FUYP (standard)
Duct	FHYBP (standard) and FDYP (optional)
Corner	FHYKP (standard)
Ceiling	FHYP (optional)

Purpose

The purpose of the drain pump control is to control the water draining from the drain pan.

Starting conditions

The drain pump control starts the drain pump when one of the following conditions is fulfilled:

- The cooling operation is activated, or
- The level in the drain pan becomes abnormally high, or
- Freeze-up prevention is detected in cooling operation.

Method

The float switch opens because an abnormal drain level is detected in the drain pan.

The table below describes the activation at open float switch.

Situation	Activation at open float switch
Thermostat ON	<ol style="list-style-type: none"> 1. The thermostat is immediately turned OFF. 2. The drain pump continues to operate for minimum 10 min. 3. If the float switch closes again within 80 s, cooling can restart after the 10 min recovery.
Thermostat OFF	<ol style="list-style-type: none"> 1. The thermostat stays forced OFF. 2. The drain pump starts to operate for minimum 10 min. 3. If the float switch closes again within 80 s, cooling can restart after the 10 min recovery.
Float switch opens each time the drain pump stops.	After five retrials the error code "RF" flashes on the remote controller.

Used input

The drain pump control uses the following inputs:

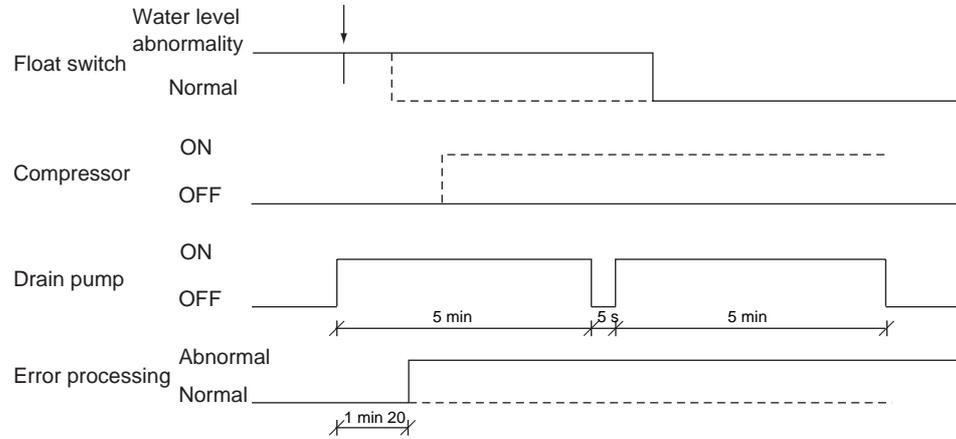
Input	Connection on indoor PCB	Connection on outdoor PCB
Float switch (33H)	X15A	—
Magnetic relay drain pump (RyP)	X25A	—

Detection system

All applicable units use a drain pan water level detection system of the float type.

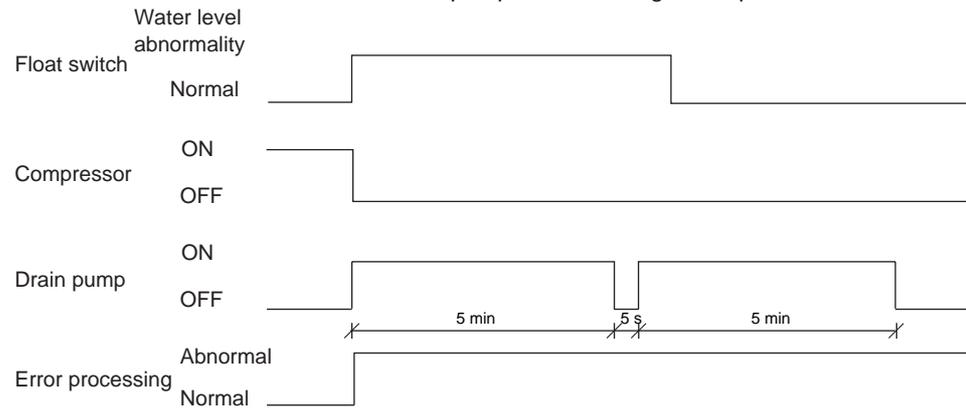
Float type: During start-up

The time chart below illustrates the drain pump control during start-up.



Float type: During operation (compr. ON)

The time chart below illustrates the drain pump control during start-up.



1.13 Fan and Flap Operations

Heating operation The table below contains the fan and flap operations.

Function	In...	Fan	Flap (FHYCP, FHYKP and FHYP)	Flap (FAYP)	Remote controller indication
Hot start after defrost	Swing operation	OFF	Horizontal	Horizontal	Swing
	Airflow direction setting				Set position
Defrost	Swing operation	LL	Horizontal	Horizontal	Swing
	Airflow direction setting				Set position
Thermostat OFF	Swing operation	LL	Horizontal	Horizontal	Swing
	Airflow direction setting				Set position
Hot start after thermostat OFF (cold air prevention)	Swing operation	LL	Horizontal	Horizontal	Swing
	Airflow direction setting				Set position
Stop (error)	Swing operation	OFF	Horizontal	Fully closed (horizontal)	—
	Airflow direction setting			Fully closed	
Overload thermostat OFF	Swing operation	LL	Horizontal	Horizontal	Swing
	Airflow direction setting				Set position

Cooling operation The table below contains the fan and flap operations.

Function	In...	Fan	Flap (FHYCP, FHYKP and FHYP)	Flap (FAYP)	Remote controller indication
Thermostat ON (microcomputer controlled dry keep mode)	Swing operation	L	Swing	Swing	Swing
	Airflow direction setting		Set position	Set position	Set position
Thermostat OFF (microcomputer controlled dry keep mode)	Swing operation	OFF	Horizontal	Horizontal	Swing
	Airflow direction setting		Set position	Set position	Set position
Thermostat OFF (cooling)	Swing operation	Setting	Horizontal	Swing	Swing
	Airflow direction setting		Set position	Set position	Set position
Stop (error)	Swing operation	OFF	Horizontal	Downward (horizontal)	—
	Airflow direction setting		Set position	Downward	
Freeze-up prevention in microcomputer controlled dry keep mode (including cooling operation)	Swing operation	L	Horizontal	Horizontal	Swing
	Airflow direction setting		Set position	Set position	Set position

1.14 Auto-Restart Function

Applicable units	All units
Purpose	The purpose of the auto-restart function is to resume the same operating mode after the power was turned OFF as when the unit was operating.
Turning OFF power	<p>When you have to turn OFF the power supply in order to carry out maintenance, make sure to turn the remote controller's ON/OFF switch OFF firstly.</p> <p>If you turn OFF the power supply while the remote controller's ON/OFF switch is still ON, the "auto-restart function" automatically starts the indoor fan immediately or the outdoor unit fan starts automatically 3 min after the power supply is turned back ON.</p>

1.15 Using Conditions for Remote Controller Thermostat

Applicable units

All units

Wired remote controllers

The remote controller thermostat is only available in wired remote controls.

Conditions in which the rem. contr. thermostat is not used

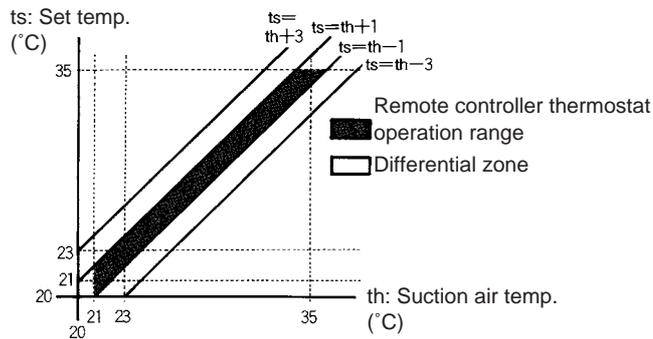
Even when the “use remote controller thermostat” is selected in service mode, the remote controller thermostat is not always used.

The table below contains the conditions in which the remote controller thermostat is not used.

Condition	The remote controller thermostat is not used when...	Except...
1	The remote controller thermostat malfunctions.	—
2	Group control is used	—
3	The set temp./air suction temp. combination is out of range. See further in this section.	When the automatic operation is selected. If so, the remote controller can be used.

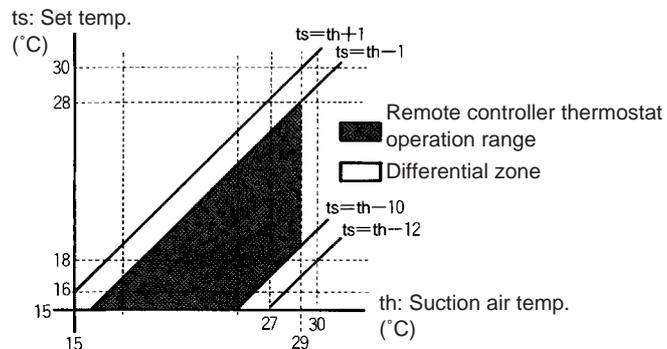
Cooling

The diagram below shows the operation range of the set temperature/air suction temperature combination.



Heating

The diagram below shows the operation range of the set temperature/air suction temperature combination.



1.16 Overcurrent Protection Function

Purpose The purpose of the “Overcurrent Protection Function” is to protect the unit against excessive current .

Method If the Current Transducer detects an overcurrent, the unit will trip on E5 error after 4 times detection.

Unit	Compressor	Current (A)
RYEP71L7V1	ZR34K3E-PFJ	19.3
RYEP71L7W1	ZR34K3E-TFD	6.8
RYEP100L7V1	ZR47K3E-PFJ	25.9
RYEP100L7W1	ZR47K3E-TFD	9.0
RYEP125L7W1	JT160FA-YE	15.0

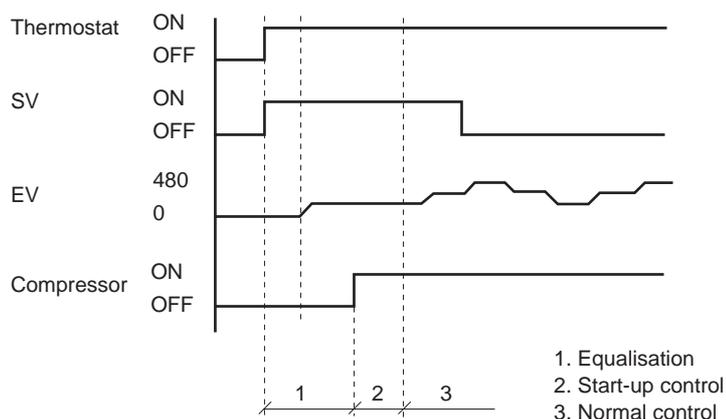
“J2” will be displayed if the overcurrent detection sensor has a malfunction.

1.17 Expansion Valve Control

Start-up control

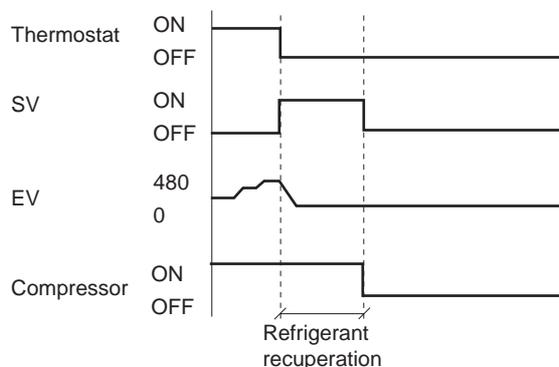
When the compressor starts, a pump down operation is carried out in order to avoid liquid pumping. The liquid receiver fills up and a minimum refrigerant amount is passed to the compressor. This minimum refrigerant amount is required to avoid discharge pipe temperatures that are too high.

The opening degree of the expansion valve depends on the start-up number. If the first start-up fails, the opening degree of the following start-up is adapted by the self-learning function.



Pump down residual operation

The unit conducts a pump down residual operation after each compressor stop command. The purpose of this function is to collect the refrigerant in the liquid receiver in order to prevent refrigerant from remaining in the indoor heat exchanger.



Initial opening degree

The initial opening degree of the outdoor expansion valve depends on the indoor and outdoor air temperature. The calculation of the opening degree is made at a thermostat ON and at the end of a defrosting cycle.

Opening degree: Self-learning function

When the system was stopped due to abnormal suction or discharge pressure, or due to a discharge temperature that is too high, the expansion valve control tries to avoid the same breakdown. The expansion valve increases the previous opening degree with 70 (in cooling mode) or 80 (in heating mode) pulses at the next start-up.

There are maximum five start-up attempts. When the compressor stops again after the fifth start-up, something is wrong with the unit and a unit check is necessary. The relevant error code appears on the remote controller.

Normal control

When the startup control is terminated, the general control will determine the expansion valve opening. The expansion valve is controlled in order for the discharge temperature to approach the optimum temperature.

The optimum discharge pipe temperature is calculated based on:

- Indoor and outdoor heat exchanger temperature
- Actual discharge pipe temperature
- Outdoor ambient temperature.

Used input

The motor operated valve control uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Outdoor thermistor	—	R1T
Outdoor heat exchanger thermistor	—	R2T
Discharge pipe thermistor	—	R3T
Indoor heat exchanger thermistor	R2T	—

2

2 Overview of the cooling mode functions

2.1 What Is in This Chapter?

Introduction

This chapter contains information on the functions used to control the system when the system is in cooling mode. Understanding these functions is vital when diagnosing a malfunction that is related to the functional control.

Overview

This chapter contains the following topics:

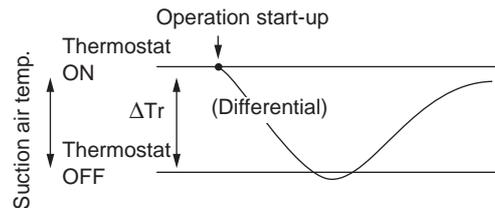
Topic	See page
2.2–Dry Keep Mode	2–28
2.3–Freeze-Up Function	2–29
2.4–Outdoor Fan Starting Control in Cooling or Dry Keep Mode	2–34
2.5–Normal Outdoor Fan Control in Cooling Operation	2–35
2.6–High Pressure Protection Control in Cooling Operation	2–37
2.7–Condensation Avoidance Control	2–38

2.2 Dry Keep Mode

Applicable units All units

Purpose The purpose of the dry keep mode is to remove humidity while maintaining the room temperature.

Method The points of thermostat ON or OFF are determined according to the suction air temperature at start-up of the unit operation. The set temperature and flow rate are not displayed on the remote controller.



Thermostat When dry keep is selected on the remote controller, the unit detects the ambient temperature. This ambient temperature is then the setpoint. The thermostat is turned OFF when the air return temperature drops below this setpoint. The thermostat is turned ON in one of the following conditions:

Suction air temperature	Thermostat ON	ΔTr
$Tr \geq 24^{\circ}C$	Tr	1.5 $^{\circ}C$
$18^{\circ}C \leq Tr < 24^{\circ}C$	Tr	1.0 $^{\circ}C$
$Tr < 18^{\circ}C$	18 $^{\circ}C$	

Operation condition The table below describes the operation condition.

Compressor condition	ON	OFF
Fan speed	L	OFF
Flap angle	Set angle	PoO
Air flow direction set with remote controller		Setting indication

Used input The dry keep function uses the following inputs:

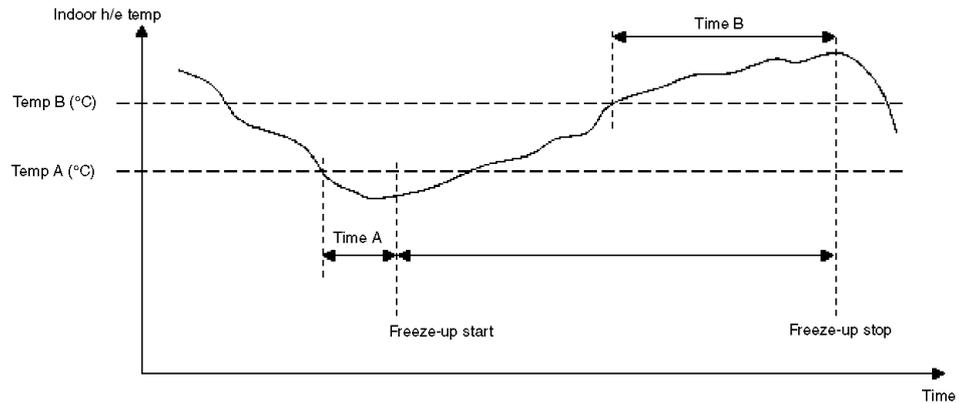
Input	Connection on indoor PCB	Connection on outdoor PCB
indoor air temperature R1T	X19A	—

2.3 Freeze-Up Function

Applicable units ■ RYEP71-125L

Starting conditions In order to avoid formation of ice on the indoor heat exchanger in cooling and dry mode, the system automatically starts up a freeze-up cycle when some specific conditions are fulfilled.

Graph



Field settings

The table below contains the values of A, B, C, D, E and F in function of the DIP switch settings on the outdoor PCB.

Position of DIP switch		Activation decided by...	Trigger conditions	Remarks
DSW 2-3	DSW 2-4			
OFF	OFF	Outdoor or Indoor	Conditions 1	Factory set conditions.
ON	(*)	Indoor only	Conditions 2	For use with EKRPER
OFF	ON	Outdoor only	Conditions 3	Increased capacity for technical room applications. Only to be used in low latent heat applications (applications with low relative humidity).

(*) Position of DSW2-4 irrelevant

2

Conditions 1

Factory settings

DSW 2-3	DSW 2-4	Start Conditions (OR)	Stop Conditions
OFF	OFF	<ul style="list-style-type: none"> ■ Freeze-up start signal received from indoor unit. ■ $T_e \leq -1^\circ\text{C}$ for 25 min accumulated compressor operation time. ■ $T_e \leq A^\circ\text{C}$ for 1 minute continuous after ≥ 8 minutes continuous compressor operation time. ■ $T_e \leq -1^\circ\text{C}$ for 1 minute after ≥ 20 minutes continuous compressor operation time 	<ul style="list-style-type: none"> ■ $T_e > 10^\circ\text{C}$ for 10 minutes continuously

Conditions 2a

In case indoor unit is connected:

DSW 2-3	DSW 2-4	Start Conditions (OR)	Stop Conditions
ON	(*)	<ul style="list-style-type: none"> ■ $T_e \leq -1^\circ\text{C}$ for 40 minutes accumulated compressor operation time. ■ $T_e \leq A^\circ\text{C}$ for 1 minute continuous after ≥ 8 minutes continuous compressor operation time 	<ul style="list-style-type: none"> ■ $T_e > 7^\circ\text{C}$ for 10 minutes continuously

(*) Position of DSW2-4 irrelevant

Conditions 2b

In case option box EKRPER is connected:

DSW 2-3	DSW 2-4	Start Conditions (OR)	Stop Conditions
ON	(*)	<ul style="list-style-type: none"> ■ Freeze-up start signal received from EKRPER 	<ul style="list-style-type: none"> ■ Freeze-up stop signal received from EKRPER

(*) Position of DSW2-4 irrelevant
See installation manual of EKRPER for more details.

Conditions 3

Increased capacity in case of low latent heat applications

DSW 2-3	DSW 2-4	Start Conditions (OR)	Stop Conditions
OFF	ON	<ul style="list-style-type: none"> ■ $T_e \leq -1^\circ\text{C}$ for 25 min accumulated compressor operation time. ■ $T_e \leq A^\circ\text{C}$ for 1 minute continuous after ≥ 8 minutes continuous compressor operation time. ■ $T_e \leq -1^\circ\text{C}$ for 1 minute after ≥ 20 minutes continuous compressor operation time 	<ul style="list-style-type: none"> ■ $T_e > 7^\circ\text{C}$ for 3 minutes continuously

Parameters

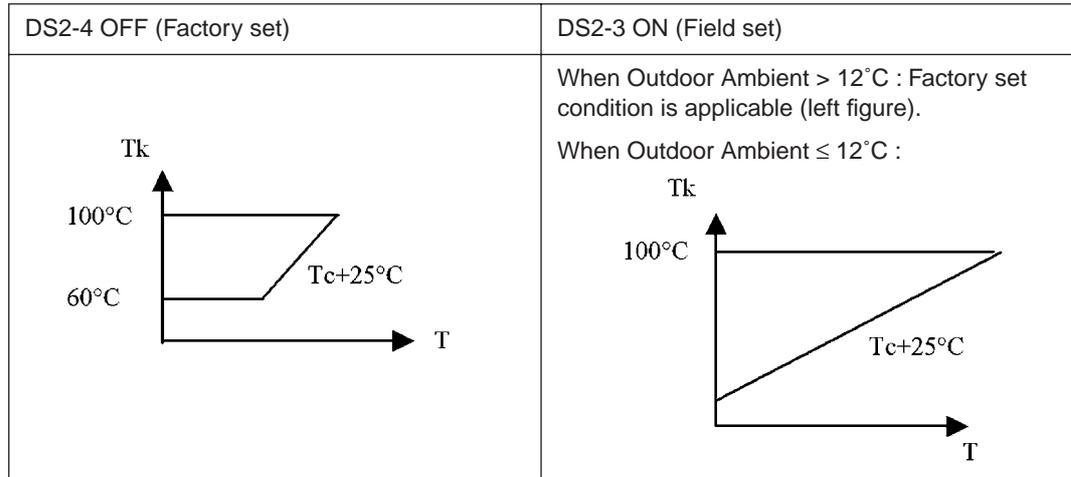
The parameter value "A" mentioned in above conditions is decided depending on the type of indoor model as follows:

Indoor unit	Value "A"
FAYP	-1°C
FHYP	-3°C
All other indoor models	-5°C

2

Target discharge pipe temperature control (Tk)

When changing DS2-4 to ON, also the target discharge pipe temperature control (Tk control) is changed



By allowing a lower discharge pipe temperature, the expansion valve closing will be limited, hence avoiding a drastic drop in Low Pressure.

Important remark when using "Condition 3"

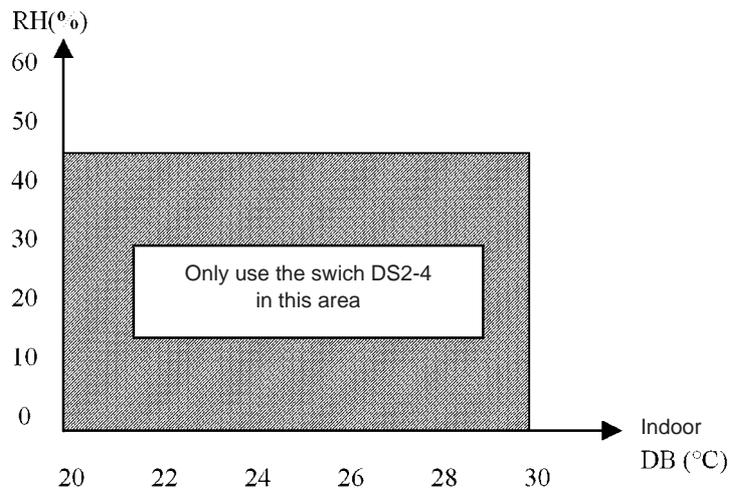
By changing DS2-4 to ON the integrated capacity increases when the outdoor temperature drops below 21°C as indicated in the table below :

	DIP switch OFF (factory setting)	DIP switch ON
Capacity at low temperature	100 % (*)	150 ~ 200 %

(*) Relative comparison to indicate a capacity increase of 50~100 % with dip-switch setting ON.

The integrated capacity increases due to the reduction in stand still time after a freeze-up activation.

Careful attention should be taken related to the internal humidity when selecting "conditions 3". Because of the reduced freeze-up reset conditions an increased risk of frost formation on the indoor coil or water blowing out of the indoor unit is existing when the indoor humidity exceeds the limits specified below :



Caution

- Final capacity result when using DS2-4 will depend on the total condition of the installation site.
 - Be sure to take into account the restrictions towards internal humidity when using DS2-4
 - Possibility of using DS2-4 should be evaluated by a professional responsible installer for each installation site.
 - Do not set DS2-4 in combination with the option EKRPER.
-

2.4 Outdoor Fan Starting Control in Cooling or Dry Keep Mode

Applicable units ■ RYEP71-125L7

Purpose The purpose is to avoid that the discharge pressure would start to rise, and stop the unit.

Method:
RYEP71-125L When the compressor starts, the fan keeps running for 3 min at starting fan speed. The starting fan speed depends on the ambient temperature. The different fan speeds for the according outdoor air temperatures are shown in the table below.

Operating mode	Outdoor air temp. Ta	Starting fan speed	See further in this section...
Cooling mode, dry keep mode	10°C ≤ Ta < 23°C	L speed	Different fan speeds
	Ta ≥ 23°C	HH speed	

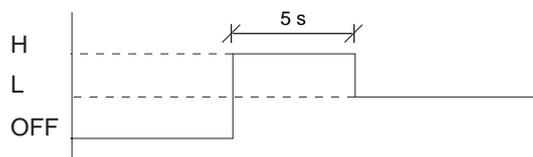
Starting fan speed The outdoor fan will start 10 seconds before compressor start in order to:

- minimize the stress to the compressor at startups.
- avoid a heat draft after fan startup.
- maximize the capacity at startup.

Different fan speeds The table below explains the meaning of L, H and HH fan speed.

Fan operation	71 and 100	125	
	1 fan	Upper fan (MF1)	Lower fan (MF2)
OFF	OFF	OFF	OFF
L	L	L	L
H	H	H	H
HH	HH	HH	HH

L-tap starting compensation When the outdoor fan is operated from OFF to L-tap, the fan motor does not turn, because of lack of starting torque. To avoid this, the fan motor operates at H-tap for the first 5 s after start-up, before changing to L-tap.



Note: The L-tap starting compensation is valid for cooling and heating!

Used input The fan starting control in cooling or dry keep mode uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Outdoor air temperature R1T	—	X4A

2.5 Normal Outdoor Fan Control in Cooling Operation

Applicable units RYEP71-125L

Purpose The purpose of this normal outdoor fan control is to ensure a correct discharge pressure in function of the outdoor air and indoor room temperature.

Method The table below shows in which conditions the outdoor fan works at low or high speed.

Condition	Fan Speed
$T_a < 41.7 - 0.84 \times T_r$	L speed
$T_a > 45.7 - 0.84 \times T_r$	H speed
$T_c > 58^\circ\text{C}$	HH speed

T_a = ambient temperature = outdoor air temperature; T_r = room suction temperature; T_c = condensing temperature (overload control)

Different fan speeds The table below explains the meaning of L, H and HH fan speed.

Fan operation	71 & 100	125	
	1 fan	Upper fan (MF1)	Lower fan (MF2)
OFF	OFF	OFF	OFF
L	L	L	L
H	H	H	H
HH	HH	HH	HH

Used input The normal outdoor fan control during cooling operation uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Indoor room temperature R1T	X19A	—
Outdoor air temperature R1T	—	X4A

Low outside temperature control (Year round cooling)

The purpose of this control is to prevent freezing of the indoor heat exchanger due to a low pressure drop by reducing the air flow volume of the outdoor unit fan.

The control is activated when the outdoor temperature drops below $(41.7 - 0.84 \times T_r)$. At this temperature, the outdoor fan speed switches to L-tap.

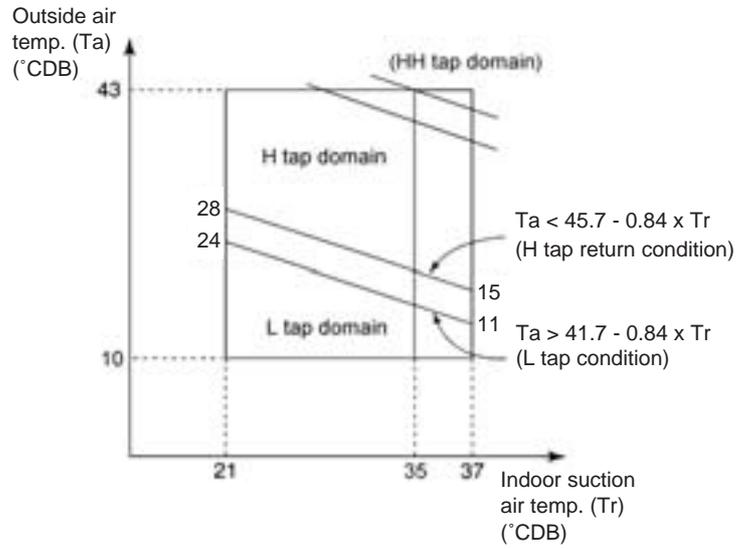
The differential for the return is 4 K.

The control is not activated during start-up control.

2

Fan speed control graph

The graph below shows the relation between inside and outside temperature and the fan speed:.

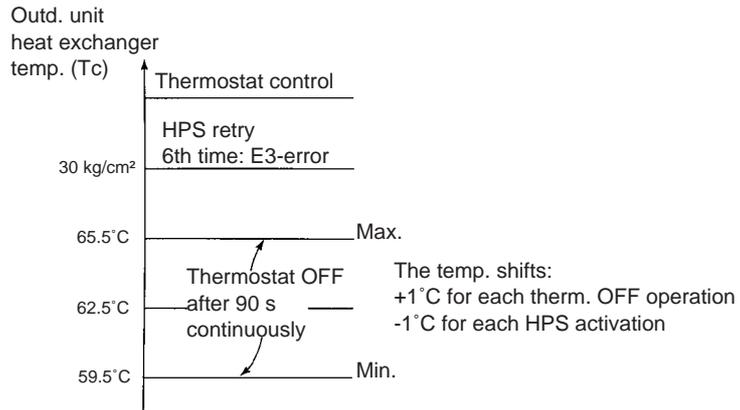


2.6 High Pressure Protection Control in Cooling Operation

Applicable units HPS retry only on RYEP125L

Purpose The purpose of the high pressure protection is to prevent a shutdown due to an error.

Method The thermostat turns OFF immediately before HPS activation according to the outdoor heat exchanger temperature (Tc).



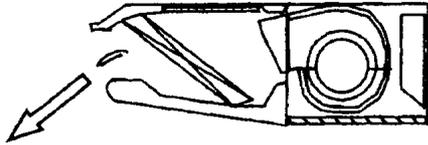
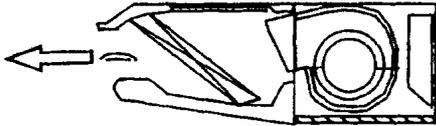
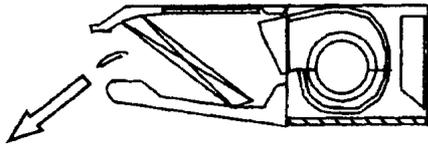
2.7 Condensation Avoidance Control

Applicable units FHYP

Operating modes Regardless of whether the thermostat is ON or OFF, the condensation avoidance control can function in the following operating modes:

- Cooling (automatic), or
- Dry keep.

Method To avoid condensation on the swing flap, the condensation avoidance control is activated:

Stage	Description
1	<p>The fan operates in cooling mode with the blade in downward position (set on the remote controller).</p> 
2	<p>After 30 min, the blade moves to a horizontal position.</p> 
3	<p>After 1 h operation in horizontal position, the blade moves back to its downward position for 30 min.</p> 
4	<p>The unit operation is reset by:</p> <ul style="list-style-type: none"> ■ Changing the operating mode into "heating" or "fan", or ■ Changing the air flow direction, or ■ Turning the unit operation ON or OFF.

3 Overview of the heating mode functions

3.1 What Is in This Chapter?

Introduction

This chapter contains information on the functions used to control the system during heating mode. Understanding these functions is vital when diagnosing a malfunction that is related to the functional control.

Overview

This chapter contains the following topics:

Topic	See page
3.2-Defrost Control	2-40
3.3-Draft Avoidance Control 1	2-43
3.4-Draft Avoidance Control 2	2-45
3.5-4-way Valve Control	2-46
3.6-Starting Outdoor Fan Control in Heating Mode	2-47
3.7-Normal Outdoor Fan Control in Heating Mode	2-48
3.8-Test run control	2-50
3.9-Discharge Pressure Control	2-51

3.2 Defrost Control

Applicable units ■ RYEP71-125L

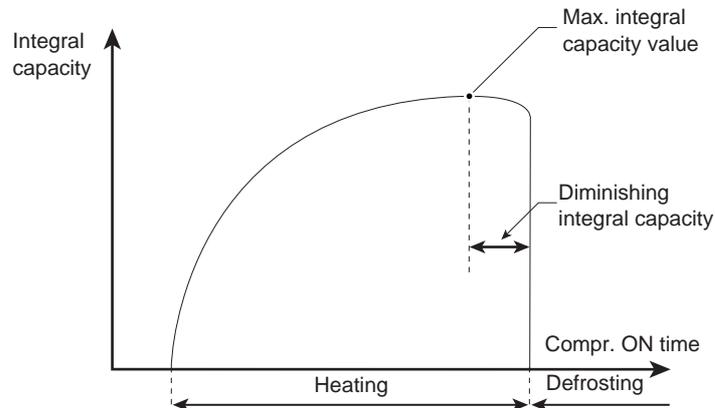
Purpose The purpose of the defrost control is to prevent frost on the outdoor heat exchanger coil. This frost forms when the unit is in heating operation in lower outdoor ambients.

Starting conditions: The defrosting starts when either condition 1 or 2 has been realized.

Condition 1	Condition 2
The compressor has been running for a total of 25 min accumulated since the start of heating operation or since the end of the previous defrosting.	
<ul style="list-style-type: none"> ■ Outdoor heat exchanger temp. $\leq -3^{\circ}\text{C}$, and ■ Outdoor heat exchanger temp. $\leq 0.4 \times T_a - 5^{\circ}\text{C}$ <div style="text-align: center;"> <p>The graph plots Outdoor heat exchanger temp. (Tc) in °CDB on the vertical axis against Outside air temp. (Ta) in °CDB on the horizontal axis. The horizontal axis ranges from -15 to 5 with major ticks every 5 units. The vertical axis ranges from -9 to 5 with major ticks every 2 units. A solid line represents the relationship $T_c = 0.4 \times T_a - 5$. A shaded area below this line is labeled 'Defrost activation range'. Dashed lines connect the points on the line to the axes: (-15, -9), (-10, -7), (-5, -5), (0, -3), and (5, -1).</p> </div>	
<ul style="list-style-type: none"> ■ Compressor ON ≥ 5 min continuously, and integral heating capacity diminishes (see further in this section), or ■ $T_a > -5^{\circ}\text{C}$ for 3 h accumulated (if DS1-3 is ON, 40 min), or ■ $T_a \leq -5^{\circ}\text{C}$ for 6 h accumulated 	Above condition for 10 min accumulated.
Outdoor fan is ON (not in O.L. control)	Outdoor fan is OFF (O.L. control)

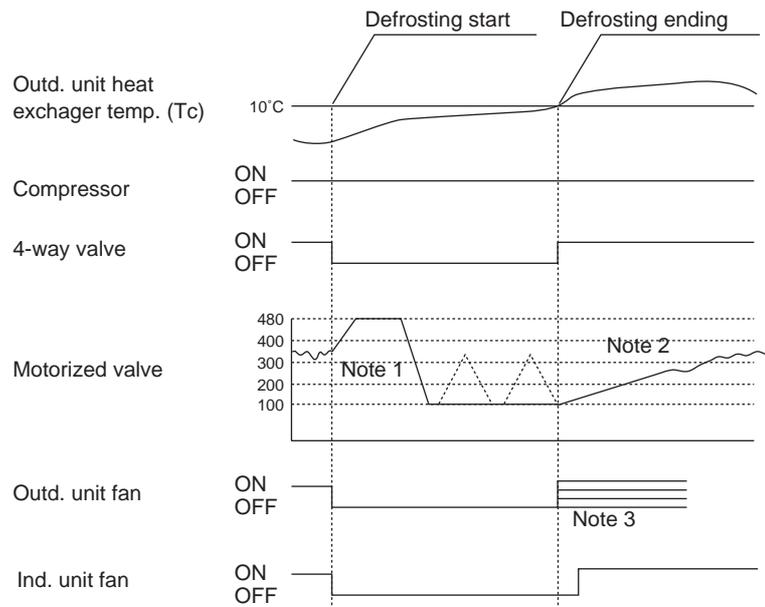
Heating integral capacity

The integral heating capacity is calculated by using the indoor unit data (R2T - R1T) divided by the compressor running time.



Defrost control

The illustration below shows the defrost control.



Note	Control and time	Description
1	Motorized valve control during defrost operation	After a defrost activation, the defrost motorized valve is at 480 pulses for a certain amount of time, and is then closed gradually to 100 pulses. Only when the discharge pipe temperature is high during defrost, the motorized valve opens at intervals.
2	Motorized valve control after defrost operation	The motorized valve is controlled to an optimum opening and the most suitable operating speed, according to the operating conditions at defrost activation.
3	Outdoor unit fan after defrost operation	The fan operates at optimum fan tap, according to the operating conditions at defrost activation.

Defrost ending

The defrost operation ends:

- After 10 min, or
- As soon as one of the following conditions is met after 1 min or more:
 - Outdoor heat exchanger temp. $\geq 10^{\circ}\text{C}$
 - Discharge pipe temp. $> 110^{\circ}\text{C}$.

Hot start after defrosting

The hot start function is activated:

- 40 s after the defrosting ending, or
- When $T_c > 34^{\circ}\text{C}$ (indoor heat exchanger temperature).

Used input

The defrost control uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Outdoor thermistor	—	R1T
Outdoor heat exchanger thermistor	—	R2T
Discharge pipe thermistor	—	R3T
Defrosting start temperature changeover switch	—	DS1-3

3.3 Draft Avoidance Control 1

Applicable units

The draft avoidance control 1 is applicable for the following units:

Model type	Model name
Cassette	FHYCP and FUYP
Corner	FHYKP
Ceiling	FUYP
Wall	FAYP

Purpose

The purpose of the draft avoidance control 1 is to avoid draft, which is very uncomfortable for the end users.

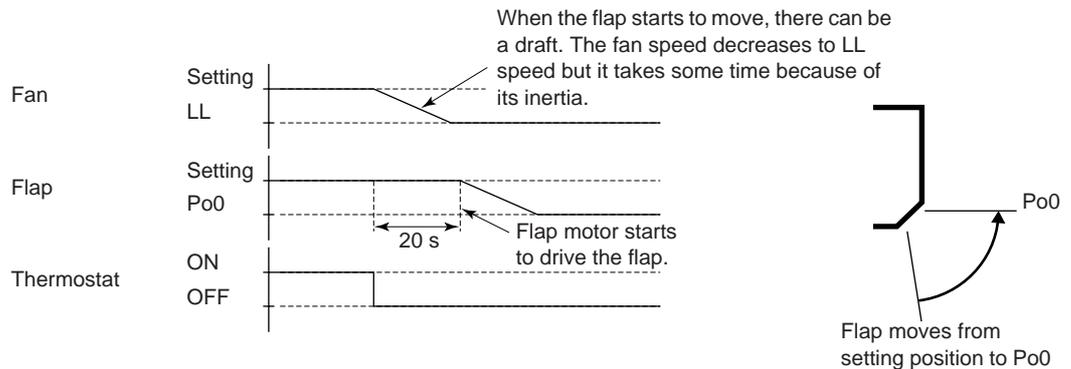
Method

The draft avoidance control 1 delays the moving of the flap setting to the Po0 position (= upper) for a certain amount of time in the following conditions:

- In heating mode and thermostat OFF, or
- In defrosting.

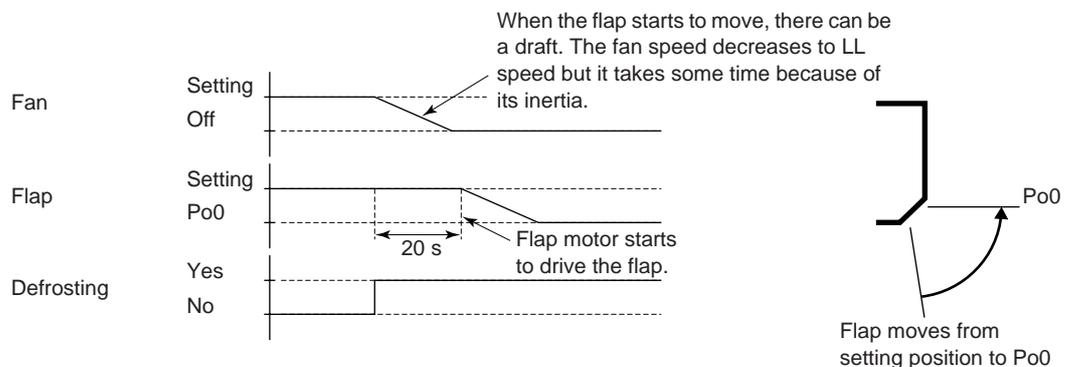
Heating mode and thermostat OFF

The time chart below illustrates the draft avoidance control 1 in heating mode and thermostat OFF.



Defrosting

The time chart below illustrates the draft avoidance control 1 in defrosting.



Used inputs

The draft avoidance control 1 uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Limit switch for flap	33S	—
No. of fan turns	X26A	—
Outdoor heat exchanger thermistor (start and end defrosting)	—	R2T

3.4 Draft Avoidance Control 2

Applicable units The draft avoidance control 2 is applicable for the following units:

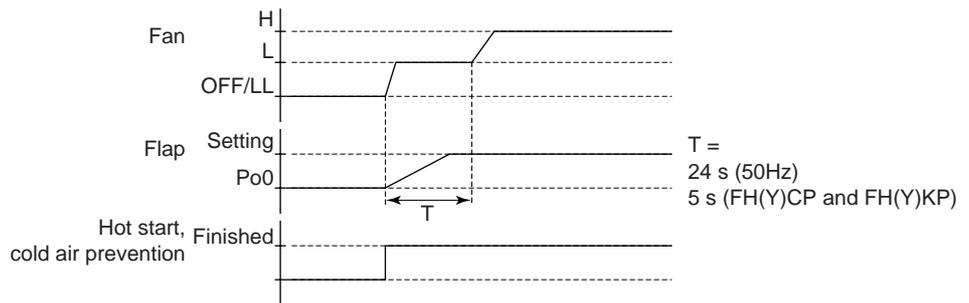
Model type	Model name
Cassette	FHYCP and FUYP
Corner	FHYKP
Ceiling	FUYP
Wall	FAYP

Purpose The purpose of the draft avoidance control 2 is to avoid draft when the flap is moving.

Starting conditions The draft avoidance control 2 is activated when:

- Hot start is finished, or
- Cold air prevention control is finished.

Time chart If the fan speed is set to “H”, the fan turns at low speed for a certain amount of time.



Used input Draft avoidance control 2 uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Limit switch for flap	33S	—
No. of fan turns	X26A	—

3.5 4-way Valve Control

Applicable units RYEP71-125L

Purpose

The purpose of the 4-way valve control is to control how the superheated refrigerant passes through the 4-way valve. The 4-way valve control carries out the changeover switching of the 4-way valve. This changeover switching is only carried out during operation, because pressure difference is required to move the internal cylinder.

When...	Then the 4-way valve connects the outlet of the compressor with...
Cooling	Outdoor heat exchanger.
Heating	Indoor heat exchanger.

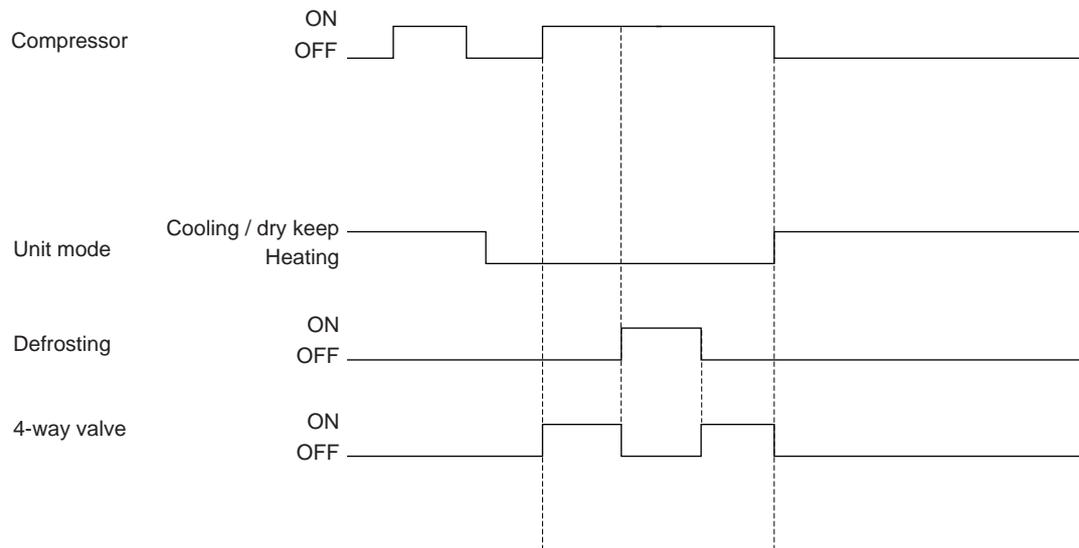
Method

The table below describes the 4-way valve control operation.

In...	The 4-way valve is...
Heating, except for defrosting	ON
<ul style="list-style-type: none"> ■ Cooling ■ Dry keep ■ Defrosting 	OFF

Time chart

The time chart below illustrates the 4-way valve control.



Used input

The 4-way valve control uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Indoor air temperature R1T (auto changeover)	X19A	—
Outdoor heat exchanger temperature R2T (defrost)	—	X5A

3.6 Starting Outdoor Fan Control in Heating Mode

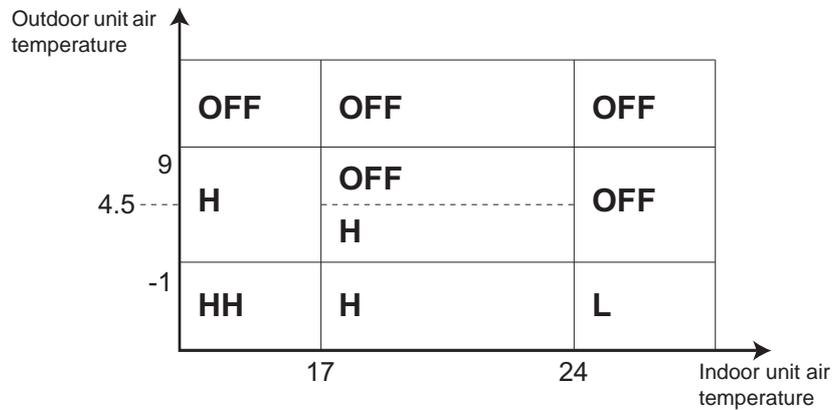
Applicable units RYEP71-125L

Purpose The purpose of the starting outdoor fan control is to control the fan speed in function of the indoor and outdoor unit air temperature.

Method The illustration below shows the fan starting control in heating mode.

- LPS is not detected for 3 min after start-up.
- The starting fan speed lasts 5 min. The fan speed stays at H for the first 5 s if it is switched from OFF to L.

The fan operating areas 1 ~ 9 are indicated.



Different fan speeds

The table below explains the meaning of L, H and HH fan speed.

Fan operation	71 and 100	125	
	1 fan	Upper fan (MF1)	Lower fan (MF2)
OFF	OFF	OFF	OFF
L	L	L	L
H	H	H	H
HH	HH	HH	HH

Used input

The outdoor fan starting control in heating mode uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Outdoor thermistor	—	R1T
Suction thermistor	R1T	—
Outdoor coil thermistor	—	R2T

3.7 Normal Outdoor Fan Control in Heating Mode

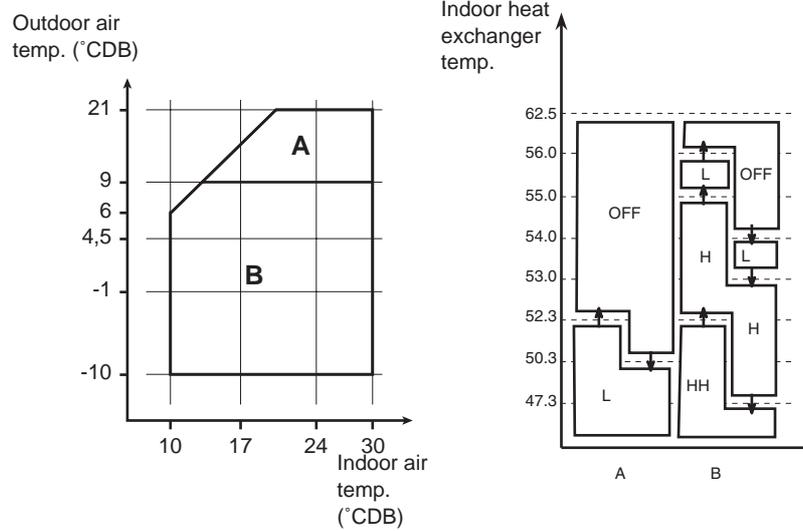
Applicable units RYEP71-125L

Purpose The purpose of the normal outdoor fan control is to:

- Reduce the chance of overload during high ambient temperature.
- Reduce the chance of icing up.

Method Normal fan control operation is done after 5 min of starting fan control operation.

The operation range is divided into two areas (A, B).



Example For area A, the fans go:

- From L speed to OFF at 52.3°C
- From OFF to L speed at 50.3°C.

Different fan speeds

The table below explains the meaning of L, H and HH fan speed.ⁱ

Fan operation	71 and 100	125	
	1 fan	Upper fan (MF1)	Lower fan (MF2)
OFF	OFF	OFF	OFF
L	L	L	L
H	H	H	H
HH	HH	HH	HH

Used input

The normal outdoor fan control during heating operation uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Outdoor thermistor	—	R1T
Suction thermistor	R1T	—
Indoor heat exchanger thermistor	R2T	—



3.8 Test run control

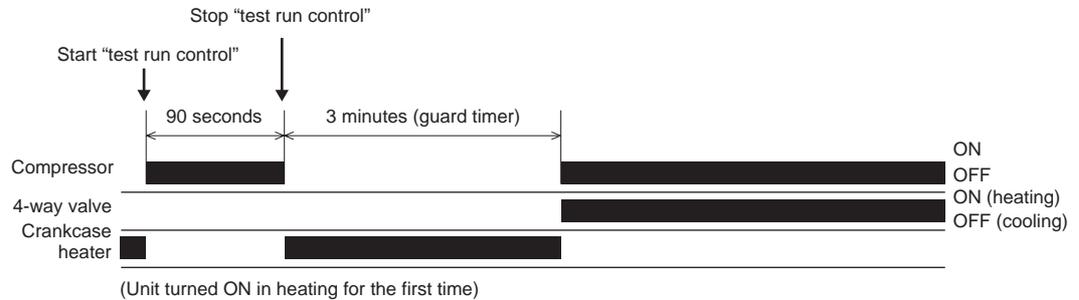
Purpose Confirm that the stop valves are opened before first compressor start-up to avoid compressor damage. RYEP71~100L7 units do not have an HPS.

Applicable units RYEP71~100L7

Outline For the "test run control", this is only activated in heating mode when the unit is turned ON for the first time or restarted for the first time after a pump down operation.

During the "test run control", the LPS detects if the stop valves are open or not. The "test run control" will end after 90 seconds.

At the time the "test run control" is activated, the outdoor unit will perform a cooling cycle and switch over to heating mode 3 minutes after the "test run control" has finished.



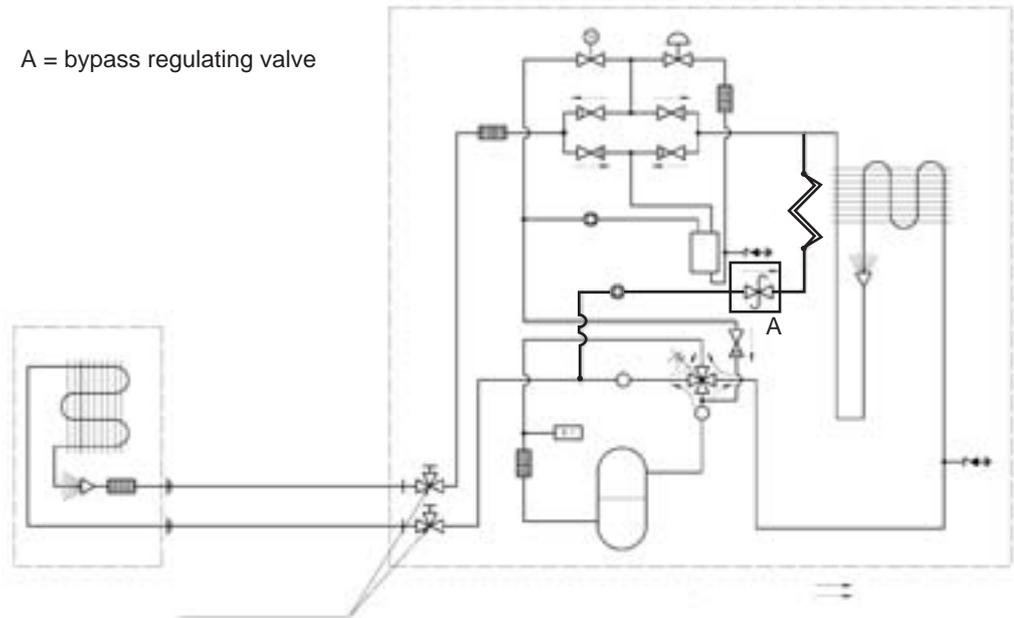
After a pump down operation, the EEPROM flag for the "test run control" will be resetted.

3.9 Discharge Pressure Control

Purpose Avoid activation of internal compressor safety in heating.

Applicable units RYEP71~100L7

Outline When the discharge pressure becomes to high in heating operation, the discharge pressure regulator will open and bypass the system. The discharge pressure regulator opens at 24,5 bar.



2

Part 3

Troubleshooting

What is in this part?

This part contains the following chapters:

Chapter	See page
1-Troubleshooting	3-3
2-Error Codes: Indoor Units	3-23
3-Error Codes: Outdoor Units	3-37
4-Error Codes: System Malfunctions	3-63
5-Additional Checks for Troubleshooting	3-73

3

1 Troubleshooting

1.1 What Is in This Chapter?

Introduction

When a problem occurs, you have to check all possible malfunctions. This chapter gives a general idea of where to look for malfunctions.

Not all repair procedures are described. Some procedures are considered common practice.

Overview

This chapter contains the following topics:

Topic	See page
1.2–Overview of General Problems	3–4
1.3–Procedure of Self-Diagnosis by Remote Controller	3–6
1.4–Checking with the Wireless Remote Controller Display	3–7
1.5–Self-Diagnosis by Wired Remote Controller	3–11
1.6–Remote Controller Display Malfunction Code and Contents	3–12
1.7–Troubleshooting with the Indoor Unit LEDs and the Remote Controller	3–14
1.8–Troubleshooting with the Remote Controller: Outdoor Malfunctions	3–15
1.9–Troubleshooting with the Remote Controller: System Malfunctions	3–16
1.10–Overview of the Indoor Safety Devices	3–17
1.11–Overview of the Outdoor Safety Devices	3–18
1.12–Outdoor Safety Device: Thermal Protector Fan Motor	3–19
1.13–Outdoor Safety Device: Reverse Phase Protector	3–20
1.14–Outdoor Safety Device: High-Pressure Switch	3–21
1.15–Outdoor Safety Device: Low-Pressure Switch	3–22

1.2 Overview of General Problems

Introduction

The general problems are:

- None of the indoor units operates
- Equipment operates but stops sometimes
- Some indoor units do not operate (twin / triple)
- Equipment operates but is not able to cool
- Abnormal operating noise and vibrations
- Equipment does not operate (operation light OFF)
- Poor cooling or heating
- Operation stops suddenly (operation light flashes)
- Abnormal functioning.

None of the indoor units operates

To troubleshoot, check the following:

- Make sure the rated voltage is supplied.
- Make sure the indoor unit type is compatible with the outdoor unit.
- Troubleshoot with the indoor unit LEDs. See page 3-14.
- Troubleshooting with the Remote Controller: Outdoor Malfunctions. See page 3-15.
- Make sure the address for the remote controller and indoor unit are set correctly. See page 4-3.

Equipment operates but stops sometimes

To troubleshoot, check the following:

- A power failure of 2 to 10 sine wave cycles can stop air conditioner operation.
- Troubleshoot with the indoor unit LEDs. See page 3-14.
- Troubleshooting with the Remote Controller: Outdoor Malfunctions. See page 3-15.

Some indoor units do not operate (twin / triple)

To troubleshoot, check the following:

- Make sure the indoor unit type is compatible with the outdoor unit.
- Troubleshoot with the indoor unit LEDs. See page 3-14.
- Troubleshooting with the Remote Controller: Outdoor Malfunctions. See page 3-15.

Equipment operates but is not able to cool

To troubleshoot, check the following:

- Make sure the thermistor has not disconnected from the pipe holder.
- Troubleshoot with the indoor unit LEDs. See page 3-14.
- Troubleshooting with the Remote Controller: Outdoor Malfunctions. See page 3-15.
- Check for gas shortage. See page 3-64.

Abnormal operating noise and vibrations

Make sure the required space for installation is provided. See chapters “General Outline: Indoor Units” and “General Outline: Outdoor Units”.

Equipment does not operate (operation light OFF)

To troubleshoot, check the following:

- Check if the breaker has switched OFF or the fuse has blown.
- Check if the batteries are placed in the remote controller.
- Check if the address switch is set correctly. See page 4-5.
- Check if the timer is set correctly.

Poor cooling or heating

To troubleshoot, check the following:

- Check if the filters are clean.
- Check if there is no obstruction of the air inlet or outlet of the indoor and outdoor units.
- Check if the temperature settings are correct.
- Check if all windows and doors are closed.
- Check if the air flow and air direction are set correctly.
- Check if there is no ventilation operation.

Operation stops suddenly (operation light flashes)

To troubleshoot, check the following:

- Check if the air filters are clean.
- Check if there is no obstruction of the air inlet or outlet of the indoor and outdoor units.

The operation light flashes when the following errors are detected:

- Activation of a safety device or malfunctioning thermistors.
- Transmission error between the indoor and the outdoor unit.

Abnormal functioning

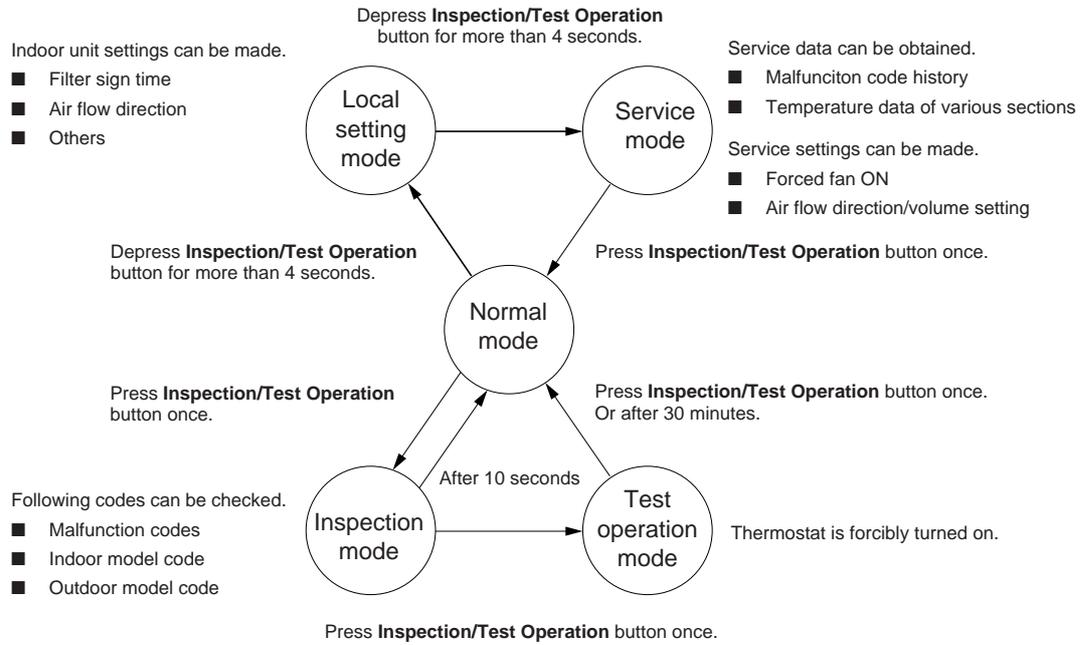
The air conditioner may malfunction due to lightning or radio waves. To check, proceed as follows:

Step	Action
1	Switch OFF the breaker.
2	Switch it back ON.
3	Check the operation by trying to operate with the remote controller.

1.3 Procedure of Self-Diagnosis by Remote Controller

The Inspection/Test Button: explanation

By turning the remote controller's inspection/test button ON, you can change the mode as shown in the figure below.



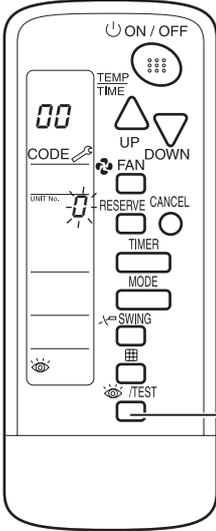
1.4 Checking with the Wireless Remote Controller Display

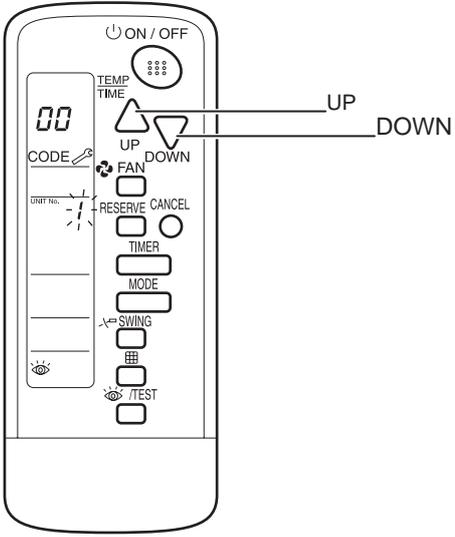
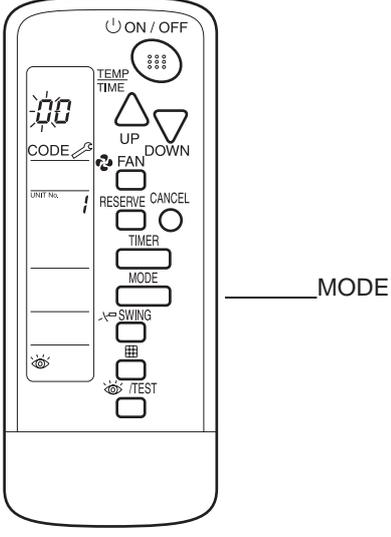
Introduction

Contrary to the wired remote controller, the wireless remote controller does not display the error code. Instead, the operation LED on the light reception section flashes.

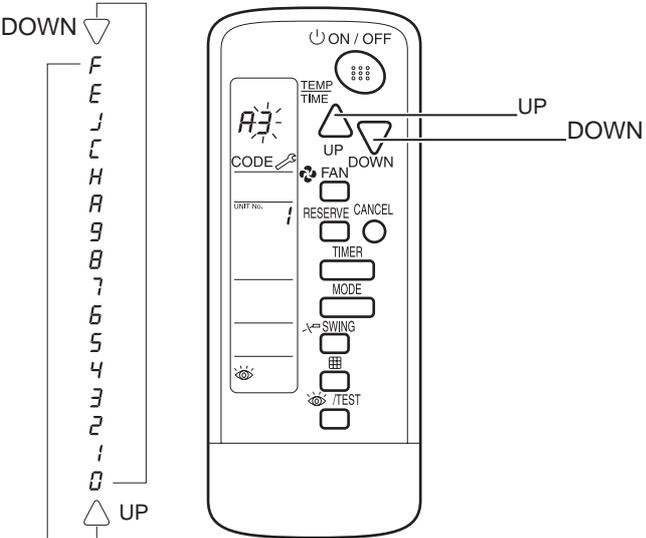
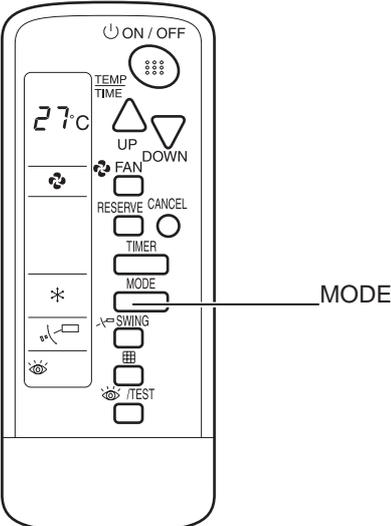
Checking

To find the error code, proceed as follows:

Step	Action
1	<p>Press the INSPECTION/TEST button to select "inspection". The equipment enters the inspection mode. "0" flashes in the UNIT No. display.</p>  <p>The diagram shows a vertical remote controller with various buttons. At the top is a power button labeled 'ON / OFF'. Below it is a 'TEMP TIME' section with a display showing '00'. Further down are 'UP' and 'DOWN' arrow buttons, a 'FAN' button, a 'RESERVE' button, and a 'CANCEL' button. Below these are 'TIMER', 'MODE', and 'SWING' buttons. At the bottom is the 'INSPECTION/TEST' button, which is pointed to by a line from the text 'INSPECTION/TEST' on the right. The remote also has a 'CODE' display and a 'UNIT NO.' display.</p>

Step	Action								
2	<p data-bbox="470 280 1412 347">Press the UP or DOWN button and change the UNIT No. until the receiver of the remote controller starts to beep.</p>  <table border="1" data-bbox="462 907 1380 1243"> <thead> <tr> <th data-bbox="462 907 917 969">If you hear...</th> <th data-bbox="917 907 1380 969">Then...</th> </tr> </thead> <tbody> <tr> <td data-bbox="462 969 917 1019">3 short beeps</td> <td data-bbox="917 969 1380 1019">Follow all steps below.</td> </tr> <tr> <td data-bbox="462 1019 917 1187">1 short beep</td> <td data-bbox="917 1019 1380 1187">Follow steps 3 and 4. Continue the operation in step 4 until you hear a continuous beep. This continuous beep indicates that the error code is confirmed.</td> </tr> <tr> <td data-bbox="462 1187 917 1243">1 continuous beep</td> <td data-bbox="917 1187 1380 1243">There is no abnormality.</td> </tr> </tbody> </table>	If you hear...	Then...	3 short beeps	Follow all steps below.	1 short beep	Follow steps 3 and 4. Continue the operation in step 4 until you hear a continuous beep. This continuous beep indicates that the error code is confirmed.	1 continuous beep	There is no abnormality.
If you hear...	Then...								
3 short beeps	Follow all steps below.								
1 short beep	Follow steps 3 and 4. Continue the operation in step 4 until you hear a continuous beep. This continuous beep indicates that the error code is confirmed.								
1 continuous beep	There is no abnormality.								
3	<p data-bbox="470 1270 1372 1337">Press the MODE selector button. The left "0" (upper digit) indication of the error code flashes.'</p> 								

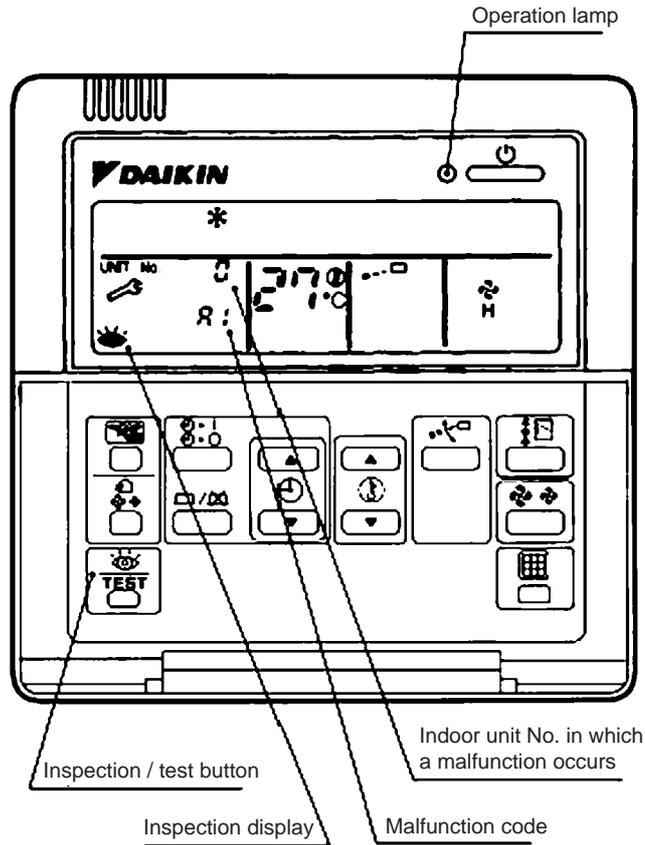
Step	Action								
4	<p data-bbox="517 282 1449 338">Press the UP or DOWN button to change the error code upper digit until the receiver of the remote controller starts to beep.</p> <div data-bbox="735 349 1410 891"> <p>The diagram shows a remote control with a keypad. To the left of the remote is a vertical list of numbers: 4, 5, 6, 7, 8, 9, U, P, L, J, F, H, E, C, R, 0. An arrow labeled 'DOWN' points to the top of the list, and an arrow labeled 'UP' points to the bottom. Lines connect the 'UP' and 'DOWN' buttons on the remote to the list, indicating that pressing these buttons cycles through the digits.</p> </div> <table border="1" data-bbox="507 920 1422 1137"> <thead> <tr> <th data-bbox="517 931 963 981">If you hear...</th> <th data-bbox="963 931 1415 981">Then...</th> </tr> </thead> <tbody> <tr> <td data-bbox="517 992 963 1032">2 short beeps</td> <td data-bbox="963 992 1415 1032">The upper digit matches.</td> </tr> <tr> <td data-bbox="517 1043 963 1084">1 short beep</td> <td data-bbox="963 1043 1415 1084">No digits match.</td> </tr> <tr> <td data-bbox="517 1095 963 1135">1 continuous beep</td> <td data-bbox="963 1095 1415 1135">Both upper and lower digits match.</td> </tr> </tbody> </table>	If you hear...	Then...	2 short beeps	The upper digit matches.	1 short beep	No digits match.	1 continuous beep	Both upper and lower digits match.
If you hear...	Then...								
2 short beeps	The upper digit matches.								
1 short beep	No digits match.								
1 continuous beep	Both upper and lower digits match.								
5	<p data-bbox="517 1173 1426 1229">Press the MODE selector button. The right "0" (lower digit) indication of the error code flashes.</p> <div data-bbox="874 1245 1278 1778"> <p>The diagram shows the same remote control as in step 4. An arrow labeled 'MODE' points to the 'MODE' button on the keypad.</p> </div>								

Step	Action
6	<p>Press the UP or DOWN button and change the error code lower digit until the receiver of the remote controller generates a continuous beep.</p> 
7	<p>Press the MODE button to return to normal status. If you do not press any button for at least 1 min, the remote controller returns automatically to normal status.</p> 

1.5 Self-Diagnosis by Wired Remote Controller

Explanation

If operation stops due to malfunction, the remote controller's operation LED blinks, and malfunction code is displayed. (Even if stop operation is carried out, malfunction contents are displayed when inspection mode is entered.) The malfunction code enables you to tell what kind of malfunction caused operation to stop. See page 3-12 for malfunction code and malfunction contents.
 <New Remote Controller> BRC1D527



1.6 Remote Controller Display Malfunction Code and Contents

Malfunction Code	Contents/Processing	Remarks
A1	Failure of PC board ass'y for indoor unit	
A3	Malfunction of water level system	
A6	Indoor unit fan motor overload / overcurrent / lock	
AF	Malfunction of water level system	Float switch is OFF during indoor unit stops.
AJ	Failure of capacity setting	Either capacity data is set incorrectly, or capacity has not been set for the data IC.
C4	Malfunction of heat exchanger temperature sensor system	
C9	Malfunction of suction air temperature sensor system	
CJ	Malfunction of remote control temperature sensor system	The remote controller thermistor does not function, but the system thermostat operation is possible.
E0	Actuation of safety device (outdoor unit)	
E1	Outdoor P.C. board malfunction	
E3	High pressure malfunction (outdoor unit)	
E4	Low pressure malfunction (outdoor unit)	
E6	Compressor overcurrent	
E9	Malfunction of electronic expansion valve (outdoor unit)	
F3	Discharge pipe temperature malfunction (outdoor unit)	
F6	Heat exchanger temperature abnormal	
H3	Failure of high pressure switch (outdoor unit)	
H9	Malfunction of outdoor air temperature sensor system (outdoor unit)	(See Note below)
J2	Malfunction of current sensor system	
J3	Malfunction of discharge pipe temperature sensor system (outdoor unit)	
J6	Malfunction of heat exchanger temperature sensor system (outdoor unit)	(See Note below)
PJ	Failure of capacity setting (outdoor unit)	Either capacity data is set incorrectly, or capacity has not been set for the data IC.
U0	Malfunction of suction pipe temperature	
U1	Reverse phase	Switch R.S.T. of the 3-phase power supply.

Malfunction Code	Contents/Processing	Remarks
U4 or UF	Failure of transmission (between indoor and outdoor unit)	Wrong wiring between indoor and outdoor units or malfunction of the PC board mounted on the indoor and the outdoor units. If UF is shown, the wiring between the indoor and outdoor units is not properly wired. Therefore, immediately disconnect the power supply and correct the wiring. (The compressor and the fan mounted on the outdoor unit may start operation independent of the remote controller operation.)
U5	Failure of transmission (between indoor unit and remote controller)	Transmission between indoor and remote controller is not being correctly carried out.
U8	Failure of transmission (between "main" and "sub" remote controller)	Transmission between "main" and "sub" remote controller is not being correctly carried out.
UA	Failure of field setting	System setting mistake for Twin system.
UC	Address duplication of central remote controller	

- In the case of the shaded error codes, "inspection" is not displayed. The system operates, but be sure to inspect and repair it.

Note

Operation when a malfunction occurs may differ according to the model.

1.7 Troubleshooting with the Indoor Unit LEDs and the Remote Controller

Shutdown

For some errors, the system only shuts down when the error occurs several times. This means that you have to wait until the system shuts down to be able to see the flashing LED on the front panel and the error code on the remote controller.

Malfunction overview

The table below contains an overview of the indoor unit malfunctions.

If...			Then...				
LED front panel	Indoor unit LED		Remote controller display	Location of the malfunction		Malfunction description	See page
	H1P (HAP)	H2P (HBP)		Other than PCB	PCB ind. unit		
X	C	C	Note 1	—	—	Normal	—
C	C	W	A1	—	○	Malfunctioning Indoor PCB (A1)	3-24
	C	X					
	W	—					
	X	—					
	C	C	A3	⊙	—	Malfunctioning Drain Water Level System (A3)	3-25
			A6	⊙	□	Indoor Unit Fan Motor Lock (A6)	3-27
		AF	⊙	○	Malfunctioning Drain System (AF)	3-29	
		AJ	⊙	○	Malfunctioning Capacity Setting (AJ)	3-31	
		C4 or C9	⊙	□	Thermistor Abnormality (C4 or C9)	3-33	
		CJ	⊙	○	Malfunctioning Remote Controller Air Thermistor (CJ)	3-35	

Symbols and notes

The table below describes the symbols and notes used in the malfunction overview.

Symbol / note	Description
Note 1	Variety of circumstances
W	LED is ON
C	LED is flashing
X	LED is OFF
⊙	High probability of malfunction
○	Low probability of malfunction
□	No possibility of malfunction (do not replace)

1.8 Troubleshooting with the Remote Controller: Outdoor Malfunctions

Malfunction overview

The table below contains an overview of the outdoor unit malfunctions.

Outdoor Unit Malfunctions	Remote Controller Display	Location of Malfunction				Contents of Malfunction	Details of Malfunction (Reference page)
		Other than PC Board	PC Board				
			Outdoor Unit	Indoor unit	Remote Contr.		
	<i>E0</i>	⊙	□	—	—	Actuation of safety device	3-38
	<i>E1</i>	—	○	—	—	Outdoor P.C. board malfunction	3-43
	<i>E3</i>	⊙	—	—	—	High pressure system (HPS) malfunction	3-44
	<i>E4</i>	⊙	—	—	—	Low pressure system (LPS) malfunction	3-46
	<i>E6</i>	⊙	□	—	—	Compressor Overcurrent	3-48
	<i>E9</i>	⊙	□	—	—	Malfunction of electronic expansion valve	3-50
	<i>F3</i>	⊙	□	—	—	Discharge pipe temperature malfunction	3-52
	<i>F6</i>	⊙	—	—	—	Malfunction of heat exchanger temperature	3-57
	<i>H3</i>	⊙	□	—	—	Failure of high pressure switch	3-54
	<i>H9</i>	⊙	□	—	—	Malfunction of outdoor air temperature sensor system	3-55
	<i>J2</i>	—	○	—	—	Malfunction of current sensor system	3-59
	<i>J3</i>	⊙	□	—	—	Malfunction of discharge pipe temperature sensor system	3-56
	<i>J6</i>	⊙	□	—	—	Malfunction of heat exchanger temperature sensor system	3-58
	<i>PJ</i>	⊙	□	—	—	Failure of capacity setting	3-61

Symbols and notes

The table below describes the symbols and notes used in the malfunction overview.

Symbol / note	Description
⊙	High probability of malfunction
○	Low probability of malfunction
□	No possibility of malfunction (do not replace)

1.9 Troubleshooting with the Remote Controller: System Malfunctions

Malfunction overview

The table below contains an overview of the system malfunctions.

If...	Then...					Malfunction description	See page
	Location of the malfunction				Rem. contr.		
Rem. contr. display	Other than PCB	PCB outd. unit	PCB ind. unit				
U0	⊙	—	—	—		Gas Shortage Detection (U0)	3-64
U1	⊙	□	—	—		Reverse Phase (U1)	3-65
U4 or UF	⊙	○	○	—		Transmission Error between Indoor and Outdoor Unit (U4 or UF)	3-67
U5	⊙	—	○	○		Transmission Error between Indoor Unit and Remote Controller (U5)	3-69
U8	⊙	—	○	○		Transmission Error between MAIN Remote Controller and SUB Remote Controller (U8)	3-70
UA	⊙	—	○	—		Malfunctioning Field Setting Switch (UA)	3-71

Symbols and notes

The table below describes the symbols and notes used in the malfunction overview.

Symbol / note	Description
⊙	High probability of malfunction
○	Low probability of malfunction
□	No possibility of malfunction (do not replace)

1.10 Overview of the Indoor Safety Devices

Overview

The table below contains an overview of the indoor safety devices.

Applicable unit	Thermal protector fan motor		Thermal fuse fan motor
	Abnormal	Reset (automatic)	
FH(Y)C(P)	$> 130 \pm 5^{\circ}\text{C}$	$< 83 \pm 20^{\circ}\text{C}$	N.A.
FHYBP	N.A.	N.A.	$> 152^{\circ}\text{C}$
FH(Y)(P)	$> 130 \pm 5^{\circ}\text{C}$	$< 83 \pm 20^{\circ}\text{C}$	N.A.
FUYP	$> 130 \pm 5^{\circ}\text{C}$	$< 83 \pm 20^{\circ}\text{C}$	N.A.
FDYP	N.A.	N.A.	$> 160^{\circ}\text{C}$
FAYP	$> 130 \pm 5^{\circ}\text{C}$	$< 83 \pm 20^{\circ}\text{C}$	N.A.
FH(Y)K(P)	$> 120 \pm 5^{\circ}\text{C}$	$< 105^{\circ}\text{C}$	N.A.
FDYMP	N.A.	N.A.	$> 152^{\circ}\text{C}$

1.11 Overview of the Outdoor Safety Devices

Overview

The table below contains an overview of the outdoor safety devices.

Applicable outdoor unit	Reverse phase protector	Overload contact compressor	Internal protection	Thermal protector fan motor	Overcurrent relay compressor	High-pressure switch	Low-pressure switch	Discharge pressure regulator
RYEP71L7V1	—	—	X	X	—	—	X	X
RYEP71L7W1	X							
RYEP100L7V1	—							
RYEP100L7W1	X	X	—			X		—
RYEP125L7W1								

3

1.12 Outdoor Safety Device: Thermal Protector Fan Motor

Thermal protector fan motor

The table below describes the thermal protector of the fan motor.

Applicable outdoor unit	Wiring symbol	Location safety	Settings		Type
			Abnormal	Reset	Reset
RYEP71L7V1	Q1M	Outdoor fan motor Q1M connected to X11A	> 135±5°C	< 95±15°C	Automatic
RYEP71L7W1					
RYEP100L7V1					
RYEP100L7W1					
RYEP125L7W1	Q1M and Q2M	Q2M connected to X12A			

1.13 Outdoor Safety Device: Reverse Phase Protector

Reverse phase protector

The table below describes the reverse phase protector.

Applicable outdoor unit	Wiring symbol	Location safety	Type
			Reset
RYEP71L7V1	No reverse phase protector		
RYEP71L7W1	PRC	Switch Box	Automatic and power OFF
RYEP100L7V1	No reverse phase protector		
RYEP100L7W1	PRC	Switch box	Automatic and power OFF
RYEP125L7W1			

3

1.14 Outdoor Safety Device: High-Pressure Switch

Applicable units RYEP125L

High-pressure switch The table below describes the high-pressure switch.

Applicable outdoor unit	Wiring symbol	Location safety	Settings		Type
			Abnormal	Reset	Reset
RYEP125L7W1	S1PH	Discharge pipe	> 33 bar	< 25.5 bar	Automatic

1.15 Outdoor Safety Device: Low-Pressure Switch

Low-pressure switch

The table below describes the low-pressure switch.

Applicable outdoor unit	Wiring symbol	Location safety	Settings		Type
			Abnormal	Reset	Reset
RYEP71L7V1	S1LP	Low-pressure switch located in suction pipe	< -0.3 bar	> +0.5 bar	Automatic
RYEP71L7W1					
RYEP100L7V1					
RYEP100L7W1					
RYEP125L7W1					

3

2 Error Codes: Indoor Units

2.1 What Is in This Chapter?

Introduction

In the first stage of the troubleshooting sequence, it is important to correctly interpret the error code on the remote controller display. The error code helps you to find the cause of the problem.

Shutdown

For some errors, the system only shuts down when the error occurs several times. This means that you have to wait until the system shuts down to be able to see the flashing LED on the front panel and the error code on the remote controller.

Overview

This chapter contains the following topics:

Topic	See page
2.2–Malfunctioning Indoor PCB (A1)	3–24
2.3–Malfunctioning Drain Water Level System (A3)	3–25
2.4–Indoor Unit Fan Motor Lock (A6)	3–27
2.5–Malfunctioning Drain System (AF)	3–29
2.6–Malfunctioning Capacity Setting (AJ)	3–31
2.7–Thermistor Abnormality (C4 or C9)	3–33
2.8–Malfunctioning Remote Controller Air Thermistor (CJ)	3–35

2.2 Malfunctioning Indoor PCB (R1)

Error code R1

LED indications The table below shows the LED indications.

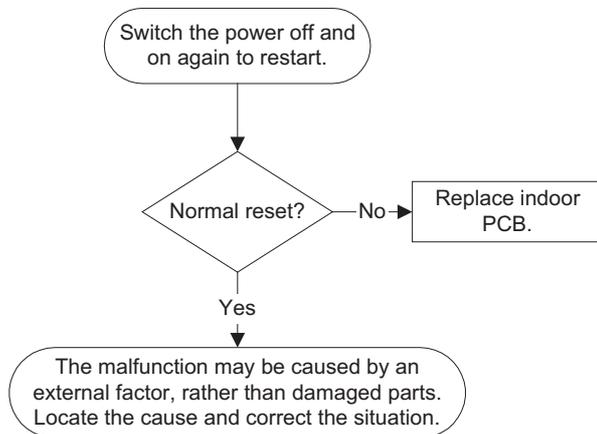
Operation	HAP (green)	HBP (green)
Normal	C	C
Malfunctioning	C	W
	C	X
	W	—
	X	—

Error generation The error is generated when the data from the EEPROM is not received correctly.

EEPROM (Electrically Erasable Programmable Read Only Memory): A memory chip that holds its content without power. It can be erased, either within the computer or externally and usually requires more voltage for erasure than the common +5 volts used in logic circuits. It functions like non-volatile RAM, but writing to EEPROM is slower than writing to RAM.

Causes The possible cause is a malfunctioning indoor PCB.

Troubleshooting To troubleshoot, proceed as follows:



Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

2.3 Malfunctioning Drain Water Level System (R3)

Error code R3

LED indications The table below shows the LED indications.

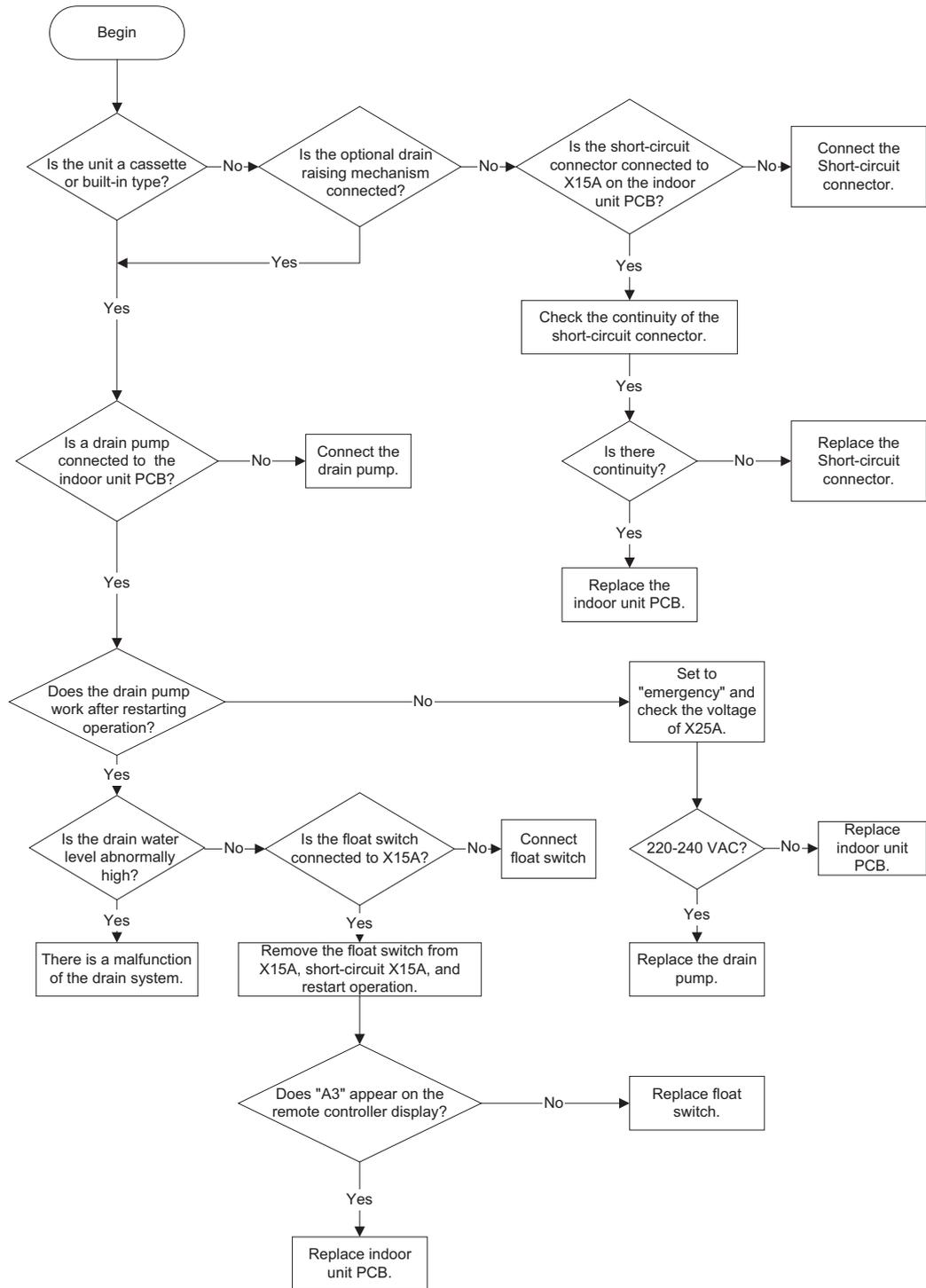
Operation	HAP (green)	HBP (green)
Normal	c	c
Malfunctioning	c	c

Error generation The error is generated when the water level reaches its upper limit and when the float switch turns OFF.

- Causes** The possible causes are:
- Malfunctioning drain pump
 - Improper drain piping work
 - Drain piping clogging
 - Malfunctioning float switch
 - Malfunctioning indoor unit PCB
 - Malfunctioning short-circuit connector X15 on PCB.

Troubleshooting

To troubleshoot, proceed as follows:



Remark

If "A3" is detected by a PC board which is not mounted with X15A, the PC board is defective.

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

2.4 Indoor Unit Fan Motor Lock (R6)

Error code R6

LED indications The table below shows the LED indications.

Operation	HAP (green)	HBP (green)
Normal	c	c
Malfunctioning	c	c

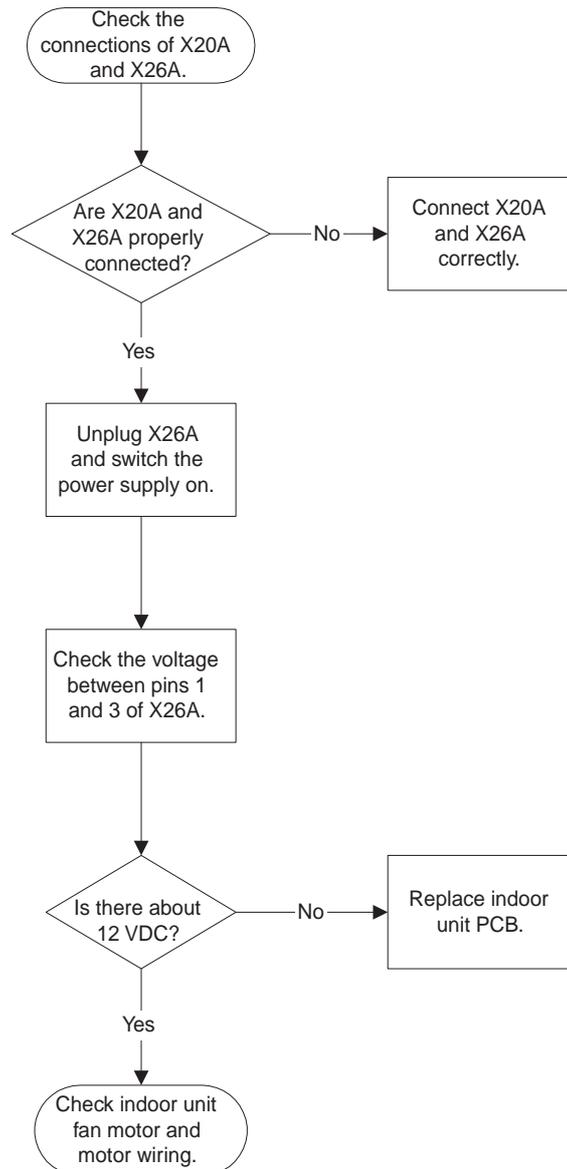
Error generation The error is generated when the fan rotations are not detected while the output voltage to the fan is at its maximum.

Causes The possible causes are:

- Malfunctioning indoor unit fan motor
- Broken or disconnected wire
- Malfunctioning contact
- Malfunctioning indoor unit PCB.

Troubleshooting

To troubleshoot, proceed as follows:

**Caution**

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

2.5 Malfunctioning Drain System (RF)

Error code RF

LED indications The table below shows the LED indications.

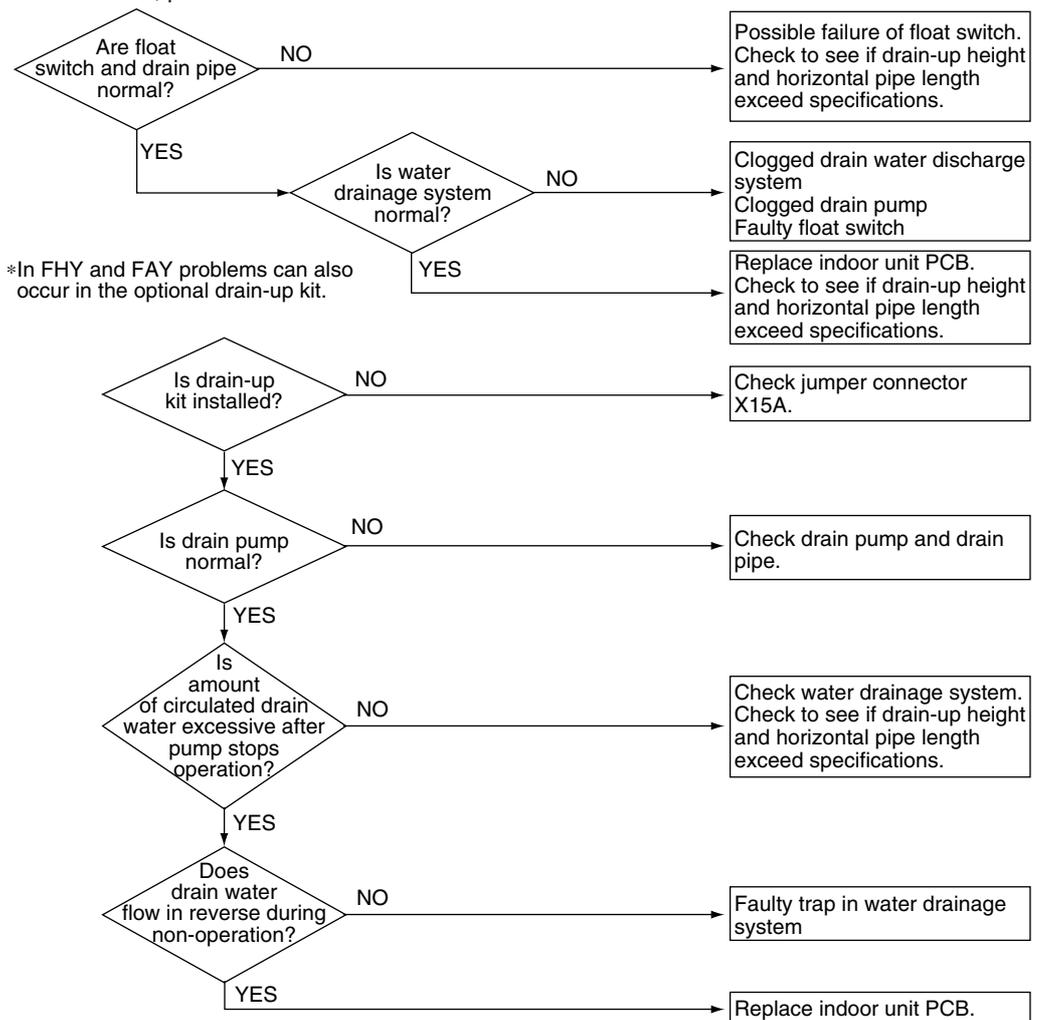
Operation	HAP (green)	HBP (green)
Normal	c	c
Malfunctioning	c	c

Error generation The error is generated when the float switch changes from ON to OFF while the compressor is OFF.

Causes The possible causes are:

- Error in the drain pipe installation
- Malfunctioning float switch
- Malfunctioning indoor unit PCB.

Troubleshooting To troubleshoot, proceed as follows:



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

2.6 Malfunctioning Capacity Setting (R_U)

Error code R_U

LED indications The table below shows the LED indications.

Operation	HAP (green)	HBP (green)
Normal	c	c
Malfunctioning	c	c

Error generation The error is generated when the following conditions are fulfilled:

Condition	Description
1	<ul style="list-style-type: none"> ■ The unit is in operation. ■ The PCB's memory IC does not contain the capacity code. ■ The capacity setting adapter is not connected.
2	<ul style="list-style-type: none"> ■ The unit is in operation. ■ The capacity that is set, does not exist for that unit.

Causes The possible causes are:

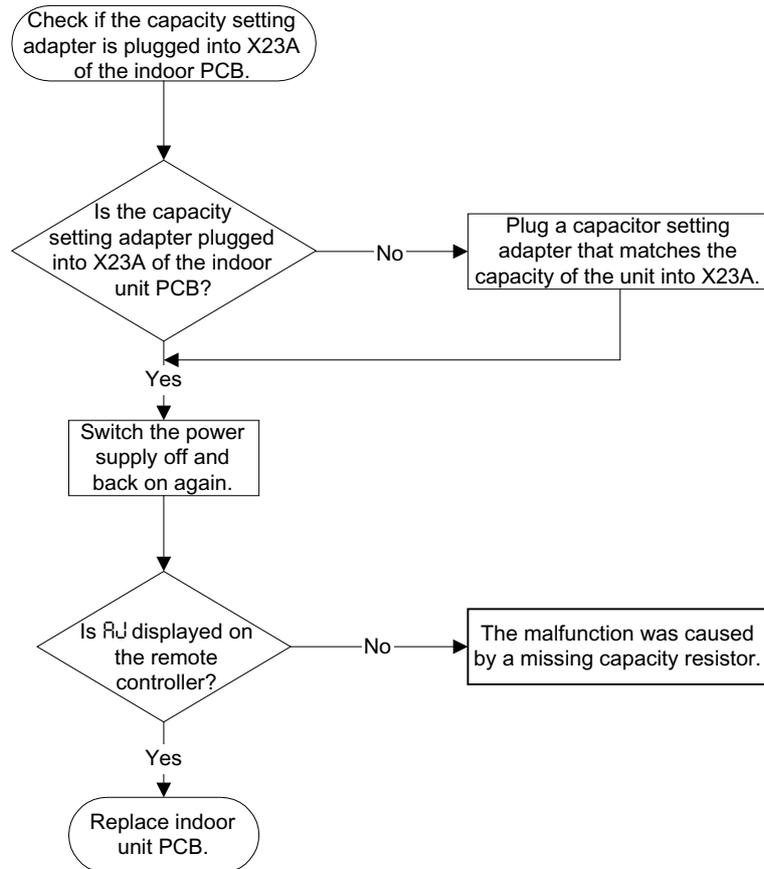
- Malfunctioning capacity setting adapter connection
- Malfunctioning indoor unit PCB.

Capacity setting adapter The capacity is set in the PCB's memory IC. A capacity setting adapter that matches the capacity of the unit is required in the following case:

In case the indoor PCB installed at the factory is for some reason changed at the installation site, the capacity will not be contained in the replacement PCB. To set the correct capacity for the PCB you have to connect a capacity setting adapter with the correct capacity setting to the PCB. The capacity setting for the PCB will become the capacity setting of the adapter because the capacity setting adapter has priority.

Troubleshooting

To troubleshoot, proceed as follows:



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

2.7 Thermistor Abnormality (E4 or E9)

Error code

The table below describes the two thermistor abnormalities.

Error	Description
E4	Malfunctioning heat exchanger thermistor system.
E9	Malfunctioning suction air thermistor system.

LED indications

The table below shows the LED indications.

Operation	HAP (green)	HBP (green)
Normal	c	c
Malfunctioning	c	c

Error generation

The error is generated when during compressor operation:

- Thermistor input > 4.96 V, or
- Thermistor output < 0.04 V.

Causes

The possible causes are:

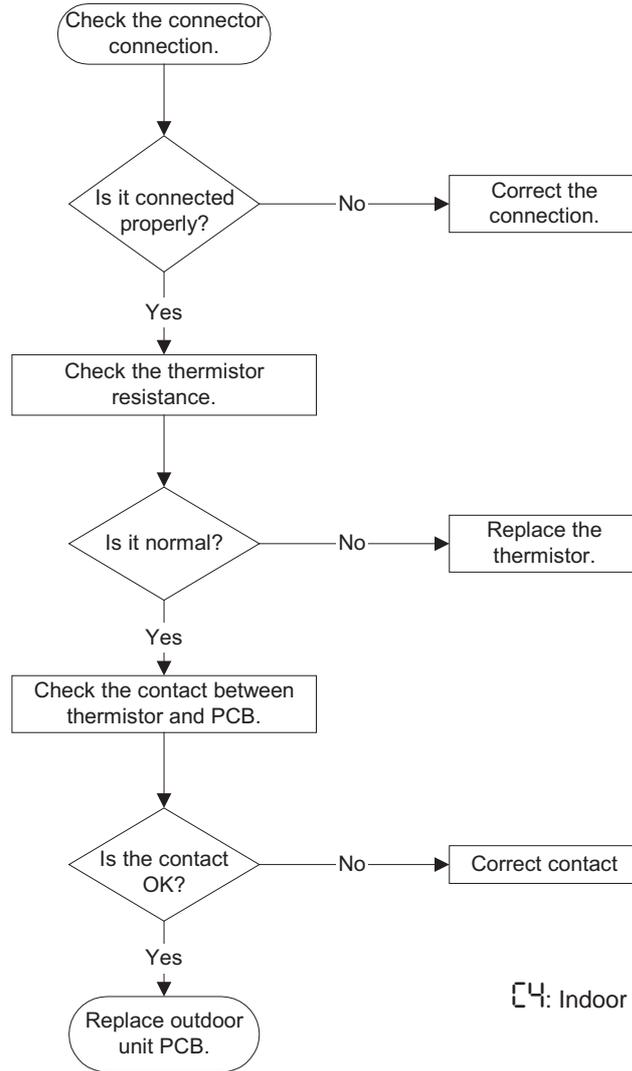
- Malfunctioning connector connection
- Malfunctioning thermistor
- Malfunctioning PCB
- Broken or disconnected wire.

Checking thermistors

See page 3-80.

Troubleshooting

To troubleshoot, proceed as follows:



④: Indoor liquid pipe thermistor (R2T).

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

2.8 Malfunctioning Remote Controller Air Thermistor (CJ)

Error code CJ

LED indications The table below shows the LED indications.

Operation	HAP (green)	HBP (green)
Normal	c	c
Malfunctioning	c	c

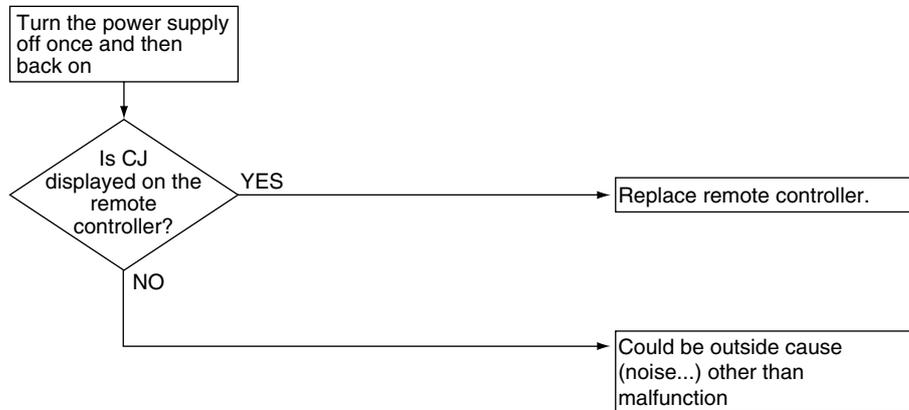
Error generation The error is generated when the remote controller thermistor becomes disconnected or shorted while the unit is running.

Even if the remote controller thermistor is malfunctioning, the system can operate with the system thermistor.

Causes The possible causes are:

- Malfunctioning thermistor
- Broken wire.

Troubleshooting To troubleshoot, proceed as follows:



Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3

3 Error Codes: Outdoor Units

3.1 What Is in This Chapter?

Introduction

In the first stage of the troubleshooting sequence, it is important to correctly interpret the error code on the remote controller display. The error code helps you to find the cause of the problem.

Overview

This chapter contains the following topics:

Topic	See page
3.2-Activation of Safety Device (E0)	3-38
3.3-Failure of Outdoor Unit PC Board (E1)	3-43
3.4-Abnormal High Pressure (Detected by the HPS) (E3)	3-44
3.5-Abnormal Low Pressure (Detected by the LPS) (E4)	3-46
3.6-Compressor Overcurrent (E6)	3-48
3.7-Malfunctioning Electronic Expansion Valve (E9)	3-50
3.8-Malfunctioning in Discharge Pipe Temperature (F3)	3-52
3.9-Malfunctioning HPS (H3)	3-54
3.10-Malfunctioning Outdoor Thermistor System (H9)	3-55
3.11-Malfunctioning Discharge Pipe Thermistor System (J3)	3-56
3.12-Malfunctioning Heat Exchanger Thermistor System (J6)	3-57
3.13-Abnormal Heat Exchanging Temperature (F6)	3-58
3.14-Malfunction of Current Sensor System (J2)	3-59
3.15-Failure of Capacity Setting (PJ)	3-61

3.2 Activation of Safety Device (E0)

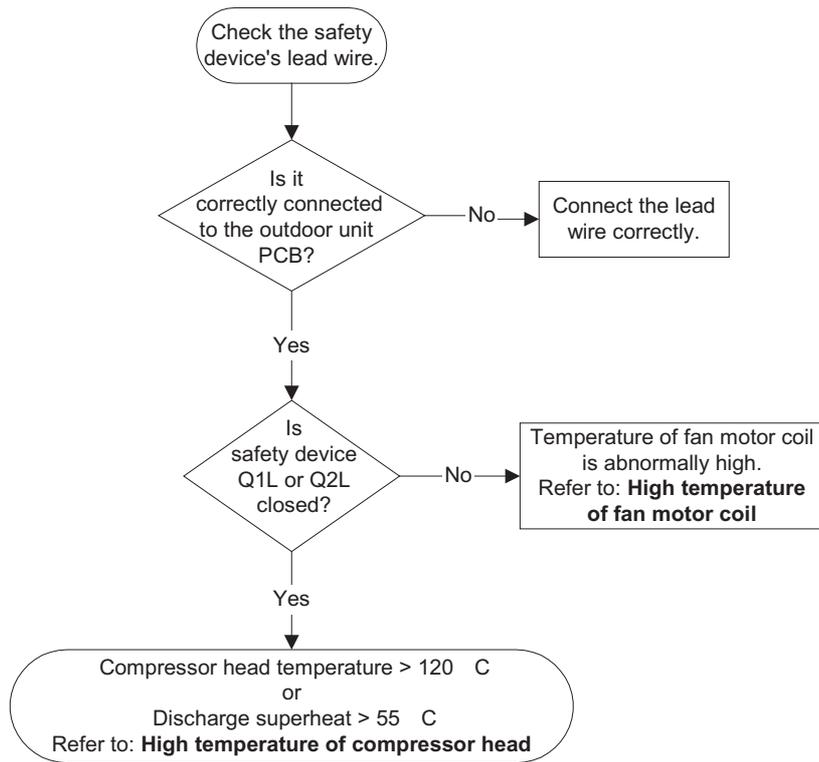
Error code E0

Error generation The error is generated when a safety device has detected an abnormality.

- Causes** The possible causes are:
- Malfunctioning safety device input connection
 - Broken or disconnected safety device harness
 - Stop valve is set to "close"
 - Clogging refrigerant piping circuit
 - Air short-circuit
 - Malfunctioning outdoor PCB.

Overview outdoor safety devices See page 3-18.

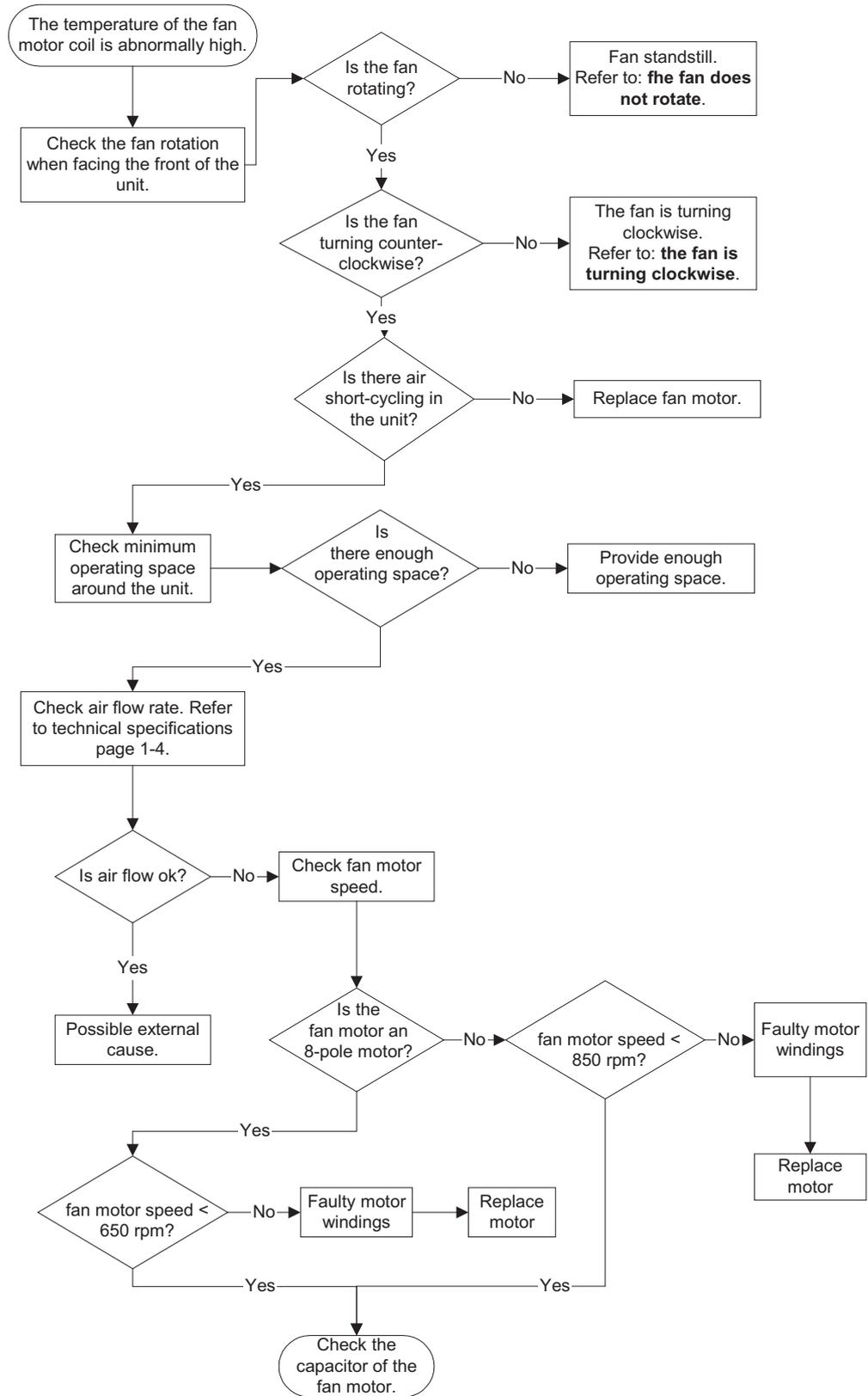
Troubleshooting To troubleshoot, proceed as follows:



Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

High temperature of fan motor coil

To troubleshoot, proceed as follows:



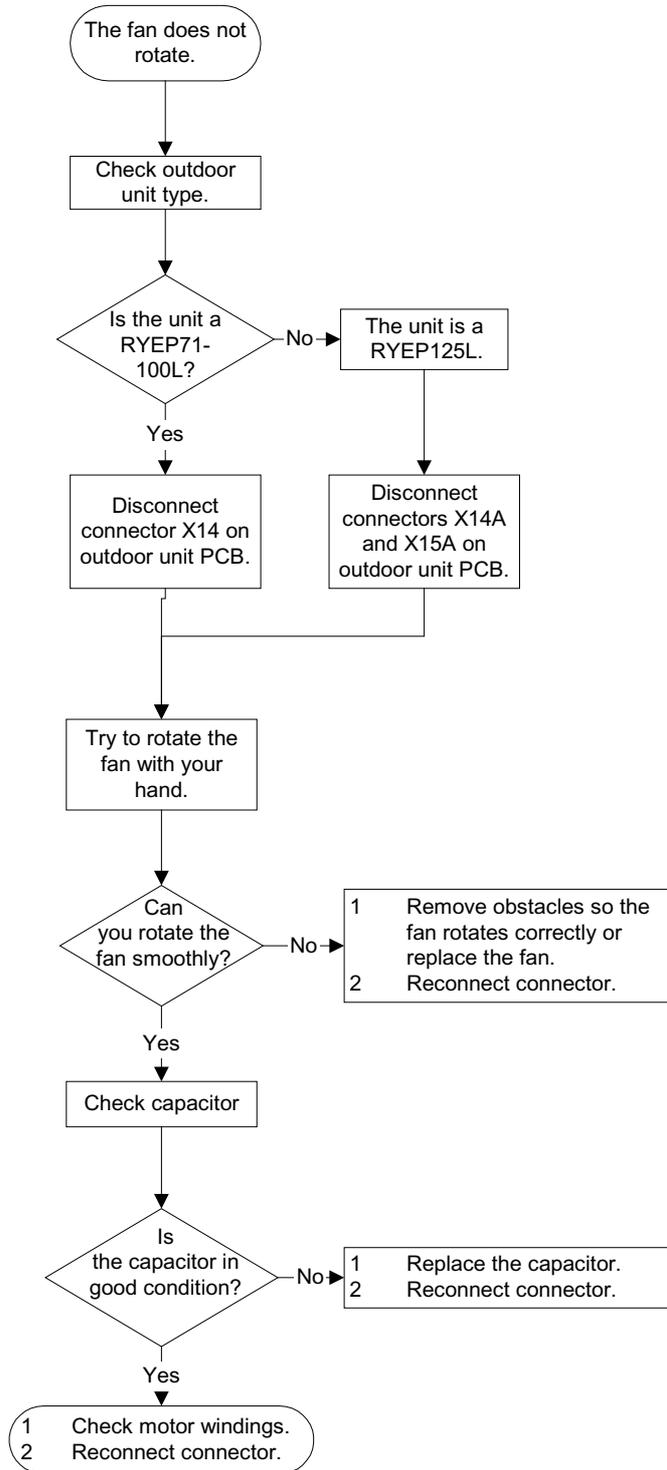
Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

The fan does not rotate

To troubleshoot, proceed as follows:

3

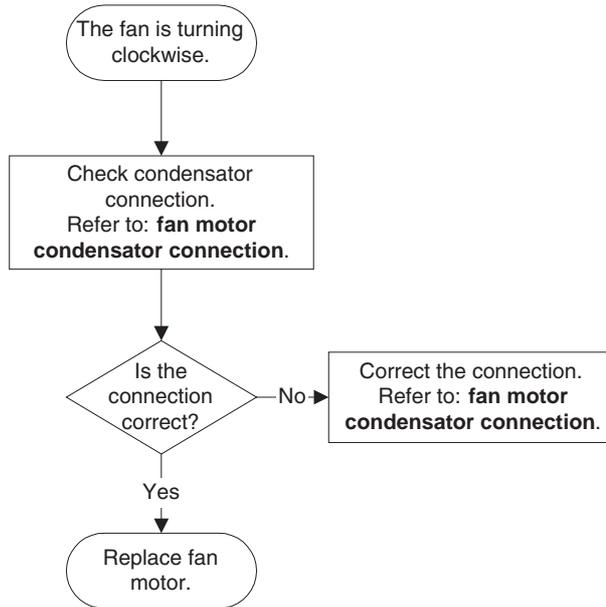


Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

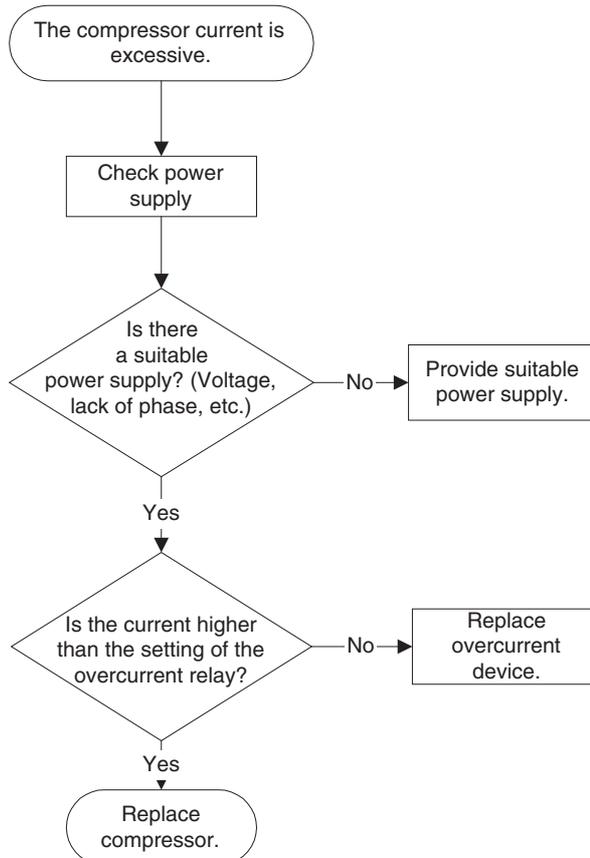
The fan is turning clockwise

To troubleshoot, proceed as follows:



Excessive compressor current

To troubleshoot, proceed as follows:

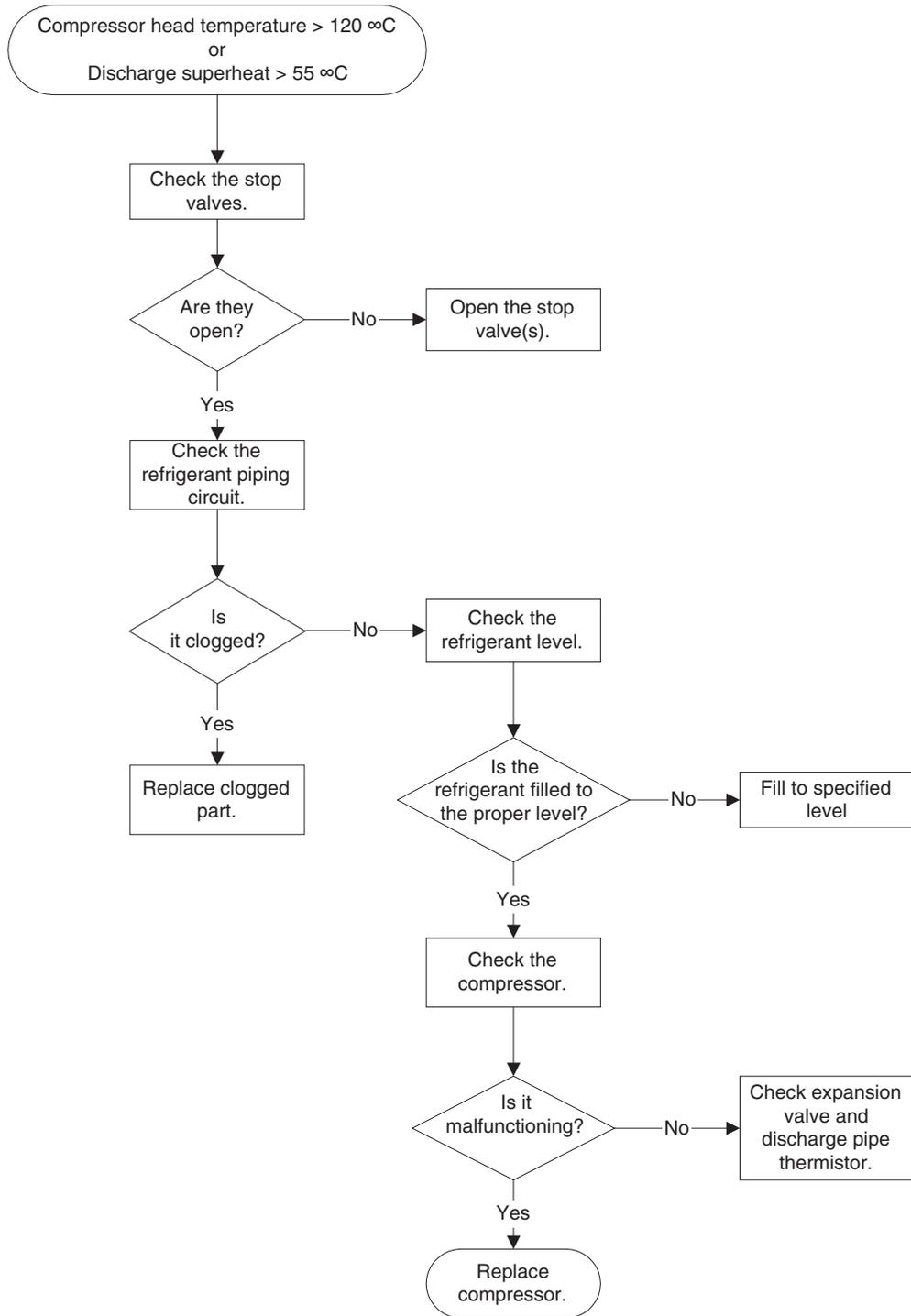


Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

High temperature of compressor head

To troubleshoot, proceed as follows:



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3

3.3 Failure of Outdoor Unit PC Board (E1)

Remote Controller Display

E1

Method of Malfunction Detection

A microcomputer checks whether or not E²PROM is normal.

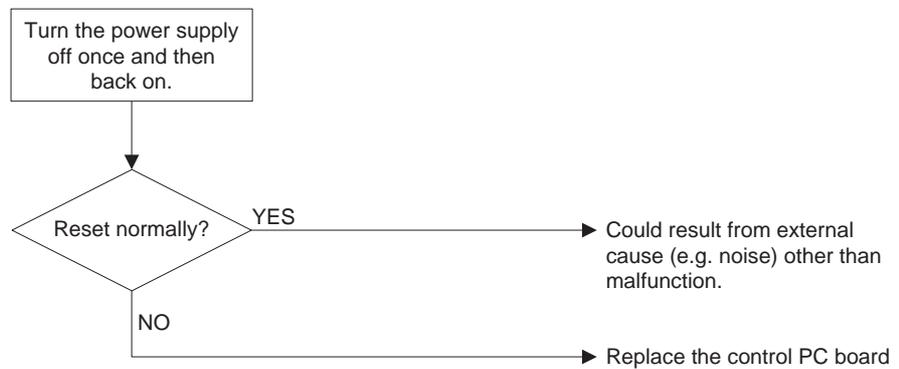
Malfunction Decision Conditions

The E²PROM is malfunctioning when the power supply is turned on.

Possible Causes

- Faulty outdoor unit PC board

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.4 Abnormal High Pressure (Detected by the HPS) (E3)

Error code E3

Applicable units RYEP125L

Error generation The error is generated when the high-pressure switch is activated during compressor operation.

Causes

The possible causes are:

- Abnormal high pressure caused by too much refrigerant or by non-condensable gas (air or nitrogen)
- Inaccuracy of the high-pressure switch
- Broken or disconnected high-pressure switch harness
- Malfunctioning high-pressure switch connector connection
- Malfunctioning outdoor unit PCB
- Malfunctioning refrigerant piping circuit
- Indoor unit air filter is clogged (Heating mode)
- Outdoor heat exchanger dirty (Cooling mode)
- Outdoor fan malfunction (Cooling mode)
- Stop valves remained close

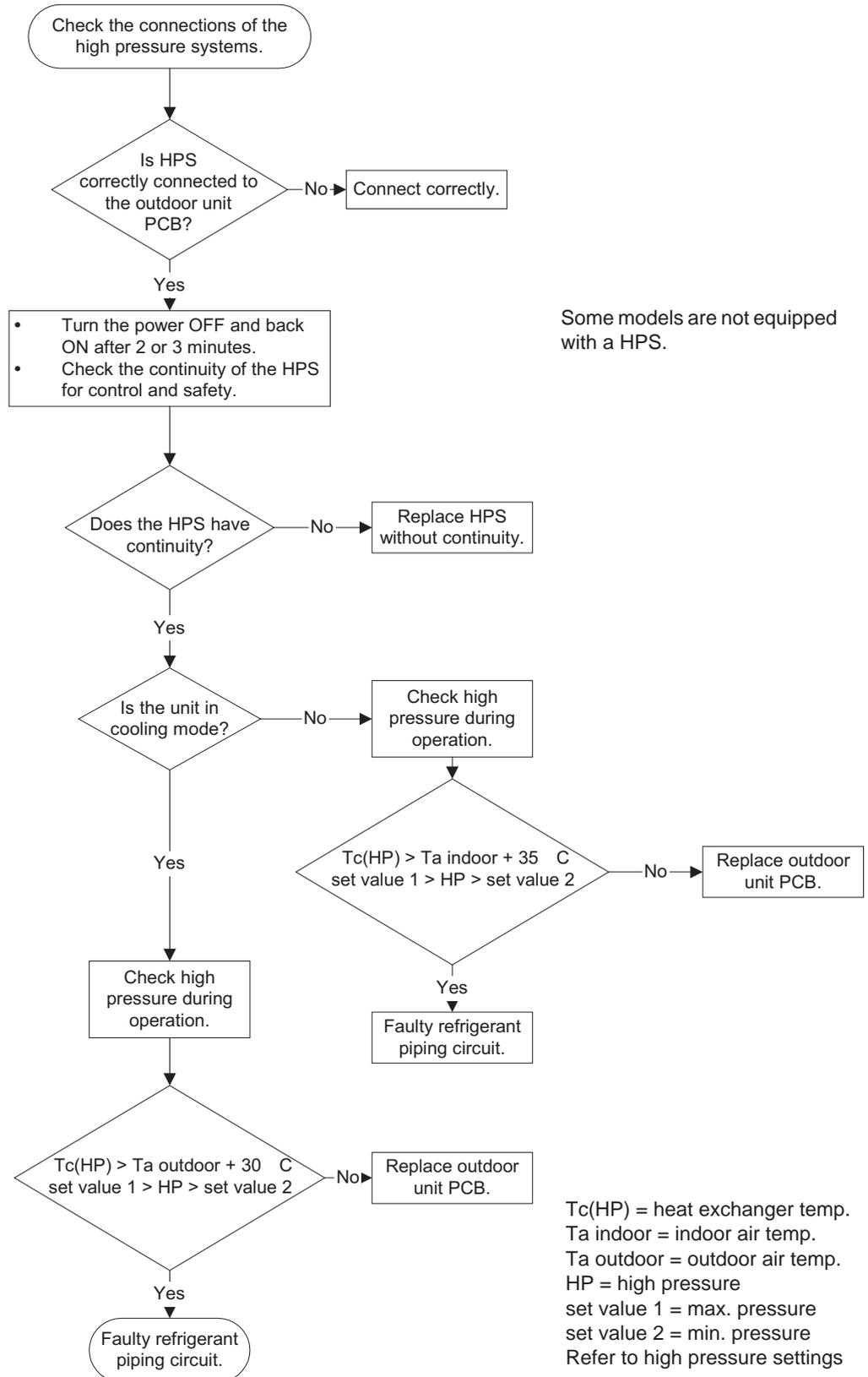
HPS settings

The table below contains the preset HPS values.

Applicable units	Abnormal	Reset
RYEP125L	> 33 bar	< 25.5 bar

Troubleshooting

To troubleshoot, proceed as follows:



Some models are not equipped with a HPS.

Tc(HP) = heat exchanger temp.
 Ta indoor = indoor air temp.
 Ta outdoor = outdoor air temp.
 HP = high pressure
 set value 1 = max. pressure
 set value 2 = min. pressure
 Refer to high pressure settings

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.5 Abnormal Low Pressure (Detected by the LPS) (E4)

Error code E4

Error generation The error is generated when the low-pressure switch is activated during compressor operation.

Causes

The possible causes are:

- Malfunctioning refrigerant piping circuit
- Malfunctioning low-pressure switch
- Disconnected or broken low-pressure switch harness
- Malfunctioning low-pressure switch connector connection
- Malfunctioning outdoor unit PCB.
- Stop valve is left close

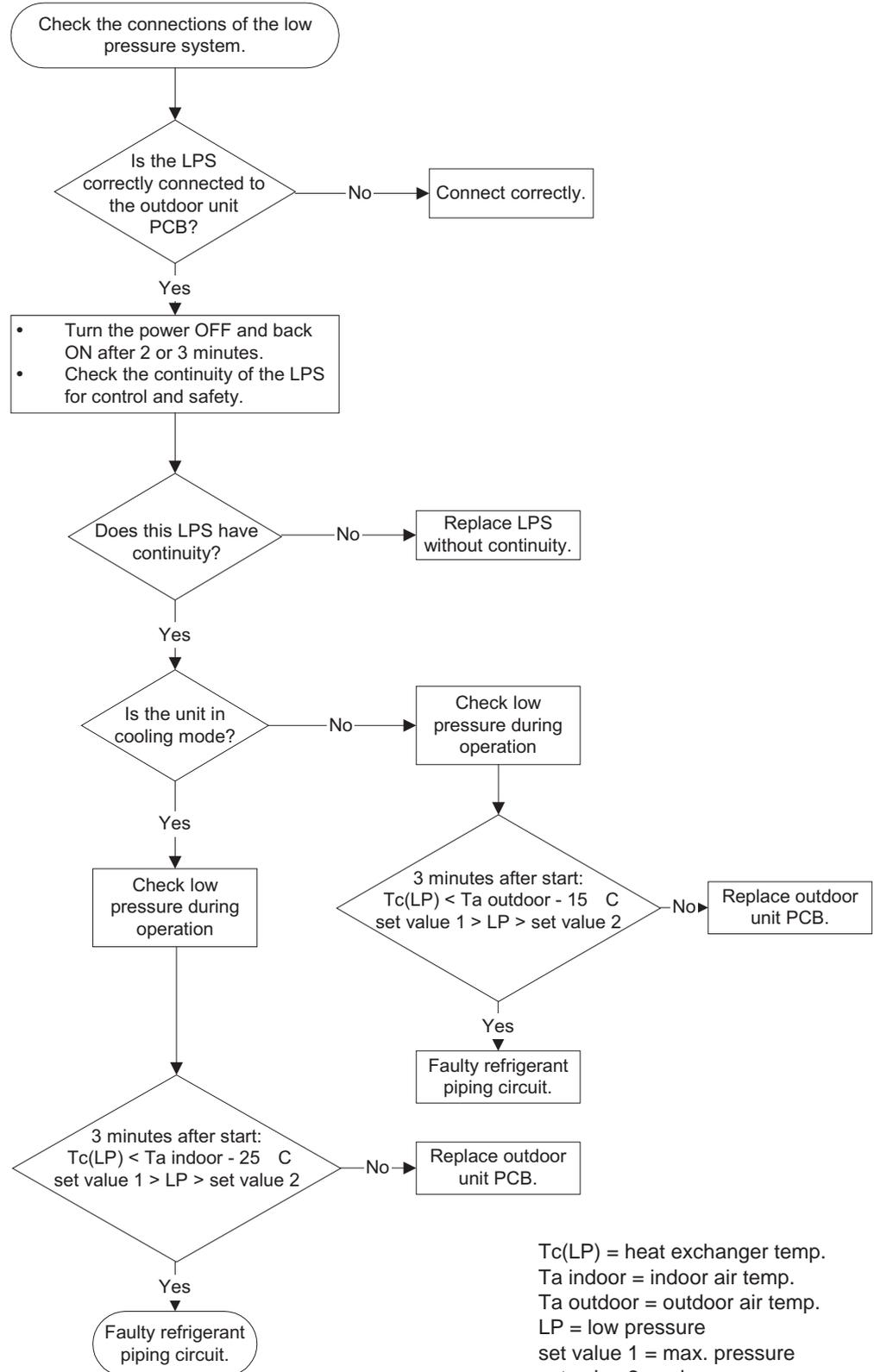
LPS settings

The table below contains the preset LPS values.

Applicable units	Abnormal	Reset
RYEP71/100/125L	< -0.3 bar	> +0.5 bar

Troubleshooting

To troubleshoot, proceed as follows:



Some models are not equipped with a HPS.

Tc(LP) = heat exchanger temp.
 Ta indoor = indoor air temp.
 Ta outdoor = outdoor air temp.
 LP = low pressure
 set value 1 = max. pressure
 set value 2 = min. pressure
 Refer to low pressure settings

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.6 Compressor Overcurrent (E6)

**Remote Controller
Display** E6

**Method of
Malfunction
Detection**

The input current value is detected with a current sensor.

**Malfunction
Decision
Conditions**

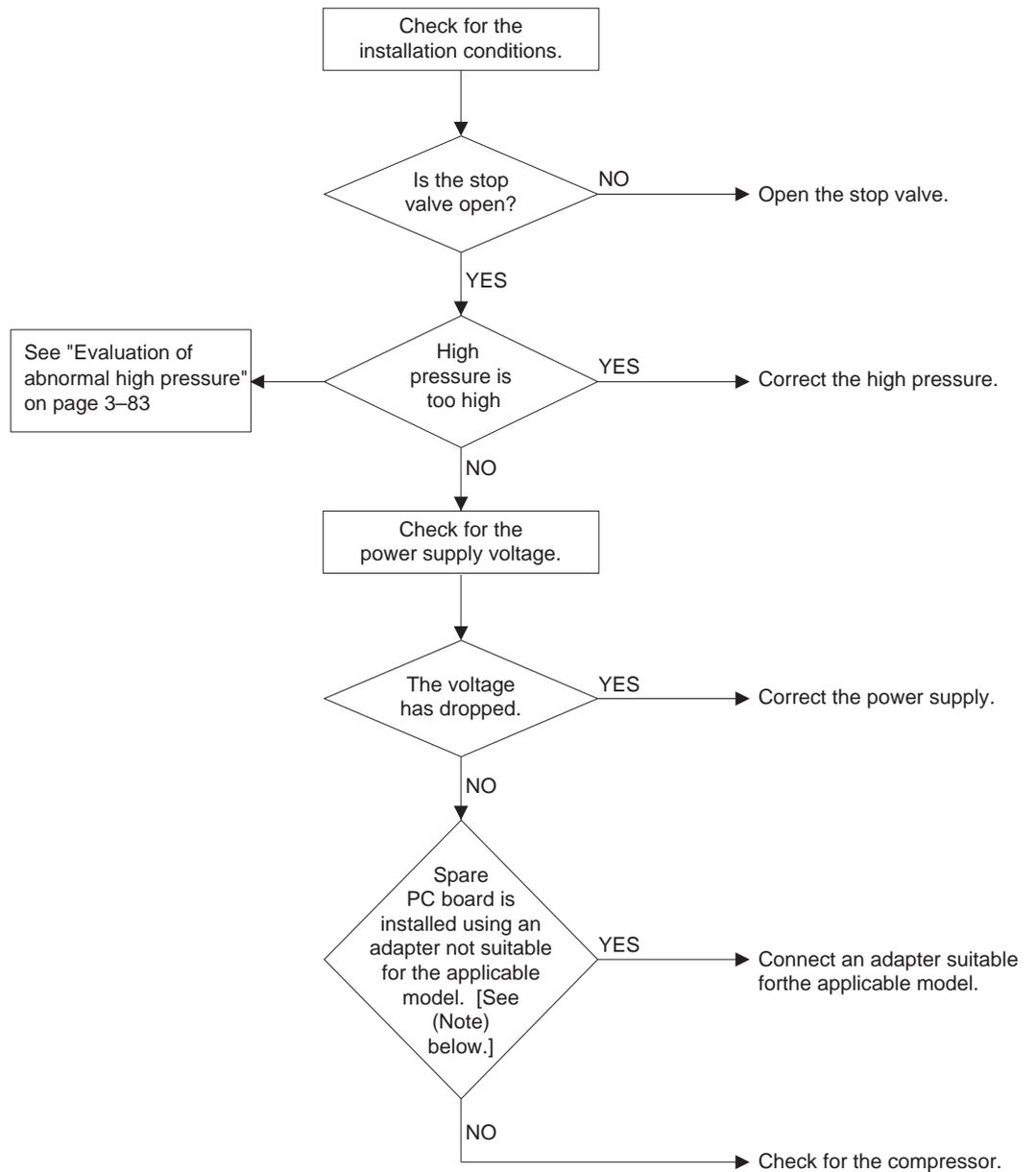
When the compressor input current exceeds the specified input current value.
Refer "Approximate Input current value" on next page.

Possible Causes

- High pressure increased too high
 - Voltage drop
 - Failure to open the stop valve
 - Faulty compressor (compressor lock)
-

3

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

Note

For details, refer to information in Section "Failure of PJ Capacity Setting".

Approximate Input current value:

		Input current value
RYEP71L7V1	ZR34K3E-PFJ	19.3
RYEP71L7W1	ZR34K3E-TFD	6.8
RYEP100L7V1	ZR47K3E-PFJ	25.9
RYEP100L7W1	ZR47K3E-TFD	9.0
RYEP125L7W1	JT160FA-YE	15.0

3.7 Malfunctioning Electronic Expansion Valve (E9)

Error code E9

Error generation The error is generated when the following coil current condition is not met:
Open circuit < coil current < short circuit.

Resistance values The table below contains the reference resistance values.

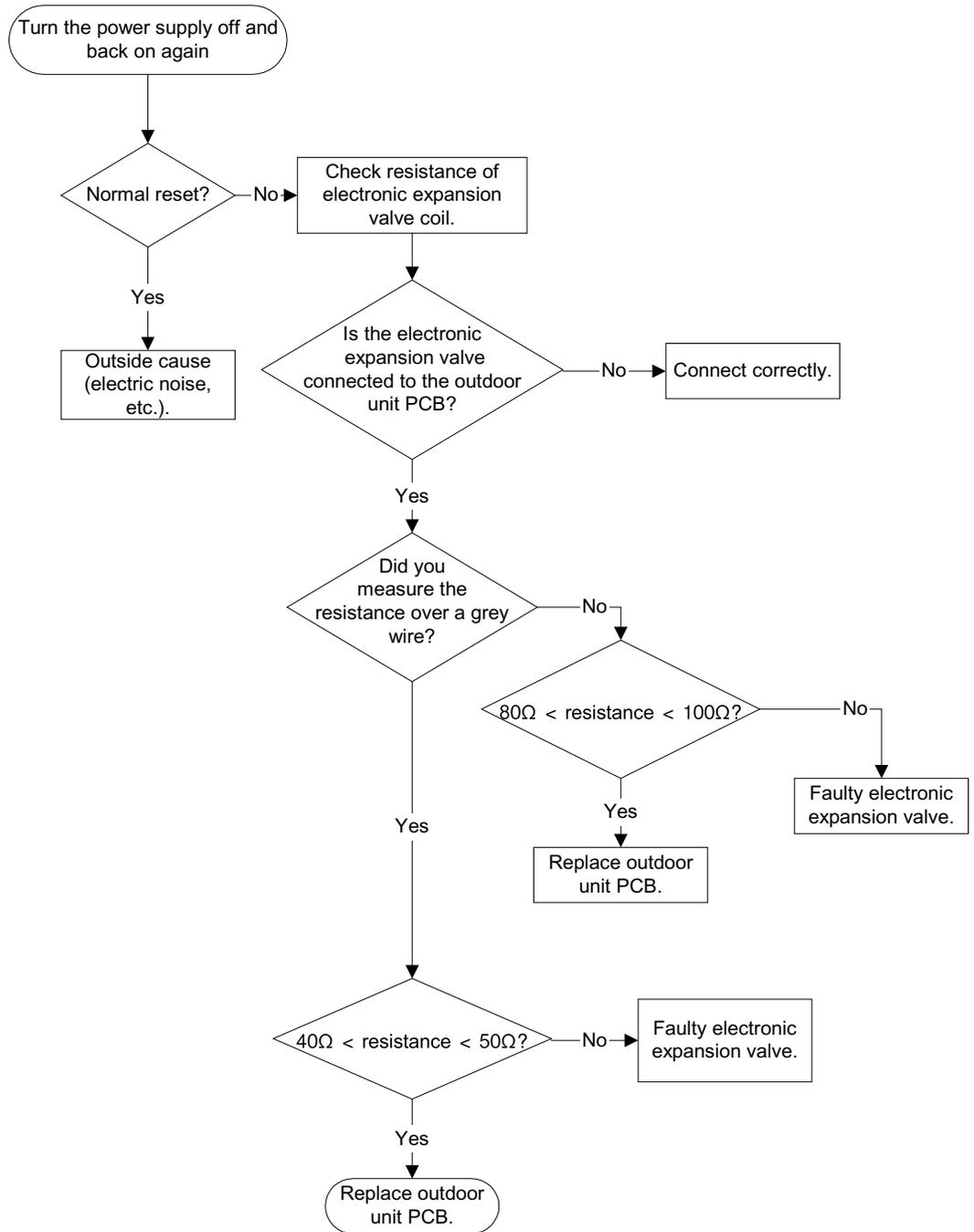
—	Grey	Black	Yellow	Red	Orange
Grey	—	40-50 Ω	40-50 Ω	40-50 Ω	40-50 Ω
Black	40-50 Ω	—	80-100 Ω	80-100 Ω	80-100 Ω
Yellow	40-50 Ω	80-100 Ω	—	80-100 Ω	80-100 Ω
Red	40-50 Ω	80-100 Ω	80-100 Ω	—	80-100 Ω
Orange	40-50 Ω	80-100 Ω	80-100 Ω	80-100 Ω	—

Causes The possible causes are:

- Malfunctioning electronic expansion valve
- Broken or disconnected electronic expansion valve harness
- Malfunctioning electronic expansion valve connector connection
- Malfunctioning outdoor unit PCB
- Outside cause (electric noise...).

Troubleshooting

To troubleshoot, proceed as follows:



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.8 Malfunctioning in Discharge Pipe Temperature (F3)

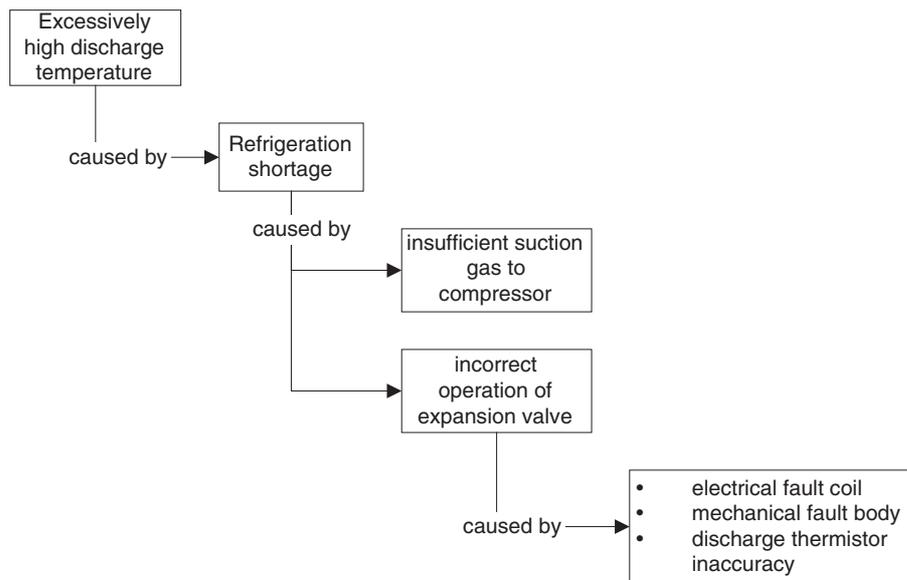
Error code F3

Error generation The error is generated when:

- Discharge pipe temperature becomes abnormally high
- Discharge pipe temperature rises suddenly
- Discharge pipe thermistor is not in its holder.

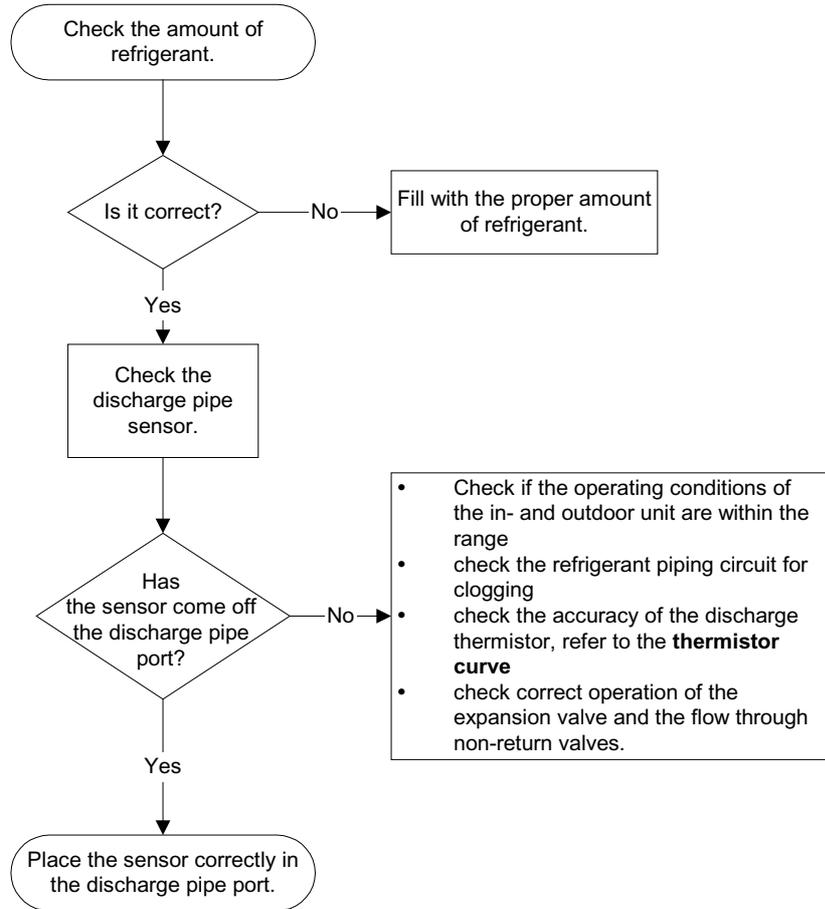
Causes The possible causes are:

- Improper refrigerant amount
- Clogging refrigerant piping circuit
- Discharge temperature that is too low due to too much refrigerant or due to the discharge thermistor being out of its holder
- Electronic expansion valve coil is disconnected from valve body
- Discharge temperature that is too high. The possible causes are:



Troubleshooting

To troubleshoot, proceed as follows:



Thermistor curve

See page 3-82.

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.9 Malfunctioning HPS (H3)

Error code H3

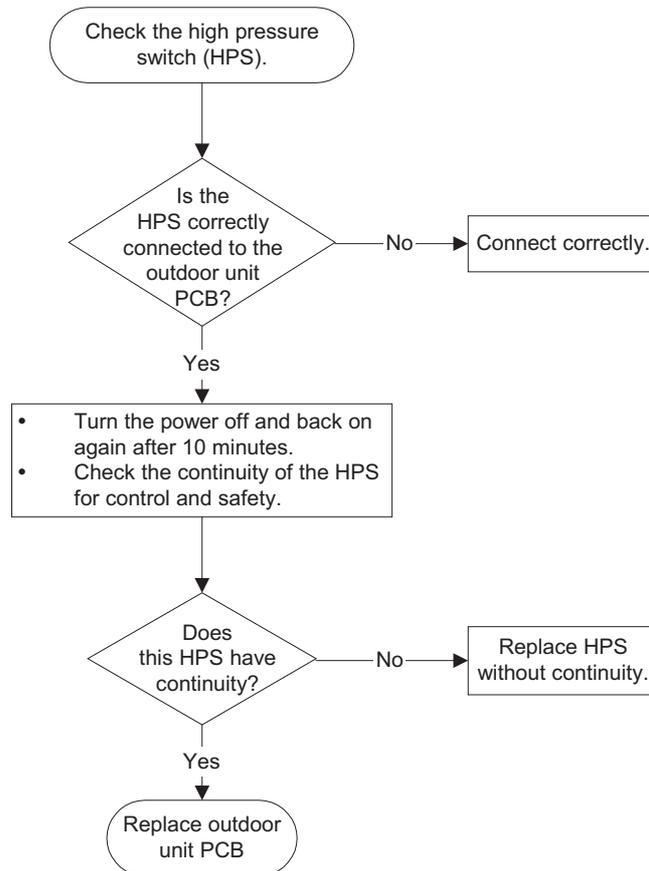
Applicable units RYEP125L

Error generation The error is generated when there is no continuity in the high-pressure switch during compressor OFF.

Causes The possible causes are:

- Malfunctioning high-pressure switch
- Broken or disconnected high-pressure switch harness
- Malfunctioning high-pressure switch connector connection
- Malfunctioning outdoor unit PCB.

Troubleshooting To troubleshoot, proceed as follows:



Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

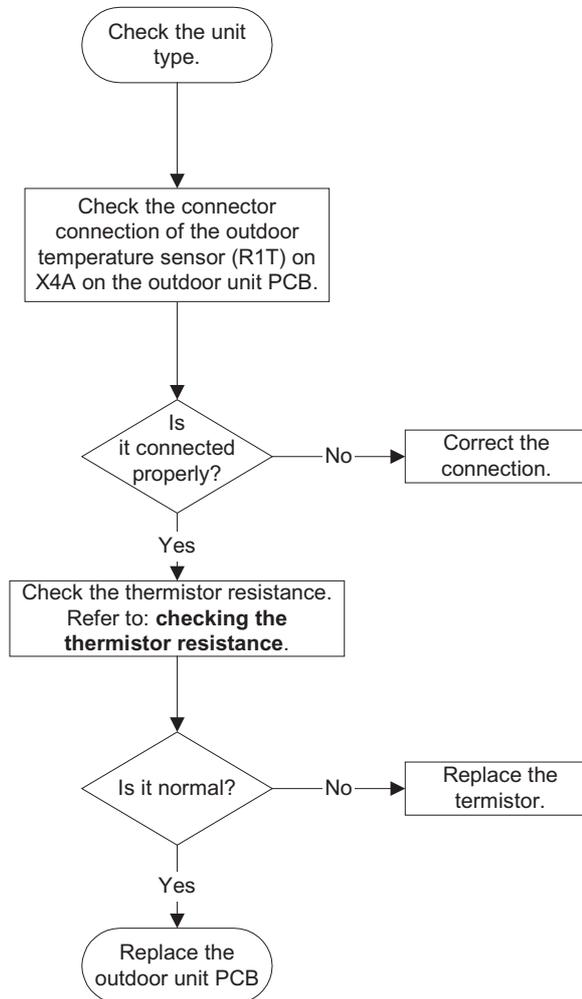
3.10 Malfunctioning Outdoor Thermistor System (H9)

Error code H9

Error generation The error is generated when the thermistor resistance is out of its range (60Ω to 600kΩ).

- Causes** The possible causes are:
- Malfunctioning outdoor thermistor
 - Malfunctioning outdoor thermistor connector connection
 - Malfunctioning outdoor unit PCB.

Troubleshooting To troubleshoot, proceed as follows:



Checking the thermistor resistance See page 3-81.

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

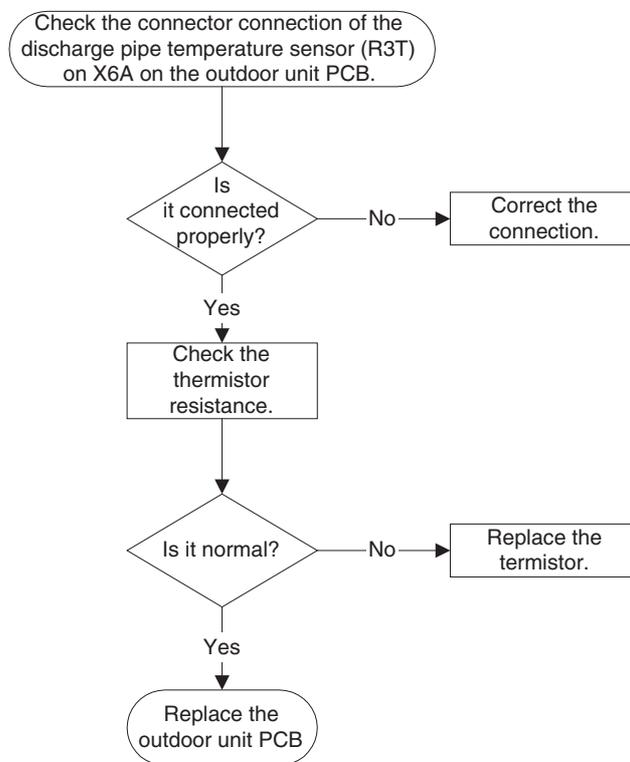
3.11 Malfunctioning Discharge Pipe Thermistor System (U3)

Error code U3

Error generation The error is generated when the thermistor resistance is out of its range.

- Causes** The possible causes are:
- Malfunctioning discharge pipe thermistor
 - Malfunctioning discharge pipe thermistor connector connection
 - Malfunctioning outdoor unit PCB.

Troubleshooting To troubleshoot, proceed as follows:



Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3

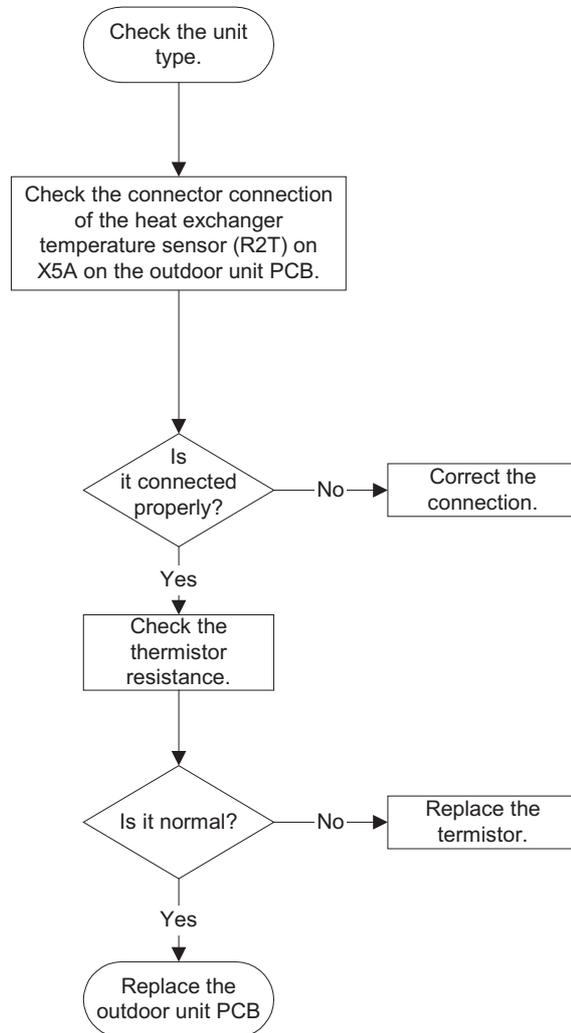
3.12 Malfunctioning Heat Exchanger Thermistor System (U6)

Error code U6

Error generation The error is generated when the thermistor resistance is out of its range.

- Causes** The possible causes are:
- Malfunctioning heat exchanger thermistor
 - Malfunctioning heat exchanger thermistor connector connection
 - Malfunctioning outdoor unit PCB.

Troubleshooting To troubleshoot, proceed as follows:



Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.13 Abnormal Heat Exchanging Temperature (F6)

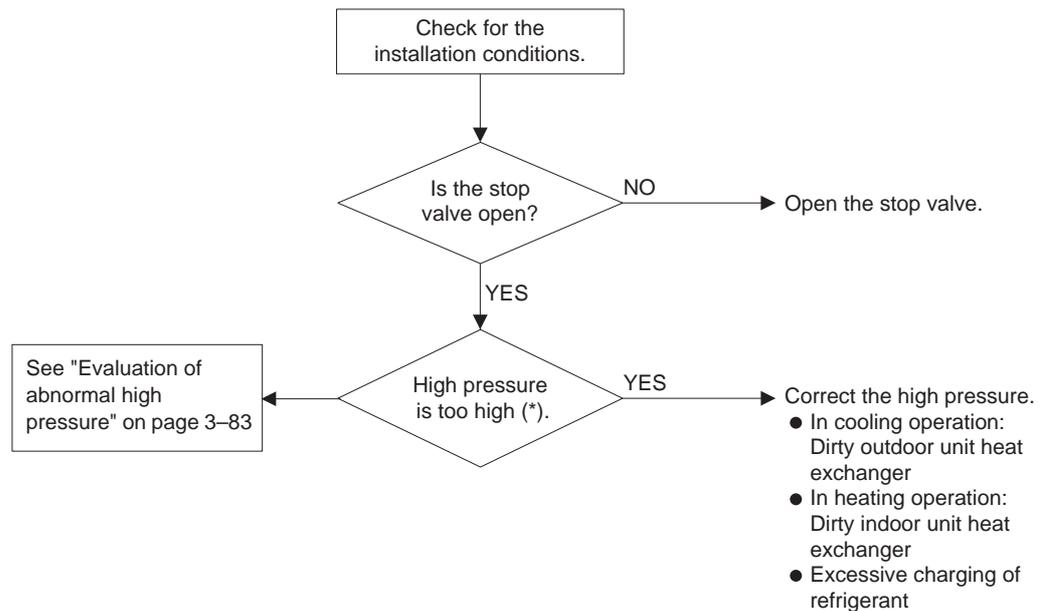
Remote Controller Display F6

Method of Malfunction Detection The high pressure control (stop) is made according to temperature detected with outdoor unit heat exchanging thermistor in cooling operation or indoor unit heat exchanging thermistor in heating operation.

Malfunction Decision Conditions When the outdoor unit heat exchanging temperature in cooling operation or the indoor unit heat exchanging temperature in heating operation exceeds a rated value.

- Possible Causes**
- Clogged indoor unit suction filter (in heating operation)
 - Dirty outdoor unit heat exchanger
 - Faulty outdoor unit fan
 - Excessive charging of refrigerant
 - Failure to open the stop valve

Troubleshooting



Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.14 Malfunction of Current Sensor System (J2)

Remote Controller Display



Method of Malfunction Detection

The malfunction of current sensor is detected through the current detected with the current sensor.

Malfunction Decision Conditions

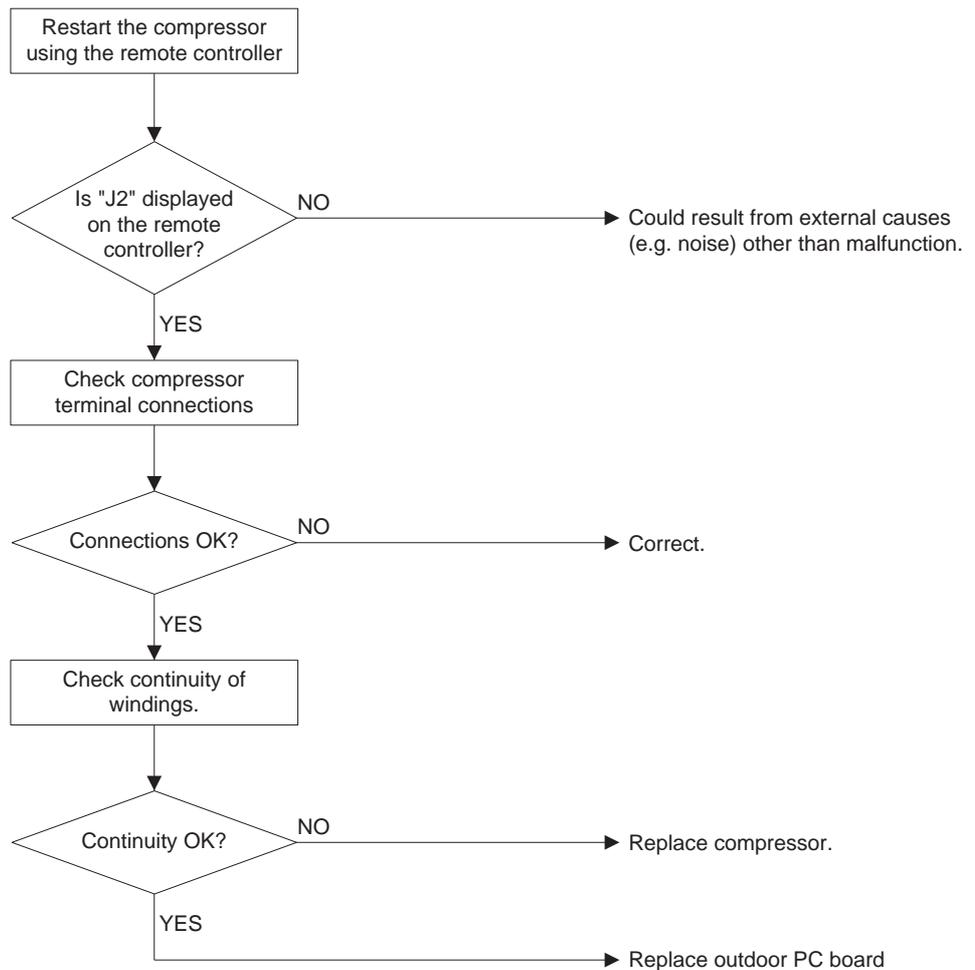
While in operation:
When the current detected with the current sensor is not more than a constant value.

While in stopping:
When the current detected with the current sensor is not less than a constant value.

Possible Causes

- Faulty current sensor
- Faulty outdoor unit PC board
- Disconnected compressor

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.15 Failure of Capacity Setting (Pj)

Remote Controller Display

Pj

Method of Malfunction Detection

Check whether set value (i.e., factory set value) written in E²PROM or set value with the (replaced) capacity setting adapter (X26A) is the same as that of outdoor unit capacity.

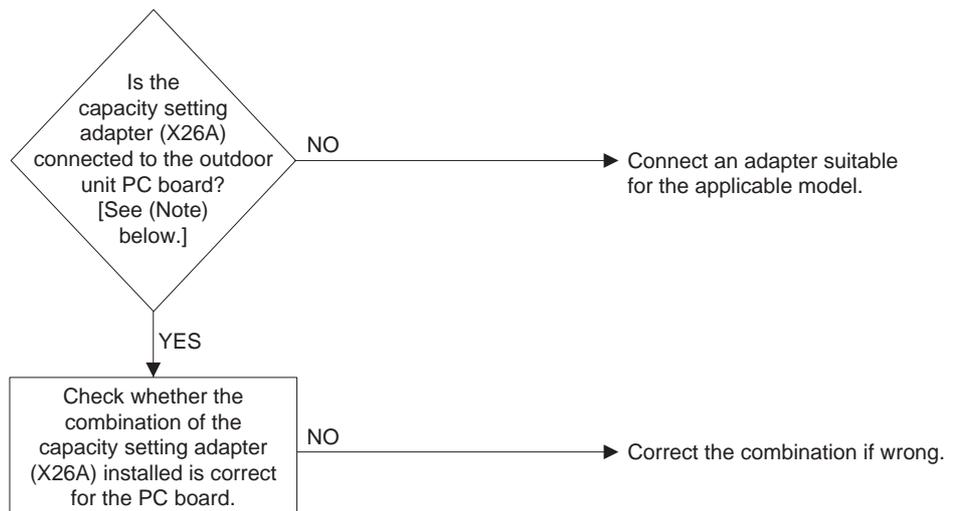
Malfunction Decision Conditions

When the set value with the E²PROM differs from that of the outdoor unit capacity or any capacity setting adapter other than that suitable for the applicable PC board is installed. (However, the failure decision is made only when the power supply is turned on.)

Possible Causes

- Improper set value with E²PROM
- Improper capacity setting adapter installed
- Faulty outdoor unit PC board

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

Notes

- The capacity setting adapter is not connected at the time of shipment from factory. (The capacity is written in the E²PROM.) This capacity setting adapter is required only when the PC board is replaced with a spare PC board.
- Refer to instructions on how to set Sky-Air L- series Spare Part outdoor PC board on page 4-20.

3

4 Error Codes: System Malfunctions

4.1 What Is in This Chapter?

Introduction

In the first stage of the troubleshooting sequence, it is important to correctly interpret the error code on the remote controller display. The error code helps you to find the cause of the problem.

Overview

This chapter contains the following topics:

Topic	See page
4.2–Gas Shortage Detection (U0)	3–64
4.3–Reverse Phase (U1)	3–65
4.4–Transmission Error between Indoor and Outdoor Unit (U4 or UF)	3–67
4.5–Transmission Error between Indoor Unit and Remote Controller (U5)	3–69
4.6–Transmission Error between MAIN Remote Controller and SUB Remote Controller (U8)	3–70
4.7–Malfunctioning Field Setting Switch (UA)	3–71

4.2 Gas Shortage Detection (U0)

Error code U0

Error method The discharge pipe thermistor detects the malfunction temperature at which there can be a gas shortage. If the discharge temperature exceeds 125°C during more than 20 s, the outdoor unit will stop and retry when the guard timer is OFF (3 min have passed).

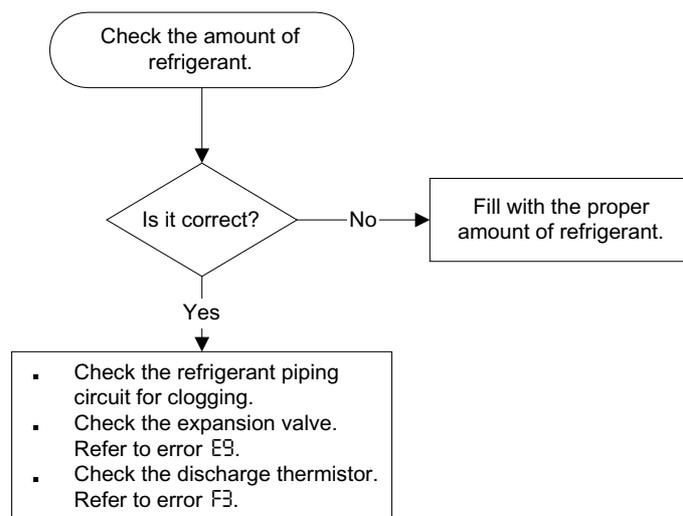
During the retrial, the expansion valve will be opened 70 pulses more (cool) or 80 pulses more (heat) than in case of the previous start. When the unit restarts with a fully opened expansion valve, the remote controller displays "U0" after pressing the test button.

Error generation The error is generated when the microcomputer detects gas shortage. However, the unit can still operate.

Causes The possible causes are:

- Refrigerant shortage
- Clogging of the refrigerant piping circuit.

Troubleshooting To troubleshoot, proceed as follows:



Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

4.3 Reverse Phase (U1)

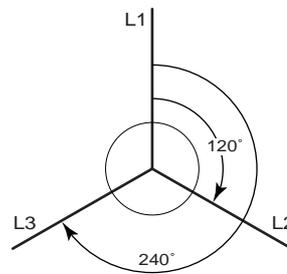
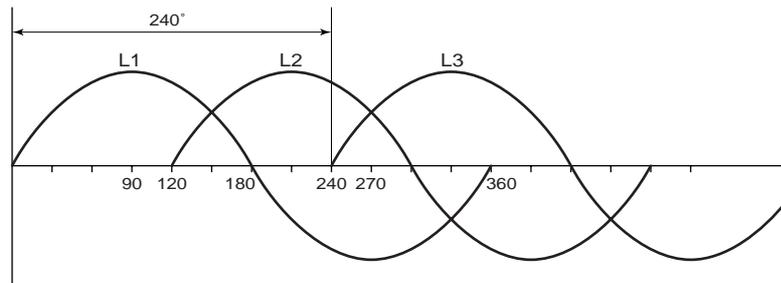
Error code

U1

This error code is only for 3-phase equipment.

Error generation

The error is generated when the difference between phase L1 and L3 is not 240°. The illustration below shows the 3-phase network.



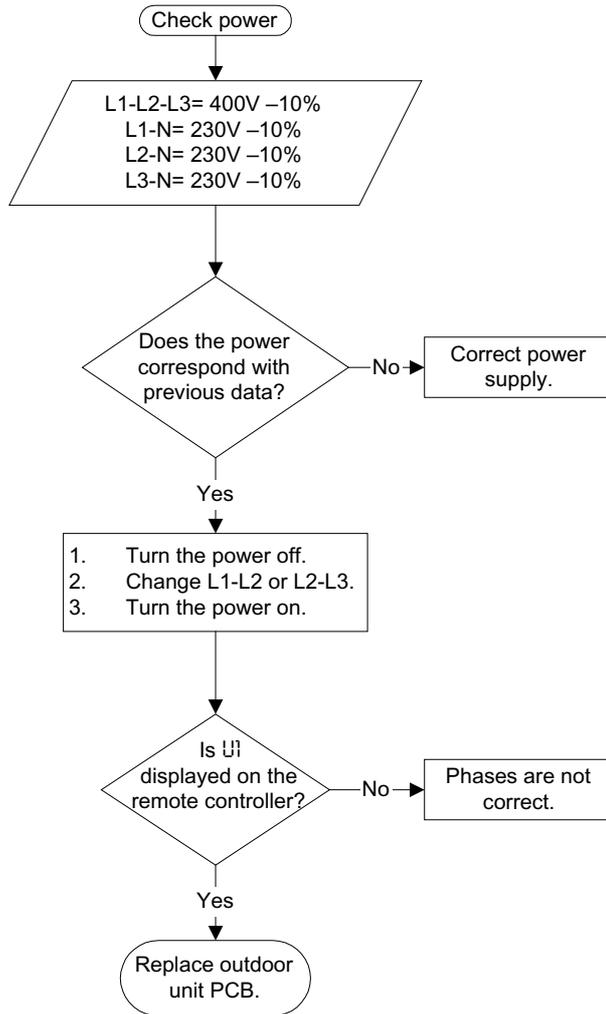
Causes

The possible causes are:

- Malfunctioning power supply wiring connection
- Broken or disconnected power supply wiring
- Malfunctioning outdoor unit PCB

Troubleshooting

To troubleshoot, proceed as follows:



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

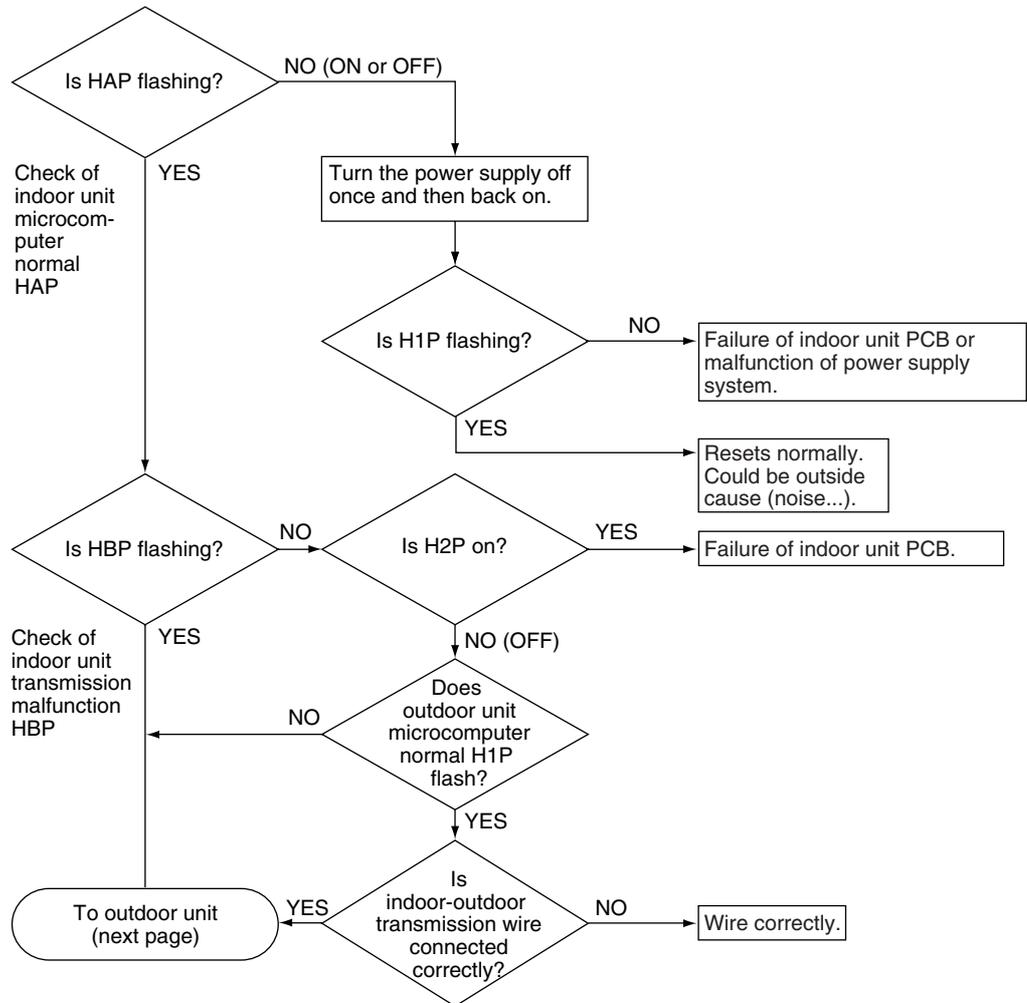
4.4 Transmission Error between Indoor and Outdoor Unit (U4 or UF)

Error code U4 or UF

Error generation The error is generated when the microprocessor detects that the transmission between the indoor and the outdoor unit is not normal over a certain amount of time.

- Causes** The possible causes are:
- Wiring indoor-outdoor transmission wire is incorrect
 - Malfunctioning indoor unit PCB
 - Malfunctioning outdoor unit PCB
 - Outside cause (noise...).

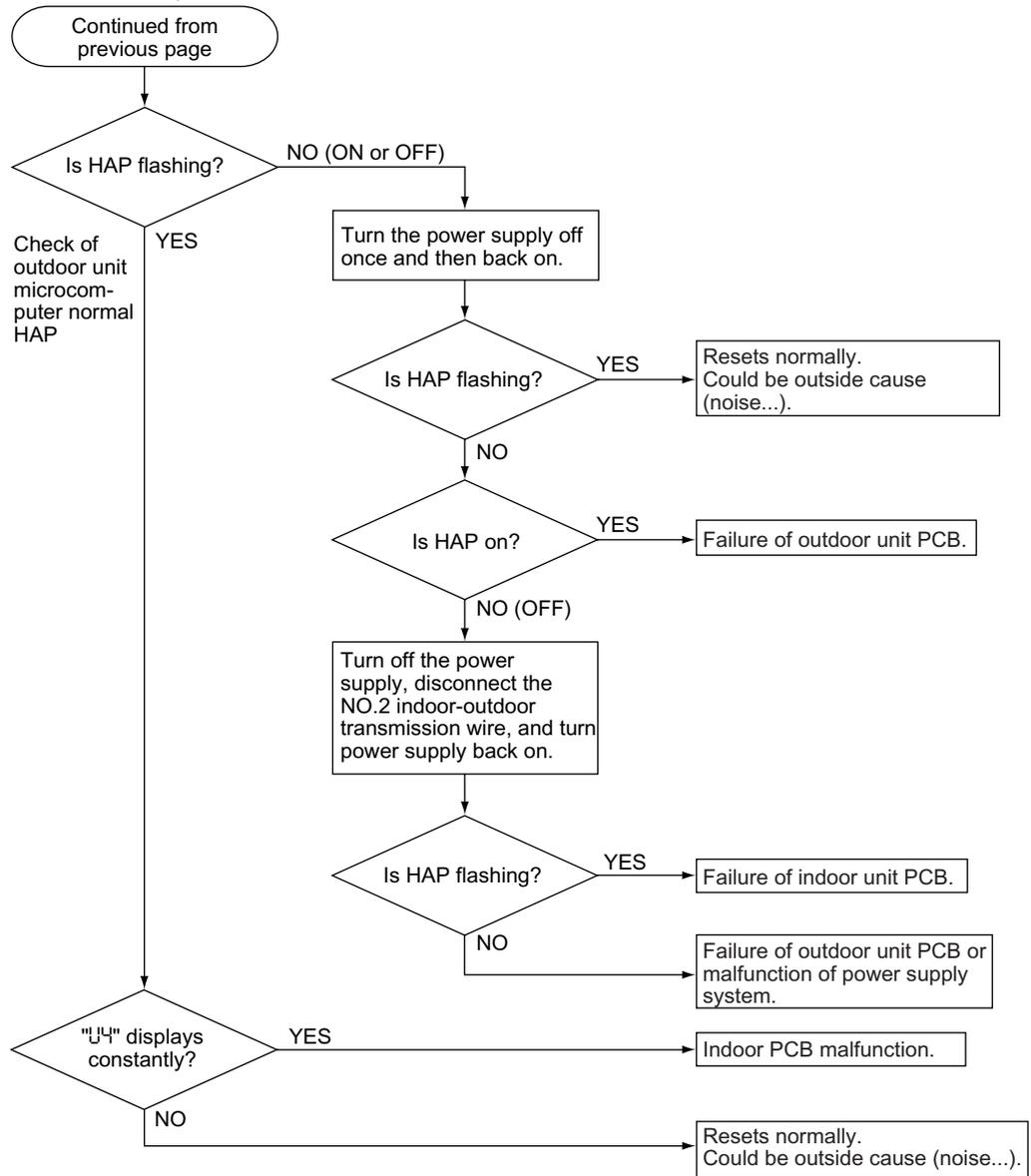
Troubleshooting 1 Diagnosis of incorrect or broken/disconnected wiring. If the LEDs on the indoor unit PC board are off, it indicates that the transmission wiring between indoor and outdoor units may be incorrect or broken/disconnected.:



Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

Troubleshooting 2

To troubleshoot, proceed as follows:



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

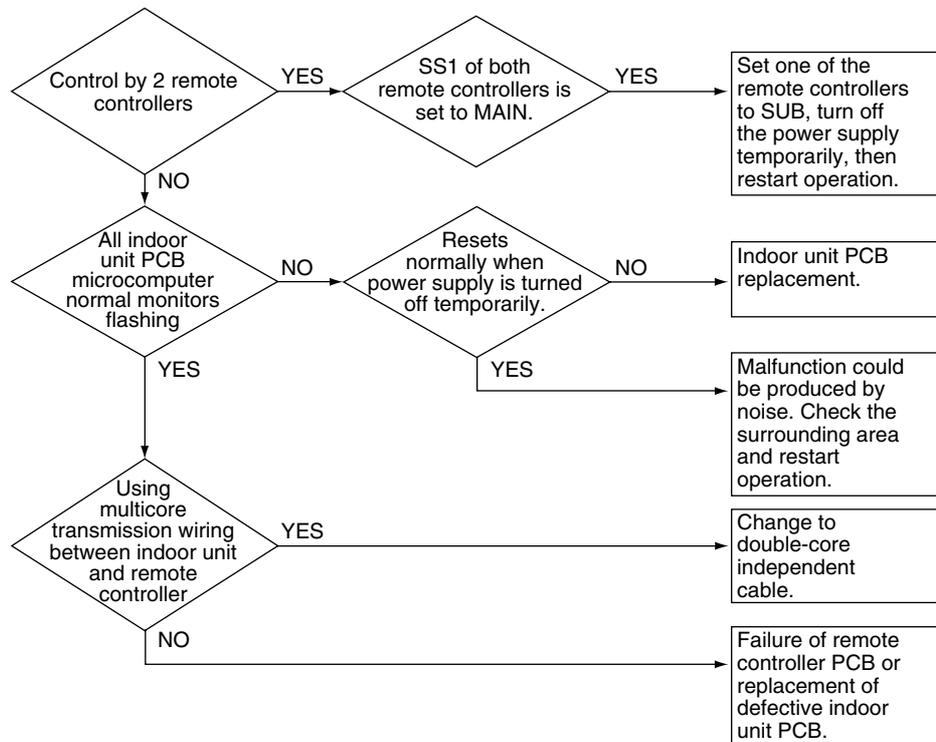
4.5 Transmission Error between Indoor Unit and Remote Controller (U5)

Error code U5

Error generation The error is generated when the microprocessor detects that the transmission between the indoor unit and the remote controller is not normal over a certain amount of time.

- Causes** The possible causes are:
- Malfunctioning remote controller
 - Malfunctioning indoor PCB
 - Outside cause (noise...)
 - Connection of two master remote controllers (when using two remote controllers).

Troubleshooting To troubleshoot, proceed as follows:



Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

4.6 Transmission Error between MAIN Remote Controller and SUB Remote Controller (U8)

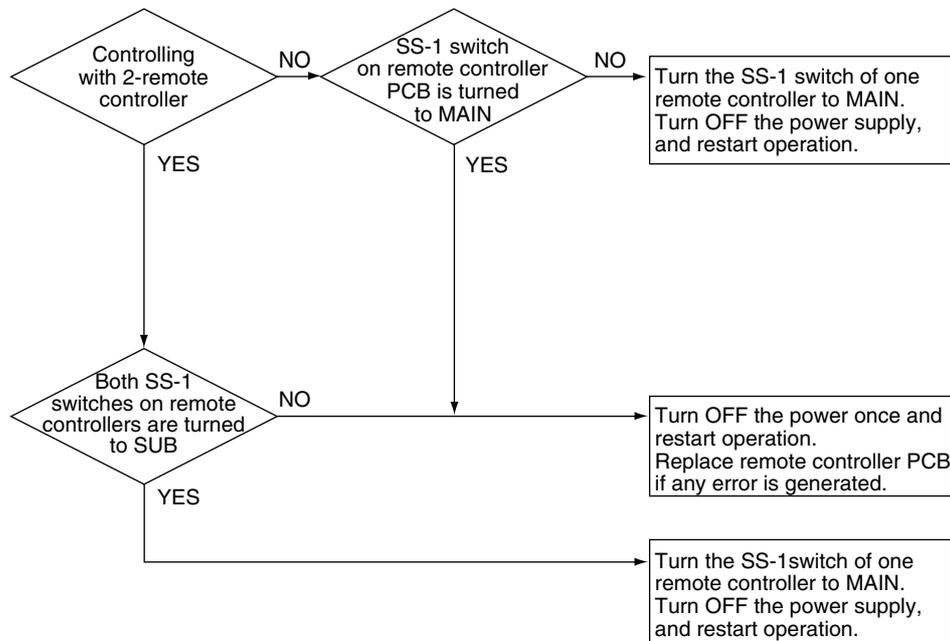
Error code U8

Error generation The error is generated when, in case of controlling with two remote controllers, the microprocessor detects that the transmission between the indoor unit and the remote controllers (MAIN and SUB) is not normal over a certain amount of time.

Causes The possible causes are:

- Transmission error between MAIN remote controller and SUB remote controller
- Connection among SUB remote controllers
- Malfunctioning remote controller PCB.

Troubleshooting To troubleshoot, proceed as follows:



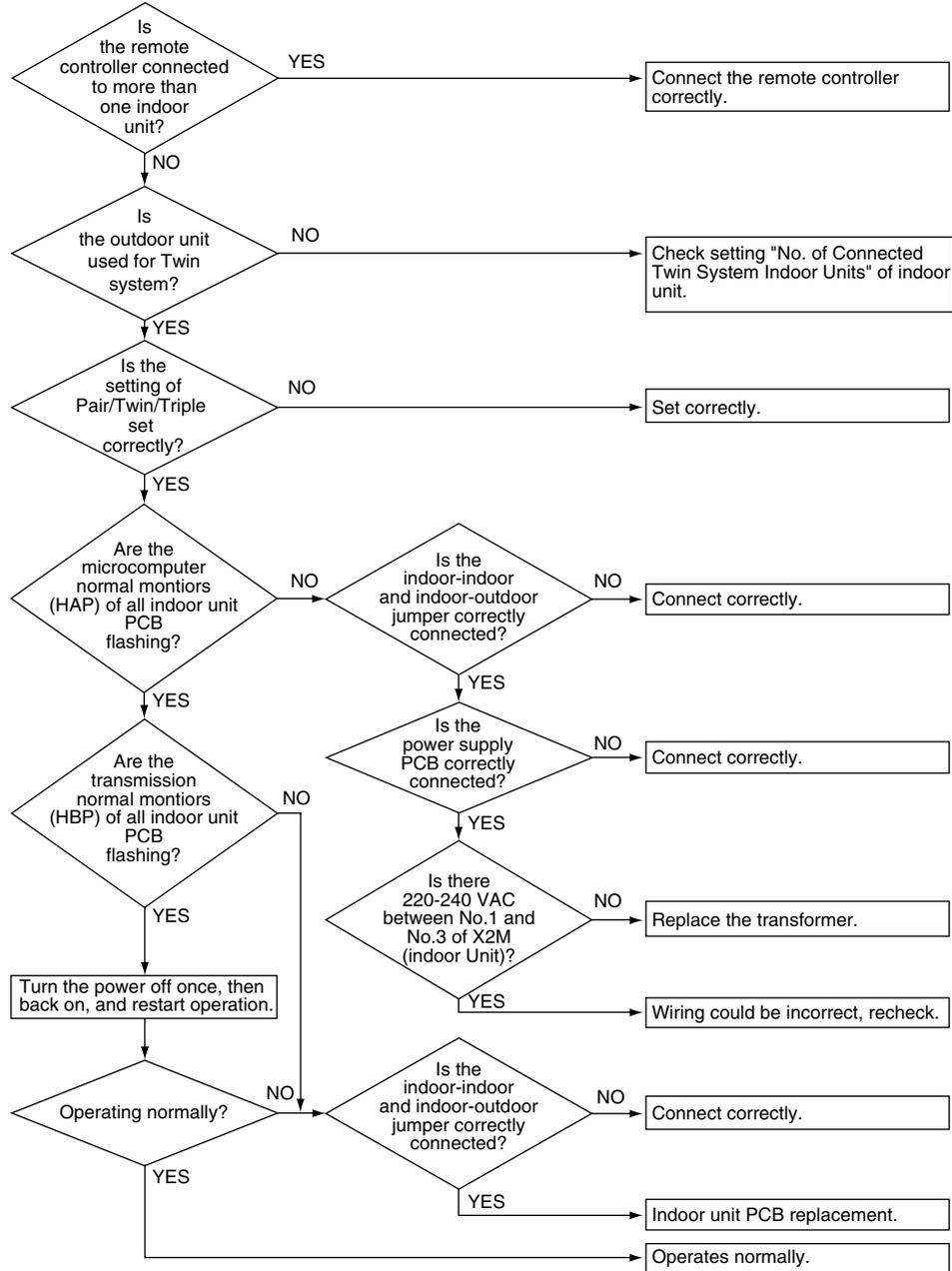
Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

4.7 Malfunctioning Field Setting Switch (UR)

Error code	UR
Error generation	The error is generated when incorrect field settings have been set for pair/twin/triple/double twin.
Causes	<p>The possible causes are:</p> <ul style="list-style-type: none">■ Malfunctioning indoor or outdoor unit PCB■ Malfunctioning power supply PCB■ Indoor-outdoor, indoor-indoor unit transmission wiring■ Malfunctioning remote controller wiring.

Troubleshooting

To troubleshoot, proceed as follows:



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

5 Additional Checks for Troubleshooting

5.1 What Is in This Chapter?

Introduction

This chapter explains how you must check the units to carry out troubleshooting correctly.

Overview

This chapter contains the following topics:

Topic	See page
5.2–Indoor Unit: Checking the Fan Motor Hall IC	3–74
5.3–Indoor Unit: Checking the Power Supply Wave Form	3–75
5.4–Outdoor Unit: Checking the Refrigerant System	3–76
5.5–Outdoor unit: Checking the Installation Condition	3–77
5.6–Outdoor Unit: Checking the Discharge Pressure	3–78
5.7–Outdoor Unit: Checking the Expansion Valve	3–79
5.8–Checking the Thermistors	3–80
5.9–R1T and R2T: Resistance Conversion Table (Ambient & Coil Sensor)	3–81
5.10–R3T: Resistance Conversion Table (Discharge Pipe Sensor)	3–82
5.11–Evaluation of abnormal high pressure	3–83
5.12–Evaluation of abnormal low pressure	3–84
5.13–Check for Clogged Points	3–85

5.2 Indoor Unit: Checking the Fan Motor Hall IC

Applicable units Units using phase cut controlled fan motor with feedback signal.

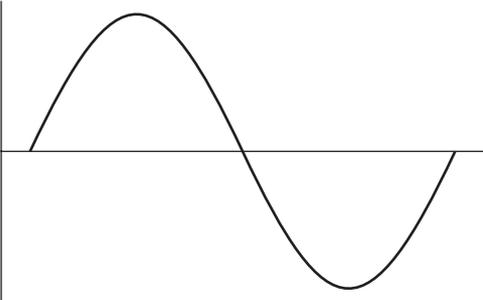
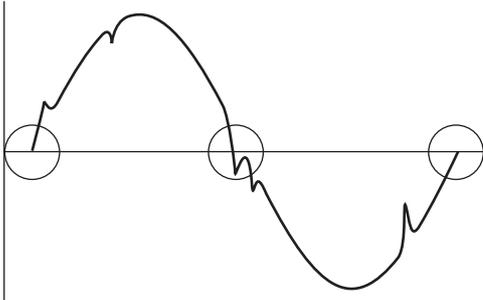
Checking To check the indoor unit fan motor hall IC, proceed as follows:

Step	Action								
1	Make sure connector S7 on PCB 1 is properly connected.								
2	Make sure the power is ON and that there is no operation.								
3	Measure the voltage between pin 1 and 3 of S7.								
4	Turn the fan one rotation with your hand and measure the generated pulses.								
5	Proceed as follows: <table border="1" data-bbox="488 786 1393 1093"> <thead> <tr> <th>If...</th> <th>Then...</th> </tr> </thead> <tbody> <tr> <td>The measured voltage between pin 1 and 3 does not equal 5 V</td> <td>Replace the PCB 1.</td> </tr> <tr> <td>The generated pulses do not equal 3 pulses between pin 2 and 3</td> <td>Replace the fan motor.</td> </tr> <tr> <td>The measured voltage does not equal 5 V and the generated pulses do not equal 3 pulses between pin 2 and 3</td> <td>Replace the PCB 1.</td> </tr> </tbody> </table>	If...	Then...	The measured voltage between pin 1 and 3 does not equal 5 V	Replace the PCB 1.	The generated pulses do not equal 3 pulses between pin 2 and 3	Replace the fan motor.	The measured voltage does not equal 5 V and the generated pulses do not equal 3 pulses between pin 2 and 3	Replace the PCB 1.
If...	Then...								
The measured voltage between pin 1 and 3 does not equal 5 V	Replace the PCB 1.								
The generated pulses do not equal 3 pulses between pin 2 and 3	Replace the fan motor.								
The measured voltage does not equal 5 V and the generated pulses do not equal 3 pulses between pin 2 and 3	Replace the PCB 1.								

5.3 Indoor Unit: Checking the Power Supply Wave Form

Checking

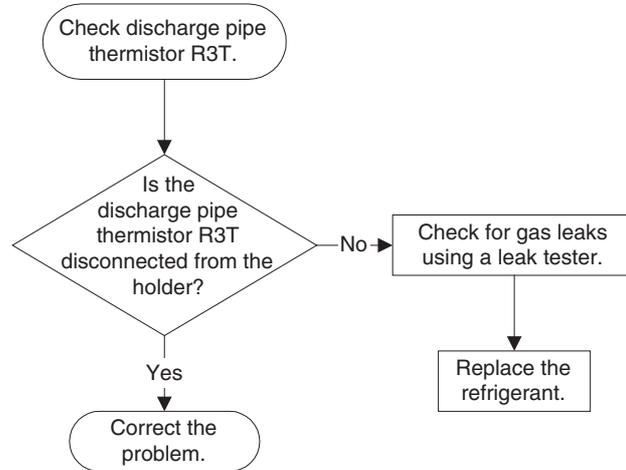
To check the power supply wave form, proceed as follows:

Step	Action
1	Measure the power supply wave form between pin 1 and 3 of X1M for the outdoor units or between pin 1 and 3 of X2M for the indoor units.
2	Check whether the power supply wave form is a sine wave: <div style="text-align: center; margin-top: 20px;">  </div>
3	Check whether there is wave form disturbance near the zero cross: <div style="text-align: center; margin-top: 20px;">  </div>
4	Adjust the supply voltage.

5.4 Outdoor Unit: Checking the Refrigerant System

Checking

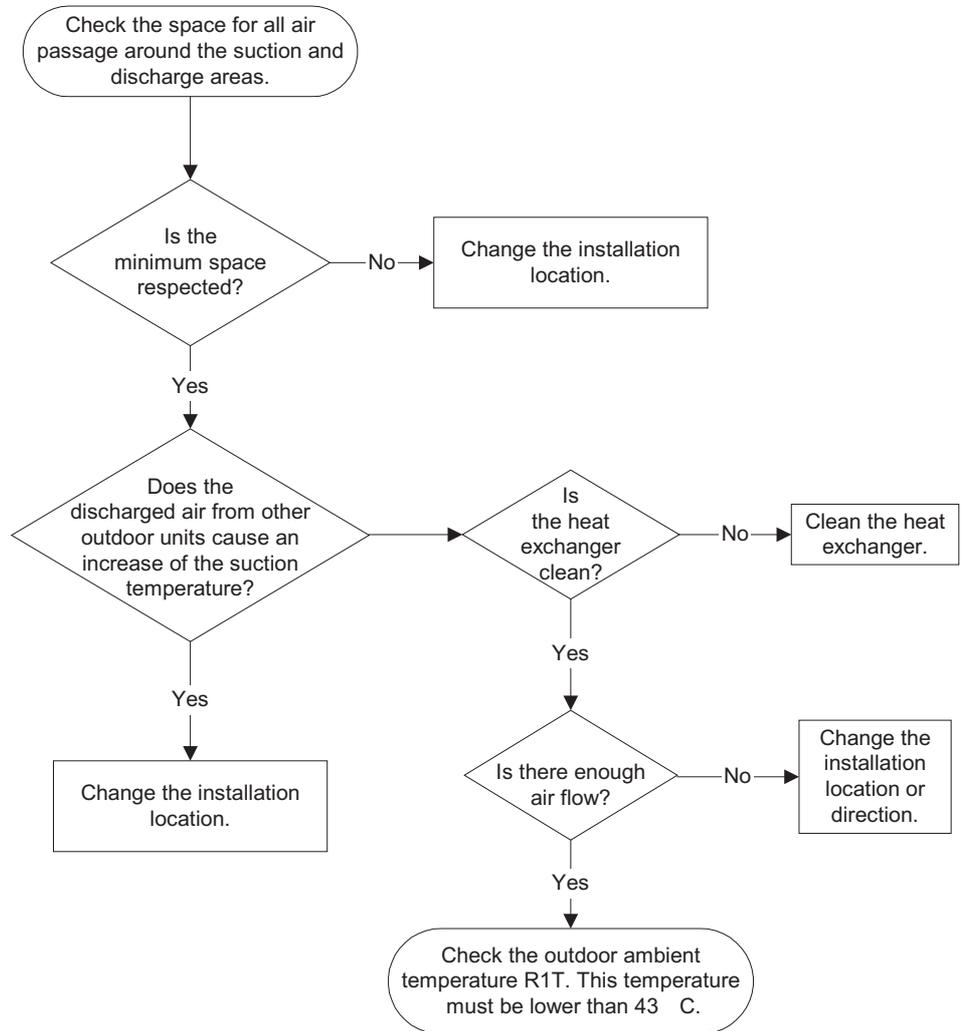
To check the refrigerant system, proceed as follows:

**3**

5.5 Outdoor unit: Checking the Installation Condition

Checking

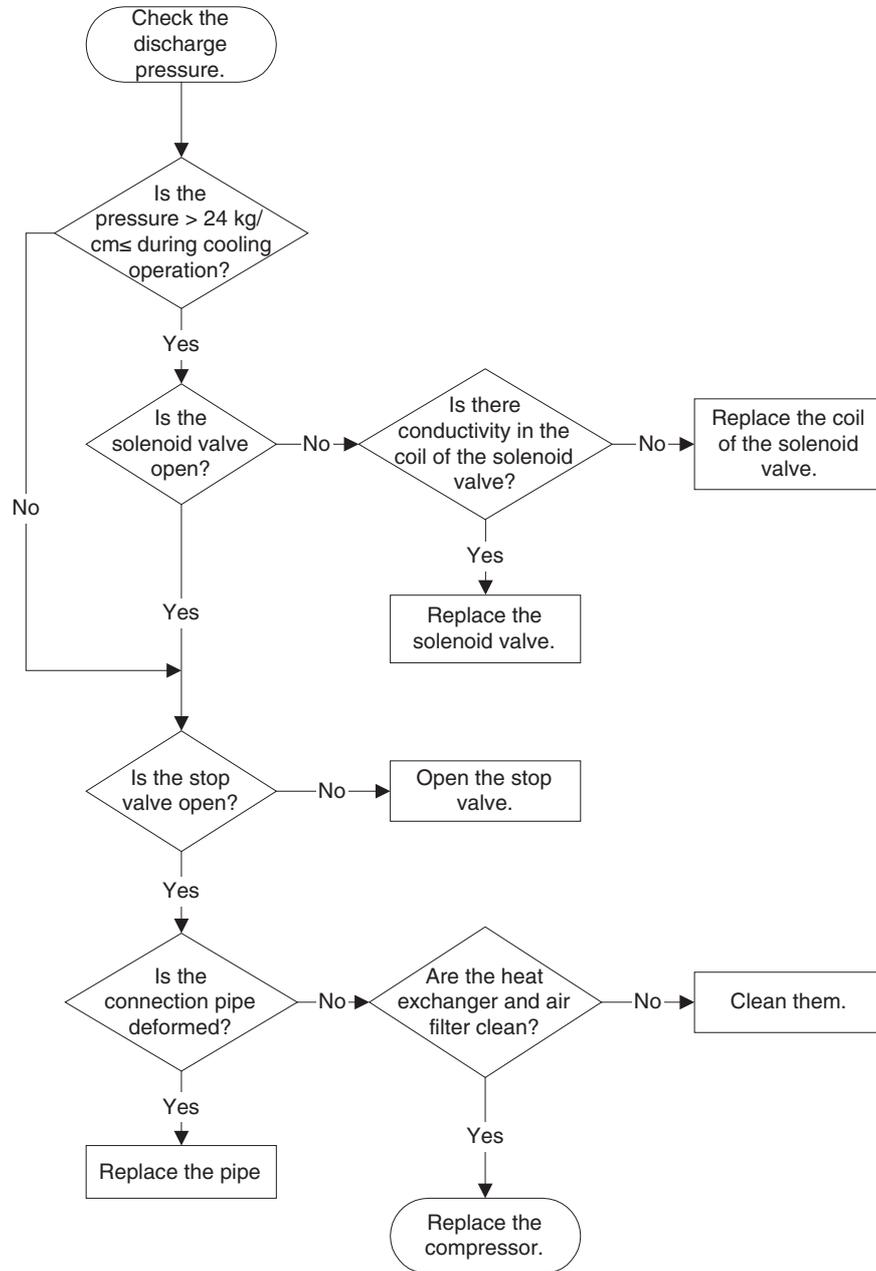
To check the installation condition, proceed as follows:



5.6 Outdoor Unit: Checking the Discharge Pressure

Checking

To check the discharge pressure, proceed as follows:



3

5.7 Outdoor Unit: Checking the Expansion Valve

Checking

To check the electronic expansion valve, proceed as follows:

Step	Action																																				
1	Check if the expansion valve connector is correctly inserted in the X24A of PCB 1.																																				
2	Compare the expansion valve unit with the number of the connector to make sure it is correctly connected.																																				
3	Switch the power OFF.																																				
4	Switch the power ON to check whether the expansion valve is producing a clicking sound. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>If...</th> <th>Then...</th> </tr> </thead> <tbody> <tr> <td>The expansion valve has no clicking sound</td> <td>Disconnect the valve connector without the clicking sound and proceed to step 5.</td> </tr> </tbody> </table>	If...	Then...	The expansion valve has no clicking sound	Disconnect the valve connector without the clicking sound and proceed to step 5.																																
If...	Then...																																				
The expansion valve has no clicking sound	Disconnect the valve connector without the clicking sound and proceed to step 5.																																				
5	<p>Check the coil current: Open circuit < normal < short circuit</p> <p>The table below contains the reference resistance values.</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>—</th> <th>Grey</th> <th>Black</th> <th>Yellow</th> <th>Red</th> <th>Orange</th> </tr> </thead> <tbody> <tr> <th>Grey</th> <td>—</td> <td>40-50 Ω</td> <td>40-50 Ω</td> <td>40-50 Ω</td> <td>40-50 Ω</td> </tr> <tr> <th>Black</th> <td>40-50 Ω</td> <td>—</td> <td>80-100 Ω</td> <td>80-100 Ω</td> <td>80-100 Ω</td> </tr> <tr> <th>Yellow</th> <td>40-50 Ω</td> <td>80-100 Ω</td> <td>—</td> <td>80-100 Ω</td> <td>80-100 Ω</td> </tr> <tr> <th>Red</th> <td>40-50 Ω</td> <td>80-100 Ω</td> <td>80-100 Ω</td> <td>—</td> <td>80-100 Ω</td> </tr> <tr> <th>Orange</th> <td>40-50 Ω</td> <td>80-100 Ω</td> <td>80-100 Ω</td> <td>80-100 Ω</td> <td>—</td> </tr> </tbody> </table>	—	Grey	Black	Yellow	Red	Orange	Grey	—	40-50 Ω	40-50 Ω	40-50 Ω	40-50 Ω	Black	40-50 Ω	—	80-100 Ω	80-100 Ω	80-100 Ω	Yellow	40-50 Ω	80-100 Ω	—	80-100 Ω	80-100 Ω	Red	40-50 Ω	80-100 Ω	80-100 Ω	—	80-100 Ω	Orange	40-50 Ω	80-100 Ω	80-100 Ω	80-100 Ω	—
—	Grey	Black	Yellow	Red	Orange																																
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Orange	40-50 Ω	80-100 Ω	80-100 Ω	80-100 Ω	—																																
6	Check the clicking sound again. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>If...</th> <th>Then...</th> </tr> </thead> <tbody> <tr> <td>There is a clicking sound</td> <td>The expansion valve works properly.</td> </tr> <tr> <td>There is no clicking sound</td> <td>Replace the expansion valve unit.</td> </tr> <tr> <td>There is still no clicking sound</td> <td>Replace outdoor PCB 1.</td> </tr> </tbody> </table>	If...	Then...	There is a clicking sound	The expansion valve works properly.	There is no clicking sound	Replace the expansion valve unit.	There is still no clicking sound	Replace outdoor PCB 1.																												
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There is a clicking sound	The expansion valve works properly.																																				
There is no clicking sound	Replace the expansion valve unit.																																				
There is still no clicking sound	Replace outdoor PCB 1.																																				

5.8 Checking the Thermistors

Thermistors

If the cause of the problem is related to the thermistors, then the thermistors should be checked prior to changing the PCB.

For more information about these thermistors, see:

- "Wiring Diagrams: Outdoor Units"
- "Functions of Thermistors" on page 2-4.

Overview of thermistors

The table below contains an overview of the thermistors:

Thermistor		Description
Indoor	R1T	Suction air thermistor
	R2T	Heat exchanger thermistor (coil thermistor)
Outdoor	R1T	Ambient air thermistor
	R2T	Heat exchanger thermistor (coil thermistor)
	R3T	Discharge pipe thermistor

Checking

To check the thermistors, proceed as follows:

Step	Action
1	Disconnect the thermistor from the PCB.
2	Read the temperature and the resistor value.
3	Check if the measured values correspond with the values in the table on the next pages.

5.9 R1T and R2T: Resistance Conversion Table (Ambient & Coil Sensor)

Temperature – resistance

The table below is the thermistor (R1T and R2T) temperature – resistance conversion table.

Temp. (°C)	R1T (kΩ)	R2T (kΩ)	Temp. (°C)	R1T (kΩ)	R2T (kΩ)	Temp. (°C)	R1T (kΩ)	R2T (kΩ)
-20	197.81	192.08	20	25.01	24.45	60	4.96	4.87
-19	186.53	181.16	21	23.91	23.37	61	4.79	4.70
-18	175.97	170.94	22	22.85	22.35	62	4.62	4.54
-17	166.07	161.36	23	21.85	21.37	63	4.46	4.38
-16	156.80	152.38	24	20.90	20.45	64	4.30	4.23
-15	148.10	143.96	25	20.00	19.56	65	4.16	4.08
-14	139.94	136.05	26	19.14	18.73	66	4.01	3.94
-13	132.28	128.63	27	18.32	17.93	67	3.88	3.81
-12	125.09	121.66	28	17.54	17.17	68	3.75	3.68
-11	118.34	115.12	29	16.80	16.45	69	3.62	3.56
-10	111.99	108.96	30	16.10	15.76	70	3.50	3.44
-9	106.03	103.18	31	15.43	15.10	71	3.38	3.32
-8	100.41	97.73	32	14.79	14.48	72	3.27	3.21
-7	95.14	92.61	33	14.18	13.88	73	3.16	3.11
-6	90.17	87.79	34	13.59	13.31	74	3.06	3.01
-5	85.49	83.25	35	13.04	12.77	75	2.96	2.91
-4	81.08	78.97	36	12.51	12.25	76	2.86	2.82
-3	76.93	74.94	37	12.01	11.76	77	2.77	2.72
-2	73.01	71.14	38	11.52	11.29	78	2.68	2.64
-1	69.32	67.56	39	11.06	10.84	79	2.60	2.55
0	65.84	64.17	40	10.63	10.41	80	2.51	2.47
1	62.54	60.96	41	10.21	10.00	—		
2	59.43	57.94	42	9.81	9.61			
3	56.49	55.08	43	9.42	9.24			
4	53.71	52.38	44	9.06	8.88			
5	51.09	49.83	45	8.71	8.54			
6	48.61	47.42	46	8.37	8.21			
7	46.26	45.14	47	8.05	7.90			
8	44.05	42.98	48	7.75	7.60			
9	41.95	40.94	49	7.46	7.31			
10	39.96	39.01	50	7.18	7.04			
11	38.08	37.18	51	6.91	6.78			
12	36.30	35.45	52	6.65	6.53			
13	34.62	33.81	53	6.41	6.53			
14	33.02	32.25	54	6.65	6.53			
15	31.50	30.77	55	6.41	6.29			
16	30.06	29.37	56	6.18	6.06			
17	28.70	28.05	57	5.95	5.84			
18	27.41	26.78	58	5.74	5.43			
19	26.18	25.59	59	5.14	5.05			

5.10 R3T: Resistance Conversion Table (Discharge Pipe Sensor)

Temperature – resistance

The table below is the thermistor (R3T) temperature – resistance conversion table.

Temp. (°C)	Resist. (kΩ)	Temp. (°C)	Resist. (kΩ)	Temp. (°C)	Resist. (kΩ)
—	—	60.0	52.8	130.0	5.4
—	—	62.0	48.9	132.0	5.4
-6.0	1120.0	64.0	45.3	134.0	4.8
-4.0	1002.5	66.0	42.0	136.0	4.6
-2.0	898.6	68.0	39.0	138.0	4.3
0.0	806.5	70.0	36.3	140.0	4.1
2.0	724.8	72.0	33.7	142.0	3.9
4.0	652.2	74.0	31.4	144.0	3.7
6.0	587.6	76.0	29.2	146.0	3.5
8.0	530.1	78.0	27.2	148.0	3.3
10.0	478.8	80.0	25.4	150.0	3.2
12.0	432.9	82.0	23.7	152.0	3.0
14.0	392.0	—	—	154.0	2.9
16.0	355.3	—	—	156.0	2.7
18.0	322.4	—	—	158.0	2.6
20.0	292.9	—	—	160.0	2.5
22.0	266.3	92.0	16.9	162.0	2.3
24.0	242.5	94.0	15.8	164.0	2.5
26.0	221.0	96.0	14.8	166.0	2.1
28.0	201.6	98.0	13.9	168.0	2.0
30.0	184.1	100.0	13.1	170.0	1.9
32.0	168.3	102.0	12.3	172.0	1.9
34.0	154.0	104.0	11.5	174.0	1.8
36.0	141.0	106.0	10.8	176.0	1.7
38.0	129.3	108.0	10.2	178.0	1.6
40.0	118.7	110.0	9.6	180.0	1.5
42.0	109.0	112.0	9.0	—	
44.0	100.2	114.0	8.5		
46.0	92.2	116.0	8.0		
48.0	84.9	118.0	7.6		
50.0	78.3	120.0	7.1		
52.0	72.2	122.0	6.7		
54.0	66.7	124.0	6.4		
56.0	61.6	126.0	6.0		
48.0	57.0	128.0	5.7		

3

5.11 Evaluation of abnormal high pressure

Abnormally high pressure level is mostly caused by the condenser side. The following contents are provided by service engineer based on their field checks. Further, the number is listed in the order of degree of influence.

In cooling operation

Check items (Possible causes)	Judgment
Does the outdoor unit fan run normally?	Visual inspection
Is the outdoor unit heat exchanger clogged?	Visual inspection
Is there clogging before or after the EV (capillary)?	Check if there is a temperature difference before and after EV (capillary). Check if the main valve unit of EV operates (by noise, vibration).
Is the check valve clogged? *Heat pump model only	Check if there is a temperature difference before and after check valve. --> If YES, the check valve is caught.
Is the HPS normal?	Check continuity by using a tester.
Is the outdoor unit installed under such conditions that short circuit easily occurs?	Visual inspection
Is the piping length 5 meters or less?	Visual inspection
Does air enter the refrigerant system?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.
Is the refrigerant overcharged?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.

In heating operation

Check items (Possible causes)	Judgment
Does the indoor unit fan run normally?	Visual inspection
Is the indoor unit heat exchanger clogged?	Visual inspection
Is the indoor unit installed under such conditions that short circuit easily occurs?	Visual inspection
Is there clogging before or after the EV (capillary)?	Check if there is a temperature difference before and after EV (capillary). Check if the main valve unit of EV operates (by noise, vibration).
Is the check valve clogged?	Check if there is a temperature difference before and after check valve. --> If YES, the check valve is caught.
Is the HPS normal?	Check continuity using a tester.
Is the piping length 5 meters or less?	Visual inspection
Does air enter the refrigerant system?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.
Is the refrigerant overcharged?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.

5.12 Evaluation of abnormal low pressure

Abnormally low pressure level is mostly caused by the evaporator side. The following contents are provided based on field checking of service engineer. Further, the number is listed in the order of degree of influence.

In cooling operation

Check items (Possible causes)	Judgment
Does the outdoor unit fan run normally?	Visual inspection
Is the indoor unit filter clogged?	Visual inspection
Is there clogging before or after the EV (capillary)?	Check if there is a temperature difference before and after EV (capillary). Check if the main valve unit of EV operates (by noise, vibration).
Is the check valve clogged? *Heat pump model only	Check if there is a temperature difference before and after check valve. -> If YES, the check valve is caught.
Is the LPS normal?	Check continuity using a tester.
Is the indoor unit installed under such conditions that short circuit easily occurs?	Visual inspection
Is the refrigerant gas short?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.

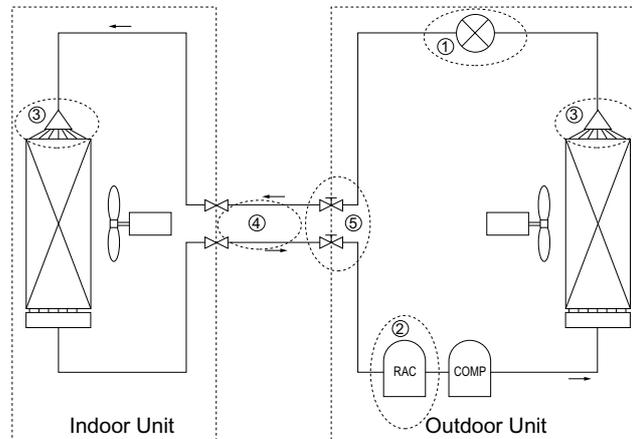
In heating operation

Check items (Possible causes)	Judgment
Does the outdoor unit fan run normally?	Visual inspection
Is the outdoor unit heat exchanger clogged?	Visual inspection
Is the outdoor unit installed under such conditions that short circuit easily occurs?	Visual inspection
Is there clogging before or after the EV (capillary)?	Check if there is a temperature difference before and after EV (capillary). Check if the main valve unit of EV operates (by noise, vibration).
Is the check valve clogged?	Check if there is a temperature difference before and after check valve. --> If YES, the check valve is caught.
Is the LPS normal?	Check continuity using a tester.
Is the refrigerant gas short?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.

5.13 Check for Clogged Points

Checks

Temperature differences must occur before or after the clogged points!



Check points		Check factor	Causes	Remedies
1	Around expansion mechanism	Temperature difference	<ul style="list-style-type: none"> ■ Dust ■ Choked moisture ■ Reduced effective pipe diameter due to adherent contamination, etc. 	Replace the expansion valve.
2	Accumulator	Frosting	<ul style="list-style-type: none"> ■ Choked moisture 	Blow a nitrogen gas, and then replace the refrigerant.
3	Distributor	Temperature difference	<ul style="list-style-type: none"> ■ Dust ■ Choked moisture ■ Reduced effective pipe diameter due to adherent contamination, etc. 	Replace the heat exchanger or distributor.
4	Field piping	Temperature difference	<ul style="list-style-type: none"> ■ Collapsed pipe 	Replace the pipe.
5	Stop valve	Temperature difference	<ul style="list-style-type: none"> ■ The stop valve is not fully open. 	Open the stop valve fully.

3

Part 4

Commissioning and Test Run

What is in this part? This part contains the following chapters:

Chapter	See page
1-Pre-Test Run Checks	4-3
2-Field settings	4-9
3-Test Run and Operation Data	4-33

4

1 Pre-Test Run Checks

1.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- Checks before test run
- Test run checks
- Setting the address for the receiver of the wireless remote controller
- Setting the address for the wireless remote controller.

Overview

This chapter contains the following topics:

Topic	See page
1.2–Test Run Checks	4–4
1.3–Setting the Wireless Remote Controller	4–5

1.2 Test Run Checks

Checks before test run

Before carrying out a test run, proceed as follows:

Step	Action
1	Make sure the voltage at the primary side of the safety breaker is: <ul style="list-style-type: none"> ■ 230 V ± 10% for 1-phase units ■ 400V ± 10% for 3-phase units.
2	Fully open the liquid and the gas stop valve.

Test run checks

To carry out a test run, check the following:

- Check that the temperature setting of the remote controller is at the lowest level or test mode.
- Switch ON the indoor units one by one to check whether they operate correctly. Afterwards, switch ON all units to check whether they all operate simultaneously.
- Go through the following checklist:

Checkpoints	Cautions or warnings
Are all units securely installed?	<ul style="list-style-type: none"> ■ Dangerous for turning over during storm. ■ Possible damage to pipe connections.
Is the earth wire installed according to the applicable local standard?	Dangerous if electric leakage occurs.
Are all air inlets and outlets of the indoor and outdoor units unobstructed?	<ul style="list-style-type: none"> ■ Poor cooling. ■ Poor heating.
Does the drain flow out smoothly?	Water leakage.
Is piping adequately heat-insulated?	Water leakage.
Have the connections been checked for gas leakage?	<ul style="list-style-type: none"> ■ Poor cooling. ■ Poor heating. ■ Stop.
Is the supply voltage conform to the specifications on the name plate?	Incorrect operation.
Are the cable sizes as specified?	Damage of cables.
Are the remote controller signals received by the unit?	No operation.

1.3 Setting the Wireless Remote Controller

Introduction

To set the wireless remote controller, you have to set the address for:

- The receiver of the wireless remote controller
- The wireless remote controller.

Setting the address for the receiver

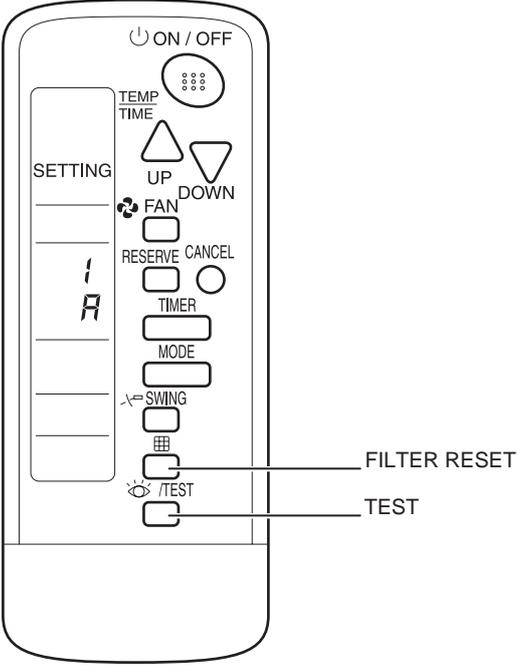
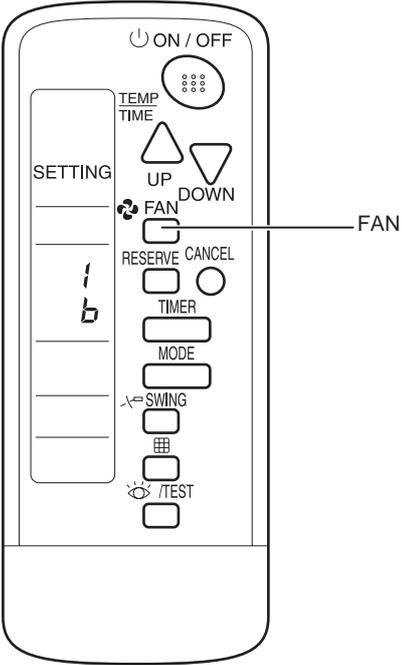
The address for the receiver of the wireless remote controller is factory set to 1. To change this setting, proceed as follows:

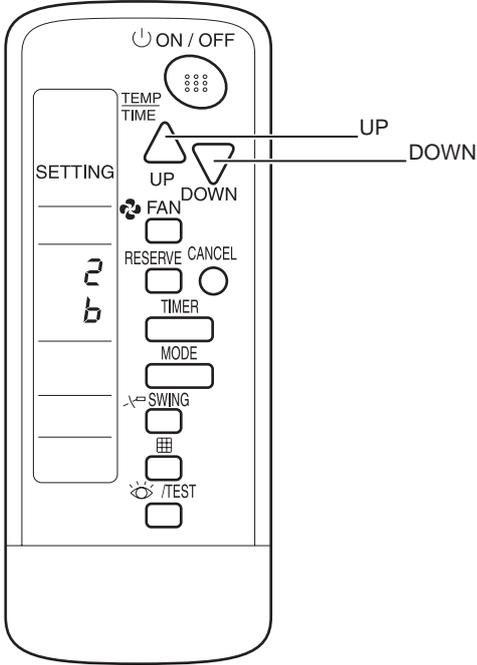
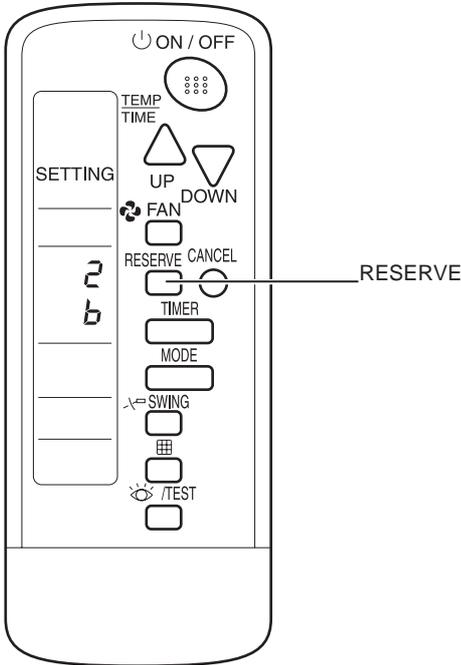
Step	Action														
1	Turn OFF the power.														
2	Remove the sealing pad on the top of the receiver. <div style="text-align: center;"> <p>Sealing pad</p> <p>Small opening</p> <p>Receiver</p> </div>														
3	Set the wireless address switch (SS2) according to the table below. You can find the wireless address switch attached on the PCB of the receiver and it is visible through the small opening on the back of the receiver. <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Unit No.</th> <th>No.</th> <th>No.</th> <th>No.</th> </tr> </thead> <tbody> <tr> <td rowspan="3">SS2</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> </tr> </tbody> </table>	Unit No.	No.	No.	No.	SS2	1	2	3	2	3	1	3	1	2
Unit No.	No.	No.	No.												
SS2	1	2	3												
	2	3	1												
	3	1	2												
4	If you use a wired and a wireless remote controller for one indoor unit, proceed as follows: <ol style="list-style-type: none"> 1. Set the wired remote controller to MAIN: On the remote controller. 2. Set the wireless remote controller to SUB: On the receiver with the MAIN/SUB switch (SS1). <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>MAIN/SUB</th> <th>MAIN</th> <th>SUB</th> </tr> </thead> <tbody> <tr> <td>SS1</td> <td style="text-align: center;">S M</td> <td style="text-align: center;">S M</td> </tr> </tbody> </table>	MAIN/SUB	MAIN	SUB	SS1	S M	S M								
MAIN/SUB	MAIN	SUB													
SS1	S M	S M													
5	Seal off the opening of the address switch and the MAIN/SUB switch with the attached sealing pad. <div style="text-align: center;"> <p>Sealing pad</p> <p>Small opening</p> <p>Receiver</p> </div>														
6	Make sure to also change the address on the remote controller.														

Setting the address for the wireless remote controller

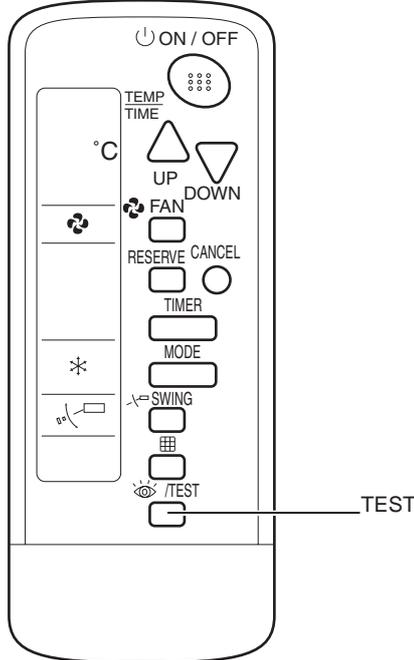
The address for the wireless remote controller is factory set to 1. To change this setting, proceed as follows:

4

Step	Action
1	<p>Hold down the FILTER RESET button and the TEST button for at least 4 s, to go to field set mode. The display indicates the field set mode.</p>  <p>The diagram shows a remote controller with a display showing '1 A'. The display is divided into sections: 'SETTING' at the top, a blank line, '1 A', and three more blank lines. The buttons are arranged vertically: ON/OFF (power), TEMP TIME (with a 3x3 grid icon), UP (triangle), DOWN (inverted triangle), FAN (fan icon), RESERVE (square), CANCEL (circle), TIMER (rectangle), MODE (rectangle), SWING (rectangle with a curved arrow), FILTER RESET (rectangle with a grid icon), and TEST (rectangle with a lightbulb icon). Lines point from the labels 'FILTER RESET' and 'TEST' to their respective buttons.</p>
2	<p>Press the FAN button to select a multiple setting (A/b), see 'Multiple settings A/b' further in this section. Each time you press the button, the display switches between "A" and "b".</p>  <p>The diagram shows the same remote controller, but the display now shows '1 b'. A line points from the label 'FAN' to the FAN button.</p>

Step	Action
3	<p data-bbox="523 282 1404 342">Press the UP and DOWN buttons to set the address. Set the same address as the receiver (1, 2 or 3). The receiver does not work with addresses 4, 5 and 6.</p>  <p>The diagram shows a remote control with a digital display showing '2' and 'b'. The 'UP' and 'DOWN' buttons are highlighted with arrows and labels. Other buttons include ON/OFF, TEMP TIME, FAN, RESERVE, CANCEL, TIMER, MODE, SWING, and /TEST.</p>
4	<p data-bbox="523 1059 1061 1093">Press the RESERVE button to confirm the setting.</p>  <p>The diagram shows the same remote control as in step 3. The 'RESERVE' button is highlighted with an arrow and label. The display still shows '2' and 'b'.</p>

4

Step	Action
5	<p>Press the TEST button to quit the field set mode and return to the normal display.</p>  <p>The diagram shows a vertical remote control interface with various buttons. At the top is an 'ON / OFF' button. Below it are 'TEMP TIME' controls with up and down arrows. Further down are 'FAN', 'RESERVE', 'CANCEL', 'TIMER', 'MODE', and 'SWING' buttons. At the very bottom is a button labeled 'TEST' with a line pointing to it from the right.</p>

Multiple settings A/b

When an outside control (central remote controller...) controls an indoor unit, sometimes the indoor unit does not respond to ON/OFF and temperature settings commands from this controller.

Remote controller		Indoor unit	
Setting	Remote controller display	Control of other air conditioners and units	No other control
A: Standard	All items are displayed.	Commands other than ON/OFF and temperature setting accepted. (1 long beep or 3 short beeps emitted)	
b: Multi System	Only one item is displayed. This item is only shown for a few seconds.	All commands accepted (2 short beeps)	

2 Field settings

2.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- How to change the field settings
- The field settings
- The factory settings.

Overview

This chapter contains the following topics:

Topic	See page
2.2–How to Change the Field Settings with the Wired Remote Controller	4–10
2.3–How to Change the Field Settings with the Wireless Remote Controller	4–12
2.4–Overview of the Field Settings of the Indoor Units	4–13
2.5–Overview of the Factory Settings of the Indoor Units	4–14
2.6–Setting the Ceiling Height	4–15
2.7–Setting the Filter Counter	4–16
2.8–MAIN/SUB Setting when Using Two Remote Controllers	4–17
2.9–Setting the Centralized Group No.	4–18
2.10–Field settings when using a spare part PCB of Sky-Air L-series outdoor unit	4–20
2.11–The Field Setting Levels	4–23
2.12–Overview of the Field Settings: RYEP71-125L	4–26
2.13–Jumpers	4–28
2.14–DIP switch DS1	4–29
2.15–DIP switch DS2	4–30

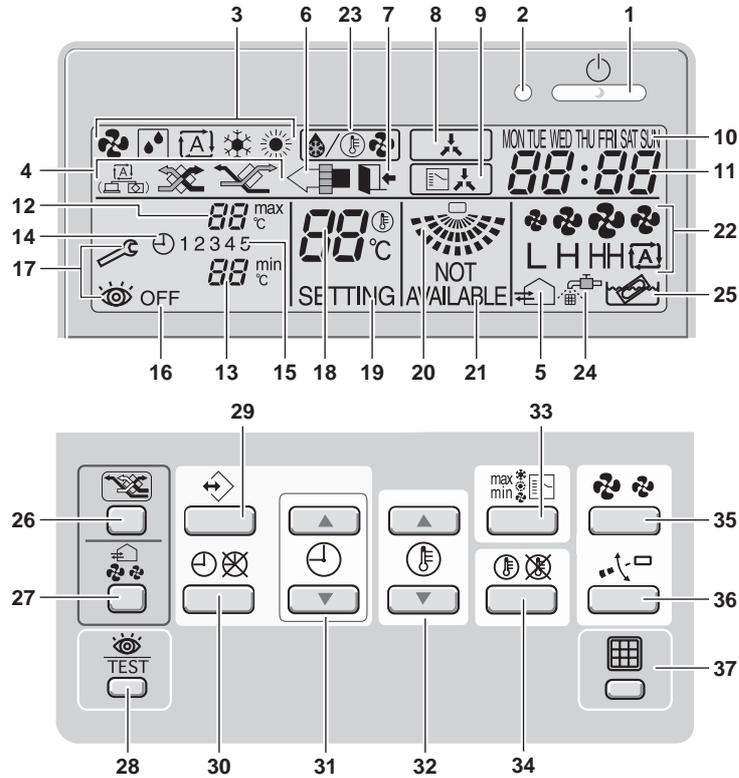
2.2 How to Change the Field Settings with the Wired Remote Controller

Installation conditions

The field settings have to be changed with the remote controller according to the installation conditions.

Wired remote controller

The illustration below shows the wired remote controller.



Components

The table below contains the components of the wired remote controller.

No.	Component	No.	Component
1	ON/OFF button	20	Air flow direction icon
2	Operation lamp	21	Not available
3	Operation mode icon	22	Fan speed icon
4	Ventilation mode icon	23	Defrost/hotstart mode icon
5	Ventilation icon	24	Air filter cleaning time icon
6	Air cleaning icon	25	Element cleaning time icon
7	Leave home icon	26	Ventilation mode button
8	External control icon	27	Ventilation amount button
9	Change-over under centralised control icon	28	Inspection/test operation button
10	Day of the week indicator	29	Programming button
11	Clock display	30	Schedule timer button
12	Maximum set temperature	31	Time adjust button
13	Minimum set temperature	32	Temperature adjust buttons
14	Schedule timer icon	33	Operation change/ button
15	Action icons	34	Setpoint/limit button
16	Off icon	35	Fan speed button
17	Inspection required	36	Air flow direction adjust button
18	Set temperature display	37	Air filter cleaning time icon reset
19	Setting		

Setting

To set the field settings, you have to change:

- “Mode No.”
- “First code No.”
- “Second code No.”.

To change the field settings, proceed as follows:

Step	Action
1	Hold down the INSPECTION/TEST button for at least 4 s during normal mode to enter the “Field setting mode”.
2	Press the TEMPERATURE CONTROL button until the desired “Mode No.” appears.
3	<ul style="list-style-type: none"> ■ If the indoor unit is under group control, all settings for all the indoor units are set at the same time. Use the codes 10 to 15 to apply this group control and proceed to the next step. ■ If you want to set the indoor units of one group individually or if you want to read out the last settings, use the codes 20 to 25 which are displayed in brackets. Press the TIMER SELECTION button to select the “Indoor unit No.” for which you want to adjust the field settings.
4	Press the upper part of the PROGRAMMING TIME button to select the “First code No.”.
5	Press the lower part of the PROGRAMMING TIME button to select the “Second code No.”.
6	Press the CONFIRMATION button to confirm the changed setting.
7	Press the INSPECTION/TEST button to return to “Normal mode”.

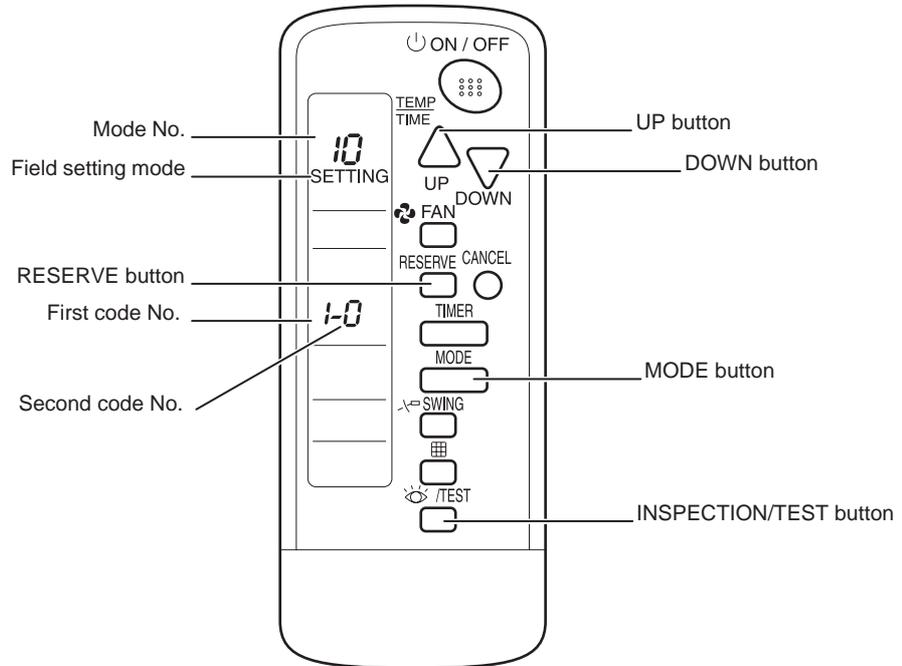
2.3 How to Change the Field Settings with the Wireless Remote Controller

Optional accessories

If optional accessories are mounted on the indoor unit, the indoor unit setting may have to be changed. Refer to OH98-2 or the installation manual (optional handbook) for each optional accessory.

Wireless remote controller

The illustration below shows the wireless remote controller.



Setting

To set the field settings, you have to change:

- “Mode No.”
- “First code No.”
- “Second code No.”.

To change the field settings, proceed as follows:

Step	Action
1	Hold down the INSPECTION/TEST button for at least 4 s during normal mode to enter the “Field setting mode”.
2	Press the MODE button to select the desired “Mode No.”.
3	Press the UP button to select the “First code No.”.
4	Press the DOWN button to select the “Second code No.”
5	Press the RESERVE button to set the present settings.
6	Press the INSPECTION/TEST button to return to the “Normal mode”.

2.4 Overview of the Field Settings of the Indoor Units

Field settings

The table below contains the possible field settings of all indoor units.

Mode No.	First code No.	Description of the setting	Second code No.			
			01	02	03	04
10 or 20	0	Filter counter	Light contamination	heavy contamination	—	—
	1	Filter type	Long	Super long	External	Oil mist
	2	Remote thermistor of the remote controller	TH1 = rem. controller	TH1 = air return	—	—
	3	Filter display	Filter indic.	No filter indic.	—	—
11 or 21	0	Number indoor to 1 outdoor	Pair	Twin	Triple	Double twin
	1	Unified or indiv. set twin	Group setting	Indiv. setting	—	—
	2	Fan OFF at thermostat OFF	LL-speed	OFF	—	—
12 or 22	0	KRP1B51/52/53 X1/X2 output	Thermostat ON	Option	Operation	Malfunction
	1	EKRORO	Forced OFF	ON/OFF operation	—	—
	3	Fan speed heating thermostat OFF	LL-speed	Set speed	—	—
	5	Automatic restart	Disabled	Enabled	—	—
13 or 23	0	Ceiling height setting	Normal ≤ 2.7 m	High >2.7≤3.0 m	Extra high >3.0≤3.5 m	—
			—	—	—	—
	1	Selection of air flow direction (setting for when a blocking pad kit has been installed).	4-way flow	3-way flow	2-way flow	—
	3	Horizontal discharge grill	Enabled	Disabled	—	—
	4	Air flow direction adjust range setting	Draft prevention	Standard	Ceiling soil prevention	—
	5	Field fan speed changeover air outlet	Standard	Option 1	Option 2	—
6	External static pressure		Normal	High	Low	—
			—	—	—	—
14 or 24	0	Additional timer to guard timer	0 s	5 s	10 s	15 s
1b (Only in case of BRC1D52)	0	Permission level setting	Level 2	Level 3	—	—
	1	Leave home function	Not permitted	Permitted	—	—
	2	Thermostat sensor in remote controller (for limit operation and leave home function only)	Use	Not use	—	—

2.5 Overview of the Factory Settings of the Indoor Units

Factory settings

The table below contains the factory settings of all indoor units

Mode No.	First code No.	Second code No.						
		FHYCP	FHYKP	FHYBP	FAYP	FDYP	FUYP	FHYP
10 or 20	0	01	01	01	01	01	01	01
	1	01	—	01	—	02	01	—
	2	02	02	02	—	02	02	02
	3	01	01	01	01	01	01	01
11 or 21	0	01	01	01	01	01	01	01
	1	01	01	01	01	01	01	01
	2	01	01	01	01	01	01	01
12 or 22	0	01	01	01	01	01	01	01
	3	01	—	01	—	—	—	—
	5	02	02	02	02	02	02	02
13 or 23	0	01	—	—	01	—	01	01
	1	01	—	—	—	—	—	—
	3	—	01	—	—	—	—	—
	4	02	02	—	—	—	—	—
	5	01	—	—	01	—	01	01
	6	—	01	01	—	—	—	—
14 or 24	0	01	01	01	—	01	01	01

2.6 Setting the Ceiling Height

Incorrectly setting

If you set the controller incorrectly, a connection mistake malfunction “UR” will appear on the remote controller display.

See 'Malfunctioning Field Setting Switch (UA)' on page 3-71.

Mode No. 13 or 23 First code No. 0

Set the second code No., according to the tables below.

FHYP

Second code No.	Ceiling-suspended type
01	Height < 2.7 m
02	2.7 m < height < 3.5 m
03	Not used

FAYP

Second code No.	Wall-mounted type
01	Normal
02	High
03	Extra high

FHYCP and FUYP

Indoor unit	Second code No.	4-way outlet	3-way outlet	2-way outlet
FHYCP35-71	01	< 2.7 m	< 3.0 m	< 3.5 m
	02	< 3.0 m	< 3.3 m	< 3.8 m
	03	< 3.5 m	< 3.5 m	—
FHYCP100-125	01	< 3.2 m	< 3.6 m	< 4.2 m
	02	< 3.6 m	< 4.0 m	< 4.2 m
	03	< 4.2 m	< 4.2 m	—
FUYP	01	< 2.7 m	< 3.0 m	< 3.5 m
	02	< 3.0 m	< 3.5 m	< 3.8 m
	03	< 3.5 m	< 3.8 m	—

2.7 Setting the Filter Counter

Mode No. 10 or 20
First code No. 0

When the filter counter indication time is set to ON, set the second code No., according to the table below

Unit	Mode No.	First code No.	Second code No.	Contamination
			01 light	02 heavy
FHYCP	10 or 20	0	±2500 hrs	±1250 hrs
FHYKP			±2500 hrs	±1250 hrs
FHYP			±2500 hrs	±1250 hrs
FUYP			±2500 hrs	±1250 hrs
FAYP~L			±200 hrs	±100 hrs
FAYP~B			±200 hrs	±100 hrs
FHYBP			±2500 hrs	±1250 hrs
FDYMP			±2500 hrs	±1250 hrs
FDYP			±2500 hrs	±1250 hrs

Fan speed OFF when thermostat OFF

When the cool/heat thermostat is OFF, you can stop the indoor unit fan by switching the setting to "Fan OFF". This setting is used as a countermeasure against odour, for example for barber shops and restaurants.

Mode No.	First code No.	Second code No.	Setting
11 or 21	2	01	—
		02	Fan OFF

Fan speed changeover when thermostat OFF

You can switch the fan speed to the set fan speed when the heating thermostat is OFF. This setting is called "Set Fan Speed".

Mode No.	First code No.	Second code No.	Setting
12 or 22	3	01	LL fan speed
		02	Set fan speed

Air flow direction setting

Set the air flow direction of the indoor units as given in the table below. This setting is needed when the optional air outlet blocking pad has been installed. The "Second code No" is factory set to "01".

Mode No	First code No	Second code No	Setting
13 or 23	1	01	F: four-direction air flow
		02	T: three-direction air flow
		03	W: two direction air flow

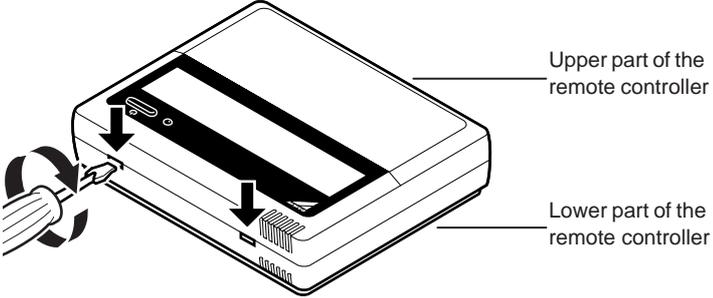
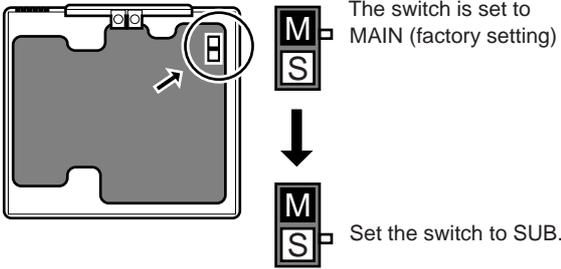
2.8 MAIN/SUB Setting when Using Two Remote Controllers

Situation

The MAIN/SUB setting is necessary when one indoor unit is controlled by two remote controllers. When you use two remote controllers (control panel and separate remote controller), set one to MAIN and the other to SUB. You can do this by setting the switch on the remote controller's PCB.

Setting

The remote controllers are factory set to MAIN, so you only have to change one remote controller from MAIN to SUB. To change a remote controller from MAIN to SUB, proceed as follows:

Step	Action
1	<p>Insert a flathead screwdriver into the recess between the upper and lower part of the remote controller, as shown in the illustration below. Gently pry off the upper part of the controller, working from the two possible positions.</p> 
2	<p>Turn the MAIN/SUB changeover switch on the PCB to "S".</p> 

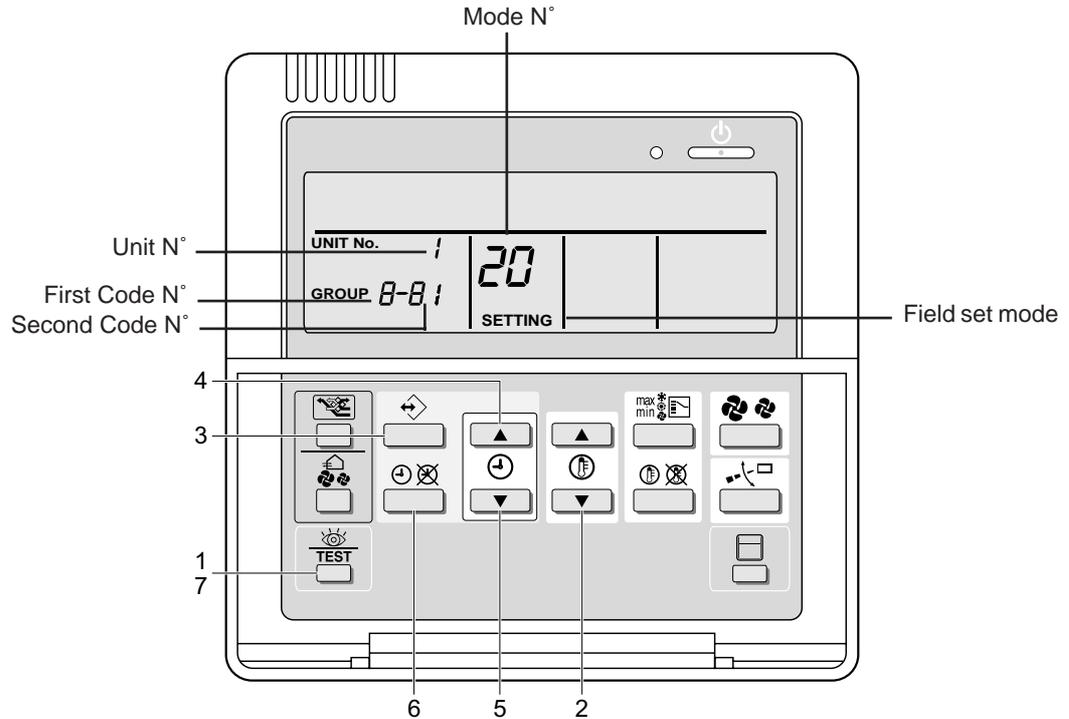
2.9 Setting the Centralized Group No.

When?

If you want to carry out centralized control with a central remote controller and a unified ON/OFF controller, you have to set the group No. for each group with the remote controller.

Wired remote controller

The illustration below shows the wired remote controller.



Setting

To set the “Centralized group No.”, proceed as follows:

Step	Action
1	Switch ON the power supply of the central remote controller, the unified ON/OFF controller and the indoor unit(s).
2	Hold down the INSPECTION/TEST button for at least 4 s during normal mode to enter the “Field setting mode”.
3	Press the TEMPERATURE CONTROL button until “Mode No.” “00” appears.
4	Press the INSPECTION/TEST button to inspect the group No. display.
5	Set the “Group No.” for each group by pressing the PROGRAMMING TIME button. The “Group No.” rises in the order of 1—00, 1—01, ..., 1—15, 2—00, ..., 2—15, 3—00, etc. The unified ON/OFF controller however displays only the range of group numbers selected by the switch for setting each address.
6	Press the CONFIRMATION button to enter the selected group No.
7	Press the INSPECTION/TEST button to return to normal mode.

Individually address setting

If the address must be set individually for each unit, set the “Mode No.” to “30”. For example, for power consumption counting.

**Group control for
FDYMP indoor units**

For group control, cut the jumper indicated as “master/slave” on the PCB of the “slave” indoor units (=slave PCB). Do not cut the jumper on the PCB of the indoor unit to which the remote controller is connected (=master PCB).

**Note**

It is not necessary to designate an indoor unit address when using group control. The address is automatically set when the power is activated.

2.10 Field settings when using a spare part PCB of Sky-Air L-series outdoor unit

When In case the outdoor PCB needs to be replaced by a spare part PCB, it is required to execute below-mentioned field settings to ensure correct operation of the unit.

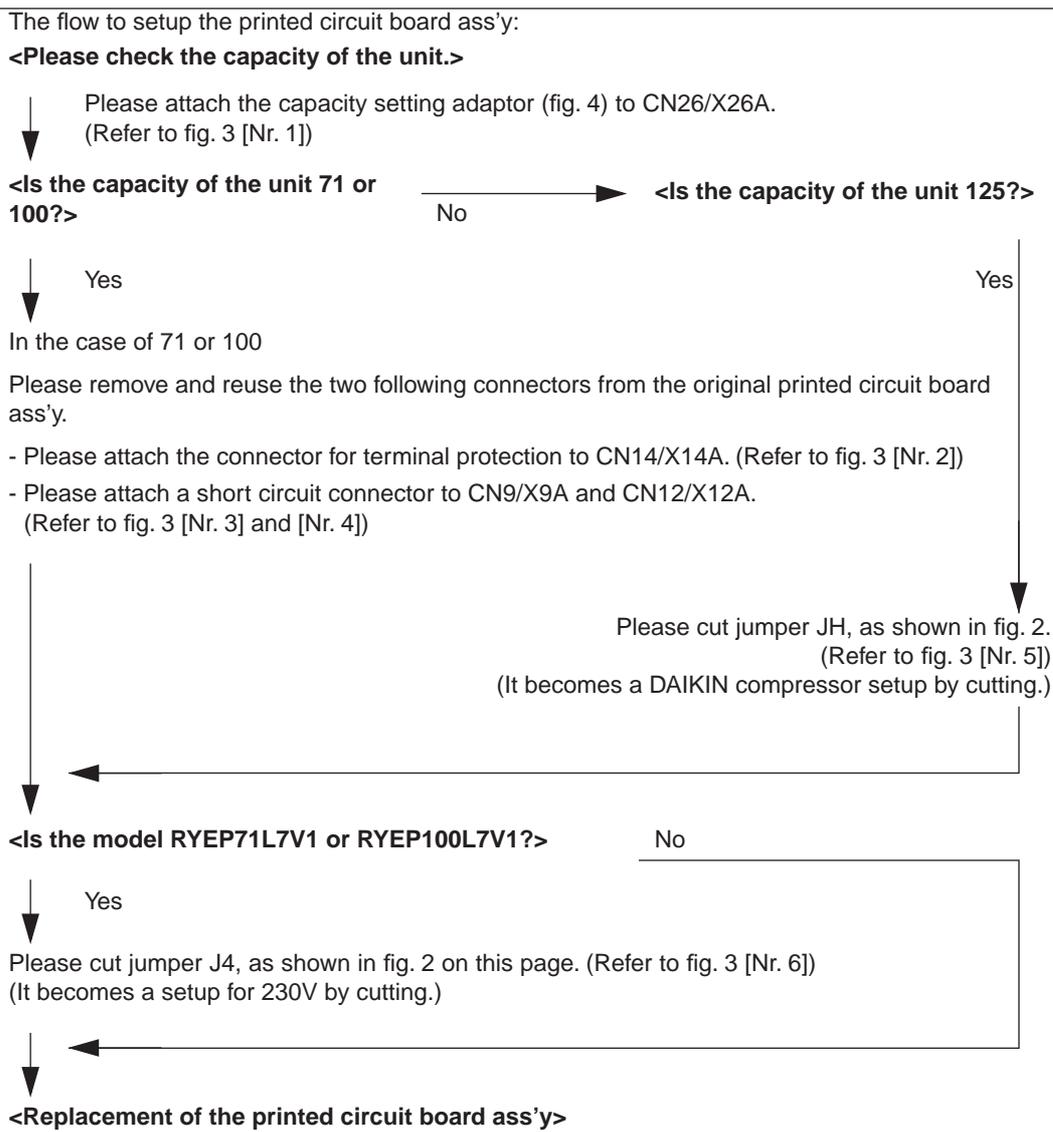
Required action In case of repair using this part, replace the part according to the following instruction:

Attention on service!

- 1 Please be sure to work after turning off all related circuit breakers.
- 2 Before starting the work, please touch the metal part of the product to discharge static electricity.
- 3 Please exchange PCB ass'y when it is still included in the resin case.
(If it would be removed from the resin case, it can cause a PCB failure.)

- The parts for replacement : - Accessories:	<ol style="list-style-type: none"> 1 The PCB ass'y 1 Capacity setting adaptor 2 The screw for terminal board : Two kinds (M4∞3 pieces, M5∞6 pieces)
---	--

Please replace the printed circuit board according to the following flow chart of "The flow to setup the printed circuit board ass'y".



4

<Replacement of the printed circuit board ass'y>

(CAUTION)

Please replace the PCB ass.y when it is still included in the resin case.

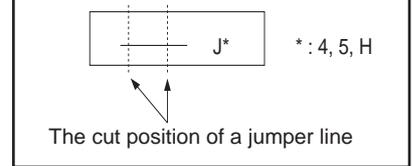
Please reconnect all connectors as before according to the electric wiring diagram.



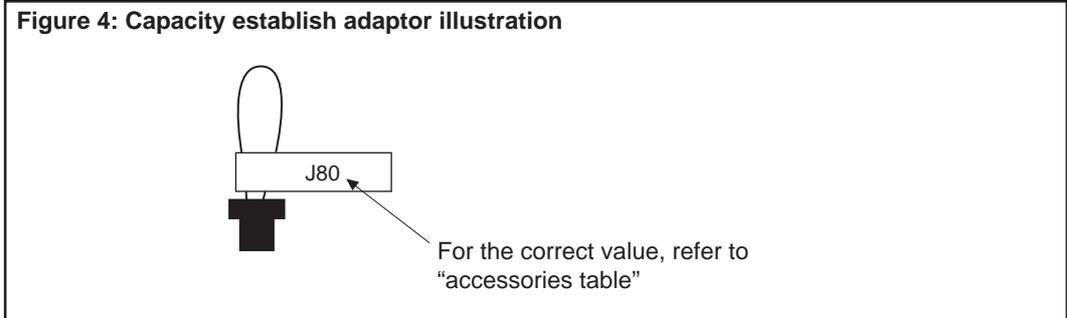
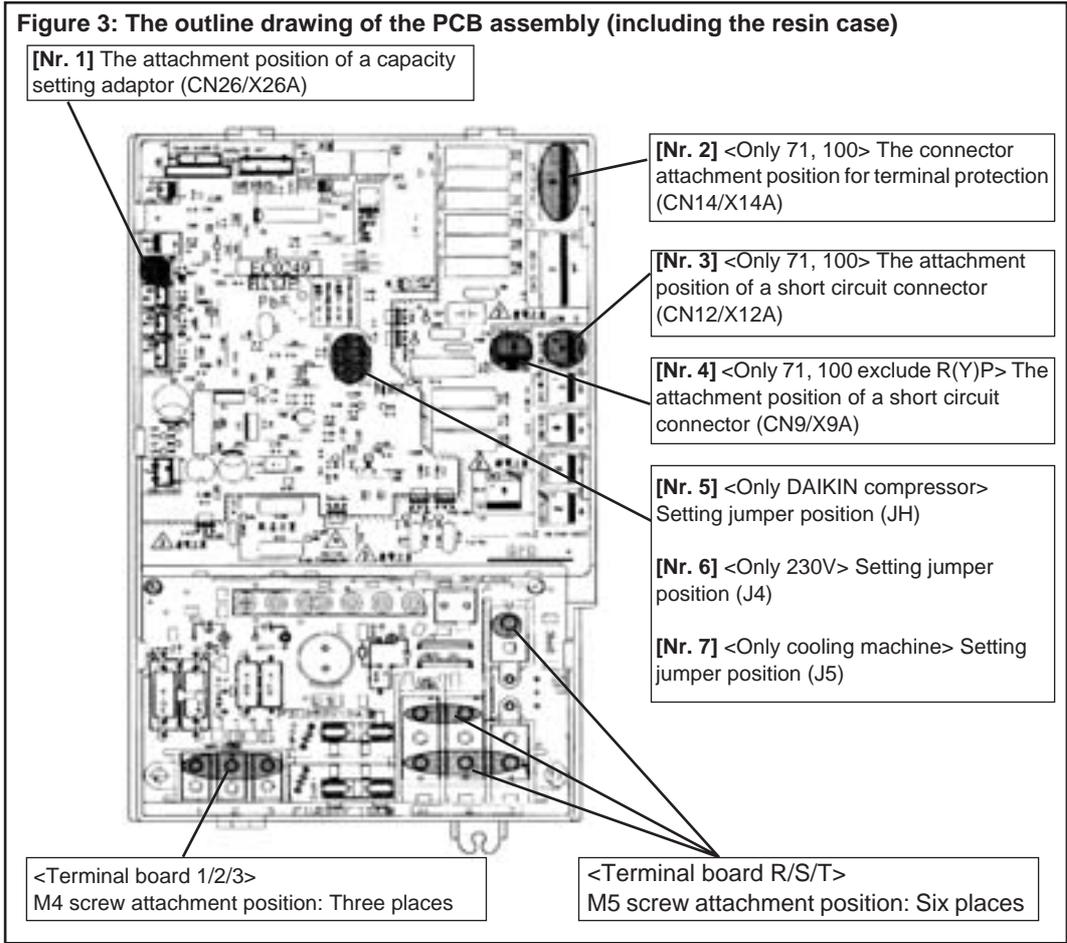
<Test run>

Please confirm that a test run is performed and that the system can operate normally after finishing the replacement.

Figure 2



4



2.11 The Field Setting Levels

Introduction

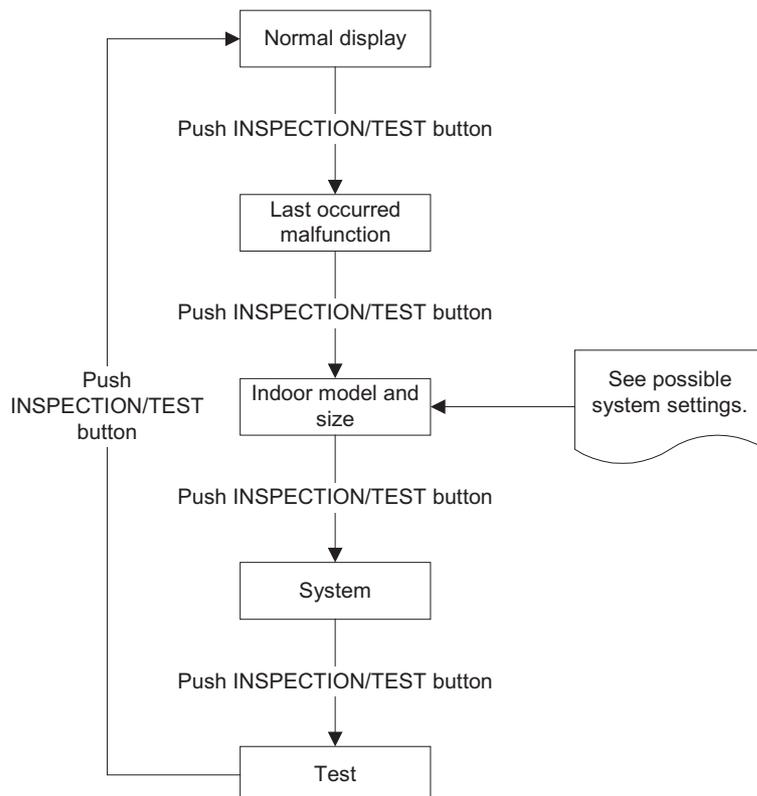
The three field setting levels are:

- Inspection level
- Monitoring level
- Maintenance mode settings.

The inspection level

The inspection level is the highest level of the three field setting levels. You can change the views in the inspection level by pressing the INSPECTION/TEST button.

The flow chart below explains the different windows of the inspection level.



Possible system settings

The table below contains the possible system settings, which are displayed on the remote controller if the TEST button is pushed twice shortly.

Size		Software	Type	
Settings	Display		Settings	Display
35	35	5	FHYCP	FC
45	45		FHYP	HC
60	63		FAYP	AC
71	71		FHYKP	EC
100	100		FHYBP	JC
125	125		FUYP	3C
200	200		FDYP	UC
250	250			—

4**Changing the mode settings**

To enter the monitoring level and to change the maintenance mode settings, proceed as follows:

Step	Action
1	Hold down the INSPECTION/TEST button for at least 4 s to enter the field setting mode.
2	Hold down the INSPECTION/TEST button for at least 4 s to enter the maintenance mode.
3	Press the TEMPERATURE CONTROL buttons as many times as needed to select the mode No. you want.
4	Press the TIMER SELECTION button as many times as needed to select the unit No. you want.
5	Carry out the settings for modes 44 and 45. See "Maintenance Mode Settings" further in this section.
6	Press the CONFIRMATION button to confirm the settings of modes 44 and 45.
7	Press the INSPECTION/TEST button to return to the normal operating mode.

Maintenance Mode Settings The table below describes the maintenance mode settings.

Mode No.	Function	Content and operation method	Example of the remote controller display
40	History error codes	Display malfunction history	
		The history No. can be changed with the programming time button.	
41	Thermistor data display	Select the display thermistor with the programming time button.	
		Thermistor: 0. Remote control thermistor 1. Suction thermistor 2. Heat exchanger thermistor.	
43	Forced fan ON	Turns the fan ON for each unit individually.	
44	Individual setting	Sets fan speed and air flow direction for each unit individually when using group control.	
		Settings are made using the “air flow direction adjust” and “fan speed adjust” buttons. Confirmation by the confirmation button is required.	
45	Unit No. change	Changes unit No.	
		Set the unit No. after changing with the programming time buttons. Confirmation by the confirmation button is required.	

2.12 Overview of the Field Settings: RYEP71-125L

Jumpers

The table below contains the jumper field settings.

Jumper	Label on PCB	Function	Applicable units	See page
J1	Thermo CTR	Change thermostat OFF control indoor unit	RYEP71-125L	4-28
J3	Thermo CTR2	Change thermostat ON control indoor unit		4-28

DIP switches

The table below contains the DIP switch field settings.

DIP switch	Function	Details	Applicable units	See page
DS1-1	Emergency ON/OFF	Switch emergency operation outdoor unit ON	RYEP71-125L	4-26
DS1-2	Cool / Heat	Select emergency cooling / heating operation on outdoor unit		4-29
DS1-3	Increase possibility to start defrost	<ul style="list-style-type: none"> ■ Changes the accumulated operation time from 3 hours to 40 minutes in order to advance the defrosting operation. ■ Increases the temperature conditions for defrost activation with 4K. 		4-29
DS1-4	Mode B Avoid risk of liquid back to the compressor	<p>At factory setting (switch = OFF), the E.V. will open at the maximum (480 pulses) for a limited time (1 or 2 minutes) before closing to 100 pulses.</p> <ul style="list-style-type: none"> ■ When changing this setting, the time of opening the E.V. at maximum opening is reduced to 30 seconds. ■ Stops the compressor at defrost start and stop 		4-29
DS2-1	Not applicable	—	RYEP71-125L	4-29
DS2-2	Not applicable	—		4-29
DS2-3	Change Freeze-up conditions	Freeze-up start / stop decided by indoor unit. (Unit will restart when evaporator temperature reached 7°C for 10 minutes)		4-30
DS2-4	Change Freeze-up conditions	Setting for low humidity applications. (Unit will restart when evaporator temperature reached 7°C for 3 minutes)		4-30

BS The table below contains the BS field setting.

BS	Label on PCB	Function	Applicable units	Details
BS	Pump down / forced defrost	Cooling/fan only: Pump down (see further in this section) Heating: Forced defrosting	RYEP71-125L	—

Pump down

Pump down is preferably carried out with the indoor unit set to “fan only” in order to avoid compressor restart with closed stop valves after finishing the previous pump down operation (close stop valves, turn OFF the power supply).

If accidentally, the power was switched back ON, the unit will automatically restart with closed stop valves, which may result in a possible compressor breakdown.

2.13 Jumpers

Input and output

The table below describes the input and the output of the jumpers.

Item	Description			
Input	ΔTr	Cooling	$\Delta Tr = Tr - Ts$	<ul style="list-style-type: none"> ■ Tr = indoor unit suction air temp. ■ Ts = temp. set by the remote controller
		Heating	$\Delta Tr = Ts - Tr$	
Output	Magnetic switch compressor K1M			

J1 The function of jumper J1 is to reduce the possibility of thermostat OFF (reduce ON/OFF cycle compr.).

Factory setting (closed state)	Field setting (open state)
Thermostat goes into OFF-state when $\Delta Tr \leq 0.0^\circ C$	Thermostat goes into OFF-state when <ul style="list-style-type: none"> ■ $-0.5^\circ C < \Delta Tr \leq 0.0^\circ C$ for 3 min, or ■ $-1.5^\circ C < \Delta Tr \leq -0.5^\circ C$ for 1 min, or ■ $\Delta Tr \leq -1.5^\circ C$
<p>Input: ΔTr</p> <p>Output: K1M</p> <p>$\geq 3 \text{ min}$</p>	<p>Input: ΔTr</p> <p>Output: K1M</p> <p>$\geq 3 \text{ min}$</p>

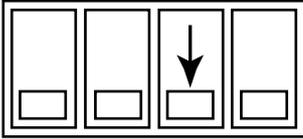
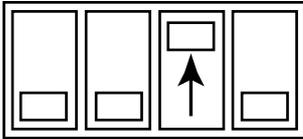
J3 The function of jumper J3 is to increase the differential for thermo ON.

Factory setting (closed state)	Field setting (open state)
Thermostat goes into ON-state when $\Delta Tr \geq 1.0^\circ C$	Thermostat goes into ON-state when $\Delta Tr \geq 4.5^\circ C$
<p>Input: ΔTr</p> <p>Output: K1M</p> <p>Pump down</p>	<p>Input: ΔTr</p> <p>Output: K1M</p> <p>Pump down</p>

2.14 DIP switch DS1

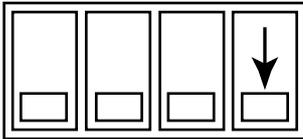
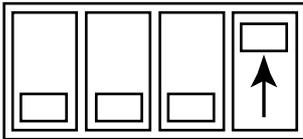
DS1-3: Defrost starting condition

The table below describes the DIP switch.

Setting	Illustration	Function
Factory setting	OFF 1 2 3 4 	For temperature settings at defrosting, see page 2-40. Accumulated operation time for defrost activation = 3 h.
Field setting	ON 1 2 3 4 	<ul style="list-style-type: none"> ■ Increases the temp. conditions for defrost activation with 4°C. ■ Changes the accumulated operation time from 3 h to 40 min in order to advance the defrosting operation.

DS1-4: Mode B

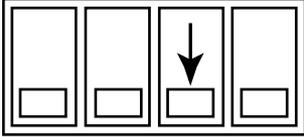
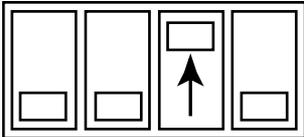
The table below describes the DIP switch.

Setting	Illustration	Function
Factory setting	OFF 1 2 3 4 	At the start-up of the defrost operation, the E.V. opens at the max. (480 pulses) for a limited time (1 or 2 min), before closing to 100 pulses.
Field setting	ON 1 2 3 4 	Changes the following in order to avoid liquid back to the compressor: <ul style="list-style-type: none"> ■ Changes the limited time of E.V. opening at max. (480 pulses) from 1 or 2 min to 30 s. ■ Stops the compressor at defrost start and stop.

2.15 DIP switch DS2

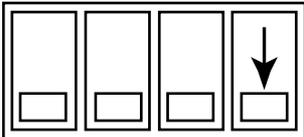
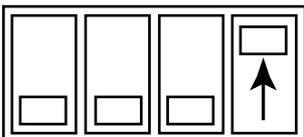
DS2-3: Freeze 1

The table below describes the DIP switch.

Setting	Illustration	Function
Factory setting	<p>OFF</p> <p>1 2 3 4</p> 	<p>Enables the “intelligent” control function.</p> <p>See page 2–29.</p>
Field setting	<p>ON</p> <p>1 2 3 4</p> 	<p>Disables the “intelligent” control function.</p> <p>Freeze-up start/stop decided by indoor unit.</p> <p>(Unit will restart when evaporator temperature reached 7°C for 10 minutes.)</p> <p>To be used in combination with EKRPER only!</p>

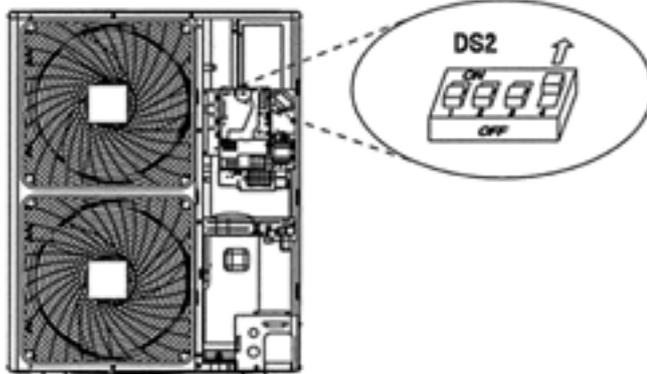
DS2-4: Freeze 2

The table below describes the DIP switch.

Setting	Illustration	Function
Factory setting	<p>OFF</p> <p>1 2 3 4</p> 	<p>Normal operation.</p>
Field setting	<p>ON</p> <p>1 2 3 4</p> 	<p>Countermeasure for low humidity applications.</p>

**DS2-4:
Method and
illustration**

The capacity will be increased when the dip switch DS2-4, mounted on the outdoor PCB, is set to ON



**DS2-4:
Capacity result at
low temperature:**

The capacity increases when outdoor temperature drops below 21°C as indicated on table below:

	Dip switch OFF (Factory setting)	Dip switch ON
Capacity low temperature	100%*	150~200%

*This is a relative comparisson to indicate an increase of 50 to 100% capacity with the dipswitch ON.

Note

See page 2-29 "Freeze up conditions" for detailed information.

DS2-4: Caution

- Finally the capacity result will depend on the total condition of the installation site. This is the responsibility of the customer.
- There is additional limitation for the relative humidity when operating this switch. Finally it will depend on the total condition of the installation site and is responsibility of the customer.
- Evaluation is necessary for each installation site by a professional responsible installer.
- Only use the switch for capacity increase in the area indicated on the graph of page 2-32.
- Do not set the switch in combination with the option EKRPER, this is only for use of Daikin indoor units.

Reason for limitation:
 When operating with switch ON, there will be a change of freeze protection control see table on next page. By this there will be some risk of:

- Ice building up at indoor heat exchanger.
- Water blown off from the unit into the room

4

3 Test Run and Operation Data

Introduction

This chapter contains the following information:

- General operation data
- Operation ranges.

Overview

This chapter contains the following topics:

Topic	See page
3.1–General Operation Data	4–34
3.2–RYEP71L7V1, RYEP71L7W1, RYEP100L7V1, RYEP100L7W1 and RYEP125L7W1	4–36

3.1 General Operation Data

During cooling mode and dry keep

The operating conditions must be as follows:

Items	Operating modes	If the operation is out this range...
Outdoor temp.	■ h/p: -5 to +46°CDB	<ul style="list-style-type: none"> ■ A safety device may stop the operation. ■ Condensation may occur on the indoor unit and start dripping.
Indoor temp.	+12 to +28°CWB	
Indoor humidity	80%	

The operation values are guidelines in the operation range:

- LP: 3.0~6.5 barg (low pressure)
- HP: 12.0~28.0 barg (high pressure)
- Td: 60~95°C (discharge pipe temperature compressor)
- Ts: -2~15°C (suction pipe temperature compressor)
- ΔTi: 8~16°C (indoor temperature difference | air return – air outlet |).

During heating mode

The operating conditions must be as follows:

Items	Operating modes	If the operation is out this range...
Outdoor temp.	-10 to +15°CWB	A safety device may stop the operation.
Indoor temp.	+15 to +27°CDB	

The operation values are guidelines in the operation range:

- LP: 1.8~6.4 barg (low pressure)
- HP: 13.0~28.0 barg (high pressure)
- Td: 55~95°C (discharge pipe temperature compressor)
- Ts: -15~10°C (suction pipe temperature compressor)
- ΔTi: 12~32°C (indoor temperature difference | air return – air outlet |).

Correlation of Air-Conditioner's Operation Status and Pressure / Running Current

What happens in comparison to normal values is summarized in the table below. (Measured from 15 ~ 20 minutes or more after operation starts.)

When Cooling

Air-Conditioner Status	Low Pressure	High Pressure	Running Current
Air Filter Fouling	Lower	Lower	Lower
Short Circuit of Indoor Unit Inlet/Outlet Air	Lower	Lower	Lower
Outdoor Unit Fin Fouling	Higher	Higher	Higher
Short Circuit of Outdoor Unit Inlet/Outlet Air	Higher	Higher	Higher
Air Mixed in Refrigerant	Higher	Higher	Higher
Water Mixed in Refrigerant	*1 Lower	Lower	Lower
Dirt Mixed in Refrigerant	*2 Lower	Lower	Lower
Lack of Refrigerant (Gas)	Lower	Lower	Lower
Unsatisfactory Compression	*3 Higher	Lower	Lower

When Heating

Air-Conditioner Status	Low Pressure	High Pressure	Running Current
Air Filter Fouling	Higher	Higher	Higher
Short Circuit of Indoor Unit Inlet/Outlet Air	Higher	Higher	Higher
Outdoor Unit Fin Fouling	Lower	Lower	Lower
Short Circuit of Outdoor Unit Inlet/Outlet Air	Lower	Lower	Lower
Air Mixed in Refrigerant	Higher	Higher	Higher
Water Mixed in Refrigerant	*1 Lower	Lower	Lower
Dirt Mixed in Refrigerant	*2 Lower	Lower	Lower
Lack of Refrigerant (Gas)	Lower	Lower	Lower
Unsatisfactory Compression	*3 Higher	Lower	Lower

Note

- *1. Water in the refrigerant freezes inside the capillary tube or expansion valve, and is basically the same phenomenon as pump down.
- *2. Dirt in the refrigerant clogs filters inside the piping, and is basically the same phenomenon as pump down.
- *3. Pressure differential between high and low pressure becomes slight.

3.2 RYEP71L7V1, RYEP71L7W1, RYEP100L7V1, RYEP100L7W1 and RYEP125L7W1

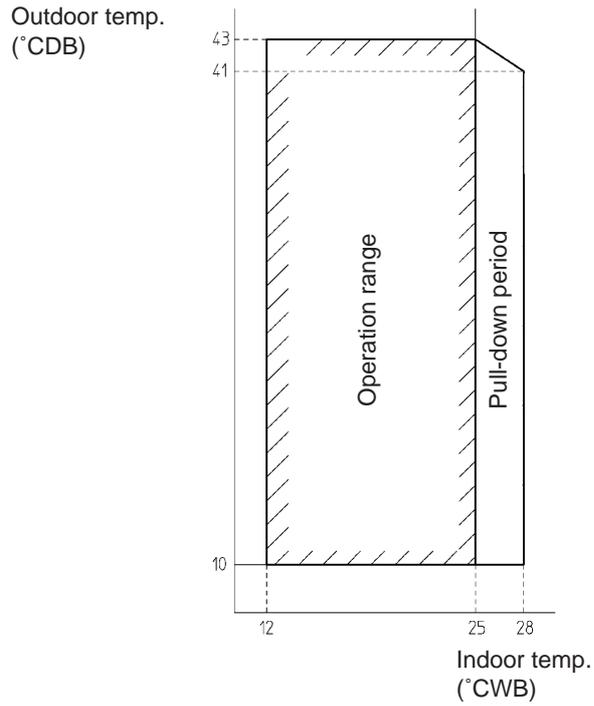
Conditions

The illustrations in this section are based on the following conditions:

- Equivalent piping length: 7.5 m
- Level difference: 0 m
- Air flow rate: High.

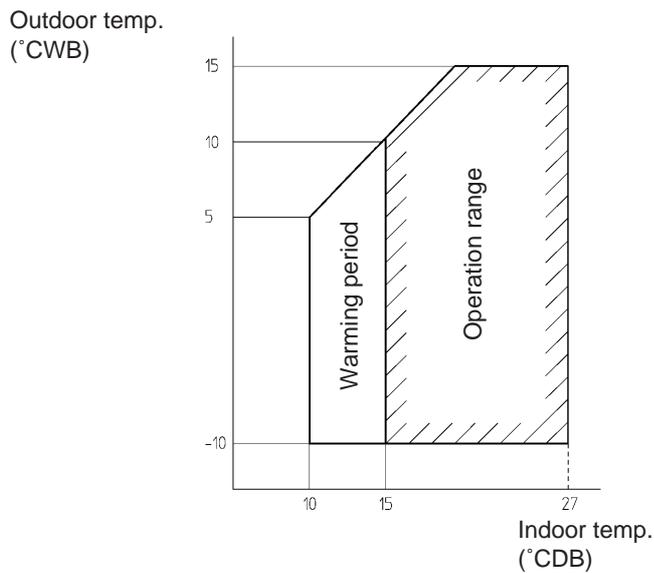
**Operation range:
Cooling**

The illustration below shows the operation range.



**Operation range:
Heating**

The illustration below shows the operation range.



4

Part 5

Disassembly and Maintenance

What is in this part? This part contains the following chapters:

Chapter	See page
1-Disassembly and Maintenance: Outdoor Units	5-3

5

1 Disassembly and Maintenance: Outdoor Units

1.1 What Is in This Chapter?

Introduction

This chapter contains the following information on the outdoor units:

- Exploded views
- Components.

Overview

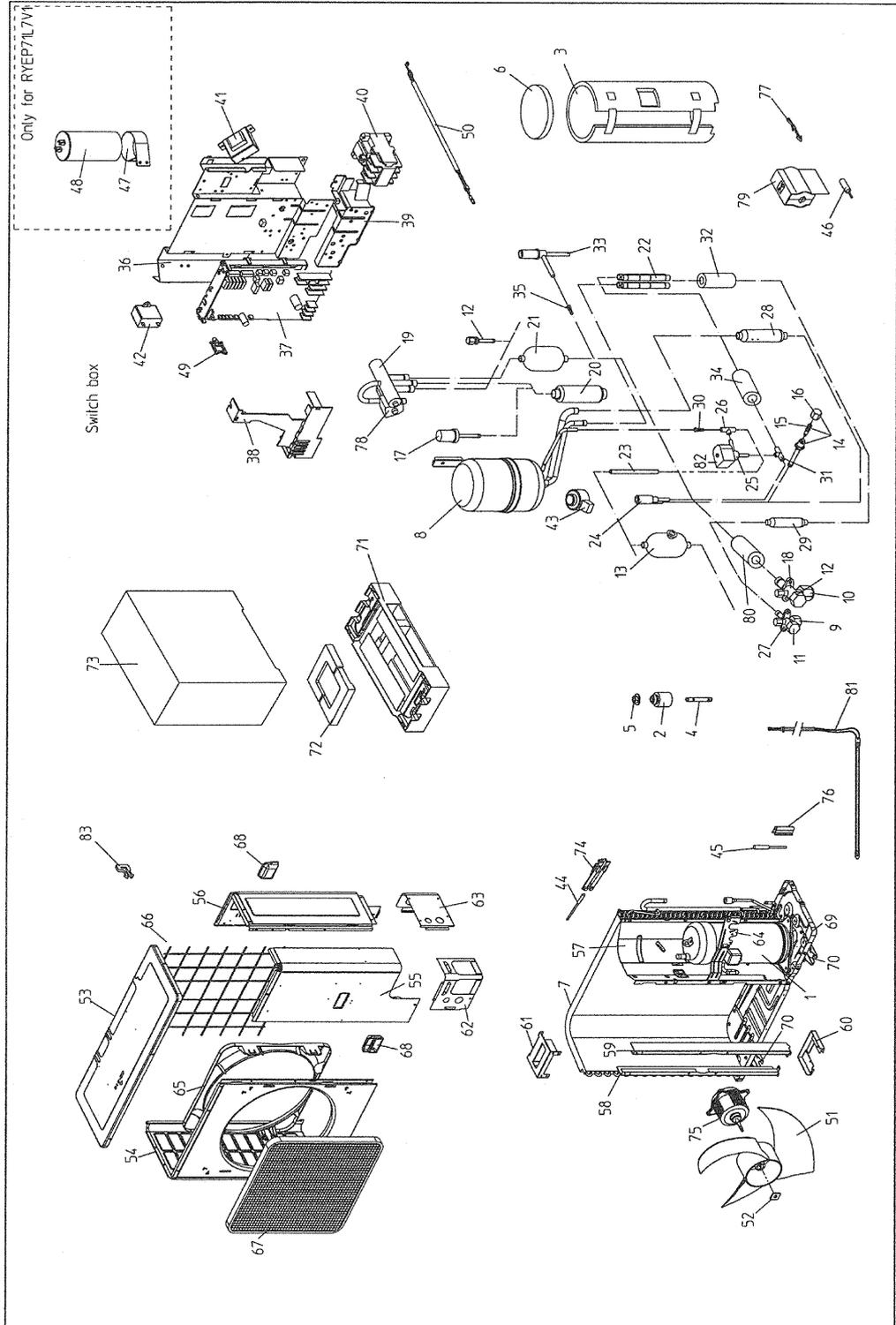
This chapter contains the following topics:

Topic	See page
1.2–RYEP71L7V1 and RYEP71L7W1	5–4
1.3–RYEP100L7V1 and RYEP100L7W1	5–6
1.4–RYEP125L7W1	5–8

1.2 RYEP71L7V1 and RYEP71L7W1

Exploded view

The illustration below shows the exploded view.



Components

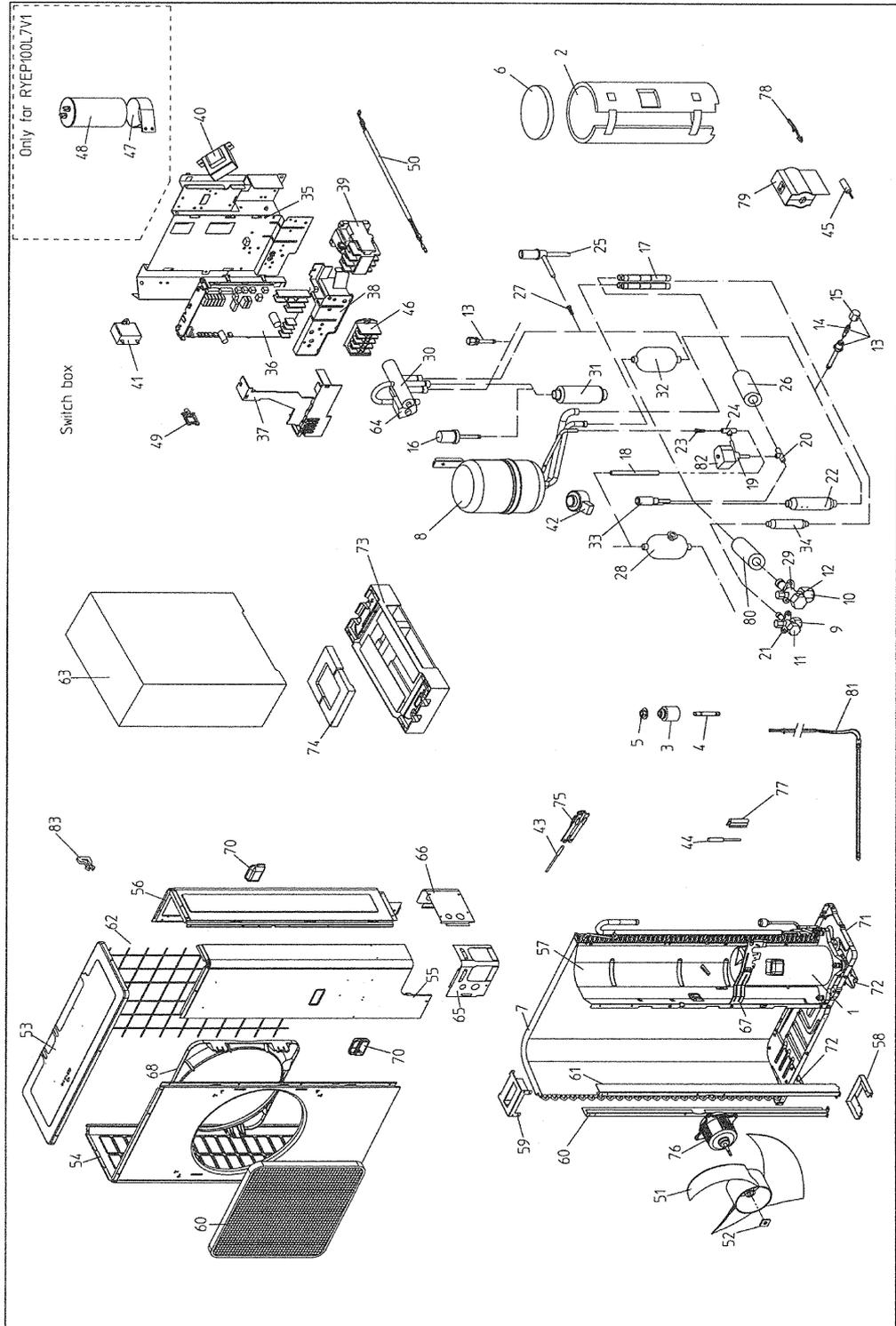
The table below contains the components of the exploded view.

No.	Component	No.	Component
1	Compressor (ZR34K3E-TFD)	42	Fan motor capacitor
1	Compressor (ZR34K3E-PFJ)	43	Motor operated valve coil
2	Rubber vibration isolator	44	Thermistor
3	Compress shell sound absorber	45	Thermistor
4	Bolt for compressor	46	Thermistor
5	Nut with washer	47	Capacitor fixing band
6	Compress head sound absorber	48	Comp. motor capacitor
7	Plate finned coil heat exch as	49	Wire clip
8	Liquid receiver assy	50	Compressor cable
9	Flare nut 3/8	50	Compressor cable
10	Flare nut 5/8"	51	Fan propellor
11	Stop valve cap	52	Washer
12	Valve cap	53	Top plate assy
13	Muffler	54	Front plate assy
14	Check valve	55	Front plate (2) assy
15	Valve core	56	Side plate assy
16	Shraeder round dustcap	57	Part. plate assy
17	Low pressure switch	58	Fan motor stand left
18	Gas stop valve assy	59	Fan motor stand right
19	Four way valve body	60	Fan motor stand
20	Filter	61	Fan motor stand (up)
21	Muffler	62	Cover
22	Check valve	63	Piping cover (rear)
23	Check valve	64	Stop valve mounting plate
24	Motor operated valve body	65	Bell mouth assy
25	Solenoid valve body	66	Suction grill
26	T-joint TSS2-2-2	67	Air discharge grill
27	Liquid stop valve assy	68	Handle
28	FI233 Filter	69	Bottom frame assy
29	FI233 Filter	70	Installation leg painted
30	Strainer	71	Bottom tray assy
31	T-joint	72	Cushion top
32	Insulation tube	73	Packing case p/m
33	Discharge pressure regulator	74	Thermistor fixing plate
34	Pipe insulation	75	Single phase AC fan motor
35	Strainer	76	Thermistor mounting spring
36	Elec. comp. mounting assy	77	Thermistor mounting spring
37	PCB assy	78	Coil of 4-way valve
37	PCB assy	79	Insulation material
38	Resin cover assy	80	Insulation tube (gas)
39	Elec. comp. box lower cover	81	Crank case heater
40	Magnetic switch	82	Solenoid valve coil
41	Transformer	83	Stopper

1.3 RYEP100L7V1 and RYEP100L7W1

Exploded view

The illustration below shows the exploded view.



Components

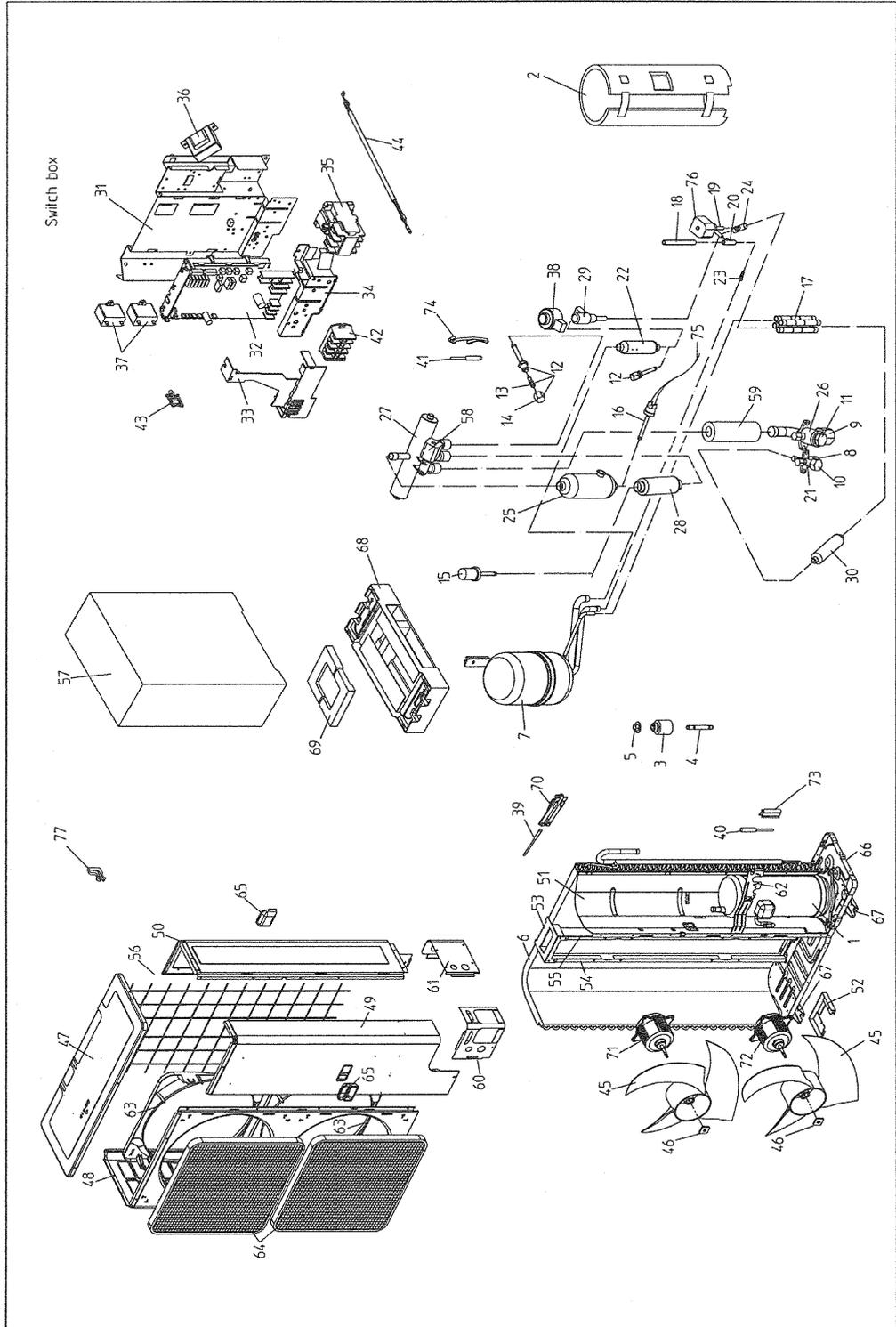
The table below contains the components of the exploded view.

No.	Component	No.	Component
1	Compressor (ZR47K3E-TFD)	42	Motor operated valve coil
1	Compressor (ZR47K3E-PFJ)	43	Thermistor
2	Compress shell sound absorber	44	Thermistor
3	Rubber vibration isolator	45	Thermistor
4	Bolt for compressor	46	Terminal strip
5	Nut with washer	47	Capacitor fixing band
6	Compress head sound absorber	48	Comp. motor capacitor
7	Plate finned coil heat exch as	49	Wire clip
8	Liquid receiver assy	50	Compressor cable
9	Flare nut 3/8	50	Compressor cable
10	Flare nut FNS-6	51	Fan propellor
11	Valve cap	52	Washer
12	Stop valve cap	53	Top plate assy
13	Check valve	54	Front plate assy
14	Valve core	55	Front plate (2) assy
15	Shraeder round dustcap	56	Side plate assy
16	Low pressure switch	57	Part. plate assy
17	Check valve	58	Fan motor stand
18	Check valve	59	Fan motor stand (up)
19	Solenoid valve body	60	Fan motor stand left
20	T-joint TSS2-2-2	61	Fan motor stand right
21	Liquid stop valve assy	62	Suction grill
22	FI233 Filter	63	Packing case P/M
23	Strainer	64	Coil of 4-way valve
24	T-joint	65	Cover
25	Discharge pressure regulator	66	Piping cover (rear)
26	Pipe insulation	67	Stop valve mounting plate
27	Strainer	68	Bell mouth assy
28	Muffler	69	Air discharge grill
29	Gas stop valve assy	70	Handle
30	4-way reversing valve body	71	Bottom frame assy
31	Filter	72	Installation leg painted
32	Muffler	73	Bottom tray assy
33	Motor operated valve body	74	Cushion top
34	Filter	75	Thermistor fixing plate
35	Elec. comp. mounting assy	76	Single phase AC fan motor
36	PCB assy	77	Thermistor mounting spring
36	PCB assy	78	Thermistor mounting spring
37	Resin cover assy	79	Insulation material
38	Elec. comp. box lower cover	80	Insulation tube (gas)
39	Magnetic switch	81	Crank case heater
39	Magnetic switch	82	Solenoid valve coil
40	Transformer	83	Stopper
41	Fan motor capacitor		

1.4 RYEP125L7W1

Exploded view

The illustration below shows the exploded view.



5

Components

The table below contains the components of the exploded view.

No.	Component	No.	Component
1	#7026# Compressor	40	Thermistor
2	Sound insulation (for comp/1)	41	Thermistor
3	Rubber cushion pre-assy	42	Terminal strip
4	Bolt for compressor	43	Wire clip
5	Nut with washer	44	Compressor cable
6	Plate finned coil heat exch as	45	Fan propellor
7	Liquid receiver assy	46	Washer
8	Flare nut 3/8	47	Top plate assy
9	Flare nut FNS-6	48	Front plate assy
10	Valve cap	49	Front plate (2) assy
11	Stop valve cap	50	Side plate assy
12	Check valve	51	Part. plate assy
13	Valve core	52	Fan motor stand
14	Shraeder round dustcap	53	Fan motor stand (up)
15	Low pressure switch	54	Fan motor stand left
16	High pressure switch	55	Fan motor stand right
17	Check valve	56	Suction grill
18	Check valve	57	Packing case p/m
19	Solenoid valve body	58	Coil of 4-way valve
20	T-joint TSS2-2-2	59	Thermal insulation tube
21	Liquid stop valve assy	60	Cover
22	FI233 Filter	61	Piping cover (rear)
23	Strainer	62	Stop valve mounting plate
24	T-joint	63	Bell mouth assy
25	Muffler	64	Air discharge grill
26	Gas stop valve assy	65	Handle
27	4-way reversing valve body	66	Bottom frame assy
28	Filter	67	Installation leg painted
29	Motor operated valve body	68	Bottom tray assy
30	Filter	69	Cushion top
31	Elec. comp. mounting assy	70	Thermistor fixing plate
32	PCB assy	71	Single phase AC fan motor
33	Resin cover assy	72	Single phase AC fan motor
34	Elec. comp. box lower cover	73	Thermistor mounting spring
35	Magnetic switch	74	Thermistor mounting spring
36	Transformer	75	HPS cable
37	Fan motor capacitor	76	Solenoid valve coil
38	Motor operated valve coil	77	Stopper
39	Thermistor		

5

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