DAIKIN

ESiE04-01

Service Manual

RZQ71~125B7V3B
Sky-Air Inverter R-410A B series

Table of Contents

1Introduction

Part 1
System Outline

1 General Outline: Outdoor Units

2 General Outline: Indoor Units

3 Specifications

4 Functional Diagrams

5 Switch Box Layout

6 Wiring Diagrams

7 PCB Layout

Part 2
Functional Description

1 General Functionality

2 Indoor Unit Functional Concept

3 Outdoor Unit Functional Concept

Part 3 Troubleshooting

1 Troubleshooting

2 Error Codes: Indoor Units

3 Error Codes: Outdoor Units

4 Error Codes: System Malfunctions

5 Additional Checks for Troubleshooting

Part 4
Commissioning and Test Run

1 Pre-Test Run Checks

2 Field settings

3 Test Run and Operation Data

Part 5
Disassembly and Maintenance

1 Disassembly and Maintenance: Outdoor Units

2 Disassembly and Maintenance: Indoor Units

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 RZQ-series.

Five parts

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

Introduction overview

The introduction contains the following topics:

1.2 Combination Overview

Introduction

In the tables in this section:

- “2” stands for twin combination.
- “3” stands for triple combination.
- “4“ double twin combination.
- “P” and “M” are allowed and guaranteed combinations, but they will not be officially mentioned as such in catalogues or databooks.

FCQ, FFQ, FBQ

The table below contains the possible combinations between indoor units (FCQ, FFQ and FBQ) and outdoor units of the Sky Air RZQ-series.

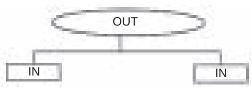
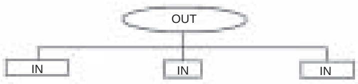
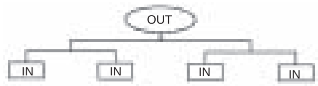
Indoor unit / Outdoor unit	950 x 950 Cassette						600 x 600 Cas.				Duct						
	FCQ35B7V1	FCQ50B7V1	FCQ60B7V1	FCQ71B7V3B	FCQ100B7V3B	FCQ125B7V3B	FFQ25BV1B	FFQ35BV1B	FFQ50BV1B	FFQ60BV1B	FBQ25B7V1	FBQ35B7V1	FBQ50B7V1	FBQ60B7V1	FBQ71B7V3B	FBQ100B7V3B	FBQ125B7V3B
RZQ71B7V3B	**2**	–	–	**P**	–	–	–	**2**	–	–	–	**2**	–	–	**P**	–	–
RZQ100B7V3B	**3**	**2**	–	–	**P**	–	–	**3**	**2**	–	–	**3**	**2**	–	–	**P**	–
RZQ125B7V3B	**4**	**3**	**2**	–	–	**P**	–	**4**	**3**	**2**	–	**4**	**3**	**2**	–	–	**P**

FDQ, FHQ, FUQ, FAQ

The table below contains the possible combinations between indoor units (FDQ, FHQ, FUQ and FAQ) and outdoor units of the Sky Air RZQ-series.

Indoor unit / Outdoor unit	LD	Ceiling suspended						C.S. Cas.			Wall	
	FDQ125B7V3B	FHQ35BUV1	FHQ50BUV1	FHQ60BUV1	FHQ71BUV1B	FHQ100BUV1B	FHQ125BUV1B	FUQ71BUV1B	FUQ100BUV1B	FUQ125BUV1B	FAQ71BUV1B	FAQ100BUV1B
RZQ71B7V3B	–	**2**	–	–	**P**	–	–	**P**	–	–	**P**	–
RZQ100B7V3B	–	**3**	**2**	–	–	**P**	–	–	**P**	–	–	**P**
RZQ125B7V3B	**P**	**4**	**3**	**2**	–	–	**P**	–	–	**P**	–	–

Combination Matrix

	Possible indoor combination		
	Simultaneous operation		
Outdoor models	**Twin**	**Triple**	**Double Twin**
			
RZQ71B7V3B	35-35 (KHRQ22M20TA7)	–	–
RZQ100B7V3B	50-50 (KHRQ22M20TA7)	35-35-35 (KHRQ127H7)	–
RZQ125B7V3B	60-60 (KHRQ22M20TA7)	50-50-50 (KHRQ127H7)	35-35-35-35 (3 x KHRQ22M20TA7)

Notes:

1 Possible indoor types:
- FCQ35-60
- FFQ35-60
- FHQ35-60
- FBQ35-60

2 When different indoor models are used in combination, designate the remote control that is equipped with the most functions as the main unit. In note 1 are the indoor units mentioned in order of the possible function (most functions are on FCQ , less functions are on FBQ).

3 Between brackets are the required Refnet kits mentioned, that are necessary to install the combination.

1.3 Precautions on handling new refrigerants

1.3.1 Outline

About Refrigerant R410A

■ Characteristics of new refrigerant, R410A

1 Performance
Almost the same performance as R22 and R407C.

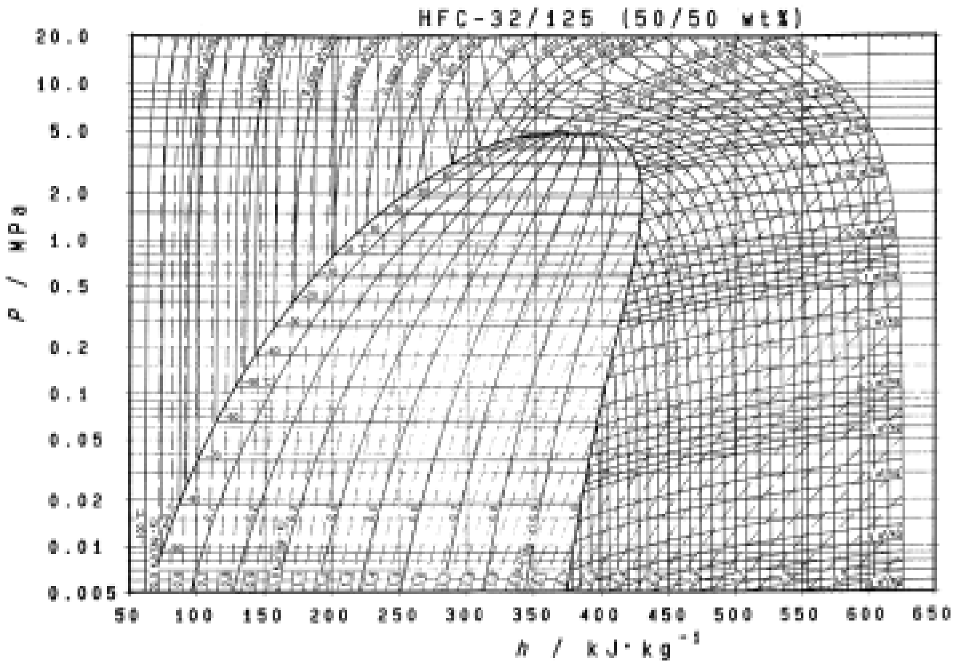
2 Pressure
Working pressure is approx. 1.4 times more than R22 and R407C.

3 Refrigerant composition
Few problems in composition control, since it is a Quasi-azeotropic mixture refrigerant.

	HFC units (Units using new refrigerants)		**HCFC units**
Refrigerant name	**R407C**	**R410A**	**R22**
Composing substances	Non-azeotropic mixture of HFC32, HFC125 and HFC134a (*1)	Quasi-azeotropic mixture of HFC32 and JFC125 (*1)	Single-component refrigerant
Design pressure	3.2 Mpa (gauge pressure) = 32.6 kgf/cm^2	4.15 Mpa (gauge pressure) = 42.3 kgf/cm^2	2.75Mpa (gauge pressure) = 28.0 kgf/cm^2
Refrigerant oil	Synthetic oil (Ether)		Mineral oil (Suniso)
Ozone destruction factor (ODP)	0	0	0.05
Combustibility	None	None	None
Toxicity	None	None	None

*1. Non-azeotropic mixture refrigerant: mixture of two or more refrigerants having different boiling points.
*2. Quasi-azeotropic mixture refrigerant: mixture of two or more refrigerants having similar boiling points.
*3. The design pressure is different at each product. Please refer to the installation manual for each product.

(Reference) 1 Mpa ≒ 1 0.19716 kgf / cm^2



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

■ Thermodynamic characteristic of R410A

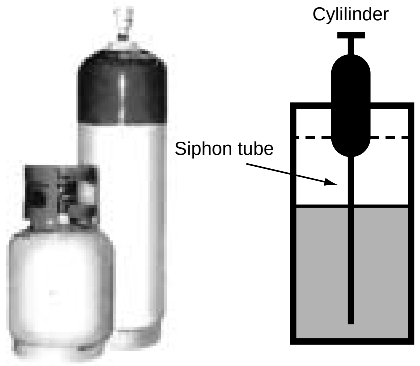
DAIREP ver2.0

Temperature (°C)	Steam pressure (kPa)		Density (kg/m³)		Specific heat at constant pressure (kJ/kgK)		Specific enthalpy (kJ/kg)		Specific entropy (kJ/KgK)	
	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor
-70	36.13	36.11	1410.7	1.582	1.372	0.695	100.8	390.6	0.649	2.074
-68	40.83	40.80	1404.7	1.774	1.374	0.700	103.6	391.8	0.663	2.066
-66	46.02	45.98	1398.6	1.984	1.375	0.705	106.3	393.0	0.676	2.058
-64	51.73	51.68	1392.5	2.213	1.377	0.710	109.1	394.1	0.689	2.051
-62	58.00	57.94	1386.4	2.463	1.378	0.715	111.9	395.3	0.702	2.044
-60	64.87	64.80	1380.2	2.734	1.379	0.720	114.6	396.4	0.715	2.037
-58	72.38	72.29	1374.0	3.030	1.380	0.726	117.4	397.6	0.728	2.030
-56	80.57	80.46	1367.8	3.350	1.382	0.732	120.1	398.7	0.741	2.023
-54	89.49	89.36	1361.6	3.696	1.384	0.737	122.9	399.8	0.754	2.017
-52	99.18	99.03	1355.3	4.071	1.386	0.744	125.7	400.9	0.766	2.010
-51.58	101.32	101.17	1354.0	4.153	1.386	0.745	126.3	401.1	0.769	2.009
-50	109.69	109.51	1349.0	4.474	1.388	0.750	128.5	402.0	0.779	2.004
-48	121.07	120.85	1342.7	4.909	1.391	0.756	131.2	403.1	0.791	1.998
-46	133.36	133.11	1336.3	5.377	1.394	0.763	134.0	404.1	0.803	1.992
-44	146.61	146.32	1330.0	5.880	1.397	0.770	136.8	405.2	0.816	1.987
-42	160.89	160.55	1323.5	6.419	1.401	0.777	139.6	406.2	0.828	1.981
-40	176.24	175.85	1317.0	6.996	1.405	0.785	142.4	407.3	0.840	1.976
-38	192.71	192.27	1310.5	7.614	1.409	0.792	145.3	408.3	0.852	1.970
-36	210.37	209.86	1304.0	8.275	1.414	0.800	148.1	409.3	0.864	1.965
-34	229.26	228.69	1297.3	8.980	1.419	0.809	150.9	410.2	0.875	1.960
-32	249.46	248.81	1290.6	9.732	1.242	0.817	153.8	411.2	0.887	1.955
-30	271.01	270.28	1283.9	10.53	1.430	0.826	156.6	412.1	0.899	1.950
-28	293.99	293.16	1277.1	11.39	1.436	0.835	159.5	413.1	0.911	1.946
-26	318.44	317.52	1270.2	12.29	1.442	0.844	162.4	414.0	0.922	1.941
-24	344.44	343.41	1263.3	13.36	1.448	0.854	165.3	414.9	0.934	1.936
-22	372.05	370.90	1256.3	14.28	1.455	0.864	168.2	415.7	0.945	1.932
-20	401.34	400.06	1249.2	15.37	1.461	0.875	171.1	416.6	0.957	1.927
-18	432.36	430.95	1242.0	16.52	1.468	0.886	174.1	417.4	0.968	1.923
-16	465.20	463.64	1234.8	17.74	1.476	0.897	177.0	418.2	0.980	1.919
-14	499.91	498.51	1227.5	19.04	1.483	0.909	180.0	419.0	0.991	1.914
-15	536.58	534.69	1220.0	20.41	1.491	0.921	182.9	419.8	1.003	1.910
-10	575.26	573.20	0212.5	21.86	1.499	0.933	185.9	420.5	1.014	1.906
-8	616.03	613.78	1204.9	23.39	1.507	0.947	189.0	421.2	1.025	1.902
-6	658.97	656.52	1197.2	25.01	1.516	0.960	192.0	421.9	1.036	1.898
-4	704.15	701.49	1189.4	26.72	1.524	0.975	195.0	422.6	1.048	1.894
-2	751.64	748.76	1181.4	28.53	1.533	0.990	198.1	243.2	1.059	1.890
0	801.52	798.41	1173.4	30.44	1.543	1.005	201.2	423.8	1.070	1.886
2	853.87	850.52	1165.3	32.46	1.552	1.022	204.3	424.4	1.081	1.882
4	908.77	905.16	1157.0	34.59	1.563	1.039	207.4	424.9	1.092	1.878
6	966.29	962.42	1148.6	36.83	1.573	1.057	210.5	425.5	1.103	1.874
8	1026.5	1022.4	1140.0	39.21	1.584	1.076	213.7	425.9	1.114	1.870
10	1089.5	1085.1	1131.3	41.71	1.596	1.096	216.8	426.4	1.125	1.866
12	1155.4	1150.7	1122.5	44.35	1.608	1.117	220.0	426.8	1.136	1.862
14	1224.3	1219.2	1113.5	47.14	1.621	1.139	223.2	427.2	1.147	1.859
16	1296.2	1290.8	1104.4	50.09	1.635	1.163	226.5	427.5	1.158	1.855
18	1371.2	1365.5	1095.1	53.20	1.650	1.188	229.7	427.8	1.169	1.851
20	1449.4	1443.4	1085.6	56.48	1.666	1.215	233.0	428.1	1.180	1.847
22	1530.9	1524.6	1075.9	59.96	1.683	1.243	236.4	428.3	1.191	1.843
24	1615.8	1609.2	1066.0	63.63	1.701	1.273	239.7	428.4	1.202	1.839
26	1704.2	1697.2	1055.9	67.51	1.721	1.306	243.1	428.6	1.214	1.834
28	1796.2	1788.9	1045.5	71.62	1.743	1.341	246.5	428.6	1.225	1.830
30	1891.9	1884.2	1034.9	75.97	1.767	1.379	249.9	428.6	1.236	1.826
32	1991.3	1983.2	1024.1	80.58	1.793	1.420	253.4	428.6	1.247	1.822
34	2094.5	2086.2	1012.9	85.48	1.822	1.465	256.9	428.4	1.258	1.817
36	2201.7	2193.1	1001.4	90.68	1.855	1.514	260.5	428.3	1.269	1.813
38	2313.0	2304.0	989.5	96.22	1.891	1.569	264.1	428.0	1.281	1.808
40	2428.4	2419.2	977.3	102.1	1.932	1.629	267.8	427.7	1.292	1.803
42	2548.1	2538.6	964.6	108.4	1.979	1.696	271.5	427.2	1.303	1.798
44	2672.2	2662.4	951.4	115.2	2.033	1.771	275.3	426.7	1.315	1.793
46	2800.7	2790.7	937.7	122.4	2.095	1.857	279.2	426.1	1.327	1.788
48	2933.7	2923.6	923.3	130.2	2.168	1.955	283.2	425.4	1.339	1.782
50	3071.5	3061.2	908.2	138.6	2.256	2.069	287.3	424.5	1.351	1.773
52	3214.0	3203.6	892.2	147.7	2.362	2.203	291.5	423.5	1.363	1.770
54	3361.4	3351.0	875.1	157.6	2.493	2.363	295.8	422.4	1.376	1.764
56	3513.8	3503.5	856.8	168.4	2.661	2.557	300.3	421.0	1.389	1.757
58	3671.3	3661.2	836.9	180.4	2.883	2.799	305.0	419.4	1.403	1.749
60	3834.1	3824.2	814.9	193.7	3.191	3.106	310.0	417.6	1.417	1.741
62	4002.1	3992.7	790.1	208.6	3.650	3.511	315.3	415.5	1.433	1.732
64	4175.7	4166.8	761.0	225.6	4.415	4.064	321.2	413.0	1.450	1.722

1.3.2 Refrigerant Cylinders

Cylinder specifications

- The cylinder is painted refrigerant color (pink).
- The cylinder valve is equipped with a siphon tube.



- Note:
  1. Refrigerant can be charged in liquid state with cylinder in upright position.
  2. Do not lay cylinder on its side during charging, since it causes refrigerant in gas state to enter the system.

Handling of cylinders

1. Laws and regulations
   R410A is liquefied gas, and the High-Pressure Gas Safety Law must be observed in handling them. Before using, refer to the High-Pressure Gas Safety Law.
   The Law stipulates standards and regulations that must be followed to prevent accidents with high-pressure gases. Be sure to follow the regulations.
2. Handing of vessels
   Since R410A is high-pressure gas, it is contained in high-pressure vessels.
   Although those vessels are durable and strong, careless handling can cause damage that can lead to unexpected accidents. Do not drop vessels, let them fall, apply impact or roll them on the ground.
3. Storage
   Although R410A is not flammable, it must be stored in a well-ventilated, cool, and dark place in the same way as any other high-pressure gases.
   It should also be noted that high-pressure vessels are equipped with safety devices that releases gas when the ambient temperature reaches more than a certain level (fusible plug melts) and when the pressure exceeds a certain level (spring-type safety valve operates).

1.3.4 Service Tools

R410A is used under higher working pressure, compared to previous refrigerants (R22,R407C). Furthermore, the refrigerating machine oil has been changed from Suniso oil to Ether oil, and if oil mixing is occurred, sludge results in the refrigerants and causes other problems. Therefore, gauge manifolds and charge hoses that are used with a previous refrigerant (R22,R407C) can not be used for products that use new refrigerants.

Be sure to use dedicated tools and devices.

■ Tool compatibility

<table>
<tr><th rowspan="3">Tool</th><th colspan="3">Compatibility</th><th rowspan="3">Reasons for change</th></tr>
<tr><th colspan="2">HFC</th><th>HCFC</th></tr>
<tr><th>R410A</th><th>R407C</th><th>R22</th></tr>
<tr><td>Gauge manifold
Charge hose</td><td colspan="3">X</td><td>■ Do not use the same tools for R22 and R410A.
■ Thread specification differs for R410A and R407C.</td></tr>
<tr><td>Charging cylinder</td><td colspan="2">X</td><td>O</td><td>■ Weighting instrument used for HFCs.</td></tr>
<tr><td>Gas detector</td><td colspan="2">O</td><td>X</td><td>■ The same tool can be used for HFCs.</td></tr>
<tr><td>Vacuum pump
(pump with reverse flow preventive function)</td><td colspan="3">O</td><td>■ To use existing pump for HFCs, vacuum pump adaptor must be installed.</td></tr>
<tr><td>Weighting instrument</td><td colspan="3">O</td><td></td></tr>
<tr><td>Charge mouthpiece</td><td colspan="3">X</td><td>■ Seal material is different between R22 and HFCs.
■ Thread specification is different between R410A and others.</td></tr>
<tr><td>Flaring tool (Clutch type)</td><td colspan="3">O</td><td>■ For R410A, flare gauge is necessary.</td></tr>
<tr><td>Torque wrench</td><td colspan="3">O</td><td>■ Torque-up for 1/2 and 5/8</td></tr>
<tr><td>Pipe cutter</td><td colspan="3">O</td><td></td></tr>
<tr><td>Pipe expander</td><td colspan="3">O</td><td></td></tr>
<tr><td>Pipe bender</td><td colspan="3">O</td><td></td></tr>
<tr><td>Pipe assembling oil</td><td colspan="3">X</td><td>■ Due to refrigerating machine oil change. (No Suniso oil can be used.)</td></tr>
<tr><td>Refrigerant recovery device</td><td colspan="3">Check your recovery device.</td><td></td></tr>
<tr><td>Refrigerant piping</td><td colspan="3">See the chart below.</td><td>■ Only ϕ19.1 is changed to 1/2H material while the previous material is "O".</td></tr>
</table>

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

Copper tube material and thickness

Pipe size	R407C		R410A	
	Material	Thickness tmmj	Material	Thickness tmmj
ϕ6.4	O	0.8	O	0.8
ϕ9.5	O	0.8	O	0.8
ϕ12.7	O	0.8	O	0.8
ϕ15.9	O	1.0	O	1.0
ϕ19.1	O	1.0	1/2H	1.0

* O: Soft (Annealed)
H: Hard (Drawn)

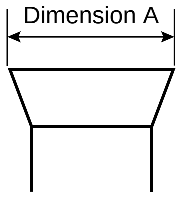
Flaring tool

Flare gauge

■ Specifications
- Dimension A

Nominal size	Tube O.D.	$A^{+0}_{-0.4}$	
	Do	Class-2 (R410A)	Class-1 (Conventional)
1/4	6.35	9.1	9.0
3/8	9.52	13.2	13.0
1/2	12.70	16.6	16.2
5/8	15.88	19.7	19.4
3/4	19.05	24.0	23.3

- Differences
- Change of dimension A



For class-1: R407C
For class-2: R410A

Conventional flaring tools can be used when the work process is changed. (change of work process)

Previously, a pipe extension margin of 0 to 0.5mm was provided for flaring. For R410A air conditioners, perform pipe flaring with a pipe extension margin of **1.0 to 1.5 mm**. (For clutch type only)

Conventional tool with pipe extension margin adjustment can be used.

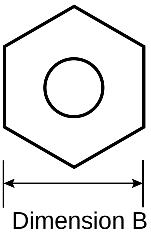
Torque wrench

- Specifications
- Dimension B Unit:mm

Nominal size	Class-1	Class-2	Previous
1/2	24	26	24
5/8	27	29	27

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

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



For class-1: R407C
For class-2: R410A

Vacuum pump with check valve

Vacuum pump adaptor
(Reverse flow preventive vacuum adaptor)

■ Specifications
- Discharge speed
  50 l/min (50Hz)
  60 l/min (60Hz)
- Suction port UNF7/16-20(1/4 Flare)
  UNF1/2-20(5/16 Flare) with adaptor
- Maximum degree of vacuum
  –100.7 kpa (5 torr – 755 mmHg)

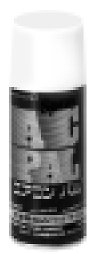
■ Differences
- Equipped with function to prevent reverse oil flow
- Previous vacuum pump can be used by installing adaptor.

Leak tester

■ Specifications
- Hydrogen detecting type, etc.
- Applicable refrigerants
  R410A, R407C, R404A, R507A, R134a, etc.

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

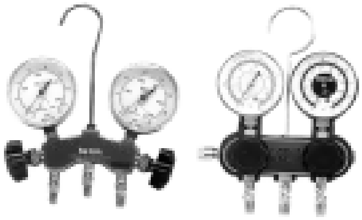
Refrigerant oil (Air compal)



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

■ Differences
- Can be used for R410A and R22 units.

Gauge manifold for R410A



- ■ Specifications
- High pressure gauge
  - 0.1 to 5.3 MPa (-76 cmHg to 53 kg/cm^2)
- Low pressure gauge
  - 0.1 to 3.8 MPa (-76 cmHg to 38 kg/cm^2)
- 1/4" → 5/16" (2min → 2.5min)
- No oil is used in pressure test of gauges.
  → For prevention of contamination
- Temperature scale indicates the relationship between pressure and temperature in gas saturated state.

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

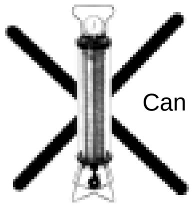
Charge hose for R410A

(Hose with ball valve)

- ■ Specifications
- Working pressure 5.08 MPa (51.8 kg/cm^2)
- Rupture pressure 25.4 MPa (259 kg/cm^2)
- Available with and without hand-operate valve that prevents refrigerant from outflow.

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

Charging cylinder



- ■ Specifications
- • Use weigher for refrigerant charge listed below to charge directly from refrigerant cylinder.
- ■ Differences
- • The cylinder can not be used for mixed refrigerant since mixing ratio is changed during charging.

  When R410A is charged in liquid state using charging cylinder, foaming phenomenon is generated inside charging cylinder.

Weigher for refrigerant charge

- ■ Specifications
- • High accuracy
  TA101A (for 10-kg cylinder) = ± 2g
  TA101B (for 20-kg cylinder) = ± 5g
- • Equipped with pressure-resistant sight glass to check liquid refrigerant charging.
- • A manifold with separate ports for HFCs and previous refrigerants is equipped as standard accessories.
- ■ Differences
- • Measurement is based on weight to prevent change of mixing ratio during charging.

Charge mouthpiece

- ■ Specifications
- • For R410A, 1/4"→ 5/16" (2min → 2.5min)
- • Material is changed from CR to H-NBR.
- ■ Differences
- • Change of thread specification on hose connection side (For the R410A use)
- • Change of sealer material for the HFCs use.

Part 1
System Outline

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

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

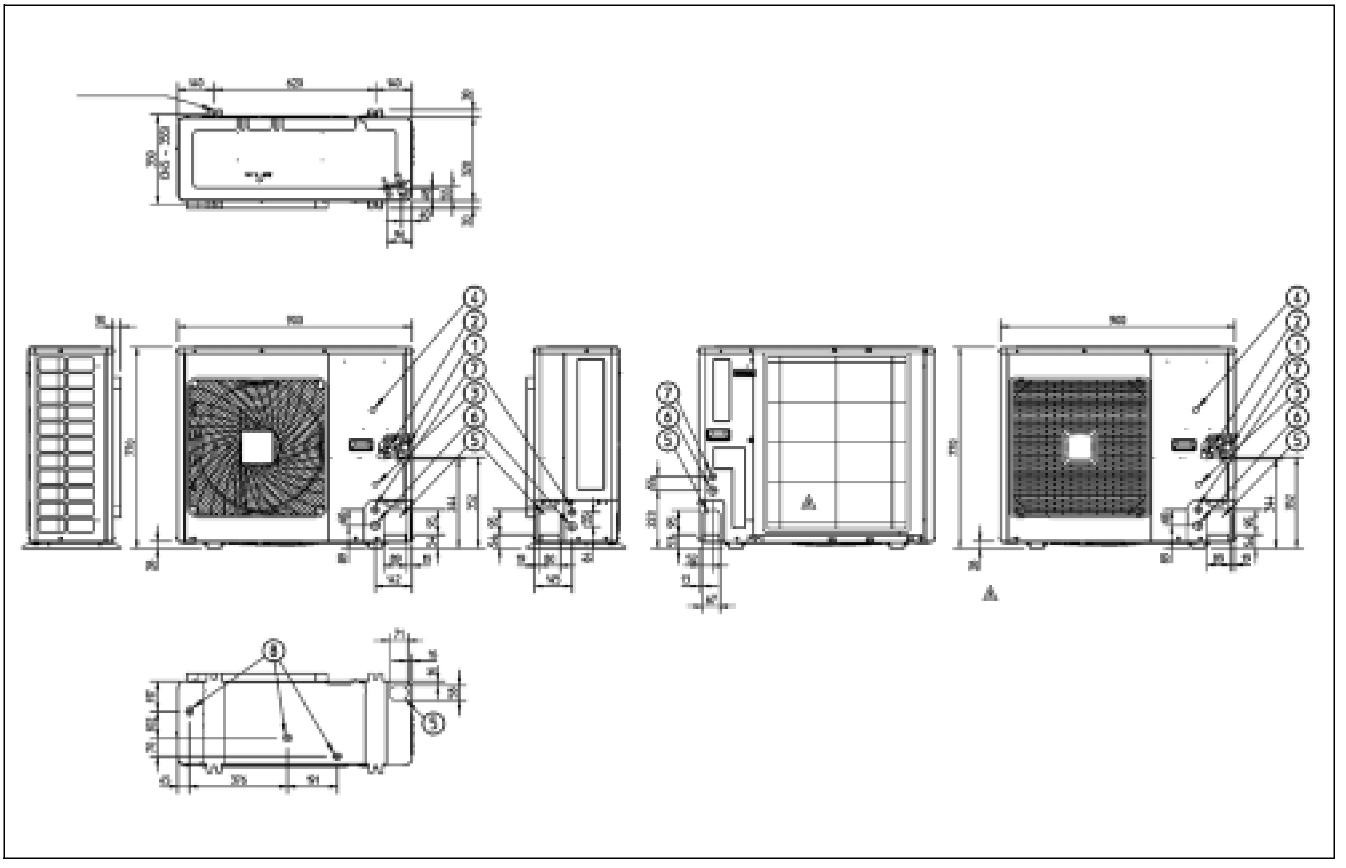
This chapter contains the following general outlines:

1

1.2 RZQ71: Outlook and dimensions

Outlook and dimensions

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



Installation and service space

See page 1–8.

Components

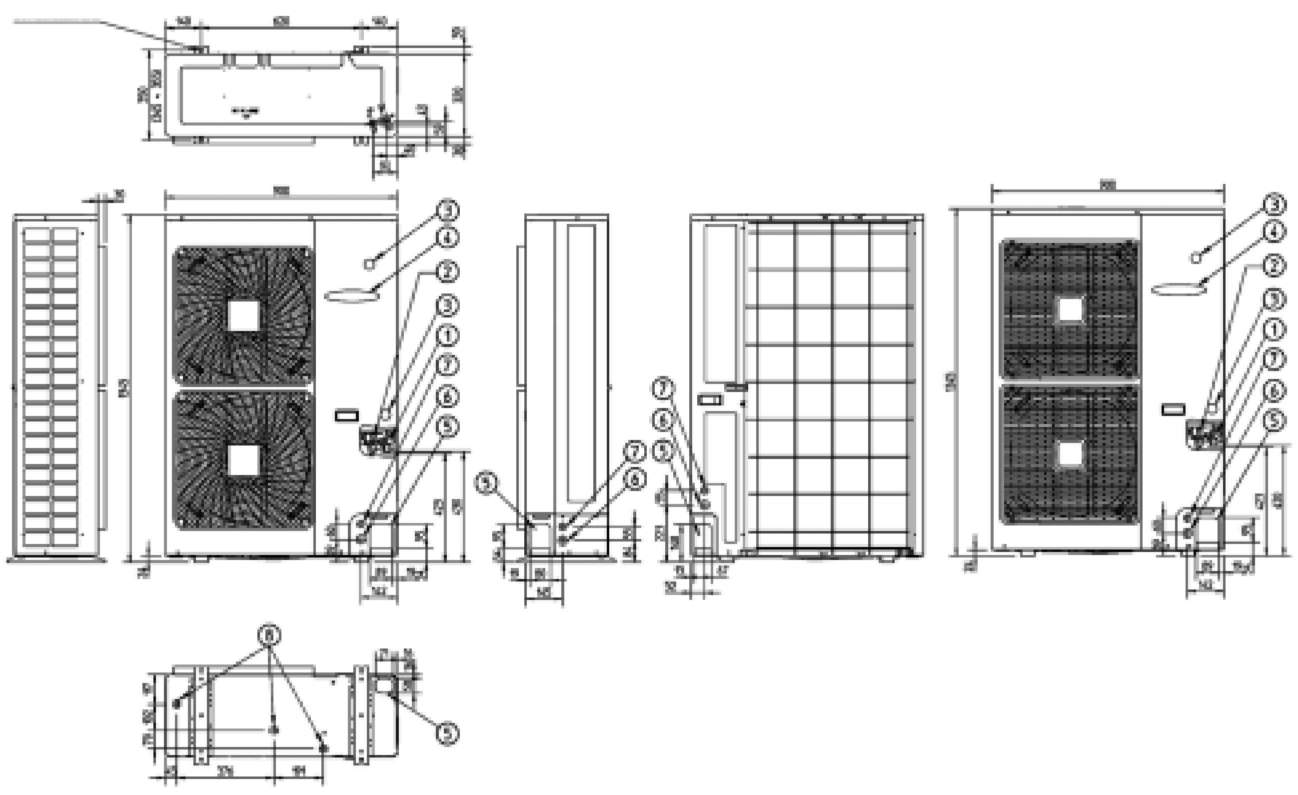
The table below contains the different components of the unit.

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

1.3 RZQ100 and RZQ125: Outlook and dimensions

Outlook and dimensions

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



Installation and service space

See page 1–8.

Components

The table below contains the different components of the unit.

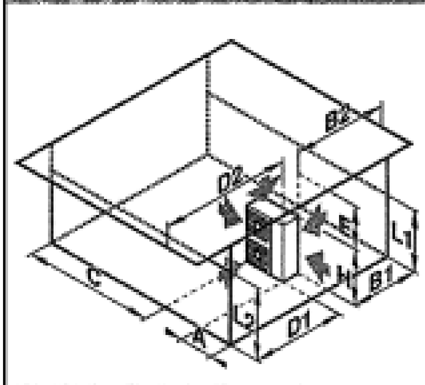
No.	Component
1	Gas pipe connection
2	Liquid pipe connection
3	Service port (inside the unit)
4	Electronic connection and grounding terminal M5 (inside the switch box)
5	Refrigerant piping intake
6	Power supply wiring intake
7	Control wiring intake
8	Drain outlet

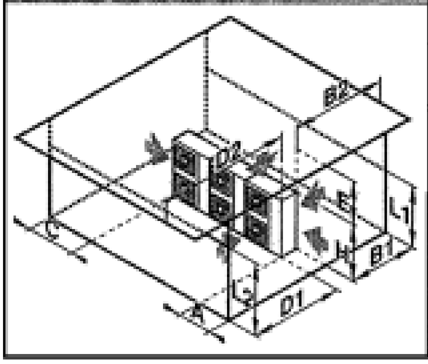
1

1.4 RZQ71, RZQ100 and RZQ125: 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.





Suction side	Discharge side	Left side	Right side	Top side			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		≥1000	0<L1≤½H ½H<L1≤H	1
						✗	L1≤H								
					L2<L1	L2≤H		≥50(100) ≥100(200)			≥500	≥500	≥1000	0<L2≤½H ½H<L2≤H	
						✗	L2≤H								
✓		✓	✓				≥200	≥200(300)		≥1000					
✓		✓	✓	✓			≥200	≥200(300)		≥1000		≤500	≥1000		
	✓										≥1000				
	✓			✓					≤500		≥1000		≥1000		
✓	✓				L1<L2			≥200(300)			≥1000				
					L2<L1			≥150(250) ≥200(300)			≥1000			0<L2≤½H ½H<L2≤H	
✓	✓			✓	L1<L2	L1≤H		≥200(300)	≤500		≥1000 ≥1250		≥1000	0<L1≤½H ½H<L1≤H	1
						✗	L1≤H								
					L2<L1	L2≤H		≥150(250) ≥200(300)			≥1000	≤500	≥1000	0<L2≤½H ½H<L2≤H	2
						✗	L2≤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

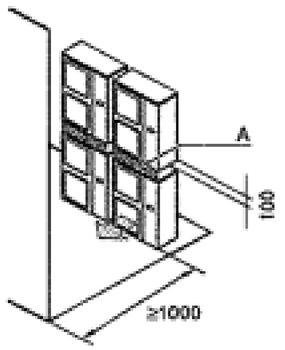
✗ This situation is not allowed

Stacked

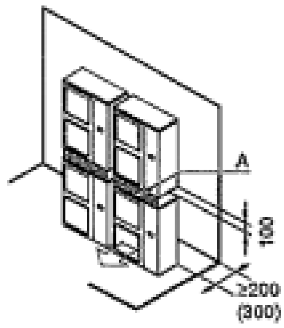
The illustration below shows the required installation and service space (mm). The values in brackets are for the 100 and 125 class.

- Do not stack more than one unit.
- ± 100 mm is required as the dimension for laying the upper outdoor unit's drain pipe.
- Get the portion A sealed so that air from the outlet does not bypass.

Obstacles exist in front of the outlet side



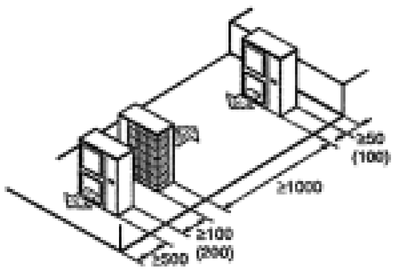
Obstacles exist in front of the air inlet



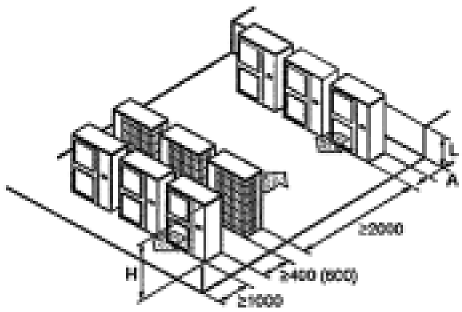
Multiple rows

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

Installation of one unit per row



Installing multiple units (2 units or more) in lateral connection per row



Relation of dimensions of H, A and L are shown in the table below.

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

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
- Components

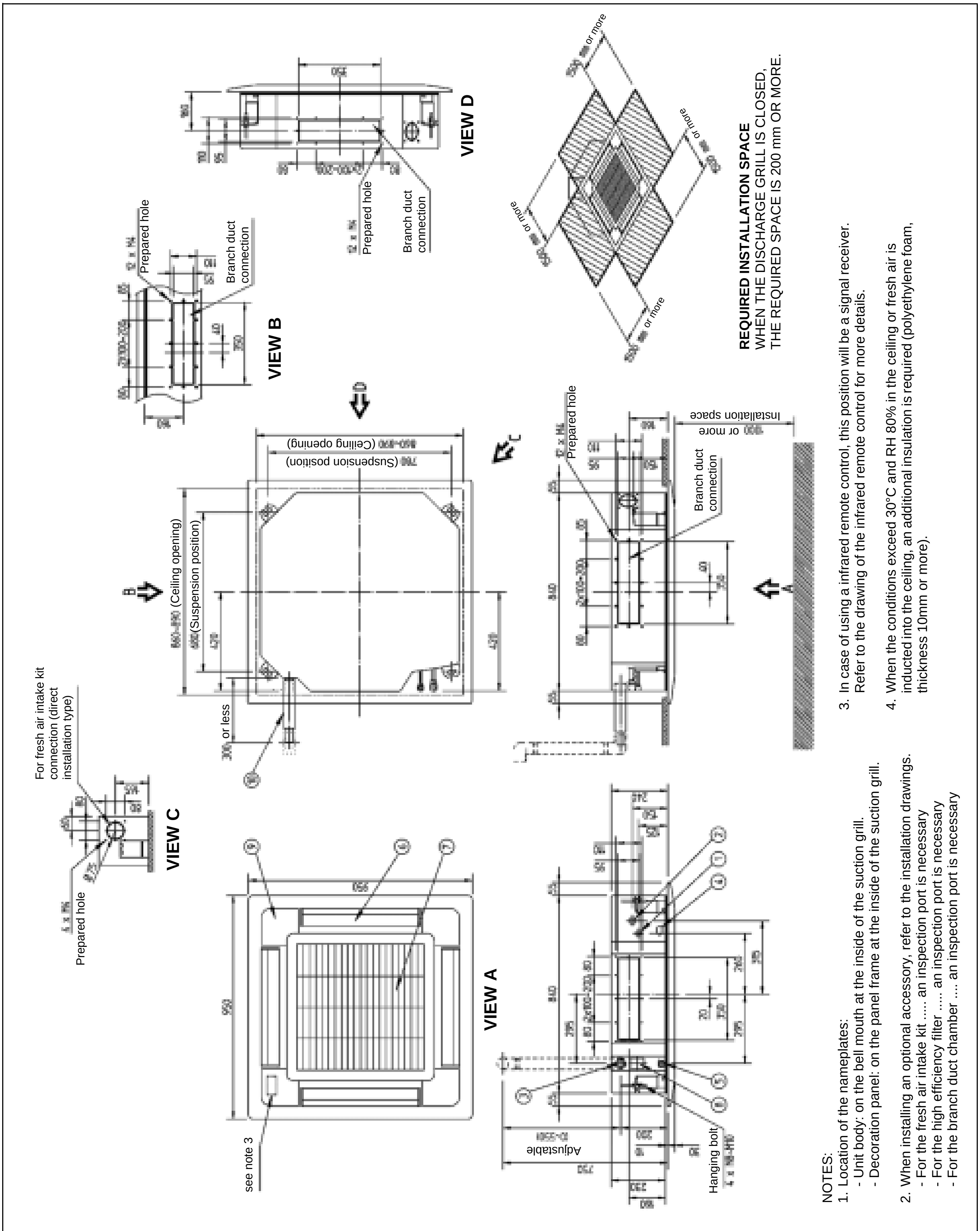
General outline

This chapter contains the following general outlines:

2.2 FCQ35B7V1 ~ FCQ71B7V3B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

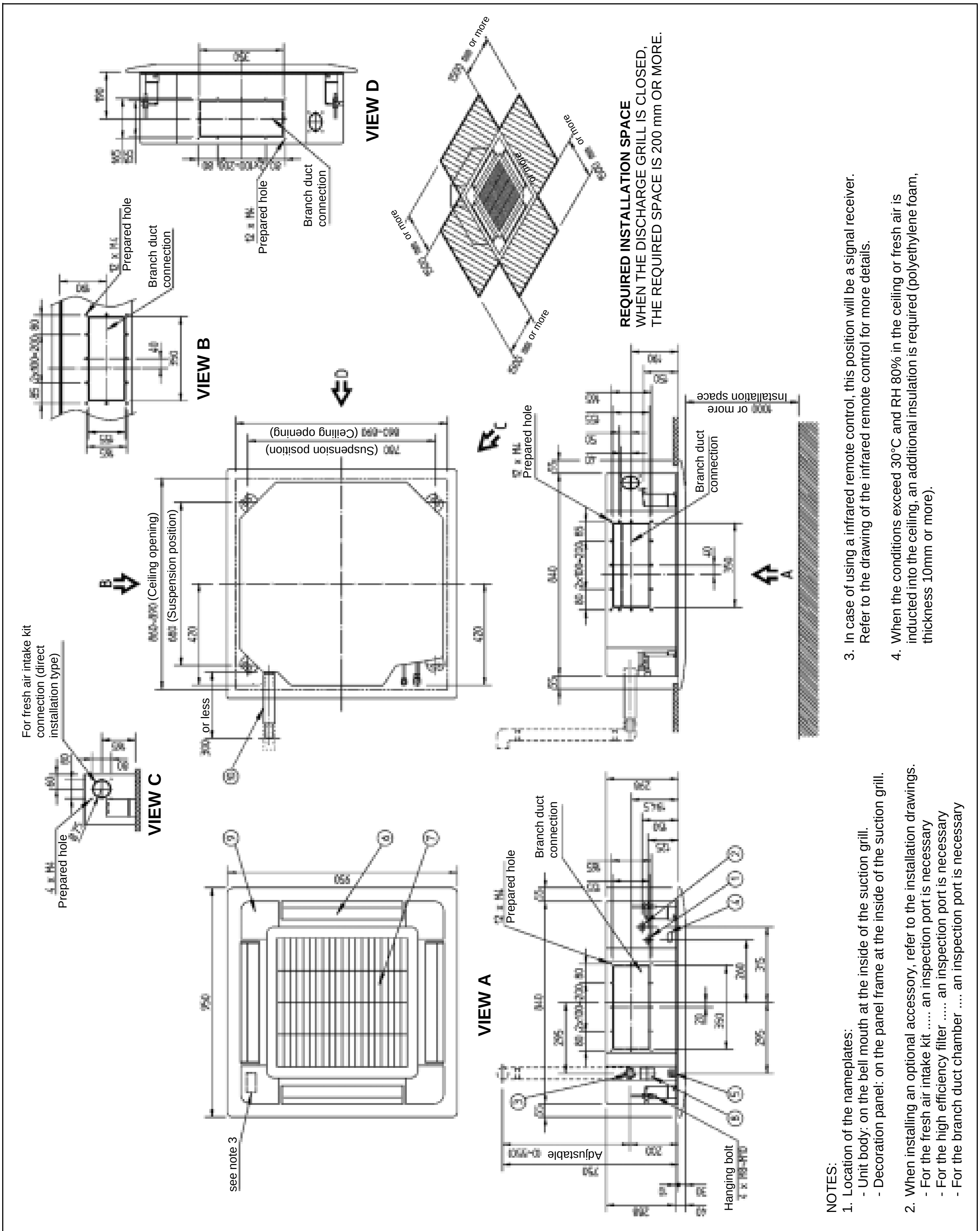
No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Power supply connection
5	Transmission wiring connection
6	Air discharge grille
7	Air suction grille
8	Water supply intake
9	Corner decoration cover
10	Drain hose

1

2.3 FCQ100~125B7V3B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

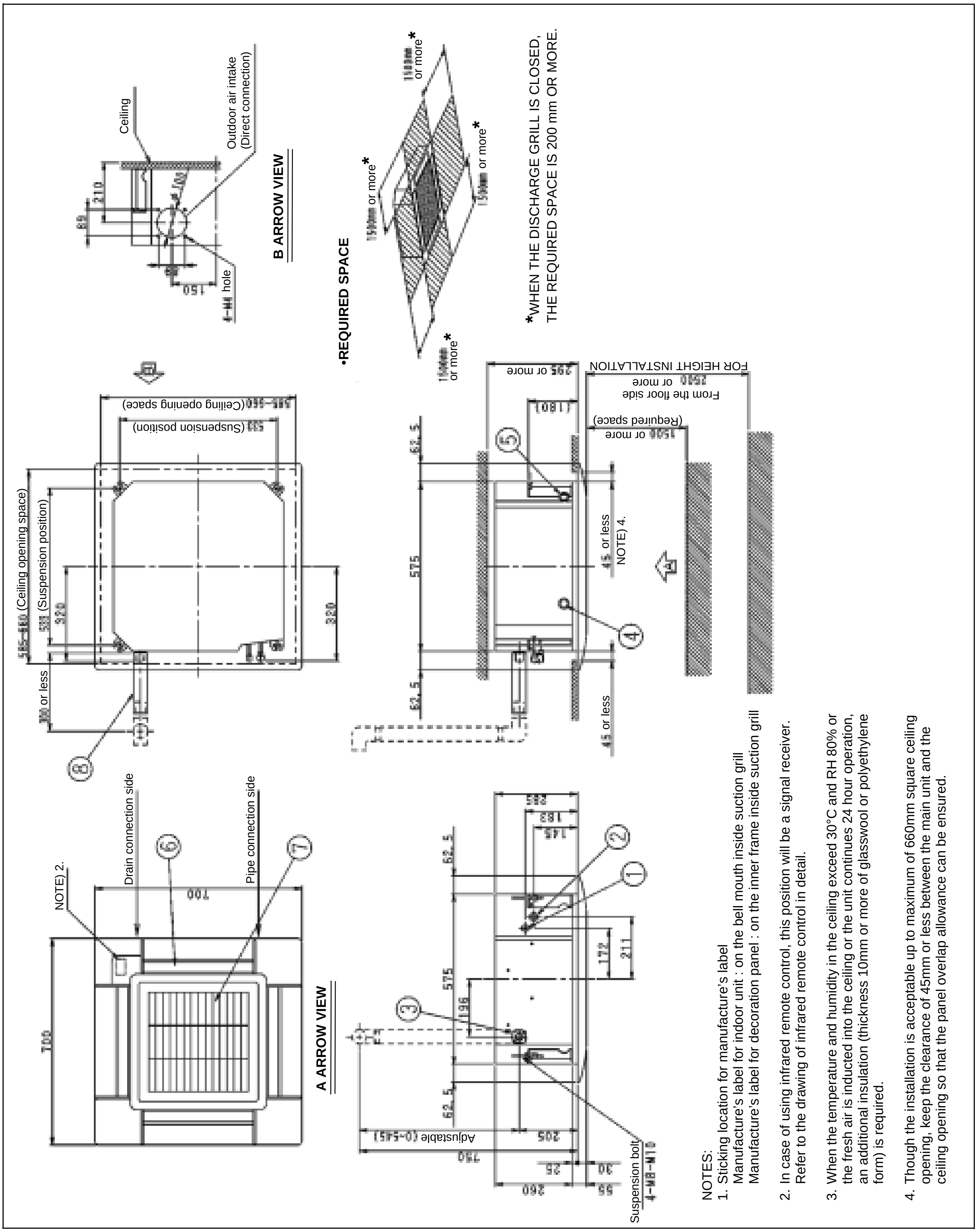
No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Power supply connection
5	Transmission wiring connection
6	Air discharge grille
7	Air suction grille
8	Water supply intake
9	Corner decoration cover
10	Drain hose

1

2.4 FFQ35~60BV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

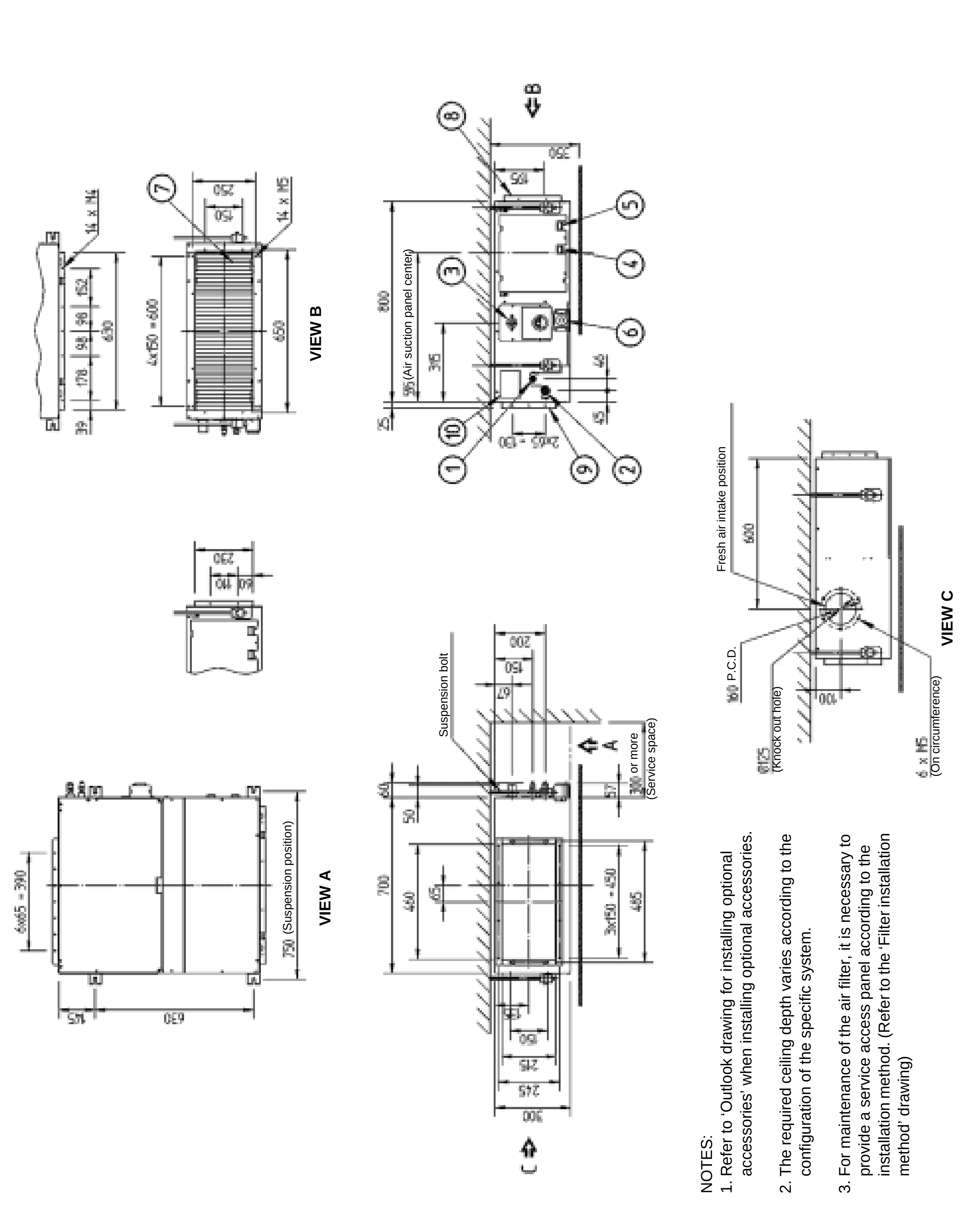
No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Power supply connection
5	Remote control code and control wiring connection
6	Air discharge grille
7	Suction grille
8	Drain hose

1

2.5 FBQ35B7V1 & FBQ50B7V1

Outlook and dimensions

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



Components

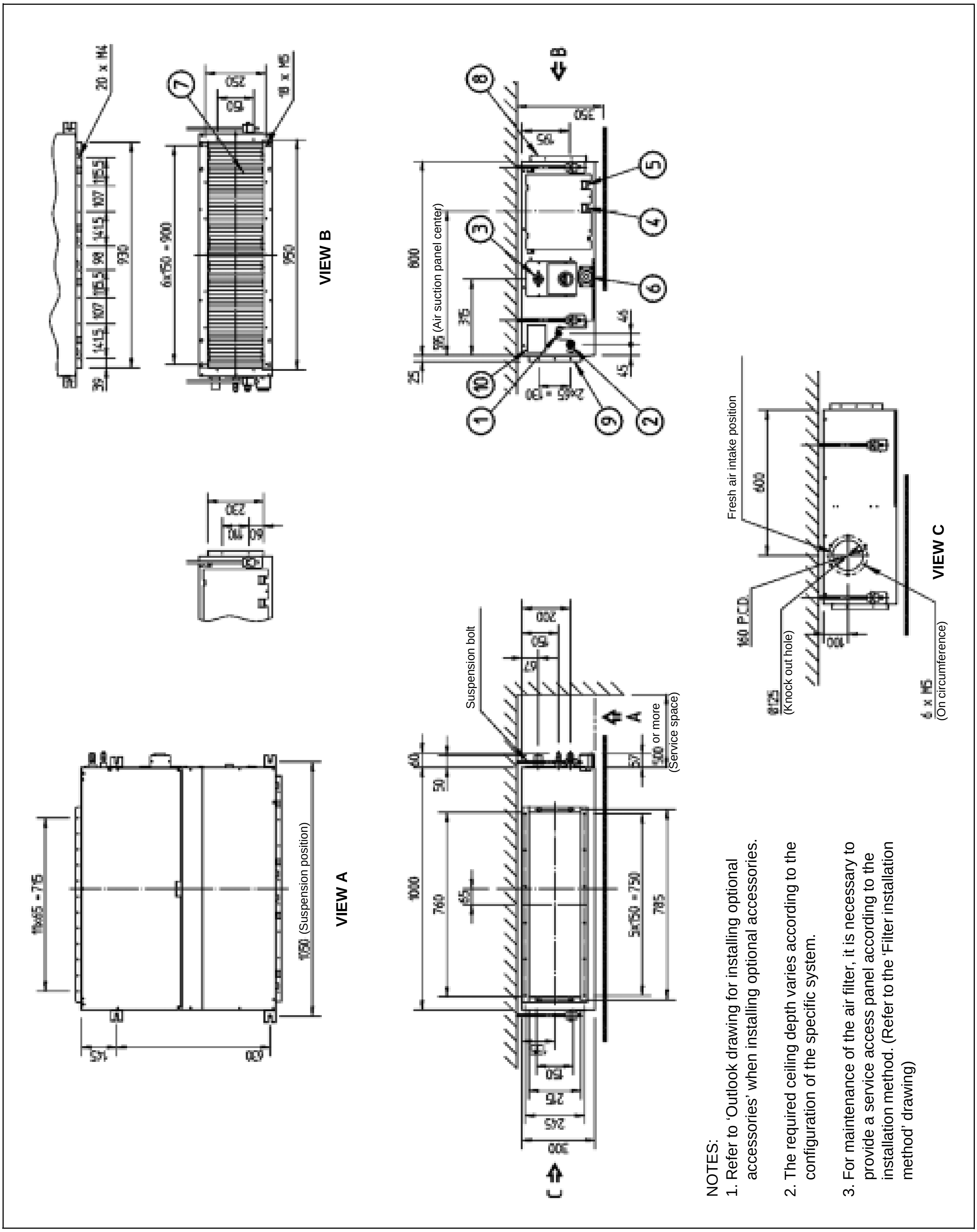
The table below contains the different components of the unit.

No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Remote control wiring connection
5	Power supply connection
6	Drain hole
7	Air filter
8	Air suction side
9	Air discharge side
10	Nameplate

2.6 FBQ60B7V1 & FBQ71B7V3B

Outlook and dimensions

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



Components

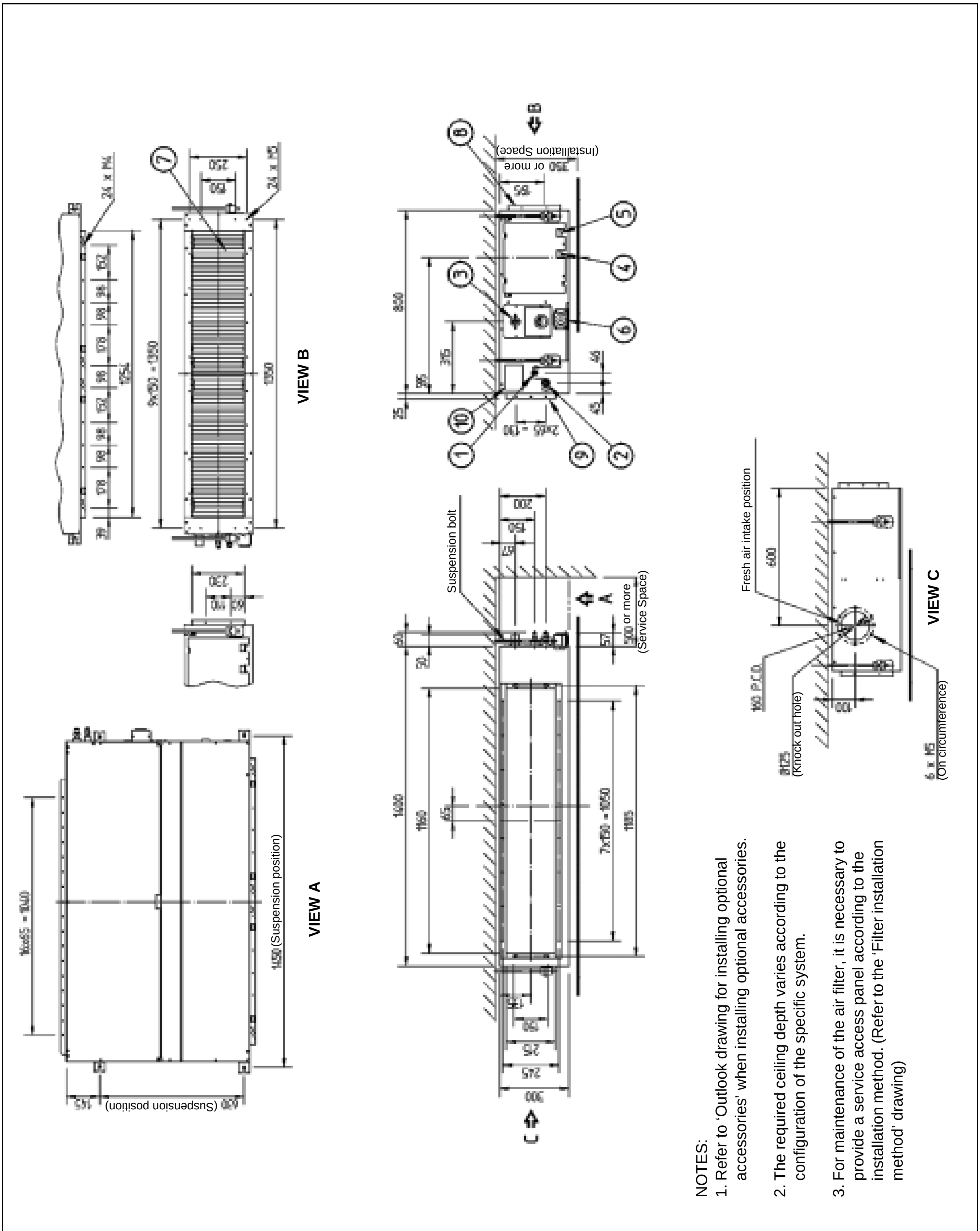
The table below contains the different components of the unit.

No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Remote control wiring connection
5	Power supply connection
6	Drain hole
7	Air filter
8	Air suction side
9	Air discharge side
10	Nameplate

2.7 FBQ100B7V3B & FBQ125B7V3B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

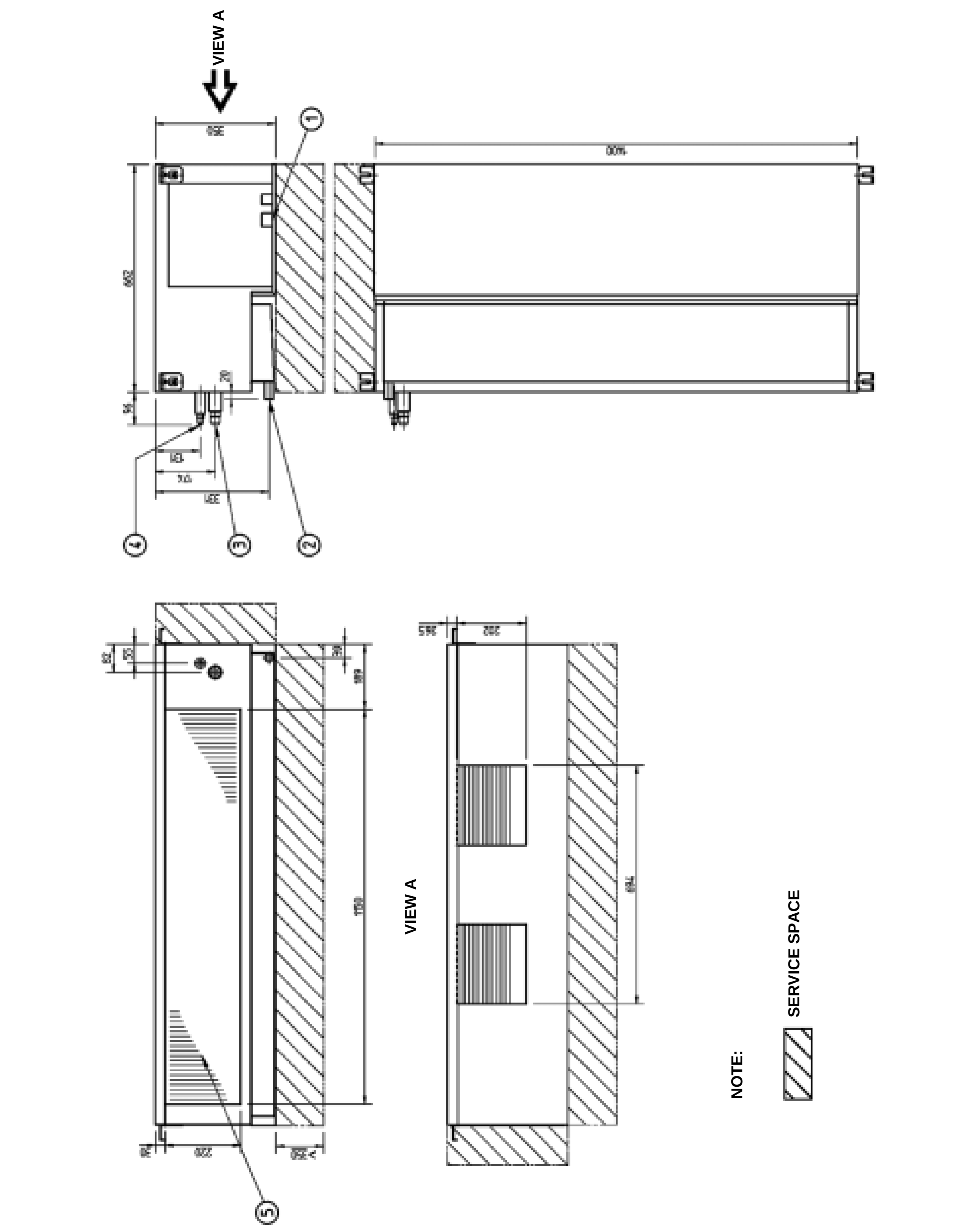
No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Remote control wiring connection
5	Power supply connection
6	Drain hole
7	Air filter
8	Air suction side
9	Air discharge side
10	Nameplate

1

2.8 FDQ125B7V3B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

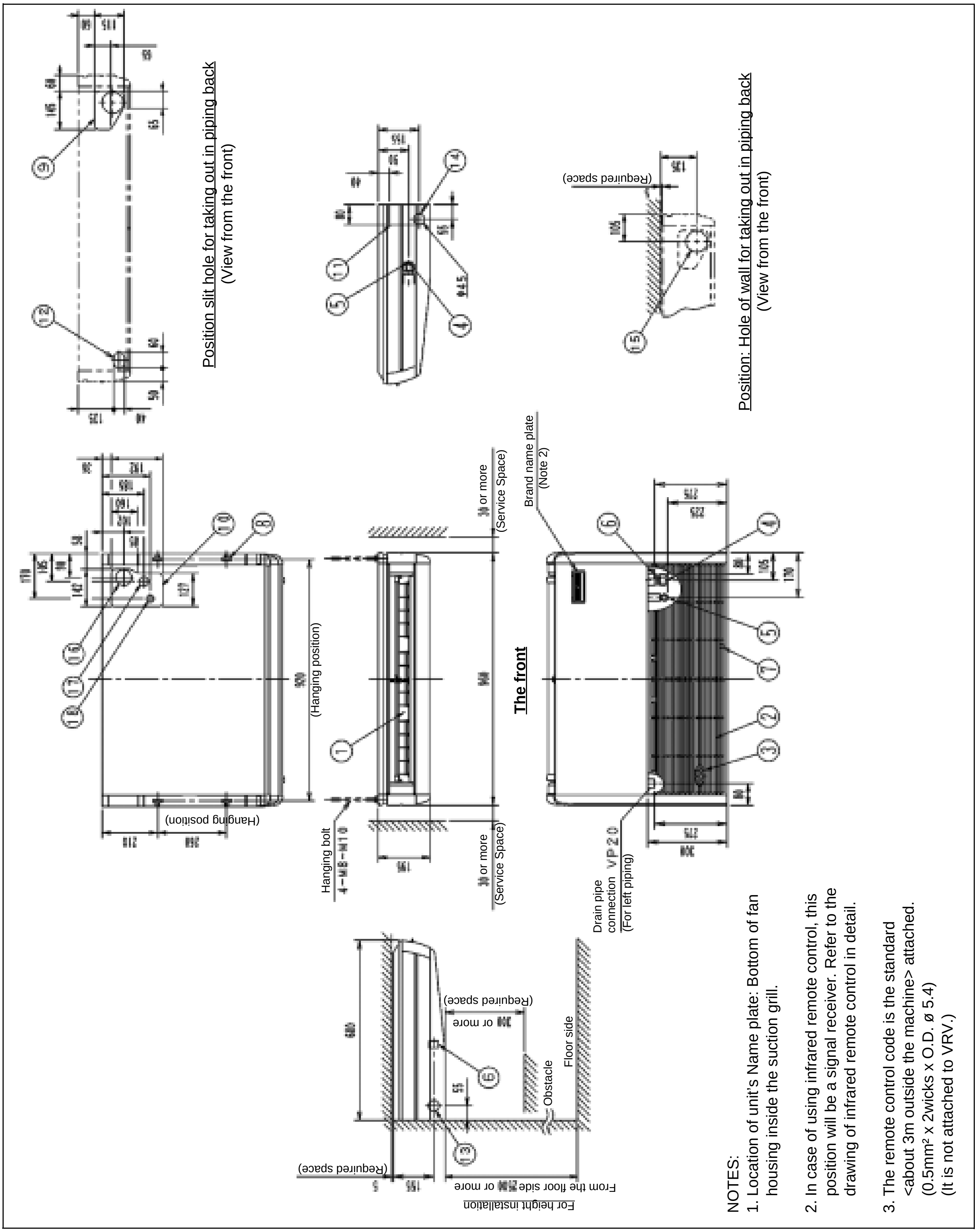
No.	Component
1	Power supply intake
2	Drain connection
3	Gas pipe connection single union
4	Liquid pipe connection single union
5	Filter

1

2.9 FHQ35BUV1 & FHQ50BUV1

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

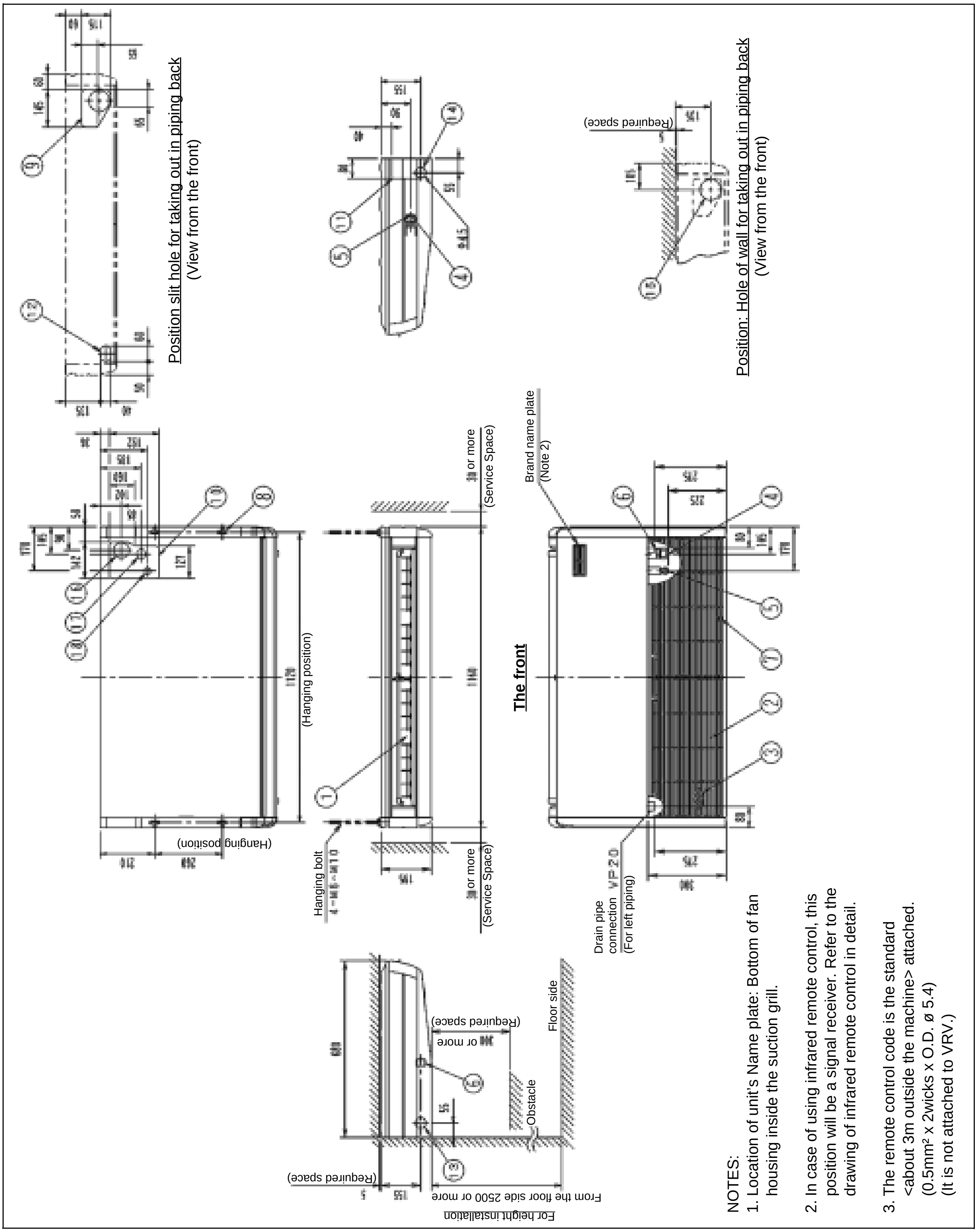
No.	Component
1	Air discharge grille
2	Air suction grille
3	Air filter
4	Gas pipe connection
5	Liquid pipe connection
6	Drain pipe connection
7	Earth terminal (Inside the electric components box)
8	Suspention bracket
9	Backward piping and wiring connection opening lid
10	Upward piping and wiring connection opening lid
11	Right side pipe connection
12	Left back drain pipe connection
13	Left side drain pipe connection
14	Right side drain pipe connection
15	Hole of wall for taking out in piping back
16	Upward drain pipe connection
17	Upward gas pipe connection
18	Upward liquid pipe connection

1

2.10 FHQ60BUV1 & FHQ71BUV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

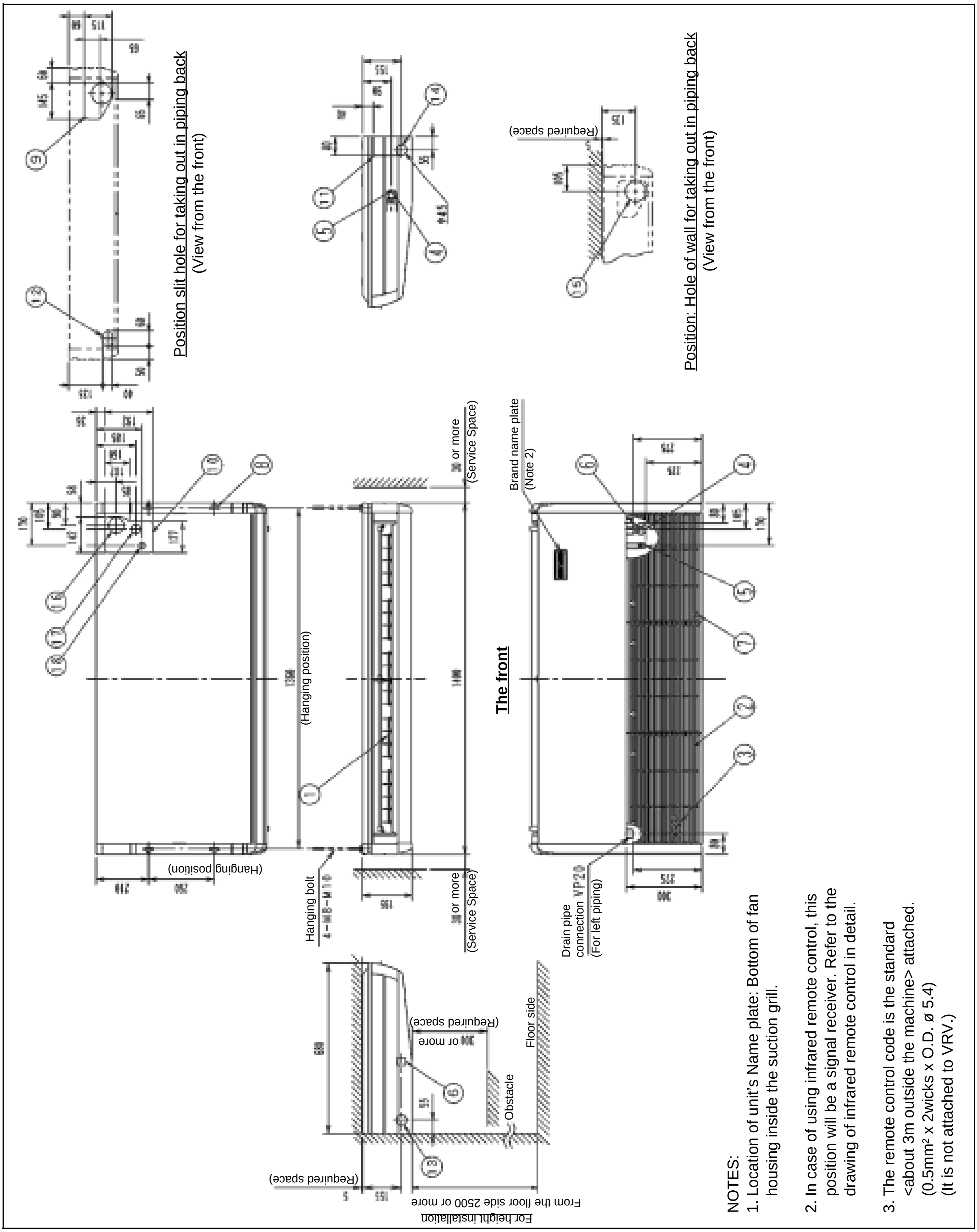
No.	Component
1	Air discharge grille
2	Air suction grille
3	Air filter
4	Gas pipe connection
5	Liquid pipe connection
6	Drain pipe connection
7	Earth terminal (Inside the electric components box)
8	Suspention bracket
9	Backward piping and wiring connection opening lid
10	Upward piping and wiring connection opening lid
11	Right side pipe connection
12	Left back drain pipe connection
13	Left side drain pipe connection
14	Right side drain pipe connection
15	Hole of wall for taking out in piping back
16	Upward drain pipe connection
17	Upward gas pipe connection
18	Upward liquid pipe connection

1

2.11 FHQ100BUV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

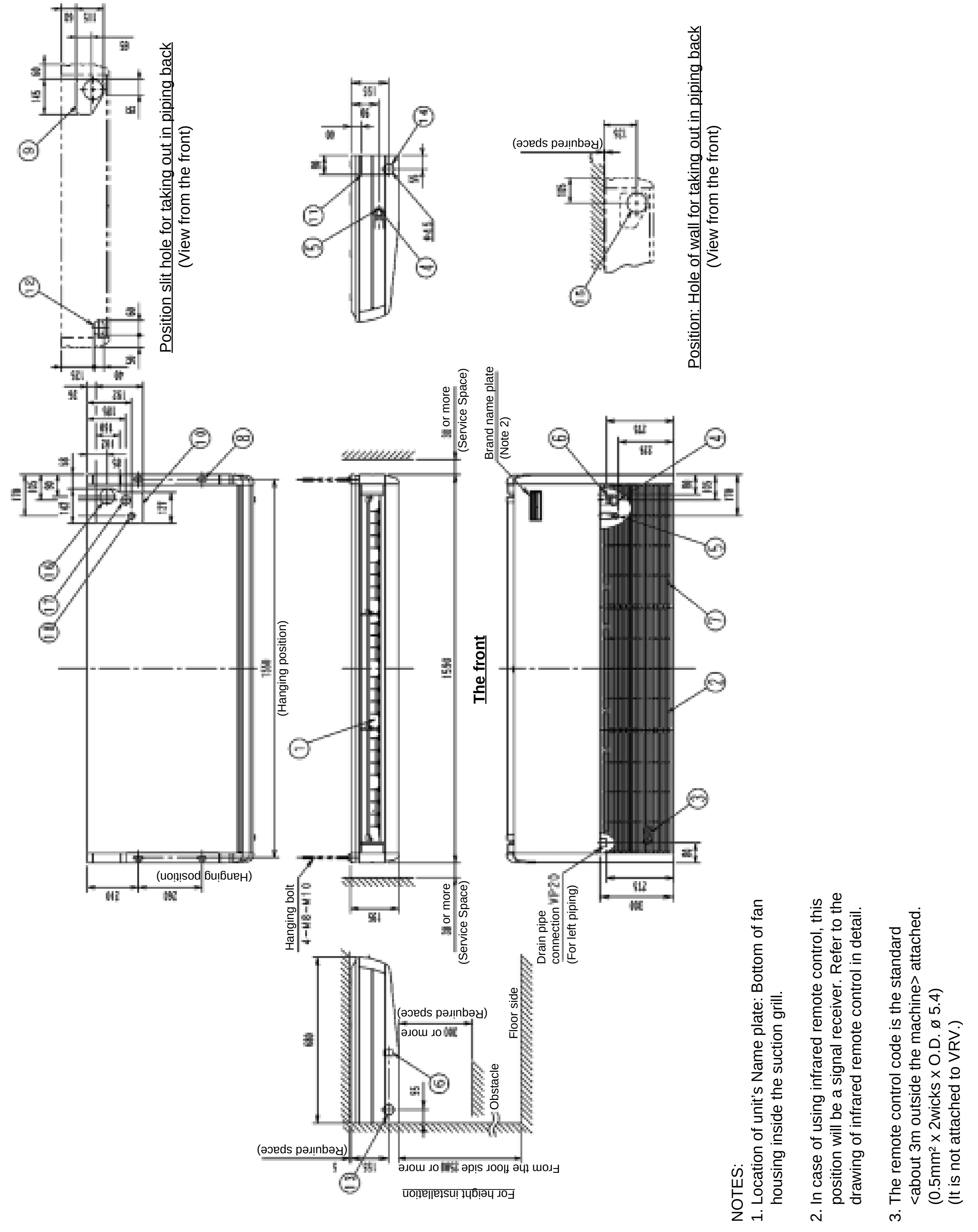
No.	Component
1	Air discharge grille
2	Air suction grille
3	Air filter
4	Gas pipe connection
5	Liquid pipe connection
6	Drain pipe connection
7	Earth terminal (Inside the electric components box)
8	Suspention bracket
9	Backward piping and wiring connection opening lid
10	Upward piping and wiring connection opening lid
11	Right side pipe connection
12	Left back drain pipe connection
13	Left side drain pipe connection
14	Right side drain pipe connection
15	Hole of wall for taking out in piping back
16	Upward drain pipe connection
17	Upward gas pipe connection
18	Upward liquid pipe connection

1

2.12 FHQ125BUV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

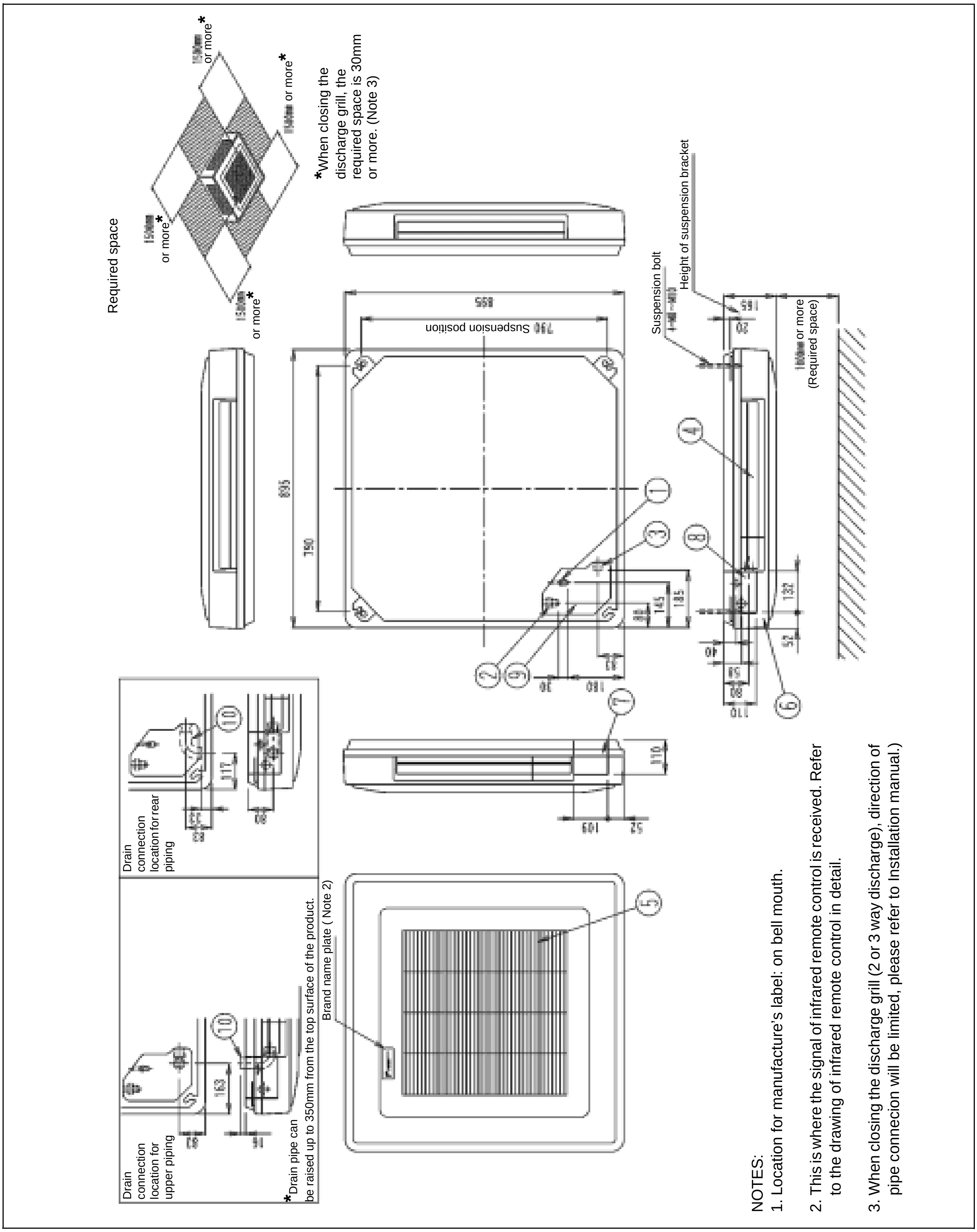
No.	Component
1	Air discharge grille
2	Air suction grille
3	Air filter
4	Gas pipe connection
5	Liquid pipe connection
6	Drain pipe connection
7	Earth terminal (Inside the electric components box)
8	Suspention bracket
9	Backward piping and wiring connection opening lid
10	Upward piping and wiring connection opening lid
11	Right side pipe connection
12	Left back drain pipe connection
13	Left side drain pipe connection
14	Right side drain pipe connection
15	Hole of wall for taking out in piping back
16	Upward drain pipe connection
17	Upward gas pipe connection
18	Upward liquid pipe connection

1

2.13 FUQ71BUV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

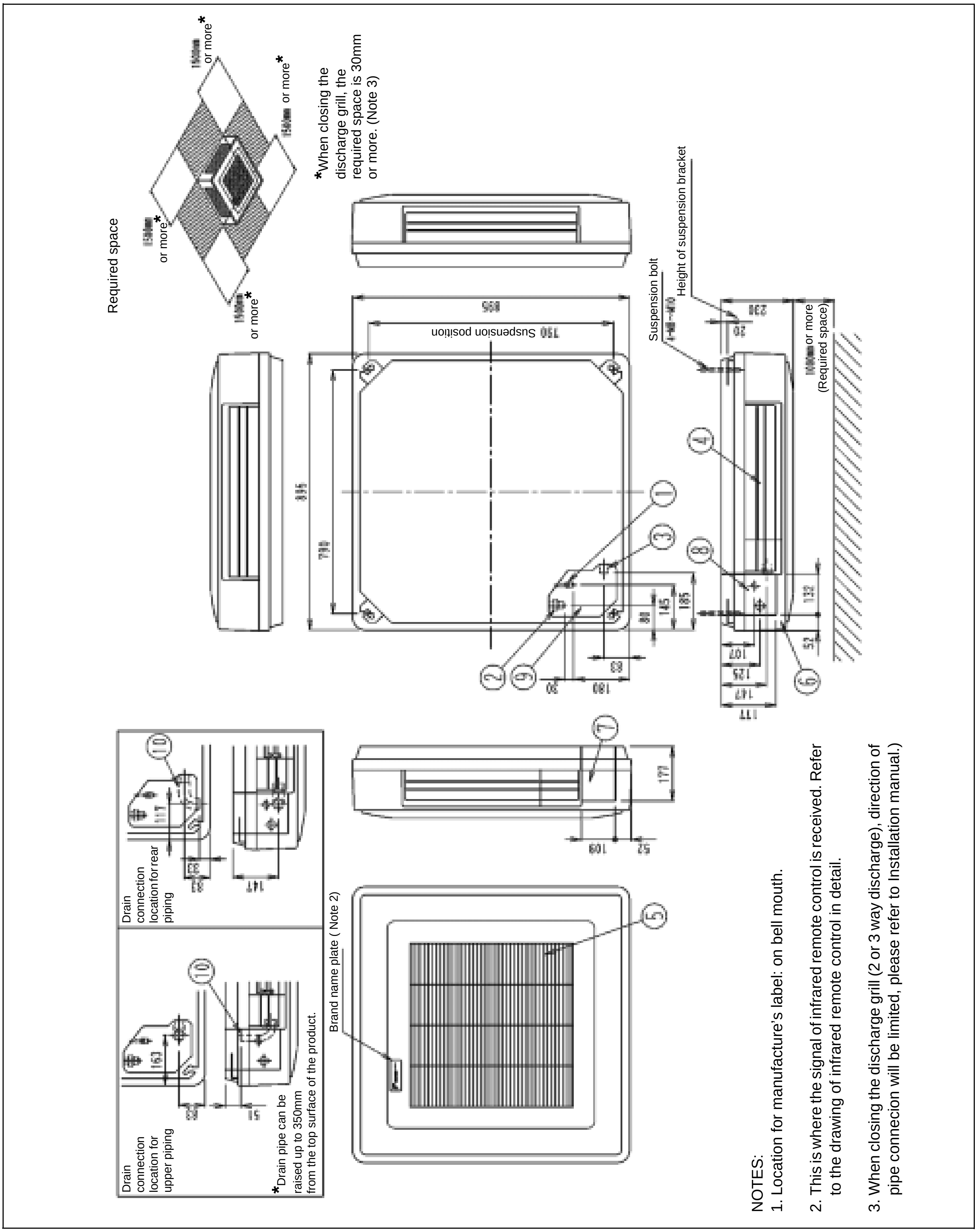
No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Air outlet
5	Air suction grille
6	Corner decoration cover
7	Right pipe/wiring connection
8	Rear pipe/wiring connection
9	Pipe through cover
10	Accessory drain elbow

1

2.14 FUQ100~125BUV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

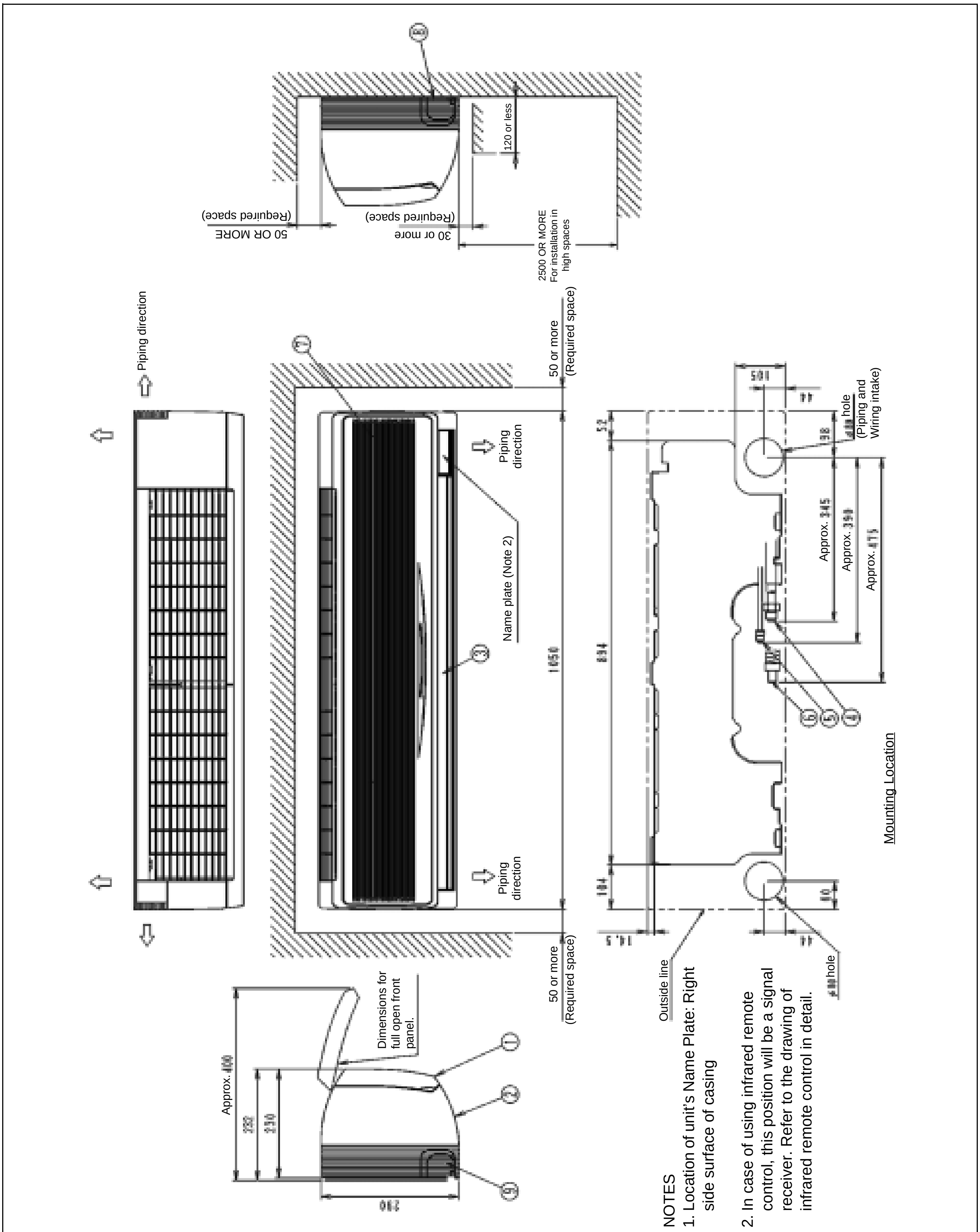
No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Air outlet
5	Air suction grille
6	Corner decoration cover
7	Right pipe/wiring connection
8	Rear pipe/wiring connection
9	Pipe through cover
10	Accessory drain elbow

1

2.15 FAQ71BUV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

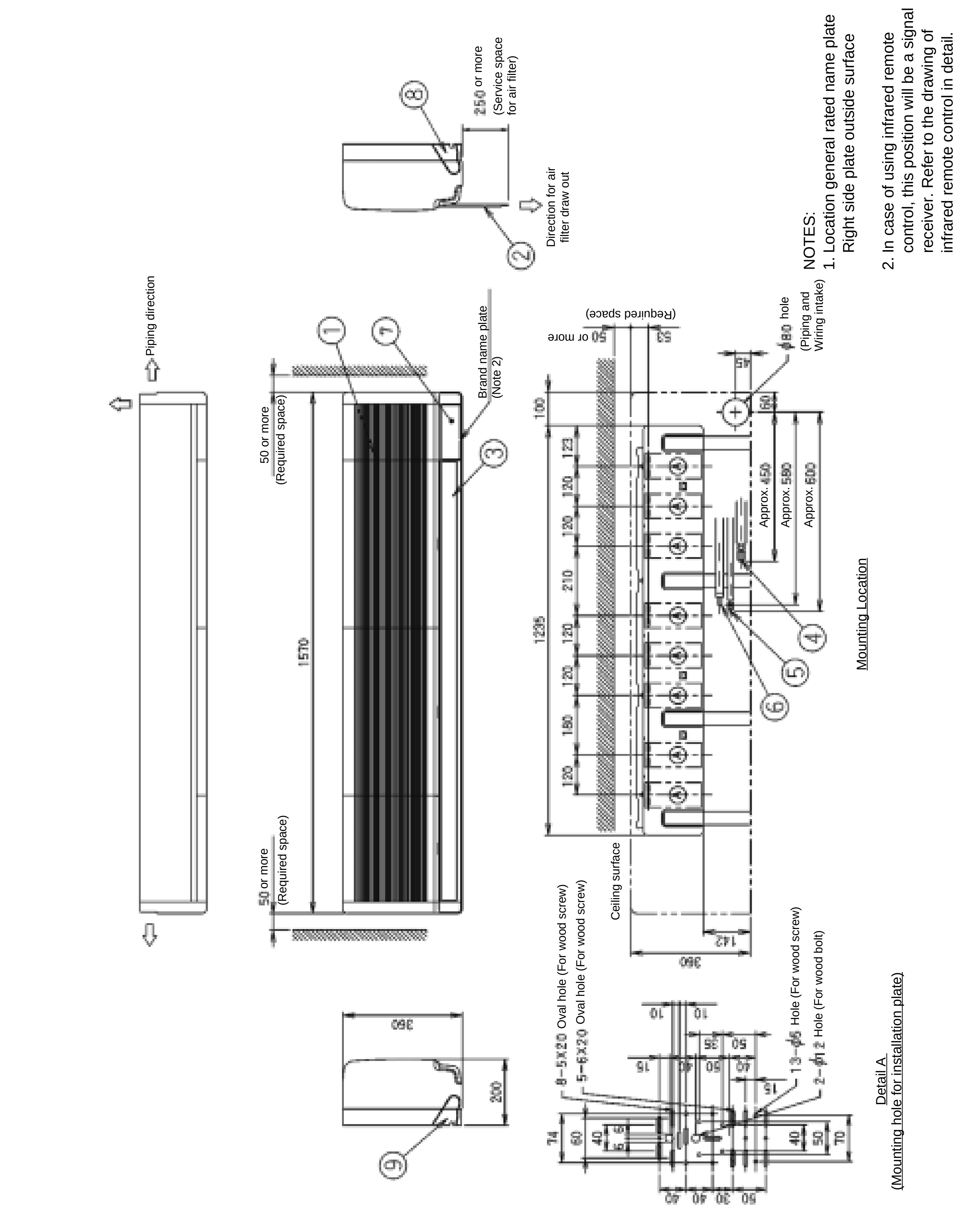
No.	Component
1	Front panel
2	Front grille
3	Air outlet
4	Gas pipe
5	Liquid pipe
6	Drain hose
7	Grounding terminal
8	Right side pipe connection hole
9	Left side pipe connection hole

1

2.16 FAQ100BUV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

No.	Component
1	Front grille
2	Air filter
3	Discharge outlet
4	Gas piping connection
5	Gas piping connection
6	Drain piping connection
7	Earth terminal
8	Slit hole for right side piping connection
9	Slit hole for left side piping connection

3 Specifications

3.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- Technical specifications
- Electrical specifications
- Electrical data

Outdoor units

This chapter contains the following specifications:

Indoor units

This chapter contains the following specifications:

1

3.2 RZQ71, RZQ100 and RZQ125

Technical specifications

The table below contains the technical specifications.

Specification		RZQ71B7V3B	RZQ100B7V3B	RZQ125B7V3B
Compressor	Model	2YC63BXD	JT100FCVD	
	Type	Hermetically sealed swing compressor	Hermetically sealed scroll compressor	
	Crankcase heater		33 W	
	Motor output	1800 W	2200 W	
	Speed			
Heat exchanger	Length	866 mm	857 mm	
	No. of rows	2		
	Fin pitch	2.00 mm		
	No. of passes	5	10	
	Face area	0.648 m²	1.131 m²	
	No. of stages	34	60	
	Tube type	Hi-XSS(8)		
	Fin type	Non-symmetric waffle louvre		
	Fin treatment	Anti-corrosion treatment (PE)		
	Empty tubeplate hole	0		
Fan	Type	Propeller		
	Discharge direction	Horizontal		
	No. of fans	1	2	
	Nominal air flow rate (230 V) cooling	54.50 m³/min	103.00 m³/min	99.00 m³/min
	Nominal air flow rate (230 V) heating	48.10 m³/min	101.00 m³/min	100.00 m³/min
	Fan motor model	KFD-325-70-8A		
	Fan speed (nominal at 230 V) No. of steps	8		
	Fan speed (nominal at 230 V) cooling	813 rpm	802 rpm	772 rpm
	Fan speed (nominal at 230 V) heating	721 rpm	787 rpm	779 rpm
	Drive	direct drive		
Refrigerant circuit	Type	R410A		
	Charge	3.20 kg	4.30 kg	
	Control	Expansion valve (electronic type)		
	No. of circuits	1		
Safety and functional devices		High pressure switch		
		Fan motor thermal protector		
		Fuse		
Heat insulation		Both liquid and gas pipe		
Weight	Machine weight	61 kg	106 kg	
	Gross weight	65 kg	111 kg	

Electrical specifications

The table below contains the electrical specifications.

Specification		RZQ71B7V3B	RZQ100B7V3B	RZQ125B7V3B
Unit	Name	V3		
	Phase	1~		
	Voltage	230V		
	Frequency	50 Hz		
	Wire connections for power supply	See installation manual 4PW16864-1		
	Wire connections for connection with indoor	See installation manual 4PW16864-1		
	Power supply intake	Outdoor unit only		
Compressor	Starting method	Inverter driven		
Fan motor	No. of motors x output	1 x 70 W	2 x 70 W	

Electrical data

Unit combination		Power supply					Compressor		OFM		IFM	
Indoor unit	Outdoor unit	Hz-Volts	Voltage range	MCA	TOCA	MFA	MSC	RLA	kW	FLA	kW	FLA
FCQ71B7V3B	RZQ71B7V3B	50-230	Max.50Hz-253V Min.50Hz-207V	17.1	17.1	20	16.2	16.2	0.07	0.3	0.045	0.6
FCQ35B7V1x2	RZQ71B7V3B	50-230		17.7	17.7	20	16.2	16.2	0.07	0.3	0.045x2	0.6x2
FFQ35BV1Bx2	RZQ71B7V3B	50-230		17.7	17.7	20	16.2	16.2	0.07	0.3	0.055x2	0.6x2
FBQ71B7V3B	RZQ71B7V3B	50-230		17.4	17.4	20	16.2	16.2	0.07	0.3	0.125	0.9
FBQ35B7V1x2	RZQ71B7V3B	50-230		17.5	17.5	20	16.2	16.2	0.07	0.3	0.065x2	0.5x2
FHQ71BUV1B	RZQ71B7V3B	50-230		17.1	17.1	20	16.2	16.2	0.07	0.3	0.062	0.6
FHQ35BUV1Bx2	RZQ71B7V3B	50-230		17.7	17.7	20	16.2	16.2	0.07	0.3	0.062x2	0.6x2
FAQ71BUV1B	RZQ71B7V3B	50-230		16.8	16.8	20	16.2	16.2	0.07	0.3	0.043	0.3
FUQ71BUV1B	RZQ71B7V3B	50-230		17.2	17.2	20	16.2	16.2	0.07	0.3	0.045	0.7
FCQ100B7V3B	RZQ100B7V3B	50-230	Max.50Hz-253V Min.50Hz-207V	21.0	21.0	30	19.4	19.4	0.07+0.07	0.3+0.3	0.090	1.0
FCQ50B7V1x2	RZQ100B7V3B	50-230		21.2	21.2	30	19.4	19.4	0.07+0.07	0.3+0.3	0.045x2	0.6x2
FCQ35B7V1x3	RZQ100B7V3B	50-230		21.8	21.8	30	19.4	19.4	0.07+0.07	0.3+0.3	0.045x3	0.6x3
FFQ50BV1Bx2	RZQ100B7V3B	50-230		21.4	21.4	30	19.4	19.4	0.07+0.07	0.3+0.3	0.055x2	0.7x2
FFQ35BV1Bx3	RZQ100B7V3B	50-230		21.8	21.8	30	19.4	19.4	0.07+0.07	0.3+0.3	0.055x3	0.6x3
FBQ100B7V3B	RZQ100B7V3B	50-230		21.0	21.0	30	19.4	19.4	0.07+0.07	0.3+0.3	0.135	1.0
FBQ50B7V1x2	RZQ100B7V3B	50-230		21.4	21.4	30	19.4	19.4	0.07+0.07	0.3+0.3	0.085x2	0.7x2
FBQ35B7V1x3	RZQ100B7V3B	50-230		21.5	21.5	30	19.4	19.4	0.07+0.07	0.3+0.3	0.065x3	0.5x3
FHQ100BUV1B	RZQ100B7V3B	50-230		20.7	20.7	30	19.4	19.4	0.07+0.07	0.3+0.3	0.130	0.7
FHQ50BUV1Bx2	RZQ100B7V3B	50-230		21.2	21.2	30	19.4	19.4	0.07+0.07	0.3+0.3	0.062x2	0.6x2
FHQ35BUV1Bx3	RZQ100B7V3B	50-230		21.8	21.8	30	19.4	19.4	0.07+0.07	0.3+0.3	0.062x3	0.6x3
FAQ100BUV1B	RZQ100B7V3B	50-230		20.4	20.4	30	19.4	19.4	0.07+0.07	0.3+0.3	0.049	0.4
FUQ100BUV1B	RZQ100B7V3B	50-230		21.1	21.1	30	19.4	19.4	0.07+0.07	0.3+0.3	0.090	1.1
FCQ125B7V3B	RZQ125B7V3B	50-230	Max.50Hz-253V Min.50Hz-207V	25.0	25.0	30	23.4	23.4	0.07+0.07	0.3+0.3	0.090	1.0
FCQ60B7V1x2	RZQ125B7V3B	50-230		25.2	25.2	30	23.4	23.4	0.07+0.07	0.3+0.3	0.045x2	0.6x2
FCQ50B7V1x3	RZQ125B7V3B	50-230		25.8	25.8	30	23.4	23.4	0.07+0.07	0.3+0.3	0.045x3	0.6x3
FCQ35B7V1x4	RZQ125B7V3B	50-230		26.4	26.4	30	23.4	23.4	0.07+0.07	0.3+0.3	0.045x4	0.6x4
FFQ60BV1Bx2	RZQ125B7V3B	50-230		25.4	25.4	30	23.4	23.4	0.07+0.07	0.3+0.3	0.055x2	0.7x2
FFQ50BV1Bx3	RZQ125B7V3B	50-230		26.1	26.1	30	23.4	23.4	0.07+0.07	0.3+0.3	0.055x3	0.7x3
FFQ35BV1Bx4	RZQ125B7V3B	50-230		26.4	26.4	30	23.4	23.4	0.07+0.07	0.3+0.3	0.055x4	0.6x4
FBQ125B7V3B	RZQ125B7V3B	50-230		25.4	25.4	30	23.4	23.4	0.07+0.07	0.3+0.3	0.225	1.4
FBQ60B7V1x2	RZQ125B7V3B	50-230		25.8	25.8	30	23.4	23.4	0.07+0.07	0.3+0.3	0.125x2	0.9x2
FBQ50B7V1x3	RZQ125B7V3B	50-230		26.1	26.1	30	23.4	23.4	0.07+0.07	0.3+0.3	0.085x3	0.7x3
FBQ35B7V1x4	RZQ125B7V3B	50-230		26.0	26.0	30	23.4	23.4	0.07+0.07	0.3+0.3	0.065x4	0.5x4
FHQ125BUV1B	RZQ125B7V3B	50-230		24.7	24.7	30	23.4	23.4	0.07+0.07	0.3+0.3	0.130	0.7
FHQ60BUV1Bx2	RZQ125B7V3B	50-230		25.2	25.2	30	23.4	23.4	0.07+0.07	0.3+0.3	0.062x2	0.6x2
FHQ50BUV1Bx3	RZQ125B7V3B	50-230		25.8	25.8	30	23.4	23.4	0.07+0.07	0.3+0.3	0.062x3	0.6x3
FHQ35BUV1Bx4	RZQ125B7V3B	50-230		26.4	26.4	30	23.4	23.4	0.07+0.07	0.3+0.3	0.062x4	0.6x4
FUQ125BUV1B	RZQ125B7V3B	50-230		25.1	25.1	30	23.4	23.4	0.07+0.07	0.3+0.3	0.090	1.1
FDQ125B7V3B	RZQ125B7V3B	50-230		28.2	28.2	30	23.4	23.4	0.07+0.07	0.3+0.3	0.500	4.2

1

Symbols:

MCA: Min. Circuit Amps
TOCA: Total Over-current Amps
MFA: Max. Fuse Amps (see note 7)
MSC : Max. current during the starting compressor
RLA : Rated Load Amps
OFM : Outdoor Fan Motor
IFM : Indoor Fan Motor
FLA : Full Load Amps
kW : Fan Motor Rated Output

Notes:

1. RLA is based on the following conditions:
   - Power supply: 50Hz 230V
   - Indoor temp. - cooling: 27°C DB/19.0°C WB
   - Indoor temp. - heating: 20.0°C DB
   - Outdoor temp. - cooling: 35.0°C DB
   - Outdoor temp. - heating: 7.0°C DB/6.0°C WB
2. TOCA means the total value of each OC set.
3. Voltage range
   Units are suitable for use on electrical systems where voltage supplied to unit terminals is not below or above listed range limits.
4. Maximum allowable voltage variation between phases is 2%.
5. MCA represents maximum input current.
   MFA represents capacity which may accept MCA. (Next lower standard fuse rating, minimum 15A)
6. Select wire size based on the larger value of MCA or TOCA.
7. MFA is used to select the circuit breaker and the ground fault circuit interruptor. (earth leakage circuit breaker)

3.3 FCQ

Technical specifications

The table below contains the technical specifications.

Specification		FCQ35B7V1	FCQ50B7V1	FCQ60B7V1	FCQ71B7V3B	FCQ100B7V3B	FCQ125B7V3B
Heat exchanger	Rows x stages x fin pitch	2x8x1.5				2x12x1.5	
	Face area	0.331 m²				0.497 m²	
	Tube type	HIXA diam. 7			HiXSS diam. 7		
	Fin type	Rhombus					
Fan	Air flow rate cooling (high)	14 m³/min	15 m³/min	18 m³/min	18 m³/min	28 m³/min	31 m³/min
	Air flow rate cooling (low)	10 m³/min	11 m³/min	14 m³/min	14 m³/min	21 m³/min	24 m³/min
	Air flow rate heating (high)	14 m³/min	15 m³/min	18 m³/min	18 m³/min	28 m³/min	31 m³/min
	Air flow rate heating (low)	10 m³/min	11 m³/min	14 m³/min	14 m³/min	21 m³/min	24 m³/min
	Qty x model	1 x QTS46B14M				1 x QTS46A17M	
	Fan speed	2 steps (direct drive)					
	Fan type	Turbo fan					
Refrigerant	Type	R410A					
Safety and functional devices		Fan motor thermal protector			Fan motor thermal fuse		
					Drain pump fuse		
Air filter		Resin net (with mold resistant)			Optional		
Temperature control		Computerized control			Microprocessor thermostat for cooling and heating		
Insulation	Heat	Foamed polystyrene			Both liquid and gas pipes		
	Sound absorbing	Foamed polystyrene					
Weight	Unit	23 kg				27.0 kg	
	Gross				29 kg	33.0 kg	

Electrical specifications

The table below contains the electrical specifications.

Specification		**FCQ35**B7V1	**FCQ50**B7V1	**FCQ60**B7V1	FCQ71B7V3B	FCQ100B7V3B	FCQ125B7V3B
Unit	Phase	1~					
	Voltage	230V					
	Frequency	50 Hz					
Fan motor	FLA (Full Load Amps)	0.6 A					
	Power consumption	140 W					
	No. of motors x output	1 x 45 W					

1

3.4 FFQ

Technical specifications

The table below contains the technical specifications.

Specification		FFQ35BV1B	FFQ50BV1B	FFQ60BV1B
Heat exchanger	Rows x stages x fin pitch	2x10x1.5		
	Face area			
	Tube type	HiXSS diam. 7		
	Fin type	Multi louver fin		
Fan	Air flow rate cooling (high)	10.0 m³/min	12.0 m³/min	15.0 m³/min
	Air flow rate cooling (low)	6.5 m³/min	8.0 m³/min	10.0 m³/min
	Air flow rate heating (high)	10.0 m³/min	–	15.0 m³/min
	Air flow rate heating (low)	6.5 m³/min	–	10.0 m³/min
	Qty x model	1 x D16P52A23		
	Fan speed	2 steps		
	Fan type	Turbo fan		
Refrigerant	Type	R410A		
Safety and functional devices				
Air filter				
Temperature control		Microcomputer control		
Insulation	Heat	Both liquid and gas pipes		
	Sound absorbing			
Weight	Unit	17.5 kg		
	Gross	21 kg		

Electrical specifications

The table below contains the electrical specifications.

Specification		**FFQ35**BV1B	**FFQ50**BV1B	**FFQ60**BV1B
Unit	Phase	1~		
	Voltage	230V		
	Frequency	50 Hz		
Fan motor	Running current (cooling)	0.40 A	0.49 A	0.61 A
	Running current (heating)	0.36 A	–	0.56 A
	Power consumption (cooling)	84 W	97 W	120 W
	Power consumption (heating)	76 W	–	111 W
	No. of motors x output	1 x 55 W		

3.5 FBQ

Technical specifications

The table below contains the technical specifications.

Specification		FBQ35B7V1	FBQ50B7V1	FBQ60B7V1	FBQ71B7V3B	FBQ100B7V3B	FBQ125B7V3B
Heat exchanger	Rows x stages x fin pitch	3 x 14 x 1.75					
	Face area	0.132 m²		0.221 m²		0.338 m²	
	Tube type	HI-XA diam. 7			Hi-XSS diam. 7		
	Fin type	Rhombus					
Fan	Air flow rate cooling (high)	11.5 m³/min	14.0 m³/min	19.0 m³/min	19.0 m³/min	27.0 m³/min	35.0 m³/min
	Air flow rate cooling (low)	9.0 m³/min	10.0 m³/min	14.0 m³/min	14.0 m³/min	20.0 m³/min	24.0 m³/min
	Air flow rate heating (high)	11.5 m³/min	14.0 m³/min	19.0 m³/min	19.0 m³/min	27.0 m³/min	35.0 m³/min
	Air flow rate heating (low)	9.0 m³/min	10.0 m³/min	14.0 m³/min	14.0 m³/min	20.0 m³/min	24.0 m³/min
	Qty x model	–			2 x	3 x	
	Fan speed	2 steps			3 steps (direct drive)		
	Fan type	Sirocco					
Refrigerant	Type	R410A					
Safety and functional devices		–			Fan motor thermal use		
Air filter		Resin net (with mold resistant)			Optional		
Temperature control		Computerized control			Microprocessor thermostat for cooling and heating		
Insulation	Heat	Both liquid and gas pipes					
	Sound absorbing	Flame and heat resistant foamed polyethylene, regular foamed polyethylene and foamed PU		Foamed Polyurethane			
Weight	Unit	30 kg	31 kg	41 kg	41 kg	51 kg	52 kg
	Gross	41 kg	42 kg	50 kg	47 kg	58 kg	59 kg

Electrical specifications

The table below contains the electrical specifications.

Specification		**FBQ35**B7V1	**FBQ50**B7V1	**FBQ60**B7V1	FBQ71B7V3B	FBQ100B7V3B	FBQ125B7V3B
Unit	Phase	1~					
	Voltage	230 V					
	Frequency	50Hz					
Fan motor	Nominal running current	0.5 A	0.7 A	0.9 A			
	Power consumption	65 W	85 W	125 W			
	No. of motors x output	1 x 65 W	1 x 85 W	1 x 125 W	1 x 125 W	1 x 135 W	1 x 225 W

1

3.6 FDQ

Technical specifications

The table below contains the technical specifications.

Specification		FDQ125B7V3B
Heat exchanger	Rows x stages x fin pitch	3 x 14 x 1.75
	Face area	0.338 m²
	Tube type	Hi-XSS diam. 7
	Fin type	Rhombus
Fan	Air flow rate cooling (high)	43.0 m³/min
	Air flow rate cooling (low)	43.0 m³/min
	Air flow rate heating (high)	43.0 m³/min
	Air flow rate heating (low)	43.0 m³/min
	Qty x model	1 x DPA216-178NB
	Fan speed	Phase cut control (direct drive)
	Fan type	Sirocco
Refrigerant	Type	R410A
Safety and functional devices		Fan motor thermal use
Air filter		Optional
Temperature control		Microprocessor thermostat for cooling and heating
Insulation	Heat	Both liquid and gas pipes
	Sound absorbing	
Weight	Unit	59.0 kg
	Gross	80.0 kg

Electrical specifications

The table below contains the electrical specifications.

Specification		FDQ125B7V3B
Unit	Phase	1~
	Voltage	230 V
	Frequency	50Hz
Fan motor	Nominal running current	
	Power consumption	
	No. of motors x output	1 x 500 W

3.7 FHQ

Technical specifications

The table below contains the technical specifications.

Specification		FHQ35BUV1B	FHQ50BUV1B	FHQ60BUV1B	FHQ71BUV1B	FHQ100BUV1B	FHQ125BUV1B
Heat exchanger	Rows x stages x fin pitch	2 x 12 x 1.75	3 x 12 x 1.75	2 x 12 x 1.75	3 x 12 x 1.75		
	Face area	0.182 m²		0.233 m²		0.293 m²	0.341 m²
	Tube type	N-Hix					
	Fin type	Multi louver					
Fan	Air flow rate cooling (high)	13.0 m³/min		17.0 m³/min	17.0 m³/min	24.0 m³/min	30.0 m³/min
	Air flow rate cooling (low)	10.0 m³/min		13.0 m³/min	14.0 m³/min	20.0 m³/min	25.0 m³/min
	Air flow rate heating (high)	13.0 m³/min		16.0 m³/min	17.0 m³/min	24.0 m³/min	30.0 m³/min
	Air flow rate heating (low)	10.0 m³/min		13.0 m³/min	14.0 m³/min	20.0 m³/min	25.0 m³/min
	Qty x model	3 x 3D12K1AA1		4 x 4D12K1AA1		3 x 3D12K2AA1	4 x 4D12K2AA1
	Fan speed	2 steps					
	Fan type	Sirocco					
Refrigerant	Type	R410A					
Safety and functional devices							
Air filter							
Temperature control							
Insulation	Heat	Foamed polystyrene / Foamed polyethylene					
	Sound absorbing	Foamed polyurethane / Glass wool					
Weight	Unit	24 kg	25 kg	27 kg		32 kg	35 kg
	Gross	31 kg	32 kg	35 kg		41 kg	45 kg

Electrical specifications

The table below contains the electrical specifications.

Specification		FHQ35BUV1B	FHQ50BUV1B	FHQ60BUV1B	FHQ71BUV1B	FHQ100BUV1B	FHQ125BUV1B
Unit	Phase	1~					
	Voltage	220-240 V					
	Frequency	50Hz					
Fan motor	FLA (Full load amps)	0.6 A				0.7 A	
	Power consumption	111 W		115 W	117 W	135 W	144 W
	No. of motors x output	1 x 62 W				1 x 130 W	

1

3.8 FUQ

Technical specifications

The table below contains the technical specifications.

Specification		FUQ71BUV1B	FUQ100BUV1B	FUQ125BUV1B
Heat exchanger	Rows x stages x fin pitch	3 x 6 x 1.5	3 x 8 x 1.5	
	Face area	0.265 m²	0.353 m²	
	Tube type	N-Hix		
	Fin type	Multi louver		
Fan	Air flow rate cooling (high)	19.0 m³/min	29.0 m³/min	32.0 m³/min
	Air flow rate cooling (low)	14.0 m³/min	21.0 m³/min	23.0 m³/min
	Air flow rate heating (high)	19.0 m³/min	29.0 m³/min	32.0 m³/min
	Air flow rate heating (low)	14.0 m³/min	21.0 m³/min	23.0 m³/min
	Qty x model	1 x QTS48A10M	1 x QTS50B15M	
	Fan speed	2 steps		
	Fan type	Turbo fan		
Refrigerant	Type	R410A		
Safety and functional devices				
Air filter		Resin net (with mold resistant)		
Temperature control				
Insulation	Heat	Heat resistant foamed polyethylene, regular foamed polyethylene		
	Sound absorbing	–		
Weight	Unit	25 kg	31 kg	
	Gross	31 kg	38 kg	

Electrical specifications

The table below contains the electrical specifications.

Specification		FUQ71BUV1B	FUQ100BUV1B	FUQ125BUV1B
Unit	Phase	1~		
	Voltage	50 Hz		
	Frequency	220-240 V		
Fan motor	FLA (Full load amps)	0.6 A	1.0 A	
	Power consumption (Cooling)	180 W	289 W	
	Power consumption (Heating)	160 W	269 W	
	No. of motors x output	1 x 45 W	1 x 90 W	

1

3.9 FAQ

Technical specifications

The table below contains the technical specifications.

Specification		FAQ71BUV1B	FAQ100BUV1B
Heat exchanger	Rows x stages x fin pitch	2 x 16 x 1.4	2 x 12 x 1.4
	Face area	0.289 m²	0.332 m²
	Tube type	Hi-XA	N-Hix
	Fin type	Multi louver	
Fan	Air flow rate cooling (high)	19.0 m³/min	23.0 m³/min
	Air flow rate cooling (low)	15.0 m³/min	19.0 m³/min
	Air flow rate heating (high)	19.0 m³/min	23.0 m³/min
	Air flow rate heating (low)	15.0 m³/min	19.0 m³/min
	Qty x model	1 x QCL9686M	1 x QCL1163MA + QCL1163MB
	Fan speed	2 steps	
	Fan type	Cross flow fan	
Refrigerant	Type	R410A	
Safety and functional devices			
Air filter			
Temperature control			
Insulation	Heat	Foamed polystyrene / foamed polyethylene	
	Sound absorbing	–	
Weight	Unit	13 kg	26 kg
	Gross	17 kg	34 kg

Electrical specifications

The table below contains the electrical specifications.

Specification		FAQ71BUV1B	FAQ100BUV1B
Unit	Phase	1~	
	Voltage	220-240 V	
	Frequency	50 Hz	
Fan motor	FLA (Full load amps)	0.4 A	
	Power consumption	68 W	101 W
	No. of motors x output	1 x 43 W	1 x 49 W

4 Functional Diagrams

4.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- Functional diagrams
- Pipe connection diameters.

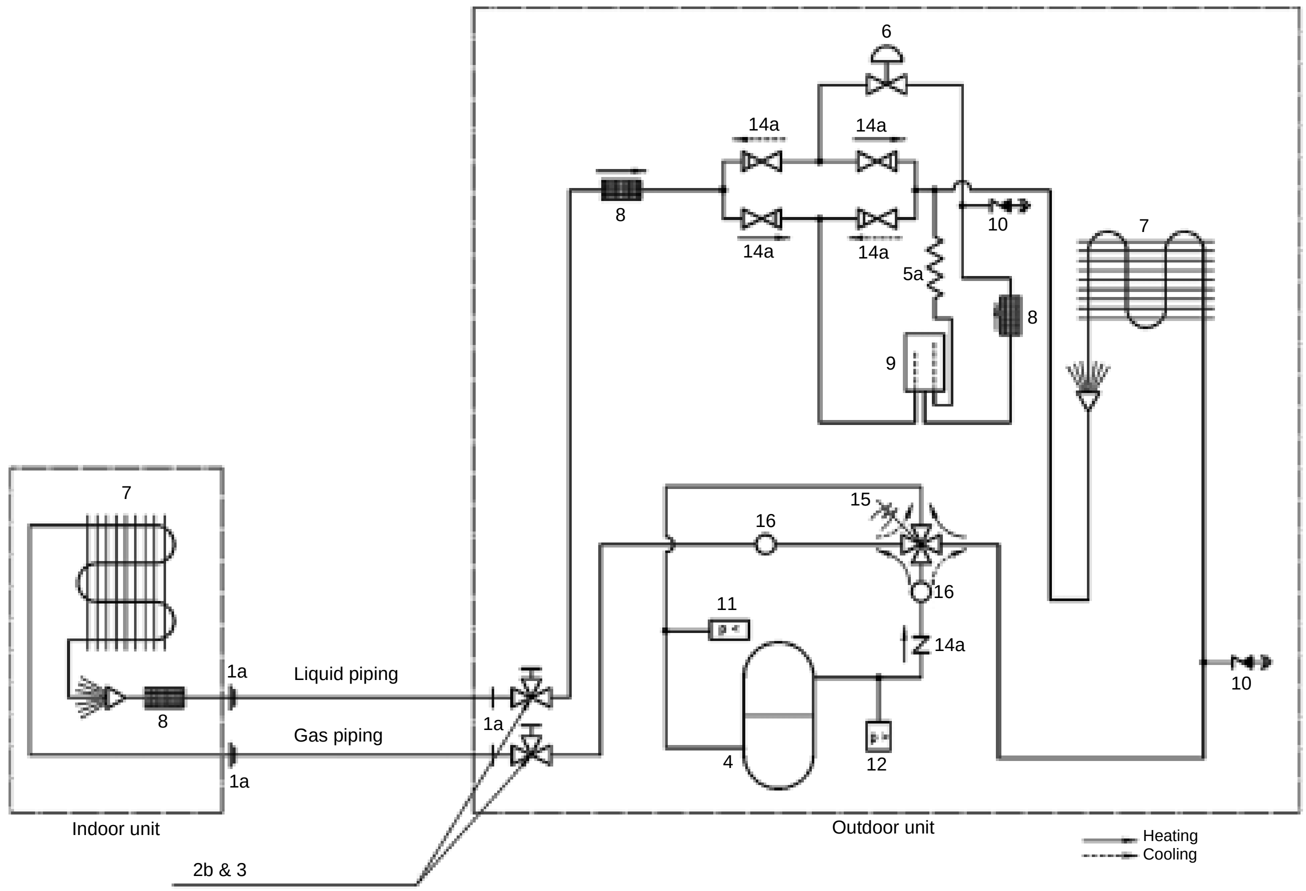
Functional diagrams

This chapter contains the following functional diagrams:

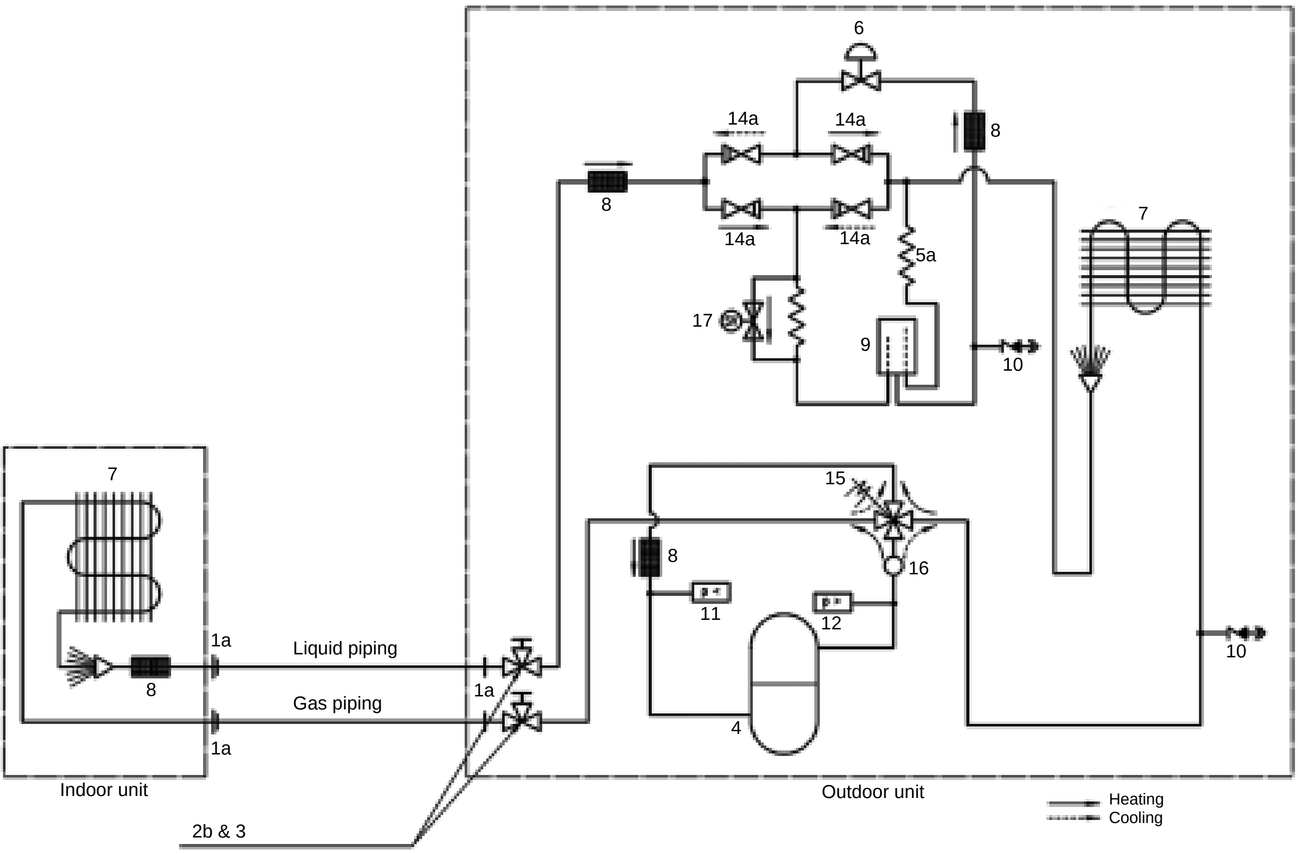
1

4.2 Pair system

RZQ71



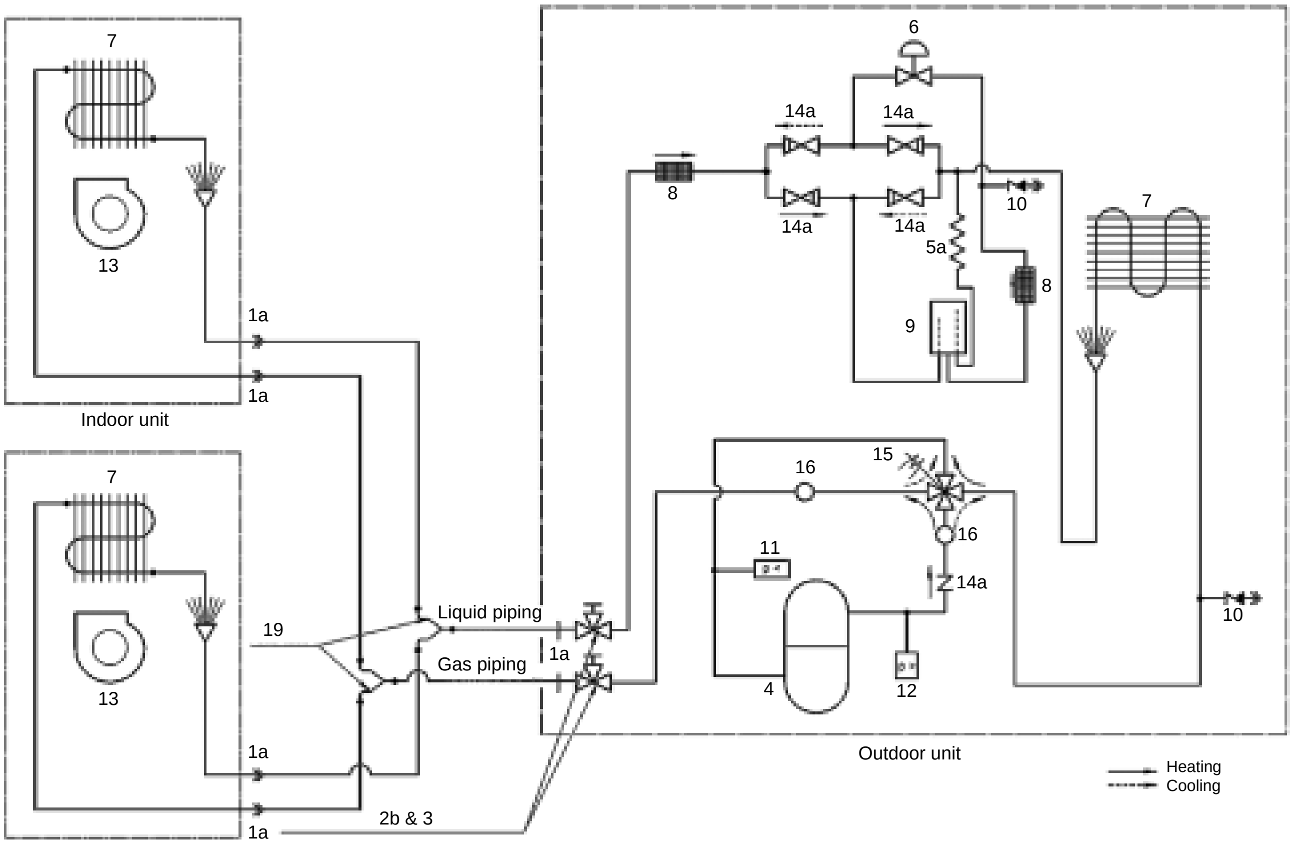
RZQ100~125


6
14a
14a
8
8
14a
14a
5a
7
17
9
10
7
15
8
16
11
12
1a
Liquid piping
8
1a
Gas piping
4
10
1a
Indoor unit
Outdoor unit
2b & 3
Heating
Cooling

1

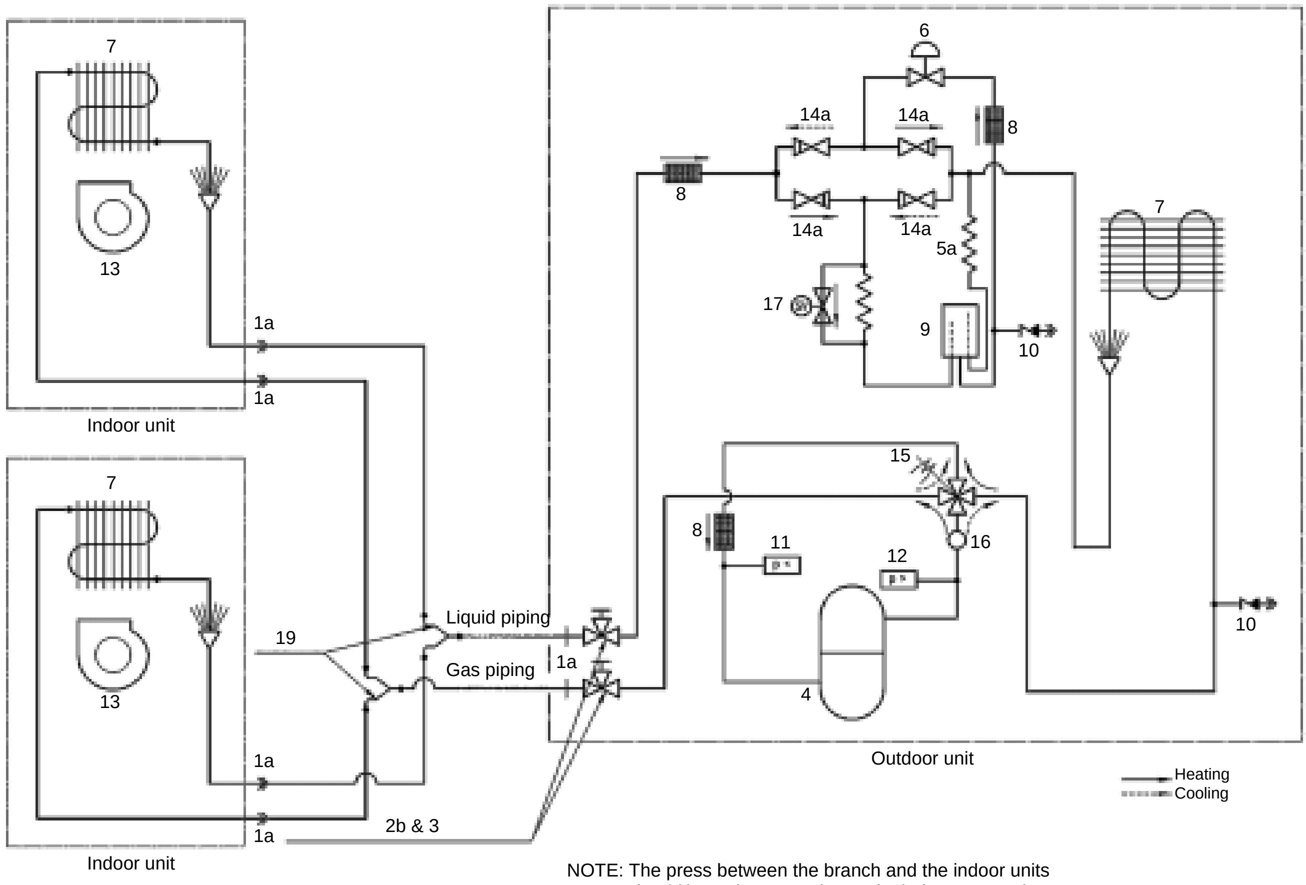
4.3 Twin System

RZQ71



NOTE: The press between the branch and the indoor units should have the same size as the indoor connections.

RZQ100~125

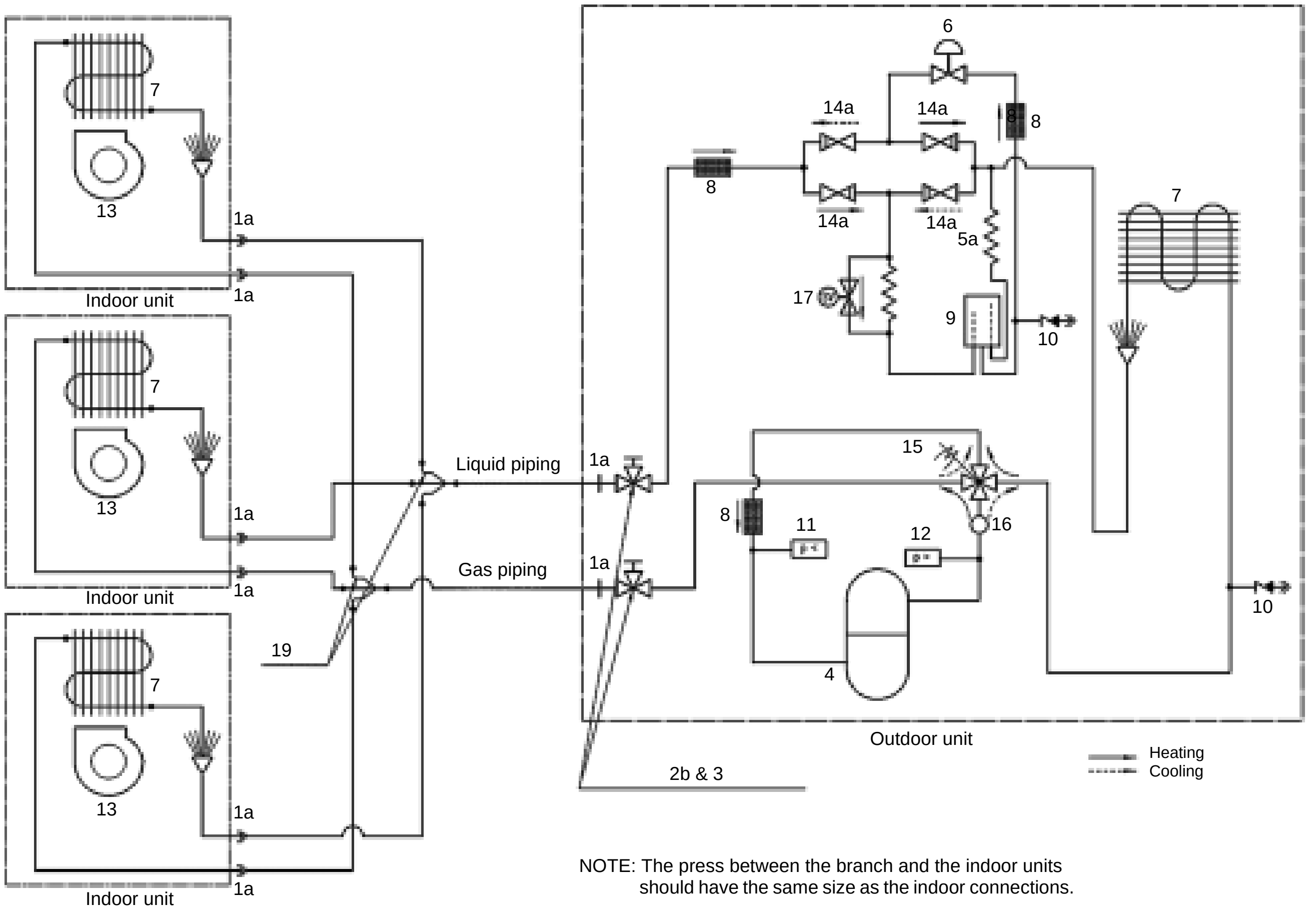


NOTE: The press between the branch and the indoor units should have the same size as the indoor connections.

1

4.4 Triple System

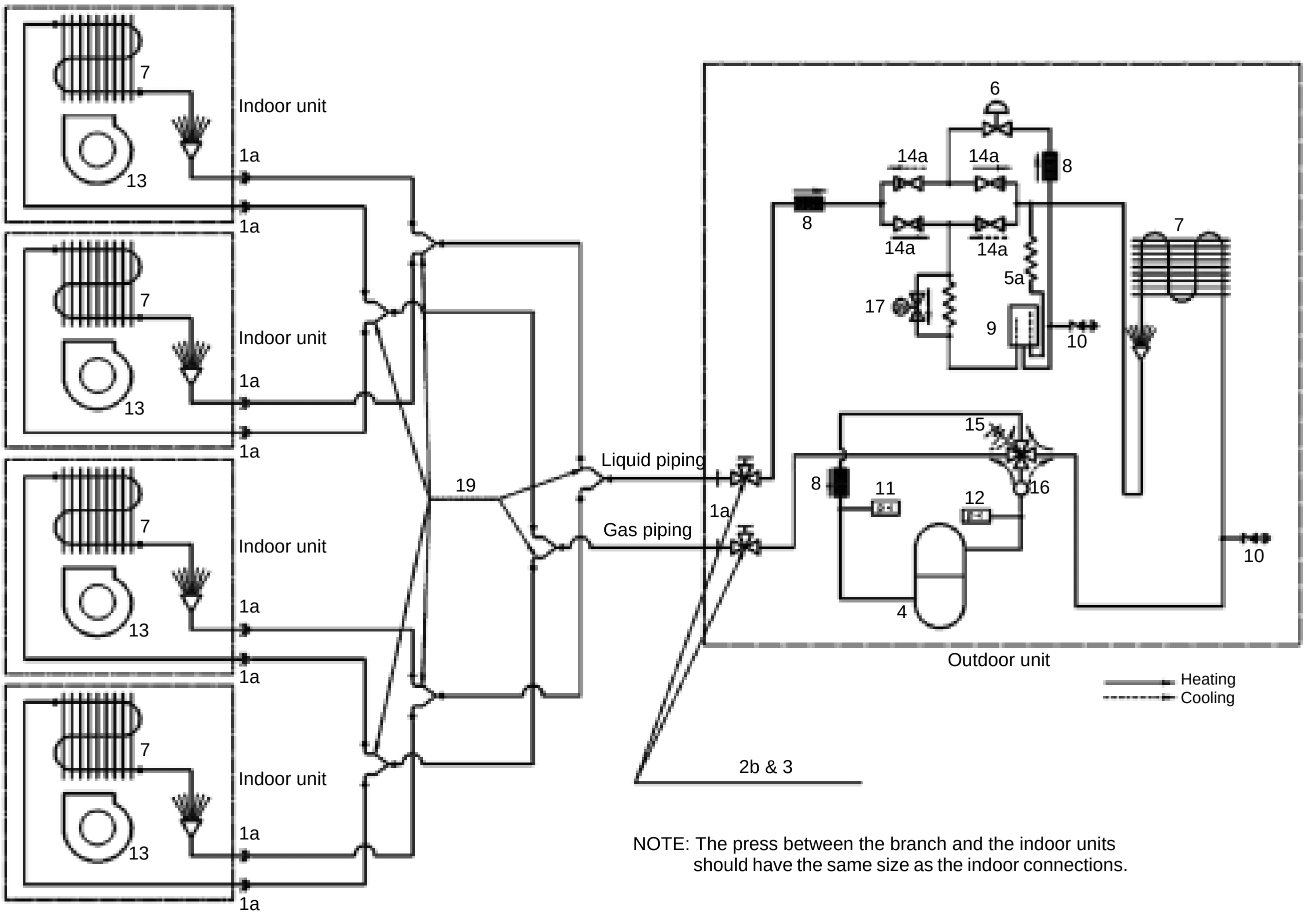
RZQ100~125



NOTE: The press between the branch and the indoor units should have the same size as the indoor connections.

4.5 Double Twin System

RZQ100~125

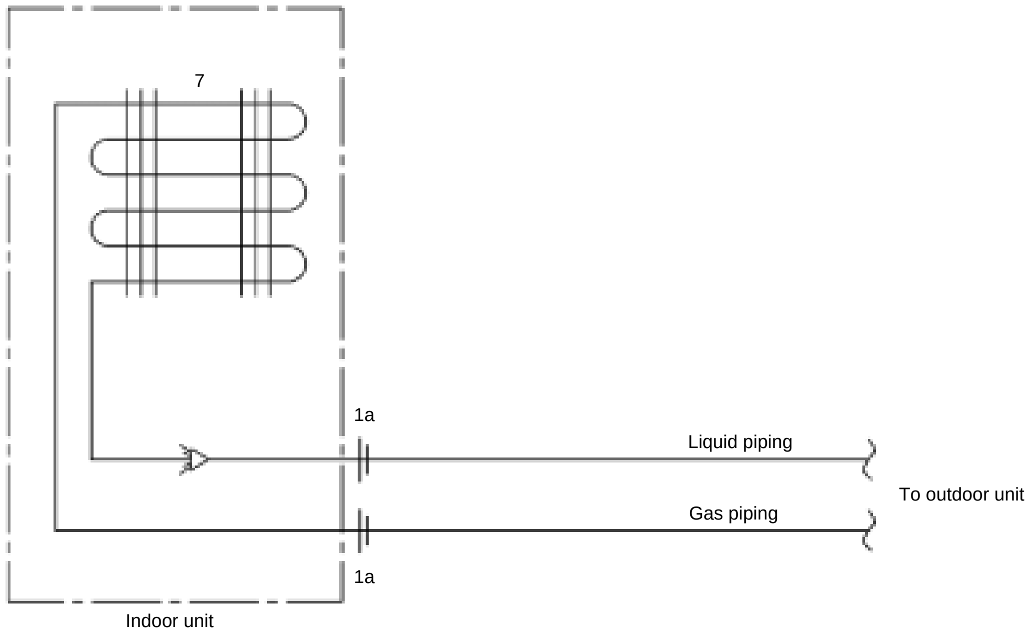


NOTE: The press between the branch and the indoor units should have the same size as the indoor connections.

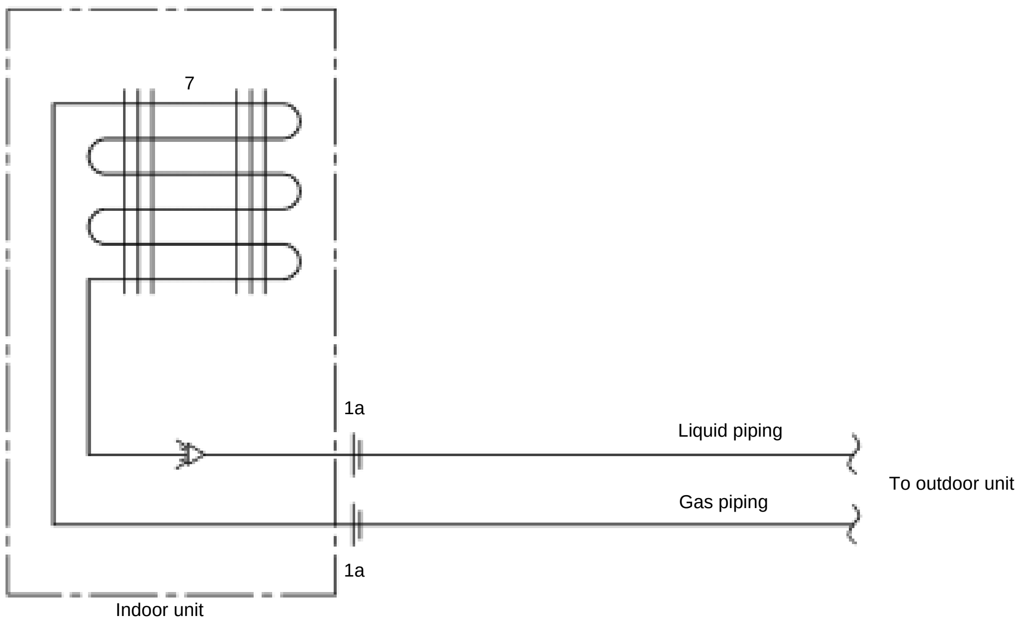
1

4.6 Indoor piping

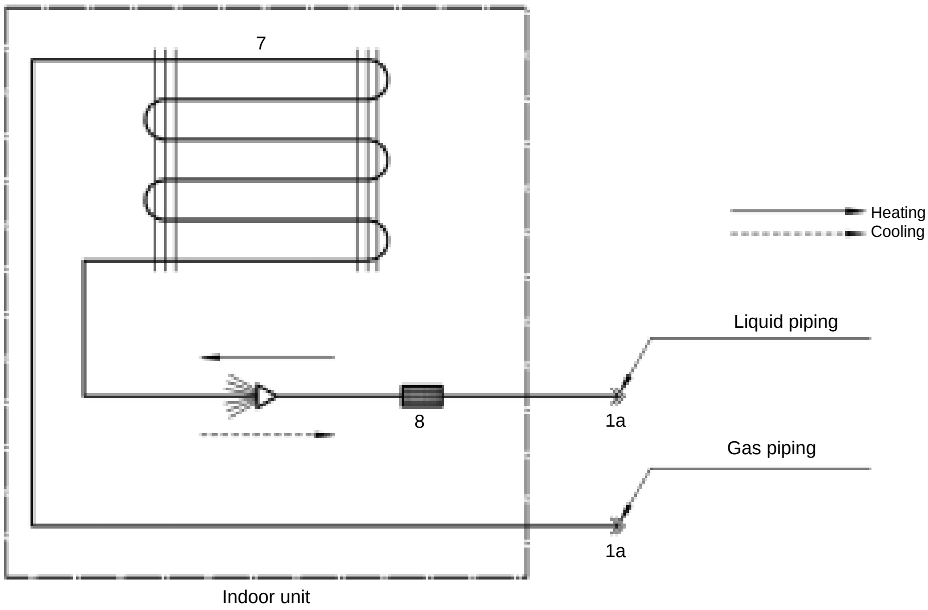
FFQ



FHQ, FUQ, FAQ



FCQ, FBQ, FDQ


7
Heating
Cooling
Liquid piping
8
1a
Gas piping
1a
Indoor unit

1

4.7 Pipe connection diameters

Outdoor units

The table below contains the refrigerant pipe connection diameters.

Model	∅ Gas pipe (flare)	∅ Liquid pipe (flare)
RZQ71B7V3B	15.9 mm	9.52 mm
RZQ100B7V3B		
RZQ125B7V3B		

Indoor units

The table below contains the refrigerant pipe connection diameters.

Model	∅ Gas pipe (flare)	∅ Liquid pipe (flare)
FCQ35B7V1	9.5 mm	6.4 mm
FCQ50~60B7V1	12.7 mm	6.4 mm
FCQ71~125B7V3B	15.9 mm	9.5 mm
FFQ35BV1B	9.5 mm	6.4 mm
FFQ50~60BV1B	12.7 mm	6.4 mm
FBQ35B7V1	9.5 mm	6.4 mm
FBQ50~60B7V1	12.7 mm	6.4 mm
FBQ71~125B7V3B	15.9 mm	9.5 mm
FDQ125B7V3B	15.9 mm	9.5 mm
FHQ35BUV1B	9.5 mm	6.4 mm
FHQ50~60BUV1B	12.7 mm	6.4 mm
FHQ71~125BUV1B	15.9 mm	9.5 mm
FUQ71~125BUV1B	15.9 mm	9.5 mm
FAQ71~100BUV1B	15.9 mm	9.5 mm

4.8 Re-using existing field piping

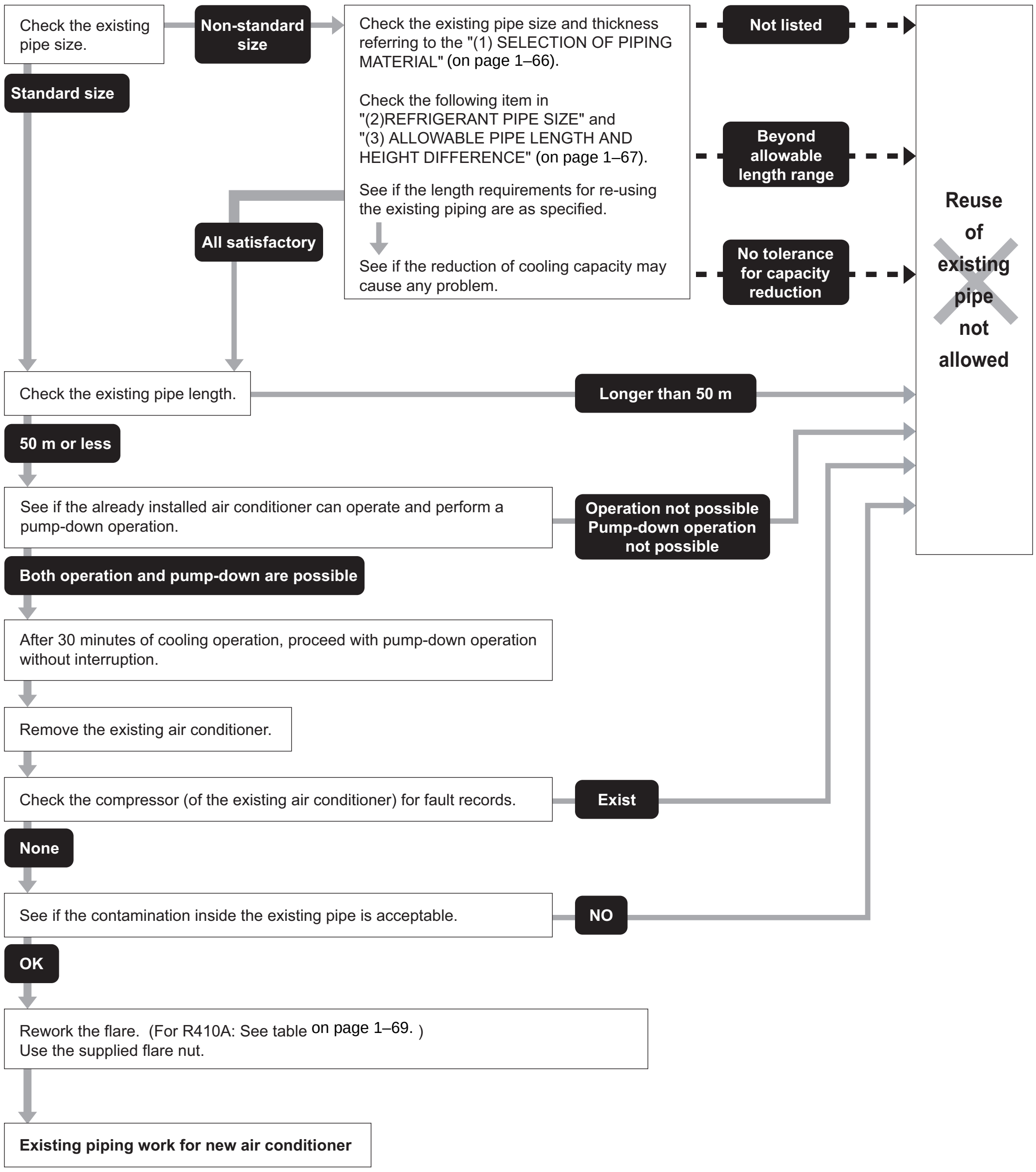
1

Introduction

When installing a system using an RZQ outdoor unit, existing or pre-installed piping can be used according to below specified conditions.

In all circumstances where these conditions can not be fully met, new piping has to be installed.

How to re-use existing piping?



Notes:

Oil contamination can be checked using the Daikin “Oil Checker Card”.

Caution:

- If copper piping is corroded, existing piping re-use is not allowed.
- Single side thermal insulation is not allowed for re-use.
- See further notes in this section for Twin, Triple and Double Twin applications.

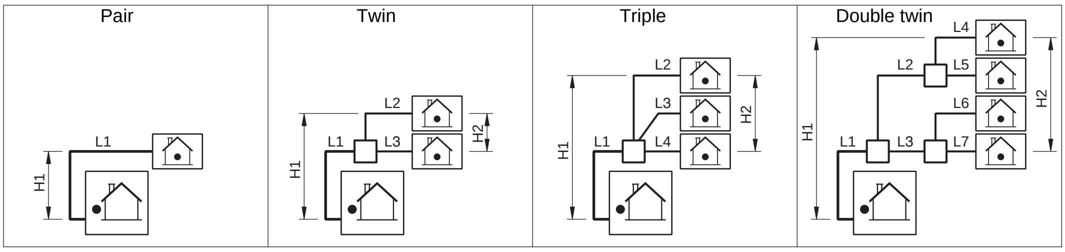
1

Precautions on refrigerant piping

- Do not allow anything other than the designated refrigerant to get mixed into the freezing cycle (air, moisture,...). If any refrigerant gas leaks while working on the unit, ventilate the room thoroughly immediately.
- Use R410A only when adding refrigerant.
- Make sure all installation tools are designed for use on R410A refrigerant to withstand the pressure.
- Vacuum pump. Use a 2-stage vacuum pump with a non-return valve. Make sure the pump oil does not flow oppositely into the new system while the pump is not working. Use a vacuum pump which can evacuate to -100.7 kPa (5 Torr, -755 mmHg).
- Check welded connections for gas leaks, if the local piping has welded connections.

Notes for Twin, Triple and Double Twin

- Main piping (L1) can be re-used, size up & size down is allowed (see further in this section for restrictions).
- Re-use of branch piping is not allowed.
- Branch piping (L2~L7) can be re-used, but standard pipe size only.



Selection of piping material

- Construction material: phosphoric acid deoxidized seamless copper for refrigerant.
- Temper grade: use piping with temper grade in function of the pipe diameter as listed in table below.
- The pipe thickness of the refrigerant piping should comply with relevant local and national regulations. The minimal pipe thickness for R410A piping must be in accordance with the table below.

Pipe ϕ	Temper grade of piping material	Minimal thickness t(mm)
6.4 / 9.5 / 12.7	O	0.80
15.9	O	1
19.1	1/2H	1

O = Annealed

1/2H = Half hard

Refrigerant pipe size

- Pipe size down and pipe size up is available for main piping (L1) only.

	Refrigerant pipe size		
	Gas pipe		
Model	**Size-down**	**Standard size**	**Size-up**
RZQ71B7V3B	ϕ 12.7	**ϕ 15.9**	—
RZQ100 & 125B7V3B	—		ϕ 19.1
	Liquid pipe		
Model	**Size-down**	**Standard size**	**Size-up**
RZQ71~125B7V3B	ϕ 6.4	**ϕ 9.5**	ϕ 12.7

- Not using the standard pipe size may result in capacity decrease. It is up to the installer to judge on this phenomenon carefully in function of the complete installation.

1

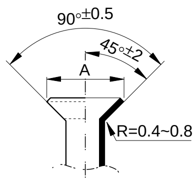
Allowable pipe length and heigth difference

When re-using existing piping, refer to below table for allowable piping length and heigth difference (figures in brackets are equivalent lengths).

	Liquid pipe size	Model RZQ-B7 71	100	125
Maximum allowable piping length (*)				
Pair: L1 Twin and triple: L1 + L2 Double twin: L1 + L2 + L4	size-down	10 m (15 m)		
	standard	**50 m (70 m)**	**50 m (70 m)**	**50 m (70 m)**
	size-up	25 m (35 m)	35 m (45 m)	35 m (45 m)
Maximum total one-way piping length				
Twin: L1 + L2 + L3	—	**50 m**	**50 m**	**50 m**
Triple: L1 + L2 + L3 + L4		—		
Double twin: L1 + L2 + L3 + L4 + L5 + L6 + L7		—		
Maximum branch piping length				
Twin: L2 Double twin: L2 + L4	—	**20 m**		
Maximum difference between branch lengths				
Twin: L2 - L3	—	**10 m**	**10 m**	**10 m**
Triple: L2 - L4		—		
Double twin: L2 - L3, L4 - L5, L6 - L7, (L2 + L4) - (L3 + L7)		—		
Maximum heigth between indoor and outdoor				
All: H1	—	**30 m**		
Maximum heigth between indoors				
Twin, triple and double twin: H2	—	**0.5 m**		
Chargeless length				
All: L1 + L2 + L3 + L4 + L5 + L6 + L7	size-down	10 m		
	standard	**30 m**		
	size-up	15 m		

Caution for flare connections

■ Refer to below table for correct flare dimensions and tightening torques. Too high tightening force may cause refrigerant leak because of flare cracking:

Piping size	Flare nut tightening torque	A dimensions for processing flares (mm)	Flare shape
Ø 6.4	14.2~17.2 N·m (144~176 kgf·cm)	8.7~9.1	
Ø 9.5	32.7~39.9 N·m (333~407 kgf·cm)	12.8~13.2	
Ø 12.7	49.5~60.3 N·m (504~616 kgf·cm)	16.2~16.6	
Ø 15.9	61.8~75.4 N·m (630~770 kgf·cm)	19.3~19.7	
Ø 19.1	97.2~118.6 N·m (989.8~1208 kgf·cm)	23.6~24.0	

■ When connecting the flare nut, apply refrigerating machine oil to the flare (inside and outside) and first screw the nut 3 or 4 turns by hand. Coat the indicated surfaces using ether or ester oil:

■ After completing the installation, carry out an inspection of the piping connections by pressure test using nitrogen.

4.9 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.
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	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.
10	Check valve with service port	The check valve allows you to connect a gauge.
11	Low-pressure switch	The low-pressure switch stops the operation of the unit when the pressure becomes abnormally low.
12	High-pressure switch	The high-pressure switch stops the operation of the unit when the pressure becomes abnormally high.
13	Propeller fan and fan motor	The propeller fan creates air displacement across the heat exhanger.
14a	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.
14b		The one-way valve is used to release overpressure in the liquid receiver during stand-still.
15	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.
16	Muffler	The muffler is used to absorb the refrigerant noise from the compressor.
17	Solenoid valve	■ Y1S: Capacity control solenoid valve ■ Y3S: Liquid injection solenoid valve ■ SV: Solenoid valve (Purge liquid receiver)
18	Thermistor	■ R1T: Air thermistor ■ R2T: Coil thermistor ■ R3T: Discharge pipe thermistor
19	Branch pipe	

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:

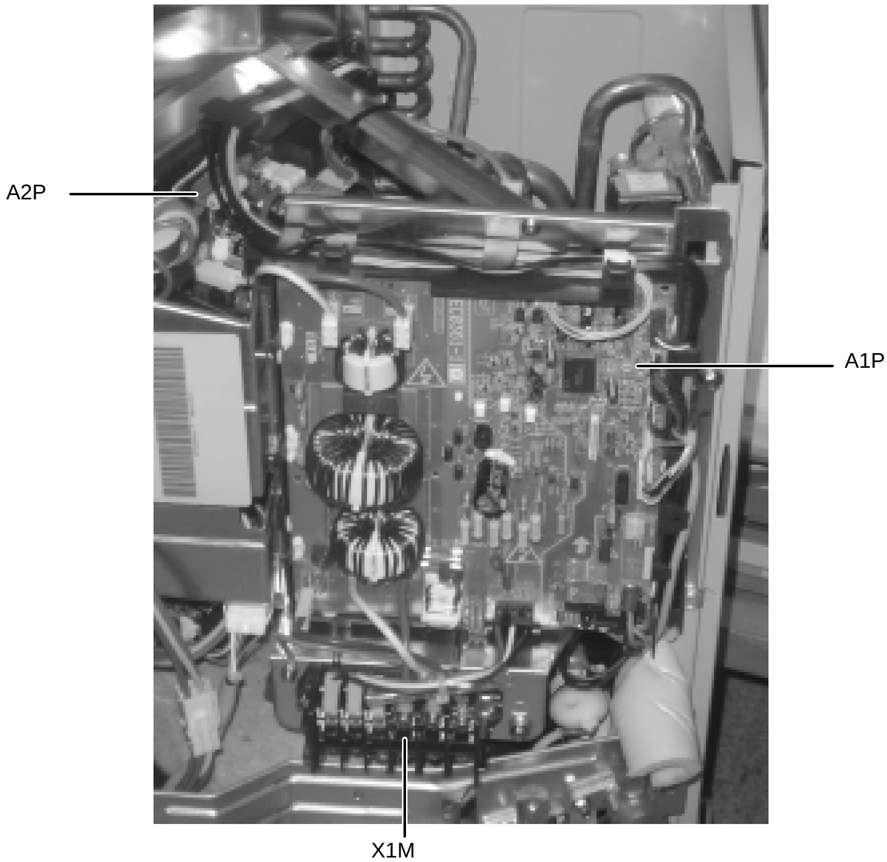
Indoor units

This chapter contains the following switch box layouts:

1

5.2 RZQ71B7V3B

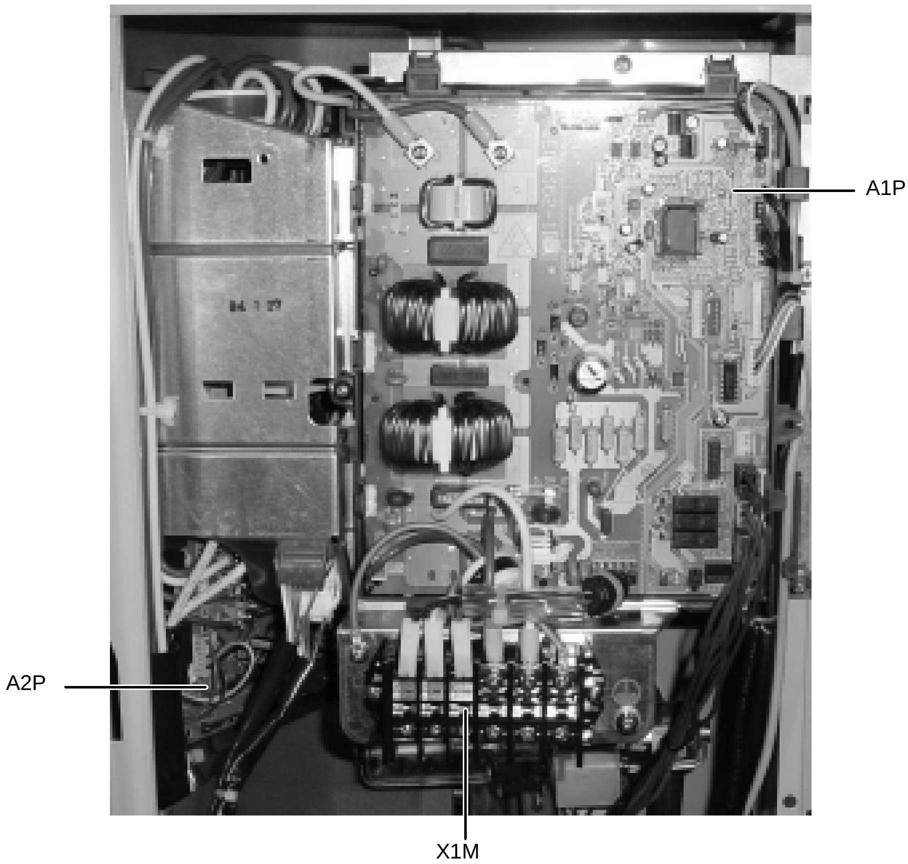
The illustration below shows the switch box layout:



Item	Description
A1P	Printed circuit board (control)
A2P	Printed circuit board (inverter)
X1M	Terminal strip

5.3 RZQ100B7V3B

The illustration below shows the switch box layout:

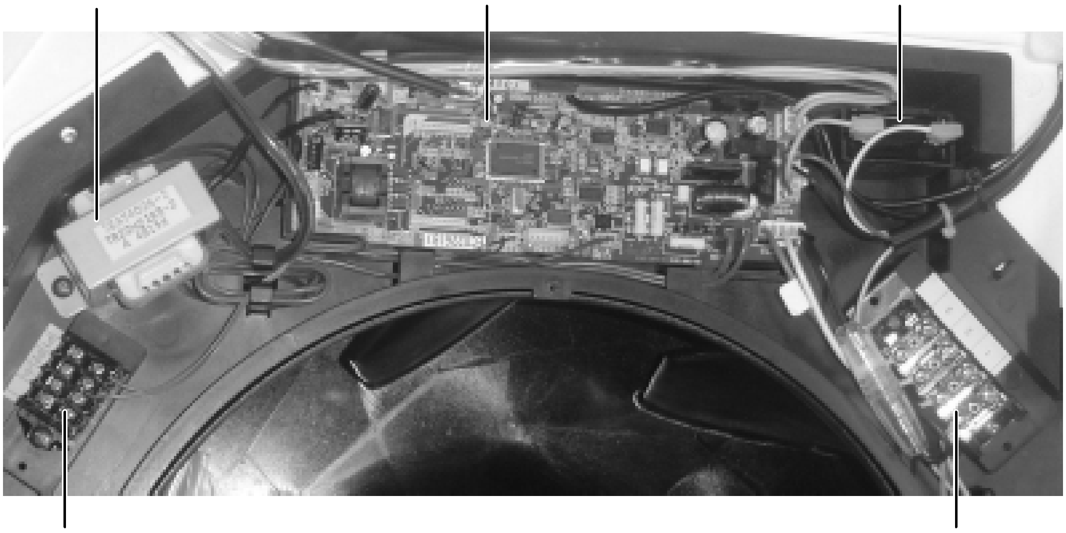


Item	Description
A1P	Printed circuit board (control)
A2P	Printed circuit board (inverter)
X1M	Terminal strip

1

5.4 FCQ35B7V1 ~ FCQ71B7V3B

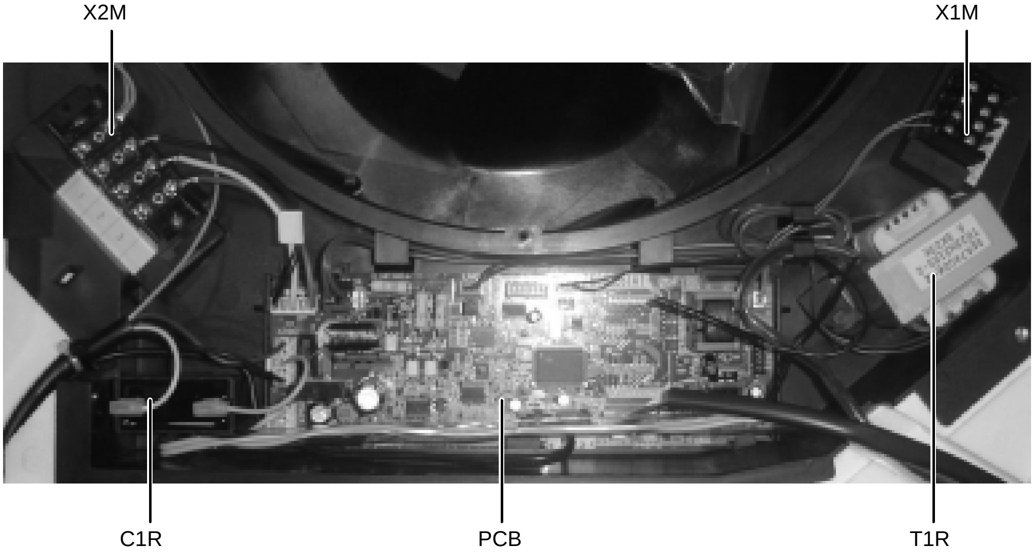
The illustration below shows the switch box layout:.



Item	Description
PCB	Printed circuit board
T1R	Transformer
C1R	Fan motor capacitor
X1M	Terminal strip (for remote control P1/P2)
X2M	Terminal strip (interconnection wiring)

5.5 FCQ100~125B7V3B

The illustration below shows the switch box layout:

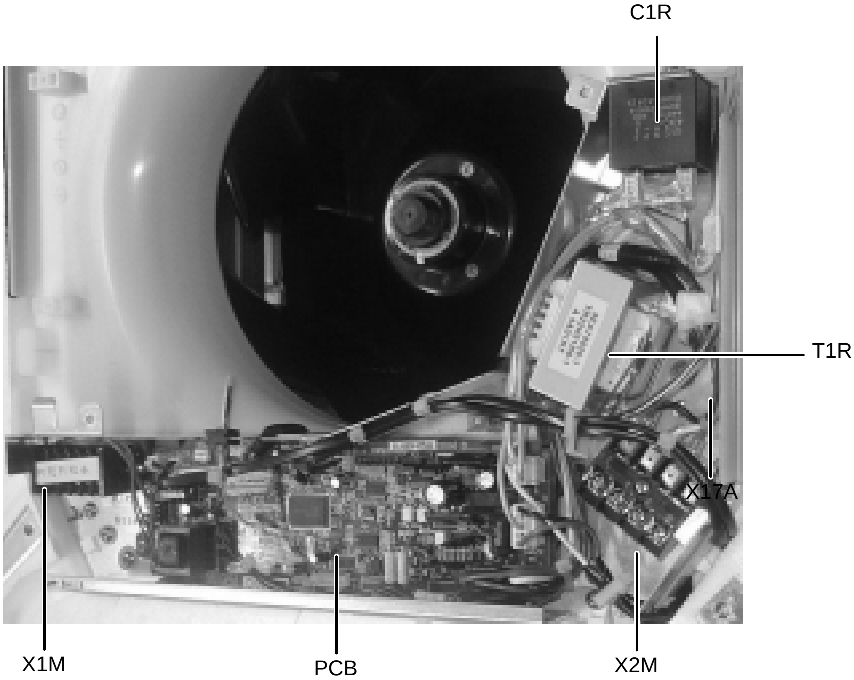


Item	Description
PCB	Printed circuit board
T1R	Transformer
C1R	Fan motor capacitor
X1M	Terminal strip (for remote control P1/P2)
X2M	Terminal strip (interconnection wiring)

1

5.6 FFQ35~60BV1B

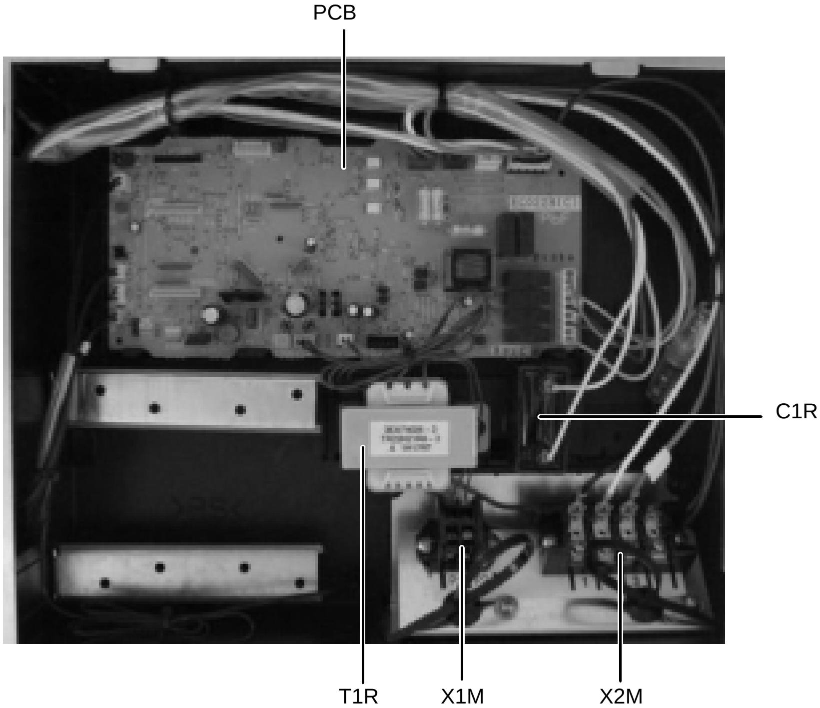
The illustration below shows the switch box layout:



Item	Description
PCB	Printed circuit board
T1R	Transformer
C1R	Fan motor capacitor
X1M	Terminal strip (for remote control P1/P2)
X2M	Terminal strip (interconnection wiring)

5.7 FBQ35B7V1 ~ FBQ125B7V3B

The illustration below shows the switch box layout:.

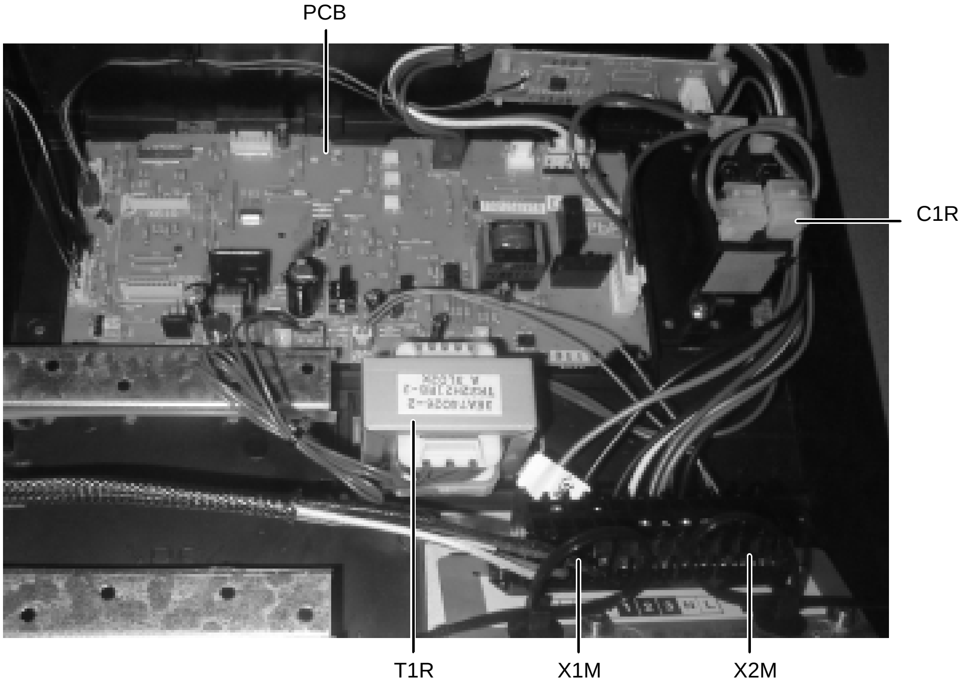


Item	Description
PCB	Printed circuit board
T1R	Transformer
C1R	Fan motor capacitor
X1M	Terminal strip (for remote control P1/P2)
X2M	Terminal strip (interconnection wiring)

1

5.8 FDQ125B7V3B

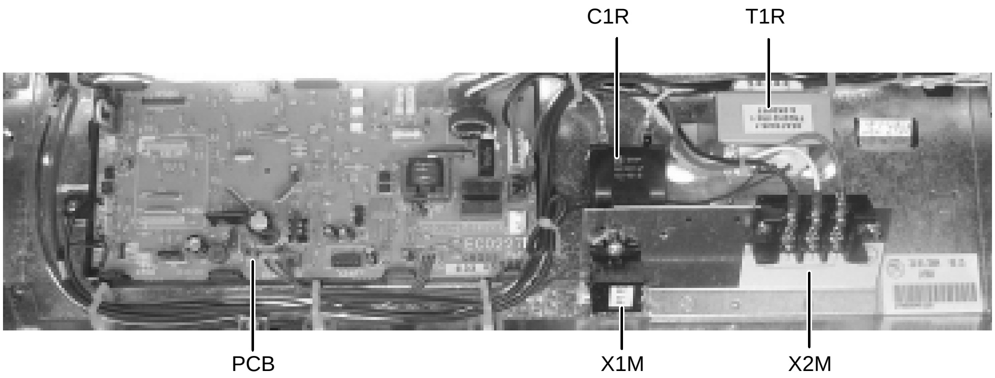
The illustration below shows the switch box layout:



Item	Description
PCB	Printed circuit board
T1R	Transformer
C1R	Fan motor capacitor
X1M	Terminal strip (for remote control P1/P2)
X2M	Terminal strip (interconnection wiring)

5.9 FHQ35BUV1 ~ FHQ125BUV1B

The illustration below shows the switch box layout:

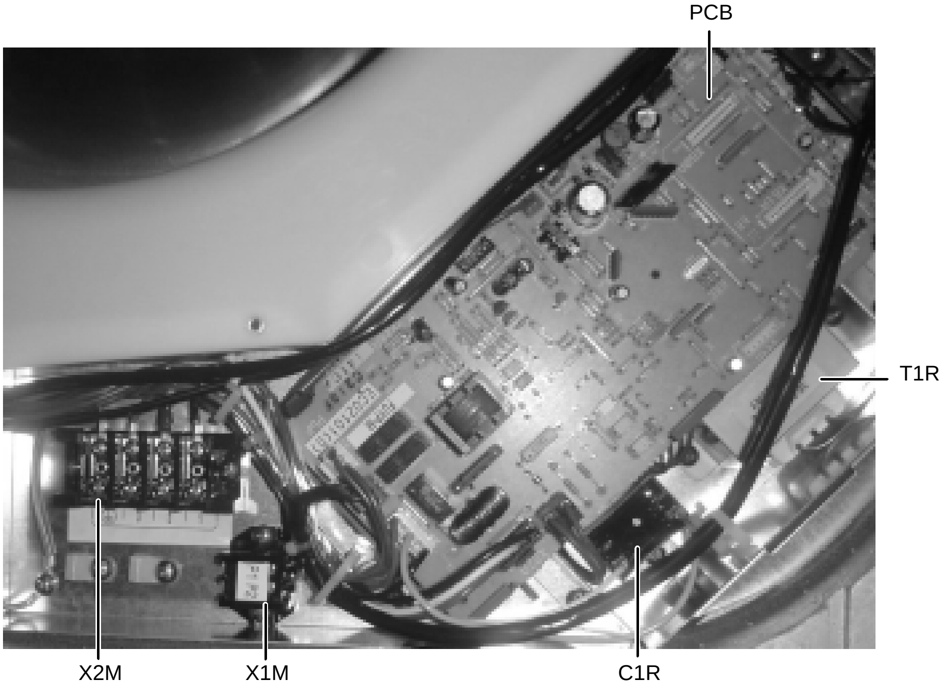


Item	Description
PCB	Printed circuit board
T1R	Transformer
C1R	Fan motor capacitor
X1M	Terminal strip (for remote control P1/P2)
X2M	Terminal strip (interconnection wiring)

1

5.10 FUQ71~125BUV1B

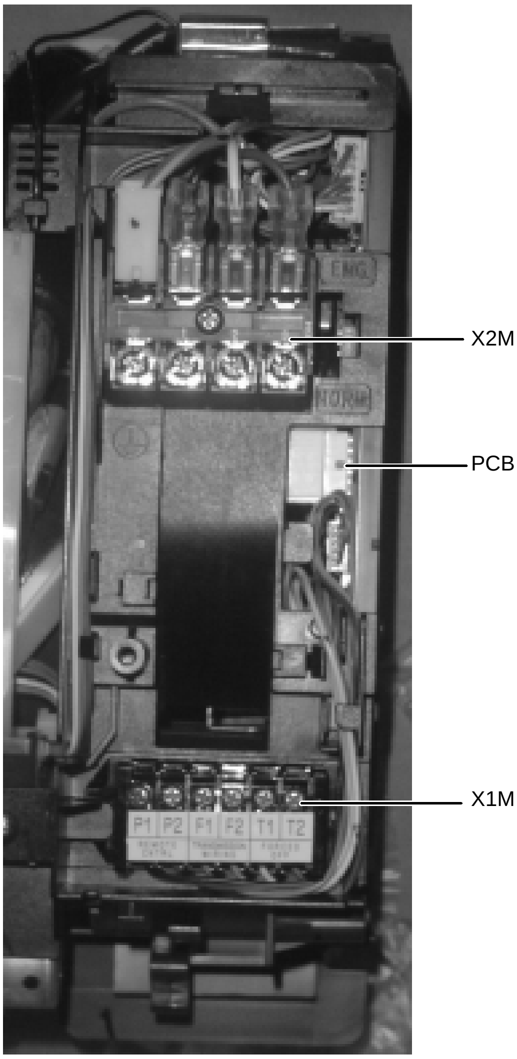
The illustration below shows the switch box layout:



Item	Description
PCB	Printed circuit board
T1R	Transformer
C1R	Fan motor capacitor
X1M	Terminal strip (for remote control P1/P2)
X2M	Terminal strip (interconnection wiring)

5.11 FAQ71BUV1B

The illustration below shows the switch box layout:

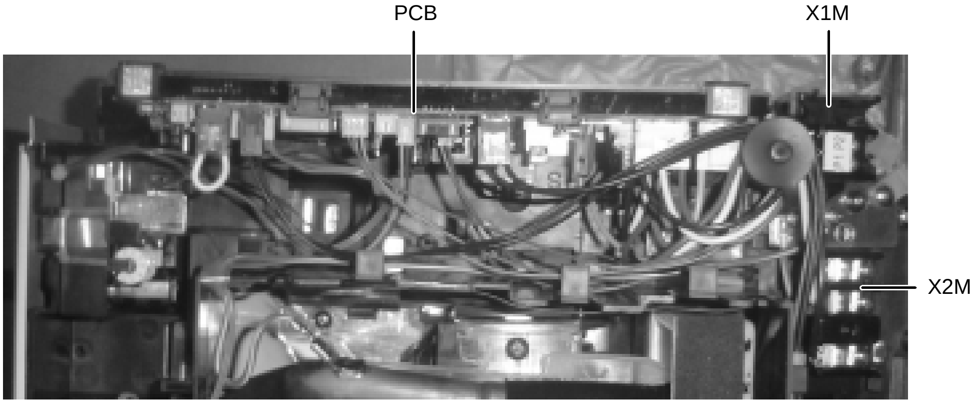


Item	Description
PCB	Printed circuit board
X1M	Terminal strip (for remote control P1/P2, F1/F2, T1/T2)
X2M	Terminal strip (interconnection wiring)

1

5.12 FAQ100BUV1B

The illustration below shows the switch box layout:



Item	Description
PCB	Printed circuit board
T1R	Transformer
C1R	Fan motor capacitor
X1M	Terminal strip (for remote control P1/P2)
X2M	Terminal strip (interconnection wiring)

1

6 Wiring Diagrams

6.1 What Is in This Chapter?

Introduction

This chapter contains the wiring diagrams of the outdoor and indoor units.

Outdoor units:

This chapter contains the following wiring diagrams:

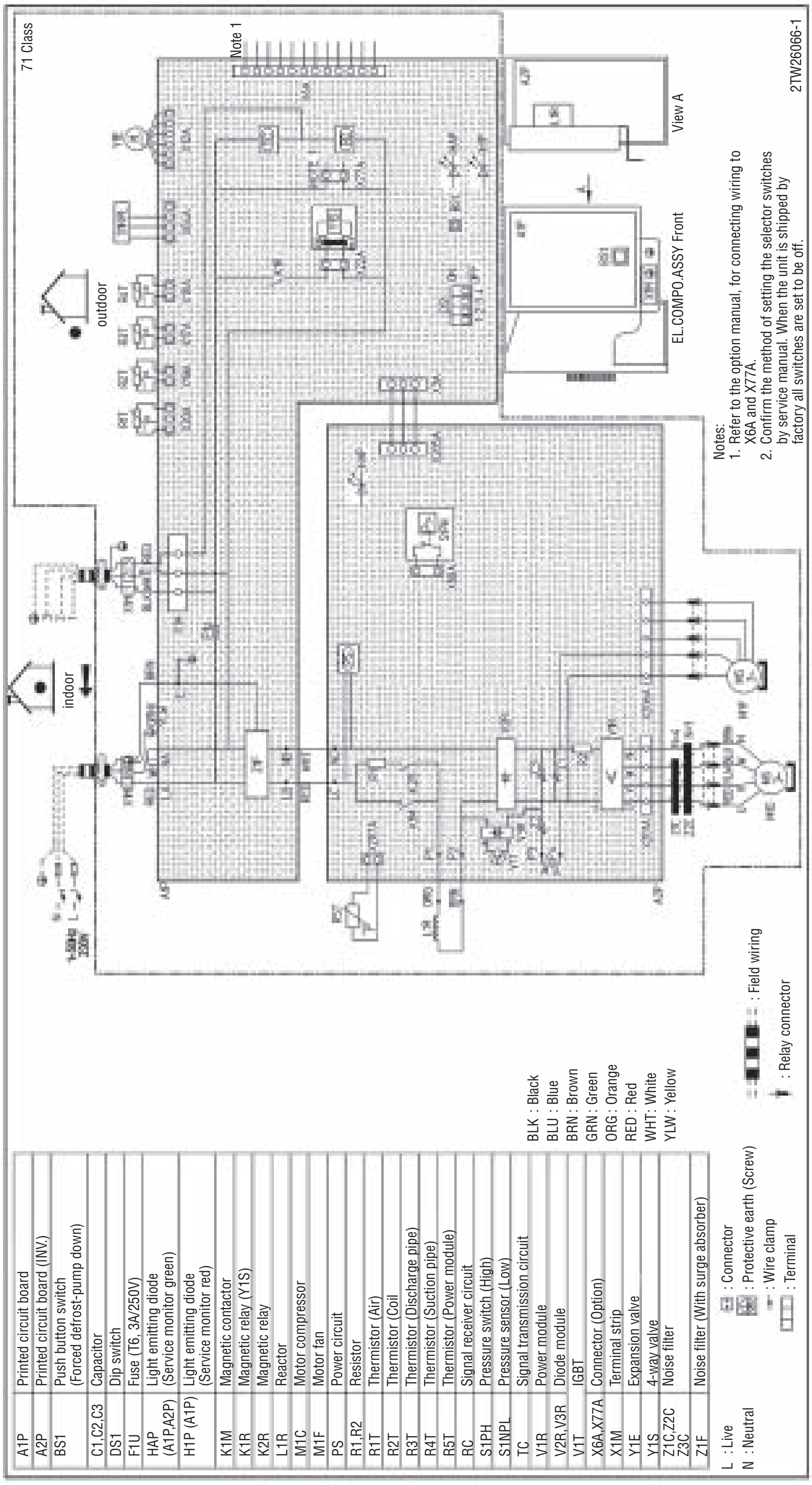
Indoor units:

This chapter contains the following wiring diagrams:

1

6.2 RZQ71B7V3B

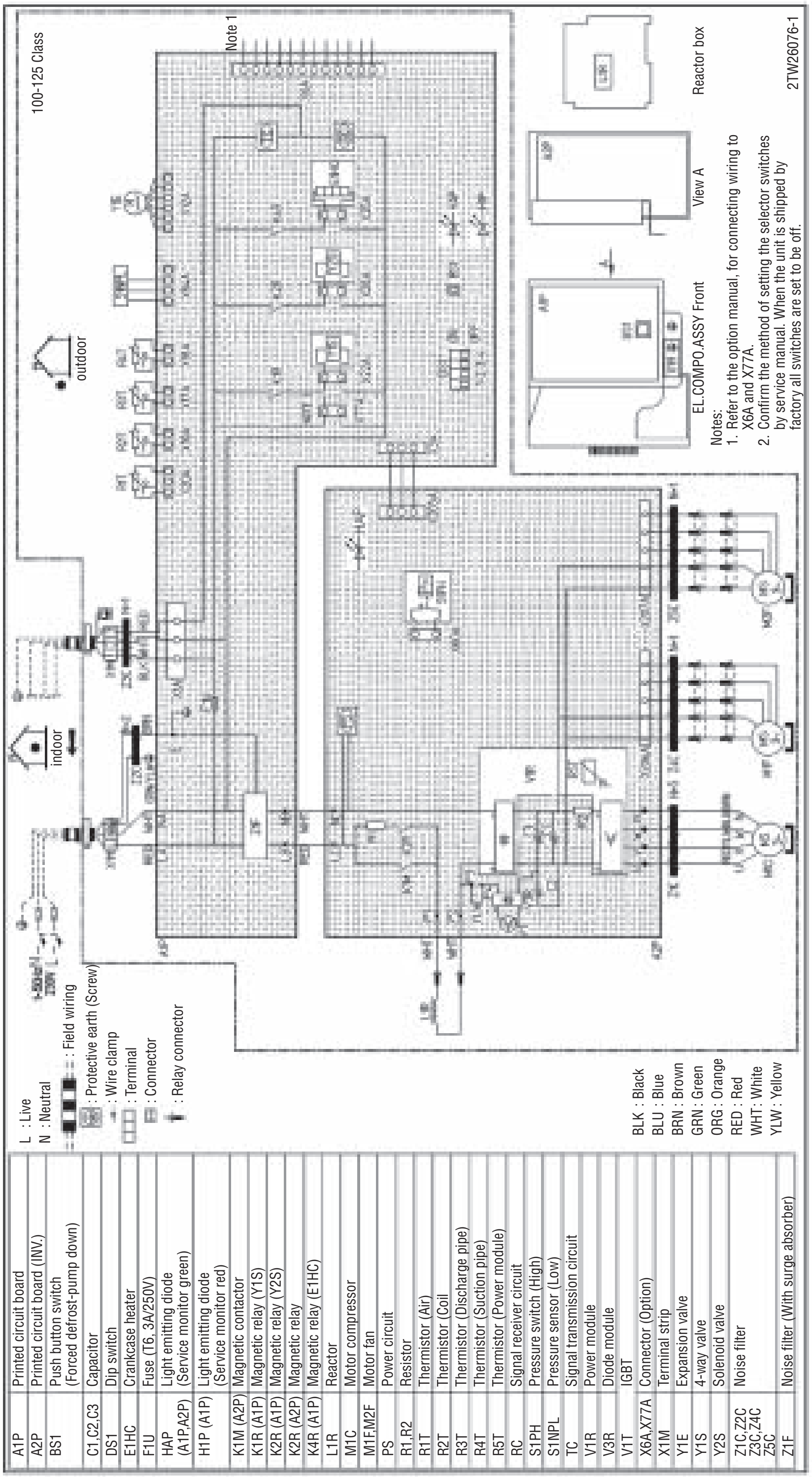
Wiring diagram The illustration below shows the wiring diagram of the unit.



6.3 RZQ100~125B7V3B

Wiring diagram

The illustration below shows the wiring diagram of the unit.

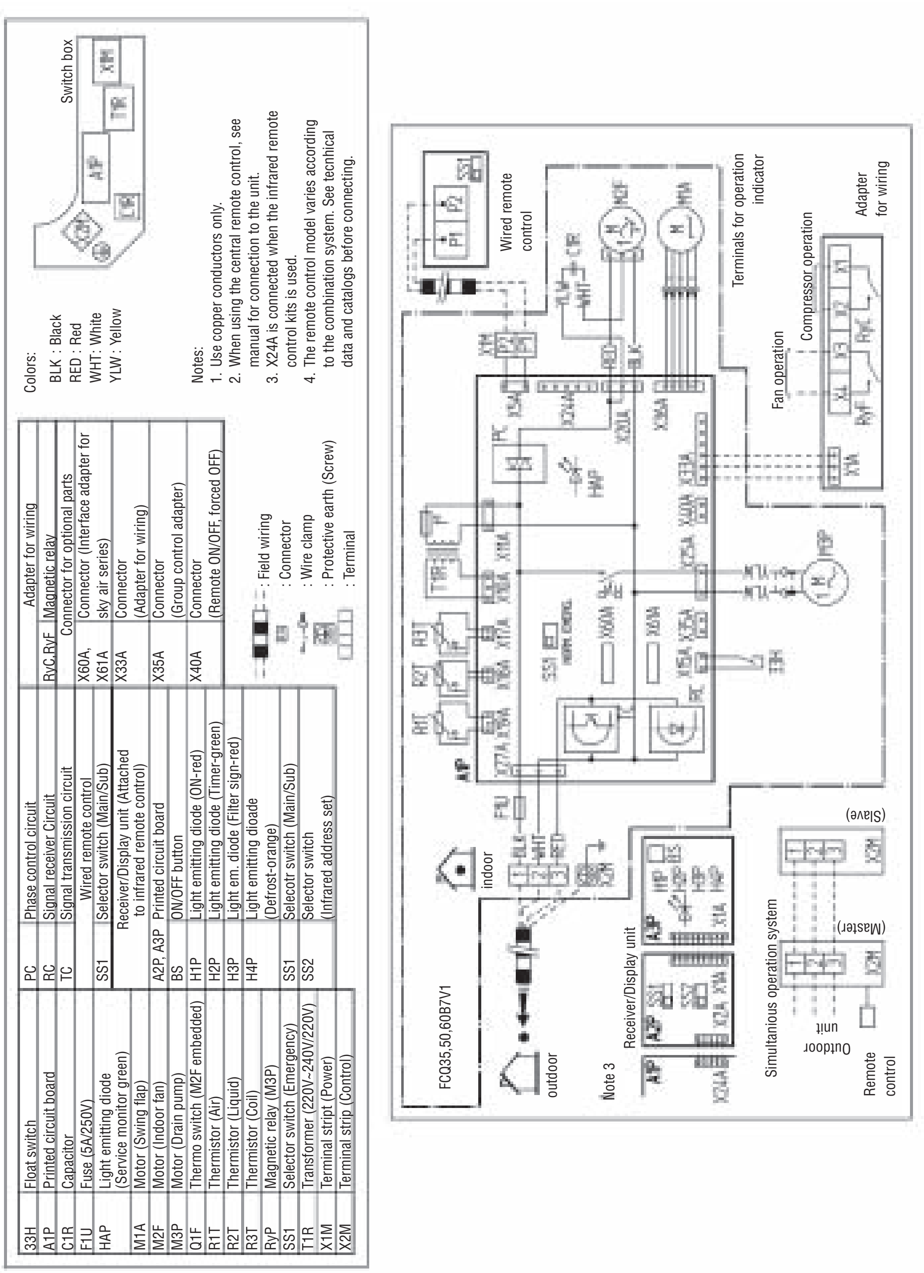


1

6.4 FCQ35~60B7V1

Wiring diagram

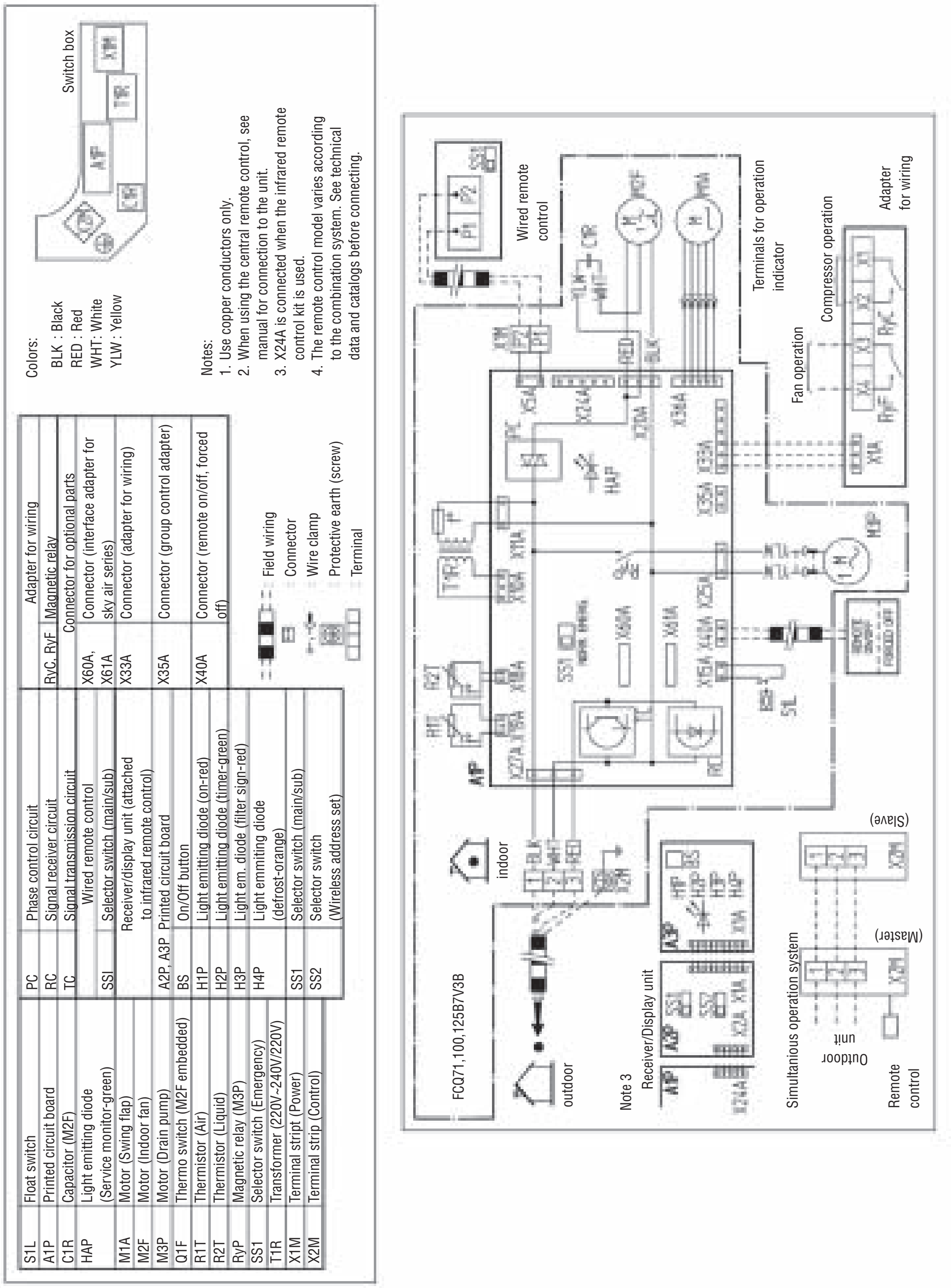
The illustration below shows the wiring diagram of the unit.



6.5 FCQ71~125B7V3B

Wiring diagram

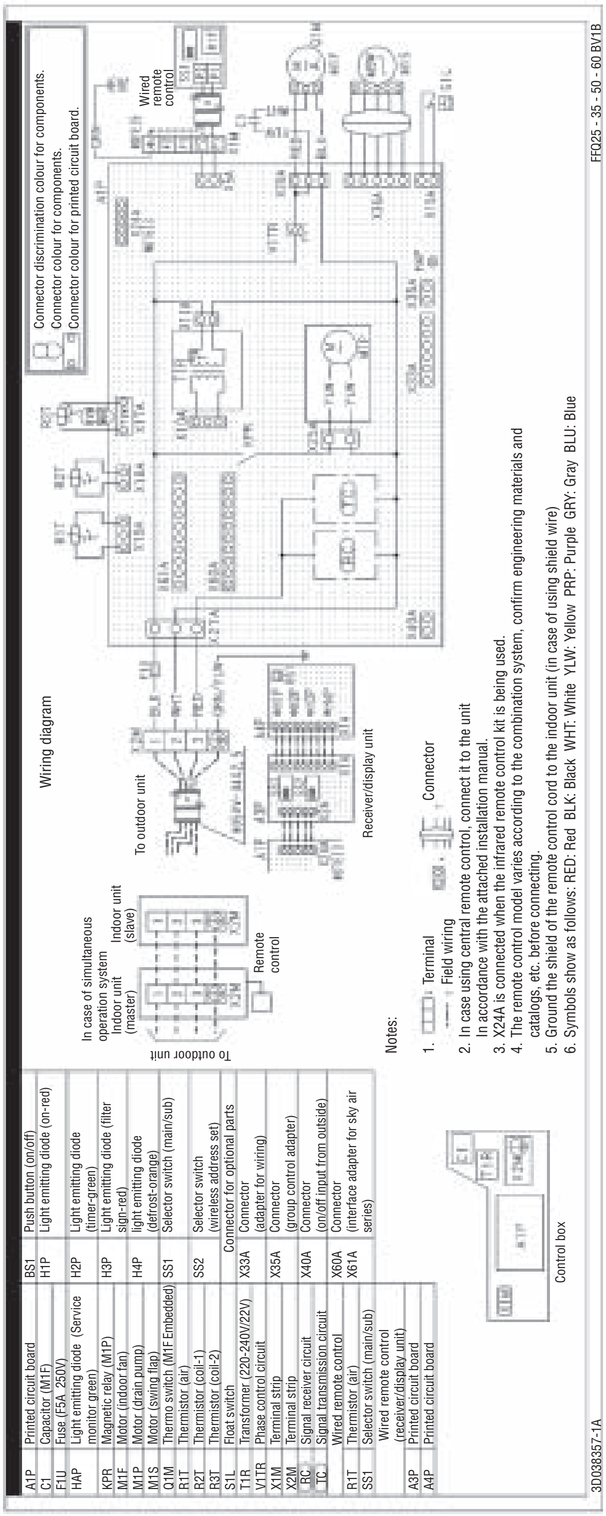
The illustration below shows the wiring diagram of the unit.



1

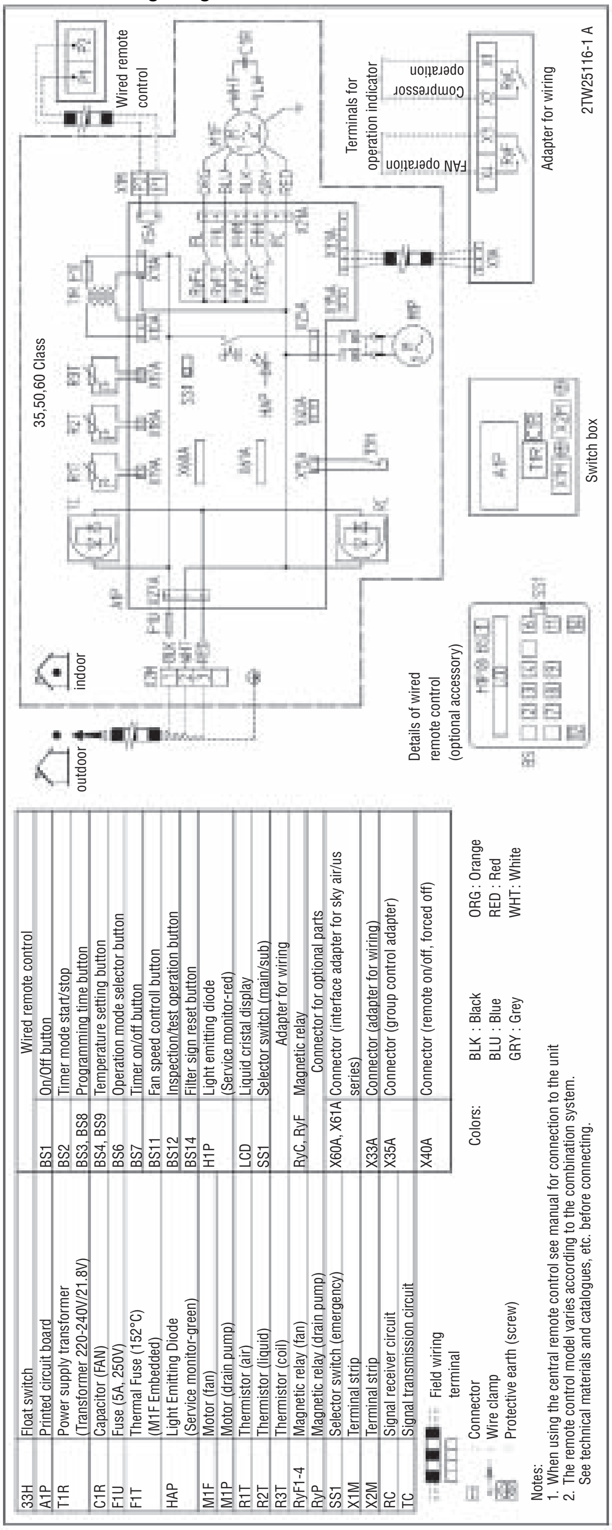
6.6 FFQ35~60BV1B

Wiring diagram The illustration below shows the wiring diagram of the unit.



6.7 FBQ35~60B7V1

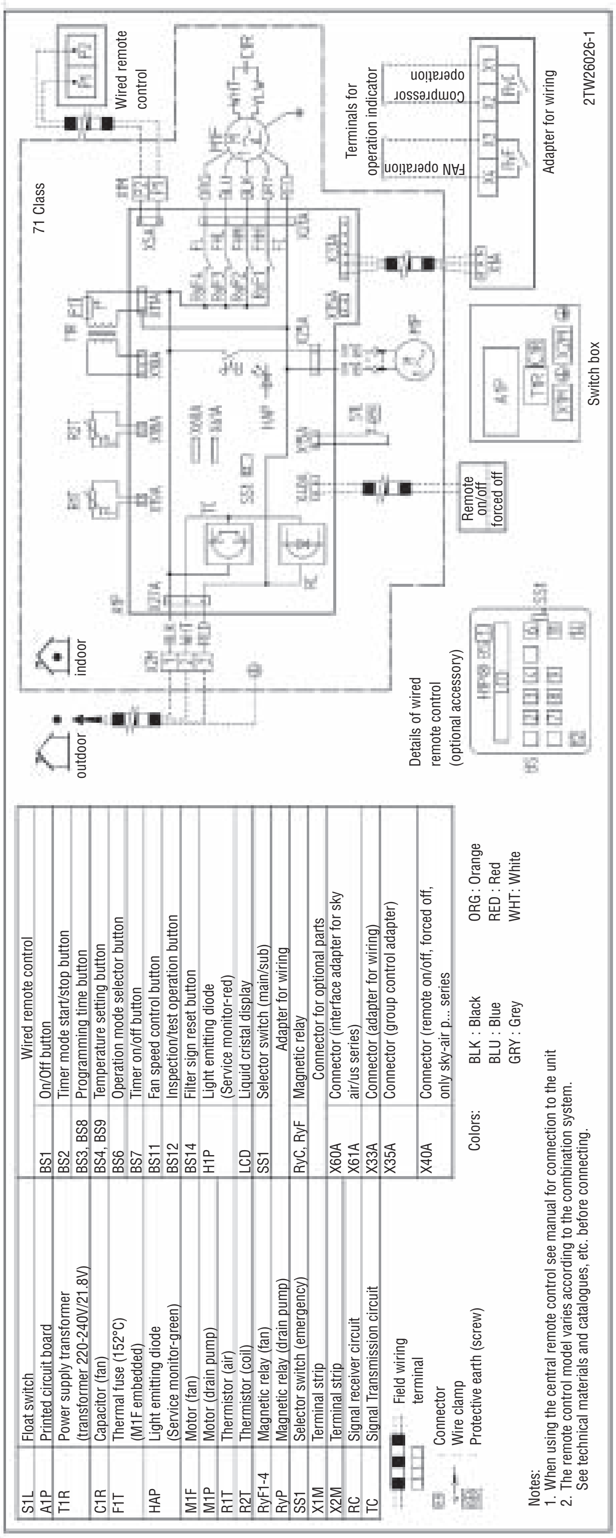
Wiring diagram The illustration below shows the wiring diagram of the unit.



1

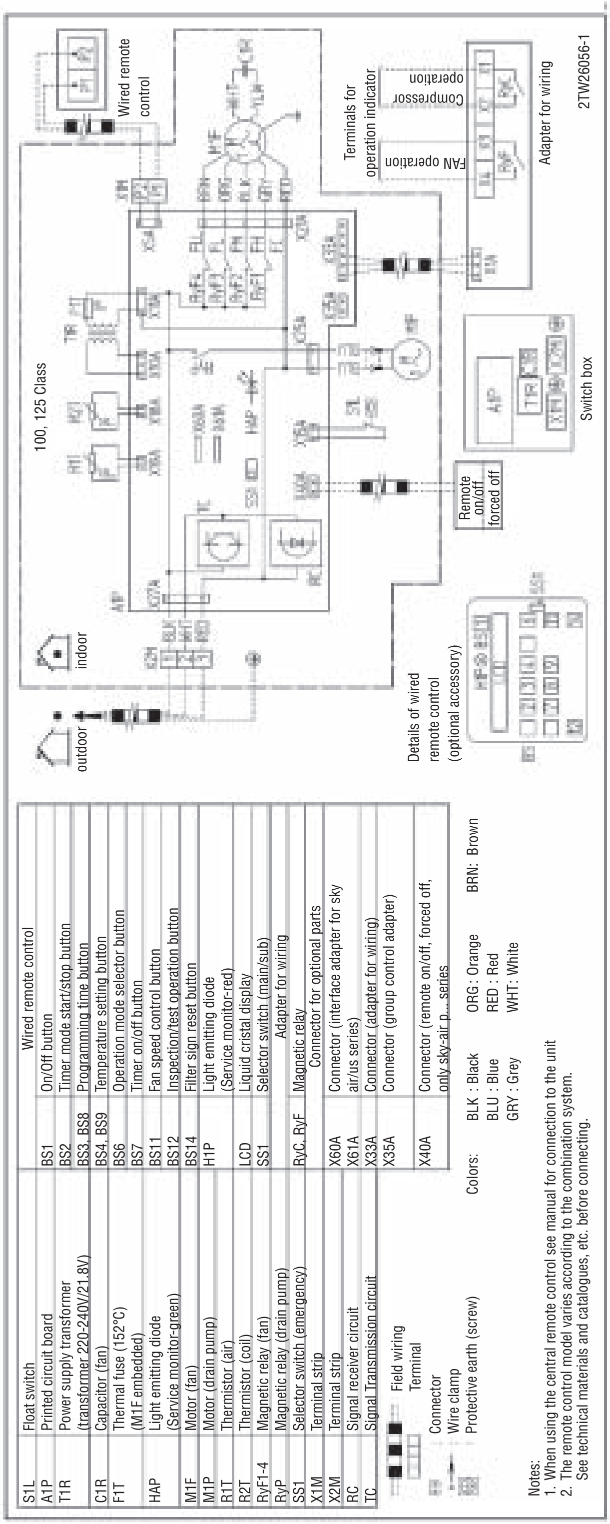
6.8 FBQ71B7V3B

Wiring diagram The illustration below shows the wiring diagram of the unit.



6.9 FBQ100~125B7V3B

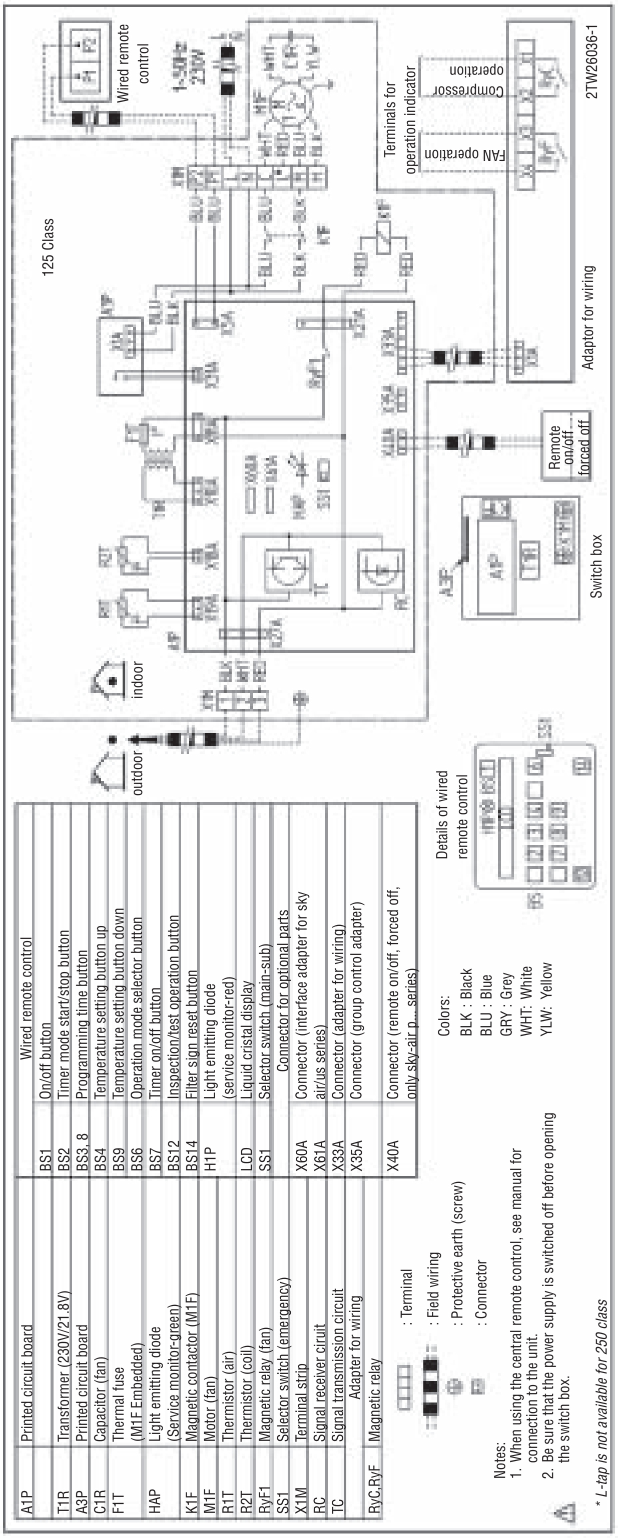
Wiring diagram The illustration below shows the wiring diagram of the unit.



1

6.10 FDQ125B7V3B

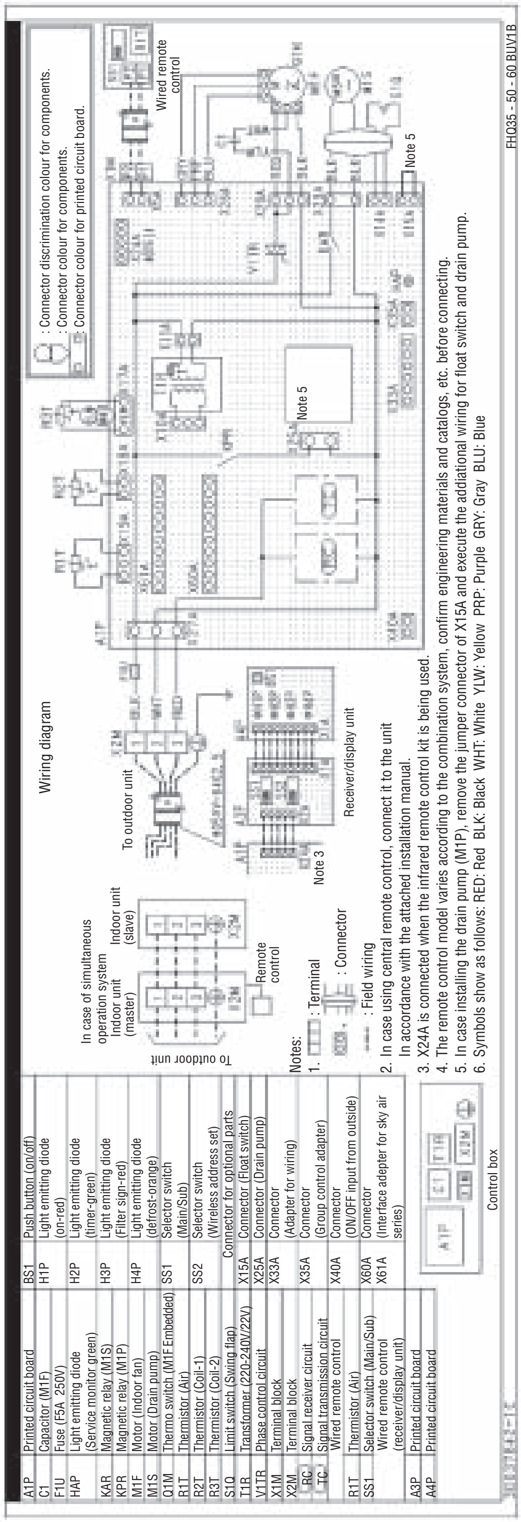
Wiring diagram The illustration below shows the wiring diagram of the unit.



6.11 FHQ35~60BUV1

1

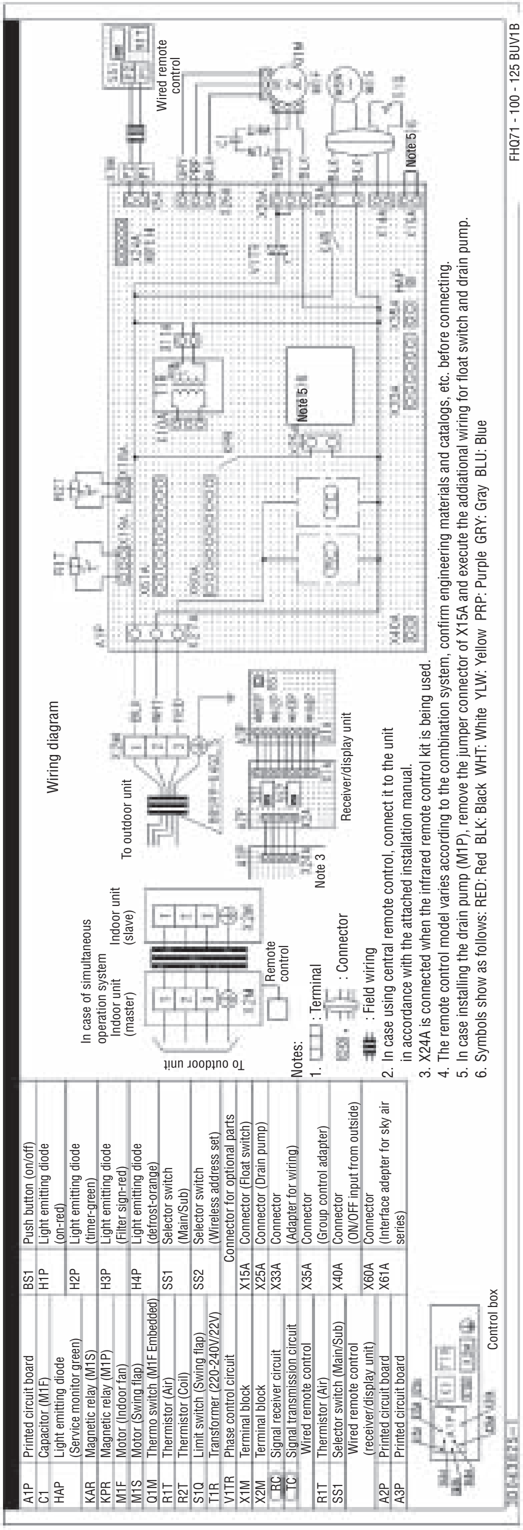
Wiring diagram The illustration below shows the wiring diagram of the unit.



1

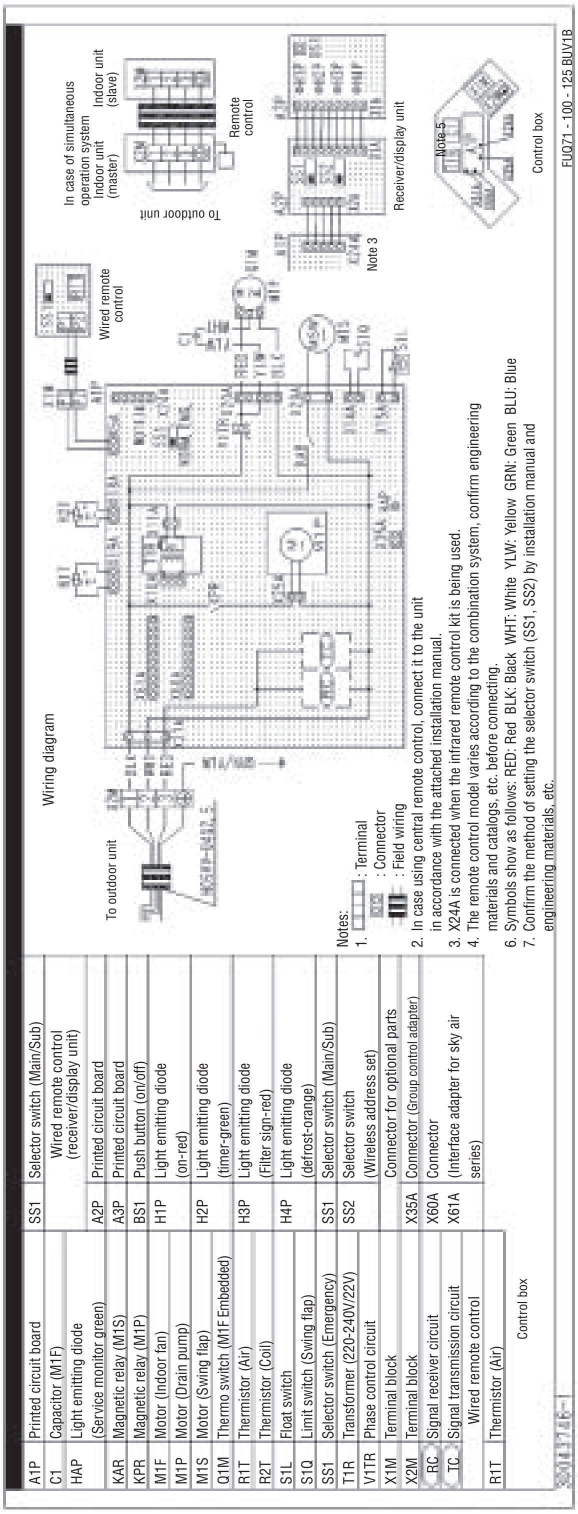
6.12 FHQ71~125BUV1B

Wiring diagram The illustration below shows the wiring diagram of the unit.



6.13 FUQ71~125BUV1B

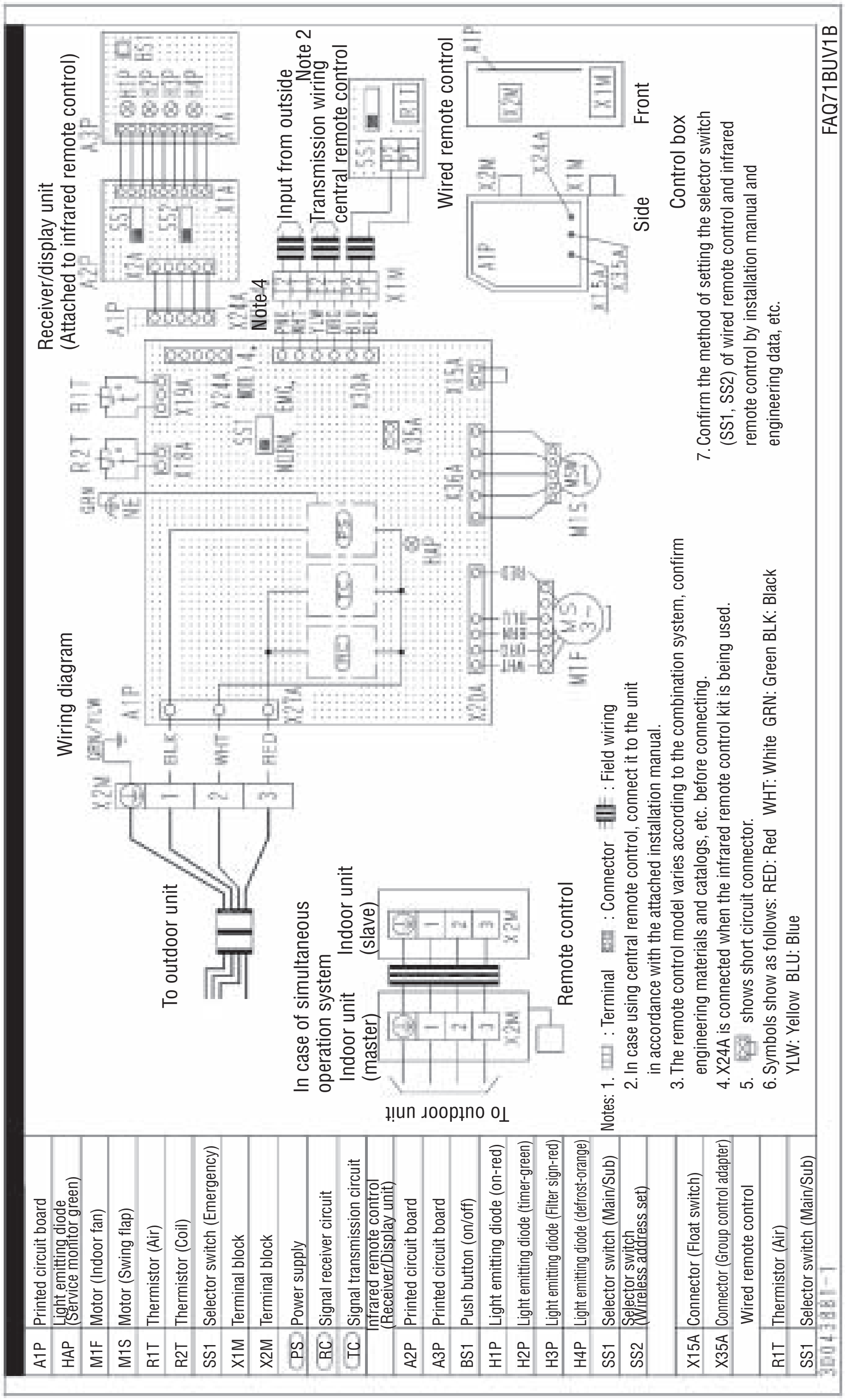
Wiring diagram The illustration below shows the wiring diagram of the unit.



1

6.14 FAQ71BUV1B

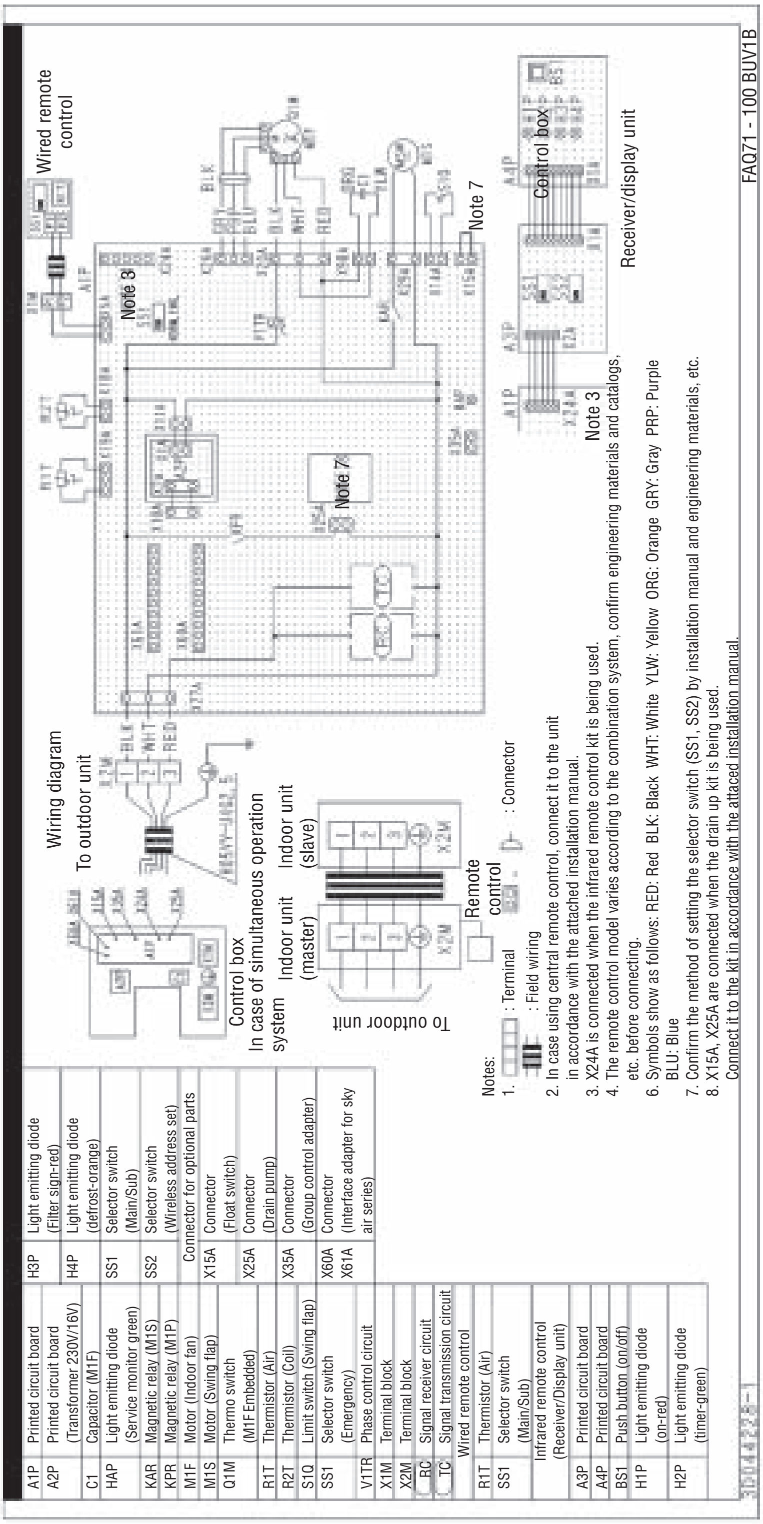
Wiring diagram The illustration below shows the wiring diagram of the unit.



1

6.15 FAQ100BUV1B

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.

Outdoor units

This chapter contains the following PCB layouts:

Indoor units

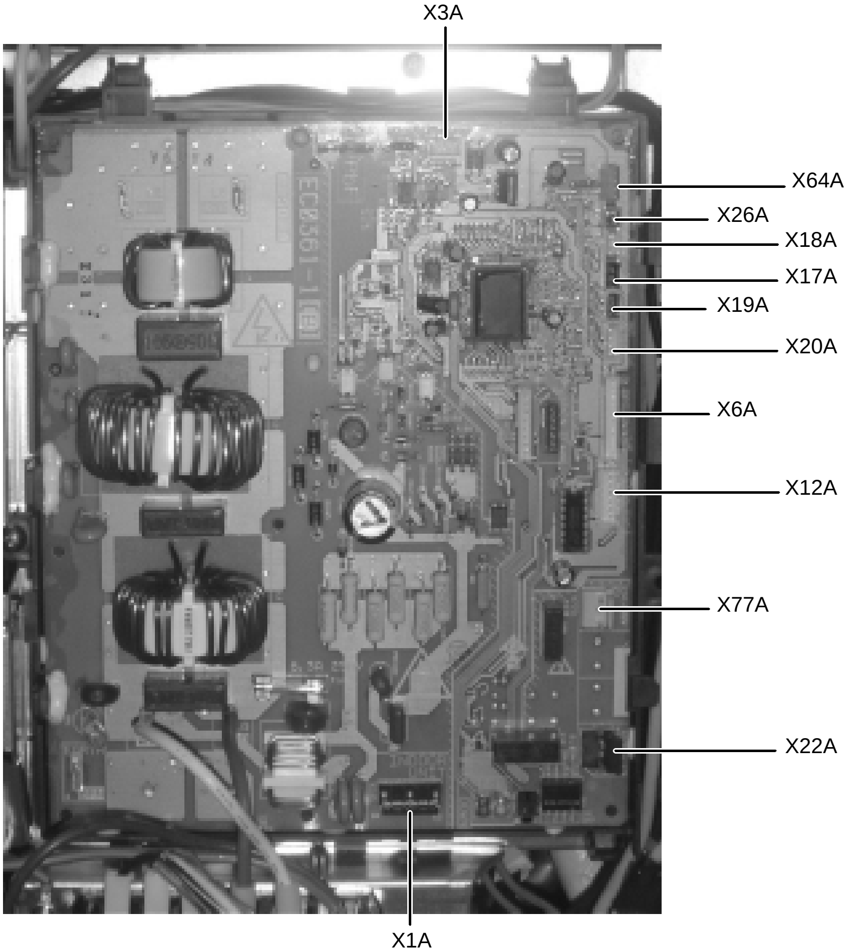
This chapter contains the following PCB layouts:

1

7.2 RZQ71B7V3B

Control PCB

The illustration below shows the PCB connectors.



Connectors

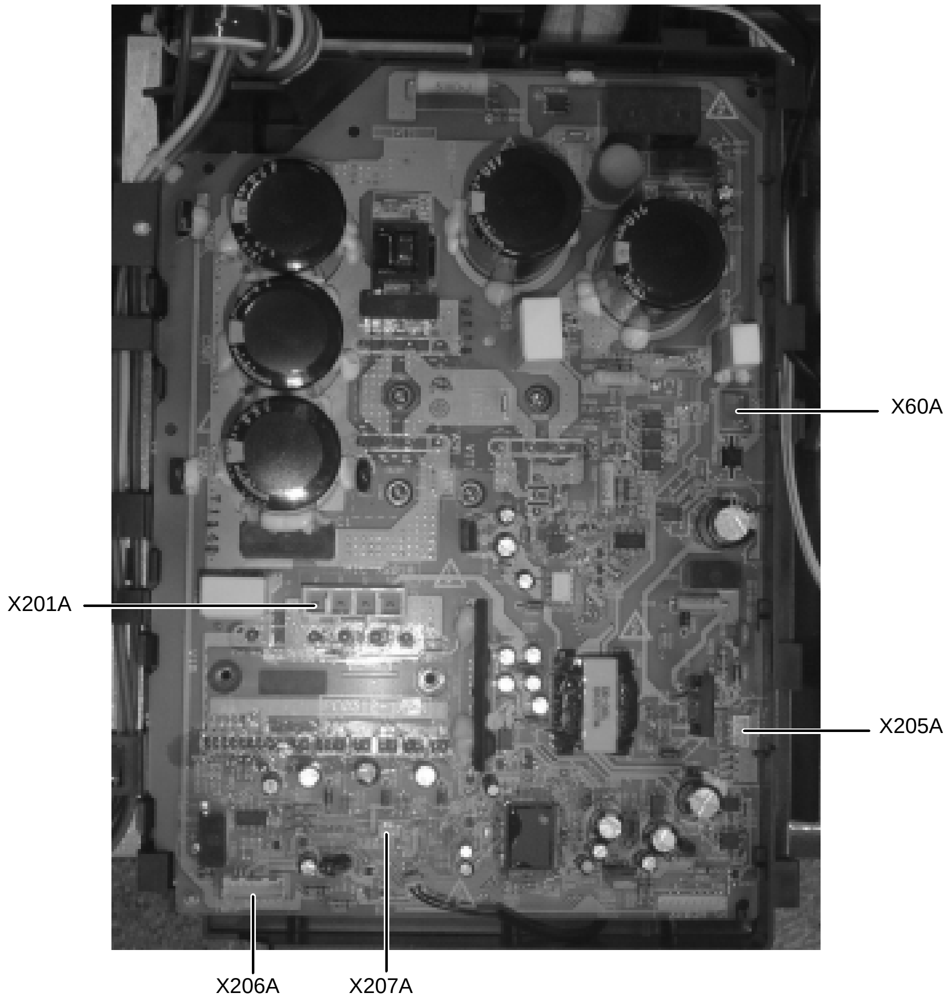
The table below describes the PCB connectors.

Connector	Connected to	Description
X1A	X1M	Terminal strip connector
X3A	X205A on inverter PCB	
X6A		For optional PCB KRP58M51
X12A	Y1E	Expansion valve
X17A	R3T	Discharge thermistor
X18A	R4T	Suction thermistor
X19A	R2T	Coil thermistor
X20A	R1T	Air thermistor
X22A	Y1S	4-way valve
X26A		Connector for spare part adaptor
X64A	S1NPL	Low pressure sensor
X77A		For optional PCB KRP58M51

1

Inverter PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

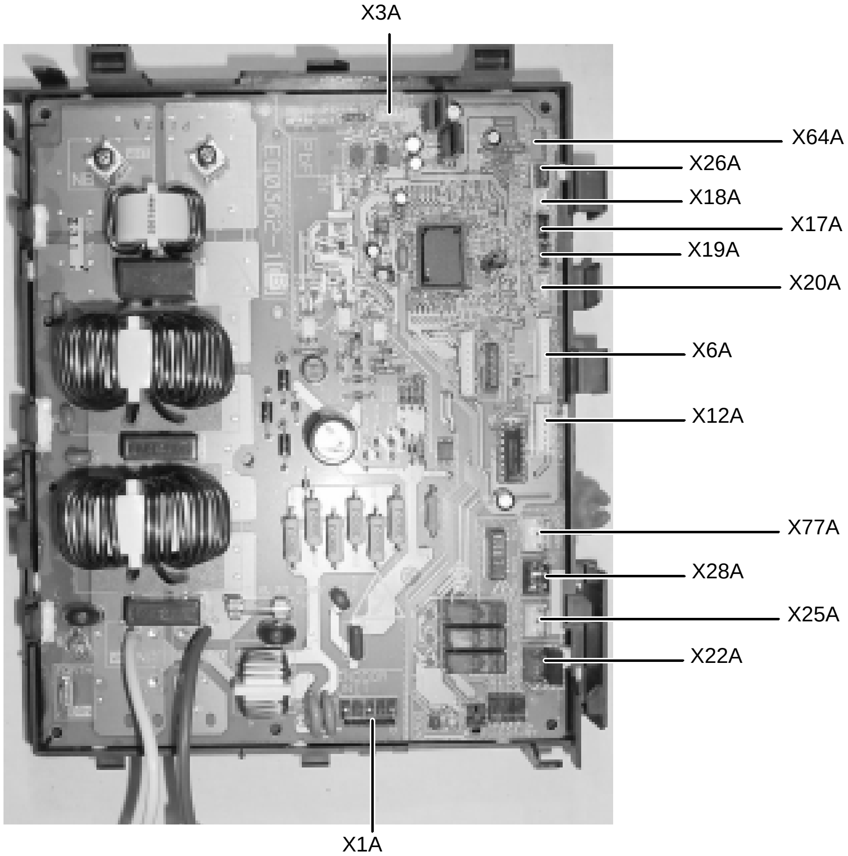
Connector	Connected to	Description
X60A	S1PH	High pressure switch
X201A	M1C	Compressor motor
X205A	X3A on control PCB	
X206A	M1F	Fan motor
X207A	R5T	Power module thermistor

1

7.3 RZQ100B7V3B

Control PCB

The illustration below shows the PCB connectors.



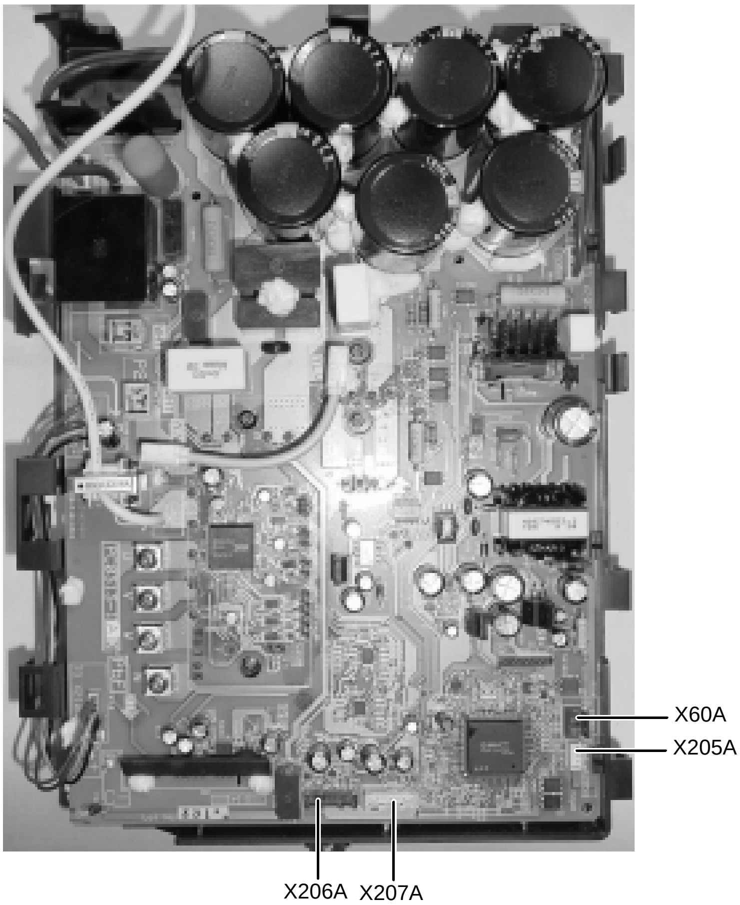
Connectors

The table below describes the PCB connectors.

Connector	Connected to	Description
X1A	X1M	Terminal strip connector
X3A	X205A on inverter PCB	
X6A		For optional PCB KRP58M51
X12A	Y1E	Expansion valve
X17A	R3T	Discharge thermistor
X18A	R4T	Suction thermistor
X19A	R2T	Coil thermistor
X20A	R1T	Air thermistor
X22A	Y1S	4-way valve
X25A	J1HC	Crankcase heater
X26A		Connector for spare part adaptor
X28A	Y2S	Solenoid valve
X64A	S1NPL	Low pressure sensor
X77A		For optional PCB KRP58M51

Inverter PCB (A2P)

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

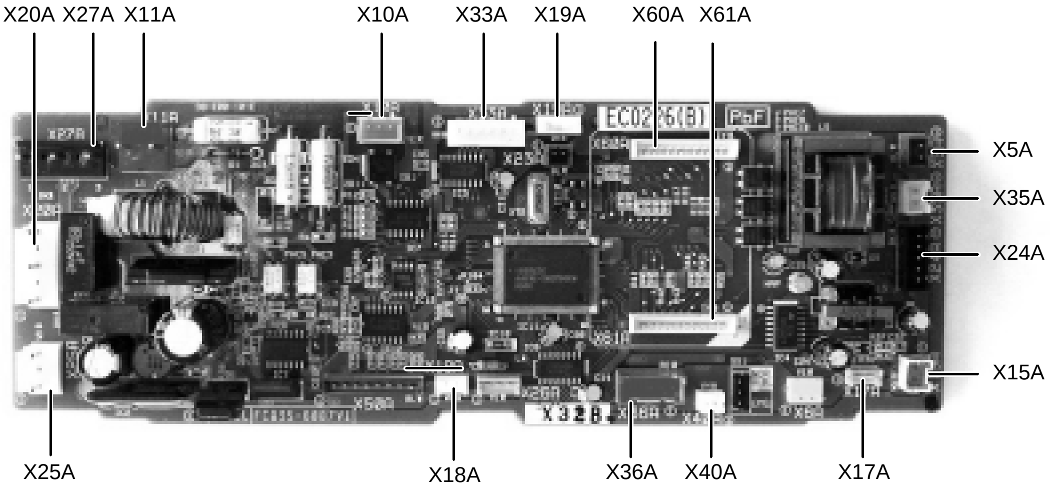
Connector	Connected to	Description
X60A	S1PH	High pressure switch
(U, V, W, N)	M1C	Compressor motor
X205A	X3A on control PCB	
X206A	M1F	Fan motor
X207A	M2F	Fan motor

1

7.4 FCQ35~60B7V1

PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

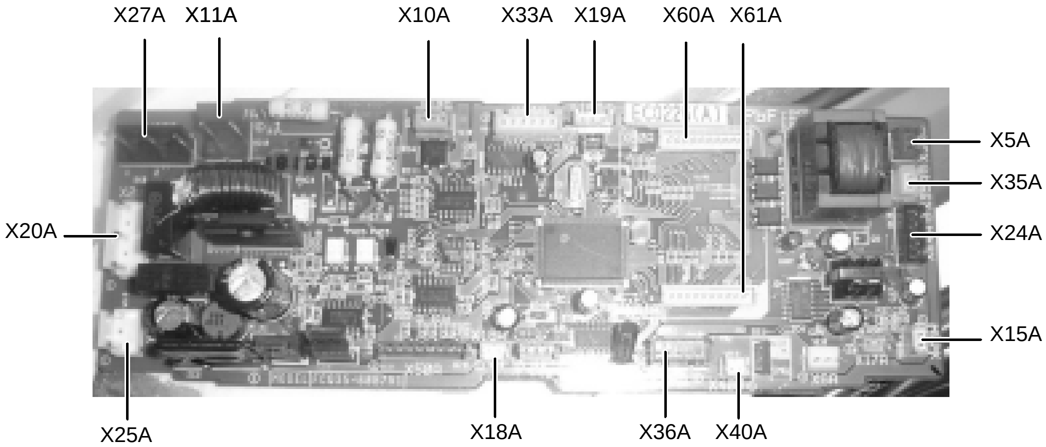
Connector	Connected to	Description
X5A	X1M	Terminal strip for P1/P2
X10A	T1R	Transformer secondary side
X11A	T1R	Transformer primary side
X15A	33H	Float switch
X17A	R3T	Coil thermistor
X18A	R2T	Coil thermistor (liquid)
X19A	R1T	Air thermistor
X20A	M2F	Fan motor (power supply)
X24A	X2A on A3P	X24A is connected when the wireless remote control is used.
X25A	M3P	Drain pump motor
X27A	X2M	Power supply & communication
X33A	X1A on KRP1B	Connector for wiring adaptor KRP1B
X35A	X1A on KRP4	Connector to group control adaptor power supply (16VDC) for optional PCB KRP4
X36A	M1A	Swing flap motor
X40A	–	Connector for remote ON/OFF, Forced OFF
X60A	X1A on DTA112	Connector for interface adaptor
X61A	X2A on DTA112	Connector for interface adaptor

1

7.5 FCQ71~125B7V3B

PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

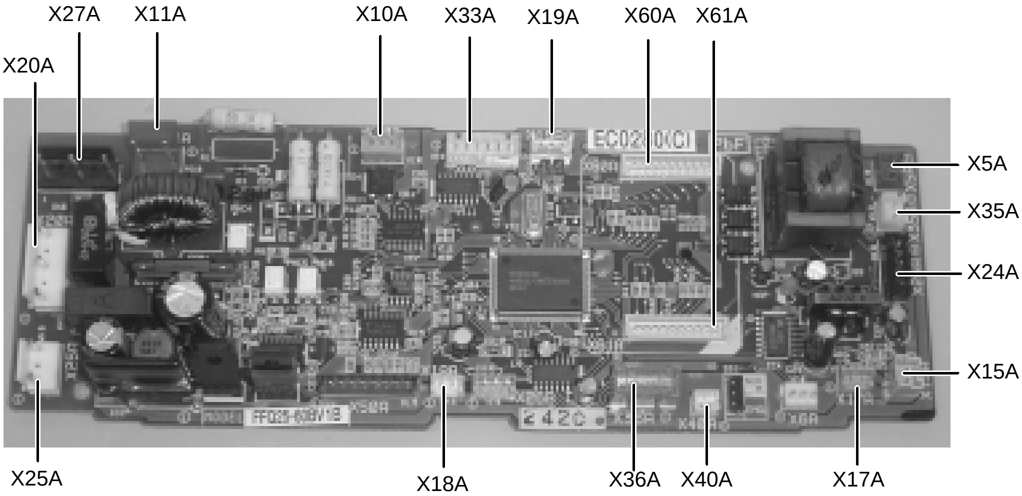
Connector	Connected to	Description
X5A	X1M	Terminal strip for P1/P2
X10A	T1R	Transformer secondary side
X11A	T1R	Transformer primary side
X15A	S1L	Float switch
X18A	R2T	Coil thermistor (liquid)
X19A	R1T	Air thermistor
X20A	M2F	Fan motor (power supply)
X24A	X2A on A3P	X24A is connected when the wireless remote control is used.
X25A	M3P	Drain pump motor
X27A	X2M	Power supply & communication
X33A	X1A on KRP1B	Connector for wiring adaptor KRP1B
X35A	X1A on KRP4	Connector to group control adaptor power supply (16VDC) for optional PCB KRP4
X36A	M1A	Swing flap motor
X40A	–	Connector for remote ON/OFF, Forced OFF
X60A	X1A on DTA112	Connector for interface adaptor
X61A	X2A on DTA112	Connector for interface adaptor

1

7.6 FFQ35~60BV1B

PCB

The illustration below shows the PCB connectors.



Connectors

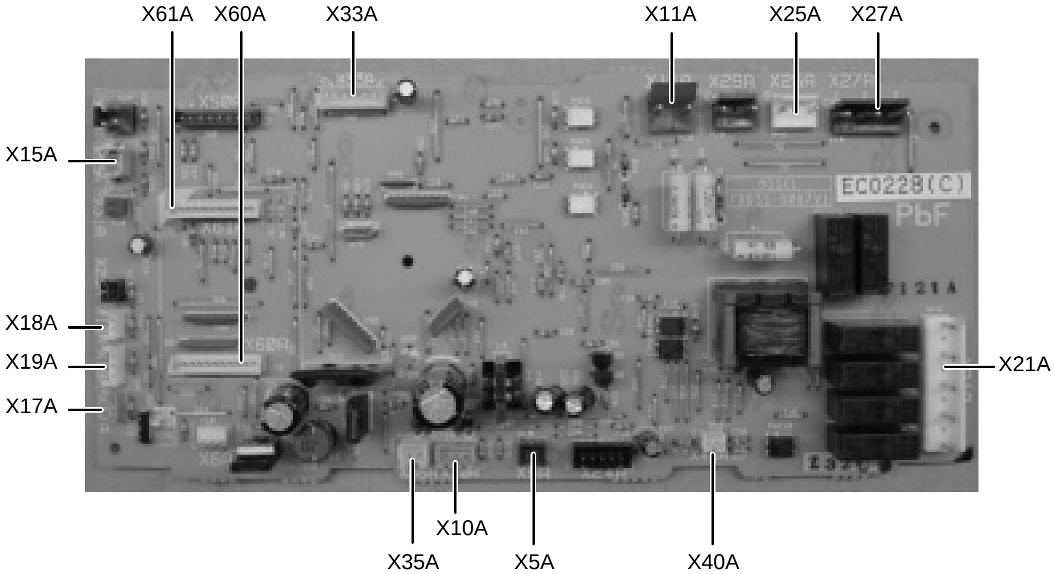
The table below describes the PCB connectors.

Connector	Connected to	Description
X5A	X1M	Terminal strip for P1/P2
X10A	T1R	Transformer secondary side
X11A	T1R	Transformer primary side
X15A	S1L	Float switch
X17A	R3T	Coil thermistor (gas). Not used on 71~125 class.
X18A	R2T	Coil thermistor (liquid)
X19A	R1T	Air thermistor
X20A	M1F	Fan motor (power supply)
X24A	X2A on A3P	X24A is connected when the wireless remote control is used.
X25A	M1P	Drain pump motor
X27A	X2M	Power supply & communication
X33A	X1A on KRP1B	Connector for wiring adaptor KRP1B
X35A	X1A on KRP4	Connector to group control adaptor power supply (16VDC) for optional PCB KRP4
X36A	M1S	Swing flap motor
X40A	–	Connector for remote ON/OFF, Forced OFF
X60A	X1A on DTA112	Connection for interface adaptor
X61A	X2A on DTA112	Connection for interface adaptor

7.7 FBQ35~60B7V1

PCB

The illustration below shows the PCB connectors.



Connectors

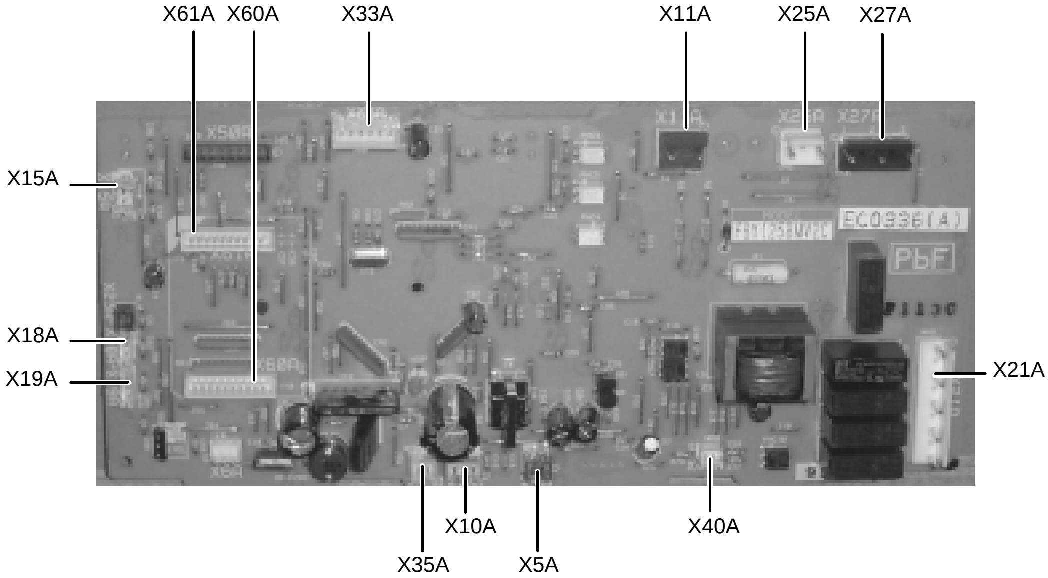
The table below describes the PCB connectors.

Connector	Connected to	Description
X5A	X1M	Terminal strip for P1/P2
X10A	T1R	Transformer secondary side
X11A	T1R	Transformer primary side
X15A	33H	Float switch
X17A	R3T	Coil thermistor
X18A	R2T	Coil thermistor (liquid)
X19A	R1T	Air thermistor
X21A	M1F	Fan motor (power supply)
X25A	M1P	Drain pump motor
X27A	X2M	Power supply & communication
X33A	X1A on KRP1B	Connector for wiring adaptor KRP1B
X35A	X1A on KRP4	Connector to group control adaptor power supply (16VDC) for optional PCB KRP4
X40A	–	Connector for remote ON/OFF, Forced OFF
X60A	X1A on DTA112	Connection for interface adaptor
X61A	X2A on DTA112	Connection for interface adaptor

7.8 FBQ100~125B7V3B

PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

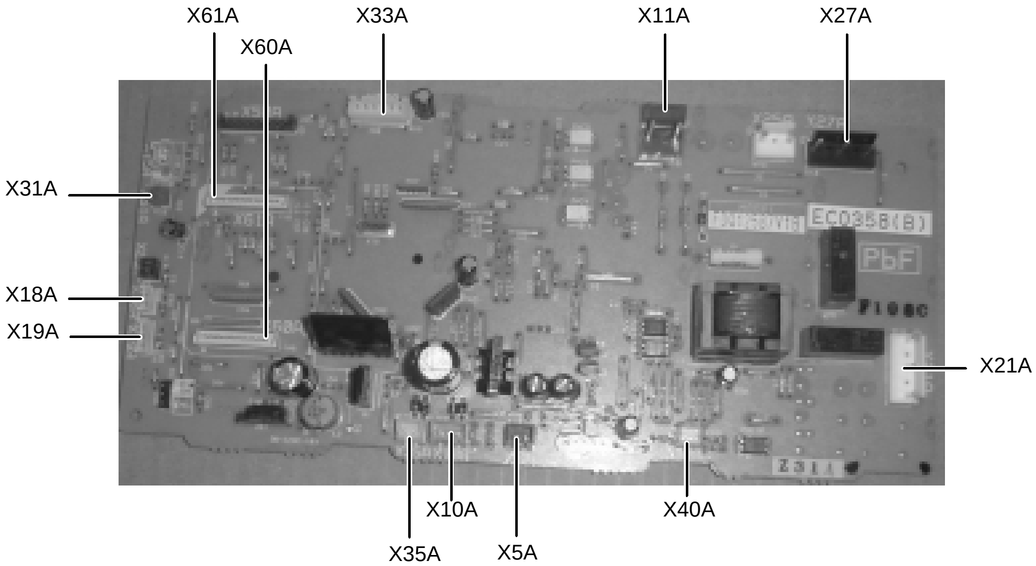
Connector	Connected to	Description
X5A	X1M	Terminal strip for P1/P2
X10A	T1R	Transformer secondary side
X11A	T1R	Transformer primary side
X15A	S1L	Float switch
X18A	R2T	Coil thermistor (liquid)
X19A	R1T	Air thermistor
X21A	M1F	Fan motor (power supply)
X25A	M1P	Drain pump motor
X27A	X2M	Power supply & communication
X33A	X1A on KRP1B	Connector for wiring adaptor KRP1B
X35A	X1A on KRP4	Connector to group control adaptor power supply (16VDC) for optional PCB KRP4
X40A	–	Connector for remote ON/OFF, Forced OFF
X60A	X1A on DTA112	Connection for interface adaptor
X61A	X2A on DTA112	Connection for interface adaptor

1

7.9 FDQ125B7V3B

PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

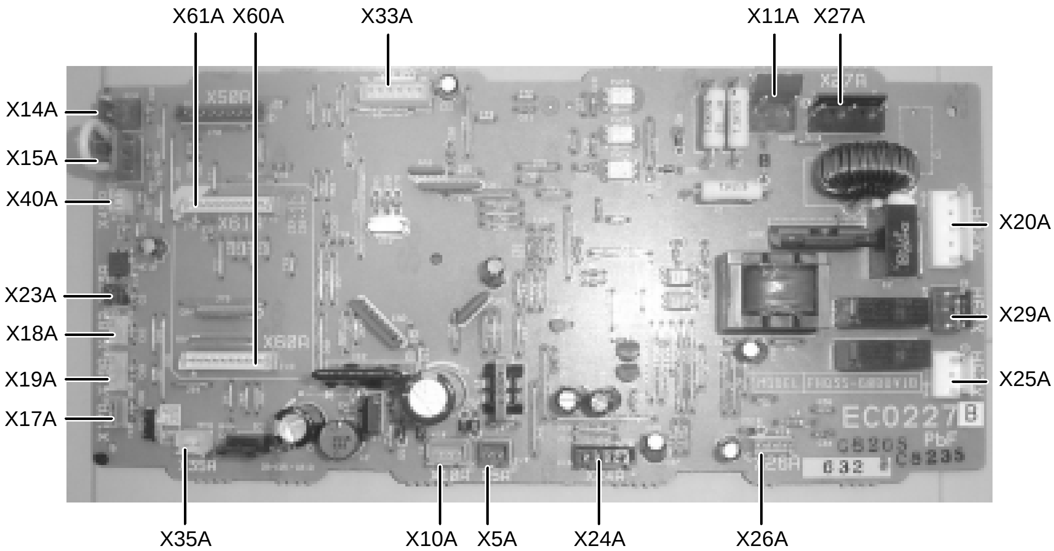
Connector	Connected to	Description
X5A	X1M	Terminal strip for P1/P2
X10A	T1R	Transformer secondary side
X11A	T1R	Transformer primary side
X18A	R2T	Coil thermistor (liquid)
X19A	R1T	Air thermistor
X21A	K1F	Magnetic contactor of fan motor
X27A	X2M	Power supply & communication
X31A	A3P	PCB
X33A	X1A on KRP1B	Connector for wiring adaptor KRP1B
X35A	X1A on KRP4	Connector to group control adaptor power supply (16VDC) for optional PCB KRP4
X40A	–	Connector for remote ON/OFF, Forced OFF
X60A	X1A on DTA112	Connection for interface adaptor
X61A	X2A on DTA112	Connection for interface adaptor

1

7.10 FHQ35~60BUV1

PCB

The illustration below shows the PCB connectors.



Connectors

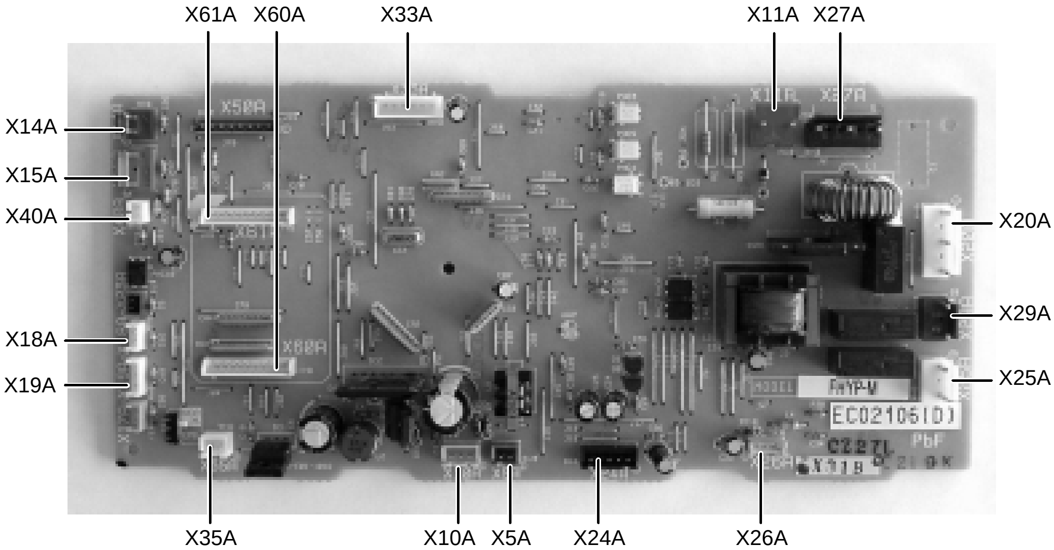
The table below describes the PCB connectors.

Connector	Connected to	Description
X5A	X1M	Terminal strip for P1/P2
X10A	T1R	Transformer secondary side
X11A	T1R	Transformer primary side
X14A	S1Q	Limit switch (Swing flap)
X15A	–	Connector for float switch. When installing the drain pump, remove the jumper connector of X15A and carry out the additional wiring for float switch and drain pump.
X17A	R3T	Coil thermistor (gas). Not used on 71~125 class.
X18A	R2T	Coil thermistor (liquid)
X19A	R1T	Air thermistor
X20A	M1F	Fan motor (power supply)
X24A	X2A on A3P	X24A is connected when the wireless remote control is used.
X25A	–	Drain pump (option)
X26A	M1F	Fan motor (feedback signal)
X27A	X2M	Power supply & communication
X29A	M1S	Swing flap motor
X33A	X1A on KRP1B	Connector for wiring adaptor KRP1B
X35A	X1A on KRP4	Connector to group control adaptor power supply (16VDC) for optional PCB KRP4
X40A	–	Connector for remote ON/OFF, Forced OFF
X60A	X1A on DTA112	Connection for interface adaptor
X61A	X2A on DTA112	Connection for interface adaptor

7.11 FHQ71~125BUV1B

PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

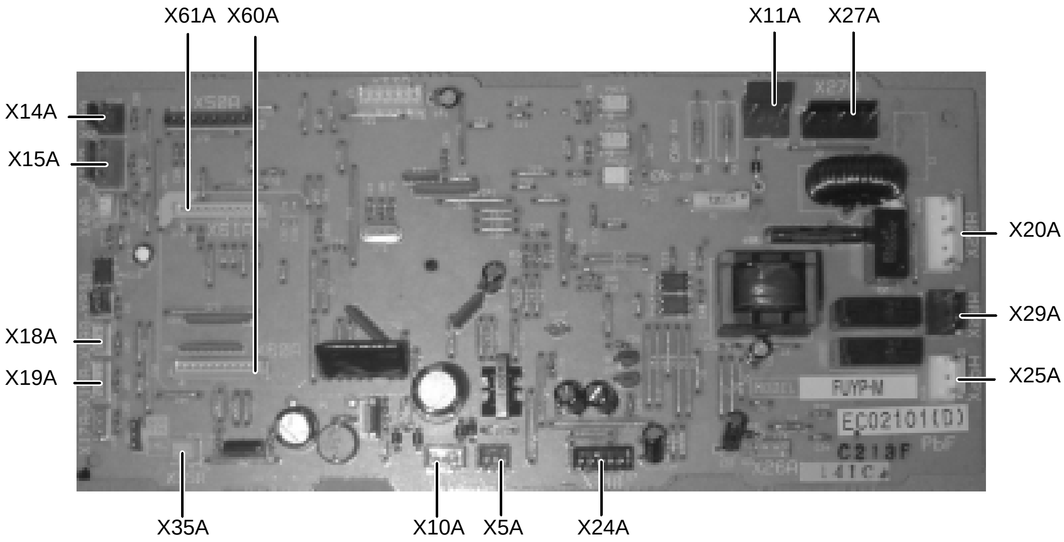
Connector	Connected to	Description
X5A	X1M	Terminal strip for P1/P2
X10A	T1R	Transformer secondary side
X11A	T1R	Transformer primary side
X14A	S1Q	Limit switch (Swing flap)
X15A	–	Connector for float switch. When installing the drain pump, remove the jumper connector of X15A and carry out the additional wiring for float switch and drain pump.
X18A	R2T	Coil thermistor (liquid)
X19A	R1T	Air thermistor
X20A	M1F	Fan motor (power supply)
X24A	X2A on A2P	X24A is connected when the wireless remote control is used.
X25A	–	Drain pump (option)
X26A	M1F	Fan motor (feedback signal)
X27A	X2M	Power supply & communication
X29A	M1S	Swing flap motor
X33A	X1A on KRP1B	Connector for wiring adaptor KRP1B
X35A	X1A on KRP4	Connector to group control adaptor power supply (16VDC) for optional PCB KRP4
X40A	–	Connector for remote ON/OFF, Forced OFF
X60A	X1A on DTA112	Connection for interface adaptor
X61A	X2A on DTA112	Connection for interface adaptor

1

7.12 FUQ71~125BUV1B

PCB

The illustration below shows the PCB connectors.



Connectors

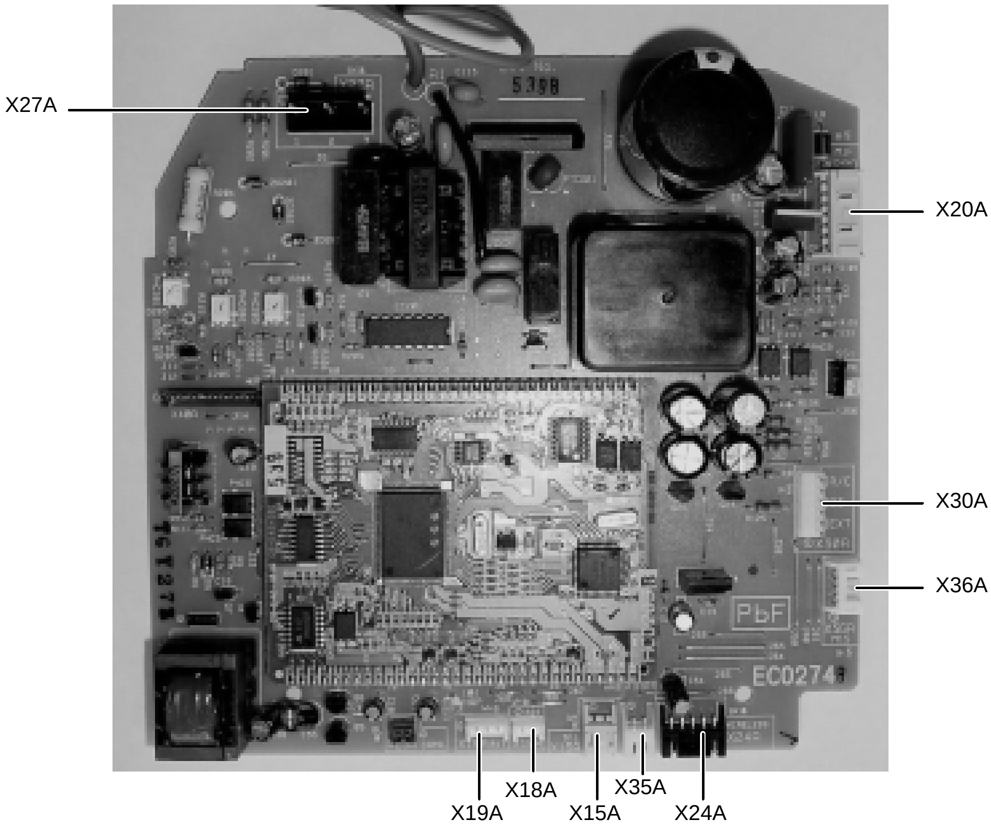
The table below describes the PCB connectors.

Connector	Connected to	Description
X5A	X1M	Terminal strip for P1/P2
X10A	T1R	Transformer secondary side
X11A	T1R	Transformer primary side
X14A	S1Q	Limit switch swing flap
X15A	S1L	Float switch
X18A	R2T	Coil thermistor (liquid)
X19A	R1T	Air thermistor
X20A	M1F	Fan motor (power supply)
X24A	X2A on A3P	X24A is connected when the wireless remote control is used.
X25A	M1P	Drain pump motor
X27A	X2M	Power supply & communication
X29A	M1S	Swing flap motor
X35A	X1A on KRP4	Connector to group control adaptor power supply (16 VDC) for optional PCB KRP4
X60A	X1A on DTA112	Connector for interface adaptor
X61A	X2A on DTA112	Connector for interface adaptor

7.13 FAQ71BUV1B

PCB

The illustration below shows the PCB connectors.



Connectors

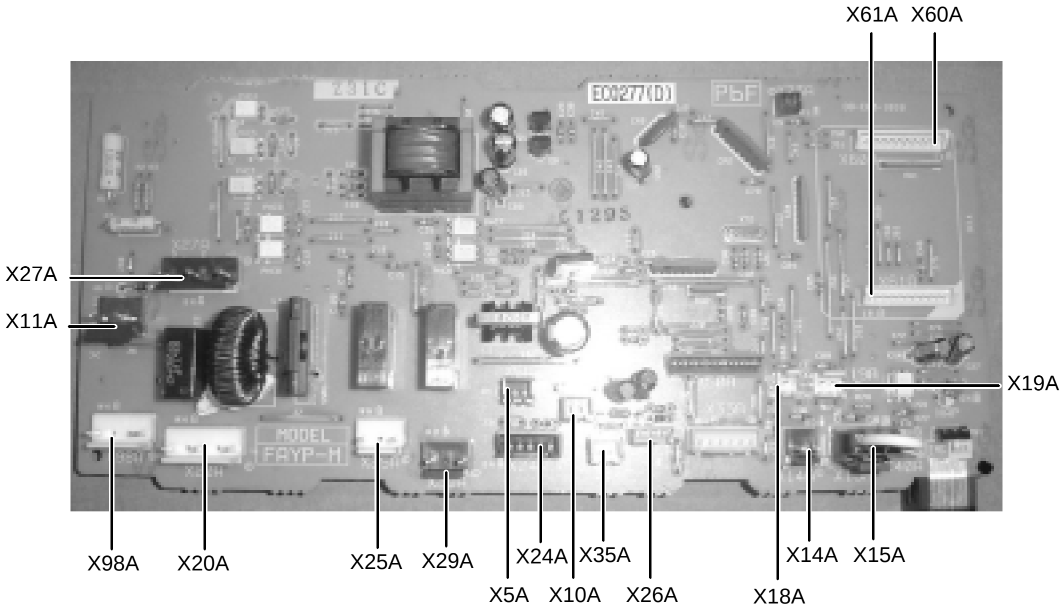
The table below describes the PCB connectors.

Connector	Connected to	Description
X15A		Connector float switch
X18A	R2T	Coil thermistor (liquid)
X19A	R1T	Air thermistor
X20A	M1F	Fan motor (power supply)
X24A	X2A on A2P	Infrared remote control connector
X27A	X2M	Power supply & communication
X30A	X1M	Terminal strip for P1/P2
X35A	X1A on KRP4	Connector to group control adaptor power supply (16 VDC) for optional PCB KRP4
X36A	M1S	Swing flap motor

7.14 FAQ100BUV1B

PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

Connector	Connected to	Description
X5A	X1M	Terminal strip for P1/P2
X10A	X2A on A2P	Transformer PCB (secondary side)
X11A	X1A on A2P	Transformer PCB (primary side)
X14A	S1Q	Limit switch swing flap
X15A		Connector float switch
X18A	R2T	Coil thermistor (liquid)
X19A	R1T	Air thermistor
X20A	M1F	Fan motor (power supply)
X24A	X2A on A3P	X24A is connected when the wireless remote control is used.
X25A	M1P	Drain pump motor
X26A	M1F	Fan motor(feedback signal)
X27A	X2M	Power supply & communication
X29A	M1S	Swing flap motor
X35A	X1A on KRP4	Connector to group control adaptor power supply (16 VDC) for optional PCB KRP4
X60A	X1A on DTA112	Connector for interface adaptor
X61A	X2A on DTA112	Connector for interface adaptor
X98A	C1	Capacitor for fan motor

Part 2
Functional Description

2

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

1 General Functionality

2

1.1 What Is in This Chapter?

Introduction

This chapter will explain all functions not related to the compressor frequency control, outdoor unit fan control and expansion valve control. These functions have been programmed to ensure the unit's reliability and lifetime, enable the operation in case of malfunction, or increase the customer's comfort.

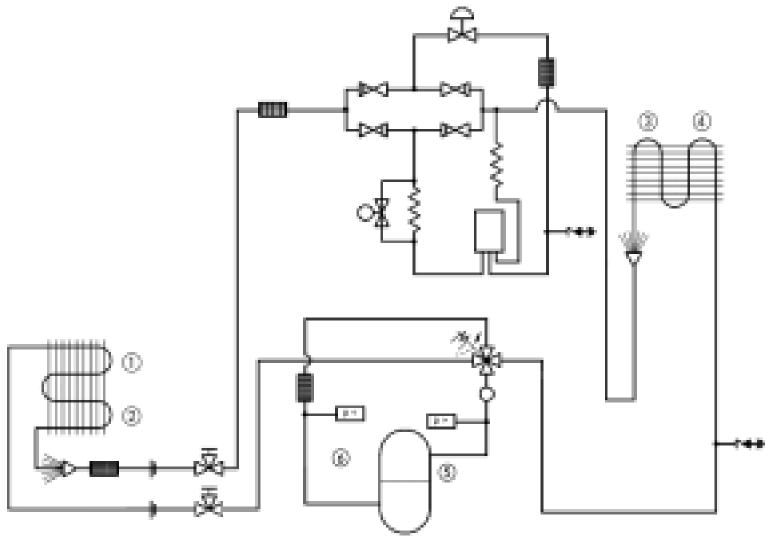
Overview

This chapter contains the following topics:

1.2 Functions of Thermistors

Locating the thermistors

.



Remark

Sensor R3T on indoor coil of FCQ35~60B7V1, FFQ35~60BV1, FBQ35~60B7V1 & FHQ35~60BUV1 is not used when the indoor units are connected to RZQ outdoor units.

Functions of the thermistors

Ther-mistor	Location	Wiring symbol	Mode	Function
1	Indoor heat exchanger	R2T	Cooling	■ Compressor frequency control (target Te) ■ Inverter current protection control ■ Freeze-up control
			Heating	■ Compressor frequency control (target Tc) ■ Inverter current protection control ■ Hot start control ■ Peak cut-off
2	Indoor air return	R1T	Cooling	■ Thermostat control ■ PMV control ■ General frequency control
			Heating	■ Thermostat control ■ PMV control ■ General frequency control
3	Outdoor heat exchanger	R2T	Cooling	■ Inverter current protection control
			Heating	■ Inverter current protection control ■ Defrost control

Ther-mistor	Location	Wiring symbol	Mode	Function
4	Outdoor ambient	R1T	Cooling	■ Outdoor fan speed control ■ PMV control ■ Pressure difference control ■ Overall current protection control ■ Preheating operation control (RZQ71)
			Heating	■ Defrost control ■ PMV control ■ Forced thermostat OFF ■ Overall current protection control ■ Preheating operation control (RZQ71)
5	Discharge pipe	R3T	Cooling	■ Discharge superheat control ■ Expansion valve control ■ Crankcase heater / preheating control
			Heating	■ Expansion valve control ■ Crankcase heater / preheating control
6	Suction pipe	R4T	Cooling	■ Expansion valve control (SH control)
			Heating	■ Expansion valve control (SH control) ■ Suction pipe superheat protection control
7	Inverter power module	R5T	Cooling	■ Outdoor fan speed control ■ Inverter fin temperature control ■ Pressure difference control
			Heating	■ Inverter fin temperature control

2

1.3 Forced Operating Mode (Emergency Operation)

Purpose

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

If...	Then...
■ R/C is defective ■ Indoor PCB is defective ■ Outdoor PCB is defective	Forced operating mode can be used to go to cooling or heating. In forced operating mode, the compressor is forced to operate until the defective indoor or outdoor PCB is back online.

Starting conditions

You can operate the system manually by changing the emergency switch on the indoor and outdoor PCB from "normal" to "emergency". When the system is operating in "emergency" it can not control the room temperature.

Both the indoor and outdoor unit must be set to "emergency" while the power is off.

Ending conditions

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

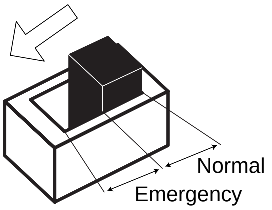
Emergency operation

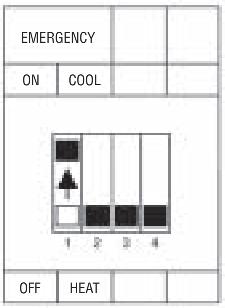
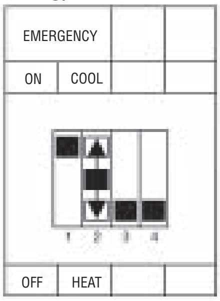
Below table explains what will happen when the switch is set to "emergency":

Changing the switch to "emergency" for the…	Switches ON the…
Indoor unit	■ Indoor fan§ ■ Drain pump
Outdoor unit	■ Compressor§ ■ Outdoor fan(s)

How to set Emergency Operation

To set emergency operation, proceed as follows:

Step	Action
1	Turn OFF the power.
2	Switch ON the emergency switch (SS1) on the indoor PCB. 

Step	Action
3	Switch ON the emergency switch on the outdoor PCB. 
4	Set the emergency switch on the outdoor PCB to the forced mode you prefer (Cooling or Heating). 
5	Turn ON the power supply.

Active components

Component	Forced cooling	Forced heating	Forced defrosting
Compressor	ON	ON	ON
4-way valve	OFF	ON	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

- During emergency operation, do not attempt to operate the equipment from the remote control. The remote control shows "88" while the emergency operation is active on the indoor unit
- If a safety device is activated during emergency, all actuators are turned OFF
- In cooling, the unit runs for 20min and then stops for 10min in order to avoid freeze-up of the indoor coil.
- In heating, defrost is activated for 3 minutes once every hour.
- Emergency operation can not be carried out when the PCB board itself is defective.
- Be sure to set the emergency switch on both the outdoor and indoor unit.
- The unit will not regulate the temperature during emergency operation.
- Change the position of the emergency switch only when the power is turned off.

2

1.4 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 type of connected outdoor unit (c/o or h/p).

Operating modes

The possible operating modes are:

Outdoor unit	Operating modes
h/p	■ Fan ■ Cooling ■ Dry keep ■ Heating
c/o	■ 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

1.5 Simulated Operation Function

Outline

When a malfunction on one of the below thermistors occurs, operation will continue while displaying the applicable alarm on the remote-control. Fin thermistor malfunction is only displayed when pressing the "Inspection" button on the remote-control.

Sensors

- Outside temperature thermistor
- Outdoor heat exchanger thermistor
- Fin thermistor
- Discharge pipe thermistor
- Indoor unit air suction thermistor
- Indoor heat exchanger thermistor

Remark

Simulated operation will not be conducted in case the low pressure sensor or suction thermistor is malfunctioning.

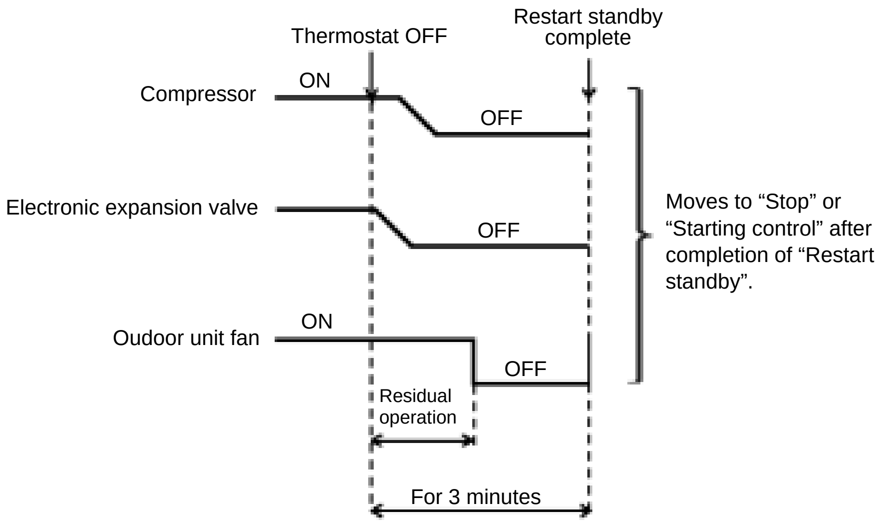
1.6 Restart Standby

Outline

To prevent the compressor from frequently turning ON and OFF and allow pressure equalization, forced thermostat OFF will be conducted for 3 minutes after compressor stopping (compressor guard timer).

2

Graph



1.7 Automatic Restart

Purpose

The purpose of the auto-restart function is to automatically resume the same operating mode as when the unit was operating when the power supply is restored after a power failure.

Do not use the "Automatic Restart" function to daily start/stop the unit.

Precautions when turning OFF power

- When you have to turn OFF the power supply in order to carry out maintenance, make sure to turn the remote control's ON/OFF switch OFF firstly.
- If you turn OFF the power supply while the remote control's ON/OFF switch is still ON, the "automatic restart function" automatically starts the indoor fan immediately and the outdoor unit fan starts automatically 3 minutes after the power supply is turned back ON.
- Do not start/stop the unit by disconnecting the power supply.Stop the unit by stop commando from the remote control or optional control before disconnecting the power supply. Be sure that the compressor and the outdoor fans are stopped before disconnecting the power supply so the "Refrigerant Recovery function" has been finished correctly.
- When restarting the unit after the power was disconnected for a longer period leave the unit OFF with the power supply connected for about half an hour (See "Crankcase Heater Control" & "Preheating Operation Control").

1.8 Using Conditions for Remote Control Thermostat

Applicable

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

Method

Unlike with VRV units, the remote control sensor is standard disabled for sky-air units. The use of the remote control sensor can be enabled by changing field setting 10(20)-2-02 to 10(20)-2-01.

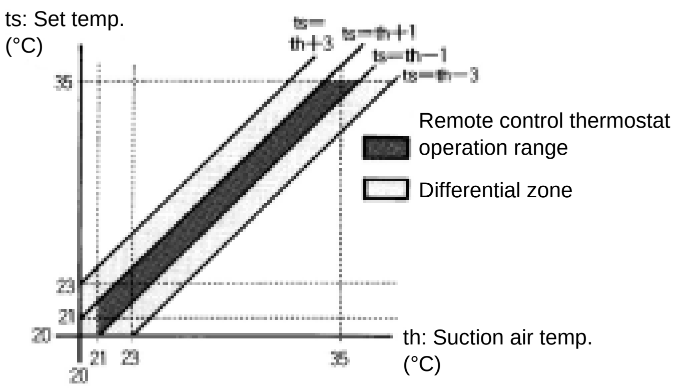
Conditions

The table below contains the condition in which the remote control thermostat is not used:

Condition	The remote control thermostat is not used when...
1	The remote control thermostat malfunctions.
2	Group control is used.
3	The set temperature / air suction temperature combination is out of range. (See below graph)

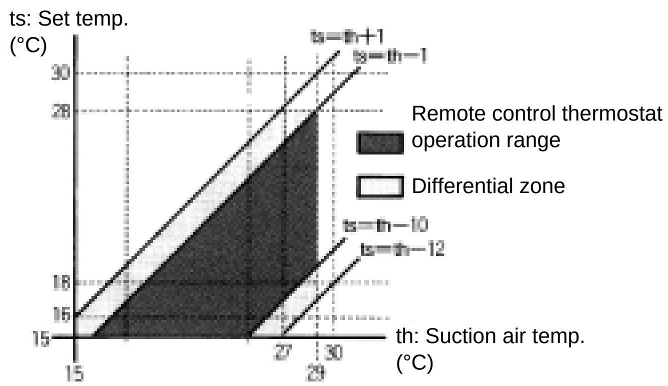
Cooling

The diagram below shows the operation range of the set temperature / air suction temperature combination in cooling operation:



Heating

The diagram below shows the operation range of the set temperature / air suction temperature combination in heating operation:



1.9 Forced Thermostat OFF

Outline

The unit will perform the forced thermostat off function in following conditions:

Condition 1 (cooling)

Thermostat off due to freeze-up prevention.

Prevent the indoor unit heat exchanger from freezing in cooling operation when one of the below conditions is applicable:

- Indoor unit heat exchanger temperature < -5°C for 1 minute continuously.
- Indoor unit heat exchanger temperature < -1°C for 40 minutes accumulated.

Condition 2 (heating)

Thermostat off due to high outdoor temperature.

When the outside temperature is > 30°CDB in heating mode, the unit will conduct a forced thermostat off operation to protect the system.

Reference

"Freeze Prevention Function". Refer to page 2-20.

1.10 Test run control

Purpose

When operating the RZQ units for the first time after installation, the unit will - depending on the selected operation mode - perform a test run operation first.

Situation 1

Cooling - first operation after installation in "Cooling mode"

Cooling thermostat ON	→	Cooling operation in "Test run mode" for 3 minutes	→	Normal cooling operation

Situation 2

Cooling - first operation after installation in "Test run mode"

Cooling Operation by Test run button	→	Cooling operation in "Test run mode" for 3 minutes	→	Cooling operation in forced thermostat ON.

Situation 3

Heating - first operation after installation in "Heating mode"

Heating thermostat ON	—	Cooling operation in test run mode for 3 minutes	→	Normal heating operation

Situation 4

Heating - first operation after installation in "Test run mode"

Heating Operation by Test run button	—	Cooling operation in test run mode for 3 minutes	→	Heating operation in forced thermostat ON.

Remarks

- When running in test run mode, the unit will sense on site installation parameters (e.g.: failure to open stop valves,..) and indicate the applicable malfunction code if required.
- If the remote control shows E3, E4 or L8 as an error code, there is possibility that either the stop valve is closed or the air flow outlet is obstructed.
- Check the inter unit branch wiring connection (1-2-3 wiring) when the error code U4 or UF is displayed on the remote control.
- This "Test Run Control" function is only performed after first power on at installation or after first power on after a pump down by using the pump down switch is.

1.11 4-way Valve Control

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 a certain 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

2

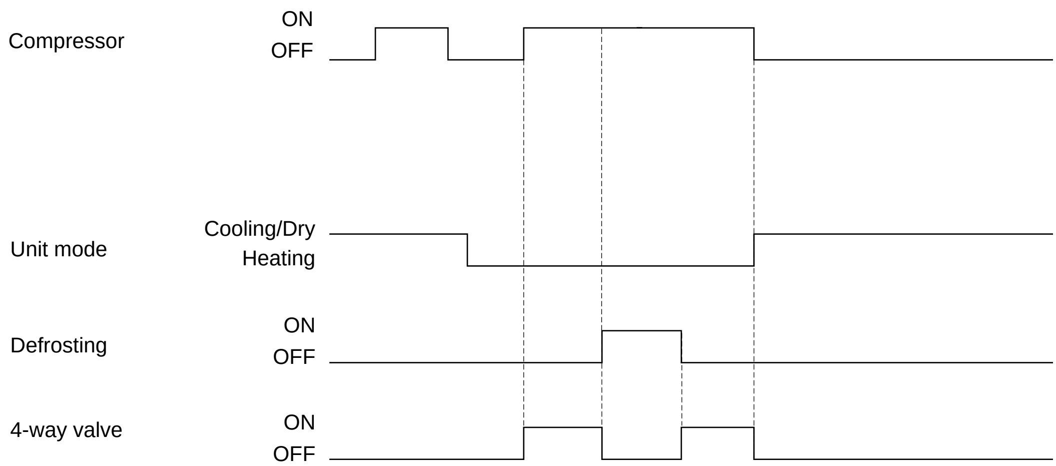
Method

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

In...	The 4-way valve is...
Heating, except for defrosting	ON
■ Cooling ■ Dry keep ■ Defrosting	OFF

Time chart

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



1.12 Pump Down Residual Operation

Outline

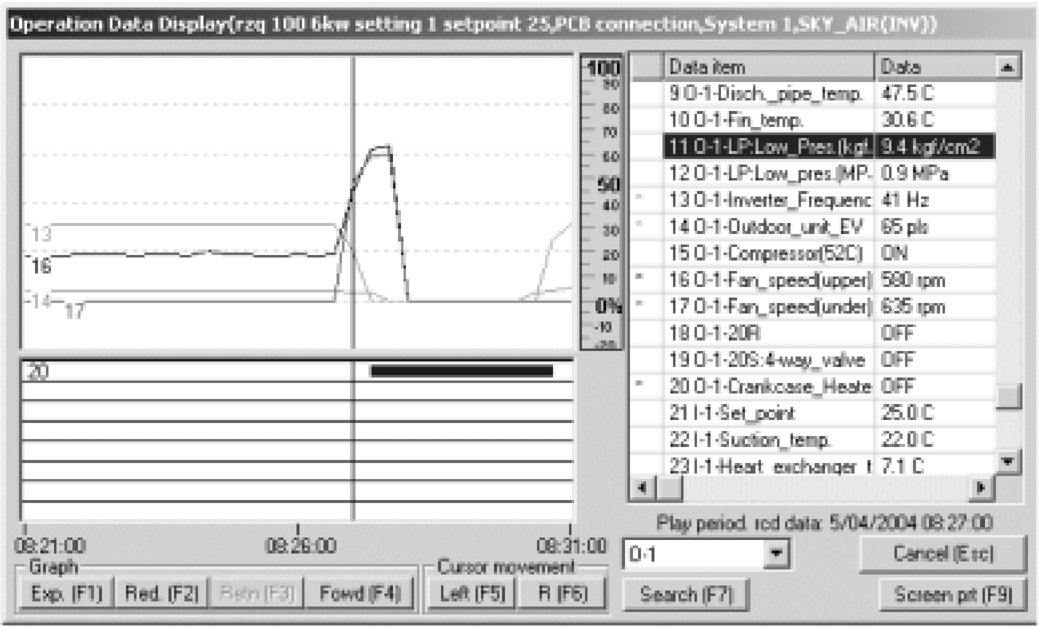
The unit will conduct a pump down residual operation after each compressor stop command.

Purpose of this function is to collect the refrigerant in the liquid receiver and outdoor heat exchanger in order to prevent liquid refrigerant from remaining in the indoor heat exchanger.

Parameters

	RZQ71B	RZQ100~125B
Compressor	38 Hz	41 HZ
Expansion valve	85 to 0 pulses (after 20 seconds)	

Graph



Ending condition

- 30 seconds have elapsed since start of residual operation

  OR

- LP < 1 bar (in cooling)
- LP < 0.2 bar (in heating)

1.13 Pump Down Operation

Outline

Whenever the units need to be moved or removed, perform a pump-down operation before disconnecting the field piping. By performing a pump-down operation, all of the refrigerant will be collected in the outdoor unit.

Procedure

Procedure		Precautions
1	Start "Fan only operation" from the remote control.	Confirm that both the liquid and gas stop valves are open.
2	Push the pump-down button BS1 on the outdoor PCB.	Compressor and outdoor fan will start automatically.
3	Once the operation stops (after 3~5 minutes) close the liquid gas stop valve first and then the gas stop valve.	
	After the "Pump Down Operation" has been finished the wired remote control screen may be blank or show "U4" error indication.It will not be able to start the unit from the remote control without switching OFF the power supply first.	Make sure the stop valves are opened before restarting the unit.

Cautions

- Pressing the pump down switch (BS1) on the outdoor PCB may cause the outdoor and indoor fan to start operating automatically.
- Be sure to open the stop valves after the pipe work has been finished. Be sure not to operate the unit with closed stop valves, or the compressor may brake down.

2

1.14 Defrost Operation

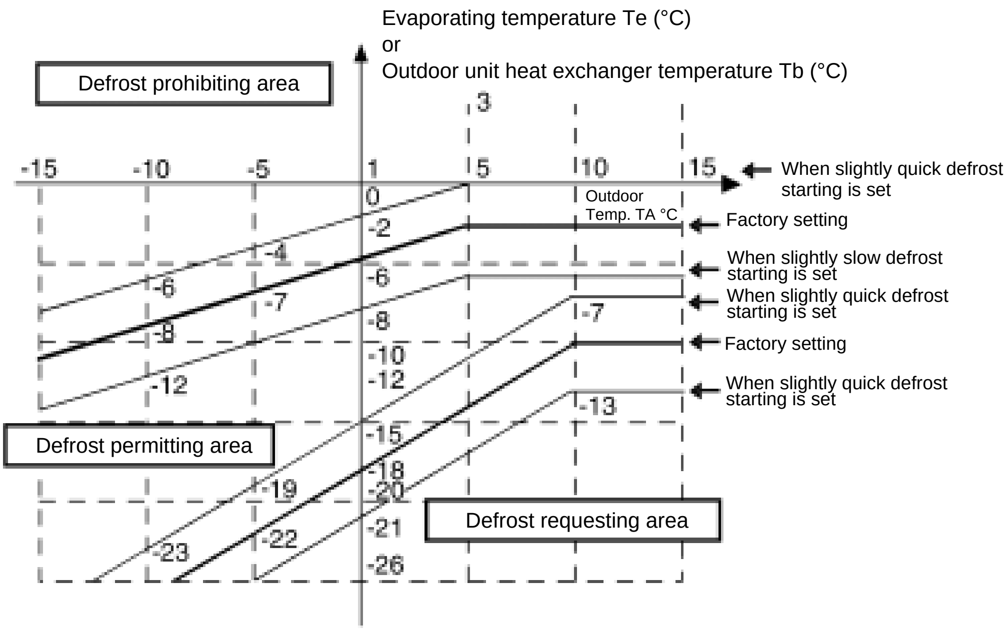
Outline

When the unit is operating in heating mode, a defrost operation will be conducted in order to avoid ice formation on the outdoor unit heat exchanger.

Defrost starting conditions

Defrost will start when the following conditions have been realized:

& {
- Integrated compressor running time is 25 minutes or more since the completion of the previous defrost operation.
- OR {
  - Defrost upper limit time A is met.
  - Low pressure saturated temperature (Te) is within the defrost requesting area.
  - Outdoor unit heat exchanger area temperature (Tb) is within the defrost requesting area.

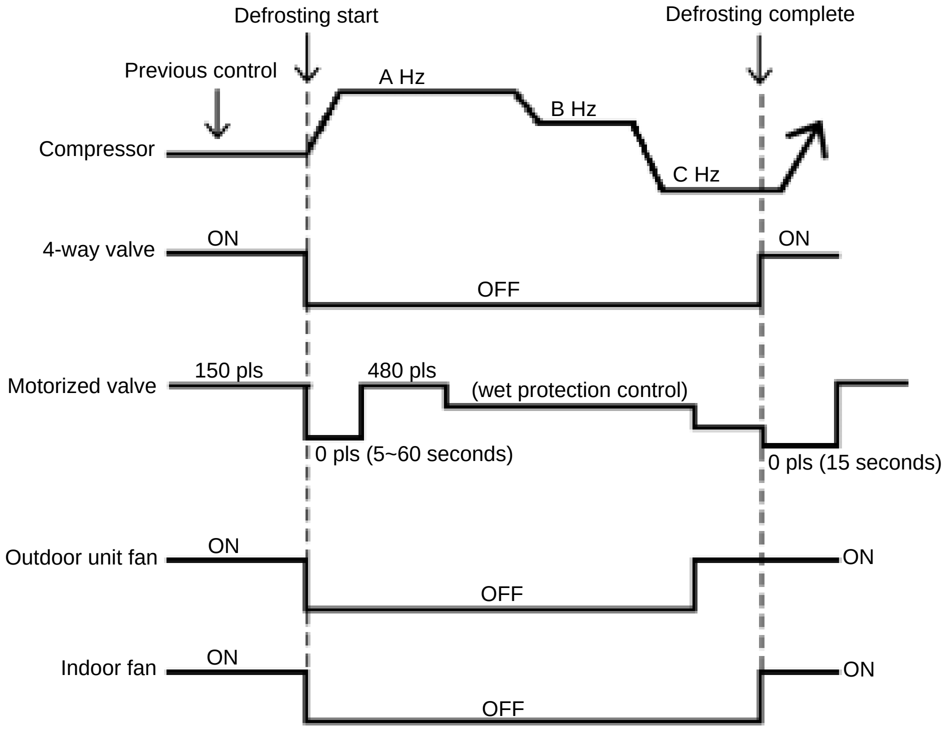


Areas

Defrost upper limit A

	When quick defrost starting is set 16(26)-3-03	Factory setting 16(26)-3-01	When slow defrost starting is set 16(26)-3-02
Outdoor temperature > -5°C	40 minutes	3 hours	6 hours
Outdoor temperature ≤ -5°C	40 minutes	6 hours	8 hours

Defrost control



	RZQ71	RZQ100&125
A Hz	162 Hz	174 Hz
B Hz	122 Hz	164 Hz
C Hz	48 Hz	72 Hz

Defrost ending condition

The defrost cycle will be ended when one of the following conditions have been reached minimum 1 minute after defrost start :

- Outdoor unit heat exchanger temperature ≥ 10°C
- High pressure ≥ 24.5 bar (calculated from LP, inv frequency and PI)
- 10 minutes have elapsed since start of defrost operation

1.15 Freeze Prevention Function

Purpose

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

2

Freeze Prevention start conditions

Freeze prevention start decided by the indoor unit (factory setting):

OR
- Indoor coil temperature ≤ -1°C for 40 minutes accumulated
- &
  - Indoor coil temperature < A°C for 1 minute continuous
  - Compressor is running for minimum 8 minutes since operation start or end of previous freeze up cycle.

Freeze Prevention stop conditions

Freeze prevention stop decided by the indoor unit (factory setting):

- Indoor coil temperature > 7°C for 10 minutes continuous

Parameters

	FAQ	FHQ	All except FAQ & FHQ
A	-1°C	-3°C	-5°C

Reference

Please refer to "Outdoor Field Settings" in Part 4 "Commissioning and Test Run" for details on possible use of EDP room settings in case of low latent heat applications. (See page 4-23)

1.16 PMV Control

Outline

When the automatic mode is selected on the remote-control, the unit will automatically activate the PMV control.

The PMV index is a calculated average comfort level.

Refer to ISO 7730 for details.

Function

An optimized indoor temperature will be calculated using the following inputs:

- Outdoor air temperature
- Indoor air temperature
- Remote control set temperature

In practice, the set point will be moved with 1 or 2 degrees whenever the conditions change. This will result in a combination of power saving and increased comfort level.

PMV control can be disabled by changing the field settings:
From: 11(21)-4-01 to: 11(21)-4-02

2

1.17 Preheating Operation Control

Applicable units

RZQ71

Outline

After the compressor has been turned off, the preheating operation will be activated in order to avoid refrigerant from dissolving in the compressor oil.

Trigger conditions

Starting conditions &

- or
  - Power supply ON to First operation
  - 60 minutes or more elapsed after compressor stop
- T2 (Discharge pipe temperature) < 40°C
- Ta (Outside temperature) < 40°C

Ending conditions or

- T2 (Discharge pipe temperature) > 43°C
- Ta (Outside temperature) > 43°C
- Thermostat ON confirmation

1.18 Crankcase Heater Control

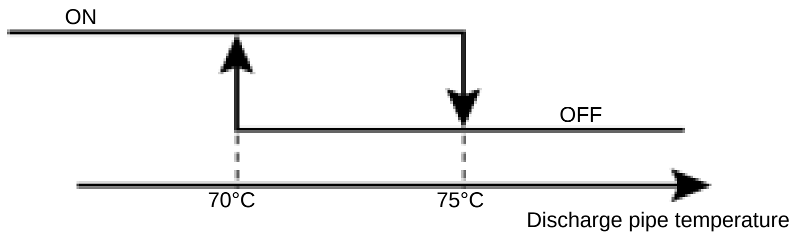
Applicable units

RZQ100 & 125

Outline

After the compressor has been turned off, the crankcase heater control will be activated in order to avoid refrigerant from dissolving in the compressor oil.

Trigger conditions



2 Indoor Unit Functional Concept

2.1 What Is in This Chapter?

Introduction

This chapter will explain more details about the various functions that are programmed for the Sky-Air R410A inverter indoor units.

Overview

This chapter contains the following topics:

2

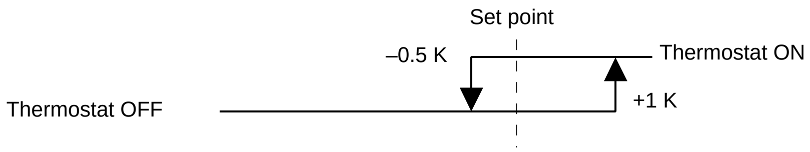
2.2 Thermostat Control

Purpose

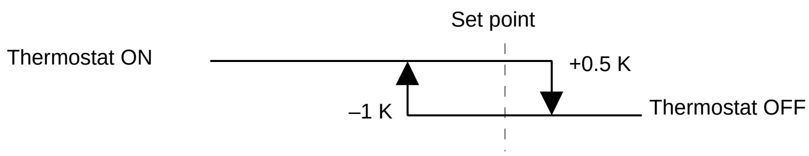
Based on the information received from the air return sensor, the thermostat control will decide the required operation status of the system.

Thermostat control

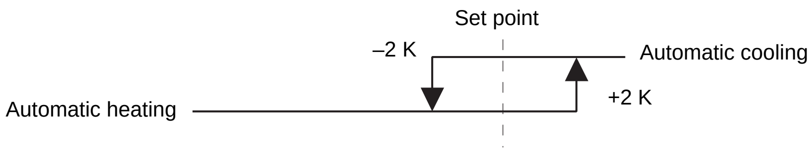
Cooling mode:



Heating mode:



Cool / heat changeover in automatic mode:



Preventing thermostat OFF conditions

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

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

Remark:

The thermostat control will be changed when using field settings for low humidity applications, setting 16(26)-2-03 & 16(26)-2-04.

See "Part 4–Commissioning and Test Run" for details.

2.3 Drain Pump Control

Purpose

Control the water draining from the drain pan.

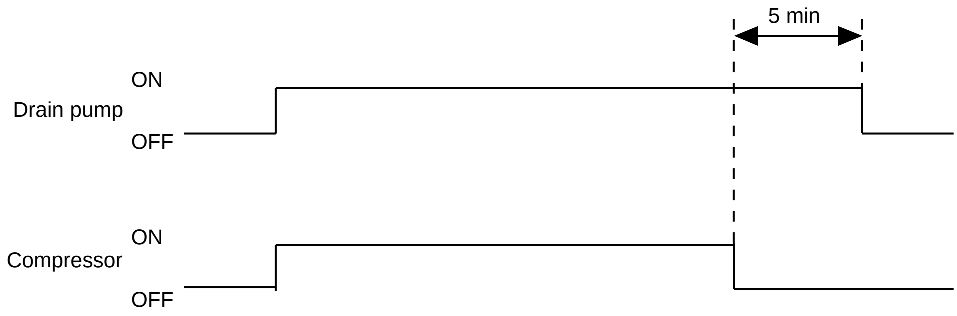
Starting conditions

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

- Cooling operation is activated
- Abnormal high water level is detected in the drain pan

Normal control

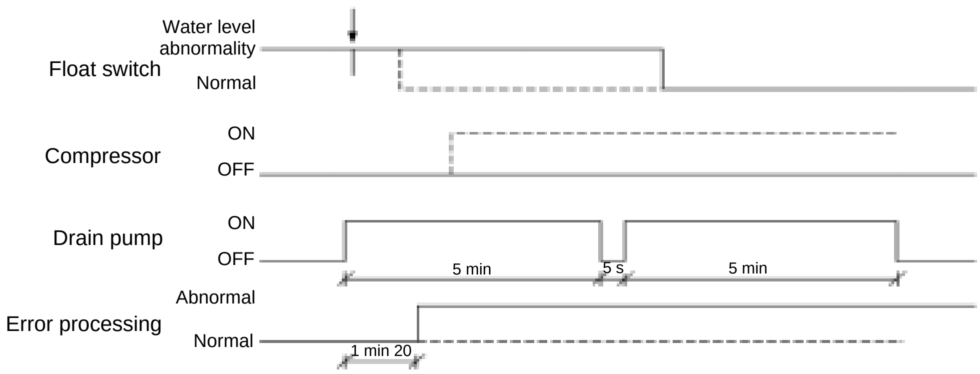
In normal control, the drain pump is turned ON at compressor starting and turned OFF 5 minutes after the compressor has stopped (residual operation).



Float switch activation during thermostat OFF

When an abnormal drain level is detected in the drain pan, the float switch opens:

1. The thermostat stays forced OFF.
2. The drain pump starts to operate for minimum 10 minutes (even if abnormality is solved within the 10 minutes).
3. If the float switch closes again within 80 seconds, cooling operation can restart within the 10 minutes recovery period.



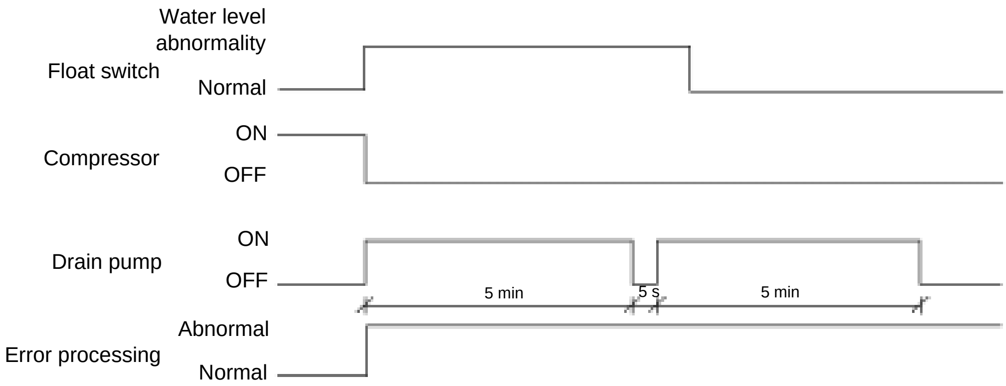
2

Float switch activation during thermostat ON

1 The thermostat is immediately turned OFF.

2 The drain pump continues to operate for minimum 10 minutes (even if abnormality is solved within the 10 minutes).

3 If the float switch closes again within 80 seconds, cooling operation can restart within the 10 minutes recovery period.



Used inputs

Input	Connection on indoor PCB	Connection on outdoor PCB
Float switch (33H)	X15A	—

2.4 Condensation Avoidance Control

Purpose

Avoid condensation on the swing flap when the most downward position of the swing flap (position 4) is selected on the remote control.

Applicable units

This function is applicable for the FHQ units only.

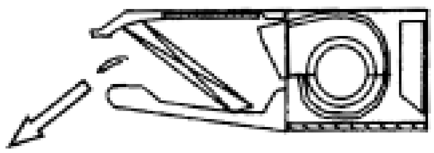
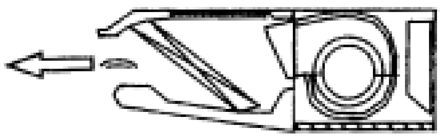
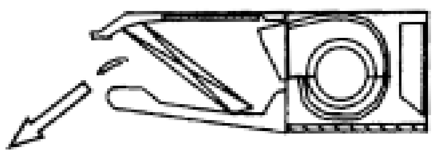
Method

The condensation avoidance control will function in the following operating modes:

- Cooling (automatic)
- Dry keep.

Method

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

Stage	Description
1	The fan operates in cooling mode with the blade in downward position (set on the remote control). 
2	After 30 min, the blade moves to a horizontal position. 
3	After 1 h operation in horizontal position, the blade moves back to its downward position for 30 min. 
4	The unit operation is reset by: ■ Changing the operating mode into “heating” or “fan” ■ Changing the air flow direction ■ Turning the unit operation OFF and ON.

2

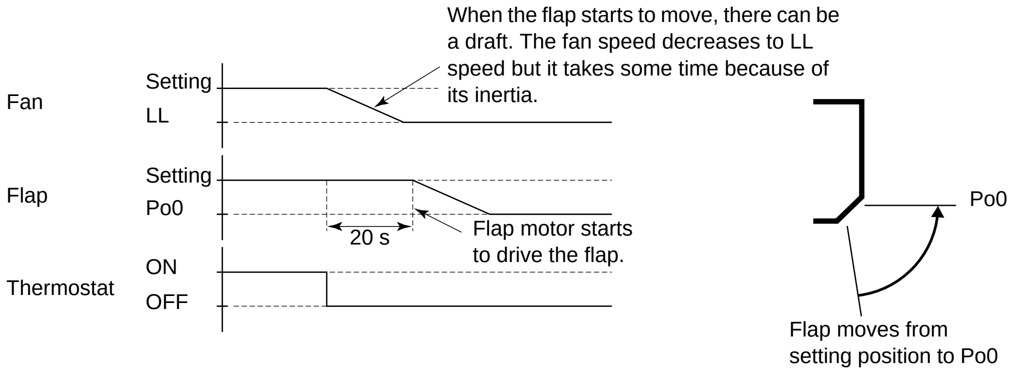
2.5 Draft Avoidance Control 1

Purpose

Avoid draft for the customer by delaying transfer of the flap to the Po0 (horizontal) position for a certain amount of time when defrosting and in heating thermostat OFF.

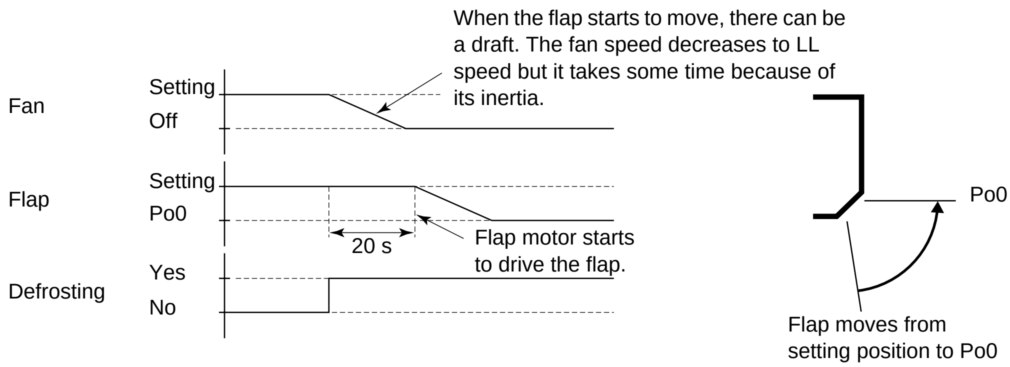
Heating thermostat OFF

The time chart below illustrates the draft avoidance control 1 in heating 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 (defrost control)	—	R2T

2.6 Draft Avoidance Control 2

Purpose

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

Starting conditions

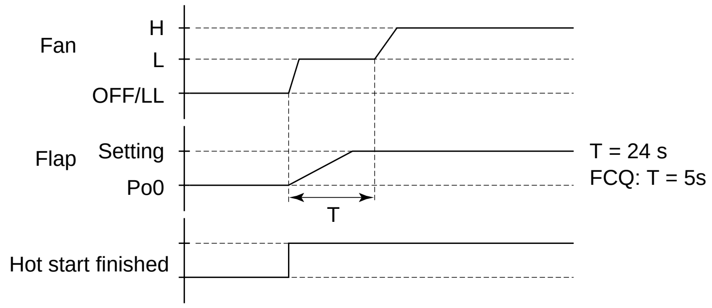
The draft avoidance control 2 is activated when:

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

2

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	—

2.7 Fan and Flap Operations

Cooling operation

The table below contains the fan and flap operations.

Function	In…	Fan	Flap (FCQ and FHQ)	Flap (FAQ)	Remote control indication
Thermostat ON in Dry Keep Mode	Swing operation	L	Swing	Swing	Swing
	Airflow direction setting		Set position	Set position	Set position
Thermostat OFF in Dry Keep Mode	Swing operation	OFF	Horizontal	Horizontal	Swing
	Airflow direction setting		Set position	Set position	Set position
Thermostat OFF in Cooling Mode	Swing operation	Set	Horizontal	Horizontal	Swing
	Airflow direction setting		Set position	Set position	Set position
Stop (Error)	Swing operation	OFF	Horizontal	Downward	---
	Airflow direction setting		Set position	Downward	
Freeze-prevention	Swing operation	OFF(*)	Horizontal	Horizontal	Swing
	Airflow direction setting		Set position	Set position	Set position

(*) LL operation on cassette type units

Heating operation

The table below contains the fan and flap operations.

Function	In…	Fan	Flap (FCQ and FHQ)	Flap (FAQ)	Remote control indication
Hot start after defrost	Swing operation	OFF	Horizontal	Horizontal	Swing
	Airflow direction setting				Set position
Defrost	Swing operation				Swing
	Airflow direction setting				Set position
Thermostat OFF	Swing operation	LL			Swing
	Airflow direction setting				Set position
Hot start after thermostat OFF (cold air prevention)	Swing operation				Swing
	Airflow direction setting				Set position
Stop (error)	Swing operation	OFF		Fully closed (horizontal)	---
	Airflow direction setting			Fully closed	
Overload thermostat OFF	Swing operation	LL		Horizontal	Swing
	Airflow direction setting				Set position

2

2.8 Indoor unit fan control

Outline

During compressor start and stop control, the indoor fan will receive instruction from the outdoor unit in order to protect the compressor from receiving liquid and to assure a smooth compressor start up:

- Indoor fan control before compressor stop
- Indoor fan control during compressor stop
- Indoor fan control before compressor startup
- Indoor fan control at compressor startup

Before compressor stop

After thermostat off or remote-control signal off has been sent from the outdoor unit to the indoor unit, the compressor will keep on running for a period of time in order to execute the "residual pump down operation". During this pump down operation, the indoor fan will keep on operating.

Purpose:

- Cooling: Minimize the remaining refrigerant amount in indoor unit heat exchanger
- Heating: Lower the high pressure by avoiding high temperature build up around the indoor unit heat exchanger.

		Indoor fan tap
Indoor cooling / Automatic cooling	Thermostat OFF	L
	Remote control OFF	LL
Indoor heating / Automatic heating	Thermostat OFF	LL
	Remote control OFF	LL
Indoor drying	Thermostat OFF	LL
	Remote conntrolle OFF	LL

During compressor stop

		Indoor fan tap
Indoor cooling / Automatic cooling	Thermostat OFF	Remote control setting
	Remote control OFF	OFF
Indoor heating / Automatic heating	Thermostat OFF	LL
	Remote control OFF	OFF
Indoor drying	Thermostat OFF	OFF
	Remote control OFF	OFF

Before compressor startup

	Indoor fan tap
Indoor cooling / Automatic cooling	Remote control setting
Indoor heating / Automatic heating	OFF
Indoor drying	L

At compressor startup

- In cooling: The indoor fan is operated at low speed until the low-pressure value reaches 6 bar.
- In heating: Hot startup controlWhen performing a startup, or after the defrosting cycle has been completed, the indoor fan will be controlled as to prevent cold air draft and secure the starting performance (quick pressure build-up).

Indoor unit fan: OFF

↓ Heating operation is turend on with remote control.

Indoor unit fan: LL tap

↓ Condition A is met.

Indoor unit fan: L tap

↓ Condition B is met.

Indoor unit fan: M tap (Continuing L tap on indoor unit without M tap equipped)

↓ Condition C is met.

Indoor unit fan: Set fan speed

	Condition A	Condition B	Condition C
Indoor unit h/e temp > 34°C	O	O	O
Indoor unit h/e temp > indoor suction air temp +17°C (+12°C if outside temperature is < 5°C)	O	O	---
Indoor unit h/e temp > indoor suction air temp +22°C (+20°C if outside temperature is < 5°C)	---	---	O
3 minutes elapsed after compressor startup	O	---	---
5.5 minutes elapsed after compressor startup	---	O	---
10.5 minutes elapsed after compressor startup	---	---	O

3 Outdoor Unit Functional Concept

3.1 What Is in This Chapter?

Introduction

This chapter will explain more details about the various functions that are programmed for the sky-air R410A inverter outdoor units.

Overview

This chapter contains the following topics:

2

3.2 Function Outline

Introduction

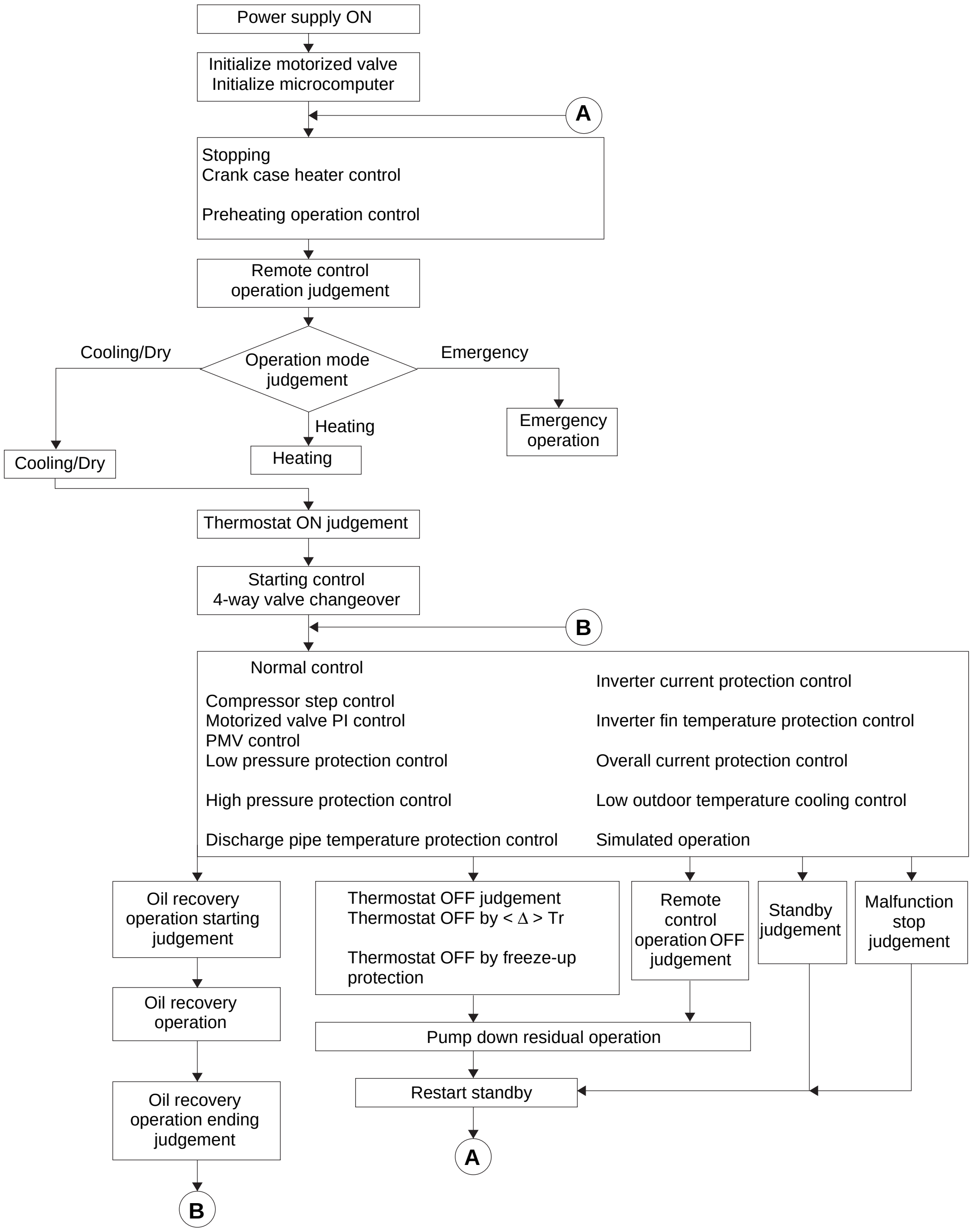
This chapter will show an overview of all applicable functions in cooling and heating mode.

Content

3.2.1 Function Outline in Cooling Mode

Flow chart

Cooling/Dry operation

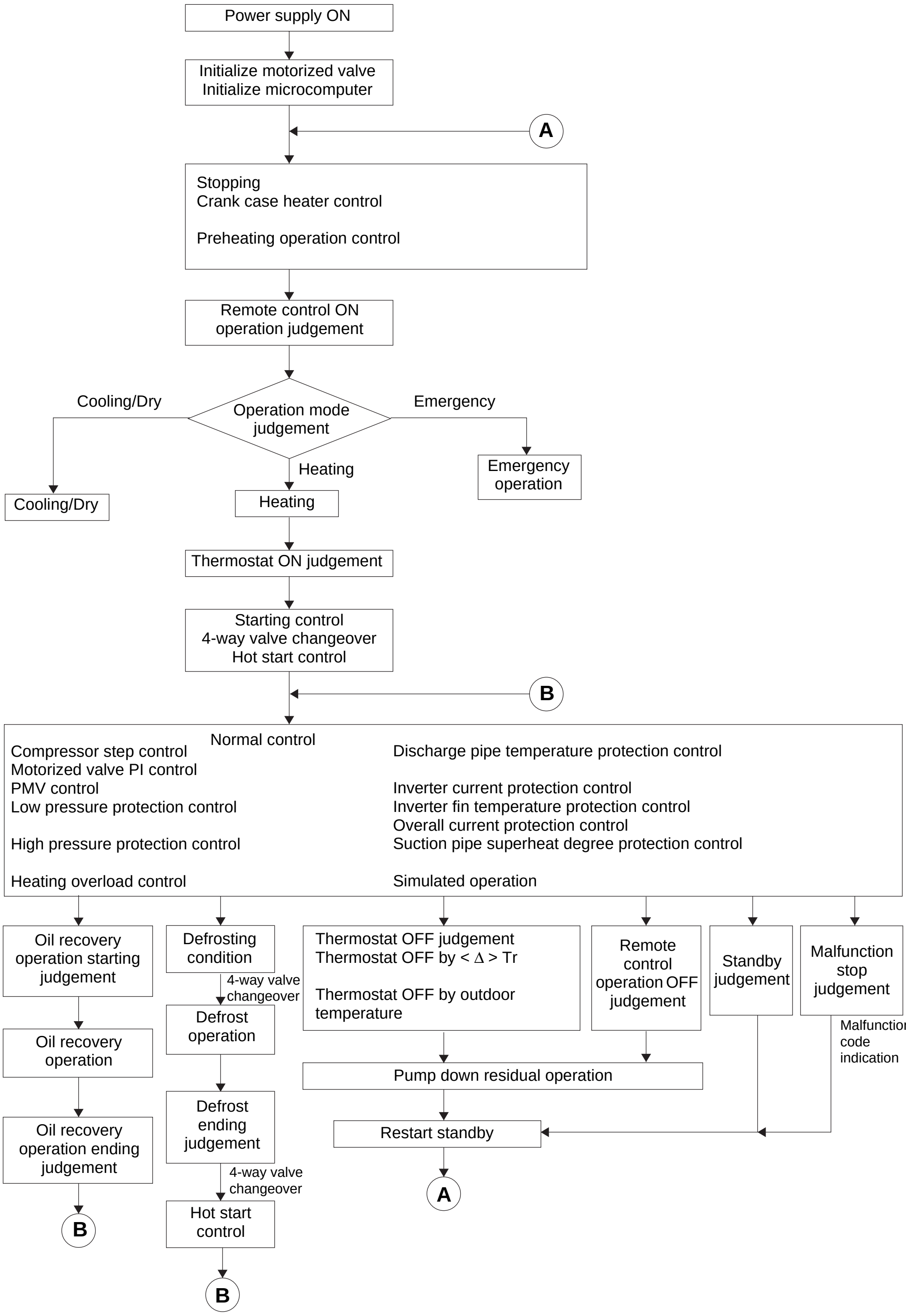


2

3.2.2 Function Outline in Heating Mode

Flow chart

Heating operation



3.3 Frequency Regulating Functions

Introduction

One of the main functions of the μ-control will be the control of the compressor frequency. The next chapter will explain how the compressor frequency is determined.

Content

2

3.3.1 Starting Frequency Control

Outline

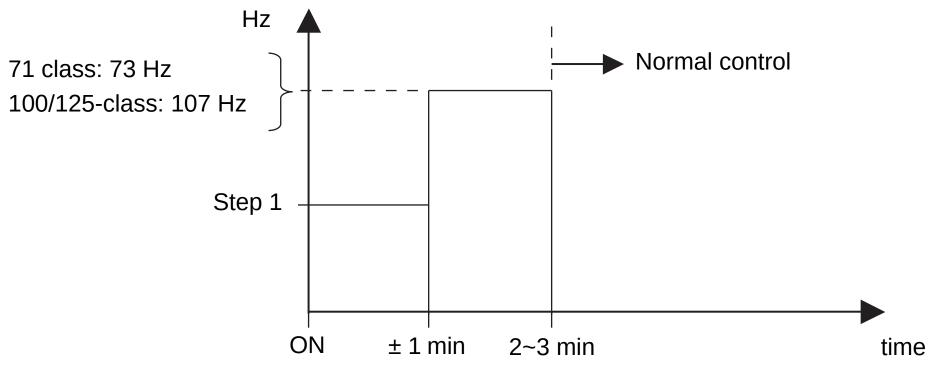
The inverter compressor will start up with a limited fixed frequency value for a specified period of time in order to prevent liquid back to the compressor, and to limit the starting current.

General

The normal starting control time is 2~3 minutes. The maximum starting frequency control time is limited to 10 minutes.

During compressor start-up, a pressure difference will be build up in order to have sufficient pressure difference for the 4-way valve to change over.

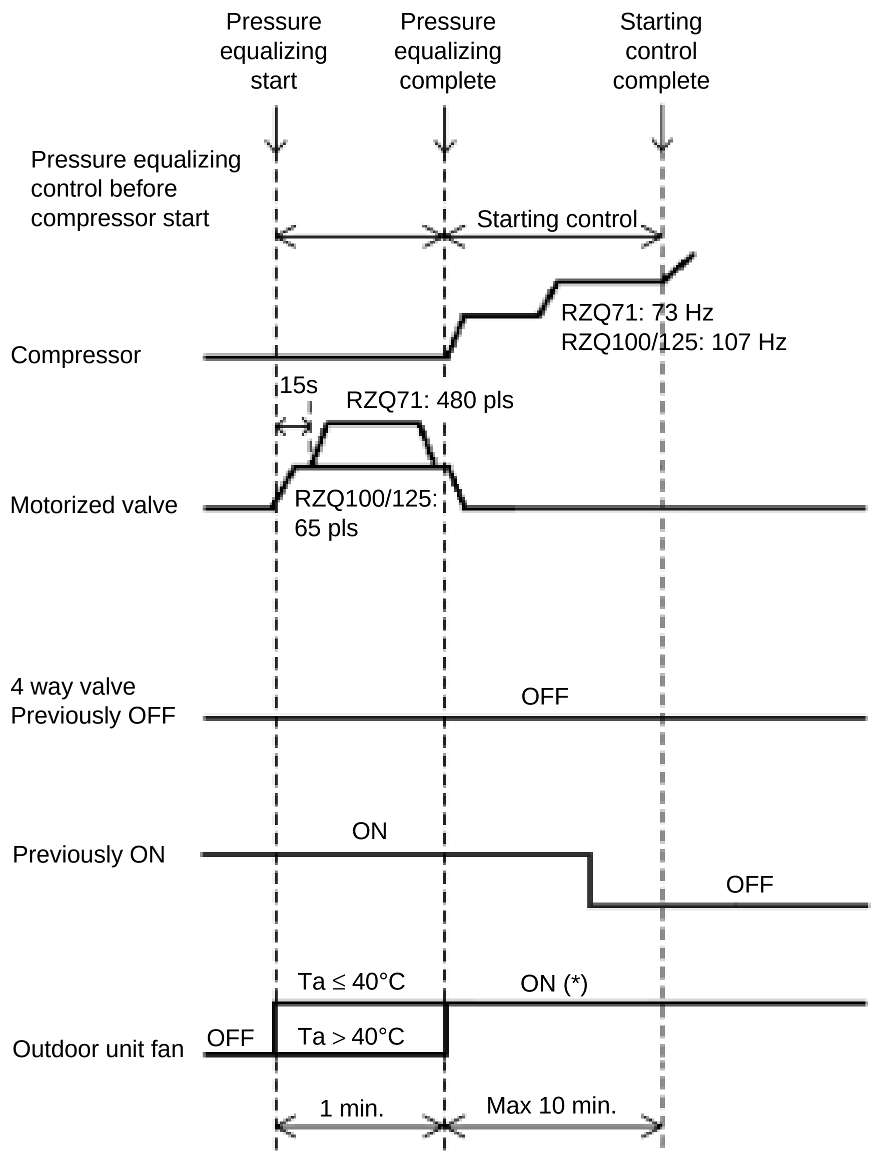
Graph



Ending condition

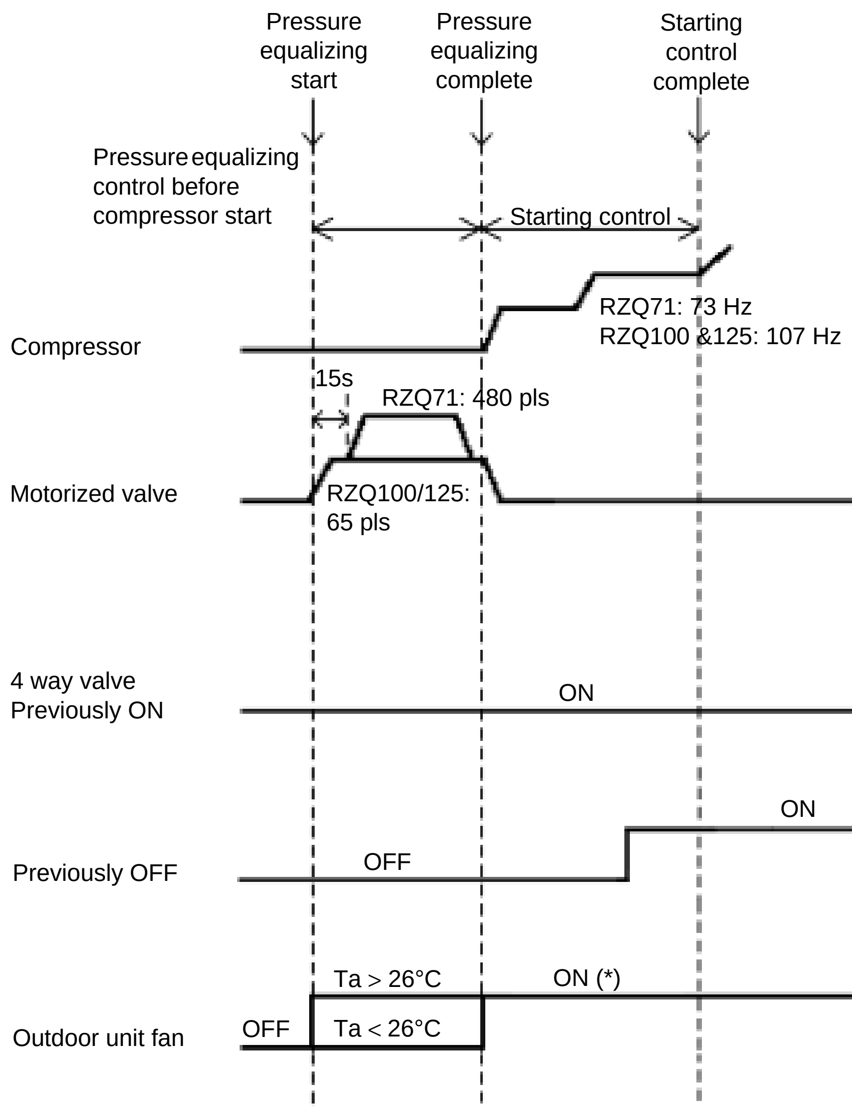
The starting control will be terminated when the low pressure value < 6 bar or when the maximum starting time of 10 minutes has been reached in case the low pressure value stays > 6 bar.

Cooling


Pressure equalizing start
Pressure equalizing complete
Starting control complete
Pressure equalizing control before compressor start
Starting control
Compressor
RZQ71: 73 Hz
RZQ100/125: 107 Hz
15s
RZQ71: 480 pls
Motorized valve
RZQ100/125: 65 pls
4 way valve
Previously OFF
OFF
Previously ON
ON
OFF
Ta ≤ 40°C
ON (*)
Outdoor unit fan
OFF
Ta > 40°C
1 min.
Max 10 min.

2

Heating



Pressure equalizing start
Pressure equalizing complete
Starting control complete
Pressure equalizing control before compressor start
Starting control
Compressor
RZQ71: 73 Hz
RZQ100 &125: 107 Hz
15s
RZQ71: 480 pls
Motorized valve
RZQ100/125: 65 pls
4 way valve Previously ON
ON
Previously OFF
OFF
ON
Outdoor unit fan
OFF
Ta > 26°C
Ta < 26°C
ON (*)

3.3.2 General Frequency Control

Outline

After the "Starting frequency control" function has been terminated, the ideal compressor frequency will be determined by the "General frequency control".

General

The compressor operation frequency is controlled in order to keep a constant evaporation temperature in cooling and a constant condensing temperature in heating.

The frequency can be changed every 20 seconds.The maximum frequency change = 2 steps/change. (= max 6 steps/min)

During abnormal situations (e.g. inverter current protection) the change per step is also = 2 steps/change, but the 20 seconds interval may be decreased, so a quicker change is possible.

Note

When other control functions are activated (e.g. discharge pipe control), they can change the compressor frequency using other inputs than the ones normally being used by the "General frequency control" function.

Cooling

In cooling, the target operation frequency will be determined by the indoor Δt and the evaporating temperature.

Δt cool = Remote control set temperature - Indoor return air temperature.

Depending on the cooling load, the target evaporating temperature (Te) will be a value between $2°C \leq Te \leq 20°C$.

Heating

In heating, the target operation frequency will be determined by the indoor Δt and the condensing temperature.

Δt heat = Indoor return air temperature - Remote control set temperature.

Depending on the heating load, the target condensing temperature (Tc) will be a value between $42°C \leq Tc \leq 51°C$.

2

2

Frequency steps

The operating frequency for the sky-air RZQ inverter units will be a value chosen from a list with fixed frequency settings that is programmed in the unit's memory:

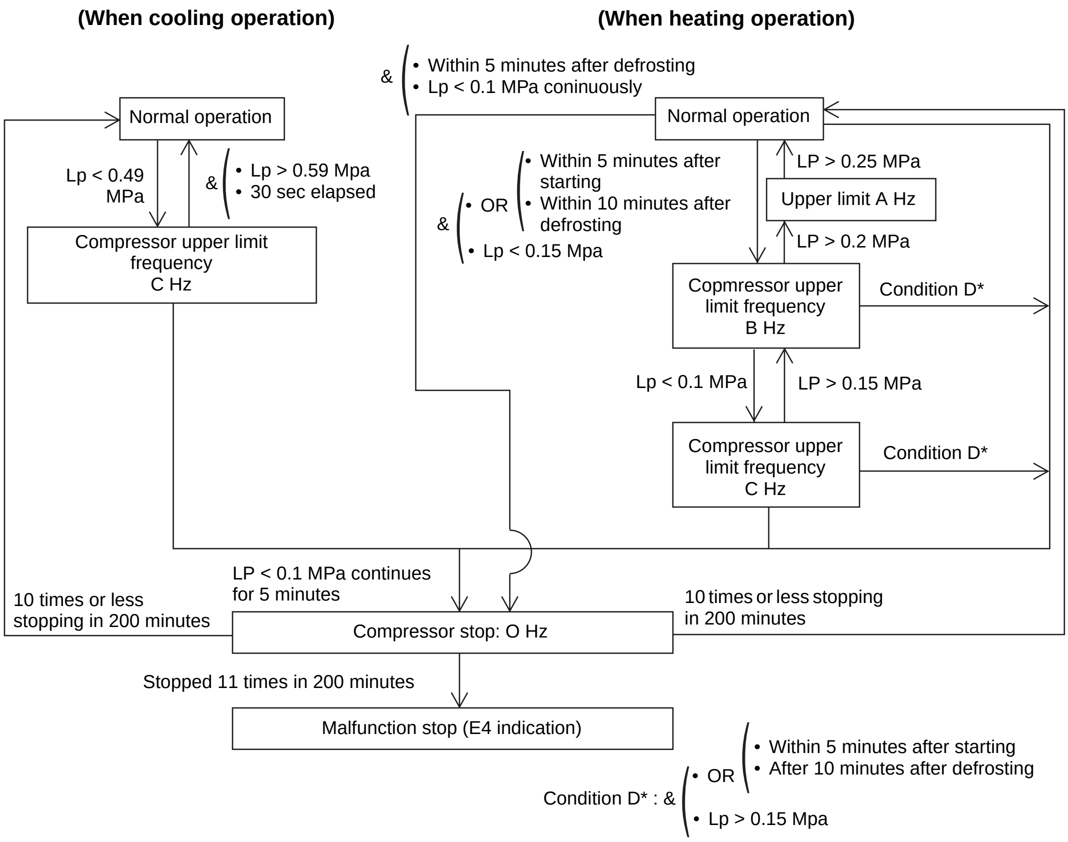
Step No.	Compressor operation frequency	
	RZQ71B	RZQ100 ~125B
1	38Hz	41Hz
2	41Hz	44Hz
3	44Hz	48Hz
4	48Hz	52Hz
5	52Hz	57Hz
6	57Hz	62Hz
7	62Hz	67Hz
8	67Hz	73Hz
9	73Hz	78Hz
10	79Hz	84Hz
11	85Hz	90Hz
12	91Hz	94Hz
13	97Hz	98Hz
14	103Hz	102Hz
15	109Hz	107Hz
16	116Hz	112Hz
17	122Hz	117Hz
18	128Hz	123Hz
19	134Hz	131Hz
20	141Hz	139Hz
21	148Hz	147Hz
22	155Hz	155Hz
23	162Hz	164Hz
24	169Hz	174Hz
25	177Hz	---

3.3.3 Low Pressure Protection Control

Outline

In order to prevent abnormal low pressures in the system, the below control function will be activated. Low pressure is measured by the low pressure sensor.

Flow chart



Parameters

	RZQ71B	RZQ100 ~125B
A Hz	109 Hz	123 Hz
B Hz	62 Hz	62 Hz
C HZ	48 Hz	62 Hz

2

3.3.4 High Pressure Protection Control

Outline

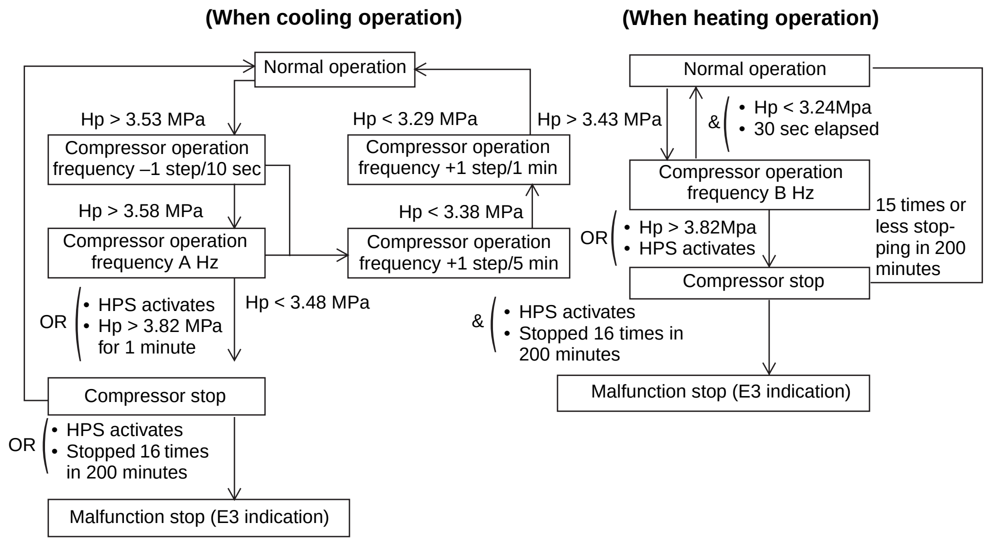
In order to prevent abnormal high pressures in the system and hence avoiding activation of the high pressure safety device the below control function will be activated.

Details

The high pressure value will be calculated from the low pressure, power input and compressor frequency.

- HPS opens at : 40 bar (tolerance: +0 / -0.15)
- HPS closes at : 30 bar (tolerance : +/- 0.15)

Flow chart



Parameters

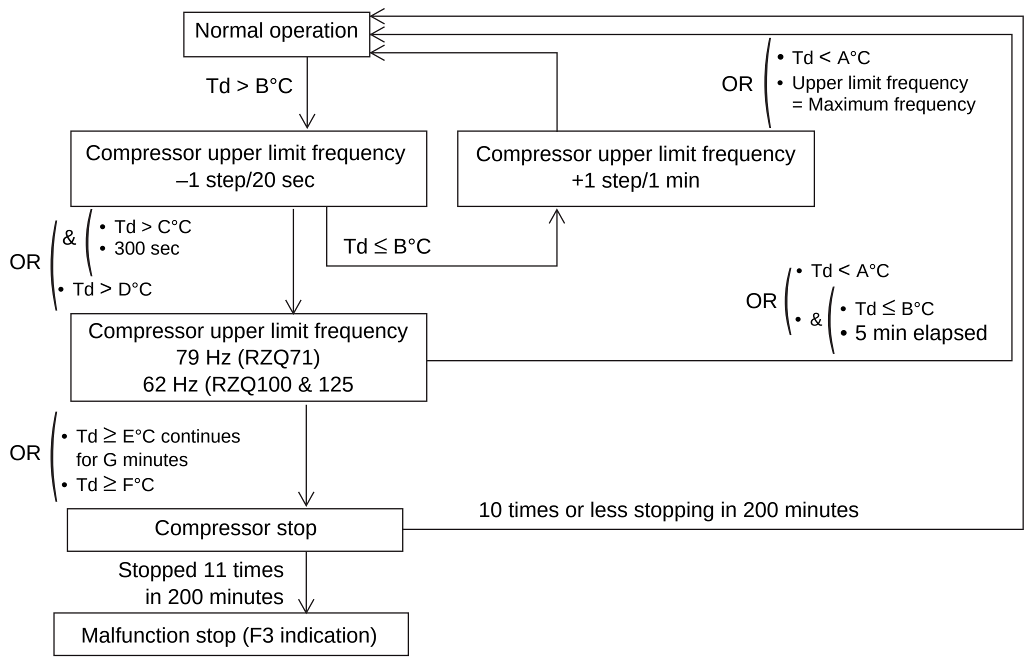
	RZQ71B	RZQ100 ~125B
A Hz	79 Hz	62 Hz
B Hz	62 Hz	62 Hz

3.3.5 Discharge Pipe Temperature Control

Outline

The compressor operating frequency will be controlled in order to avoid abnormal high compressor temperatures (see also expansion valve control).

Flow chart



Parameters

	RZQ71B	RZQ100 & 125B
A°C	100°C	100°C
B°C	105°C	105°C
C°C	110°C	110°C
D°C	120°C	120°C
E°C	110°C	115°C
F°C	125°C	135°C
Gmin	15min	10min

Td = Discharge pipe temperature

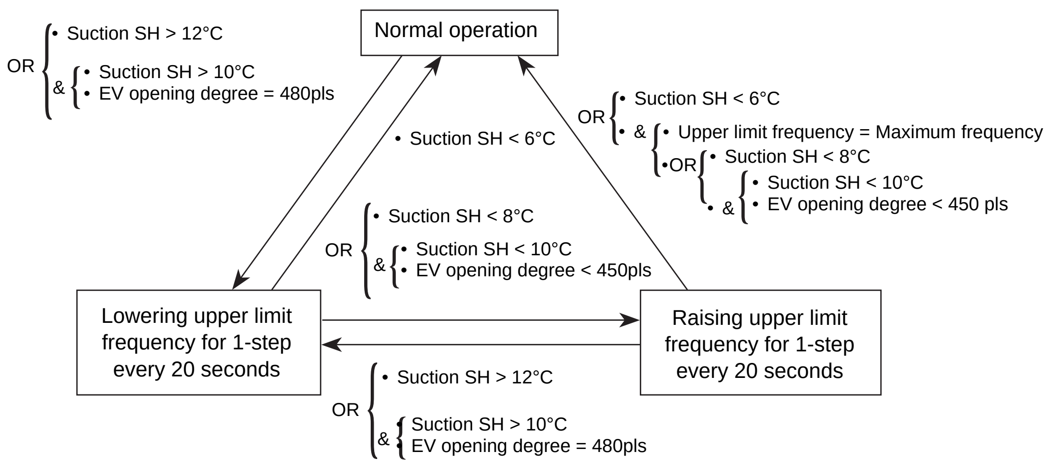
3.3.6 Suction Pipe Superheat Protection Control (Heating Mode)

Outline

In case the suction superheat value in heating mode is too high, the oil return to the compressor will be insufficient. In order to avoid that the compressor oil will be accumulated in the outdoor unit heat exchanger, the upper limit frequency will be decreased.

2

Flow chart

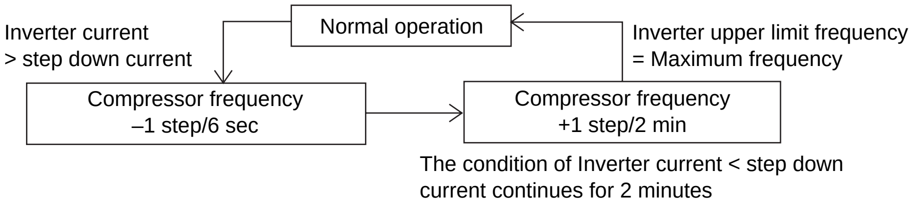


3.3.7 Inverter Current Protection Control

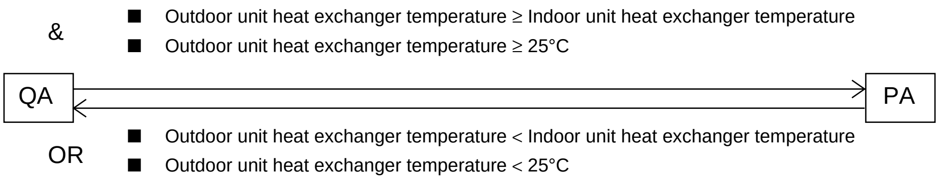
Outline

The compressor operating frequency will be restricted in order to prevent an over-current to the compressor.

Flow chart



Parameters



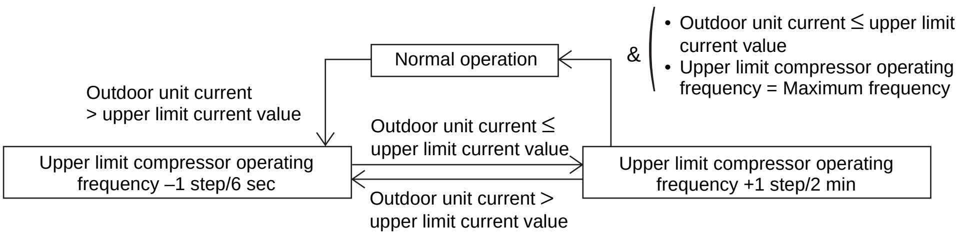
	RZQ71B	**RZQ100 ~125B**
P(A)	11.7 A	21 A
Q(A)	12.9 A	23 A

3.3.8 Input Current Control

Outline

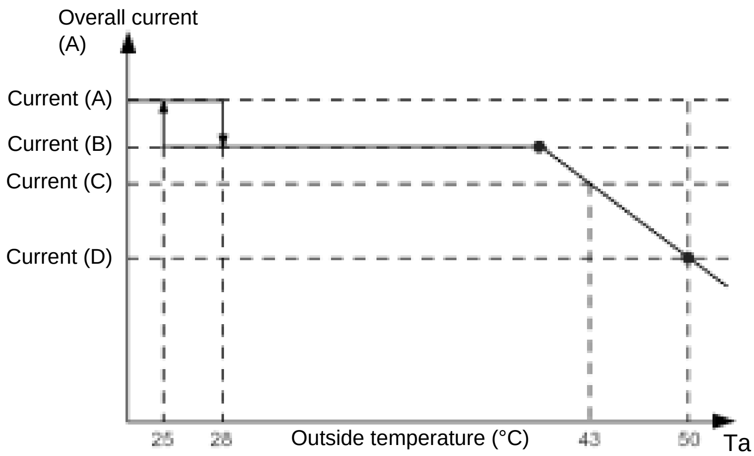
Unlike the inverter current control, this function will monitor the overall input current and will restrict the compressor upper limit operating frequency as to prevent activation of the circuit breakers.

Flow chart



Upper limit current

The outdoor model type and the outdoor air temperature will determine the upper limit current value.



	A	B	C	D
RZQ71B	20 A	17.5 A	14.2 A	8.4 A
RZQ100/125B	22 A	17.6 A	17.0 A	10.0 A

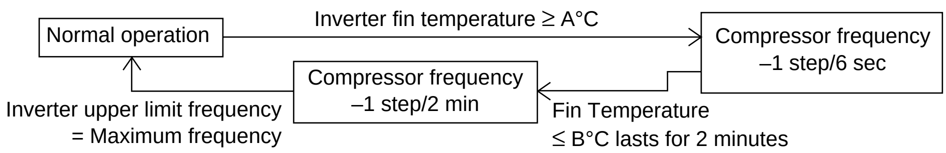
3.3.9 Inverter Cooling Fin Temperature Control

Outline

This control will restrict the compressor upper limit frequency in order to protect the electronic components in the switch box from overheating (L4-error activation).

By lowering the compressor frequency, the current drawn by the compressor will be reduced and as a result the temperature inside the switch box will drop.

Flow chart



Parameters

	RZQ71B	RZQ100~125B
A°C	82°C	90°C
B°C	79°C	87°C

3.3.10 Pressure Difference Control

Outline

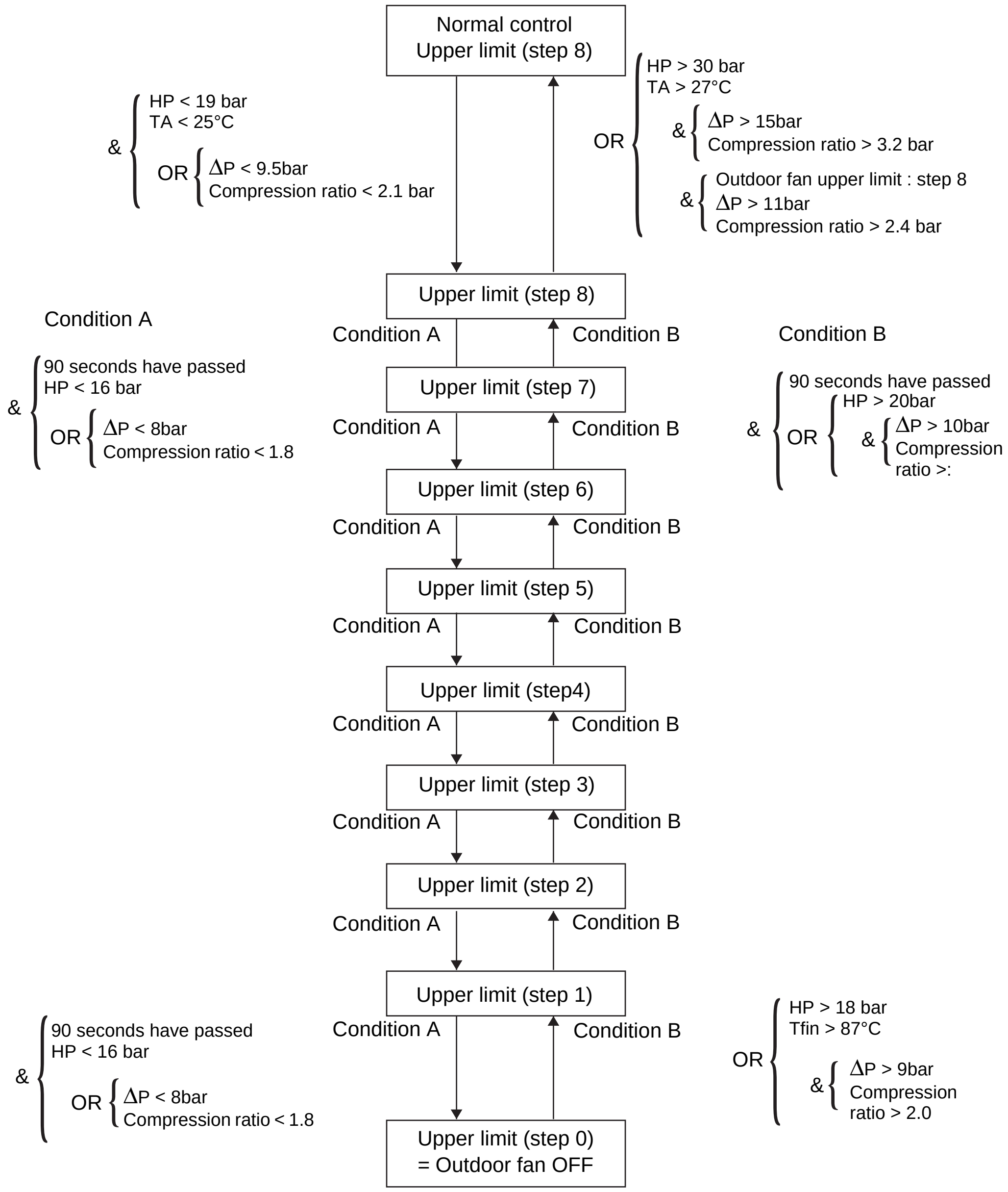
To ensure the compression ratio (pressure difference between high and low pressure) at low outdoor temperature conditions in cooling mode and high outdoor temperature conditions in heating mode, the outdoor fan and target compressor frequency may be varied.

2

Cooling

In cooling low ambient conditions, the outdoor fan speed and compressor frequency will be adapted to secure the differential pressure between high and low pressure.

Fan control in cooling



Frequency restriction in cooling

	Normal control			
	Used indoor unit	**71**	**100**	**125**
Upper limit frequency	Wall mounted indoor	109Hz	112Hz	139Hz
	Other than wall mounted indoor	169Hz	164Hz	
Lower limit frequency	---	38Hz	41Hz	

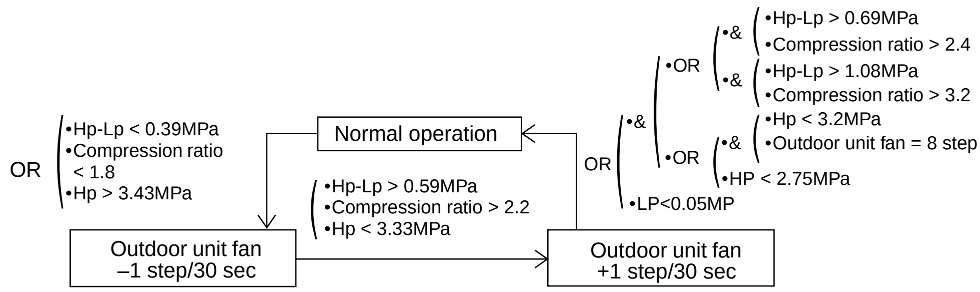
	71	**100**	**125**
Upper limit frequency	109Hz	123Hz	
Lower limit frequency	48Hz	62Hz	

	71	**100**	**125**
Upper limit frequency	109Hz	123Hz	
Lower limit frequency	62Hz	62Hz	

Heating

High outdoor ambient (overload conditions):

In heating overload conditions, the outdoor fan speed will be adapted to secure the differential pressure between high and low pressure.



Only the fan speed will be adapted in heating overload conditions.
No adjustments to the compressor frequency will be made.

2

3.3.11 Oil Recovery Operation

Outline

When the compressor operates for a certain period of time at low frequency, the oil level in the compressor may become low due to incomplete oil recovery.To prevent damage to the compressor and in worst case avoid compressor lock, an oil recovery operation will be conducted.

Details

During the oil recovery operation, the operation frequency of the compressor will be increased for a time period of 10 minutes.

Example

Trigger conditions for 71-class:

- In cooling : Compressor frequency = 62 Hz for 10 minutes continuously.
- In heating : Compressor frequency = 109 Hz for 10 minutes continuously.

When the above conditions are fulfilled, a calculation of the oil discharge amount will be executed according to the below formula:

Oil discharge amount = inverter frequency (Hz) x D x Δtime
(D = constant value depending on outdoor unit type).

When the result of the above calculation is lower than a reference value programmed in the unit's memory, the oil recovery operation will be started:

The compressor will operate at a frequency above 62 Hz in cooling and 109 Hz in heating for 10 minutes continuously.

3.4 Expansion Valve Regulating Functions

Introduction

This chapter will explain the functions that are used to control the expansion valve opening.

Content

3.4.1 Expansion Valve Control at Startup

Outline

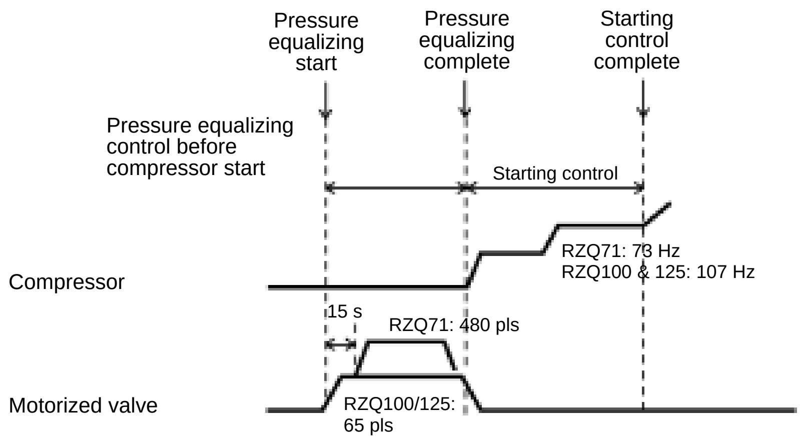
Before going to the general expansion valve control, the expansion valve opening will be limited in order to avoid the risk of liquid back and allow quick build up of pressure difference.

2

Details

During startup, the opening degree is determined by both the compressor frequency & the suction superheat. During startup, it is not possible to use only the value of the suction superheat because the operation is not stable yet. As a consequence also the SH value will not be stable.

Graph



Expansion valve opening during pressure equalization

On RZQ71 units (using double swing compressor) the expansion valve will be fully opened (to 480 pulses) for pressure equalisation before compressor start-up. Just before compressor start up, the expansion valve opening will be set to 65 pulses, same as for the 100 & 125 class.

Ending condition

The starting control will be terminated when the low pressure value < 6 bar or when the maximum starting time of 10 minutes has been reached in case the low pressure value stays > 6 bar.

3.4.2 General Expansion Valve Control

Outline

After the start up control function has been terminated the general expansion valve control function will regulate the expansion valve opening in function of the target suction SH value (= superheat at evaporator outlet).

The actual discharge SH value will be used to set the target suction SH value during operation.

The measured suction SH value will be used to control the opening of the expansion to the target suction SH value.

Details

When the unit is in cooling or heating operation the opening of the expansion valve will be controlled in order to keep the amount of superheat at the evaporator outlet constant. This way the evaporator can be used at maximum efficiency under all conditions. The initial target heat exchanger outlet superheat value = 5°C.

The target heat exchanger outlet superheat value can be increased in case the discharge superheat value decreases.

The target heat exchanger outlet superheat value can be decreased in case the discharge superheat value increases.

Control

During "General expansion valve control" 2 parameters will be used to control the actual expansion valve opening degree:

1 Target superheat amount :
When the target heat exchanger outlet superheat > actual heat exchanger outlet superheat → the expansion valve will close.
When the target heat exchanger outlet superheat < actual heat exchanger outlet superheat → the expansion valve will open.
The superheat amount is checked every 10 seconds.

2 Frequency change: At the time of compressor frequency change, the expansion valve opening will be changed with a fixed value. This value will be in function of the amount of compressor frequency change.

Calculations

The heat exchanger outlet superheat value is calculated from the saturated suction temperature Te (using LP sensor) and the suction pipe temperature R4T : SH = R4T-Te.

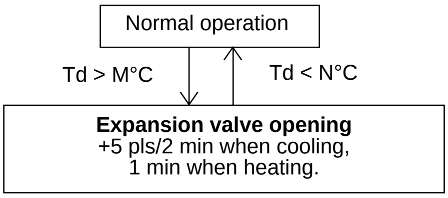
The discharge superheat value is calculated from the saturated discharge temperature Td (HP value calculated out of PI, frequency and LP) and the discharge pipe temperature R3T : SH = R3T-Td.

3.4.3 Discharge Pipe Temperature Control

Outline

The expansion valve opening will be controlled in order to avoid abnormal high compressor discharge temperatures (see also compressor operating frequency control).

Details



	RZQ71B	RZQ100~125B
M°C	95°C	95°C
N°C	80°C	

3.5 Outdoor Unit Fan Speed Control

Introduction

This chapter will explain how the outdoor fan speed is determined in cooling and heating operation.

Content

2

2

3.5.1 Outdoor Unit Fan Speed Control

Fan speed control

The outdoor fan speed will be controlled in function of the actual outdoor ambient temperature, the condensation pressure, pressure difference between low and high pressure and compression ratio.

For details please refer to "Pressure Difference Control".

Fan step table RZQ71

Step	Cooling	Heating
0	0	0
1	200	200
2	250	250
3	300	300
4	360	360
5	430	430
6	515	515
7	620	620
8	790	720

Fan step table RZQ100

	Cooling		Heating	
Step	M1F	M2F	M1F	M2F
0	0	0	0	0
1	250	0	250	0
2	400	0	285	250
3	285	250	335	300
4	360	325	395	360
5	445	410	470	435
6	545	510	560	525
7	660	625	660	625
8	820	785	825	790

Fan step table RZQ125

	Cooling		Heating	
Step	**M1F**	**M2F**	**M1F**	**M2F**
0	0	0	0	0
1	250	0	250	0
2	400	0	285	250
3	285	250	335	300
4	360	325	395	360
5	445	410	470	435
6	545	510	560	525
7	660	625	660	625
8	850	815	835	800

Reference

See also:

- "Pressure Difference Control" on page 2–52
- "Defrost Operation" on page 2–18

2

Part 3
Troubleshooting

What is in this part?

This part contains the following chapters:

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.

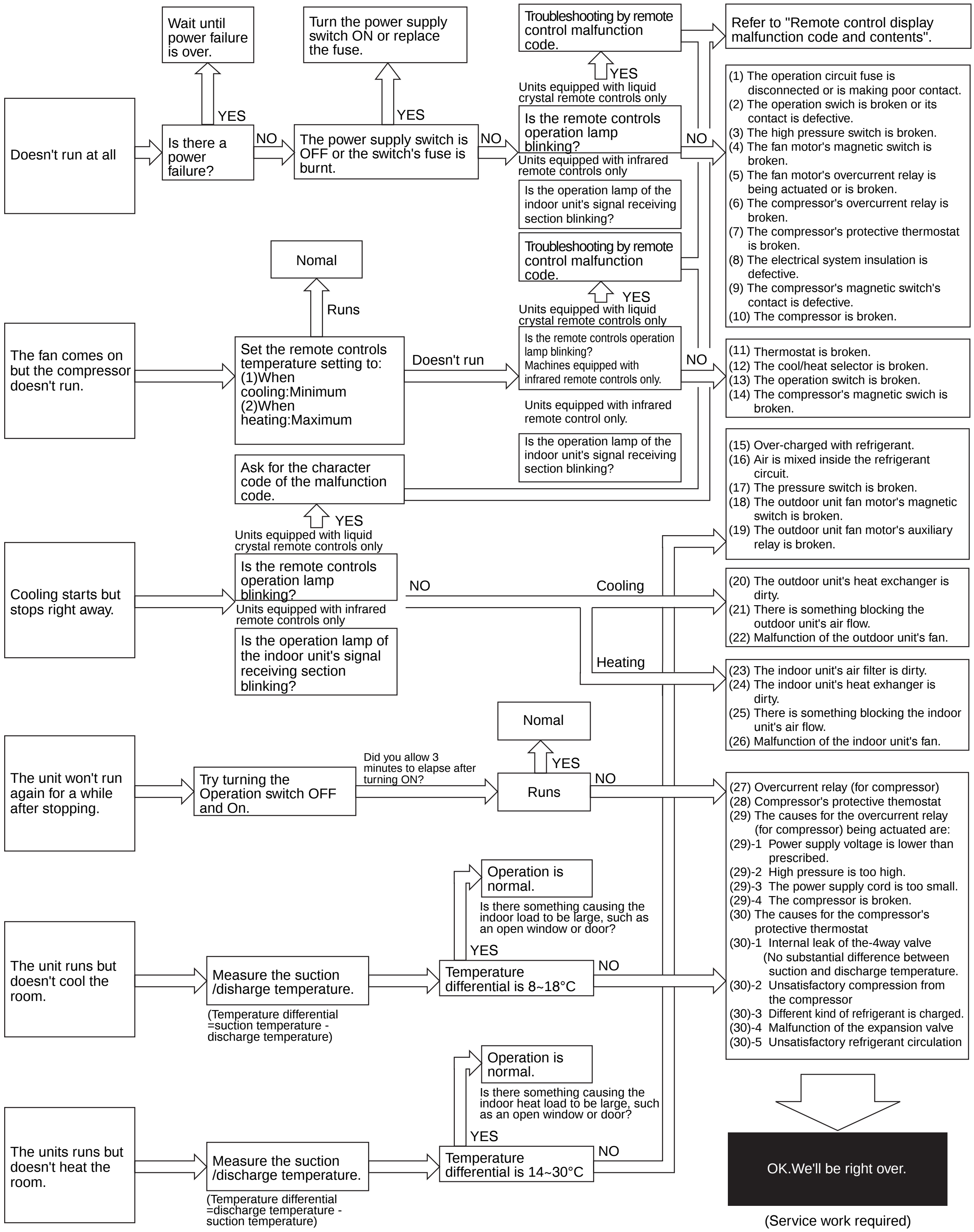
Overview

This chapter contains the following topics:

3

1.2 General Troubleshooting Flowchart

Find out the situation according to the following procedure when there is a request for service from the customer.



(S1989)

1.3 Overview of General Problems

Overview

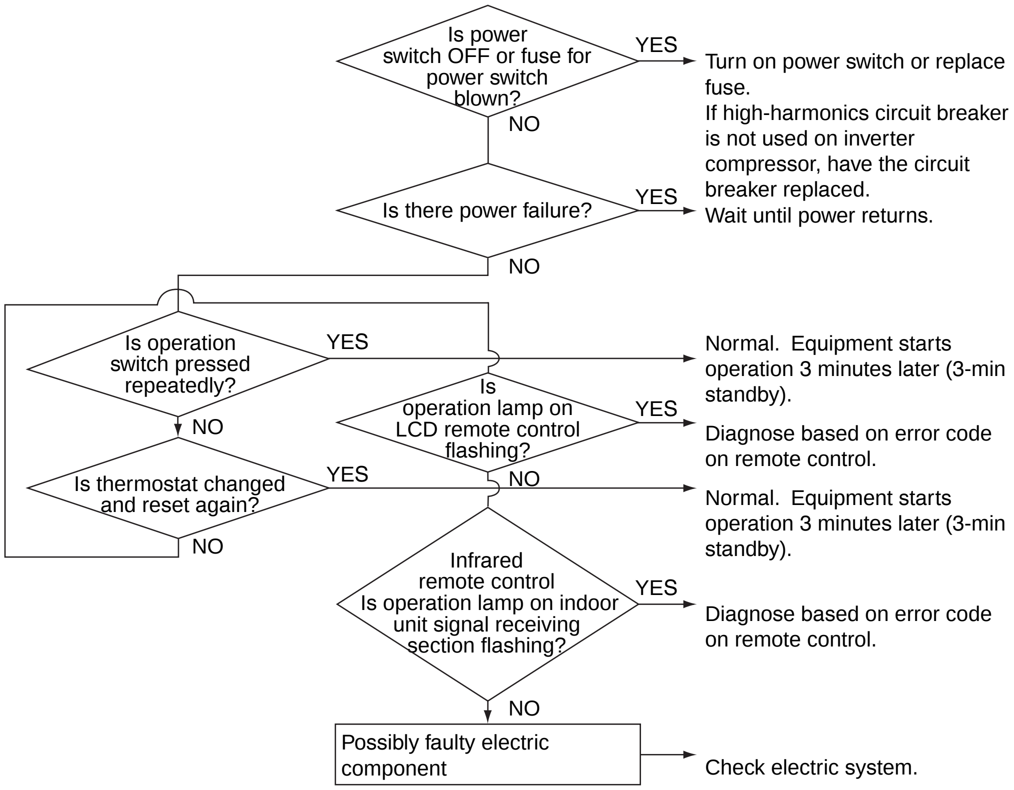
	Equipment Condition	**Remedy**
1	Equipment does not operate.	See page 3-6
2	Fan operates, but compressor does not.	See page 3-6
3	Cooling/heating operation starts but stops immediately.	See page 3-10
4	After unit shuts down, it cannot be restarted for a while.	See page 3-12
5	Equipment operates but does not provide cooling.	See page 3-14
6	Equipment operates but does not provide heating.	See page 3-16
7	Equipment discharges white mist.	See page 3-18
8	Equipment produces loud noise or shakes.	See page 3-19
9	Equipment discharges dust.	See page 3-20
10	Remote control LCD displays “88.”	See page 3-21
11	Indoor swing flap does not operate.	See page 3-22
12	Equipment emits odor.	Room smell and cigarette odors accumulated inside the indoor unit are discharged with air. Inside of the indoor unit must be cleaned.
13	Flap operates when power is turned on.	It is normal. The flap initializes for accurate positioning.
14	Change of operation mode causes flap to move.	It is normal. There is a control function that moves the flap when operation mode is changed.
15	Fan operates in “M” mode during heating even if remote control is set to “Low.”	It is normal. It is caused by the activation of the overload control (airflow shift control).
16	Flap automatically moves during cooling.	It is normal. It is caused by the activation of the dew prevention function or ceiling soiling prevention function.
17	Indoor unit fan operates in “L” mode for 1 minute in microcomputer-controlled dry mode even if compressor is not operating.	It is normal. The monitoring function forcibly operates the fan for one minute.
18	In simultaneous ON/OFF multi-system setup, indoor unit (sub) does not operate in sync with the other indoor unit (main). (Flat, fan, etc.)	It is normal. It is caused by a signal transmission lag.
19	Indoor unit fan operates after heating operation stops.	It is normal. The fan operates in the “LL” mode for 60 to 100 seconds to dissipate the residual heat in the heater.
20	Drain pump operates when equipment is not operating.	It is normal. The drain pump continues to operate for several minutes after equipment is turned off.
21	Horizontal swing sends air to different directions in cooling and heating even if it is set to the same position.	It is normal. The airflow direction in cooling/dry operation is different from that in heating/fan operation.
22	Flap remains horizontal even if it is set to Swing.	It is normal. The flap does not swing in the thermostat OFF mode.

3

1.3.1 Equipment does not operate

Applicable Model	All models of SkyAir series
Error Detection Method	
Error Generating Condition	
Possible Causes	■ Fuse blown or disorder of contact in operation circuit ■ Faulty operation switch or contact point ■ Faulty high pressure switch ■ Faulty magnetic switch for fan motor ■ Activation or fault of overcurrent relay for fan motor ■ Faulty overcurrent relay for compressor ■ Faulty compressor protection thermostat ■ Insufficient insulation in electric system ■ Faulty contact point of magnetic switch for compressor ■ Malfunction of compressor ■ Fefective remote control or low batteries (infrared) ■ Check if address is set correctly on infrared R.C.

Troubleshooting



(S2575)

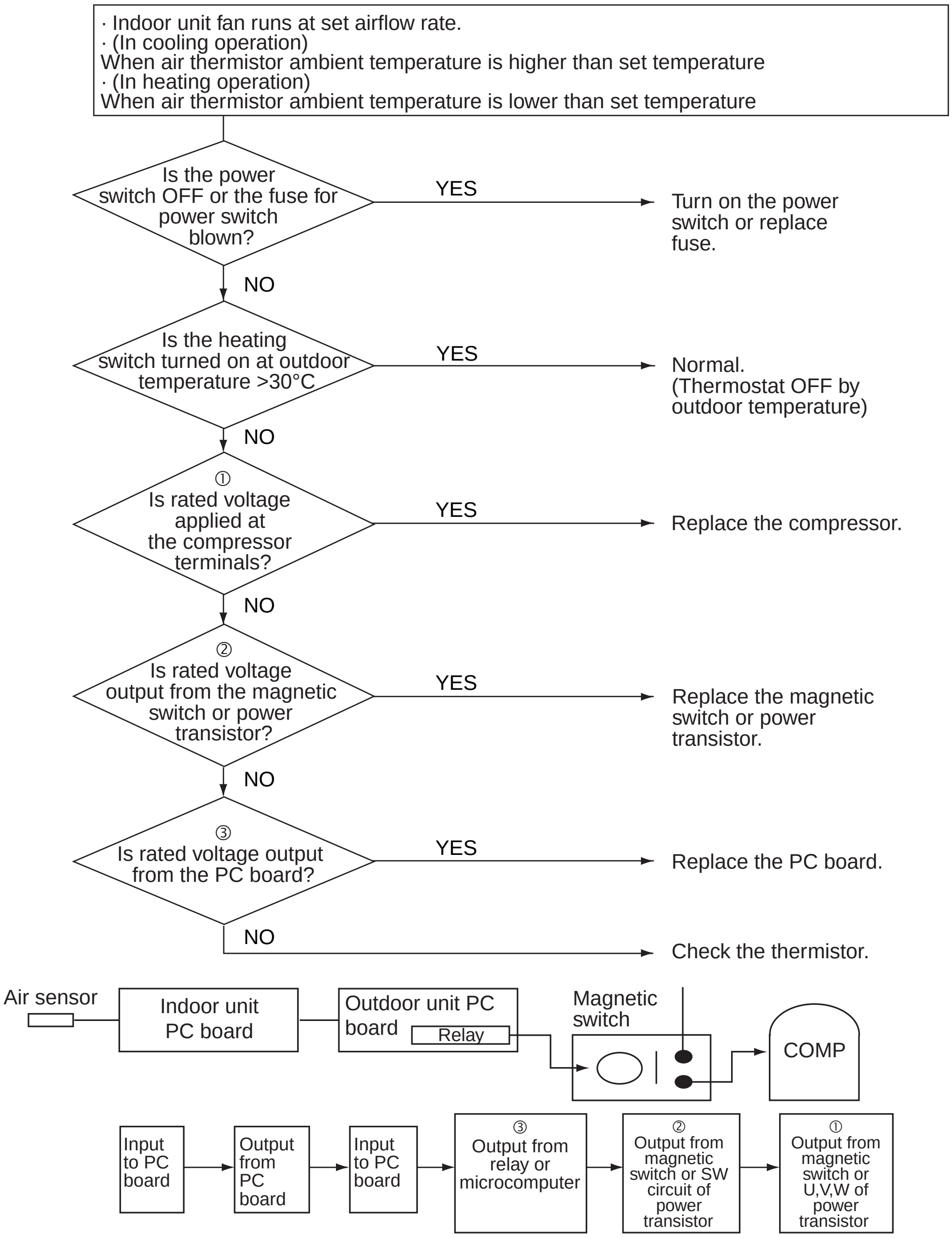
Caution

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

1.3.2 Indoor fan operates, but compressor does not

Applicable Model	All models of SkyAir series
Method of Malfunction Detection	
Malfunction Decision Conditions	
Possible Causes	■ Faulty thermistor ■ Faulty indoor/outdoor unit PCB ■ Faulty magnetic switch ■ Faulty power transistor ■ Faulty compressor

Troubleshooting



(S2576)

Caution

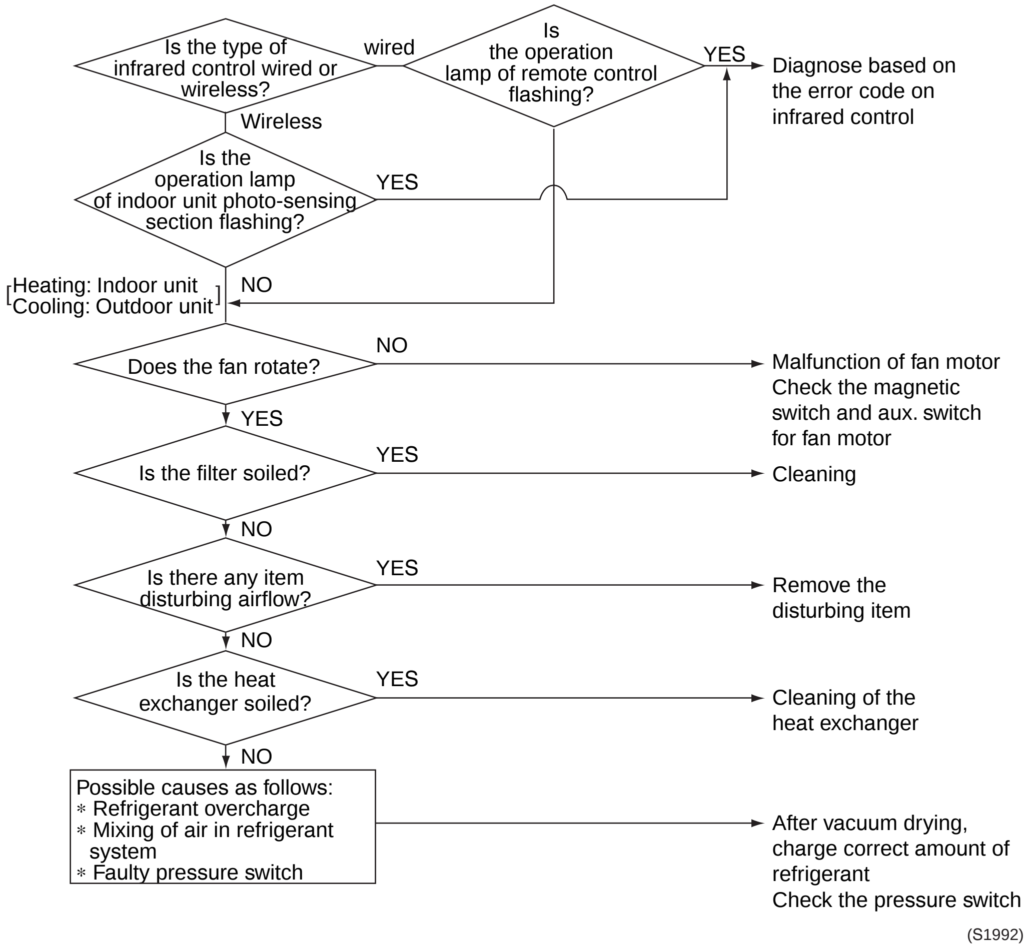
Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

1.3.3 Cooling/heating operation starts but stops immediately.

Applicable Model	All models of SkyAir series
Error Detection Method	
Error Generating Condition	
Possible Cause	■ Excess charge of refrigerant ■ Air intrudes into refrigerant system ■ Faulty pressure switch ■ Faulty magnetic switch for outdoor unit fan motor ■ Faulty aux. relay for outdoor unit fan motor ■ Soiled heat exchanger of outdoor unit ■ There is an interfering item in air flow of outdoor unit ■ Malfunction of outdoor unit fan ■ Soiled air filter of indoor unit ■ Soiled heat exchanger of indoor unit ■ There is some interfering item in airflow of indoor unit ■ Malfunction of indoor unit fan

3

Troubleshooting



Caution

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

1.3.4 After unit shuts down, it cannot be restarted for a while.

Applicable Model

All models of SkyAir series

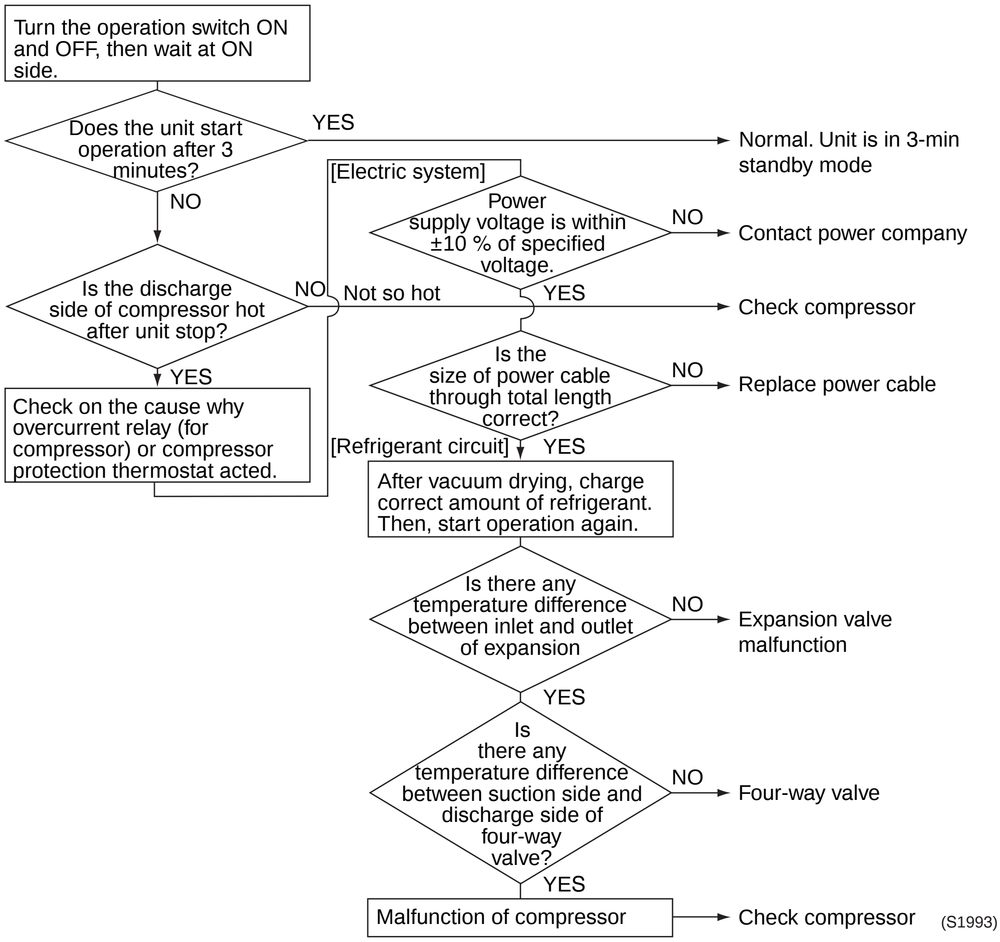
Error Detection Method

Error Generating Condition

Possible Cause

- Overcurrent relay (for compressor)
- Compressor protection thermostat
- Overcurrent relay may act due to the following reasons
  Lower voltage of power supply
  Excess level of high pressure
  Insufficient size of power cable
  Malfunction of compressor
- Compressor protection thermostat may act due to the following reasons
  Internal leakage of four-way valve (There is no difference between suction and discharge temperature)
  Insufficient compression of compressor
  Incorrect refrigerant
  Faulty expansion valve
  Insufficient circulation of refrigerant

Troubleshooting



Caution

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

1.3.5 Equipment operates but does not provide cooling

Applicable Model

All models of SkyAir series

Error Detection Method

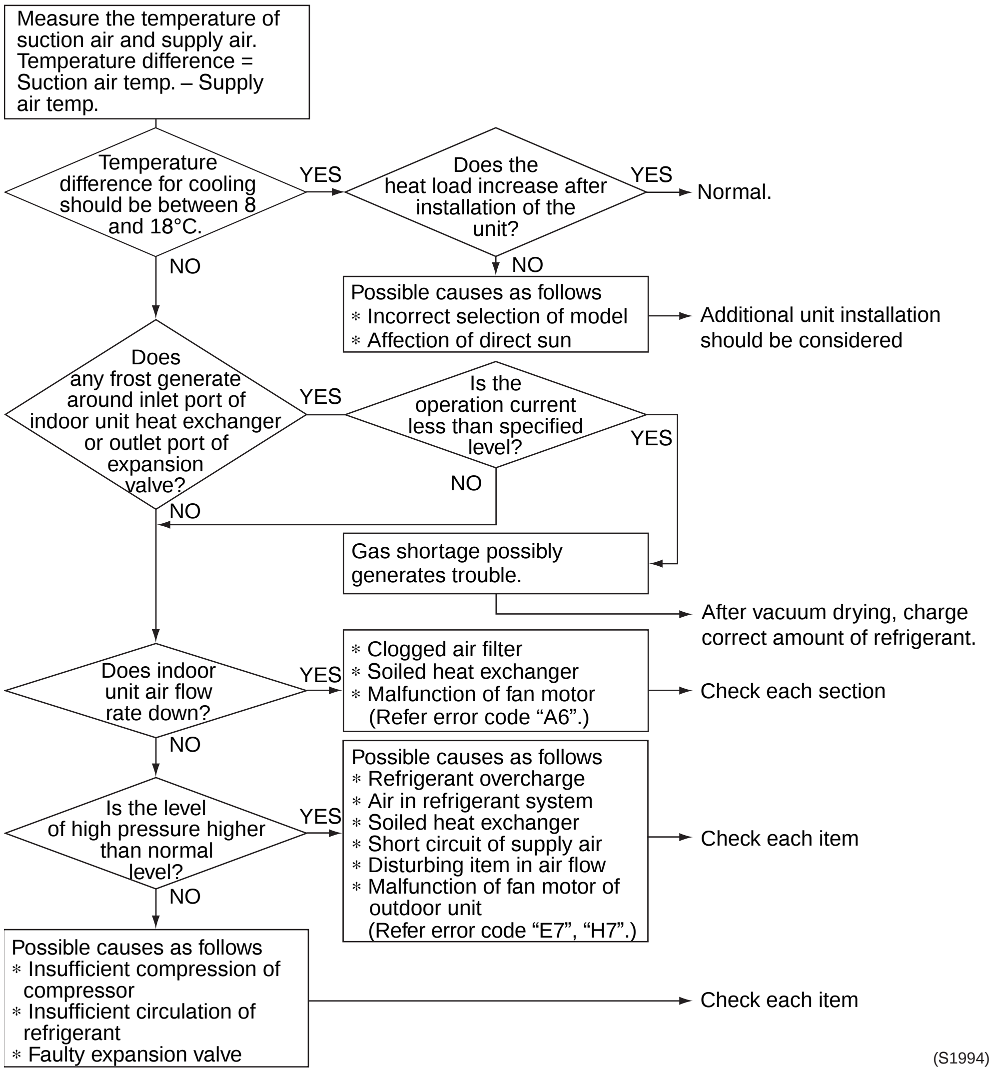
Error Generating Condition

Possible Cause

- Overcurrent relay (for compressor)
- Compressor protection thermostat
- Overcurrent relay may act due to the following reasons
  Lower voltage of power supply
  Excess level of high pressure
  Insufficient size of power cable
  Malfunction of compressor
- Compressor protection thermostat may act due to the following reasons
  Internal leakage of four-way valve (There is no difference between suction and discharge temperature)
  Insufficient compression of compressor
  Incorrect refrigerant charge/leak
  Faulty expansion valve
  Insufficient circulation of refrigerant
- Malfunction of thermistors or thermistor out of position.

3

Troubleshooting



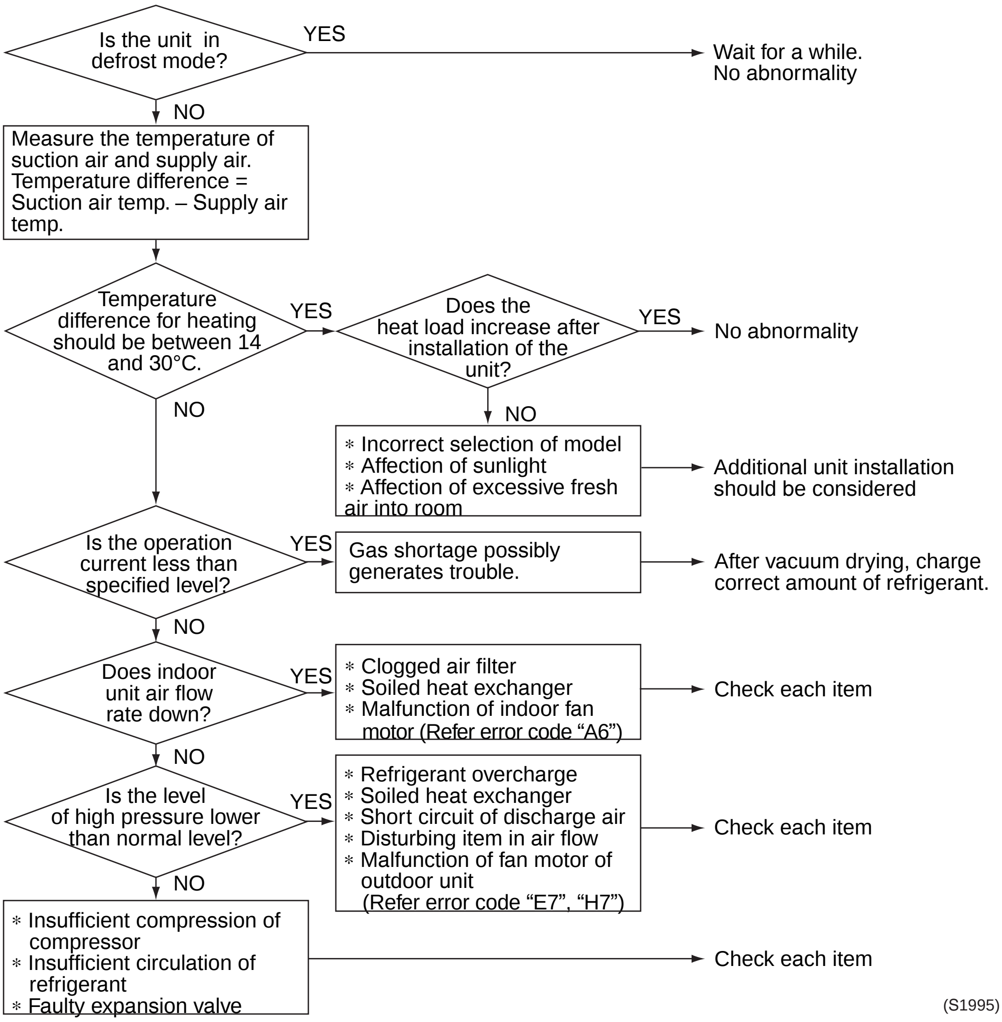
Caution

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

1.3.6 Equipment operates but does not provide heating

Applicable Model	All models of SkyAir series
Error Detection Method	
Error Generating Condition	
Possible Cause	■ Excess charge of refrigerant ■ Air intrudes into refrigerant system ■ Faulty pressure switch ■ Faulty magnetic switch for outdoor unit fan motor ■ Faulty aux. relay for outdoor unit fan motor ■ Soiled heat exchanger of outdoor unit ■ There is an interfering item in air flow of outdoor unit ■ Malfunction of outdoor unit fan ■ Soiled air filter of indoor unit ■ Soiled heat exchanger of indoor unit ■ There is some interfering item in airflow of indoor unit ■ Malfunction of indoor unit fan

Troubleshooting



Caution

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

1.3.7 Equipment discharges white mist

Applicable Model

All models of SkyAir series

Error Detection Method

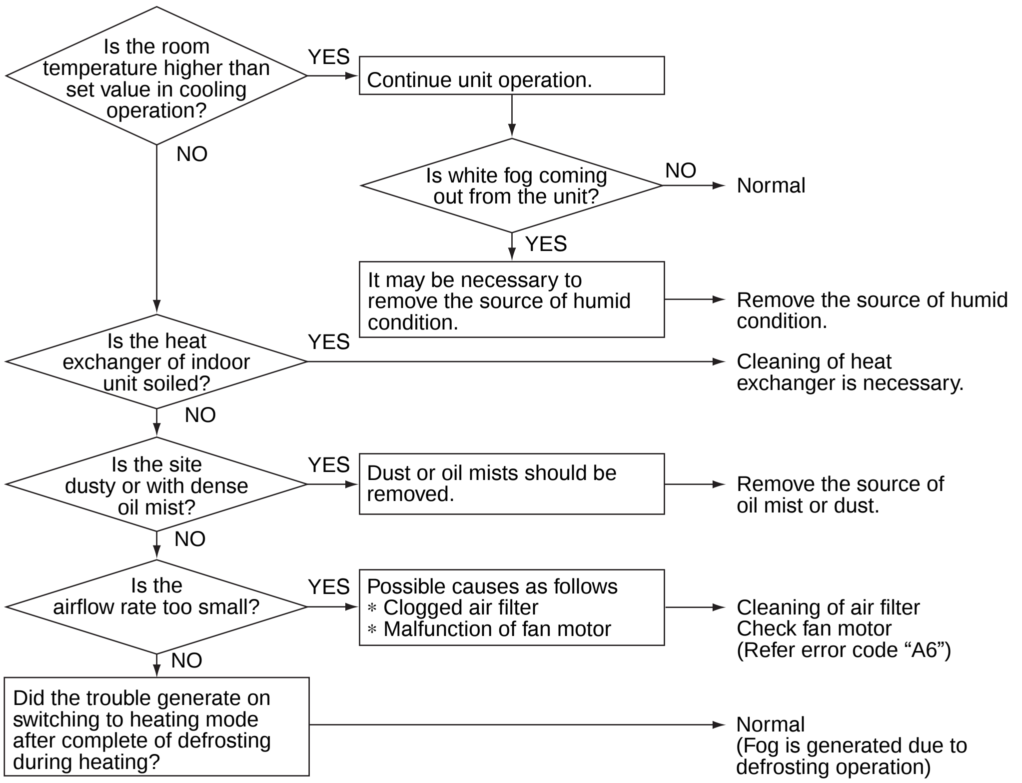
Error Generating Condition

Possible Cause

3

- Humid installation site
- Installation site is dirty and with dense oil mists.
- Soiled heat exchanger
- Clogged air filter
- Malfunction of fan motor

Troubleshooting



(S1996)

Caution

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

1.3.8 Equipment produces loud noise or shakes

Applicable Model

All models of SkyAir series

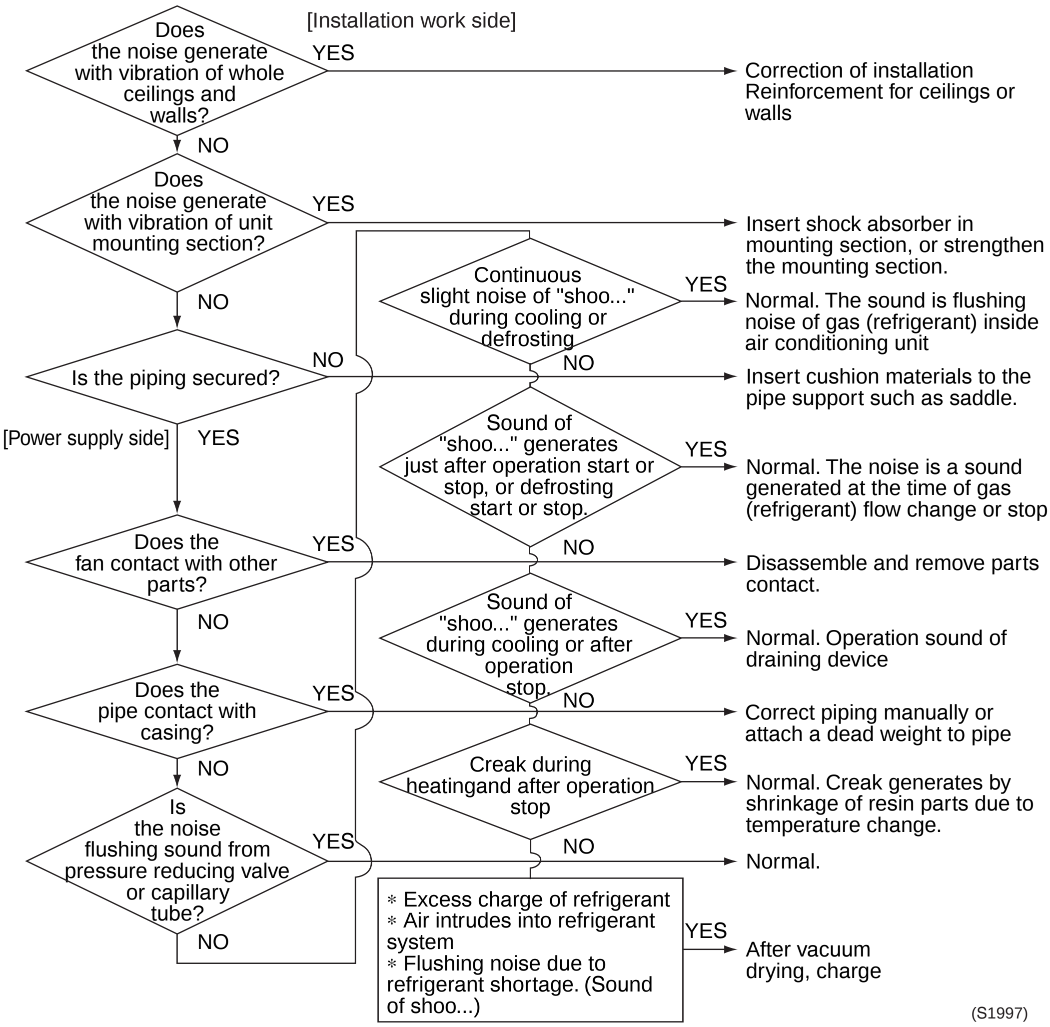
Error Detection Method

Error Generating Condition

Possible Cause

- Excess charge of refrigerant
- Air intrudes into refrigerant system
- Flushing noise due to refrigerant shortage. (Sound of shoo...)

Troubleshooting



Caution

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

1.3.9 Equipment discharges dust.

Applicable Model All models of SkyAir series

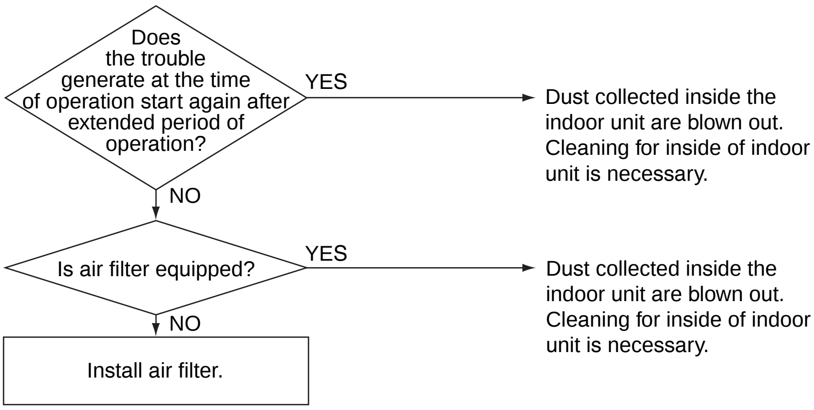
Error Detection Method

Error Generating Condition

Possible Cause

- Carpet
- Animal's hair
- Application (cloth shop,...)

Troubleshooting



(S1998)

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

1.3.10 Remote control LCD displays "88"

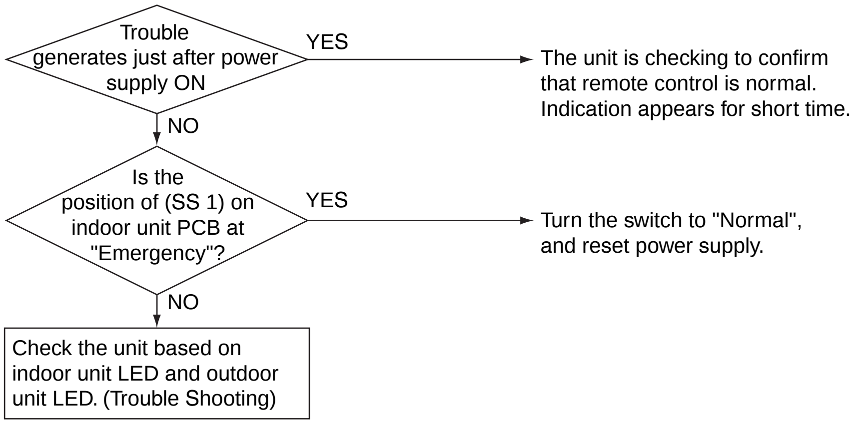
Applicable Model All models of SkyAir series

Error Detection Method

Error Generating Condition

Possible Cause

Troubleshooting



(S1999)

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

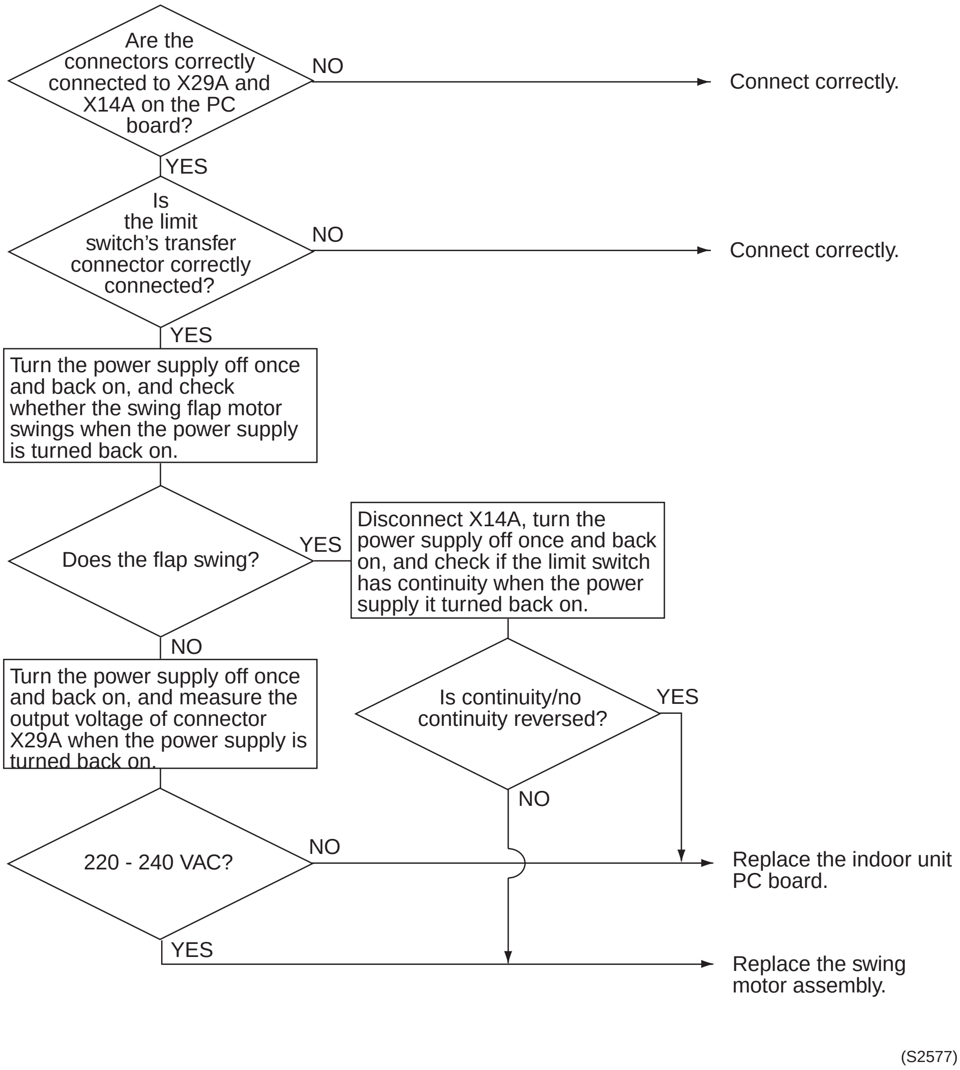
3

3

1.3.11 Swing flap does not operate

Applicable Models	FUQ, FHQ, FAQ100
Method of Malfunction Detection	Utilizes ON/OFF of the limit switch when the motor turns.
Malfunction Decision Conditions	When ON/OFF of the micro switch for positioning cannot be reversed even through the swing flap motor for a specified amount of time (about 30 seconds).
Remark	Some functions can force the swing flap into a fixed position, altough swing mode is selected on the remote control. This is not an unit error, but a control function to prevent draft to the customer. Before starting the troubleshooting, make sure the swing flap is not forced into such a fixed position. (e.g. Hot start, defrost operation, thermostat OFF in heating operation or freeze prevention in cooling operation. For details see "Fan and Flap Operations" on page 2-32)
Possible Causes	■ Faulty swing motor ■ Faulty micro switch ■ Faulty connector connection ■ Faulty indoor unit PC board

Troubleshooting



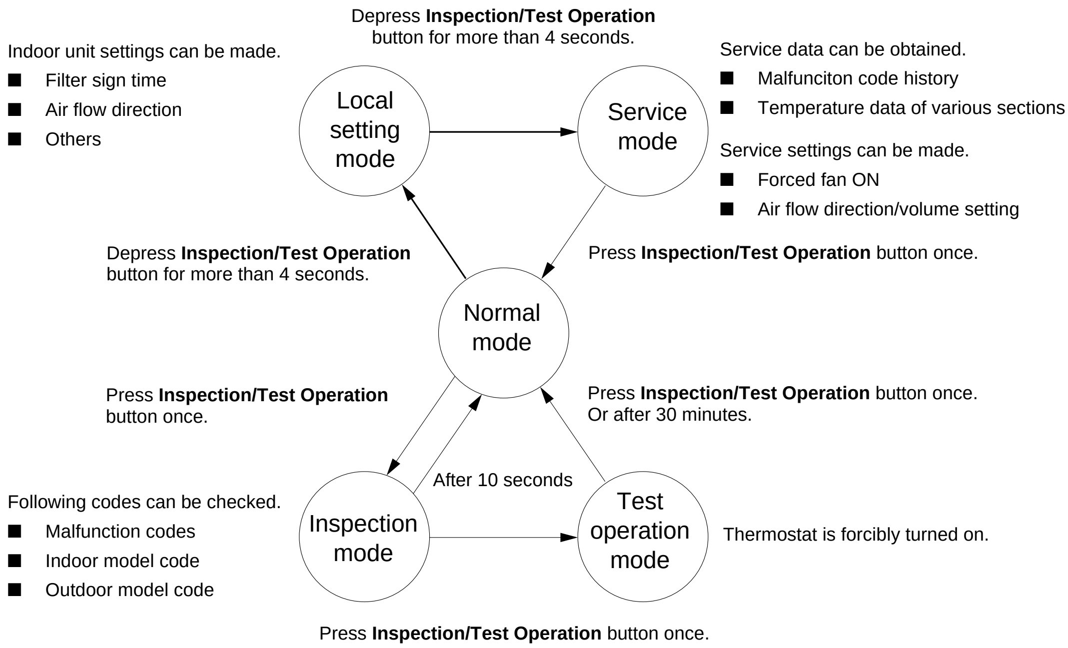
Caution

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

1.4 Procedure of Self-Diagnosis by Remote Control

The inspection/test button

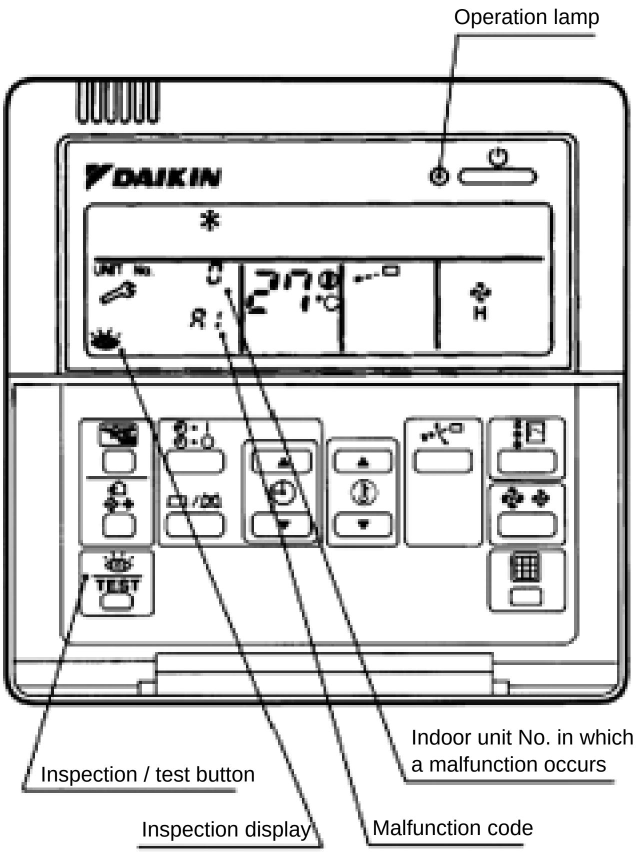
The following modes can be selected by using the [Inspection/Test Operation] button on the remote control.



1.5 Fault-diagnosis by Wired Remote Control

Explanation

If operation stops due to malfunction, the remote control'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 3-30 for malfunction code and malfunction contents.



3

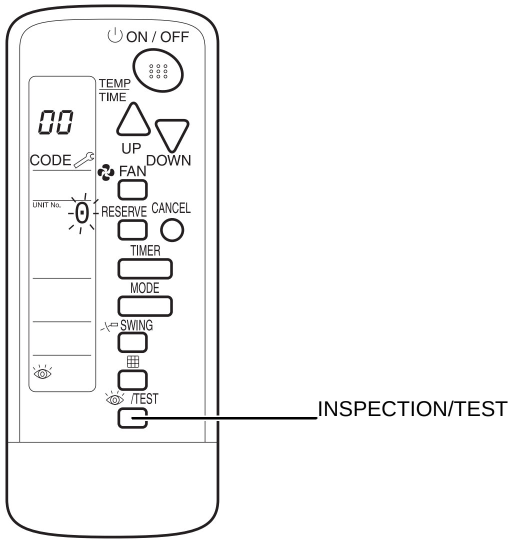
1.6 Fault-diagnosis by Infrared remote control

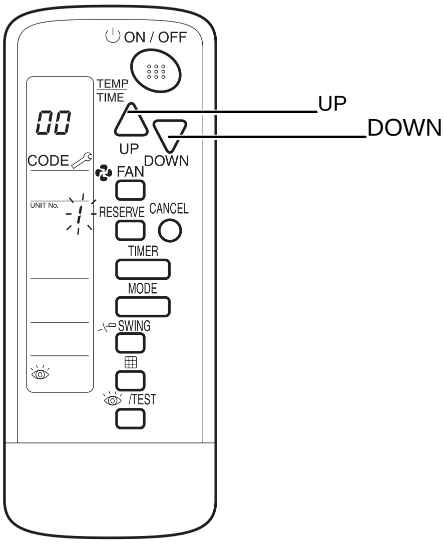
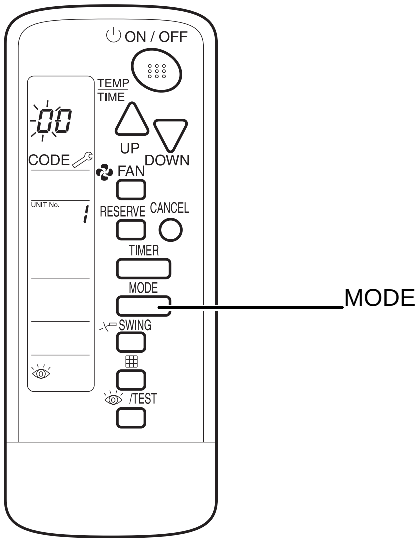
Introduction

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

Checking

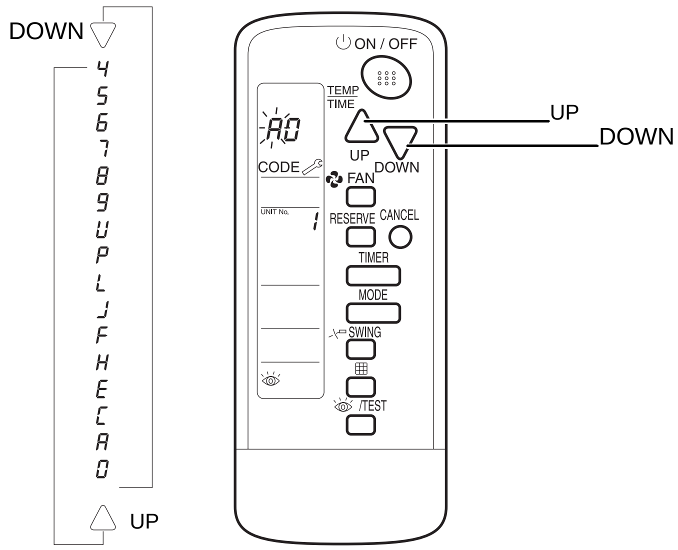
To find the error code, proceed as follows:

Step	Action
1	Press the INSPECTION/TEST button to select “inspection”. The equipment enters the inspection mode. “0” flashes in the UNIT No. display. 

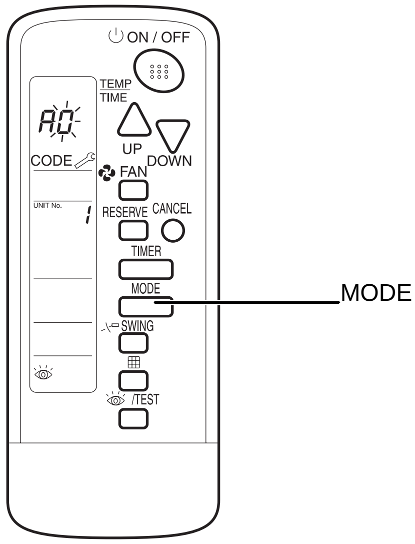
<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>2</td><td>Press the UP or DOWN button and change the UNIT No. until the receiver of the remote control starts to beep.

<table>
<tr><th>If you hear...</th><th>Then...</th></tr>
<tr><td>3 short beeps</td><td>Follow all steps below.</td></tr>
<tr><td>1 short beep</td><td>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>1 continuous beep</td><td>There is no abnormality.</td></tr>
</table></td></tr>
<tr><td>3</td><td>Press the MODE selector button.The left “0” (upper digit) indication of the error code flashes.’

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

3

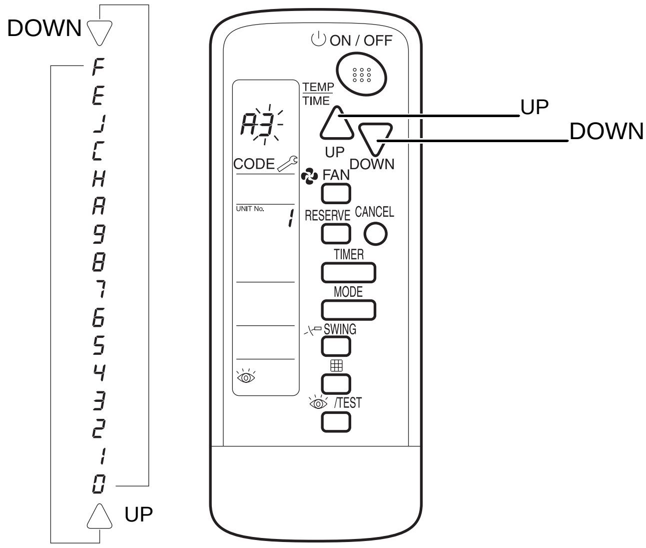
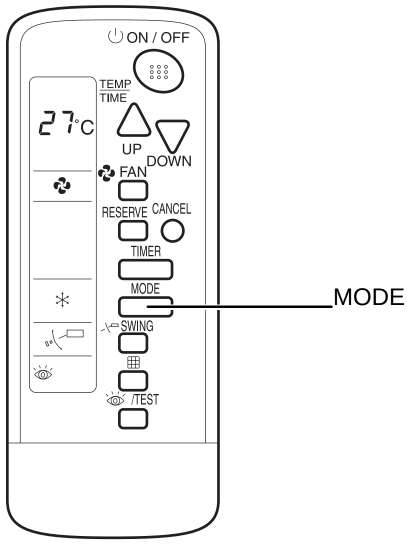
<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>4</td><td>Press the UP or DOWN button to change the error code upper digit until the receiver of the remote control starts to beep.



<table>
<tr><th>If you hear...</th><th>Then...</th></tr>
<tr><td>2 short beeps</td><td>The upper digit matches.</td></tr>
<tr><td>1 short beep</td><td>No digits match.</td></tr>
<tr><td>1 continuous beep</td><td>Both upper and lower digits match.</td></tr>
</table>
</td></tr>
<tr><td>5</td><td>Press the MODE selector button.The right “0” (lower digit) indication of the error code flashes.



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

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

3

3

1.7 Overview of Error Codes

Malfunction Code	Contents/Processing	Remarks
A1	Failure of PC board ass'y for indoor unit	
A3	Malfunction of drain water level system	
A6	Indoor unit fan motor overload / overcurrent / lock	(Note 1)
AF	Abnormal drain water level	Activation of float switch during compressor off.
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	
C5	Malfunction of gas piping temperature sensor system	
C9	Malfunction of suction air temperature sensor system	
CJ	Malfunction of remote control air temperature sensor system	Failure of remote control air thermistor. Unit can be operated by indoor unit thermistor.
E0	Actuation of safety device (outdoor unit)	(Note 1)
E1	Outdoor unit PC board malfunction	
E3	High pressure malfunction (outdoor unit)	
E4	Abnormality of low pressure (outdoor)	Failure of low pressure sensor system. Check if the stop valve open.
E5	Compressor motor lock malfunction	Compressor motor lock, incorrect wiring.
E7	Outdoor fan motor lock or outdoor fan instantaneous overcurrent malfunction	
E9	Malfunction of electronic expansion valve (outdoor unit)	
F3	Discharge pipe temperature malfunction (outdoor unit)	
H3	Failure of high pressure switch (outdoor unit)	
H7	Malfunction of outdoor fan motor signal	
H9	Malfunction of outdoor air temperature sensor system (outdoor unit)	(Note 2)
J3	Malfunction of discharge pipe temperature sensor system (outdoor unit)	
J5	Suction pipe thermistor malfunction	Failure of suction pipe thermister system
J6	Malfunction of heat exchanger temperature sensor system (outdoor unit)	(Note 2)
JC	Malfunction of suction pressure sensor	Failure of suction pressure sensor system
L4	Radiation fin temperature rise	Malfunction of inverter cooling
L5	Instantaneous over current	Possibility of compressor motor grounding or shortage of motor winding
L8	Electronic thermal	Possibility of compressor overload, open circuit in compressor motor
L9	Stall prevention	Possibility of compressor seizing
LC	Malfunction of transmission system (between control PCB and inverter PCB)	

Malfunction Code	Contents/Processing	Remarks
P1	Open phase or voltage unbalance	
P4	Abnormal radiation fin temperature sensor (outdoor unit)	
PJ	Failure of capacity setting (outdoor unit)	Either capacity data is set incorrectly, or capacity has not been set for the data IC
U0	Lack of gas malfunction	Abnormal suction pipe temperature
U2	Abnormal power supply voltage	Including malfunction of K1M, K2M
U4/UF	Failure of transmission (between indoor and outdoor unit)	Transmission between indoor and outdoor unit is not being correctly carried out. (Note 1, Note 2)
U5	Failure of transmission (between indoor unit and remote control)	Transmission between indoor and remote control is not being correctly carried out.
U8	Failure of transmission (between “main” and “sub” remote control	Transmission between “main” and “sub” remote control is not being correctly carried out.
UA	Failure of fieldsetting	System fieldsetting error pair, twin, triple, double twin or wrong capacity class.
UC	Address error of central remote control	

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

Notes:

1. There is a possibility of open phase power supply, check power supply also.
2. Operation when a malfunction occurs may differ according to the model.

3

1.8 Troubleshooting by LED Indications

1.8.1 Troubleshooting by LED on the indoor unit's

Foreword

Troubleshooting can be carried out by service monitor LED (green). (Blinks when normal)

W : LED on / X : LED off / C : LED blinks / — : No connection with troubleshooting

Microcomputer Normal Monitor	Transmission Normal Monitor	Contents/Processing
HAP (LED-A)	HBP (LED-B)	
C	C	Indoor unit normal → Outdoor unit trouble shooting
C	W	Incorrect transmission wiring between indoor and outdoor unit
	X	If outdoor unit's LED-A is off, proceed outdoor unit's trouble shooting. If outdoor unit's LED-A blinks, failure of wiring or indoor or outdoor unit P.C board ass'y. (Note 4)
W	—	Failure of indoor unit PC board ass'y (Note 5)
X		Malfunction of power supply or failure of PC board ass'y or broken transmission wire between indoor and outdoor unit. (Note 5)

Notes:

1. When the INSPECTION/TEST button of remote control is pushed, **INSPECTION** display blinks entering **INSPECTION** mode.
2. In the **INSPECTION** mode, when the ON/OFF button is pushed and held for 5 seconds or more, the aforementioned malfunctioning history display is off. In this case, after the malfunction code blinks 2 times, the code display turns to "00" (=Normal) and the unit No. turns to "0". The INSPECTION mode automatically switches to the normal mode (set temperature display).
3. Operation halts due to malfunction depending on the model or condition.
4. If LED-B is off, the transmission wiring between indoor and outdoor unit may be incorrect or disconnected. Before performing the previously described troubleshooting, check the transmission wiring.
5. Troubleshoot by turning off the power supply for a minimum of 5 seconds, turning it back on, and then rechecking the LED display.

1.8.2 Troubleshooting by LED on outdoor unit PCB

The following diagnosis can be conducted by turning on the power switch and checking the LED indication on the printed circuit board of the outdoor unit.

W : LED on / X : LED off / C : LED blinks / — : Not used for diagnosis

LED detection		Description
HAP	H1P	
(Green)	(Red)	
C	X	Normal
W	—	Faulty outdoor unit PCB (Note 1)
X	—	Power supply abnormality, or faulty outdoor unit PCB (Note 2)
C	W	Activation of protection device (Note 3)

3

Notes:

1. Turn off the power switch, and turn it on again after 5 seconds or more. Check the error condition, and diagnose the problem.
2. Turn off the power switch. After 5 seconds or more, disconnect the connection wire (2). Then turn on the power switch. If the HAP on the outdoor unit PCB flashes after about 10 seconds, the indoor unit PCB is faulty.
3. Also check for open phase.

Remark: The error detection monitor continues to indication the previously generated error until the power switch is turned off.
Be sure to turn off the power switch after inspection.

1.9 Troubleshooting by Remote Control Display / LED Display

Explanation for Symbols

C : LED blinks / W : LED on / X : LED off / — : No connection with troubleshooting

◎ : High probability of malfunction
○ : Possibility of malfunction
□ : Low probability of malfunction
— : No possibility of malfunction (do not replace)

1.9.1 Indoor malfunctions

Indoor Unit Mal-functions	Indoor Unit LED Display Note 2		Remote Control Display	Location of Malfunction				Contents of Malfunction	Details of Malfunction (Reference Page)
	H1P	H2P		Other than PC Board	PC Board				
					Out-door Unit	Indoor Unit	Remote Control		
	c	c	*Note 1	—	—	—	—	Normal → to outdoor unit	—
	c	w	A1	—	—	○	—	Malfunction indoor unit PC board (For troubleshooting by LED, refer to p.32.)	3–40
	c	x							
	w	—							
	x	—							
	c	c	A3	◎	—	—	—	Malfunction of drain water level system	3–41
	c	c	AF	◎	—	—	—	Malfunction of drain sys-tem	3–44
	c	c	A6	◎	—	□	—	Indoor unit fan motor lock	3–46
	c	c	AJ	◎	—	○	—	Malfunction of capacity setting	3–48
	c	c	C4	◎	—	□	—	Malfunctioning heat exchanger thermistor sys-tem.	3–50
	c	c	C5	◎	—	□	—	Malfuncioning gaspipe thermistor system.	3–50
	c	c	C9	◎	—	□	—	Malfunctioning suction air thermistor system.	3–50
	c	c	CJ	—	—	□	—	Malfunctioning remote control air thermisto	3–52

1.9.2 Outdoor malfunctions

Outdoor Unit Malfunction	Remote Control Display	Location of Malfunction				Contents of Malfunction	Details of Malfunction (Reference Page)
		Other than PC Board	PC Board				
			Outdoor Unit	Indoor Unit	Remote Control		
	E0	◎	☐	—	—	Activation of protection device Note 1.	3–54
	E1	◎	◎	—	—	Outdoor unit P.C board malfunction	3–55
	E3	◎	—	—	—	Abnormality of high pressure (HPS)	3–56
	E4	◎	☐	—	—	Abnormality of low pressure (outdoor)	3–58
	E5	◎	☐	—	—	Compressor motor lock malfunction	3–60
	E7	◎	☐			Malfunction of outdoor unit fan motor	3–62
	E9	◎	☐	—	—	Malfunction of Electronic expansion valve	3–63
	F3	◎	☐	—	—	Discharge pipe temperature malfunction	3–65
	H3	◎	◎	—	—	Faulty high pressure switch (HPS)	3–67
	H7	◎	◎	—	—	Malfunction of outdoor fan signal	3–68
	H9	◎	☐	—	—	Malfunction of outdoor air temperature sensor system	3–69
	J3	◎	☐	—	—	Malfunction of discharge pipe temperature sensor system	3–69
	J5	◎	☐	—	—	Suction pipe thermistor malfunction	3–69
	J6	◎	☐	—	—	Malfunction of heat exchanger temperature sensor system	3–69
	JC	◎	☐	—	—	Suction pipe pressure sensor malfunction	3–70
	L4	◎	☐	—	—	High temperature of radiation fin	3–71
	L5	◎	☐	—	—	Overcurrent of DC output (instantaneous)	3–72
	L8 Note 2	◎	☐	—	—	Electronic thermal switch (time lag)	3–74
	L9	◎	☐	—	—	Stall prevention (time lag)	3–76
	LC	◎	○	—	—	Malfunction of transmission system (between control PCB and inverter PCB)	3–78
	P1	◎	☐	—	—	Open phase or voltage unbalance	3–80
	P4	◎	☐	—	—	Malfunction of radiator fin temperature thermistor	3–82
	PJ	◎	☐	—	—	Error in capacity setting	3–84
	U0	◎	—	—	—	Gas shortage	3–85
	U2	◎	☐	—	—	Abnormal power supply voltage	3–86

Notes:
1. Possibility of open phase in power supply.
2. In RZQ model, L8 is not displayed on remote control. Please see 3–74 for more detail.

1.9.3 System

Outdoor Unit Malfunction	Remote Control Display	Location of Malfunction				Contents of Malfunction	Details of Malfunction (Reference Page)
		Other than PC Board	PC Board				
			Outdoor Unit	Indoor Unit	Remote Control		
	U4 or UF	◎	○	○	—	Transmission error (between indoor and outdoor unit)	3–90
	U5	◎	—	○	○	Transmission error (between indoor and remote control)	3–92
	U8	◎	—	○	○	Transmission error between “main” remote control and “sub” remote control	3–93
	UA	◎	—	○	—	Excessive indoor units connected to this system.	3–94
	UC	◎	—	—	○	Centralized address setting error	3–96

1.10 Overview of the Outdoor Safety Devices

	High pressure switch		Fuse
	Open	**Close**	
RZQ71	4.0 Mpa +0/-0.15	3.0 +/-0.15	6.3A/250V
RZQ100			
RZQ125			

3

1.11 Overview of the Indoor Safety Devices

	Thermal protector		Thermal fuse fan motor
	Abnormal	Reset (automatic)	
FFQ35~60	>130°C +/-5°C	<83°C +/-20°C	N.A.
FCQ35~71	>130°C +/-5°C	<83°C +/-20°C	N.A.
FCQ100/125	>140°C +/-5°C	<45°C +/-15°C	N.A.
FBQ35~125	N.A.	N.A.	>152°C
FDQ125	N.A.	N.A.	>160°C
FHQ35~125	>130°C +/-5°C	<83°C +/-20°C	N.A.
FUQ71~125	>130°C +/-5°C	<83°C +/-20°C	N.A.
FAQ71/100	>130°C +/-5°C	<83°C +/-20°C	N.A.

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 control 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 control.

Overview

This chapter contains the following topics:

2.2 Malfunctioning Indoor PCB (A1)

Error code A1

LED indications The table below shows the LED indications.

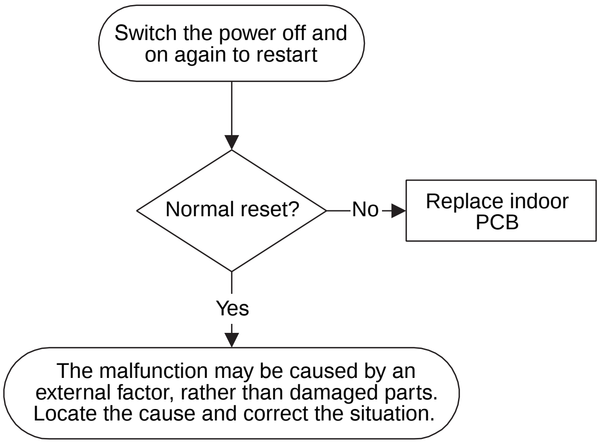
Operation	HAP (green)	HBP (green)
Normal	c	c
Malfunctioning	c	w
	c	x
	w	—
	x	—

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



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

2.3 Malfunction of Drain Water Level System (A3)

Error code

A3

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.

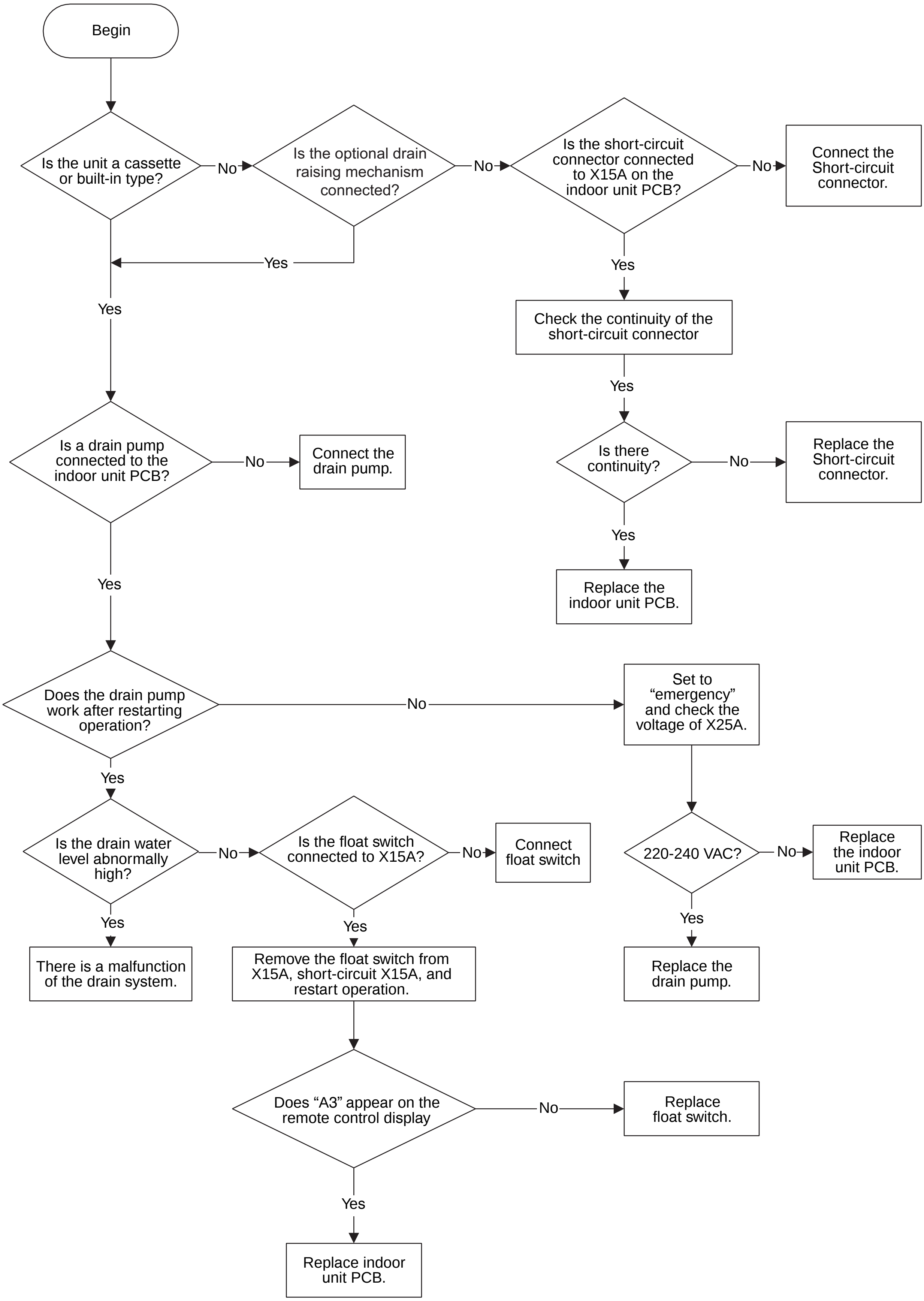
Causes

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.

3

Troubleshooting



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 Malfunctioning Drain System (AF)

Error code

AF

LED indications

The table below shows the LED indications.

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

Error generation

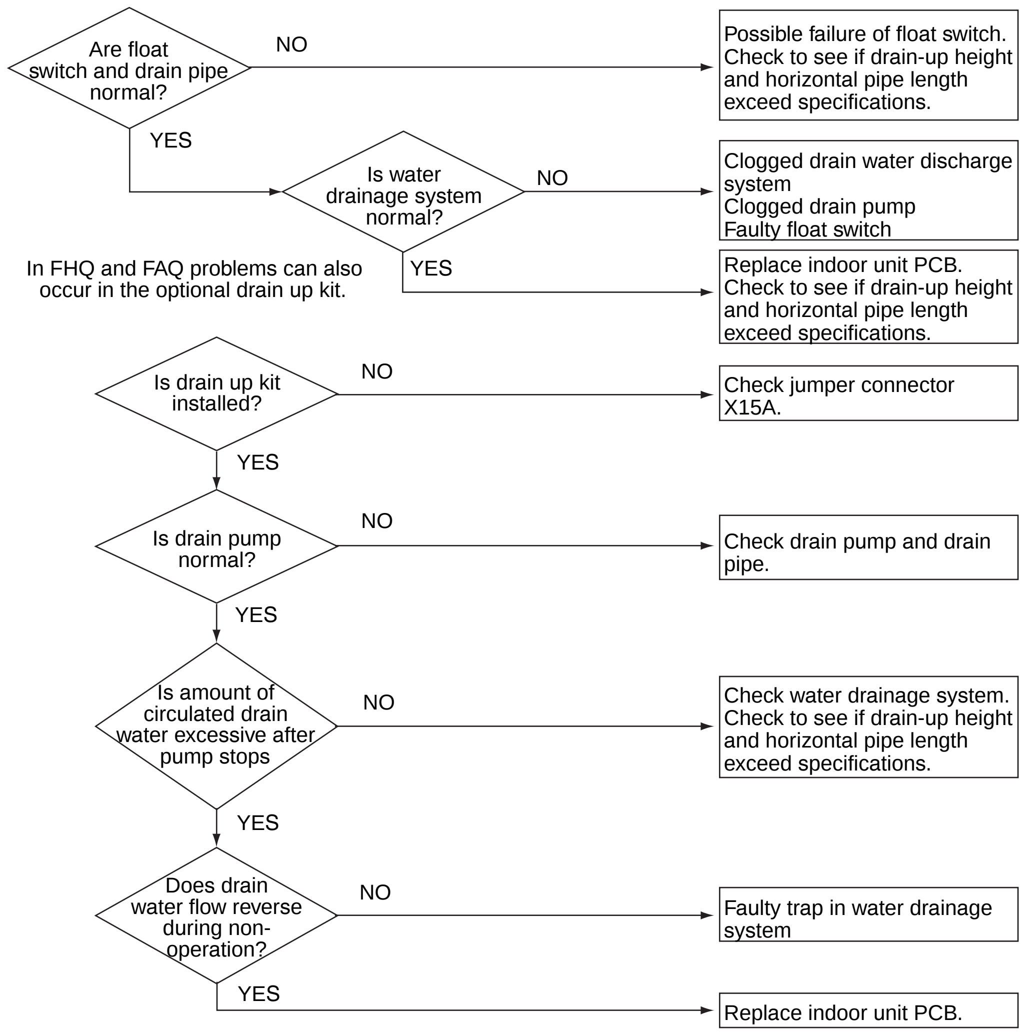
The error is generated when the float switch changes from ON to OFF while the compressor is OFF.

Causes

The possible causes are:

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

Troubleshooting



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

3

2.5 Indoor Unit Fan Motor Lock (A6)

Error code

A6

LED indications

The table below shows the LED indications.

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

Error generation

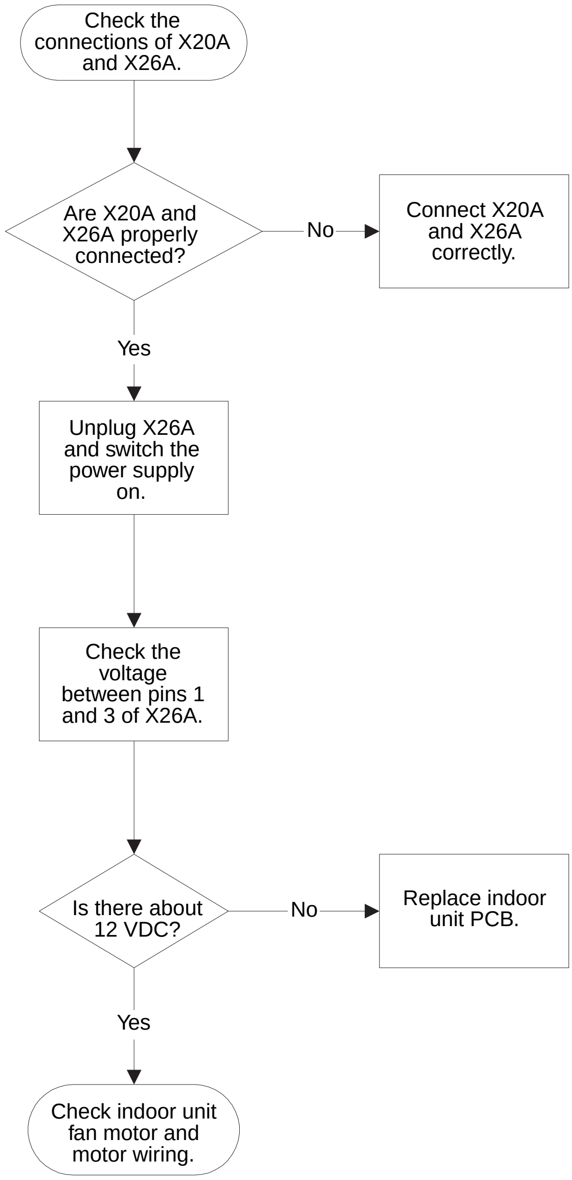
The error is generated when the fan rotations are not detected while the output voltage to the fan is at its maximum.

Causes

The possible causes are:

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

Troubleshooting



Caution

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

2.6 Malfunctioning Capacity Setting (AJ)

Error code

AJ

LED indications

The table below shows the LED indications.

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

3

Error generation

The error is generated when the following conditions are fulfilled:

Condition	Description
1	■ The unit is in operation. ■ The PCB’s memory IC does not contain the capacity code. ■ The capacity setting adaptor is not connected.
2	■ The unit is in operation. ■ The capacity that is set, does not exist for that unit.

Causes

The possible causes are:

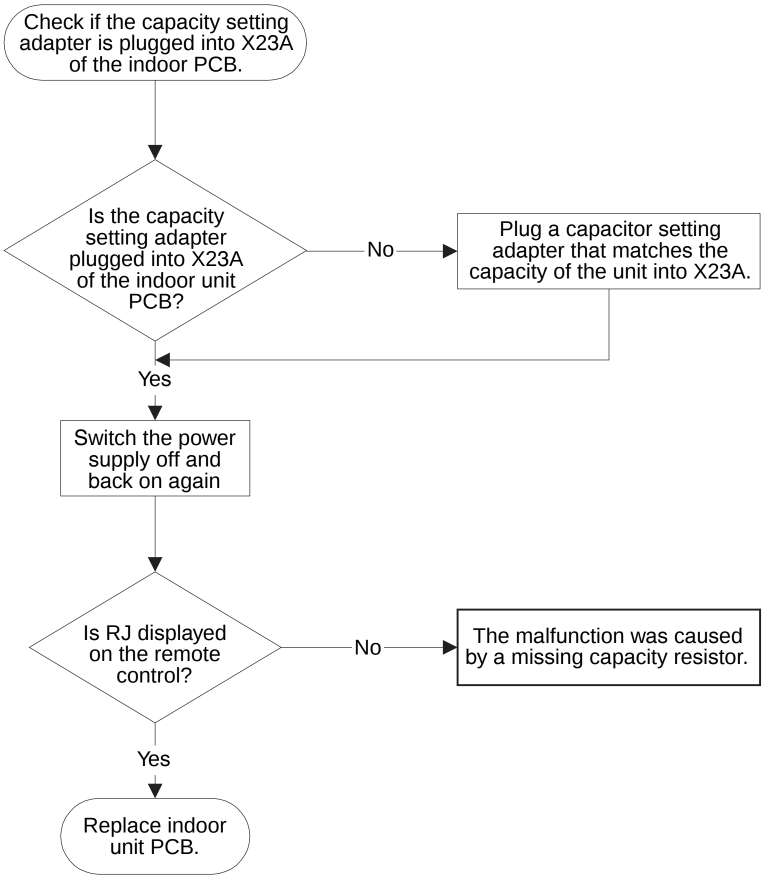
- Malfunctioning capacity setting adaptor connection
- Malfunctioning indoor unit PCB.

Capacity setting adaptor

The capacity is set in the PCB’s memory IC. A capacity setting adaptor 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 adaptor with the correct capacity setting to the PCB. The capacity setting for the PCB will become the capacity setting of the adaptor because the capacity setting adaptor has priority.

Troubleshooting



Caution

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

2.7 Thermistor Abnormality (C4, C5, C9)

Error code

The table below describes the two thermistor abnormalities.

Error	Description
C4	Malfunctioning heat exchanger thermistor system.
C5	Malfuncioning gaspipe thermistor system.
C9	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

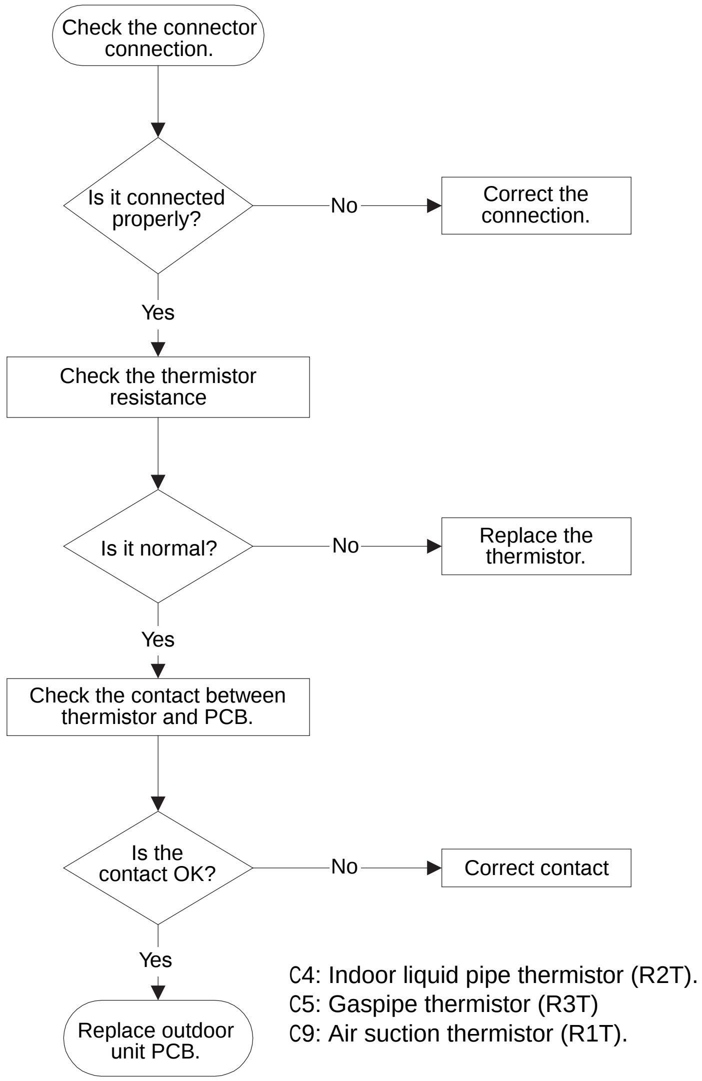
The possible causes are:

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

Checking thermistors

See page 3–102.

Troubleshooting



Caution

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

2.8 Malfunctioning Remote Control 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 control thermistor becomes disconnected or shorted while the unit is running.

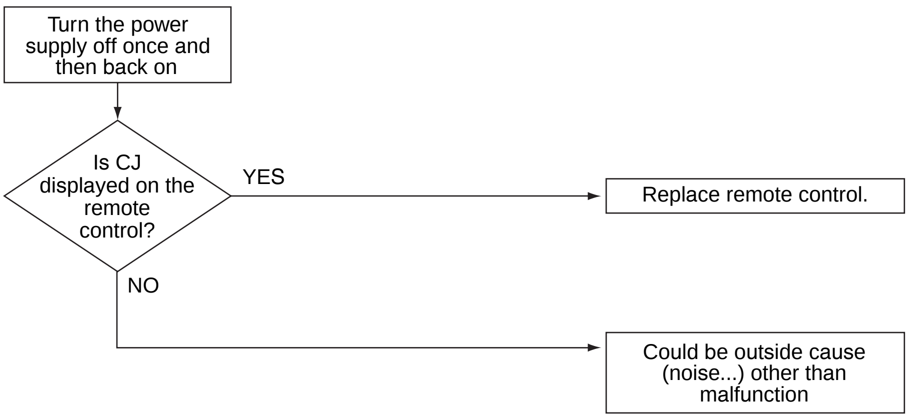
Even if the remote control thermistor is malfunctioning, the system can operate with the system thermistor.

Causes

The possible causes are:

- Malfunctioning thermistor
- Broken wire.

Troubleshooting



Caution

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

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 control display. The error code helps you to find the cause of the problem.

3

Overview

This chapter contains the following topics:

3.2 Actuation of Protection Device (E0)

Remote Control Display

E0

Method of Malfunction Detection

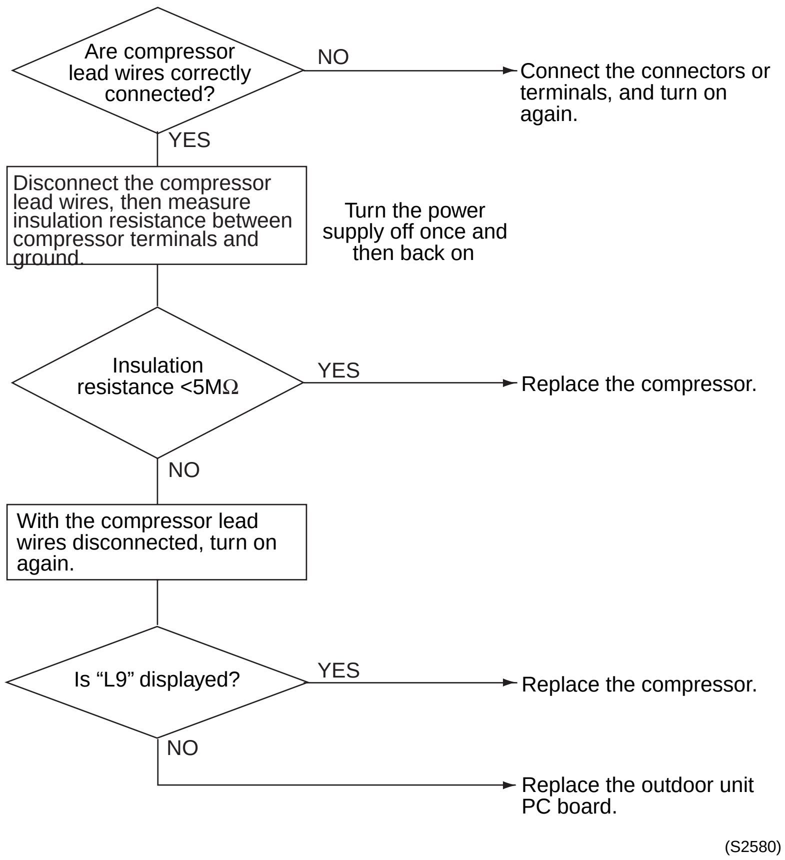
The protection device input circuit checks the actuation of each individual protection device. (Batch detection of all protection devices)

Malfunction Decision Conditions

Supposed Causes

- Actuation of outdoor unit protection device
- Faulty outdoor unit PC board
- Instantaneous power failure

Troubleshooting



Caution

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

3.3 Failure of Outdoor Unit PC Board (E1)

Remote Control Display

E1

Method of Malfunction Detection

Microcomputer checks whether E^2PROM is normal.

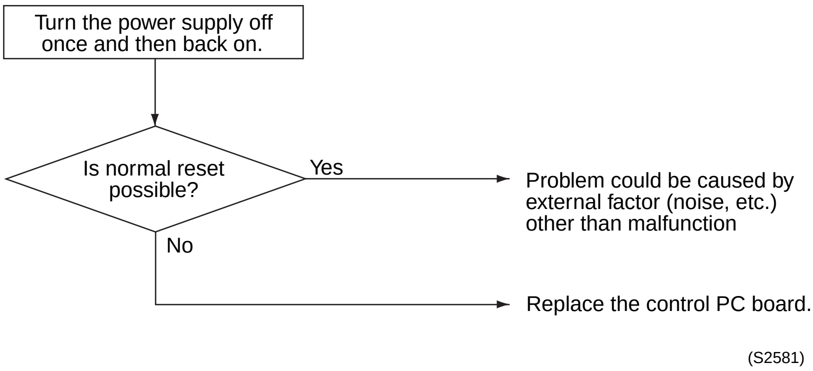
Malfunction Decision Conditions

E^2PROM:
When E^2PROM malfunctions when turning the power supply on

Supposed 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)

Remote Control Display

E3

Method of Malfunction Detection

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

Malfunction Decision Conditions

When the high pressure switch is actuated
Actuating pressure:
RZQ71~125

3

Supposed Causes

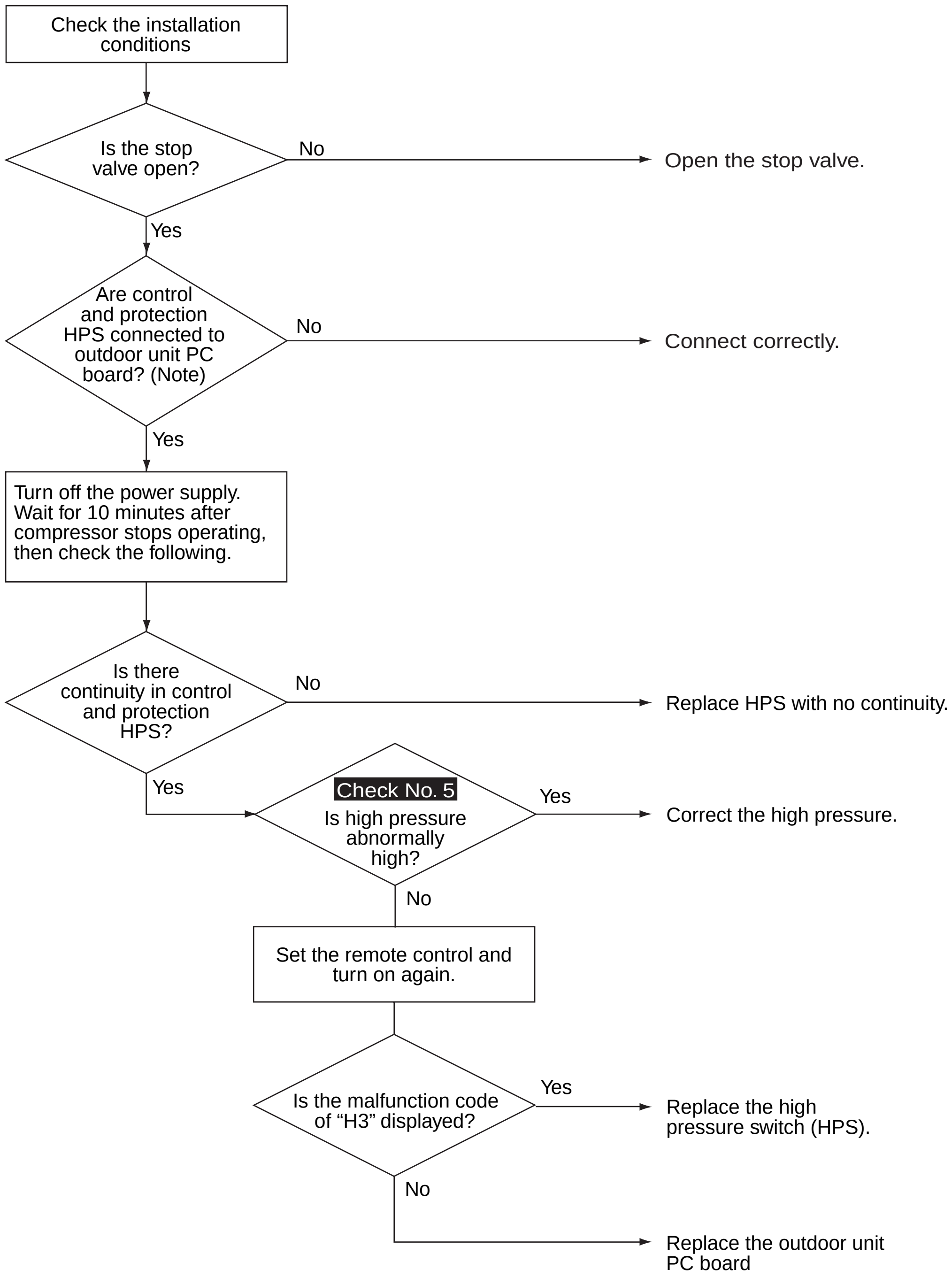
- Faulty high pressure switch
- Disconnection in high pressure switch harness
- Faulty connection of high pressure switch connector
- Clogged indoor unit suction filter (in heating operation)
- Dirty outdoor unit heat exchanger
- Faulty outdoor unit fan
- Refrigerant overcharge
- Stop valve is left in closed.

HPS settings

The table below contains the preset HPS values.

	High pressure switch		Fuse
	Open	**Close**	
RZQ71	4.0 Mpa +0/-0.15	3.0 +/-0.15	6.3A/250V
RZQ100			
RZQ125			

Troubleshooting



(S2582)

Caution

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

3.5 Actuation of Low Pressure Sensor (E4)

Remote Control Display

E4

Method of Malfunction Detection

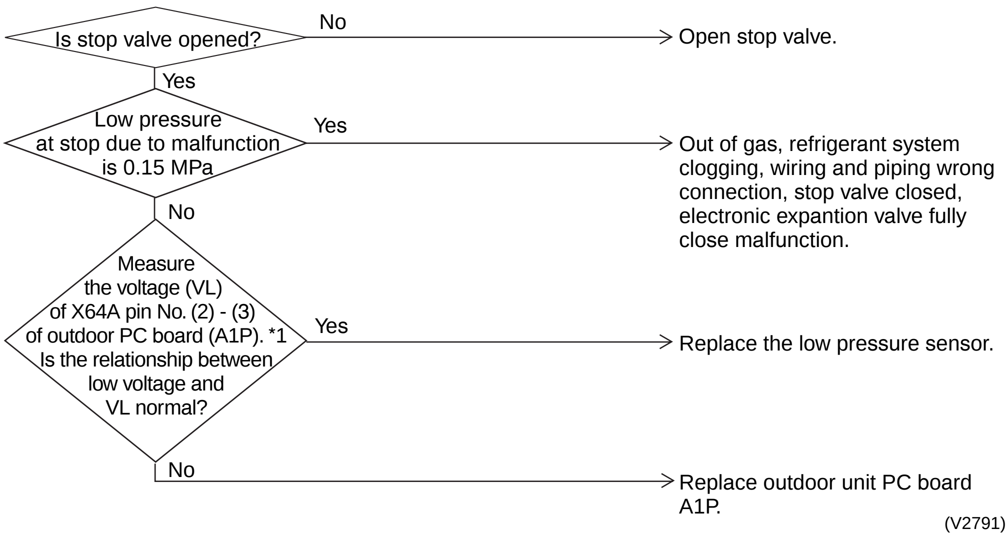
Malfunction Decision Conditions

Error is generated when the low pressure is dropped under specific pressure.

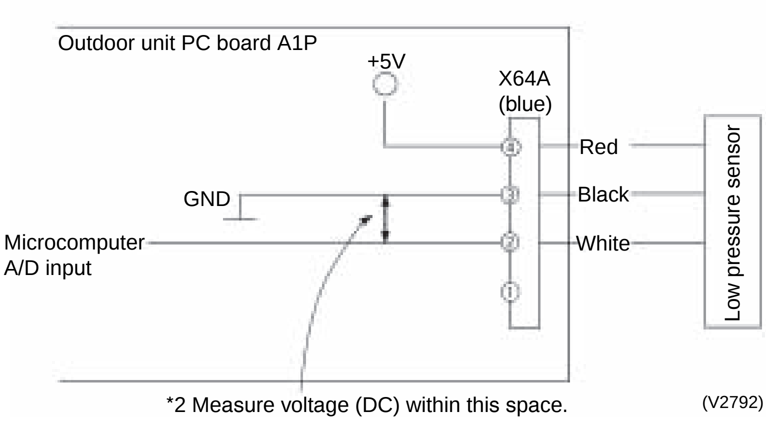
Supposed Causes

- Abnormal drop of low pressure (Lower than 0.15MPa)
- Defect of low pressure sensor
- Defect of outdoor unit PC board
- Stop valve is not opened.

Troubleshooting



*1: Voltage measurement point



*2 Refer to Low pressure sensor, check on page 3–111.

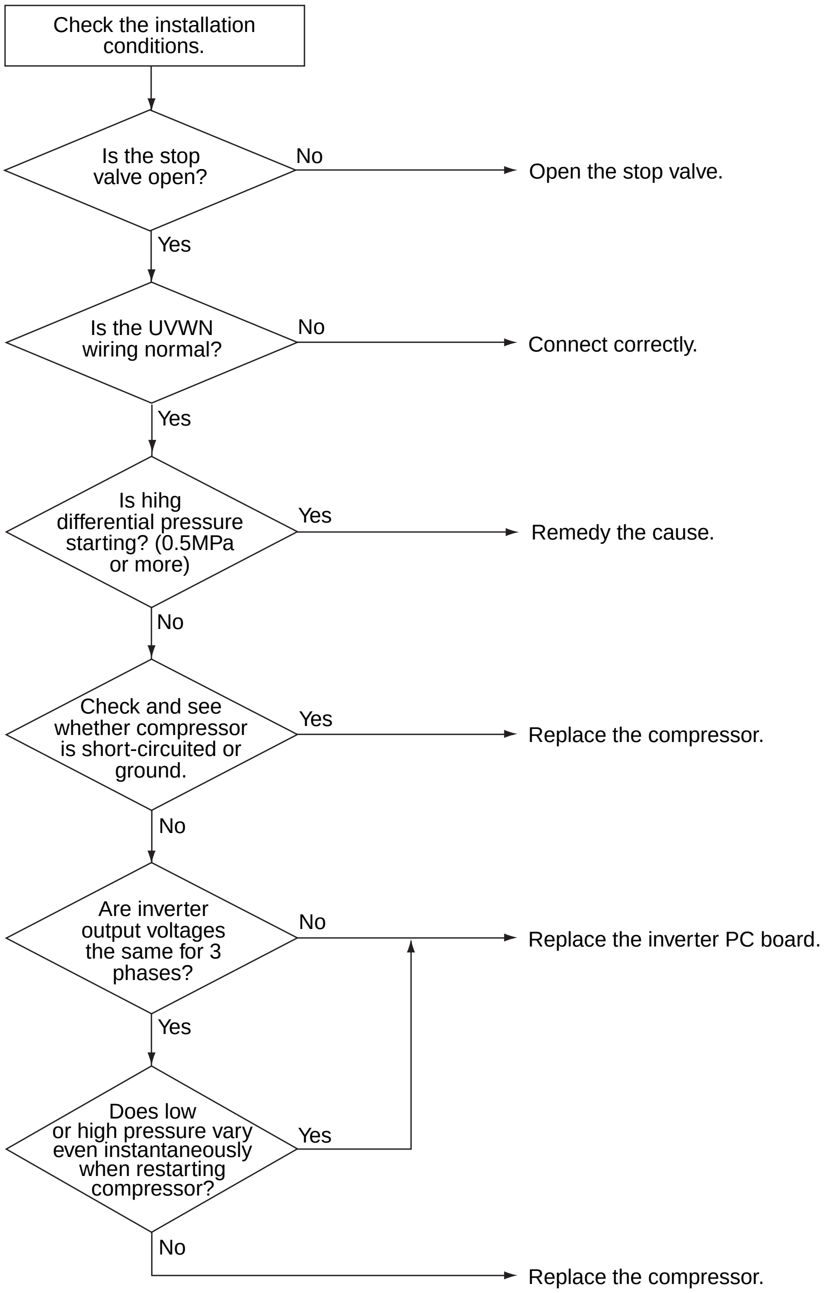
Caution

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

3.6 Compressor Motor Lock (E5)

Remote Control Display	E5
Method of Malfunction Detection	Inverter PC board takes the position signal from UVWN line connected between the inverter and compressor, and detects the position signal pattern.
Malfunction Decision Conditions	The position signal with 3 times cycle as imposed frequency is detected when compressor motor operates normally, but 2 times cycle when compressor motor locks. When the position signal in 2 times cycle is detected
Supposed Causes	■ Compressor lock ■ High differential pressure (0.5MPa or more) starting ■ Incorrect UVWN wiring ■ Faulty inverter PC board ■ Stop valve is left in closed.

Troubleshooting



(S2583)

Caution

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

3.7 Malfunction of Outdoor Unit Fan Motor (E7)

Remote Control Display

E7

Method of Malfunction Detection

Abnormality of fan motor system is detected according to the fan speed detected by hall IC when the fan motor runs.

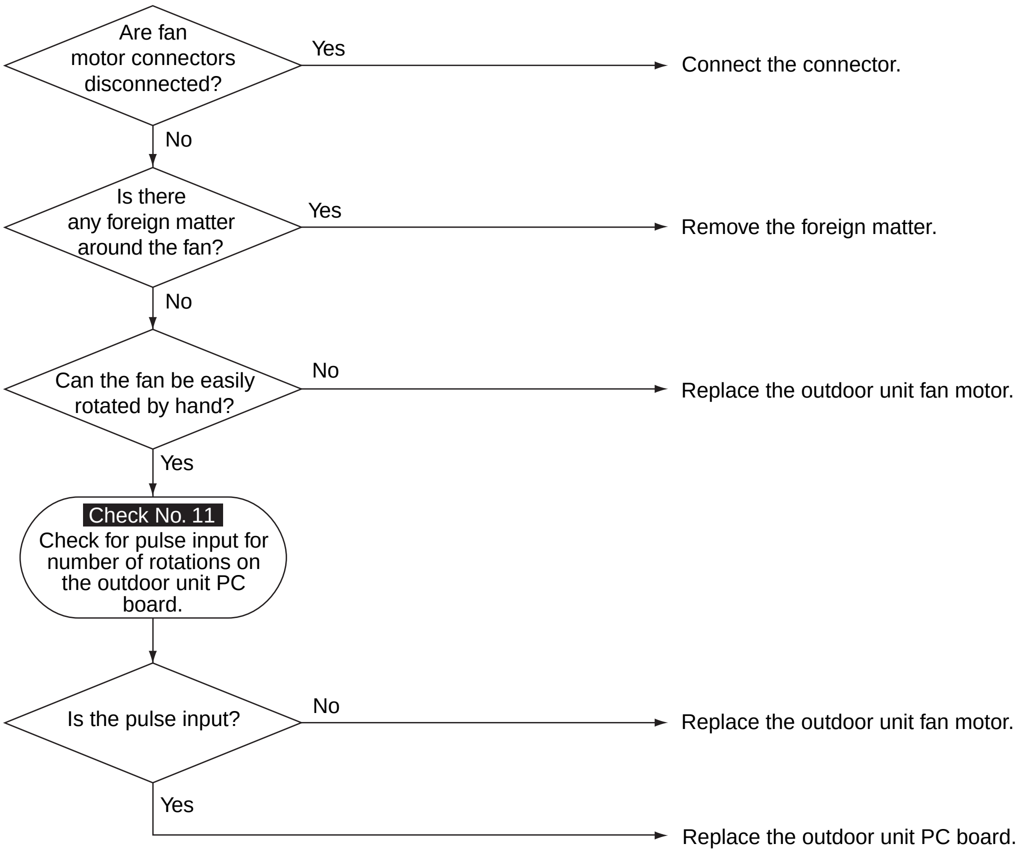
Malfunction Decision Conditions

- When the fan runs with speed less than a specified one for 15 seconds or more when the fan motor running conditions are met
- When connector detecting fan speed is disconnected
- When malfunction is generated 4 times, the system shuts down.

Supposed Causes

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

Troubleshooting



(S2584)

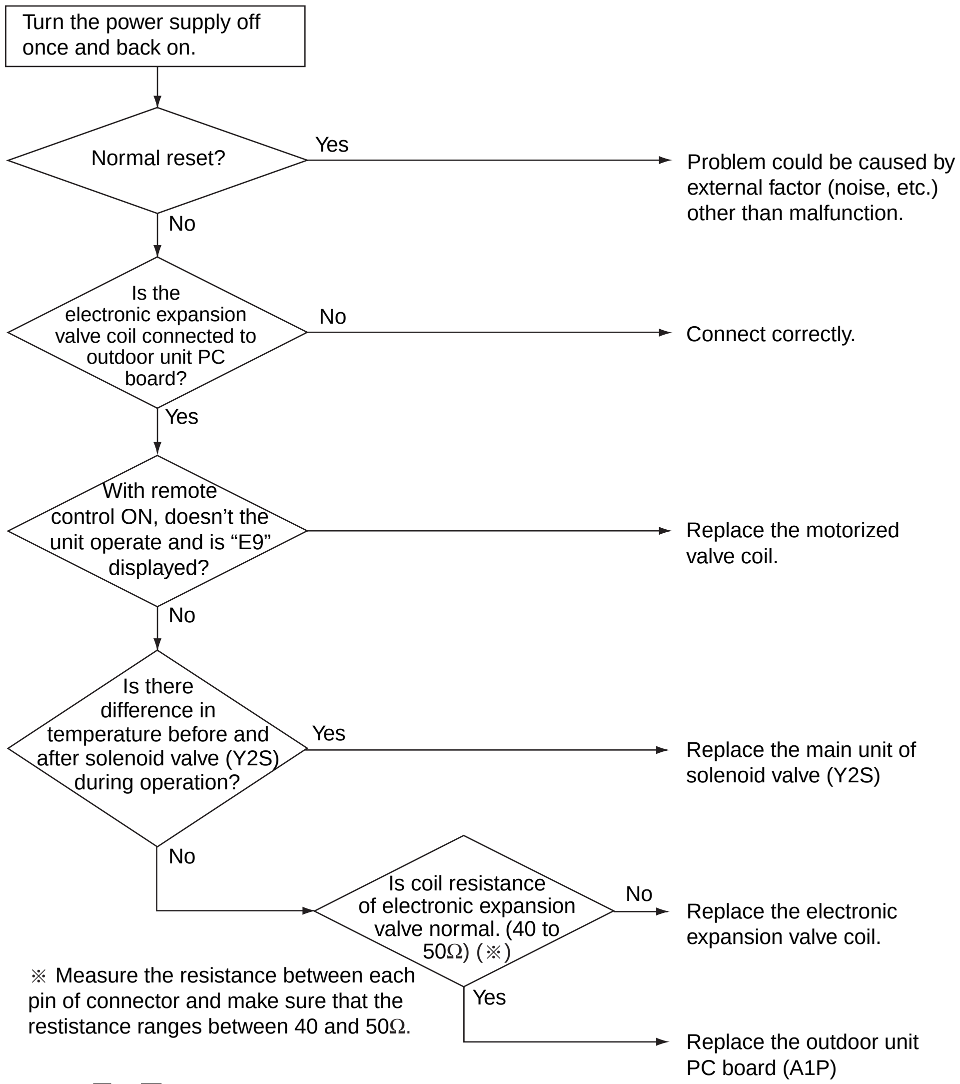
Caution

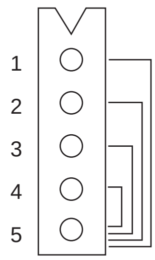
Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.8 Malfunction of Electronic Expansion Valve (E9)

Remote Control Display	E9
Method of Malfunction Detection	Method is determined according to the suction pipe superheat degree and electronic expansion valve opening degree calculated by values of low pressure sensor and suction pipe temperature thermistor.
Malfunction Decision Conditions	When the following conditions are met for 10 minutes ■ Suction pipe superheat degree < 2°C ■ Minimum electronic expansion valve opening degree
Supposed Causes	■ Faulty electronic expansion valve ■ Faulty solenoid valve ■ Faulty check valve

Troubleshooting





Measurement point
1—5
2—5
3—5
4—5

(S2585)

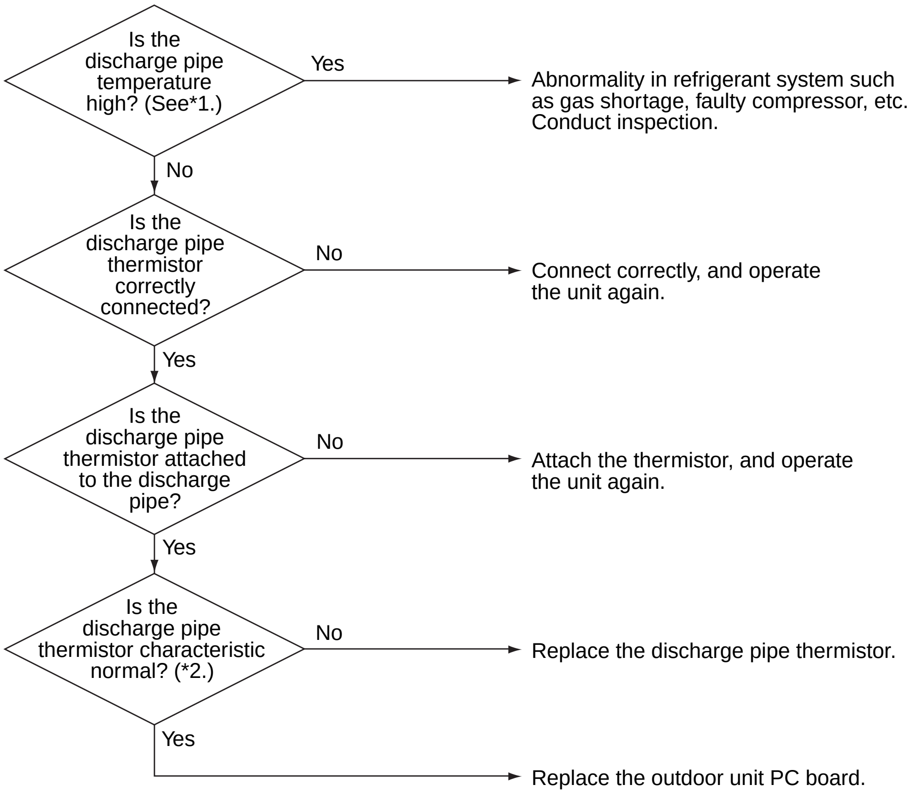
Caution

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

3.9 Malfunctioning in Discharge Pipe Temperature (F3)

Remote Control Display	F3
Method of Malfunction Detection	Abnormality is detected according to the temperature detected by the discharge pipe temperature sensor.
Malfunction Decision Conditions	■ When the discharge pipe temperature rises to an abnormally high level ■ When the discharge pipe temperature rises suddenly
Supposed Causes	■ Faulty discharge pipe thermistor ■ Faulty connection of discharge pipe thermistor ■ Insufficient refrigerant amount ■ Faulty compressor ■ Disconnection of discharge pipe temperature thermistor piping

Troubleshooting



*1 Temperature varies depending on model type.

Model name	Temperature
RZQ71	110°C
RZQP100 ~ 125	115°C

*2 See Check No. 12 for “Thermistor temperature/Resistance characteristics”.

(S2586)

Caution

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

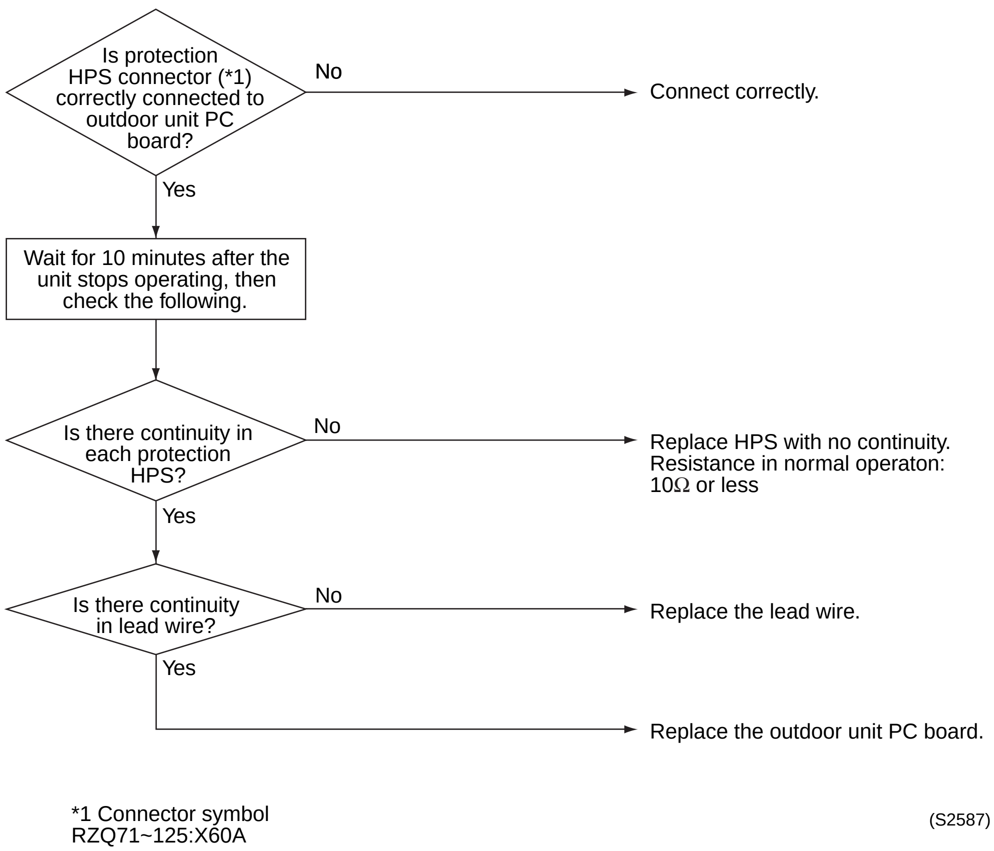
3.10 Malfunctioning HPS System (H3)

Remote Control Display	H3
Method of Malfunction Detection	The protection device circuit checks continuity in the high pressure switch.
Malfunction Decision Conditions	When there is no continuity in the high pressure switch during compressor stops operating.

Supposed Causes

- Incomplete high pressure switch
- Disconnection in high pressure switch harness
- Faulty connection of high pressure switch connector
- Faulty outdoor unit PC board
- Disconnected lead wire

Troubleshooting



Caution

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

3.11 Malfunction of Outdoor Fan Motor Signal (H7)

Remote Control Display

H7

Method of Malfunction Detection

Detection of signal malfunction from outdoor fan motor.

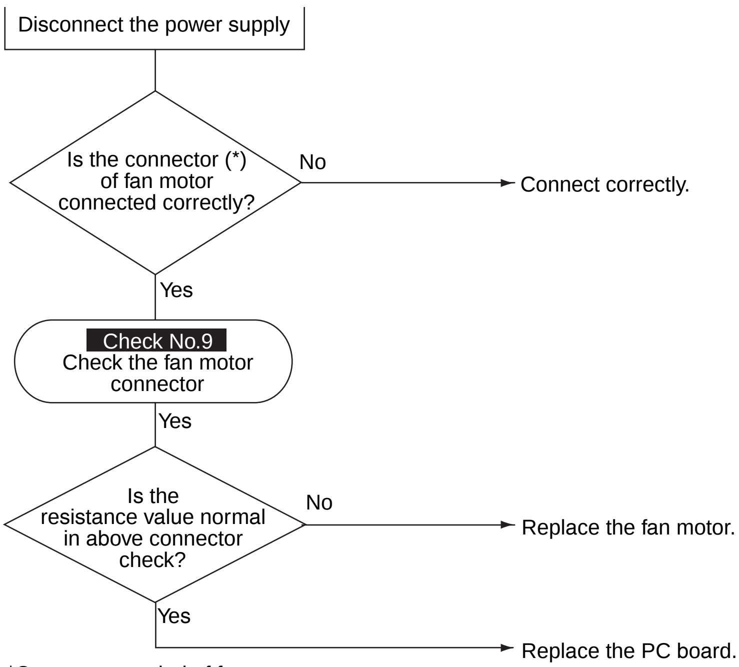
Malfunction Decision Conditions

When malfunction signal is detected at the start of fan motor operation.

Supposed Causes

- Malfunction of fan motor signal (circuit failure)
- Disconnection, short of fan motor lead wire and coming off the connector
- Faulty PC board

Troubleshooting



*Connector symbol of fan motor

Model name	Connector symbol
RZQ71	X206A
RZQ100 to 125	X206A, X207A

★ Caution for service
If the outdoor fan rotates due to strong wind, voltage generates in main circuit capacitor. To prevent electric shock, make sure the low voltage of main circuit (50 VDC or lower) before carrying out troubleshooting. To prevent PC board from being damaged, touch the earth connector in an electric parts box immediately before the inserting and extracting the connector, which discharges the static from human body

(S2588)

Caution

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

3.12 Malfunction of Thermistor System (H9, J3, J5, J6)

Remote Control Display

H9, J3, J5, J6

Method of Malfunction Detection

Abnormality is detected according to the temperature detected by each individual thermistor.

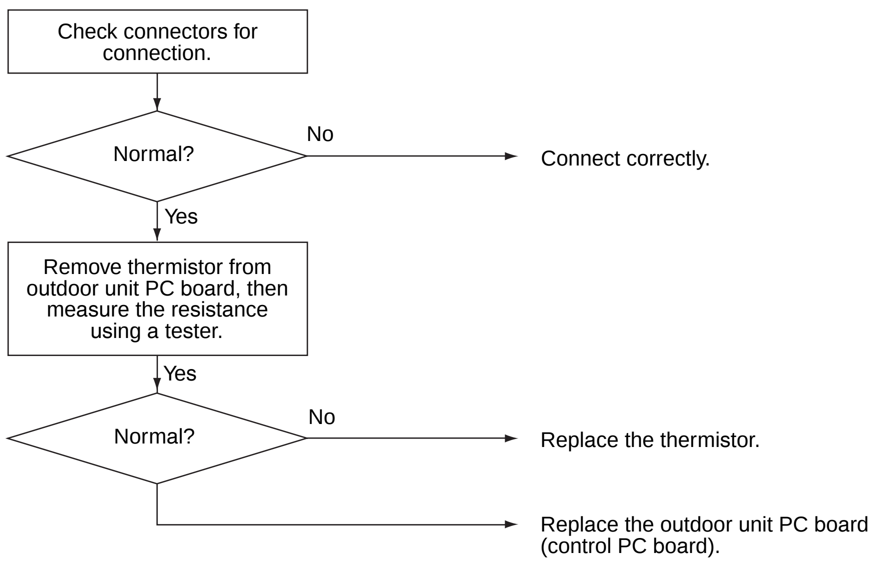
Malfunction Decision Conditions

When thermistor is disconnected or short-circuited during operation

Supposed Causes

- Faulty thermistor
- Faulty connection of connector
- Faulty outdoor unit PC board (control PC board)

Troubleshooting



H9 : Malfunction of outdoor temperature thermistor system
J3 : Malfunction of discharge pipe thermistor system
J5 : Malfunction of suction pipe thermistor system
J6 : Malfunction of heat exchange thermistor

★See Check No. 12 for "Thermistor temperature/Resistance characteristics".

(S2589)

Caution

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

3.13 Malfunction of Suction Pipe Pressure Sensor (JC)

Remote Control Display

JC

Method of Malfunction Detection

Malfunction is detected from pressure detected by low pressure sensor.

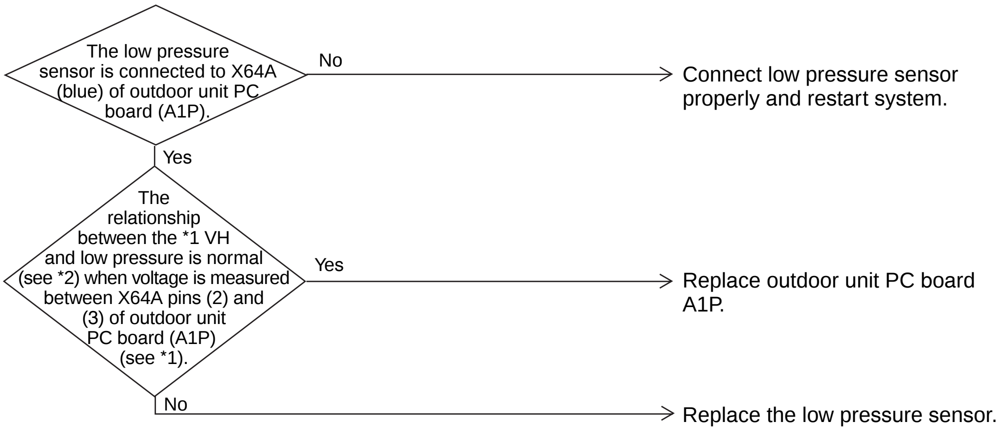
Malfunction Decision Conditions

When the suction pipe pressure sensor is short circuit or open circuit.

Supposed Causes

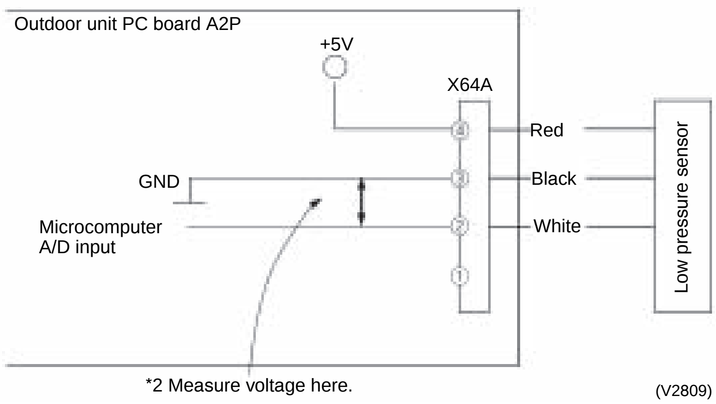
- Defect of low pressure sensor system
- Connection of high pressure sensor with wrong connection.
- Defect of outdoor unit PC board.

Troubleshooting



(V2808)

∗1: Voltage measurement point



(V2809)

∗2: Refer to pressure sensor, pressure/voltage characteristics table on page 3–111.

Caution

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

3.14 Radiation Fin Temperature Increased (L4)

Remote Control Display

L4

Method of Malfunction Detection

Fin temperature is detected by the thermistor of the radiation fin.
(Thermistor for RZQ100 & 125 is on power transistor (IGBT).)

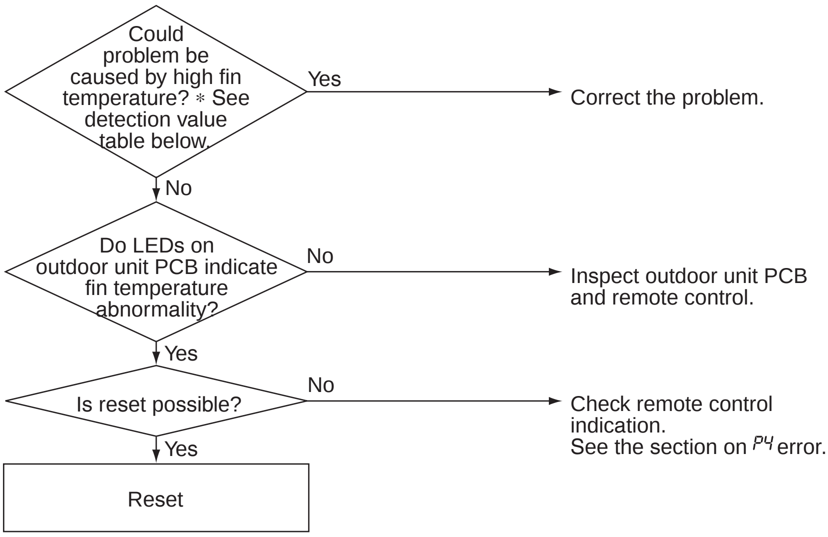
Malfunction Decision Conditions

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

Supposed Causes

- Activation of fin thermal switch
- Faulty fin thermistor
- High outside air temperature
- Insufficient cooling of inverter radiation fin
- Blocked suction opening
- Dirty radiation fin
- Faulty outdoor unit PCB

Troubleshooting



(S2031)

* Fin temperature detection values

	Detection	Reset
RZQ71	90°C	80°C
RZQ100~125	98°C	88°C

Caution

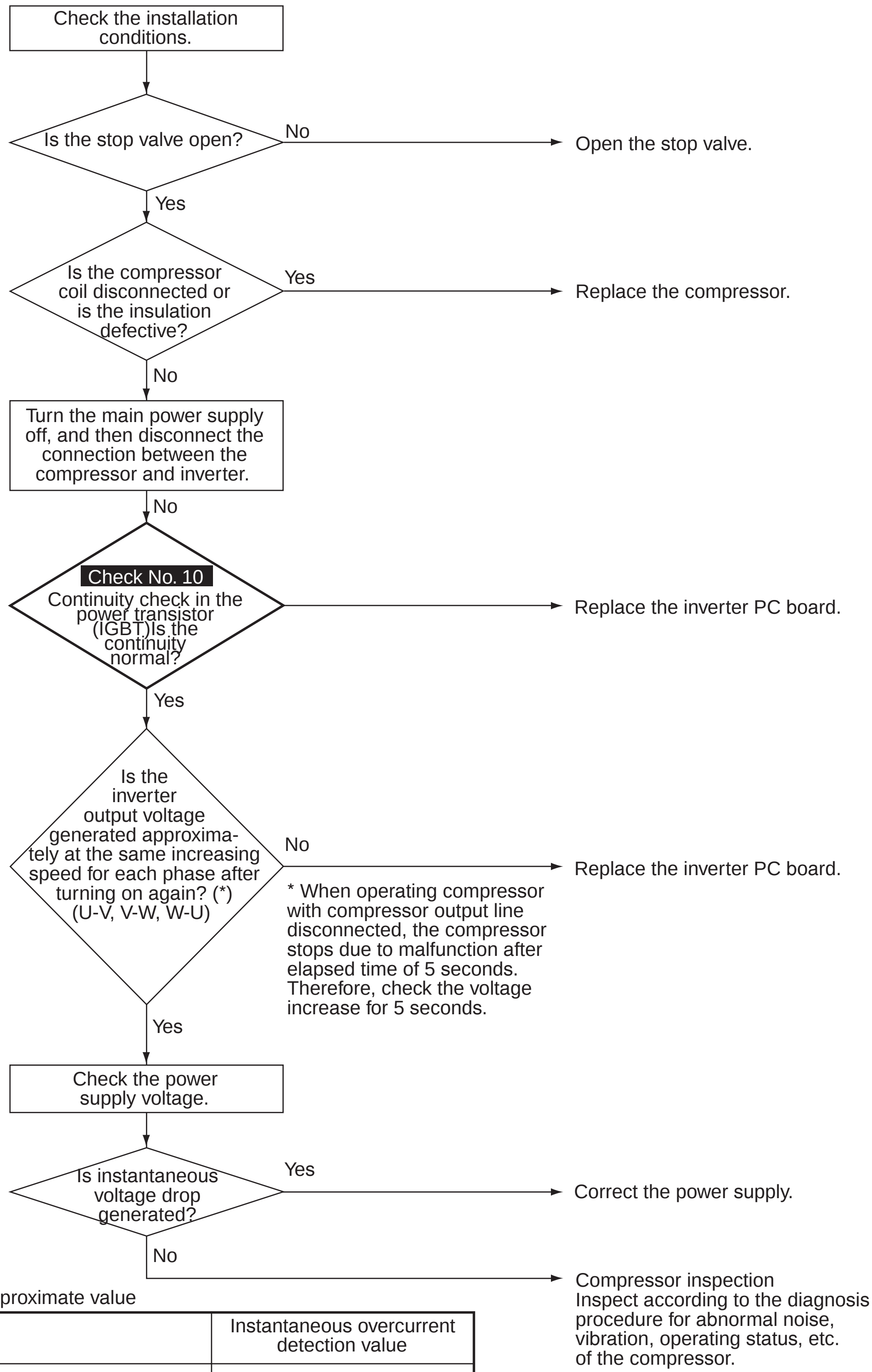
Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.15 DC Output Overcurrent (Instantaneous) (L5)

3

Remote Control Display	L5
Method of Malfunction Detection	Malfunction is detected by converting the current flowing to power transistor into voltage with CT1 (DC current sensor).
Malfunction Decision Conditions	When overcurrent has run to power transistor. (Actuated even by instantaneous overcurrent)
Supposed Causes	■ Faulty compressor coil (disconnection, poor insulation) ■ Compressor startup malfunction (mechanical lock) ■ Faulty inverter PC board ■ Instantaneous fluctuation of power supply voltage ■ Faulty compressor (if bearing is scratched) ■ The stop valve is left in closed.

Troubleshooting



★ Approximate value

	Instantaneous overcurrent detection value
RZQ71	20A
RZQ100 ~125	65A

(S2592)

Caution

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

3

3.16 Electronic Thermal (Time Lag) (L8)

Remote Control Display

L8

Method of Malfunction Detection

Malfunction is detected by converting the current flowing to power transistor into voltage with CT1 (DC current sensor).
Inverter PC board detects the disorder of position signal.

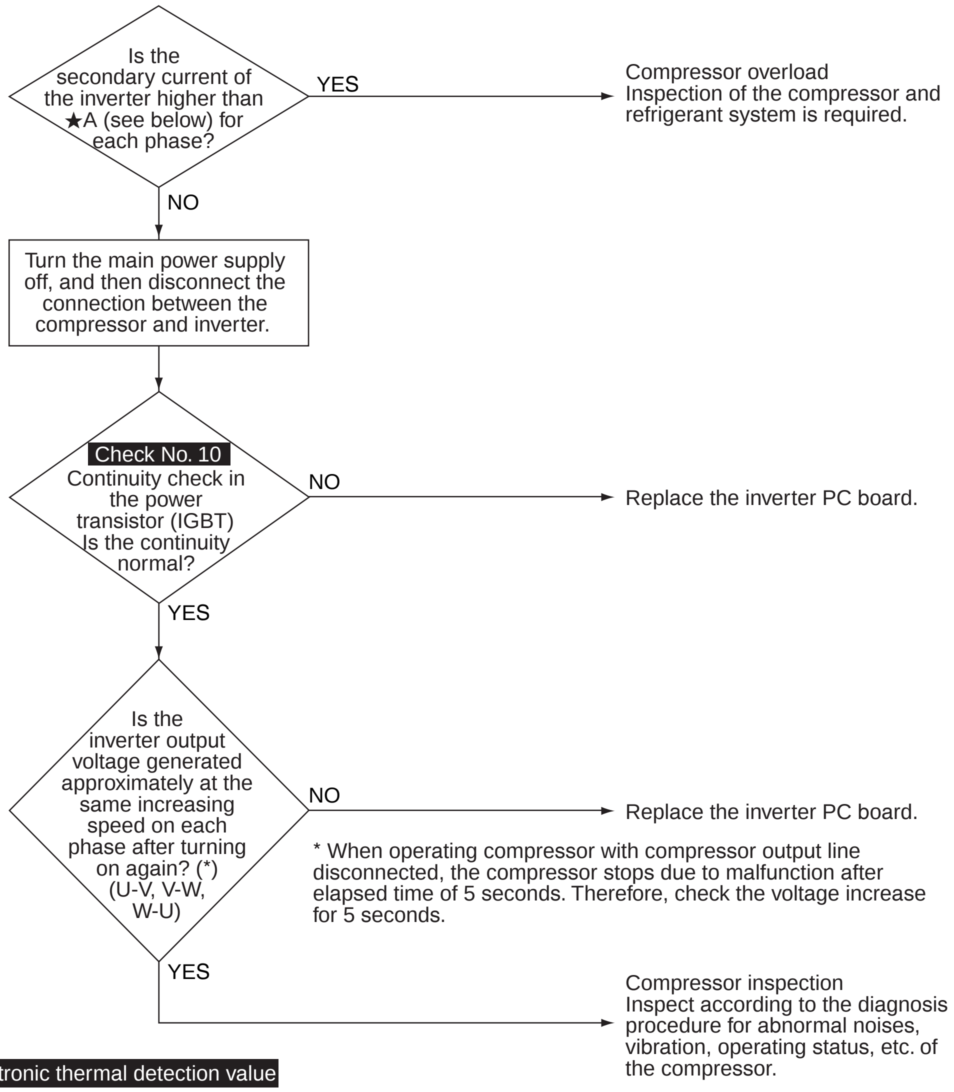
Malfunction Decision Conditions

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

Supposed Causes

- Compressor overload (during operation)
- Disconnected compressor coil
- Faulty inverter
- Faulty compressor (if bearing is scratched)

Troubleshooting



★ Electronic thermal detection value

		Detection value
RZQ71	Cooling	22A × 5 seconds or 13.6A (cooling), 15.1A (heating) × 260 seconds
	Heating	
RZQ100 ~ 125	Cooling	33A × 5 seconds or 26A × 260 seconds
	Heating	

(S2593)

Caution

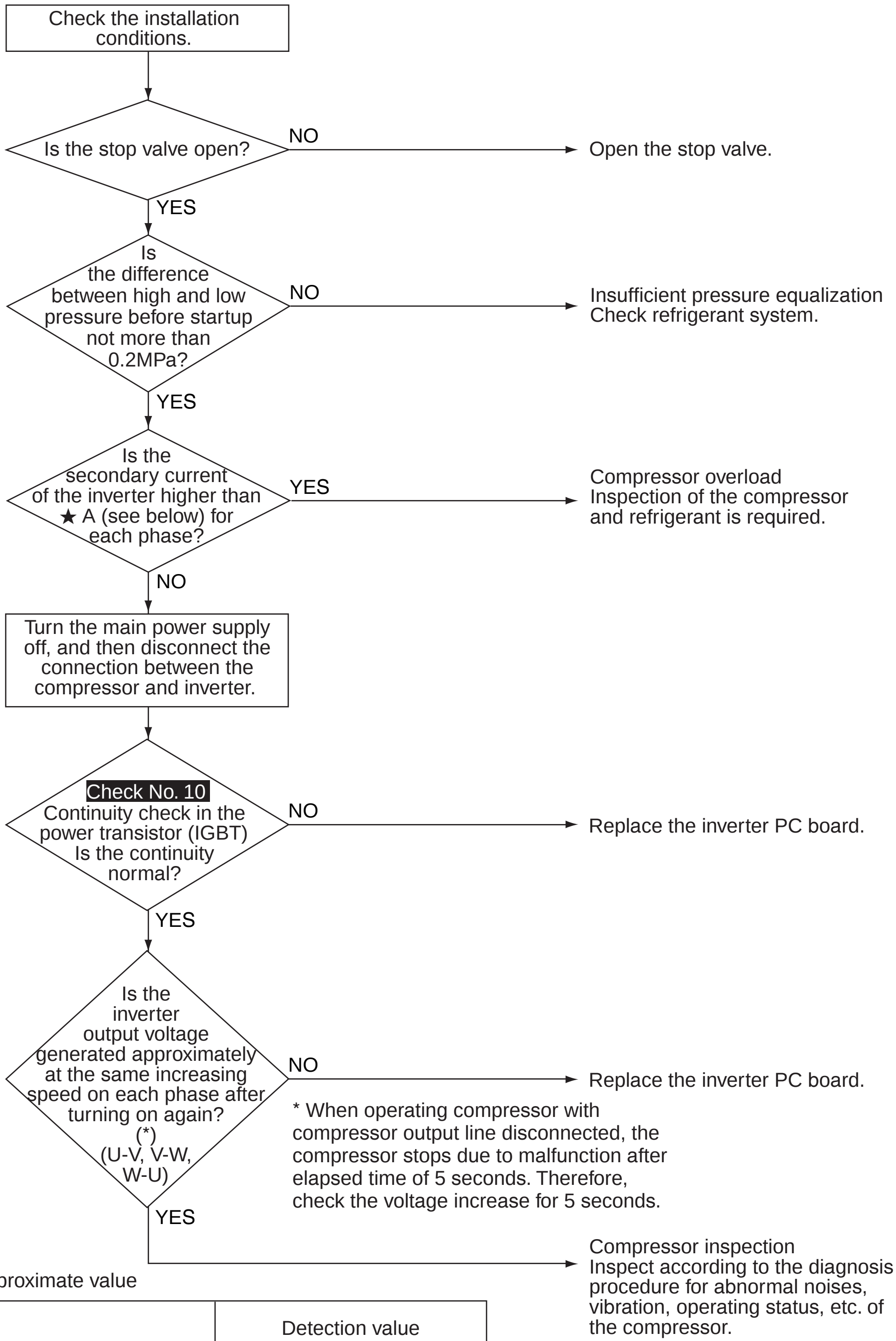
Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.17 Stall Prevention (Time Lag) (L9)

3

Remote Control Display	L9
Method of Malfunction Detection	Malfunction is detected by converting the current flowing to power transistor into voltage with CT1 (DC current sensor). Inverter PC board detects the disorder of position signal.
Malfunction Decision Conditions	When compressor overload (except for when startup) is detected When position signal is disordered
Supposed Causes	■ Faulty compressor (lock) ■ Pressure differential startup ■ Faulty inverter ■ The stop valve is left in closed.

Troubleshooting



★ Approximate value

	Detection value
RZQ71	22.0A
RZQ100 ~ 125	33.0A

(S2594)

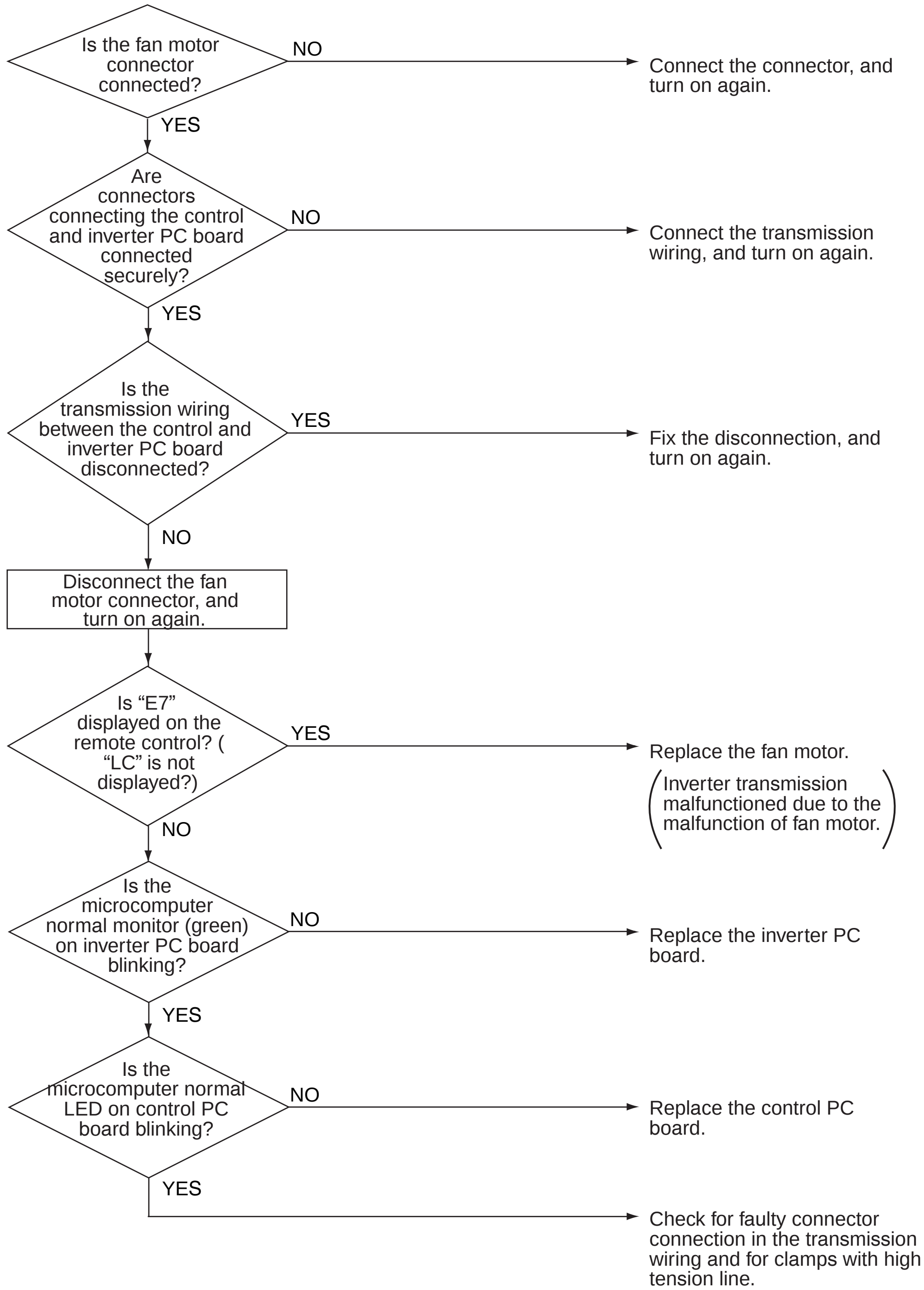
Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3

3.18 Malfunction of Transmission system (Between Control PCB and Inverter PCB) (LC)

Remote Control Display	LC
Method of Malfunction Detection	Checks and sees whether transmission between control and inverter PC board is carried out normally.
Malfunction Decision Conditions	When the transmission is not carried out in a specified period of time or longer
Supposed Causes	■ Incorrect transmission wiring between control and inverter PC board/insufficient contact in wiring ■ Faulty control and inverter PC board ■ External factors (noise, etc.)

Troubleshooting



(S2595)

Caution

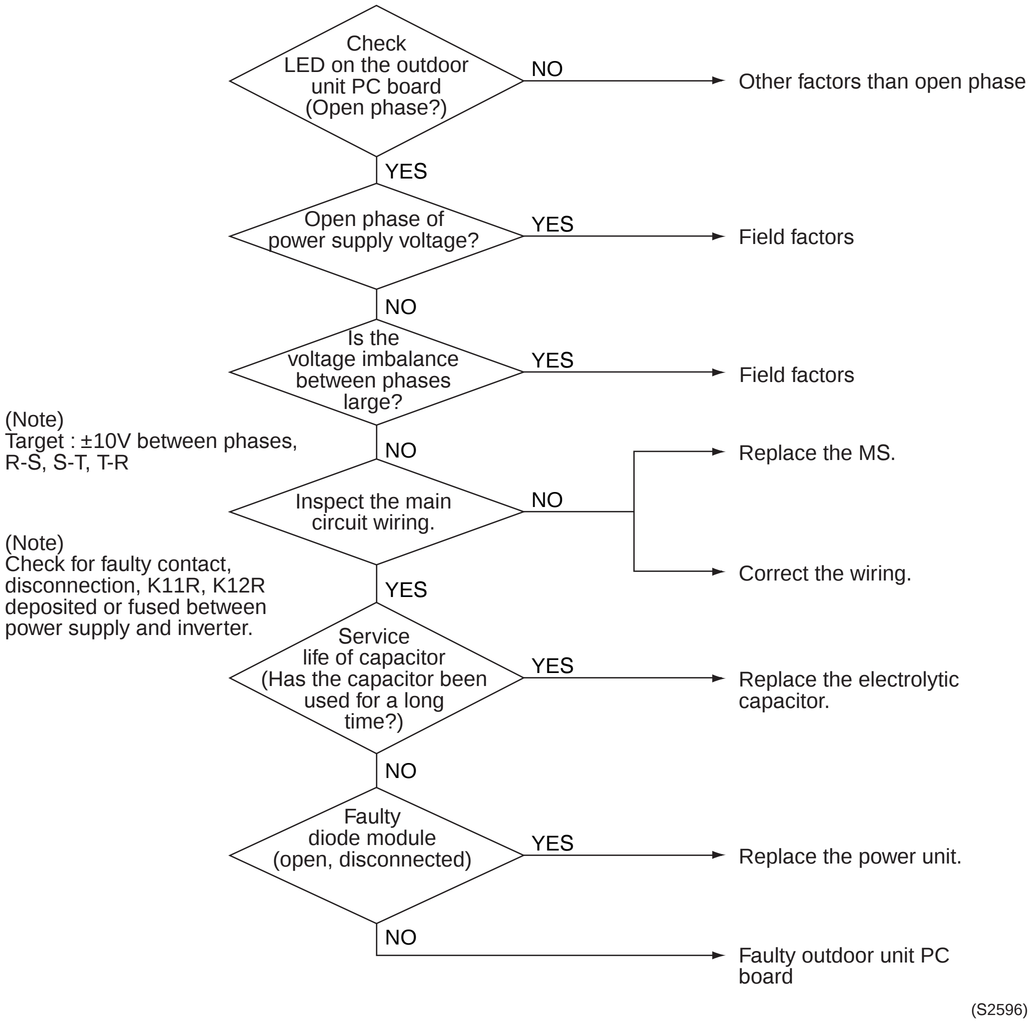
Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.19 Open Phase (P1)

Remote Control Display	P1
Method of Malfunction Detection	Malfunction is detected according to the voltage waveform of main circuit capacitor built in inverter.
Malfunction Decision Conditions	When the aforementioned voltage waveform becomes identical with the waveform of the power supply open phase.
Supposed Causes	■ Open phase ■ Voltage imbalance between phases ■ Faulty main circuit capacitor ■ Power unit (Disconnection in diode module) ■ Faulty outdoor unit PC board ■ Faulty Magnetic Relay (K11R, K12R) ■ Improper main circuit wiring

3

Troubleshooting



Caution

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

3.20 Malfunction of Radiator Fin Temperature Thermistor (P4)

Remote Control Display

P4

Method of Malfunction Detection

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

Malfunction Decision Conditions

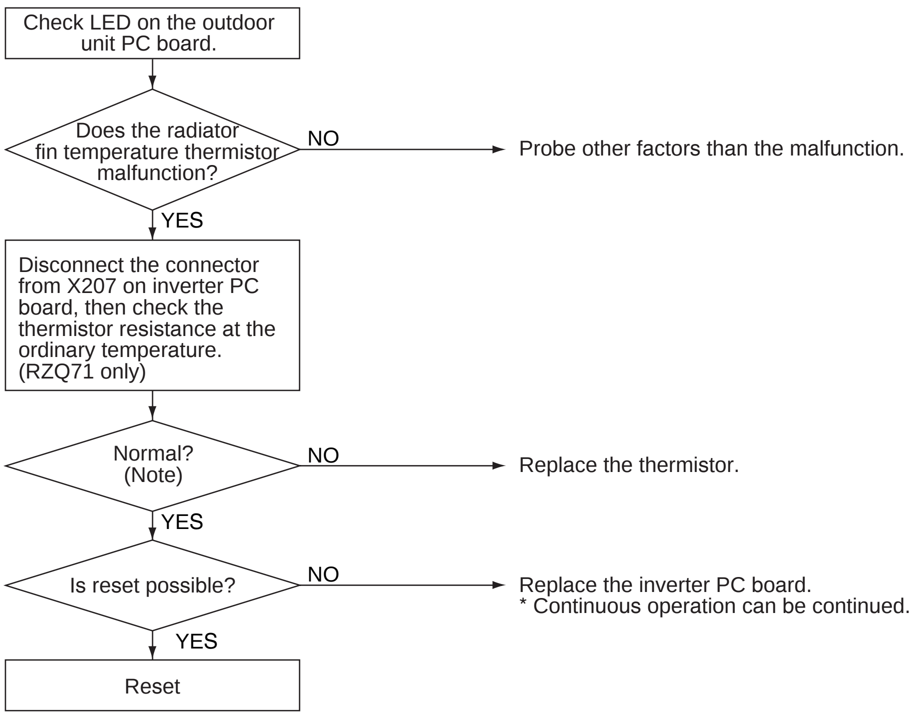
When open or short circuit of the radiator fin temperature thermistor is detected during the compressor stops operating

3

Supposed Causes

- Faulty radiator fin temperature thermistor (RZQ71)
- Faulty outdoor unit PC board
- Faulty radiator fin temperature thermistor (RZQ100-125) (Needs inverter PCB replacement)

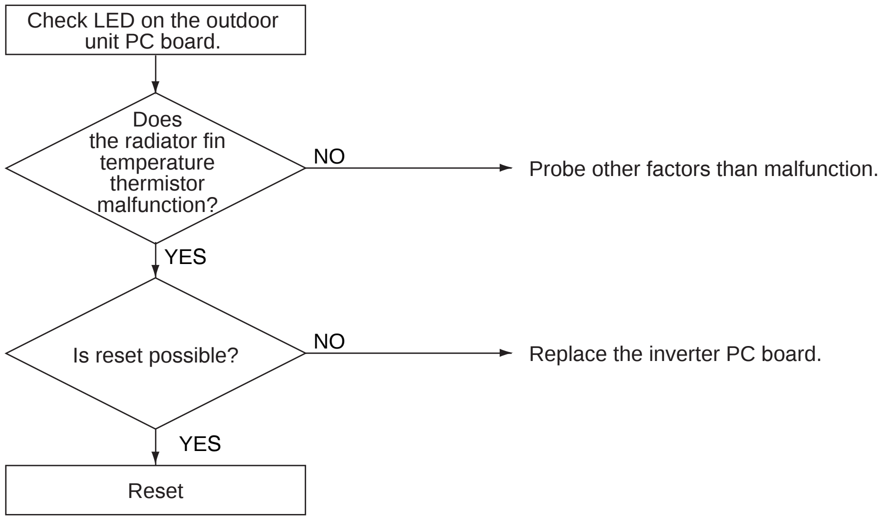
Troubleshooting RZQ71



★See Check 12 for "Thermistor temperature/Resistance characteristics".

(S2597)

Troubleshooting RZQ100-125



*1. This error code is displayed only when TEST button is pushed. While the normal operation still continues, inverter protection cannot be actuated.
*2. On this unit, the radiator fin temperature thermistor cannot be mantled/dismantled independently. Replace by inverter PC board.
*3. See Check 12 for “Thermistor temperature/Resistance characteristics”.

(S2600)

Caution

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

3.21 Failure of Capacity Setting (PJ)

Remote Control Display

PJ

Method of Malfunction Detection

Check whether set value written in E^2PROM (at factory) or set value of capacity setting adaptor (for replacement) is the same as outdoor unit capacity.

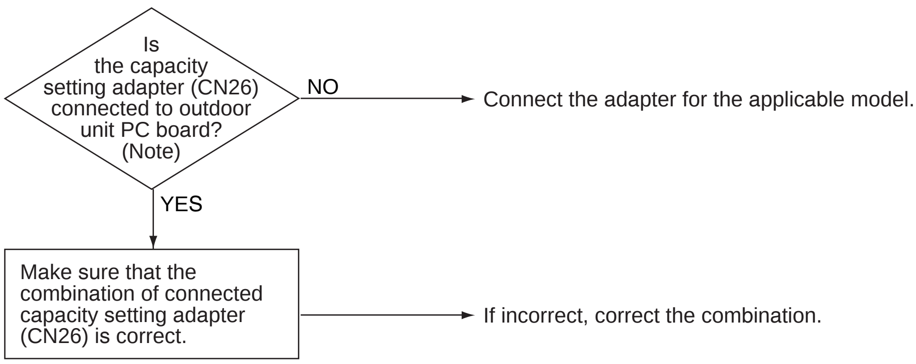
Malfunction Decision Conditions

When the set value on E^2PROM differs from the outdoor unit capacity or a capacity setting adaptor except for PC board applicable models is installed. (Malfunction decision is made only when turning the power supply on.)

Supposed Causes

- Improper set value of E^2PROM
- Improper capacity setting adaptor
- Faulty outdoor unit PC board

Troubleshooting



(Note)
Capacity setting adapter is not connected at factory. (Capacity is written in E^2PROM.) Capacity setting adapter is required only when the PC board was replaced with spare PC board.

(S2601)

Caution

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

3.22 Gas Shortage (Malfunction) (U0)

Remote Control Display

U0

Method of Malfunction Detection

(In test operation)
Detection by closed stop valve.

(In normal operation)
Gas shortage is detected according to the discharge pipe temperature.

Malfunction Decision Conditions

(In test operation)
Variations of the indoor unit heat exchange temperature judge whether stop valve is open or closed.

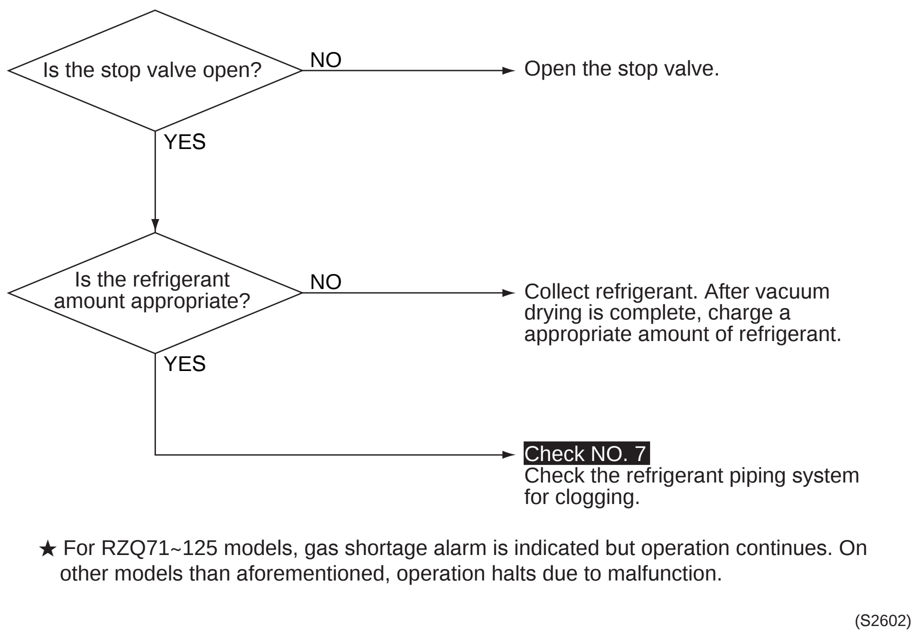
(In normal operation)
When microcomputer judges and detects gas shortage.

* Gas shortage is not decided repeating retry. When INSPECTION button on the remote control is pushed, “U0” is displayed.

Supposed Causes

- The stop valve is left in closed.
- Insufficient refrigerant amount
- Clogged refrigerant piping system

Troubleshooting



Caution

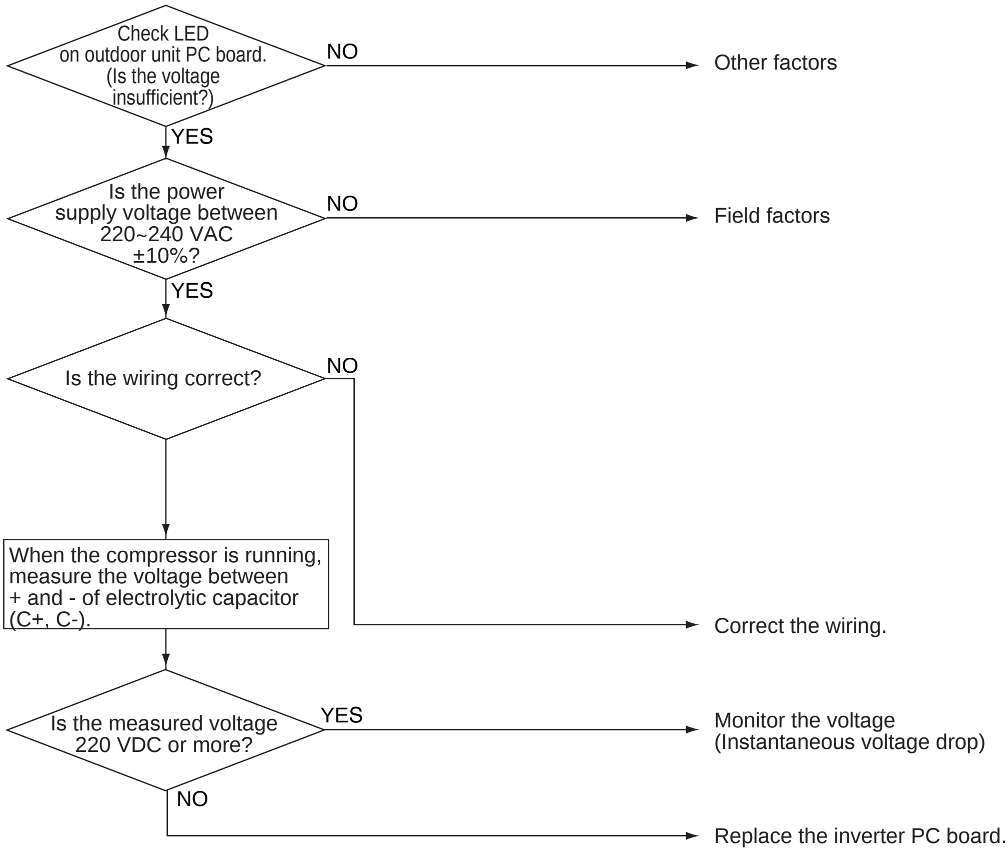
Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.23 Abnormal Power Supply Voltage (U2)

Remote Control Display	U2
Method of Malfunction Detection	Malfunction is detected according to the voltage of main circuit capacitor built in the inverter and power supply voltage.
Malfunction Decision Conditions	When the voltage of main circuit capacitor built in the inverter and power supply voltage drop (150-170 VAC) or when the power failure of several tons of ms or longer is generated. * Remote control does not decide the abnormality.
Supposed Causes	■ Drop in power supply voltage (180 V or less) ■ Instantaneous power failure ■ Inverter open phase (Phase T) ■ Faulty main circuit wiring ■ Faulty outdoor unit PC board ■ Main circuit parts damaged

3

Troubleshooting



(S2605)

Caution

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

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 control display. The error code helps you to find the cause of the problem.

Overview

This chapter contains the following topics:

4.2 Malfunction of Transmission 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.

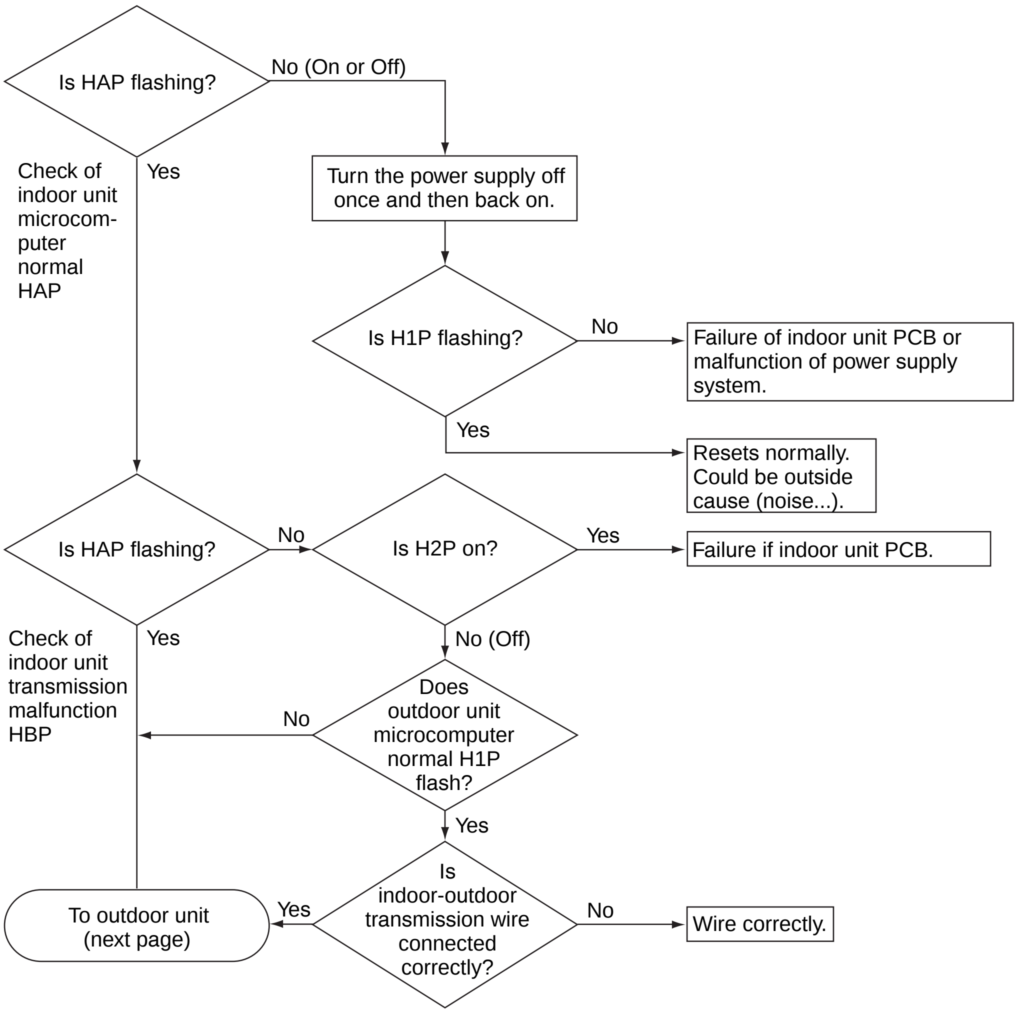
Causes

The possible causes are:

- Wiring indoor-outdoor transmission wire is incorrect
- Malfunctioning indoor unit PCB
- Malfunctioning outdoor unit PCB
- Outside cause (noise...).

Troubleshooting 1

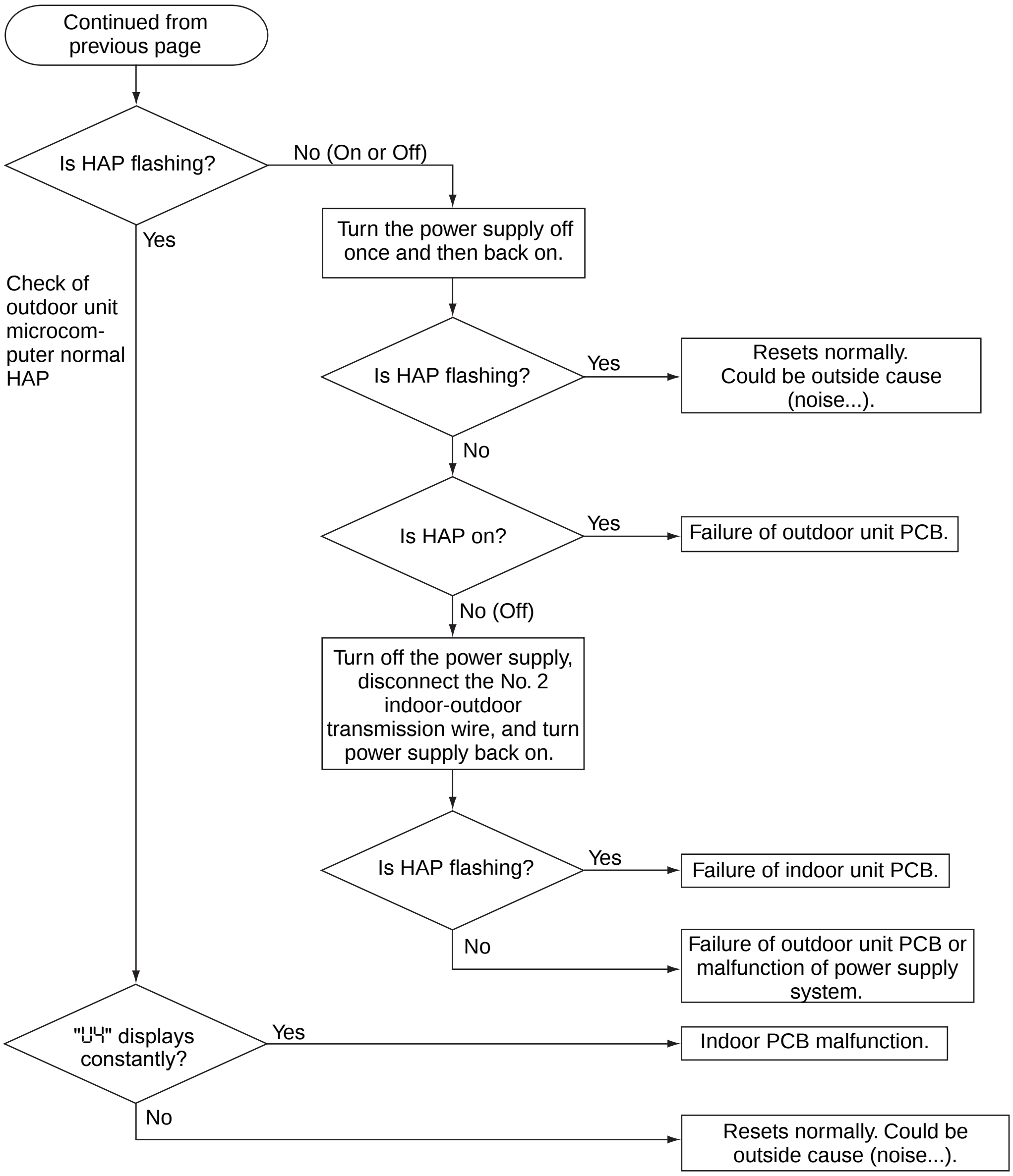
Diagnosis of incorrect or broken/disconnected wiring. If the LEDs on the indoor unit PC board are off, it indicates that the transmission wiring between indoor and outdoor units may be incorrect or broken/disconnected.



Caution

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

Troubleshooting 2



Caution

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

4.3 Malfunction of Transmission between Indoor Unit and Remote Control (U5)

3

Error code

U5

Error generation

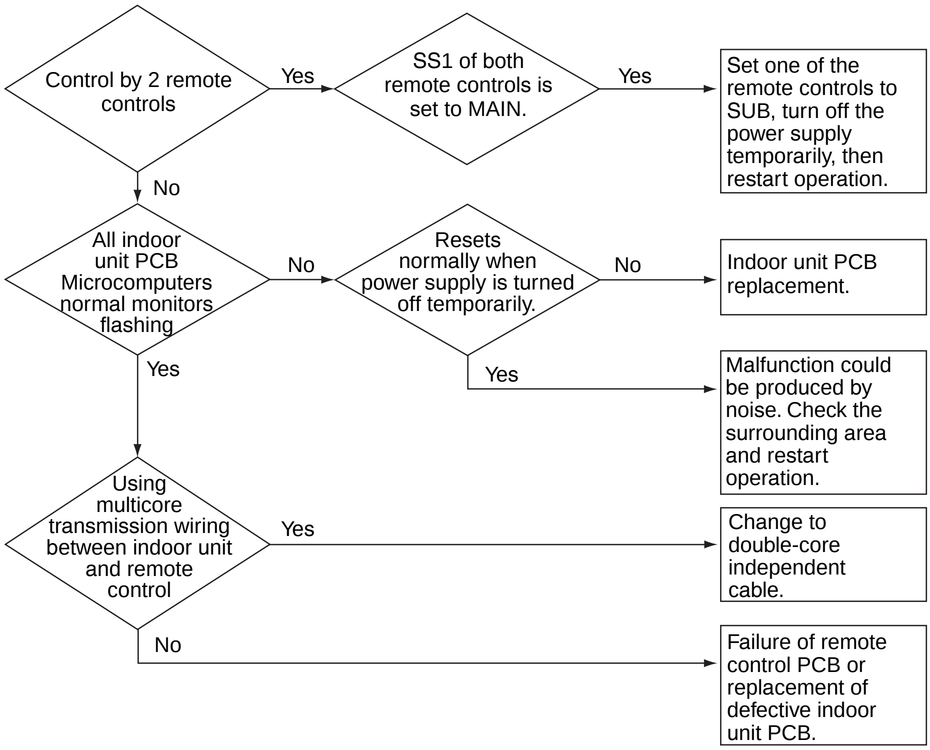
The error is generated when the microprocessor detects that the transmission between the indoor unit and the remote control is not normal over a certain amount of time.

Causes

The possible causes are:

- Malfunctioning remote control
- Malfunctioning indoor PCB
- Outside cause (noise...)
- Connection of two master remote controls (when using two remote controls).

Troubleshooting



Caution

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

4.4 Malfunction of Transmission between MAIN Remote Control and SUB Remote Control (U8)

Error code

U8

Error generation

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

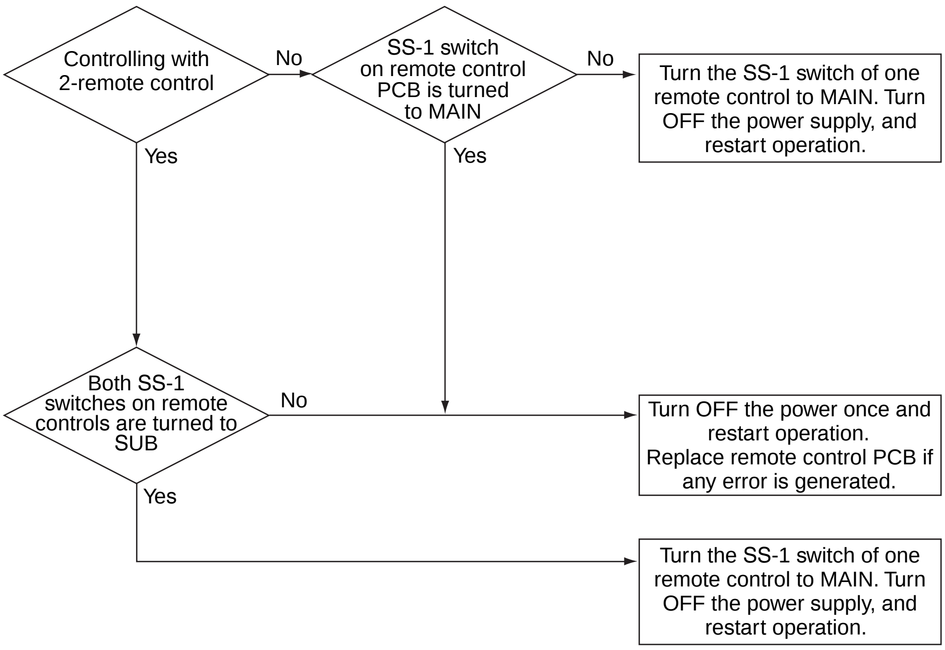
Causes

The possible causes are:

- Transmission error between MAIN remote control and SUB remote control
- Connection among SUB remote controls
- Malfunctioning remote control PCB.

3

Troubleshooting



Caution

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

4.5 Malfunctioning Field Setting Switch (UA)

Error code

UA

Error generation

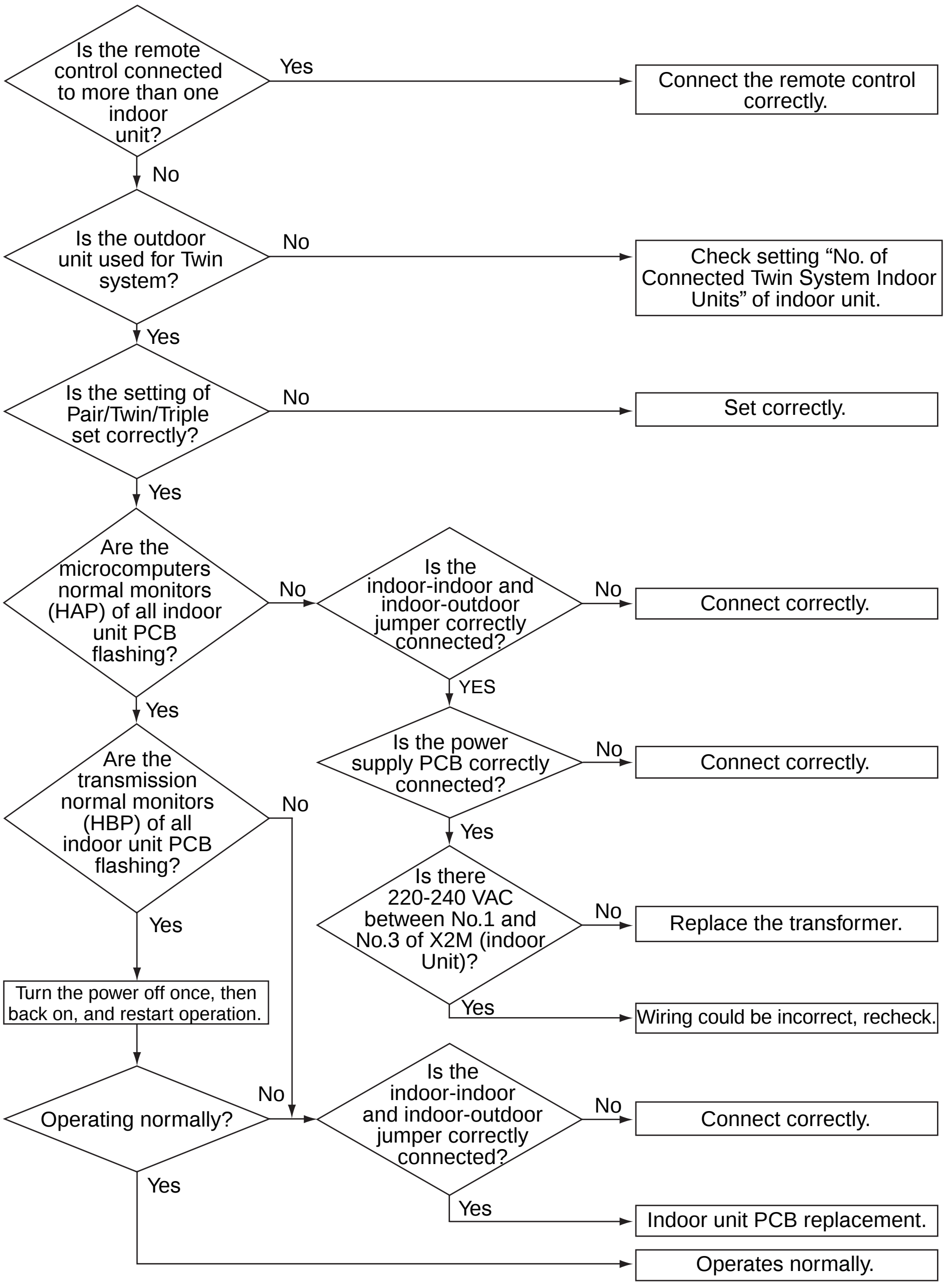
The error is generated when incorrect field settings have been set for pair/twin/triple/double twin.

Causes

The possible causes are:

- Malfunctioning indoor or outdoor unit PCB
- Malfunctioning power supply PCB
- Indoor-outdoor, indoor-indoor unit transmission wiring
- Malfunctioning remote control wiring.

Troubleshooting



Caution

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

4.6 Centralized Address Setting Error (UC)

Remote Control Display

UC

Applicable Models

All indoor unit models

Method of Malfunction Detection

Indoor unit microcomputer detects and judges the centralized address signal according to the transmission between indoor units.

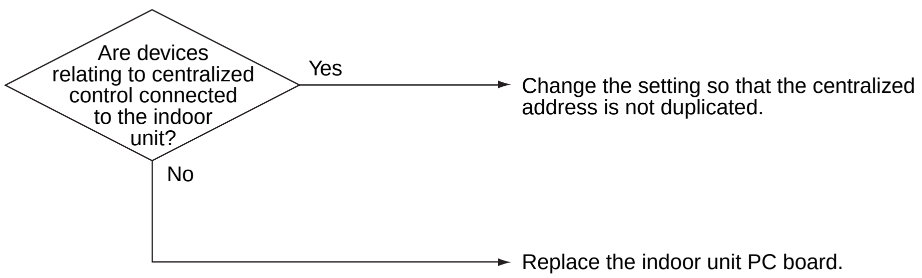
Malfunction Decision Conditions

When the microcomputer judges that the centralized address signal is duplicated

Supposed Causes

- Faulty centralized address setting
- Faulty indoor unit PC board

Troubleshooting



(S2607)

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:

3

5.2 Indoor Unit: Checking the Fan Motor Hall IC

Applicable units

Units using phase cut controlled fan motor with feedback signal.

Checking

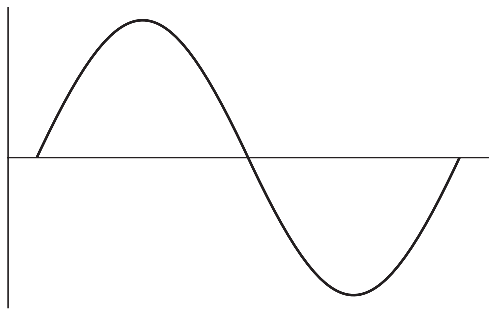
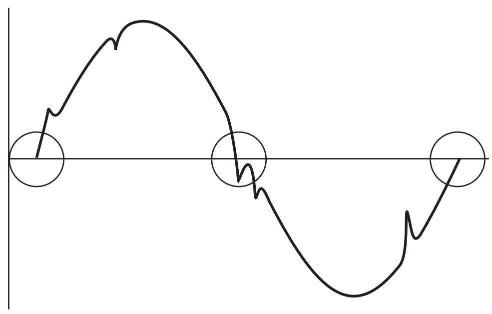
To check the indoor unit fan motor hall IC, proceed as follows:

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1</td><td>Make sure connector S7 on PCB 1 is properly connected.</td></tr>
<tr><td>2</td><td>Make sure the power is ON and that there is no operation.</td></tr>
<tr><td>3</td><td>Measure the voltage between pin 1 and 3 of S7.</td></tr>
<tr><td>4</td><td>Turn the fan one rotation with your hand and measure the generated pulses.</td></tr>
<tr><td>5</td><td>Proceed as follows:
<table>
<tr><th>If...</th><th>Then...</th></tr>
<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>
</table>
</td></tr>
</table>

5.3 Indoor Unit: Checking the Power Supply Wave Form

Checking

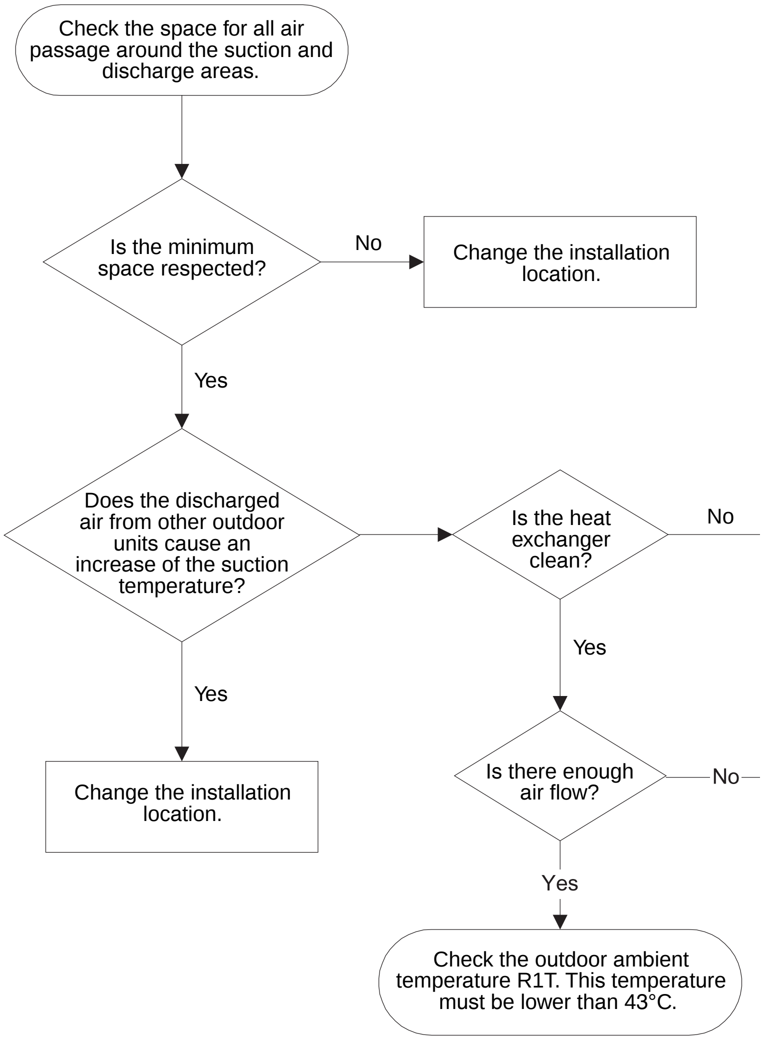
To check the power supply wave form, proceed as follows:

Step	Action
1	Measure the power supply wave form between pin 1 and 2 of X1M for the outdoor units or between pin 1 and 2 of X2M for the indoor units.
2	Check whether the power supply wave form is a sine wave: 
3	Check whether there is wave form disturbance near the zero cross: 
4	Adjust the supply voltage.

5.4 Outdoor unit: Checking the Installation Condition

Checking

To check the installation condition, proceed as follows:



3

5.5 Outdoor Unit: Checking the Expansion Valve

Checking

To check the electronic expansion valve, proceed as follows:

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1</td><td>Check if the expansion valve connector is correctly inserted in the X12A of A1P.</td></tr>
<tr><td>2</td><td>Compare the expansion valve unit with the number of the connector to make sure it is correctly connected.</td></tr>
<tr><td>3</td><td>Switch the power OFF.</td></tr>
<tr><td>4</td><td>Switch the power ON to check whether the expansion valve is producing a clicking sound.
<table>
<tr><th>If...</th><th>Then...</th></tr>
<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>
</table>
</td></tr>
<tr><td>5</td><td>Check the coil current: Open circuit < normal < short circuit
The table below contains the reference resistance values.
<table>
<tr><th>—</th><th>White</th><th>Grey</th><th>Black</th><th>Yellow</th><th>Red</th><th>Orange</th></tr>
<tr><td>White</td><td>—</td><td>∞</td><td>45 Ω</td><td>∞</td><td>45 Ω</td><td>∞</td></tr>
<tr><td>Grey</td><td>∞</td><td>—</td><td>∞</td><td>45 Ω</td><td>∞</td><td>45 Ω</td></tr>
<tr><td>Black</td><td>45 Ω</td><td>∞</td><td>—</td><td>∞</td><td>90 Ω</td><td>∞</td></tr>
<tr><td>Yellow</td><td>∞</td><td>45 Ω</td><td>∞</td><td>—</td><td>∞</td><td>90 Ω</td></tr>
<tr><td>Red</td><td>45 Ω</td><td>∞</td><td>90 Ω</td><td>∞</td><td>—</td><td>∞</td></tr>
<tr><td>Orange</td><td>∞</td><td>45 Ω</td><td>∞</td><td>90 Ω</td><td>∞</td><td>—</td></tr>
</table>
</td></tr>
<tr><td>6</td><td>Check the clicking sound again.
<table>
<tr><th>If...</th><th>Then...</th></tr>
<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 A1P.</td></tr>
</table>
</td></tr>
</table>

3

5.6 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
	R3T	Gas pipe thermistor
Outdoor	R1T	Ambient air thermistor
	R2T	Heat exchanger thermistor
	R3T	Discharge pipe thermistor
	R4T	Suction pipe thermistor
	R5T	Power module fin 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.

5.7 Resistance Conversion Table (Ambient, Coil, Fin)

Temperature – resistance

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

Temp. (°C)	A (kΩ)	B (kΩ)	Temp. (°C)	A (kΩ)	B (kΩ)	Temp. (°C)	A (kΩ)	B (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			

Applicable sensors

A: Indoor: R1T, R2T, R3T
Outdoor: R1T, R2T, R4T

B: Outdoor: R5T

5.8 R3T: Resistance Conversion Table (Discharge Pipe Sensor)

Temperature – resistance

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

Temp. (°C)	Resist. (kΩ)
—	—
—	—
-6.0	1120.0
-4.0	1002.5
-2.0	898.6
0.0	806.5
2.0	724.8
4.0	652.2
6.0	587.6
8.0	530.1
10.0	478.8
12.0	432.9
14.0	392.0
16.0	355.3
18.0	322.4
20.0	292.9
22.0	266.3
24.0	242.5
26.0	221.0
28.0	201.6
30.0	184.1
32.0	168.3
34.0	154.0
36.0	141.0
38.0	129.3
40.0	118.7
42.0	109.0
44.0	100.2
46.0	92.2
48.0	84.9
50.0	78.3
52.0	72.2
54.0	66.7
56.0	61.6
48.0	57.0

Temp. (°C)	Resist. (kΩ)
60.0	52.8
62.0	48.9
64.0	45.3
66.0	42.0
68.0	39.0
70.0	36.3
72.0	33.7
74.0	31.4
76.0	29.2
78.0	27.2
80.0	25.4
82.0	23.7
—	—
—	—
—	—
—	—
92.0	16.9
94.0	15.8
96.0	14.8
98.0	13.9
100.0	13.1
102.0	12.3
104.0	11.5
106.0	10.8
108.0	10.2
110.0	9.6
112.0	9.0
114.0	8.5
116.0	8.0
118.0	7.6
120.0	7.1
122.0	6.7
124.0	6.4
126.0	6.0
128.0	5.7

Temp. (°C)	Resist. (kΩ)
130.0	5.4
132.0	5.4
134.0	4.8
136.0	4.6
138.0	4.3
140.0	4.1
142.0	3.9
144.0	3.7
146.0	3.5
148.0	3.3
150.0	3.2
152.0	3.0
154.0	2.9
156.0	2.7
158.0	2.6
160.0	2.5
162.0	2.3
164.0	2.5
166.0	2.1
168.0	2.0
170.0	1.9
172.0	1.9
174.0	1.8
176.0	1.7
178.0	1.6
180.0	1.5
—	

5.9 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.

5.10 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.

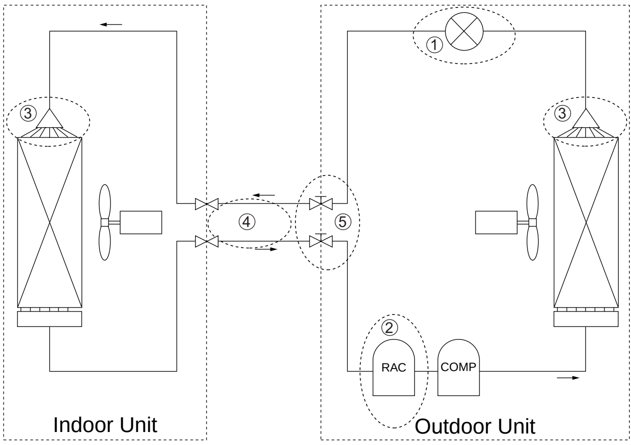
In heating operation

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.

5.11 Checks

5.11.1 Clogged Points

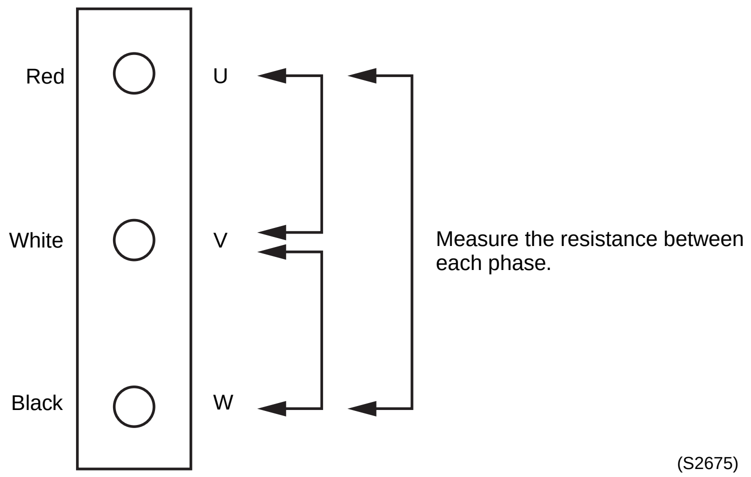
Temperature differences must occur before or after the clogged points!



Check points		Check factor	Causes	Remedies
1	Around expansion mechanism	Temperature difference	■ Dust ■ Choked moisture ■ Reduced effective pipe diameter due to adherent contamination, etc.	Replace the expansion valve.
2	Accumulator	Frosting	■ Choked moisture	Blow a nitrogen gas, and then replace the refrigerant.
3	Distributor	Temperature difference	■ Dust ■ Choked moisture ■ Reduced effective pipe diameter due to adherent contamination, etc.	Replace the heat exchanger or distributor.
4	Field piping	Temperature difference	■ Collapsed pipe	Replace the pipe.
5	Stop valve	Temperature difference	■ The stop valve is not fully open.	Open the stop valve fully.

5.11.2 Indoor Unit: Fan Motor Checks (Phase Controlled Motor)

(1) Turn the power supply off.
With the relay connector disconnected, measure the resistance between UVW phases of the connector (3 cores) at the motor side, then make sure that the resistance between each phase is balanced and not short-circuited.

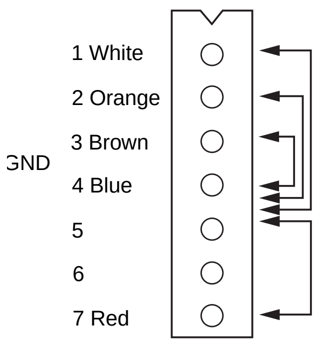


(S2675)

5.11.3 Outdoor Unit: Fan Motor Signal Line

For RZQ71~125 models

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



(S2675)

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

5.11.4 Outdoor unit: Fan Speed Pulse

For RZQ71~125 models

(1) Disconnect the connector X206A with the power supply OFF and Operation OFF.

(2) Is the voltage between pins 4 and 3 of X206A about 15 VDC after turning the power supply on?

(3) Is the voltage between pins 4 and 1 of X206A about 5 VDC?

(4) Connect the connector X206A with the power supply OFF and Operation OFF.

(5) When making one turn of the upper fan motor by hand after turning the power supply on, is a pulse (0 and 5 V) generated 4 times between pins 4 and 1 of X206A? (Measure at the contact terminal on the harness side with the connector connected.)

For RZQ100~125 models

(6) Disconnect the connector X207A with the power supply OFF and Operation OFF.

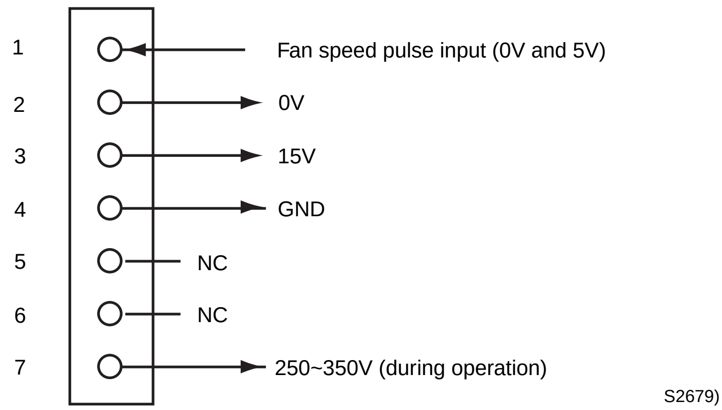
(7) Is the voltage between pins 4 and 3 of X207A about 15 VDC after turning the power supply on?

(8) Is the voltage between pins 4 and 1 of X207A about 5 VDC?

(9) Connect the connector X207A with the power supply OFF and Operation OFF.

(10) When making one turn of the lower fan motor by hand after turning the power supply on, is a pulse (0 and 5 V) generated 4 times between pins 4 and 1 of X207A?

(2) (7): NO → Faulty PC board → Replace the PC board.
(3) (8): NO → Faulty PC board → Replace the PC board.
(5)(10): NO → Faulty hall IC → Replace the DC fan motor.
(2) (3) (5) (7) (8) (10): YES → Replace the PC board.



5.11.5 Outdoor unit: Check for Power Transistor

Judgment according to the continuity check by using an analog tester:

(1) Do not touch the charged area (high voltage) for 10 minutes after turning the power supply off.

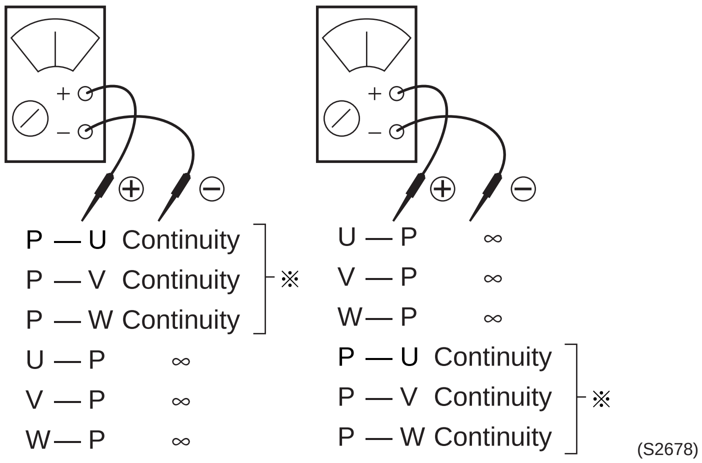
(2) If you must touch such an area, make sure that the power supply voltage of power transistor is 50 V or less.

(3) Before measuring the continuity, disconnect the connection between compressor and power transistor.

(4) Measure the continuity in the following procedure.
[Judgment] Normal if the continuity check results in the following.

3

Power transistor (on inverter PC board)



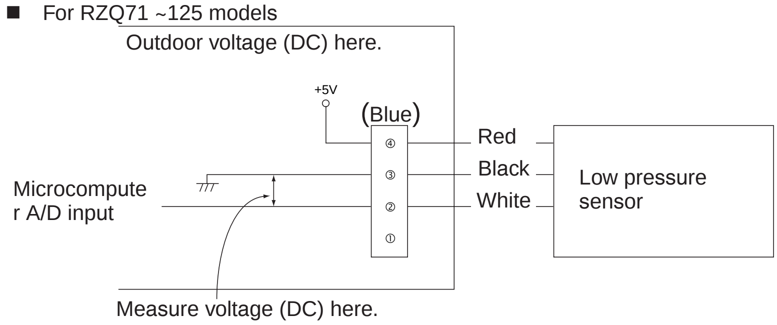
* If there is continuity, the resistance should be the same as each phase.

* If a digital tester is used for the measurement of continuity, ∞ and continuity may be reversed.

5.11.1 Outdoor unit: Check LPS

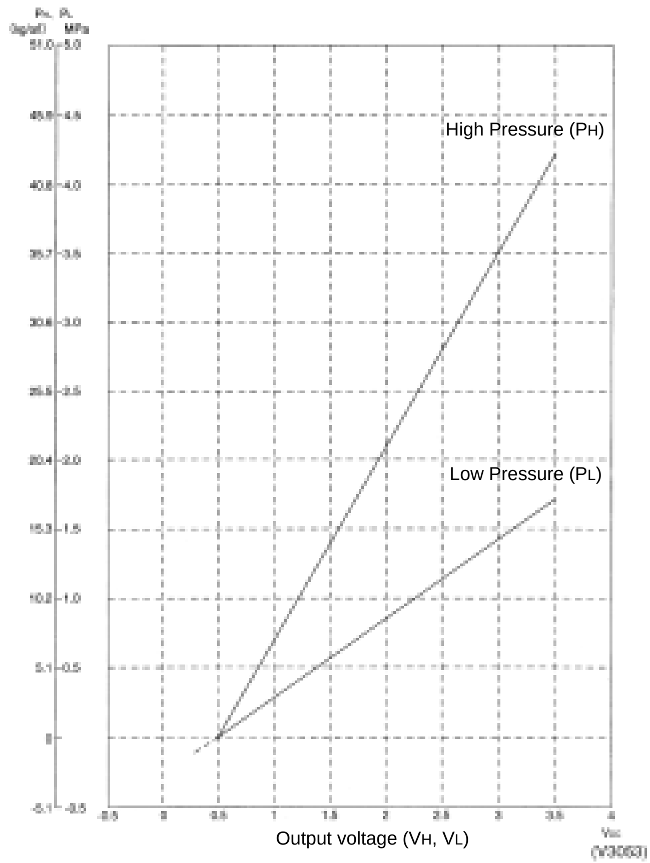
Measure the voltage (DC) between pins 2 and 3 of the connector.

- For RZQ71 ~125 models



(S2680)

Detected Pressure



P_H = 1.38V-0.69
P_L = 0.57V-0.28
P_H: High pressure (MPa)
P_L: Low pressure (MPa)
V: Voltage (V)

P_H = Detected Presuure (High side) MPa
P_L = Detected Presuure (Low side) MPa
V_H: Output voltage (High side) Vdc
V_L: Output voltage (Low side) Vdc

3

3

Part 4
Commissioning and Test Run

What is in this part?

This part contains the following chapters:

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 infrared remote control
- Setting the address for the infrared remote control.

Overview

This chapter contains the following topics:

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: ■ 230 V ± 10%
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 control is at the lowest level in cooling mode or use test mode.
- Go through the following checklist:

Checkpoints	Cautions or warnings
Are all units securely installed?	■ 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?	■ 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?	■ 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 and according to local regulations?	Damage of cables.
Are the remote control signals received by the unit?	No operation.

1.3 Setting the Infrared remote control

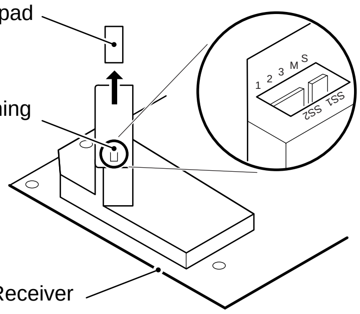
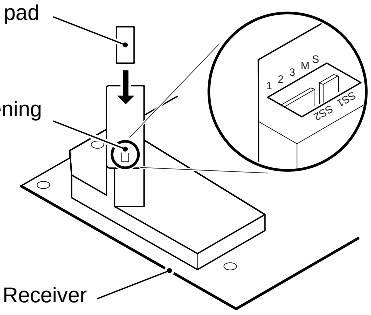
Introduction

To set the infrared remote control, you have to set the address for:

- The receiver of the infrared remote control
- The infrared remote control.

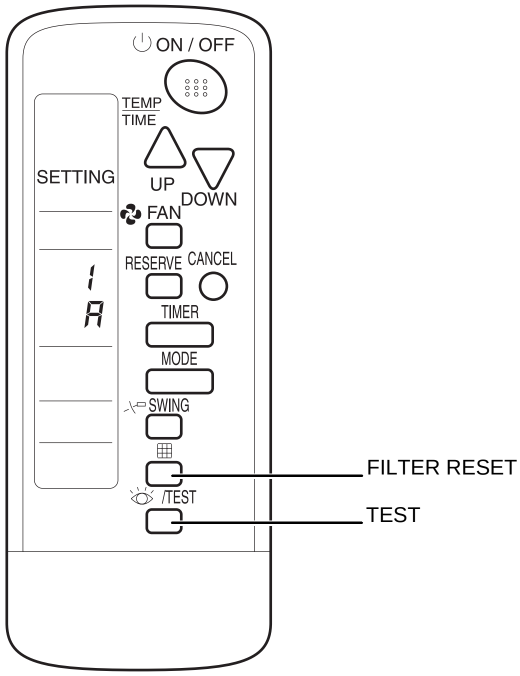
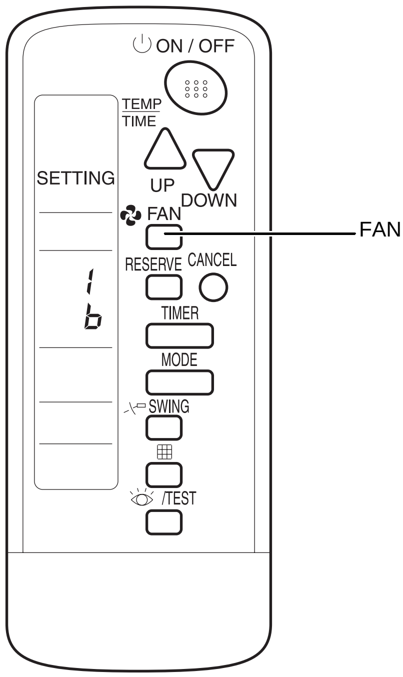
Setting the address for the receiver

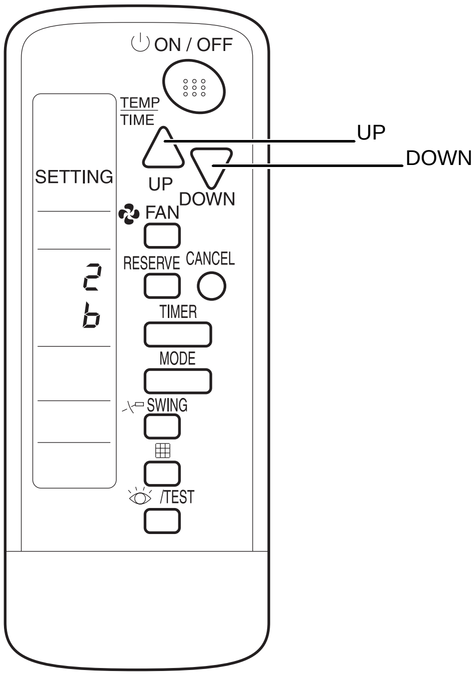
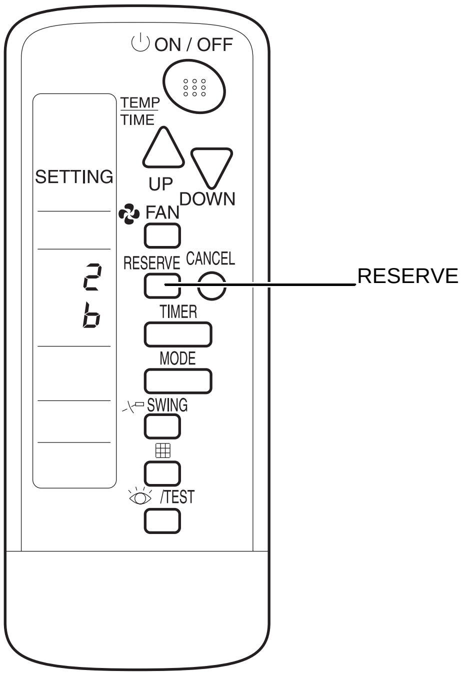
The address for the receiver of the infrared remote control is factory set to 1. To change this setting, proceed as follows:

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1</td><td>Turn OFF the power.</td></tr>
<tr><td>2</td><td>Remove the sealing pad on the top of the receiver.

</td></tr>
<tr><td>3</td><td>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>
<tr><th>Unit No.</th><th>No. 1</th><th>No. 2</th><th>No. 3</th></tr>
<tr><td>SS2</td><td>
</td><td>
</td><td>
</td></tr>
</table></td></tr>
<tr><td>4</td><td>If you use a wired and a infrared remote control for one indoor unit, proceed as follows:
1. Set the wired remote control to MAIN: On the remote control.
2. Set the infrared remote control to SUB: On the receiver with the MAIN/SUB switch (SS1).
<table>
<tr><th>MAIN/SUB</th><th>MAIN</th><th>SUB</th></tr>
<tr><td>SS1</td><td>
</td><td>
</td></tr>
</table></td></tr>
<tr><td>5</td><td>Seal off the opening of the address switch and the MAIN/SUB switch with the attached sealing pad.

</td></tr>
<tr><td>6</td><td>Make sure to also change the address on the remote control.</td></tr>
</table>

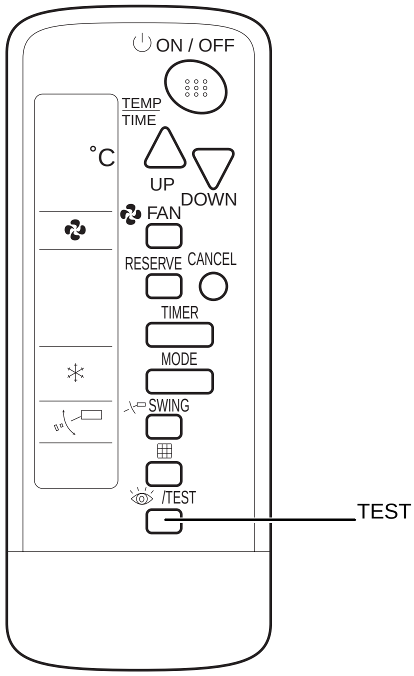
Setting the address for the infrared remote control

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

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1</td><td>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.

</td></tr>
<tr><td>2</td><td>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”.

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

Step	Action
3	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. 
4	Press the RESERVE button to confirm the setting. 

4

Step	Action
5	Press the TEST button to quit the field set mode and return to the normal display. 

Multiple settings A/b

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

Remote control		**Indoor unit**	
Setting	**Remote control 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:

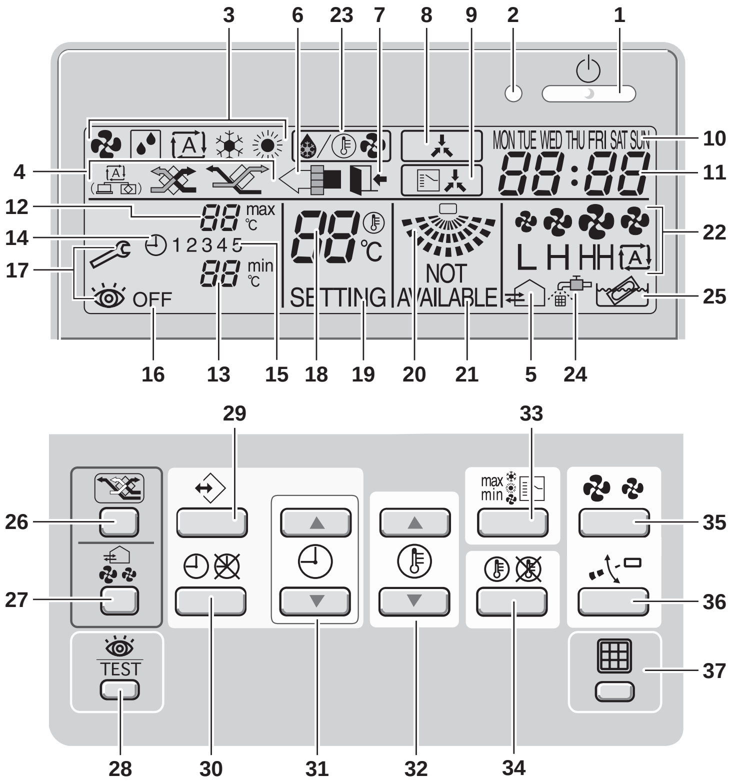
2.2 How to Change the Field Settings with the Wired Remote Control

Installation conditions

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

Wired remote control

The illustration below shows the wired remote control.



Components

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

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	■ 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".

4

2.3 How to Change the Field Settings with the Infrared remote control

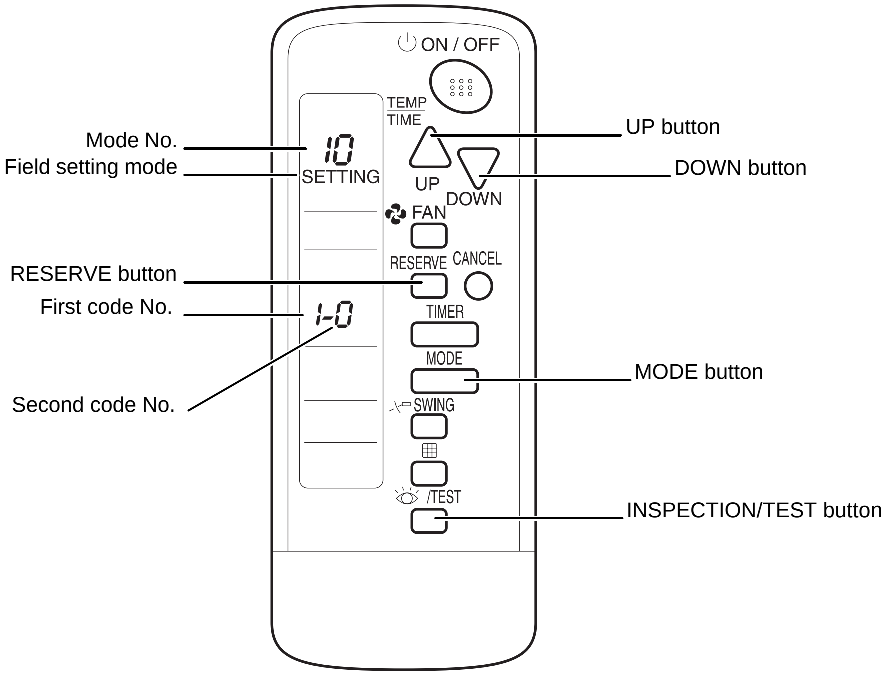
Optional accessories

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.

Infrared remote control

The illustration below shows the infrared remote control.



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 on 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 control	TH1 = rem. control	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	High	Extra high	—
			≤ 2.7 m	>2.7≤3.0 m	>3.0≤3.5 m	—
	1	Selection of air flow direction (setting for when a blocking pad kit has been inst alled).	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	Ceil soil prevention	—
	5	Field fan speed changeover air outlet (domestic only)	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 control (for limit operation and leave home function only)	Use	Not use	—	—

2.5 Overview of the Factory Settings on the Indoor Units

Factory settings The table below contains the factory settings of all indoor units

Mode No.	First code No.	Second code No.						
		FCQ	FFQ	FBQ	FAQ	FDQ	FUQ	FHQ
10 or 20	0	01	01	01	01	01	01	01
	1	01	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	01	—	—	—	—
	5	02	02	02	02	02	02	02
13 or 23	0	01	—	—	01	—	01	01
	1	01	01	—	—	—	—	—
	3	—	—	—	—	—	—	—
	4	02	02	—	—	—	—	—
	5	01	01	—	01	—	01	01
	6	—	—	01	—	—	—	—
14 or 24	0	01	01	01	—	01	01	01

2.6 Setting the Ceiling Height

Incorrectly setting

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

See ’Malfunctioning Field Setting Switch (UA)’ on page 3–94.

Mode No. 13 or 23
First code No. 0

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

FHQ

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

FAQ

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

FCQ and FUQ

Indoor unit	Second code No.	4-way outlet	3-way outlet	2-way outlet
FCQ35-71	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	—
FCQ100-125	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	—
FUQ	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
FCQ	10 or 20	0	±2500 hrs	±1250 hrs
FFQ			±2500 hrs	±1250 hrs
FHQ			±2500 hrs	±1250 hrs
FUQ			±2500 hrs	±1250 hrs
FAQ			±200 hrs	±100 hrs
FBQ			±2500 hrs	±1250 hrs
FDQ			±2500 hrs	±1250 hrs

4

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

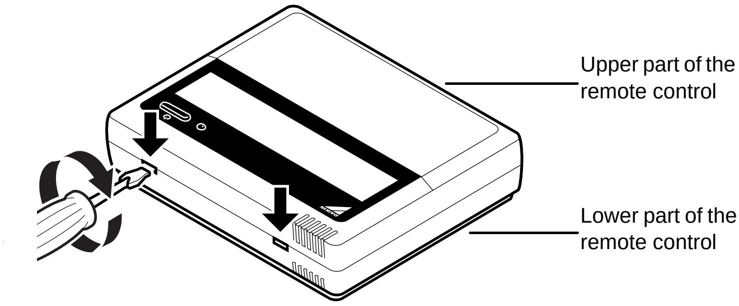
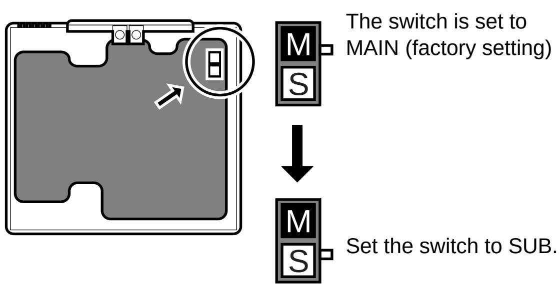
2.8 MAIN/SUB Setting when Using Two Remote Controls

Situation

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

Setting

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

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

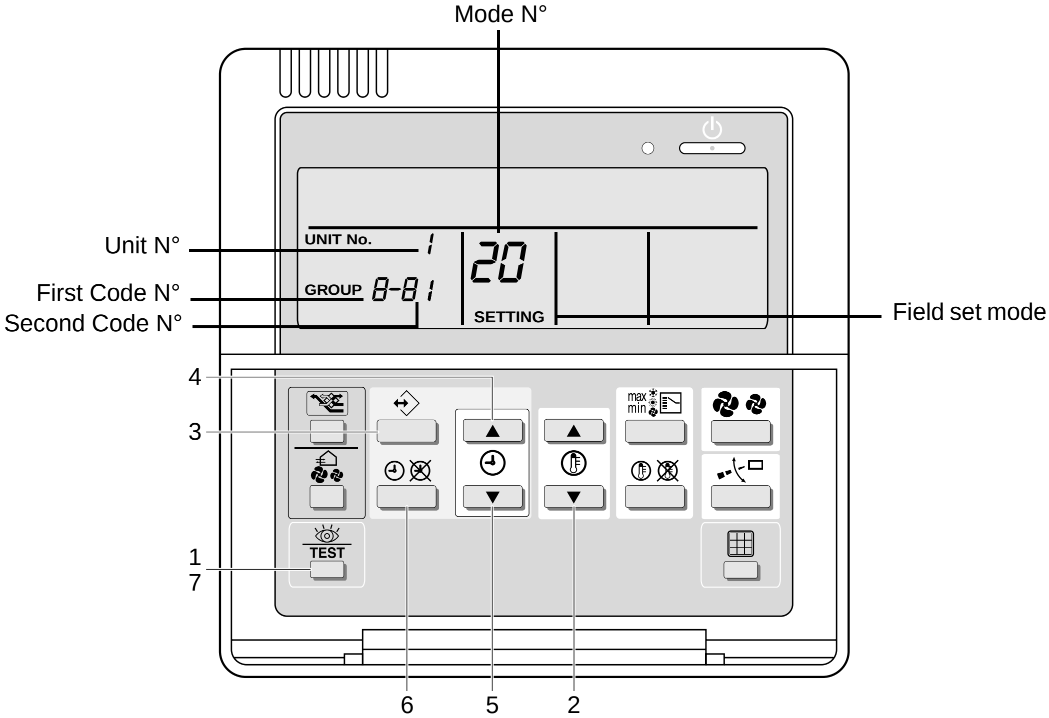
2.9 Setting the Centralized Group No.

When?

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

Wired remote control

The illustration below shows the wired remote control.



Setting

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

Step	Action
1	Switch ON the power supply of the central remote control, the unified ON/OFF control 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 control 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.

4

2.10 The Field Setting Levels

Introduction

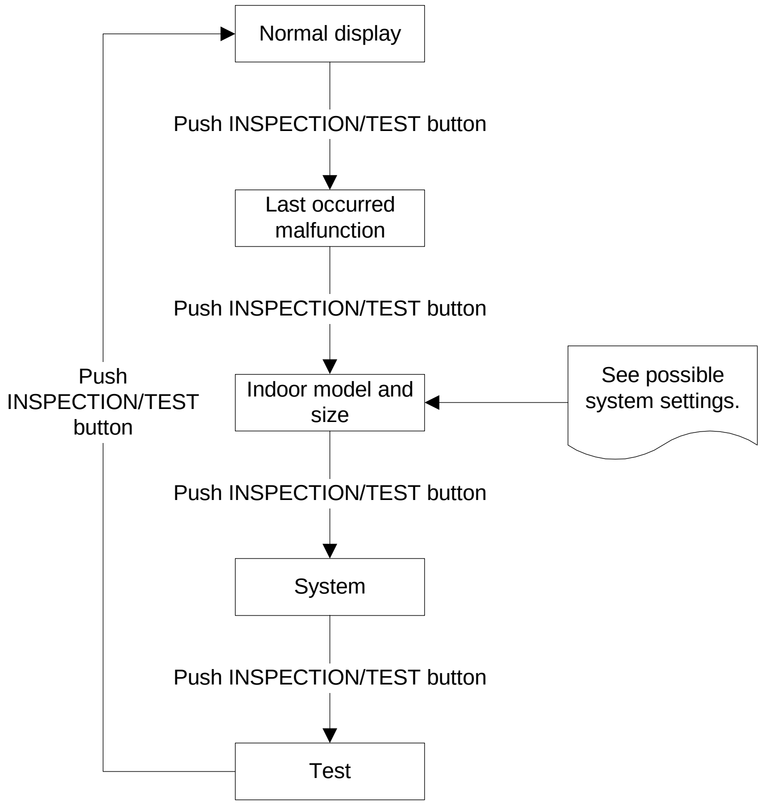
The three field setting levels are:

- 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.



4

Possible system settings

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

Size		Software	Type	
Settings	Display		Settings	Display
35	35	5	FCQ	FJ
45	45		FHQ	HJ
60	63		FAQ	AJ
71	71		FFQ	GJ
100	100		FBQ	JJ
125	125		FUQ	3J
200	200		FDQ	UJ
250	250		—	

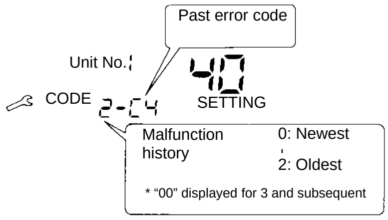
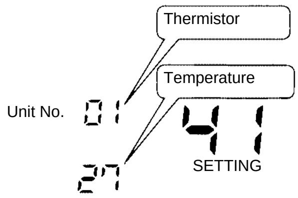
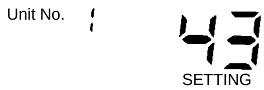
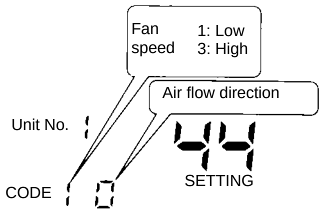
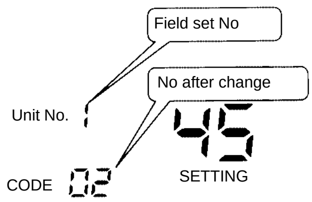
Changing the mode settings

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 control 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.	

2.11 Overview of the Field Settings on the Outdoor Units

Remote control settings

The table below contains the remote control settings.

Mode N°	First code	Description	Second n°					Details
			01	02	03	04	05	
16 or 26	0	Night time low noise operation	Disabled (Factory setting)	Automatic low noise activation	Capacity preceding setting (when using KRP58 option)	Automatic low noise + capacity preceding	—	4–26
	1	Automatic low noise start and stop time	—	—	22h00 ~ 06h00	22h00 ~ 08h00 (Factory)	20h00 ~ 08h00	4–26
	2	EDP room setting	Disabled (Factory setting)	—	EDP room setting	EDP room setting + no freeze up	—	4–30
	3	Defrost starting setting	Standard (Factory setting)	Defrost slow starting setting	Defrost quick starting setting	—	—	2–18

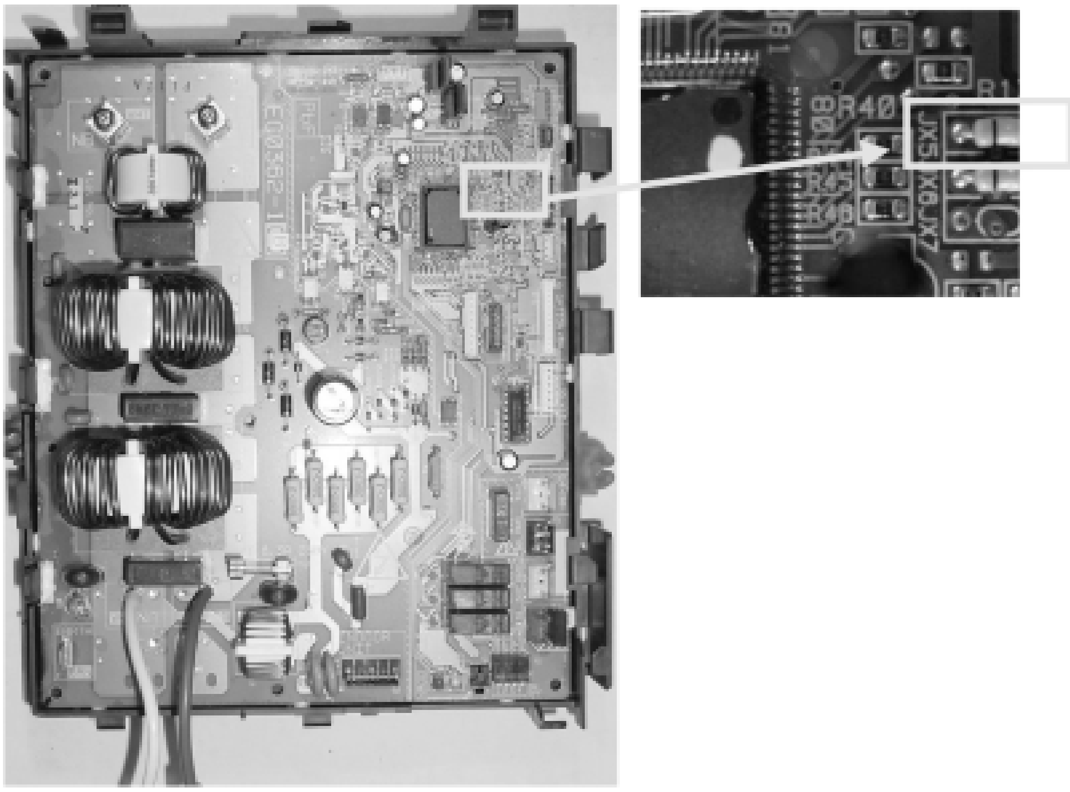
Jumpers

The table below contains the jumper field settings.

Jumper	Label on PCB	Function	Details
JX5	JX5	Set as cooling only	—

Location on PCB A1P: see drawing on next page.

This drawing shows the position of jumper JX5 on PCB A1P.



DIP switches

The table below contains the DIP switch field settings.

DIP switch	Label on PCB	Function	Details
DS1-1	ON/OFF	Switch emergency operation outdoor unit ON/OFF.	See page 2-6.
DS1-2	Cool / Heat	Select cooling / heating emergency operation.	See page 2-6.
DS1-3	ON/OFF	Test purposes only. Keep factory setting “OFF”.	—
DS1-4	ON/OFF	Test purposes only. Keep factory setting “OFF”.	—

BS

The table below contains the BS field setting.

BS	Label on PCB	Function	Details
BS	BS1	Cooling / fan only: Pump down Heating: Forced defrosting function	See page 2-17. See page 2-6.

2.12 Overview of the Factory Settings on the Outdoor Units

Factory settings

The table below contains the factory settings of all outdoor units

		RZQ71	RZQ100	RZQ125
26	0	01	01	01
	1	04	04	04
	2	01	01	01
	3	01	01	01

4

2.13 Silent Operation

Purpose

Lower the operation sound of the outdoor unit.

Setting

Silent Operation can be activated by:

1 Automatic control (By field setting from remote control)

2 External activation (from optional PCB KRP58M)

2.13.1 Silent Operation by Automatic control

Table

Silent operation can be set by field setting from the wired remote control:

Descrip-tion	Mode	First Code	Second Code				
			01	02	03	04	05
Silent Operation	16(26)	0	OFF	Low noise activation	—	Low noise + capac-ity priority	—
Low noise start & stop time		1	—	—	22h00 ~ 06h00	22h00 ~ 08h00	20h00 ~ 08h00

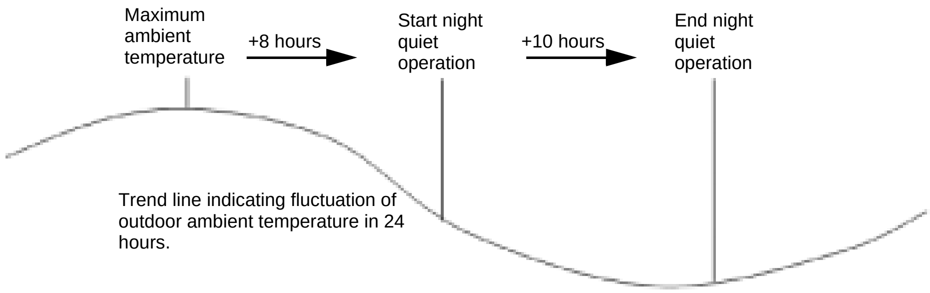
Method

When setting mode 16(26)-0-02, silent operation will be carried out by presuming the current time in accordance with the outside temperature.
Automatic mode will start when the outdoor temperature is = average max of last 10 days -5°C and will be conducted for 10 hours.
The maximum outdoor temperature is supposed to occur at 14:00h.
As the time judgement is made in accordance with the outdoor temperature, the above mentioned timing is an estimation only.

Capacity precedence setting

When setting mode 16(26)-0-04, the low noise operation will be stopped when the heating or cooling load increases. In that case, the operation will return to normal operation. The unit will return to low-noise operation when the heating or cooling load decreases again.

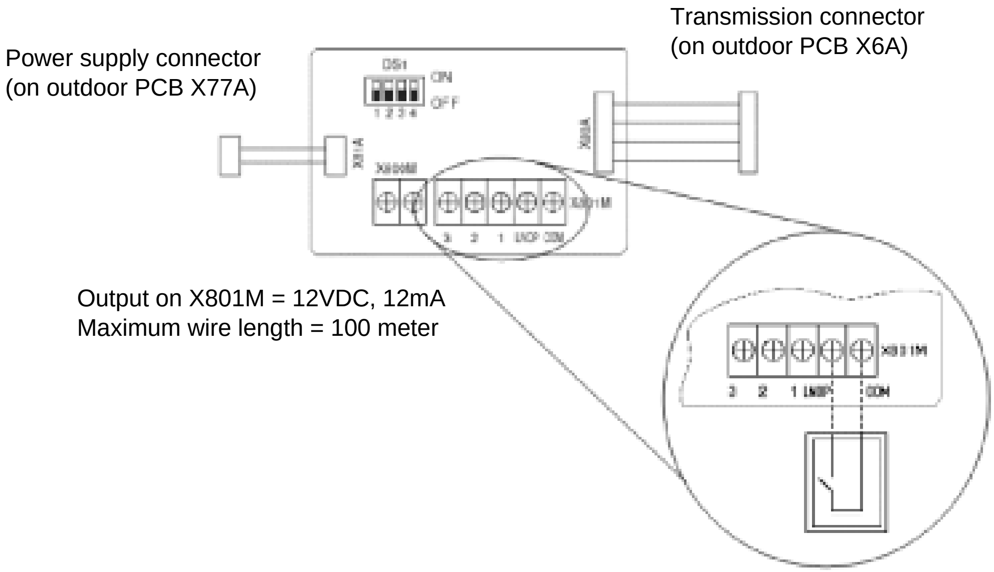
Graph



2.13.2 External activation from optional PCB

Graph

Silent operation can also be activated from the optional PCB.



Silent operation will start when the contact on LNOP-COM is closed and will remain active as long as the contact is closed. No field setting on the outdoor unit or by remote control is required.
Silent operation will be ended when the contact is re-opened.
Use of the KRP58M enables the use of an external time clock.

Capacity priority Setting

Same as with the automatic control, priority for capacity can be set.Prioirity for capacity will be activated by changing field setting 26-0-03 in combination with the closed contact on KRP58M.

Description	Mode	First Code	Second Code			
			01	02	03	04
Silent Operation	16(26)	0	Factory	---	Capacity priority	---

Exceptions

The silent operation will be overruled in the following conditions:

- Pump down residual operation
- Startup control
- Defrost operation
- Oil recovery

Sound reduction

	71	100	125
Sound reduction	4 dBA	4 dBA	5 dBA

2.14 I-Demand Function

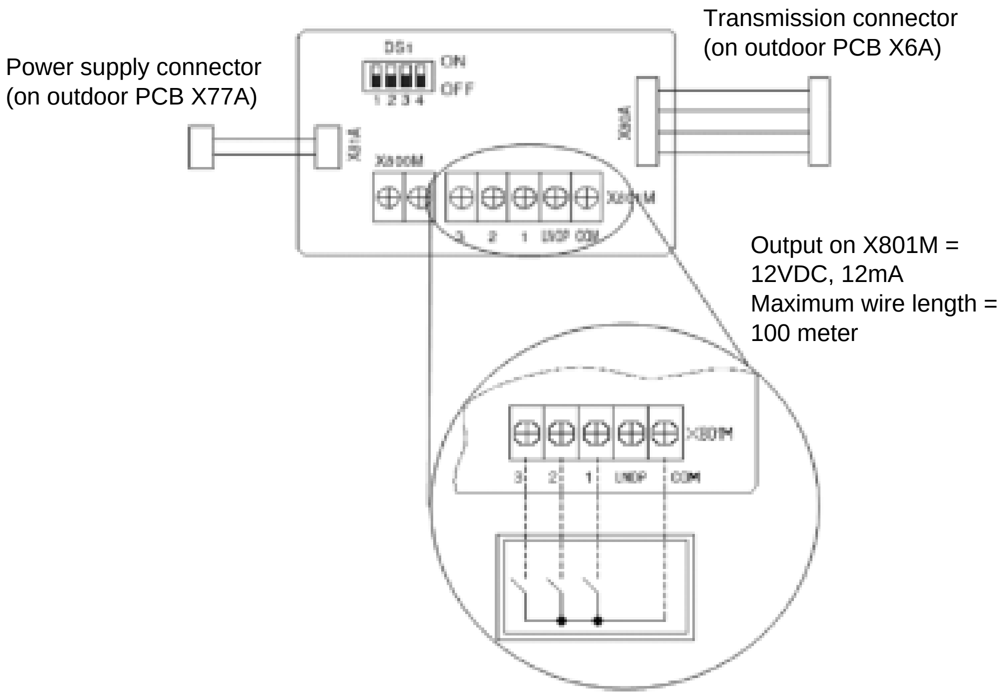
Purpose

Set a limitation towards the power consumption from the system.(e.g. budget control, limit power consumption during peak moments,..)

Setting

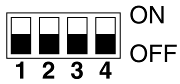
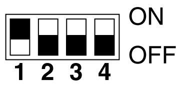
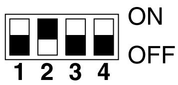
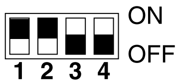
3 different demand setting can be selected by using terminal X801M:

- Demand 1 → Close contact between COM and contact 1
- Demand 2 → Close contact between COM and contact 2
- Demand 3 → Close contact between COM and contact 3



Demand 1

Power consumption limitation in function of setting on DS1:

DS1 SETTING			Maximum Power Consumption
1	2		
OFF	OFF		60%
ON	OFF		70%
OFF	ON		80%
ON	ON		100%

Demand 2

Power consumption limitation set to 40%.

Demand 3

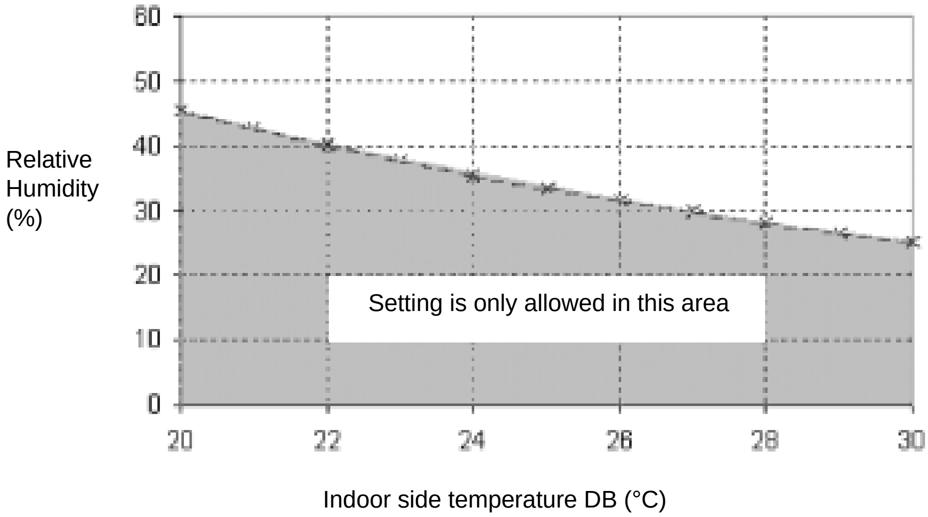
Forced thermostat OFF.

2.15 Setting for Low Humidity Application

Purpose

Can be set when using the RZQ units for year round cooling in low humidity applications such as computerrooms (EDP rooms), technical rooms, etc...to increase the capacity of the unit.

Definition of Low Humidity Area



Caution

When using the "LH settings" outside the "Low Humidity Area" there is an increased risk of ice accumulation on the indoor coil or water blowing out from the indoor unit.

Function details

		Factory setting	Low humidity application setting	Low humidity application + freeze up operation prevention
Field Setting		16(26)-2-01	16(26)-2-03	16(26)-2-04
Compressor control		■ The compressor frequency is controlled in function of the target evaporating temperature. ■ The target evaporating temperature is controlled in function of the cooling load.		
		Minimum target Te = 2°C **See graph 1**	Minimum target Te = 0°C **See graph 2**	Initial minimum target Te = 2°C, but can be changed in function of actual Te, to avoid freeze up activation: ■ Te ≤ -1°C for 20 minutes accumulated => Change target Te ≥ 5°C ■ Te ≤ -1°C for 30 minutes accumulated => Change target Te ≥ 8°C **See graph 3**
Freeze protection function	Start	Te ≤ -1°C for 40 minutes accumulated OR Te ≤ A°C for 1 minute continuous (Indoor decision)	Te ≤ -1°C for 40 minutes accumulated OR Te ≤ -3°C for 1 minute continuous (Outdoor decision)	Te ≤ -1°C for 40 minutes accumulated OR Te ≤ A°C for 1 minute continuous (Outdoor decision)
	End	Te > 7°C for 10 minutes continuously. (Indoor decision)	Te > 7°C for 3 minutes continuously OR Te > 4°C for 20 minutes continuously (Outdoor decision)	Te > 7°C for 3 minutes continuously OR Te > 4°C for 20 minutes continuously (Outdoor decision)

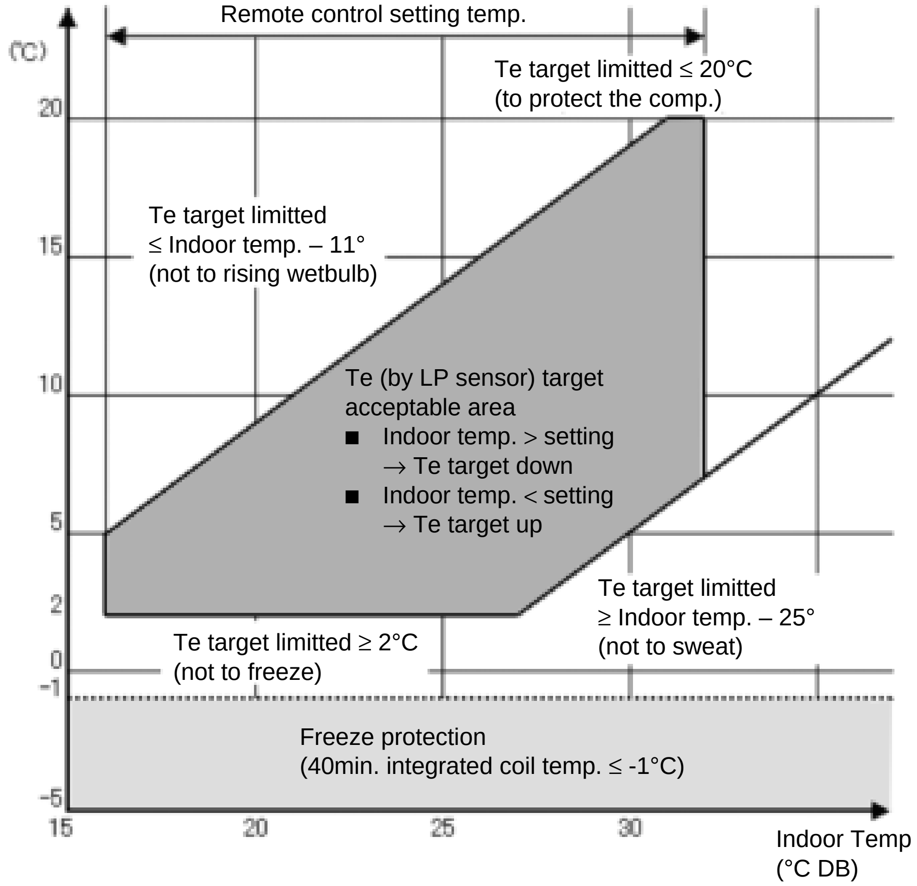
Parameters

	FAQ	FHQ	All except FAQ & FHQ
A	-1°C	-3°C	-5°C

Graph 1

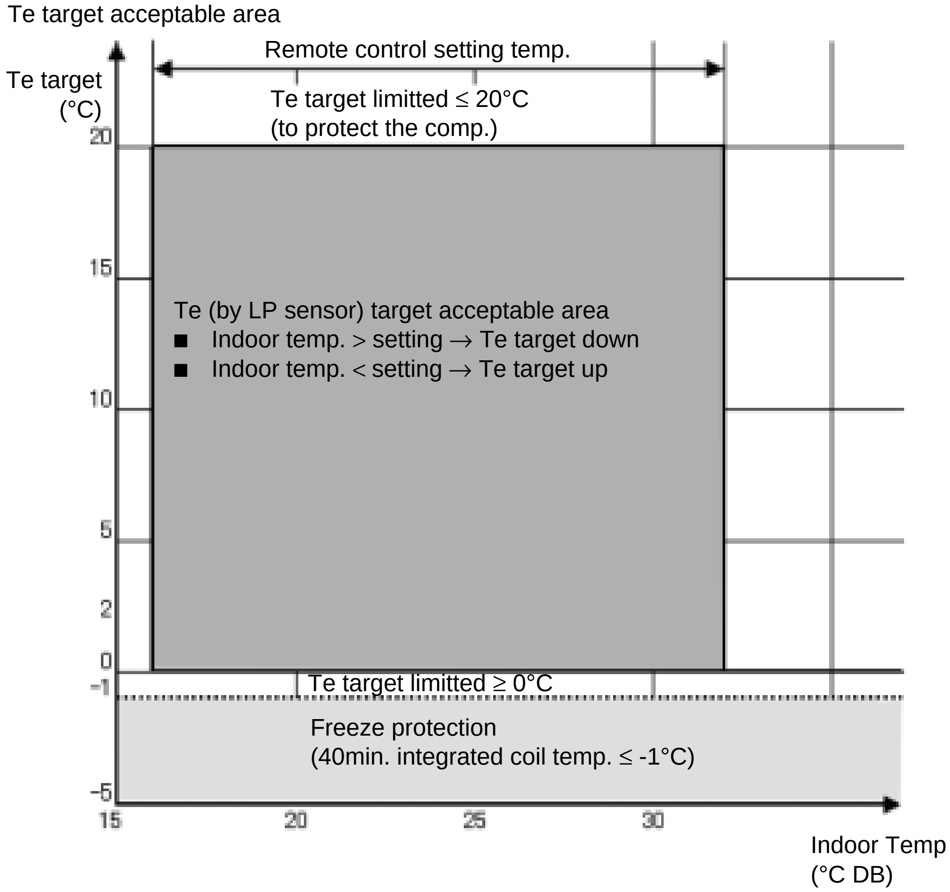
Target evaporating temperature control in case of factory setting 16(26)-2-01:

Te target acceptable area



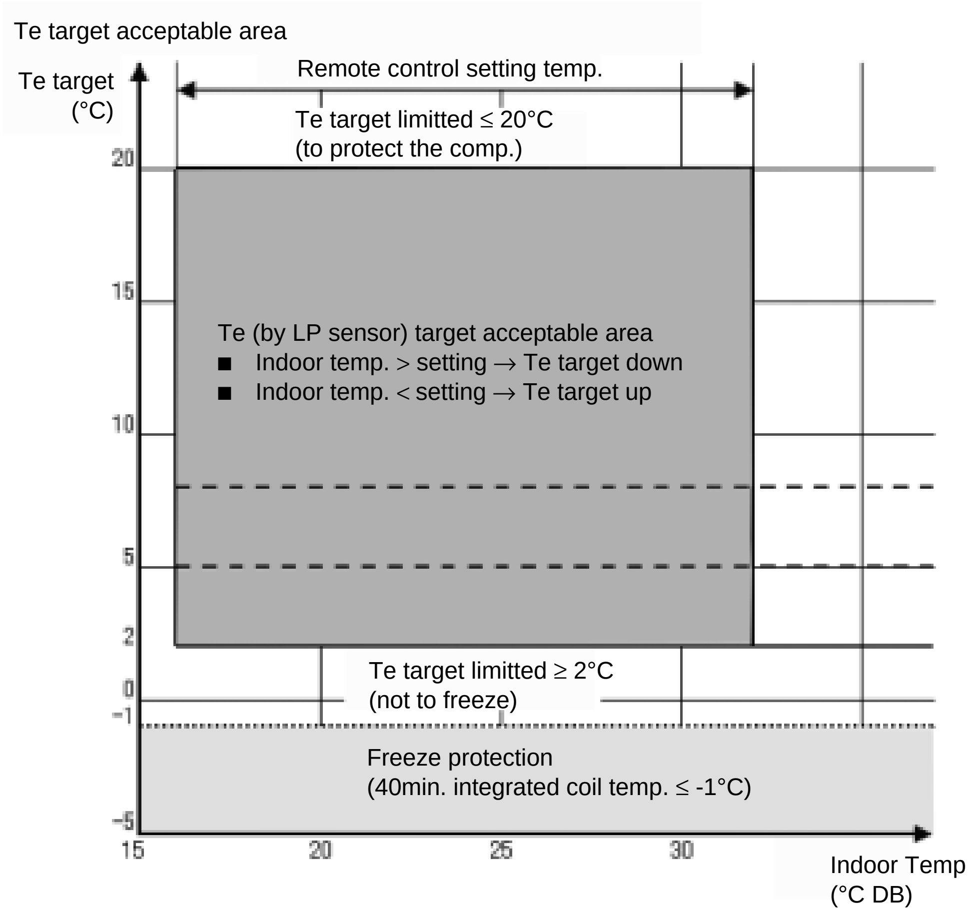
Graph 2

Target evaporating temperature control when "low humidity application" is selected. Field setting 16(26)-2-03:



Graph 3

Target evaporating temperature control when "low humidity application + freeze up operation prevention" is selected. Field setting 16(26)-2-04:



Change thermostat control

In order to increase continuous operation of the unit in low latent heat applications and avoid the rise of temperature after thermostat OFF, the thermostat control will be changed when using field settings 16(26)-2-03 & 16(26)-2-04.

Thermostat ON

- ΔTrs ≥ 0.5 °C (No change from standard setting)

Thermostat OFF

- ΔTrs ≤ -2.0 °C for 5 minutes continuously.
- ΔTrs ≤ 4.5 °C

Capacity

When "low humidity application" is selected. Field setting 16(26)-2-03:

Outdoor Temp. (°C-DB)	Indoot Temp. (°C-WB°							
	11	14	16	18	19	20	22	24
	Capacity (% of standard point)							
-15	0.62	0.76	0.86	0.95	1.00	1.02	1.07	1.11
-10	0.62	0.76	0.86	0.95	1.00	1.02	1.07	1.11
-5	0.62	0.81	0.91	1.01	1.06	1.16	1.21	1.26
0	0.62	0.81	0.91	1.01	1.06	1.16	1.21	1.26
5	0.62	0.81	0.91	1.01	1.06	1.16	1.21	1.26
10	0.62	0.81	0.91	1.01	1.06	1.16	1.21	1.26
15	0.62	0.81	0.91	1.01	1.12	1.14	1.19	1.24
20	0.62	0.81	0.91	1.07	1.10	1.12	1.16	1.21
25	0.62	0.81	0.91	1.05	1.07	1.09	1.13	1.18
30	0.61	0.81	0.91	1.01	1.04	1.06	1.10	1.14
35	0.61	0.81	0.94	0.98	1.00	1.02	1.06	1.11
40	0.61	0.81	0.90	0.94	0.96	0.98	1.02	1.06

Capacity

When "low humidity application + freeze up operation prevention" is selected. Field setting 16(26)-2-04:

Outdoor Temp. (°C-DB)	Indoot Temp. (°C-WB°							
	11	14	16	18	19	20	22	24
	Capacity (% of standard point)							
-15	0.51	0.68	0.78	0.95	1.01	1.06	1.16	1.26
-10	0.51	0.68	0.78	0.95	1.01	1.06	1.16	1.26
-5	0.51	0.68	0.78	0.95	1.01	1.06	1.16	1.26
0	0.51	0.68	0.78	0.95	1.01	1.06	1.16	1.26
5	0.51	0.68	0.78	0.95	1.01	1.06	1.16	1.26
10	0.51	0.68	0.78	0.95	1.01	1.06	1.16	1.26
15	0.51	0.68	0.78	0.95	1.01	1.06	1.16	1.24
20	0.51	0.68	0.78	0.95	1.01	1.06	1.16	1.21
25	0.51	0.68	0.78	0.95	1.00	1.06	1.13	1.18
30	0.51	0.68	0.78	0.95	1.00	1.05	1.10	1.14
35	0.51	0.68	0.78	0.95	1.00	1.02	1.06	1.11
40	0.51	0.67	0.78	0.94	0.96	0.98	1.02	1.06

Note:

- Operation range on indoor side expanded from minimum 12°CWB to 11°CWB when using LH setting.
- Do not use a setpoint below 20°C to avoid operation out of the indoor operation range (11°CWB).
- Be sure to set the indoor fan to high speed.

4

2.16 Defrost start setting

See ‘Defrost Operation’ on page 2-18.

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:

4

3.1 General Operation Data

Guide Lines for Optimal Operation Condition

The operation value guide lines when operating under standard conditions **(at Rated frequency)** by pushing the test run button on the remote control are as given in the table below.

Indoor Unit Fan:

“H” Operation Compressor: Rated Frequency

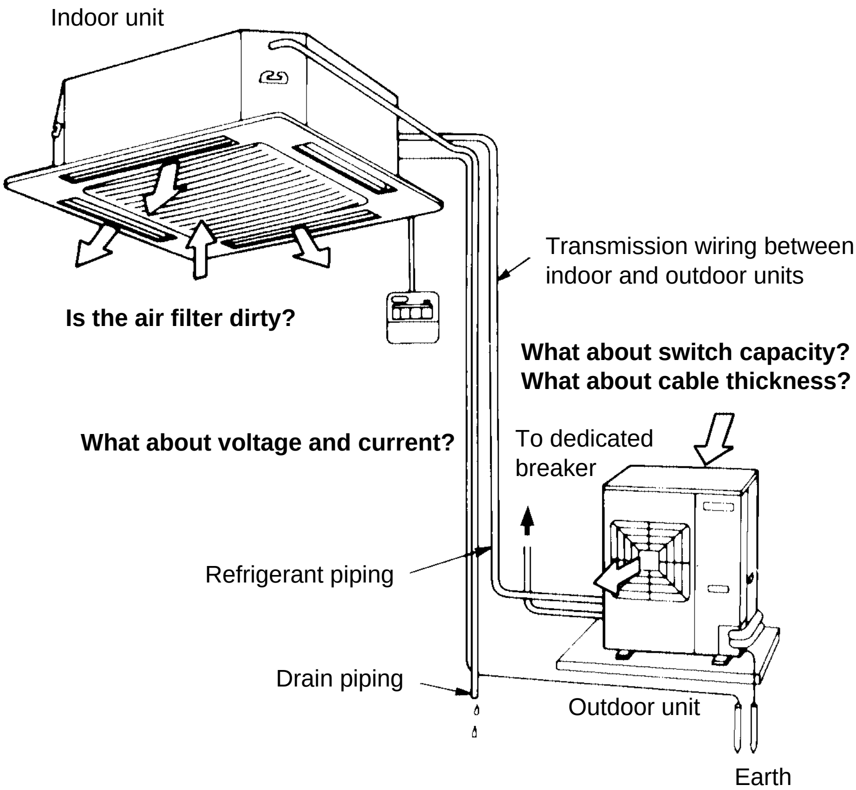
	High Pressure (Mpa)	Low Pressure (Mpa)	Discharge Pipe Temperature (°C)	Suction Temperature (°C)	Indoor Unit Side: Differential Between Suction Temperature and Discharge Temperature (°C)	Outdoor Unit Side: Differential Between Suction Temperature and Discharge Temperature (°C)
Cooling	26 bar ~ 34 bar	6 bar ~ 10 bar	60~100	–2~10	8~18	7~12
Heating	25 bar ~ 32.6 bar	5.3 bar ~ 7.5 bar	60~100	–6~2	14~30	2~6

Standard Conditions

	Indoor Unit Conditions	Outdoor Unit Conditions
Cooling Operation	27°C DB/19°C WB	35°C DB
Heating Operation	20°C DB	7°C DB/6°C WB

During or after maintenance, when the power supply is turned back on, operation restarts automatically by the “auto restart function.” Please exercise the proper caution.

When perfoming maintenance, you should at least perform the following inspections:



4

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

Notes:

- ∗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 low.

3.2 Operation Range

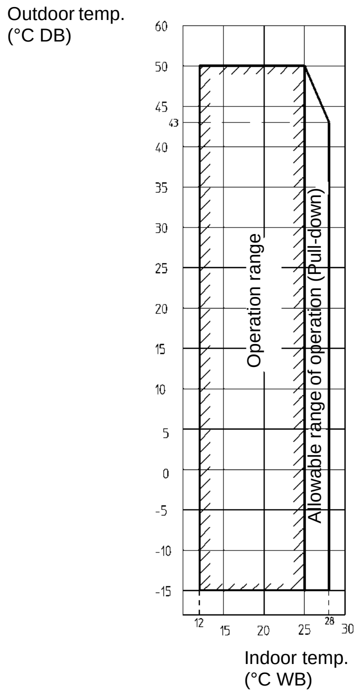
Conditions

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.

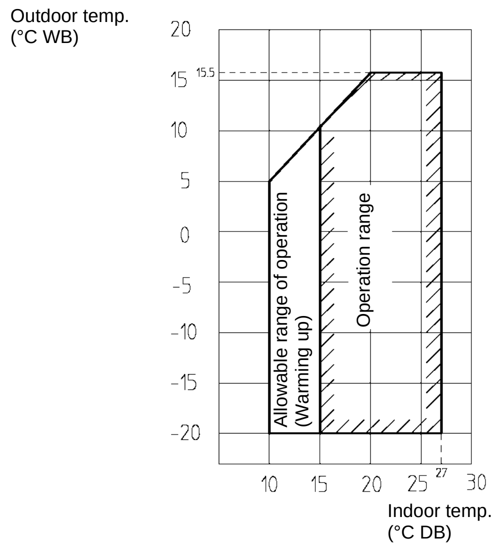
Operation range: Cooling

The illustration below shows the operation range.



Operation range: Heating

The illustration below shows the operation range.



4

Notes:

- Depending on operation and installation conditions, the indoor unit can change over to freeze-up operation (Indoor de-icing).
- To reduce the freeze-up operation (Indoor de-icing) frequency it is recommended to install the outdoor unit in a location not exposed to wind.