



ESIE05-01



# *Service Manual*

**RR/RQ71~125B7**

**Sky-Air R410A non-inverter B-series**

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# 1 Introduction

## 1.1 About This Manual

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

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**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 R410A B-series room air conditioners.

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

Part	See page
Part 1–System Outline	1–1
Part 2–Functional Description	2–1
Part 3–Troubleshooting	3–1
Part 4–Commissioning and Test Run	4–1
Part 5–Disassembly and Maintenance	5–1

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**Introduction overview** The introduction contains the following topics:

Topic	See page
1.2–Combination Overview: Outdoor Units of the Sky Air B-Series	x
1.3–Precautions on handling new refrigerants	xii

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**Note:** This Service Manual is about Outdoor Models only. Please refer to the indoor unit Service Manual ESIE05-04 for details on the indoor units.

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## 1.2 Combination Overview: Outdoor Units of the Sky Air B-Series

### Introduction

In the tables in this section:

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

### Combination matrix

Cooling only units:

MODEL NAME	FCQ35	FCQ50	FCQ60	FCQ71	FCQ100	FCQ125	FBQ35	FBQ50	FBQ60	FBQ71	FBQ100	FBQ125	FHQ35	FHQ50	FHQ60	FHQ71	FHQ100	FHQ125
RR71B	T	—	—	P	—	—	T	—	—	P	—	—	T	—	—	P	—	—
RR100B	T	T	T	T	P	—	T	T	T	T	P	—	T	T	T	T	P	—
RR125B	—	T	T	T	—	P	—	T	T	T	—	P	—	T	T	T	—	P

MODEL NAME	FUQ71	FUQ100	FUQ125	FAQ71	FAQ100	FFQ35	FFQ50	FFQ60	FDQ125
RR71B	P	—	—	P	—	T	—	—	—
RR100B	T	P	—	T	P	T	T	T	—
RR125B	T	—	P	T	—	—	T	T	P

Heat pump units:

MODEL NAME	FCQ35	FCQ50	FCQ60	FCQ71	FCQ100	FCQ125	FBQ35	FBQ50	FBQ60	FBQ71	FBQ100	FBQ125	FHQ35	FHQ50	FHQ60	FHQ71	FHQ100	FHQ125
RQ71B	T	—	—	P	—	—	T	—	—	P	—	—	T	—	—	P	—	—
RQ100B	T	T	T	T	P	—	T	T	T	T	P	—	T	T	T	T	P	—
RQ125B	—	T	T	T	—	P	—	T	T	T	—	P	—	T	T	T	—	P

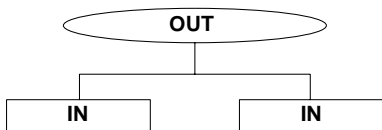
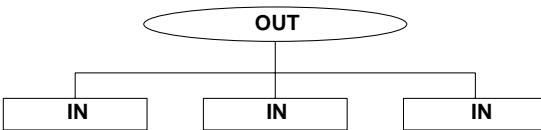
MODEL NAME	FUQ71	FUQ100	FUQ125	FAQ71	FAQ100	FFQ35	FFQ50	FFQ60	FDQ125
RQ71B	P	—	—	P	—	T	—	—	—
RQ100B	T	P	—	T	P	T	T	T	—
RQ125B	T	—	P	T	—	—	T	T	P



### Allowed capacity combinations for twin & triple

Outdoor unit			
	71	100	125
Indoor units	35 + 35	35 + 71	60 + 60
		50 + 60	50 + 71
		50 + 50	50 + 50 + 50
		35 + 35 + 35	

### Required refnets

Possible indoor combination						
Simultaneous operation						
Outdoor models	TWIN			TRIPLE		
						
RQ71B7V3/W1 RR71B7V3/W1	35-35 (KHRQ22M20TA7)					
RQ100B7V3/W1 RR7100B7V3/W1	50-50 (KHRQ22M20TA7)	50-60 (KHRQ22M20TA7)	35-71 (KHRQ22M20TA7)	35-35-35 (KHRQ127H7)		
RQ125B7V3/W1 RR125B7V3/W1	60-60 (KHRQ22M20TA7)	50-71 (KHRQ22M20TA7)		50-50-50 (KHRQ127H7)		

### Note:

In case of twin/triple application, designate the remote controller that is equipped with the most functions as the "master" (main) unit. In below table, units are listed in order of available functions (most functions are on FCQ, less functions are on FBQ):

- FCQ35~71
- FFQ35~60
- FUQ71
- FHQ35~71
- FAQ71
- FBQ35~71

## 1.3 Precautions on handling new refrigerants

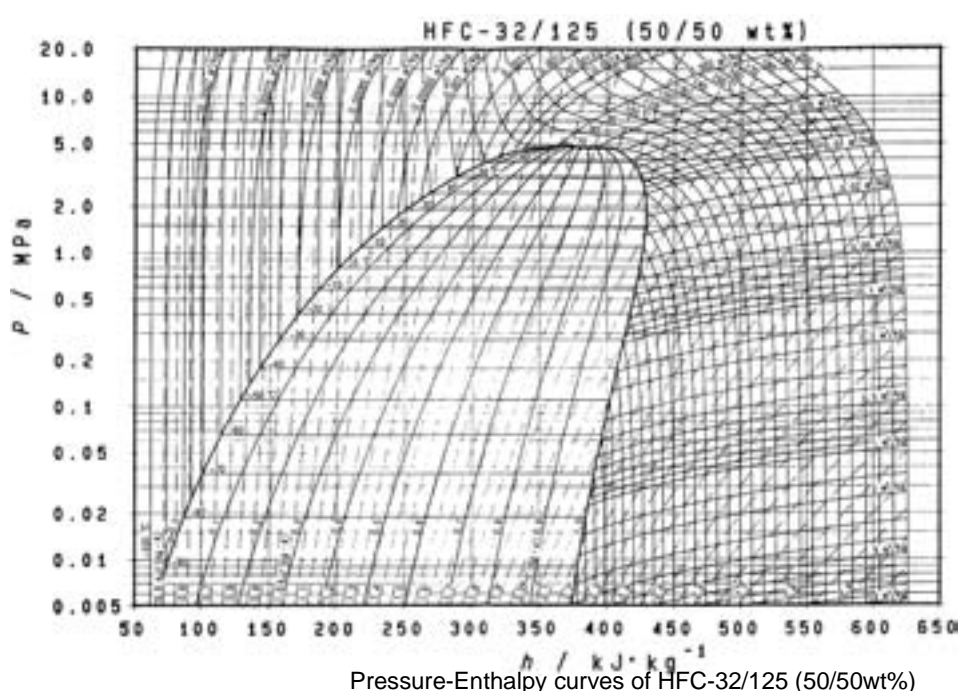
### 1.3.1 Outline

#### 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 <sup>2</sup>	4.15 Mpa (gauge pressure) = 42.3 kgf/cm <sup>2</sup>	2.75Mpa (gauge pressure) = 28.0 kgf/cm <sup>2</sup>
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  $\frac{1}{9.80665}$  0.19716 kgf / cm<sup>2</sup>



## ► Thermodynamic characteristic of R410A

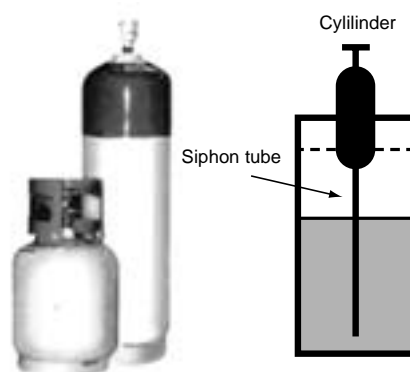
DAIRFP ver2.0

Temperature (°C)	Steam pressure (kPa)		Density (kg/m <sup>3</sup> )		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	1.981	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	1.424	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	318.41	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	13.26	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	463.61	1234.8	17.74	1.476	0.897	177.0	418.2	0.980	1.919
-14	499.91	498.20	1227.5	19.04	1.483	0.909	180.0	419.0	0.991	1.914
-12	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	1212.5	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	423.2	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	1.975	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	1.776
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	2.664	2.557	300.3	421.0	1.389	1.757
58	3671.3	3661.2	836.9	180.4	2.883	2.799	305.3	419.4	1.403	1.749
60	3834.1	3824.2	814.9	193.7	3.194	3.106	310.9	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 Handling 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

Tool	Compatibility			Reasons for change
	HFC		HCFC	
	R410A	R407C	R22	
Gauge manifold Charge hose	X			<ul style="list-style-type: none"> <li>➤ Do not use the same tools for R22 and R410A.</li> <li>➤ Thread specification differs for R410A and R407C.</li> </ul>
Charging cylinder	X		O	➤ Weighting instrument used for HFCs.
Gas detector	O		X	➤ The same tool can be used for HFCs.
Vacuum pump (pump with reverse flow preventive function)	O			➤ To use existing pump for HFCs, vacuum pump adaptor must be installed.
Weighting instrument	O			
Charge mouthpiece	X			<ul style="list-style-type: none"> <li>➤ Seal material is different between R22 and HFCs.</li> <li>➤ Thread specification is different between R410A and others.</li> </ul>
Flaring tool (Clutch type)	O			➤ For R410A, flare gauge is necessary.
Torque wrench	O			➤ Torque-up for 1/2 and 5/8
Pipe cutter	O			
Pipe expander	O			
Pipe bender	O			
Pipe assembling oil	X			➤ Due to refrigerating machine oil change. (No Suniso oil can be used.)
Refrigerant recovery device	Check your recovery device.			
Refrigerant piping	See the chart below.			➤ Only $\phi 19.1$ is changed to 1/2H material while the previous material is "O".

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

### Copper tube material and thickness

Pipe size	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)

(\*) Pipe thickness may vary according to unit type. Refer to the Installation Manual for correct wall thickness.

### Flaring tool



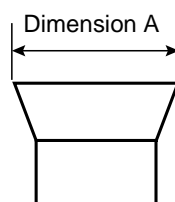
Flare gauge



- Specifications
- Dimension A

Nominal size	Tube O.D.	A <sup>+0</sup> / <sub>-0.4</sub>	
		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

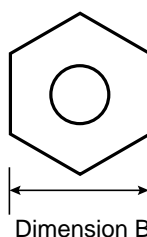


- Specifications
- Dimension B Unit:mm

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<sup>2</sup>)
  - Low pressure gauge
    - 0.1 to 3.8 MPa (-76 cmHg to 38 kg/cm<sup>2</sup>)
  - 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<sup>2</sup>)
    - Rupture pressure 25.4 MPa (259 kg/cm<sup>2</sup>)
    - 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) =  $\pm 2\text{g}$
    - TA101B (for 20-kg cylinder) =  $\pm 5\text{g}$
  - 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:

Chapter	See page
1-General Outline: Outdoor Units	1-3
2-Specifications	1-13
3-Functional Diagrams	1-19
4-Switch Box Layout	1-31
5-Wiring Diagrams: Outdoor Units	1-35
6-PCB Layout	1-43

# 1

# 1 General Outline: Outdoor Units

## 1.1 What Is in This Chapter?

**Introduction**

This chapter contains the following information on the outdoor units:

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

**General outline**

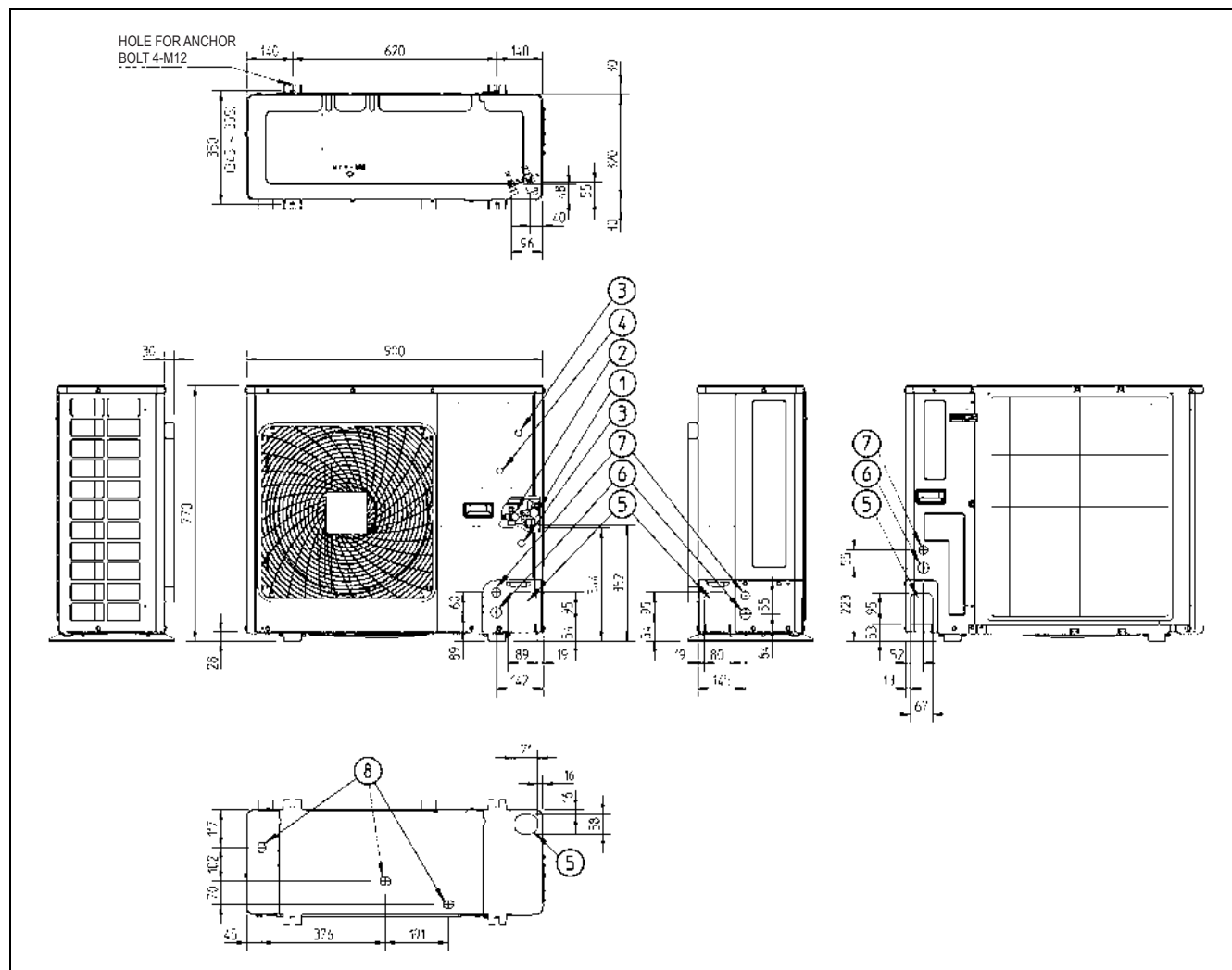
This chapter contains the following general outlines:

General outline	See page
1.2-RR71 and RQ71: Outlook, Dimensions and Components	1-4
1.3-RR100 and RQ100: Outlook, Dimensions and Components	1-6
1.4-RR125 and RQ125: Outlook, Dimensions and Components	1-8
1.5-RR71, RR100, RR125, RQ71, RQ100 and RQ125: Installation and Service Space	1-10

## 1.2 RR71 and RQ71: Outlook, Dimensions and Components

## Outlook and dimensions

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



## Installation and service space

See page 1–10.

**Components**

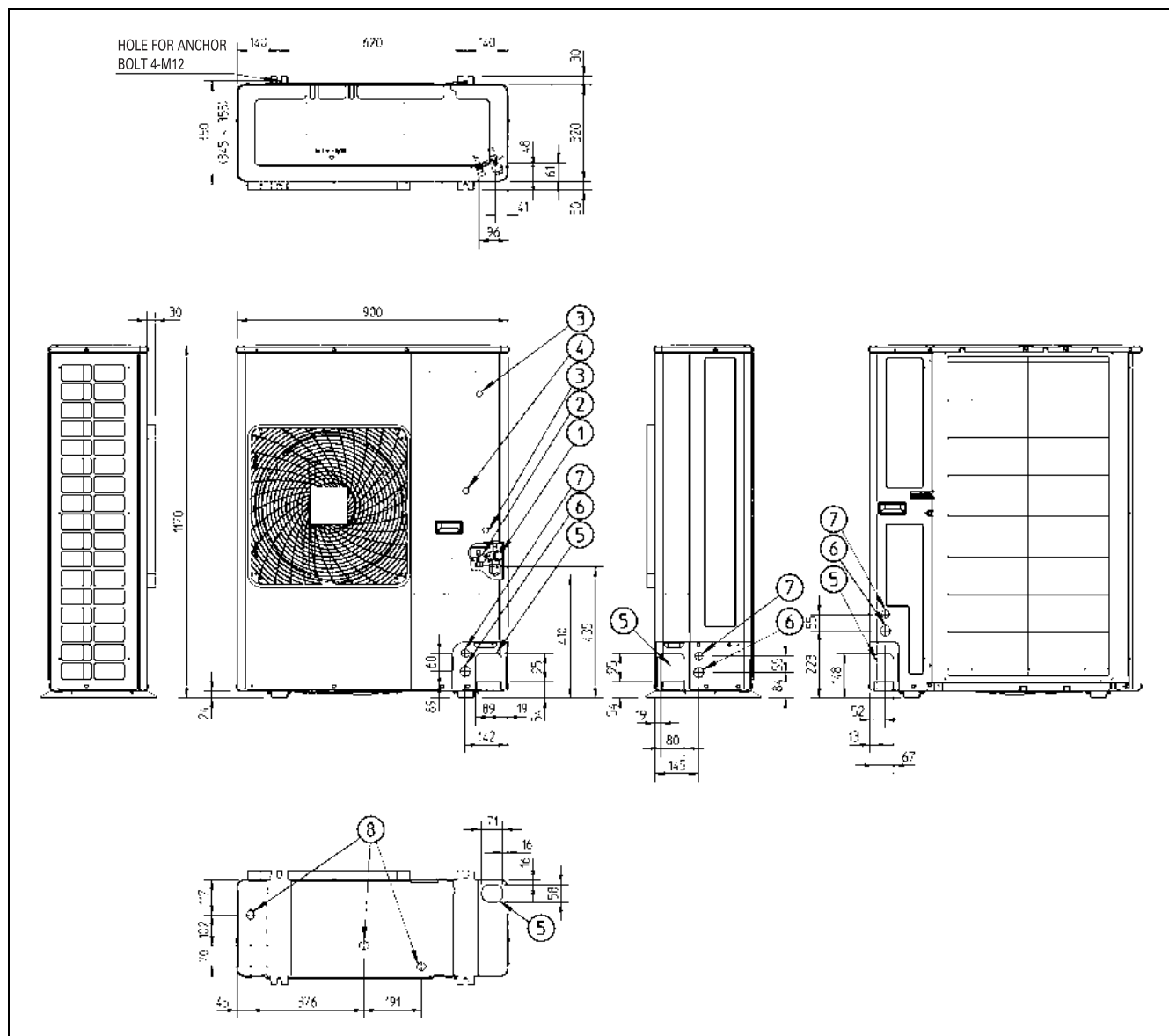
The table below contains the different components of the unit.

No.	Component
1	Gas pipe connection
2	Liquid pipe connection
3	Service port (inside the unit) (for RQ71 only)
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 RR100 and RQ100: Outlook, Dimensions and Components

### Outlook and dimensions

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



### Installation and service space

See page 1-10.



**Components**

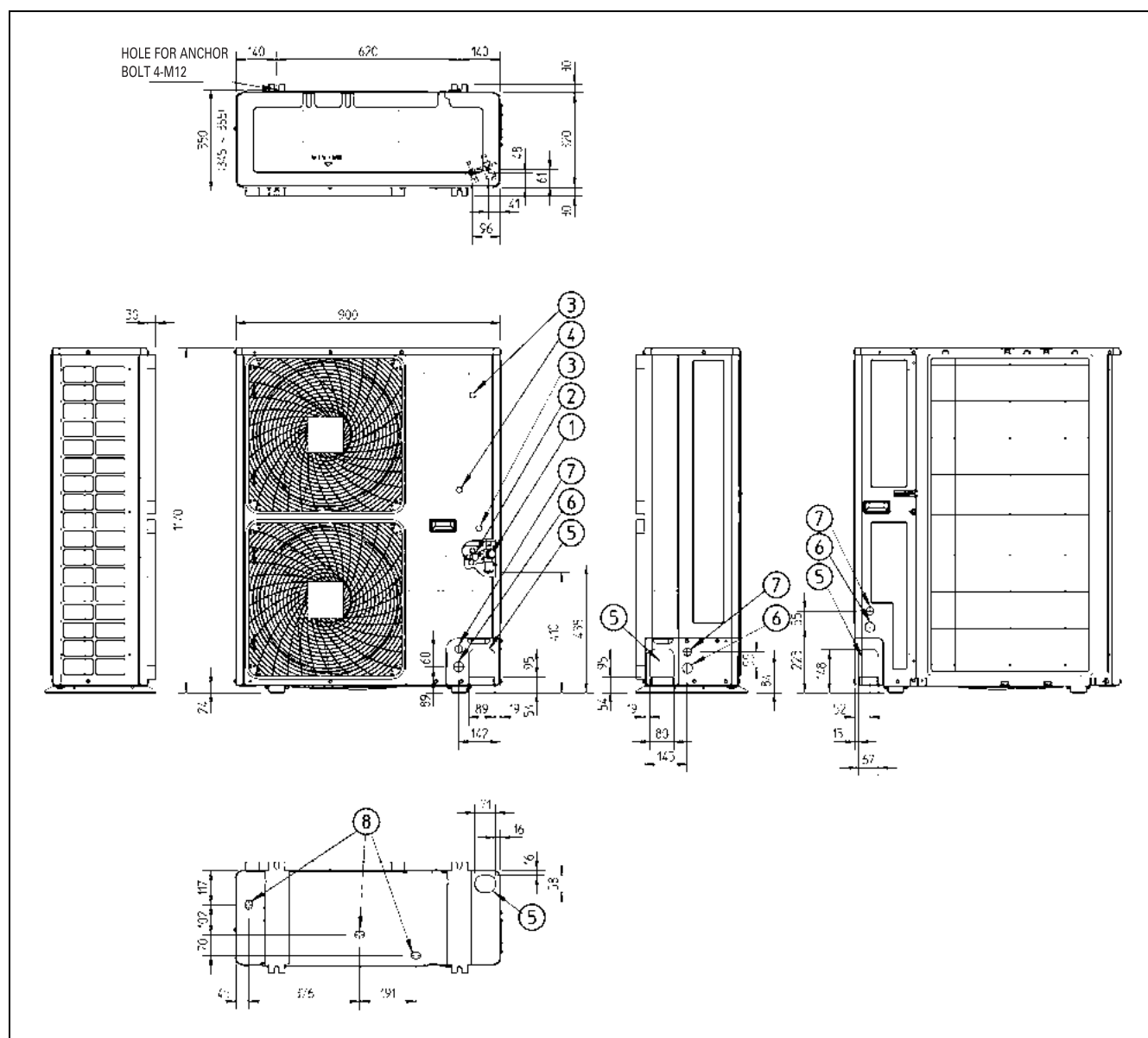
The table below contains the different components of the unit.

No.	Component
1	Gas pipe connection
2	Liquid pipe connection
3	Service port (inside the unit) (for RQ100 only)
4	Grounding terminal M5 (inside the switch box)
5	Refrigerant piping intake
6	Power supply wiring intake
7	Control wiring intake
8	Drain outlet

## 1.4 RR125 and RQ125: Outlook, Dimensions and Components

## Outlook and dimensions

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



## Installation and service space

See page 1–10.

**Components**

The table below contains the different components of the unit.

No.	Component
1	Gas pipe connection
2	Liquid pipe connection
3	Service port (inside the unit) (for RQ125 only)
4	Grounding terminal M5 (inside the switch box)
5	Refrigerant piping intake
6	Power supply wiring intake
7	Control wiring intake
8	Drain outlet

## 1.5 RR71, RR100, RR125, RQ71, RQ100 and RQ125: Installation and Service Space

### Non stacked

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

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

- ▲ 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

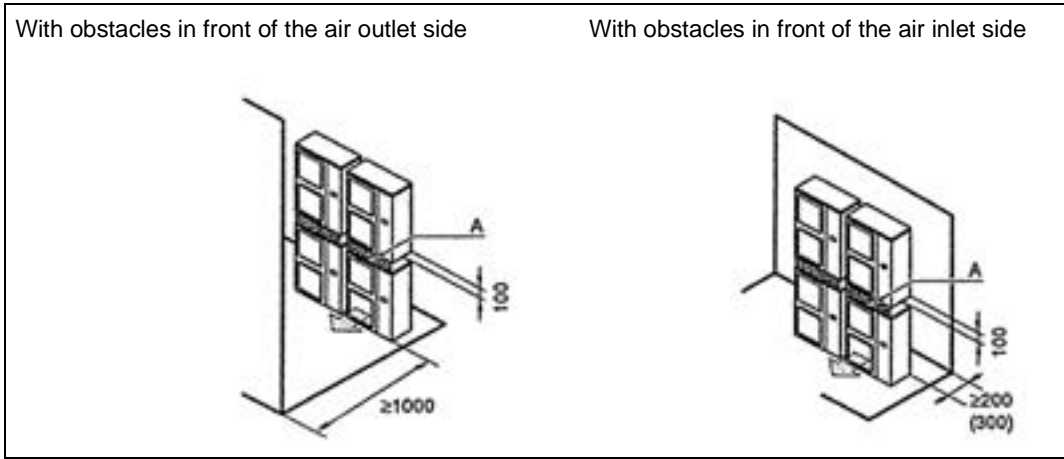


This situation is not allowed

# Stacked

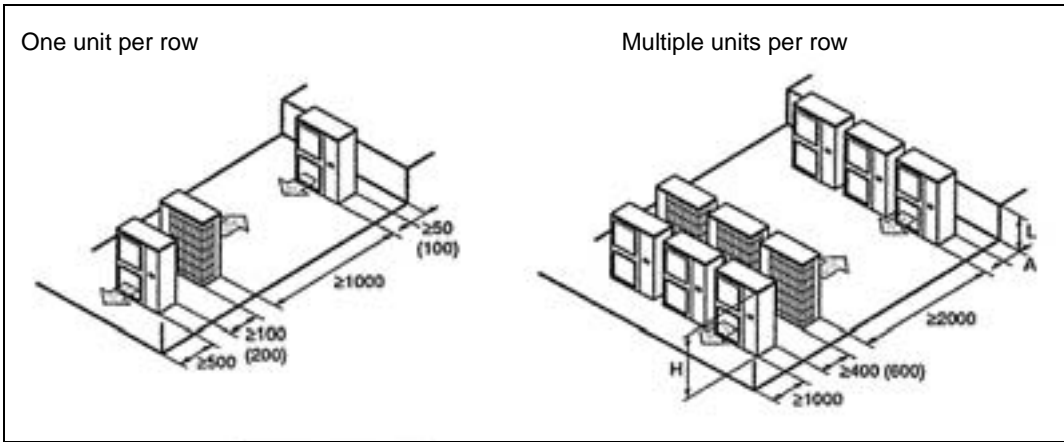
The illustration below shows the required installation and service space (mm). The values in brackets are for the 100 and 125 class.

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



# Multiple rows

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



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

1

# 2 Specifications

## 2.1 What Is in This Chapter?

**Introduction**

This chapter contains the following information:

- Technical specifications
- Electrical specifications.
- Electrical data

**Options**

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

**Outdoor units**

This chapter contains the following specifications:

Specifications	See page
2.2-RR71, RR100 and RR125	1-14
2.3-RQ71, RQ100 and RQ125	1-17

**Indoor units**

Refer to Indoor unit Service Manual ESIE05-04.

## 2.2 RR71, RR100 and RR125

### Technical specifications

The table below contains the technical specifications.

Specification		RR71B7V3B	RR71B7W1B	RR100B7V3B	RR100B7W1B	RR125B7W1B
Compressor	Model	JT90G-V1N	JT90G-YE	JT125G-V1N	JT125G-YE	JT160G-YE
	Type	Hermetically sealed scroll type				
	Refrigerant oil type	DAPHNE FVC68D				
	Oil charge	1,5 liter				
Outdoor Heat exchanger	Length	857 mm				
	Rows x stages x fin pitch	2 x 34 x 2.0 mm		2 X 52 X 2.0 mm		
	No of passes	6		10		
	Face area	0.641 m²		0.980 m²		
	Tube type	HI-XSS Cooling tube				
	Fin type	Non sym. waffle louver				
	Empty tubeplate hole	0				
	No of fans	1				2
Fan	Nominal air flow (230V) cooling	48 m³/min		55 m³/min		89 m³/min
	Fan motor model	P47L11S x 1				P47L11S x 2
	Fan speed	3 steps				
Refrigerant circuit	Type	R410A				
	Charge	2.7 kg		3.7 kg		
Safety and functional devices		See page 1–19 and 3–19				
Heat insulation		Both liquid and gas pipes				
Machine weight		83 kg	81 kg	102 kg	99 kg	106 kg

### Electrical specifications

The table below contains the electrical specifications.

Specification		RR71B7V3B	RR71B7W1B	RR100B7V3B	RR100B7W1B	RR125B7W1B
Unit	Phase	1~	3N~	1~	3N~	
	Voltage	230 V	400 V	230 V	400 V	
	Frequency	50 Hz				
	No. of wire connections	3 wires for power supply (including earth wire)	5 wires for power supply (including earth wire)	3 wires for power supply (including earth wire)	5 wires for power supply (including earth wire)	
		4 wires for connection with indoor (including earth wire)				
	Power supply intake	Outdoor unit only				
Compressor	Phase	1~	3~	1~	3~	
	Voltage	230 V	400 V	230 V	400 V	
	Starting method	Direct				
	No. x motor output	1x2200 W			1x3000 W	
Fan motor	Phase	1~				
	Voltage	230 V				
	No. of motors x output	1x65W			1x90 W	



## Electrical Data RR71

The table below contains the electrical specifications for RR71.

Unit combination		Power supply					Compressor		OFM		IFM	
Indoor unit	Outdoor unit	Hz-Volts	Voltage range	MCA	TOCA	MFA	LRA	RLA	kW	FLA	kW	FLA
FCQ71	RR71B7V3B	50-230	Max.50Hz-264V Min.50Hz-198V	15.3	23.2	32	75.5	11.3	0.065	0.6	0.045	0.6
FUQ71	RR71B7V3B	50-230		15.3	23.2	32	75.5	11.3	0.065	0.6	0.045	0.6
FHQ71	RR71B7V3B	50-230		15.8	23.2	32	75.5	11.7	0.065	0.6	0.062	0.6
FAQ71	RR71B7V3B	50-230		14.4	22.9	32	75.5	11.6	0.065	0.6	0.046	0.3
FBQ71	RR71B7V3B	50-230		15.0	23.5	32	75.5	10.8	0.065	0.6	0.125	0.9
FCQ71	RR71B7W1B	50-400/230	Max.50Hz-440/253 V Min.50Hz-360/197 V	6.5	11.2	16	41.1	4.3	0.065	0.6	0.045	0.6
FUQ71	RR71B7W1B	50-400/230		6.5	11.2	16	41.1	4.2	0.065	0.6	0.045	0.6
FHQ71	RR71B7W1B	50-400/230		6.6	11.2	16	41.1	4.3	0.065	0.6	0.062	0.6
FAQ71	RR71B7W1B	50-400/230		6.3	10.9	16	41.1	4.3	0.065	0.6	0.046	0.3
FBQ71	RR71B7W1B	50-400/230		6.6	11.5	16	41.1	4.1	0.065	0.6	0.125	0.9

### Symbols:

MCA: Min. Circuit Amps  
 TOCA: Total Over-current Amps  
 MFA: Max. Fuse Amps (see note 7)  
 LRA : Locked Rotor Amps  
 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:  
 Indoor temp.: 27°CDB/19.5°CWB  
 Outdoor temp. : 35°CDB.
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 operation range limits.
4. Maximum allowable voltage unbalance between phases is 2%.
5. MCA/MFA  
 $MCA = 1.25 \times RLA + \text{all FLA}$ ,  $MFA = < 2.25 \times RLA + \text{all FLA}$   
 (next lower standard fuse rating Min. 16A).
6. Select wire size based on the larger value of MCA or TOCA.
7. Instead of fuse, use circuit breaker.

# Electrical Data RR100 and RR125

The table below contains the electrical specifications for RR100 and RR125.

Unit combination		Power supply					Compressor		OFM		IFM	
Indoor unit	Outdoor unit	Hz-Volts	Voltage range	MCA	TOCA	MFA	LRA	RLA	kW	FLA	kW	FLA
FCQ100	RR100B7V3B	50-230	Max.50Hz-264V Min.50Hz-198V	23.8	34.8	40	98.5	17.6	0.090	0.8	0.090	1.0
FUQ100	RR100B7V3B	50-230		23.3	34.8	40	98.5	17.2	0.090	0.8	0.090	1.0
FHQ100	RR100B7V3B	50-230		23.0	34.5	40	98.5	17.2	0.090	0.8	0.130	0.7
FAQ100	RR100B7V3B	50-230		23.0	34.2	40	98.5	17.4	0.090	0.8	0.049	0.4
FBQ100	RR100B7V3B	50-230		23.2	34.8	40	98.5	17.1	0.090	0.8	0.135	1.0
FCQ100	RR100B7W1B	50-400/230	Max.50Hz-440/253 V Min.50Hz-360/197 V	9.2	11.8	16	48.2	5.9	0.090	0.8	0.090	1.0
FUQ100	RR100B7W1B	50-400/230		8.9	11.8	16	48.2	5.7	0.090	0.8	0.090	1.0
FHQ100	RR100B7W1B	50-400/230		8.6	11.5	16	48.2	5.7	0.090	0.8	0.130	0.7
FAQ100	RR100B7W1B	50-400/230		8.3	11.2	16	48.2	5.7	0.090	0.8	0.049	0.4
FBQ100	RR100B7W1B	50-400/230		8.9	11.8	16	48.2	5.7	0.090	0.8	0.135	1.0

Unit combination		Power supply					Compressor		OFM		IFM	
Indoor unit	Outdoor unit	Hz-Volts	Voltage range	MCA	TOCA	MFA	LRA	RLA	kW	FLA	kW	FLA
FCQ125	RR125B7W1B	50-400/230	Max.50Hz-440/253 V Min.50Hz-360/197 V	11.9	15.3	20	63	7.7	0.065 +0.085	0.6+ 0.7	0.090	1.0
FUQ125	RR125B7W1B	50-400/230		11.7	15.3	20	63	7.5	0.065 +0.085	0.6+ 0.7	0.090	1.0
FHQ125	RR125B7W1B	50-400/230		11.4	15.0	20	63	7.5	0.065 +0.085	0.6+ 0.7	0.130	0.7
FBQ125	RR125B7W1B	50-400/230		12.2	15.7	20	63	7.6	0.065 +0.085	0.6+ 0.7	0.225	1.4
FDQ125	RR125B7W1B	50-400/230		14.9	18.5	20	63	7.5	0.065 +0.085	0.6+ 0.7	0.500	4.2

## Symbols:

MCA: Min. Circuit Amps

TOCA: Total Over-current Amps

MFA: Max. Fuse Amps (see note 7)

LRA : Locked Rotor Amps

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:

Indoor temp.: 27°CDB/19.5°CWB

Outdoor temp. : 35°CDB.

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 operation range limits.

4. Maximum allowable voltage unbalance between phases is 2%.

5. MCA/MFA

$MCA = 1.25 \times RLA + \text{all FLA}$ ,  $MFA = < 2.25 \times RLA + \text{all FLA}$   
(next lower standard fuse rating Min. 16A).

6. Select wire size based on the larger value of MCA or TOCA.

7. Instead of fuse, use circuit breaker.

## 2.3 RQ71, RQ100 and RQ125

### Technical specifications

The table below contains the technical specifications.

Specification		RQ71B7V3B	RQ71B7W1B	RQ100B7V3B	RQ100B7W1B	RQ125B7W1B
Compressor	Model	JT90G-V1N	JT90G-YE	JT125G-V1N	JT125G-YE	JT160G-YE
	Type	Hermetically sealed scroll type				
	Refrigerant oil type	DAPHNE FVC68D				
	Oil charge	1.5 liter				
Outdoor Heat exchanger	Length	857 mm				
	Rows x stages x fin pitch	2 x 34 x 2.0 mm		2 x 52 x 2.0 mm		
	No of passes	6		10		
	Face area	0.641 m²		0.980 m²		
	Tube type	HI-XSS Cooling tube				
	Fin type	Non sym. waffle louvre				
	Empty tubeplate hole	0				
Fan	No. of fans	1			2	
	Nominal air flow (230 V) cooling	48 m³/min		55 m³/min		89 m³/min
	Nominal air flow (230 V) Heating	43 m³/min		50 m³/min		80 m³/min
	Fan motor model	P47L11S				P47L11S x 2
	Fan speed	3 steps				
Refrigerant circuit	Type	R410A				
	Charge	2.7 kg		3.7 kg		
Safety and functional devices		See page 1–19 and 3–19				
Heat insulation		Both liquid and gas pipes				
Machine weight		84 kg	83 kg	103 kg	101 kg	108 kg

### Electrical specifications

The table below contains the electrical specifications.

Specification		RQ71B7V3B	RQ71B7W1B	RQ100B7V3B	RQ100B7W1B	RQ125B7W1B	
Unit	Phase	1~	3N~	1~	3N~	3N~	
	Voltage	230 V	400 V	230 V	400 V	400 V	
	Frequency	50 Hz					
	No. of wire connections	3 wires for power supply (including earth wire)	5 wires for power supply (including earth wire)	3 wires for power supply (including earth wire)	5 wires for power supply (including earth wire)	5 wires for power supply (including earth wire)	
		4 wires for connection with indoor (including earth wire)	4 wires for connection with indoor (including earth wire)	4 wires for connection with indoor (including earth wire)	4 wires for connection with indoor (including earth wire)	4 wires for connection with indoor (including earth wire)	
	Power supply intake	Outdoor unit only					
Compressor	Phase	1~	3~	1~	3~		
	Voltage	230 V	400 V	230 V	400 V		
	Starting method	Direct					
	No. x motor output	1x2200 W		1x3000 W		1x3750 W	
Fan motor	Phase	1~					
	Voltage	230 V					
	No. of motors x output	1x65 W		1x90 W		1x85 + 1x65 W	

## Electrical Data

The table below contains the electrical specifications.

Unit combination		Power supply					Compressor		OFM		IFM	
Indoor unit	Outdoor unit	Hz-Volts	Voltage range	MCA	TOCA	MFA	LRA	RLA	kW	FLA	kW	FLA
FCQ71	RQ71B7V3B	50-230	Max.50Hz-264V Min.50Hz-198V	15.3	23.2	32	75.5	11.3	0.065	0.6	0.045	0.6
FUQ71	RQ71B7V3B	50-230		15.3	23.2	32	75.5	11.3	0.065	0.6	0.045	0.6
FHQ71	RQ71B7V3B	50-230		16.3	23.2	32	75.5	12.1	0.065	0.6	0.062	0.6
FAQ71	RQ71B7V3B	50-230		15.4	22.9	32	75.5	11.6	0.065	0.6	0.046	0.3
FBQ71	RQ71B7V3B	50-230		15.0	23.5	32	75.5	10.8	0.065	0.6	0.125	0.9
FCQ71	RQ71B7W1B	50-400/230	Max.50Hz-440/253 V Min.50Hz-360/197 V	6.5	11.2	16	41.1	4.3	0.065	0.6	0.045	0.6
FUQ71	RQ71B7W1B	50-400/230		6.5	11.2	16	41.1	4.2	0.065	0.6	0.045	0.6
FHQ71	RQ71B7W1B	50-400/230		6.7	11.2	16	41.1	4.4	0.065	0.6	0.062	0.6
FAQ71	RQ71B7W1B	50-400/230		6.3	10.9	16	41.1	4.3	0.065	0.6	0.046	0.3
FBQ71	RQ71B7W1B	50-400/230		6.6	11.5	16	41.1	4.1	0.065	0.6	0.125	0.9

Unit combination		Power supply					Compressor		OFM		IFM	
Indoor unit	Outdoor unit	Hz-Volts	Voltage range	MCA	TOCA	MFA	LRA	RLA	kW	FLA	kW	FLA
FCQ100	RQ100B7V3B	50-230	Max.50Hz-264V Min.50Hz-198V	23.8	34.8	40	98.5	17.6	0.090	0.8	0.090	1.0
FUQ100	RQ100B7V3B	50-230		23.3	34.8	40	98.5	17.2	0.090	0.8	0.090	1.0
FHQ100	RQ100B7V3B	50-230		25.3	34.5	40	98.5	19.0	0.090	0.8	0.130	0.7
FAQ100	RQ100B7V3B	50-230		24.5	34.2	40	98.5	18.6	0.090	0.8	0.049	0.4
FBQ100	RQ100B7V3B	50-230		23.2	34.8	40	98.5	17.1	0.090	0.8	0.135	1.0
FCQ100	RQ100B7W1B	50-400/230	Max.50Hz-440/253 V Min.50Hz-360/197 V	9.2	11.8	16	48.2	5.9	0.090	0.8	0.090	1.0
FUQ100	RQ100B7W1B	50-400/230		8.9	11.8	16	48.2	5.7	0.090	0.8	0.090	1.0
FHQ100	RQ100B7W1B	50-400/230		9.4	11.5	16	48.2	6.3	0.090	0.8	0.130	0.7
FAQ100	RQ100B7W1B	50-400/230		8.8	11.2	16	48.2	6.1	0.090	0.8	0.049	0.4
FBQ100	RQ100B7W1B	50-400/230		8.9	11.8	16	48.2	5.7	0.090	0.8	0.135	1.0

Unit combination		Power supply					Compressor		OFM		IFM	
Indoor unit	Outdoor unit	Hz-Volts	Voltage range	MCA	TOCA	MFA	LRA	RLA	kW	FLA	kW	FLA
FCQ125	RQ125B7W1B	50-400/230	Max.50Hz-440/253 V Min.50Hz-360/197 V	12.4	15.3	20	63	8.1	0.065 +0.085	0.6+ 0.7	0.090	1.0
FUQ125	RQ125B7W1B	50-400/230		12.2	15.3	20	63	7.9	0.065 +0.085	0.6+ 0.7	0.090	1.0
FHQ125	RQ125B7W1B	50-400/230		12.3	15.0	20	63	8.2	0.065 +0.085	0.6+ 0.7	0.130	0.7
FBQ125	RQ125B7W1B	50-400/230		12.2	15.7	20	63	7.6	0.065 +0.085	0.6+ 0.7	0.225	1.4
FDQ125	RQ125B7W1B	50-400/230		14.9	18.5	20	63	7.5	0.065 +0.085	0.6+ 0.7	0.500	4.2

## Symbols:

MCA: Min. Circuit Amps

TOCA: Total Over-current Amps

MFA: Max. Fuse Amps (see note 7)

LRA : Locked Rotor Amps

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:

Indoor temp.: 27°CDB/19.5°CWB

Outdoor temp. : 35°CDB.

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 operation range limits.

4. Maximum allowable voltage unbalance between phases is 2%.

5. MCA/MFA

MCA = 1.25 x RLA + all FLA, MFA = &lt; 2.25 x RLA + all FLA (next lower standard fuse rating Min. 16A).

6. Select wire size based on the larger value of MCA or TOCA.

7. Instead of fuse, use circuit breaker.

# 3 Functional Diagrams

## 3.1 What Is in This Chapter?

**Introduction**

This chapter contains the following information:

- Functional diagrams
- Pipe connection diameters.

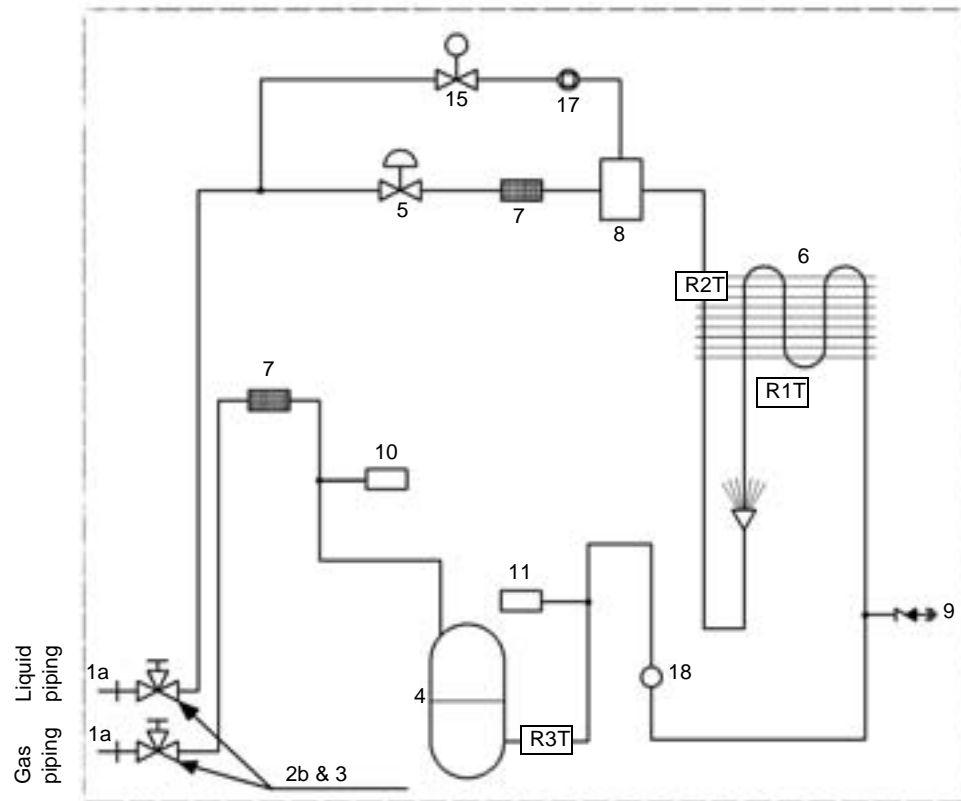
**Functional diagrams**

This chapter contains the following functional diagrams:

Functional diagram	See page
3.2-RR71B7, RR100B7 and RR125B7	1-20
3.3-RQ71B7, RQ100B7 and RQ125B7	1-24
3.4-Piping Components	1-29

## 3.2 RR71B7, RR100B7 and RR125B7

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

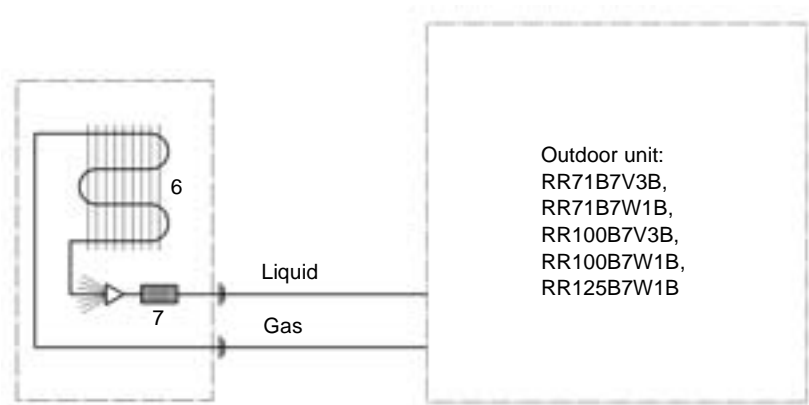


### Components

For a description of the components, see 'Piping Components' on page 1-29.

Pair system

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



Pipe connection diameters

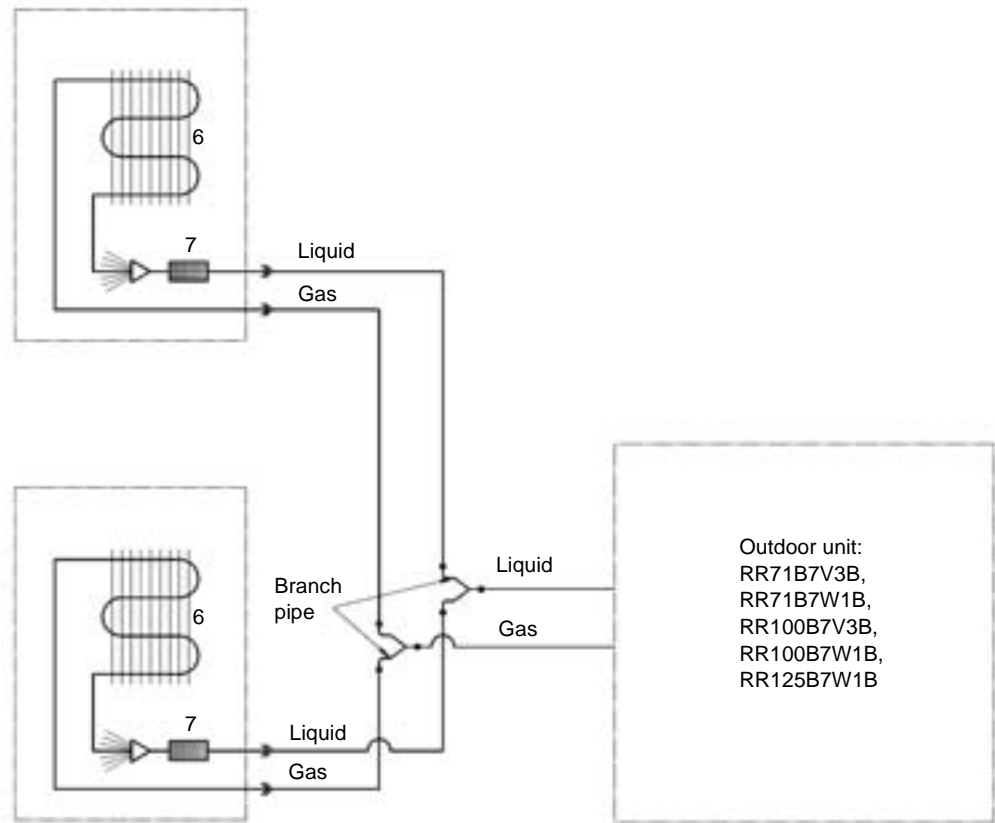
The table below contains the refrigerant pipe connection diameters (O.D.).

Model	Ø Gas pipe (flare)	Ø Liquid pipe (flare)
RR71B7V3B	15.9 mm	9.5 mm
RR71B7W1B		
RR100B7V3B		
RR100B7W1B		
RR125B7W1B		

1

Twin system

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



Pipe connection diameters

The table below contains the refrigerant pipe connection diameters (O.D.).

Model	Ø Gas pipe (flare)	Ø Liquid pipe (flare)
RR71B7V3B	15.9 mm	9.5 mm
RR71B7W1B		
RR100B7V3B		
RR100B7W1B		
RR125B7W1B		

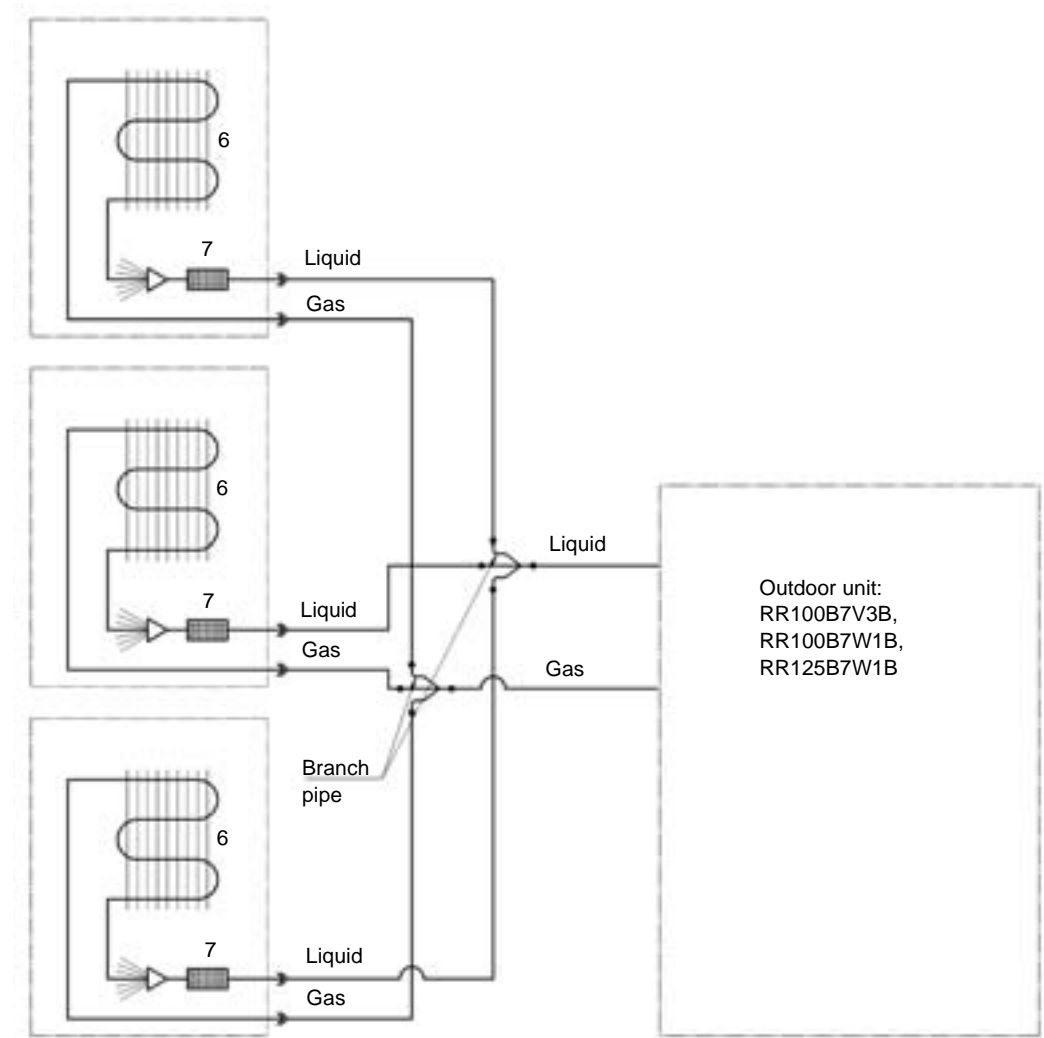
Note

The pipes between the branch and the indoor units should have the same size as the indoor connections.



Triple system

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



Pipe connection diameters

The table below contains the refrigerant pipe connection diameters (O.D.).

Model	Ø Gas pipe (flare)	Ø Liquid pipe (flare)
RR100B7V3B	15.9 mm	9.5 mm
RR100B7W1B		
RR125B7W1B		

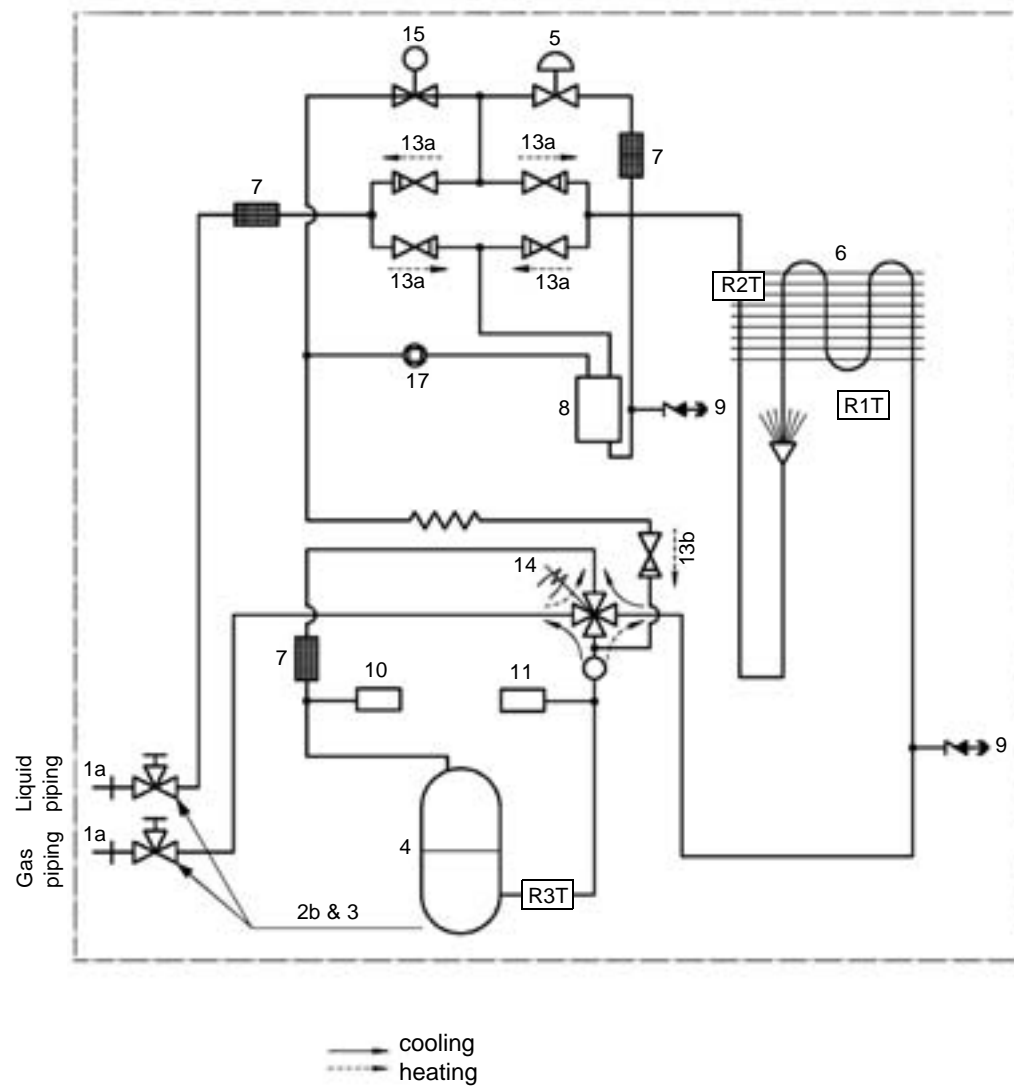
Note

The pipes between the branch and the indoor units should have the same size as the indoor connections.

### 3.3 RQ71B7, RQ100B7 and RQ125B7

#### Functional diagram

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

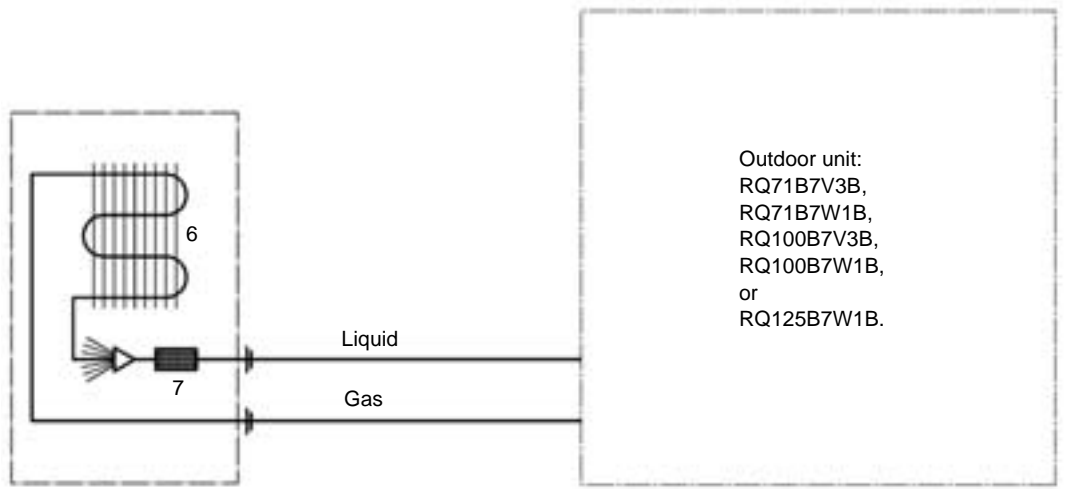


#### Components

For a description of the components, see 'Piping Components' on page 1-29.

Pair system

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



Pipe connection diameters

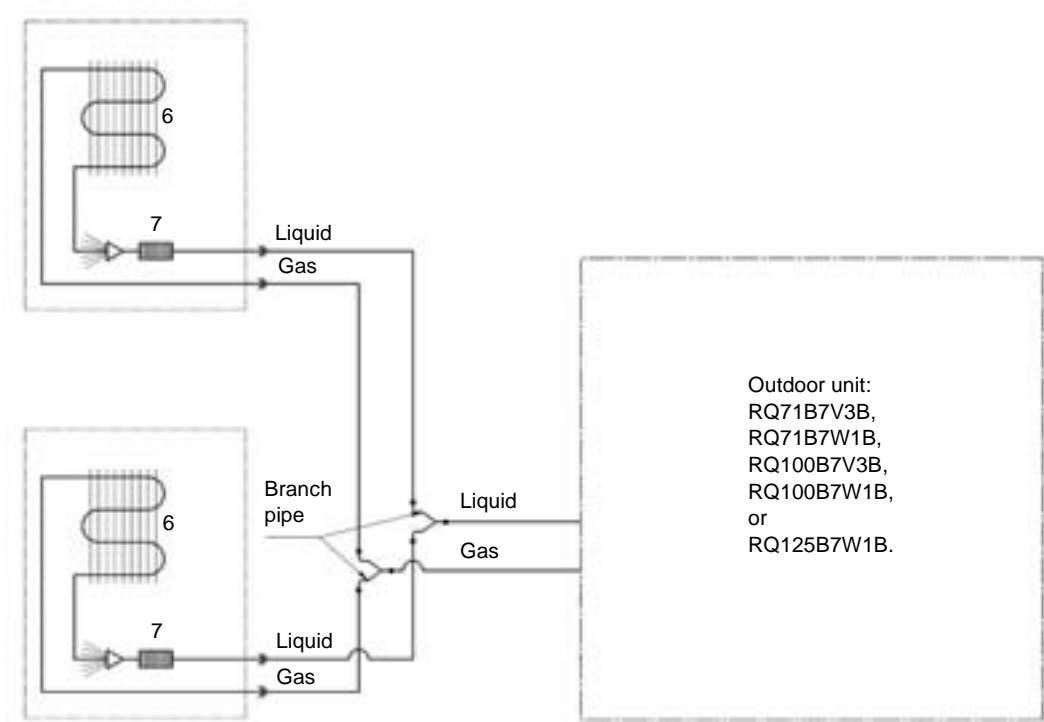
The table below contains the refrigerant pipe connection diameters (O.D.).

Model	Ø Gas pipe (flare)	Ø Liquid pipe (flare)
RQ71B7V3B	15.9 mm	9.5 mm
RQ71B7W1B		
RQ100B7V3B		
RQ100B7W1B		
RQ125B7W1B		

1

Twin system

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



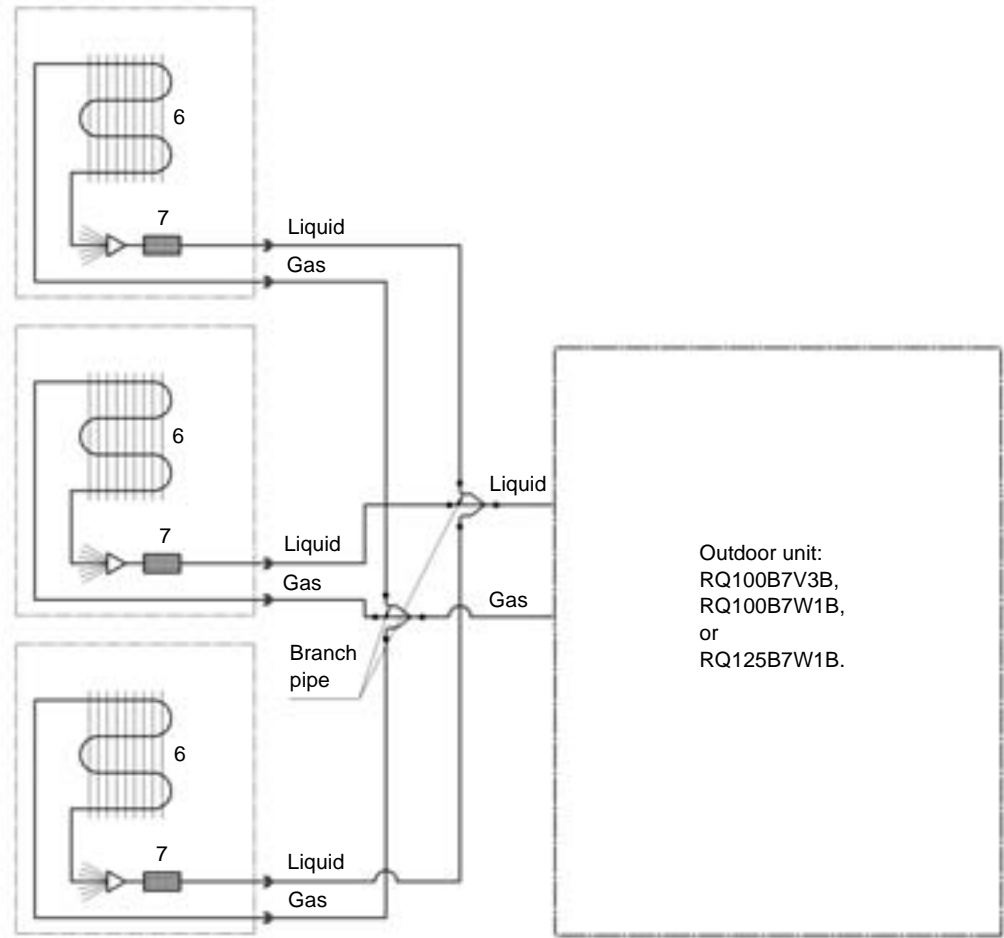
Pipe connection diameters

The table below contains the refrigerant pipe connection diameters (O.D.).

Model	Ø Gas pipe (flare)	Ø Liquid pipe (flare)
RQ71B7V3B	15.9 mm	9.5 mm
RQ71B7W1B		
RQ100B7V3B		
RQ100B7W1B		
RQ125B7W1B		

Triple system

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



Pipe connection diameters

The table below contains the refrigerant pipe connection diameters (O.D.).

Model	Ø Gas pipe (flare)	Ø Liquid pipe (flare)
RQ100B7V3B	15.9 mm	9.5 mm
RQ100B7W1B		
RQ125B7W1B		



3.4 Piping Components

Components

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

No.	Component	Function / remark
1a	Flare connection	See pipe connection diameter.
2b	Liquid stop valve with service port	The liquid stop valve is used as shut-off valve in case of a pump-down.
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.
5	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.
6	Heat exchanger	The heat exchanger is of the multi louvre fin type. Hi-X -tubes and coated waffle louvre fins are used.
7	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.
8	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.
9	Check valve with service port	The check valve allows you to connect a gauge.
10	Low-pressure switch	The low-pressure switch stops the operation of the unit when the pressure becomes abnormally low.
11	High-pressure switch	The high-pressure switch stops the operation of the unit when the pressure becomes abnormally high.
12	Propeller fan and fan motor	The propeller fan creates air displacement across the heat exchanger.
13a	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.
13b	One-way valve	The one-way valve is used to release overpressure in the liquid receiver during stand-still.
14	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.
15	Solenoid valve	➤ SV: Solenoid valve (Purge liquid receiver)
16	Thermistor	➤ R1T: Air thermistor ➤ R2T: Coil thermistor ➤ R3T: Discharge pipe thermistor
17	Strainer	
18	Muffler	The muffler is mounted in the discharge line to absorb discharge pulsations from the compressor. It's also used to fit the discharge pipe thermistor.





# 4 Switch Box Layout

## 4.1 What Is in This Chapter?

**Introduction** This chapter shows the switch box components.

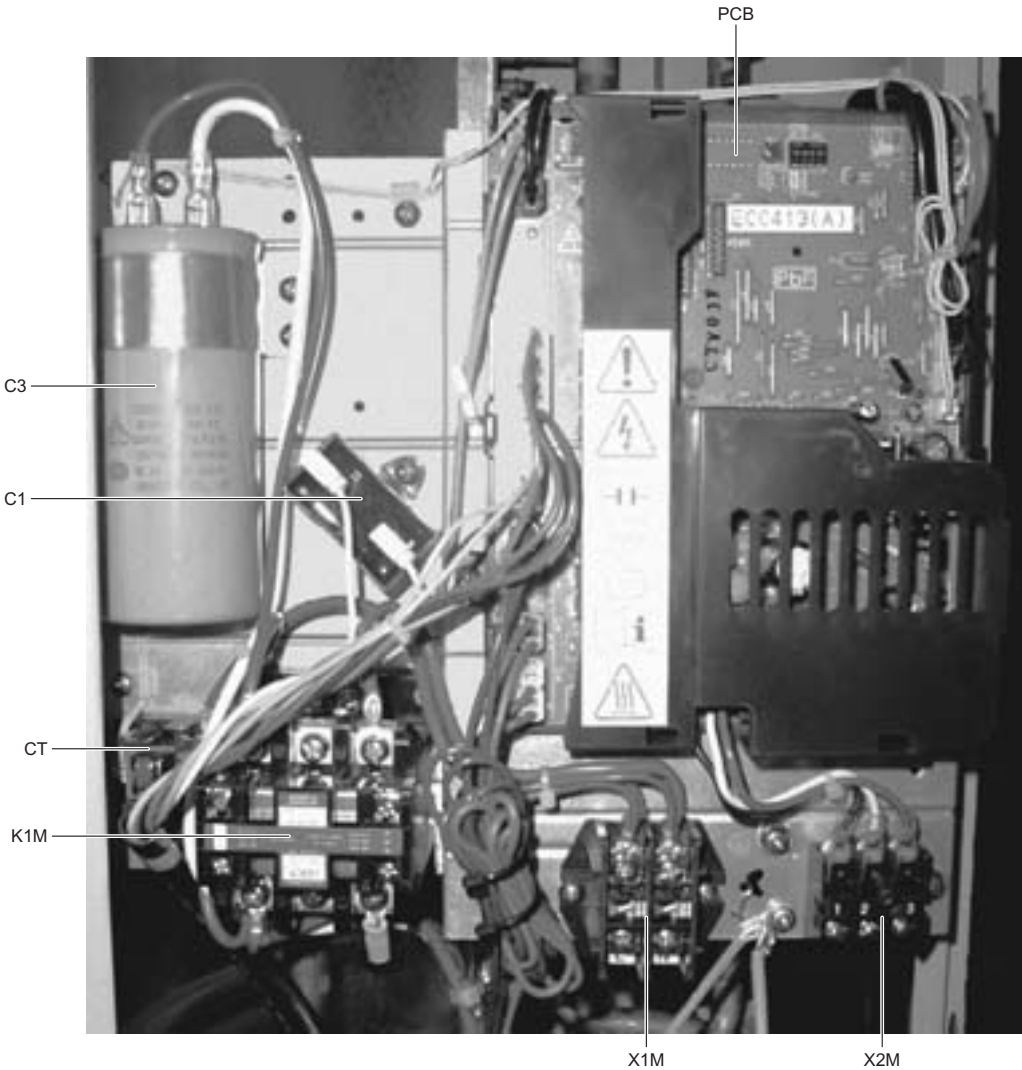
**Outdoor units** This chapter contains the following switch box layouts:

Switch box layout	See page
4.2-RR/RQ71~100B7V3B	1-32
4.3-RR/RQ71~100B7W1B	1-33
4.4-RR/RQ125B7W1B	1-34

4.2 RR/RQ71~100B7V3B

Switch box

The illustration below shows the switch box layout.



Components

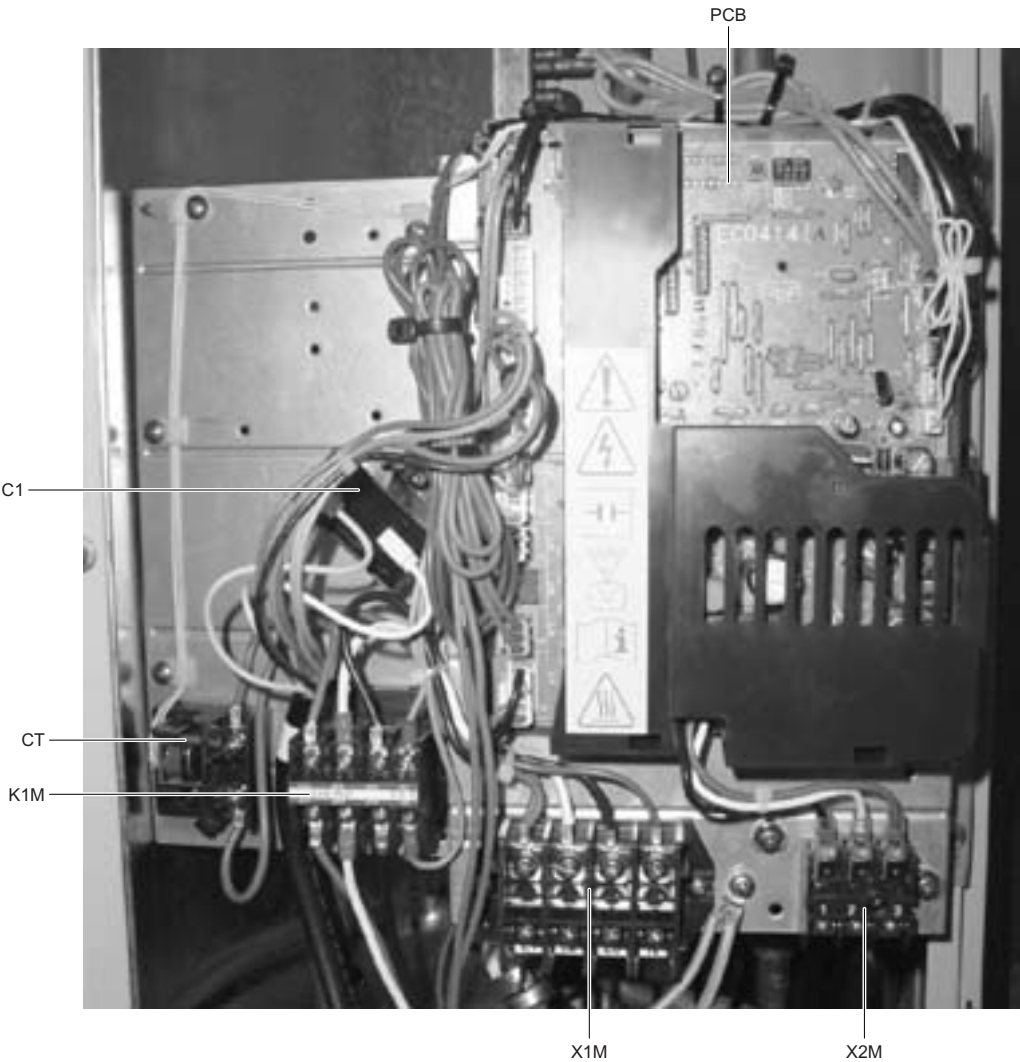
The table below contains the components of the switch box.

Symbol	Component
PCB	Printed Circuit Board
C1	Fan motor capacitor (M1F)
C3	Compressor capacitor (M1C)
CT	Current transformer
K1M	Magnetic contactor compressor
X1M	Terminal strip power supply
X2M	Terminal strip interconnection wiring

4.3 RR/RQ71~100B7W1B

Switch box

The illustration below shows the switch box layout.



Components

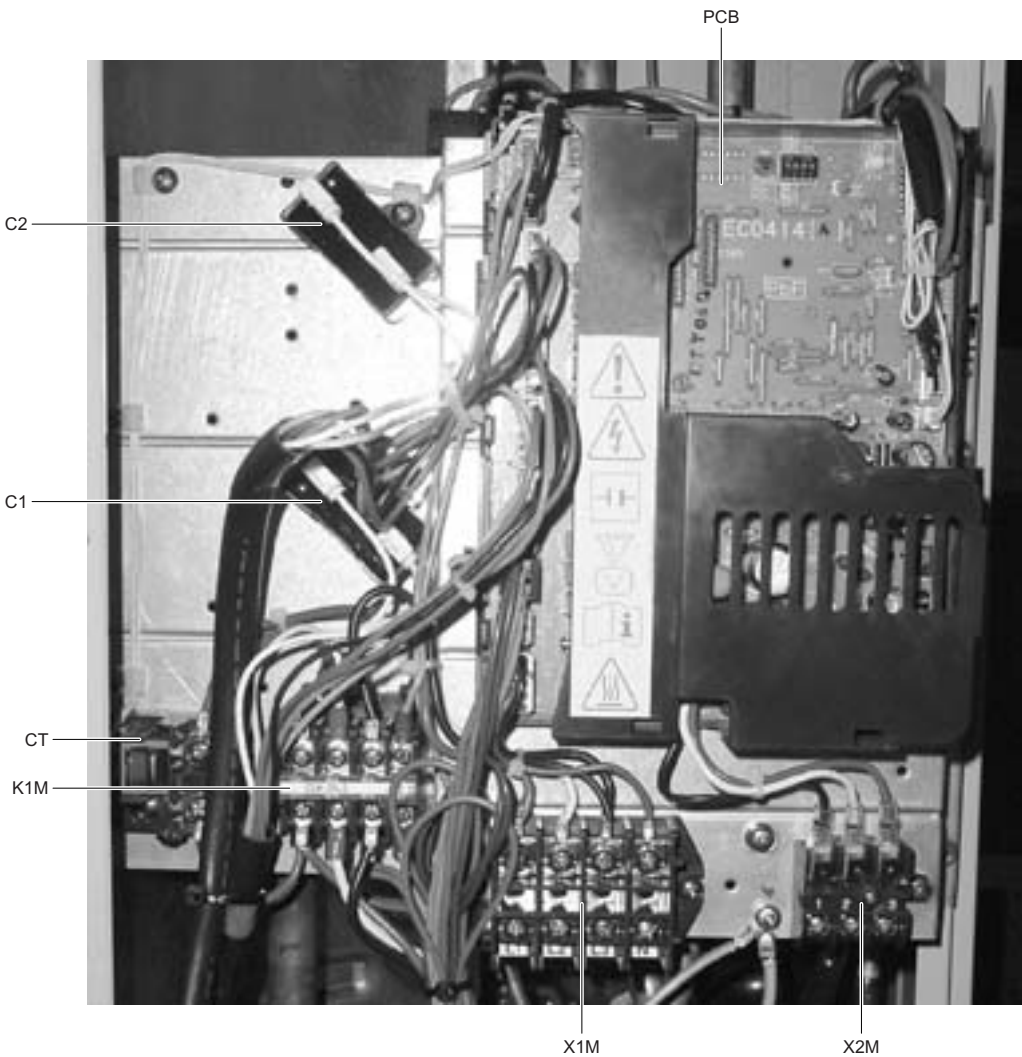
The table below contains the components of the switch box.

Symbol	Component
PCB	Printed Circuit Board
C1	Fan motor capacitor (M1F)
CT	Current transformer
K1M	Magnetic contactor compressor
X1M	Terminal strip power supply
X2M	Terminal strip interconnection wiring

4.4 RR/RQ125B7W1B

Switch box

The illustration below shows the switch box layout.



Components

The table below contains the components of the switch box.

Symbol	Component
PCB	Printed Circuit Board
C1	Fan motor capacitor (M1F)
C2	Compressor capacitor (M2F)
CT	Current transformer
K1M	Magnetic contactor compressor
X1M	Terminal strip power supply
X2M	Terminal strip interconnection wiring

# 5     Wiring Diagrams: Outdoor Units

## 5.1     What Is in This Chapter?

**Introduction**

This chapter contains the wiring diagrams of the outdoor units.

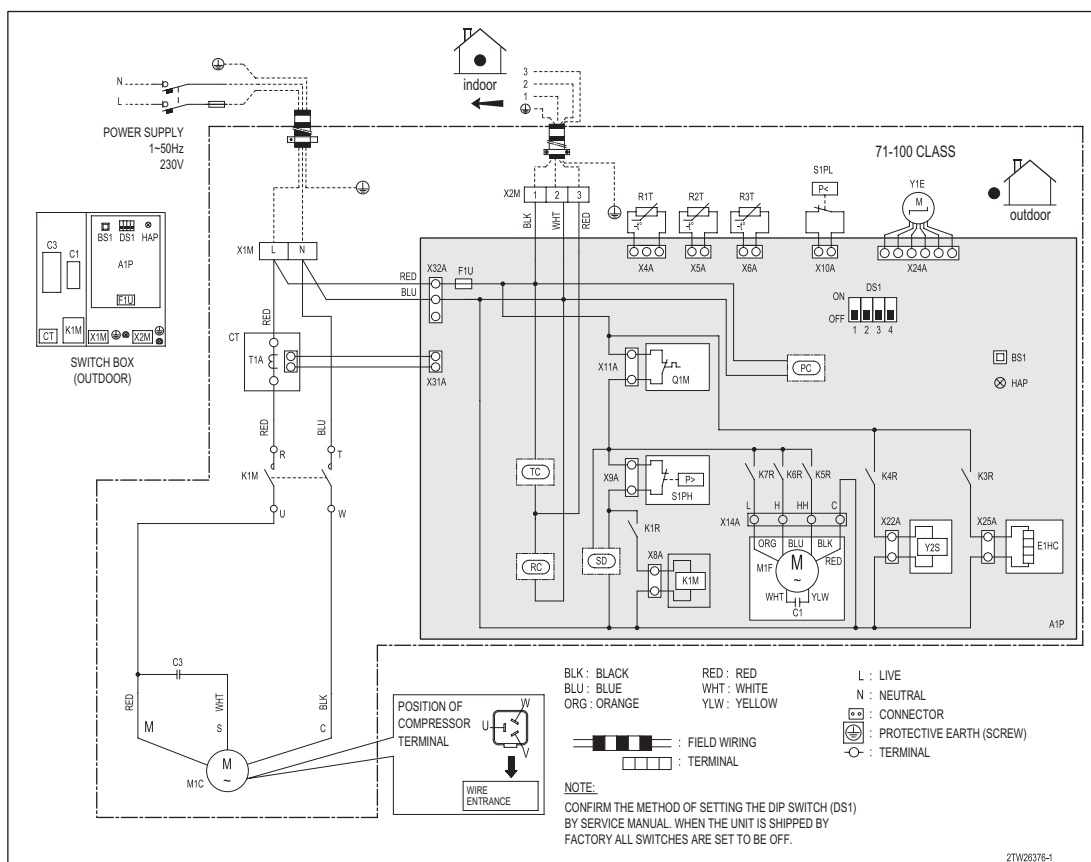
**Wiring diagrams**

This chapter contains the following wiring diagrams:

Wiring diagram	See page
5.2-RR71-100B7V3B	1-36
5.3-RR71-100B7W1B	1-37
5.4-RR125B7W1B	1-38
5.5-RQ71-100B7V3B	1-39
5.6-RQ71-100B7W1B	1-40
5.7-RQ125B7W1B	1-41

## 1

The illustration below shows the wiring diagram of the unit.

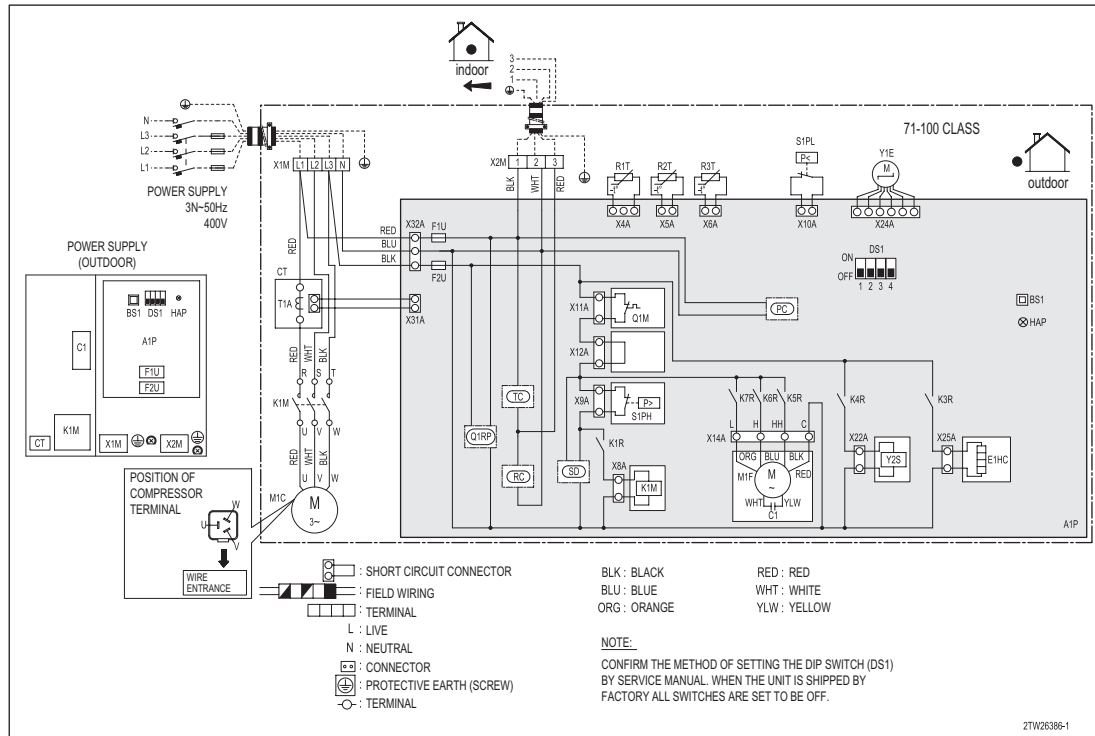


A1P	Printed circuit board	M1F	Motor fan
BS1	Push button switch (Forced defrost-pump down)	PC	Power circuit
		Q1M	Thermo switch (M1F)
C1	Capacitor (M1F)	R1T	Thermistor (Air)
C3	Capacitor (M1C)	R2T	Thermistor (Coil)
DS1	Dip switch	R3T	Thermistor (Discharge pipe)
E1HC	Crankcase heater	RC	Signal receiver circuit
F1U	Fuse (T6.3/250V)	S1PH	Pressure switch (High)
HAP	Light emitting diode (Service monitor green)	S1PL	Pressure switch (Low)
		SD	Safety devices input
K1M	Magnetic contactor (M1C)	T1A	Current transformer
K1R	Magnetic relay (K1M)	TC	Signal transmission circuit
K3R	Magnetic relay (E1HC)	X1M, X2M	Terminal strip
K4R	Magnetic relay (Y2S)	Y1E	Expansion valve (Electronic)
K5R, K6R, K7R	Magnetic relay (M1F)	Y2S	Solenoid valve
M1C	Motor compressor	CT	Current transformer

## 5.3 RR71-100B7W1B

### Wiring diagram

The illustration below shows the wiring diagram of the unit.

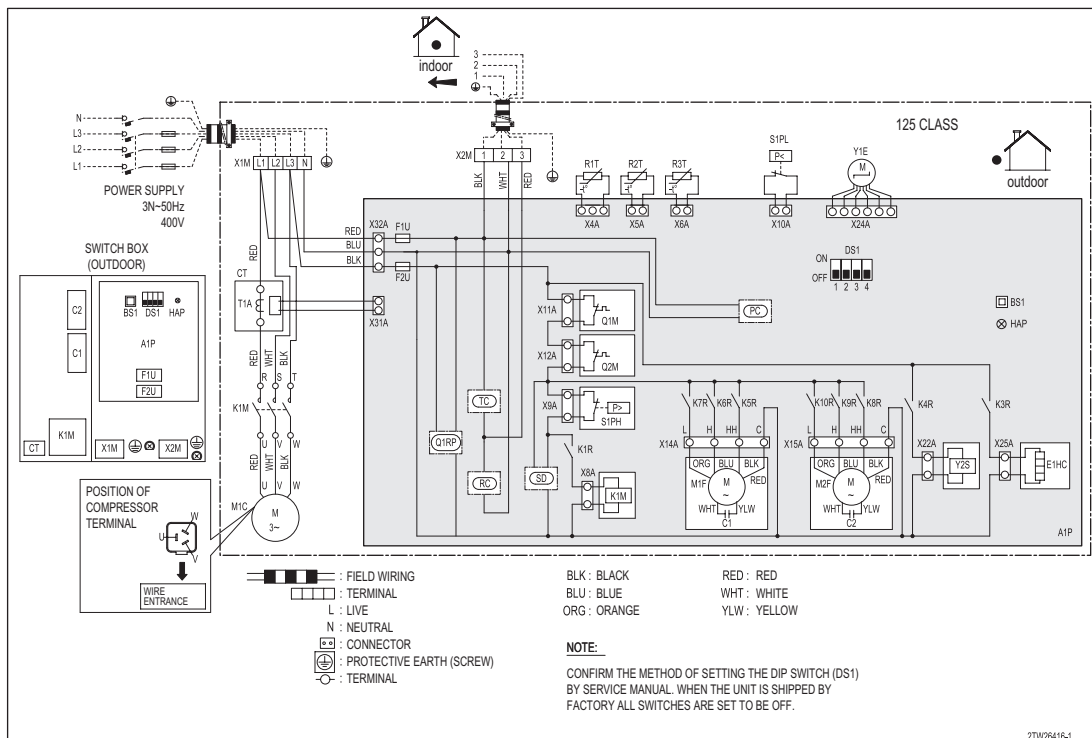


A1P	Printed circuit board	PC	Power circuit
BS1	Push button switch (Forced defrost-pump down)	Q1M	Thermo switch (M1F)
C1	Capacitor (M1F)	Q1RP	Phase reverse circuit
DS1	Dip switch	R1T	Thermistor (Air)
E1HC	Crankcase heater	R2T	Thermistor (Coil)
F1U, F2U	Fuse (T6.3/250V)	R3T	Thermistor (Discharge pipe)
HAP	Light emitting diode (Service monitor green)	RC	Signal receiver circuit
K1M	Magnetic contactor (M1C)	S1PH	Pressure switch (High)
K1R	Magnetic relay (K1M)	S1PL	Pressure switch (Low)
K3R	Magnetic relay (E1HC)	SD	Safety devices input
K4R	Magnetic relay (Y2S)	T1A	Current transformer
K5R, K6R, K7R	Magnetic relay (M1F)	TC	Signal transmission circuit
M1C	Motor compressor	X1M, X2M	Terminal strip
M1F	Motor fan	Y1E	Expansion valve (Electronic)
		Y2S	Solenoid valve
		CT	Current transformer

## 5.4 RR125B7W1B

### Wiring diagram

The illustration below shows the wiring diagram of the unit.



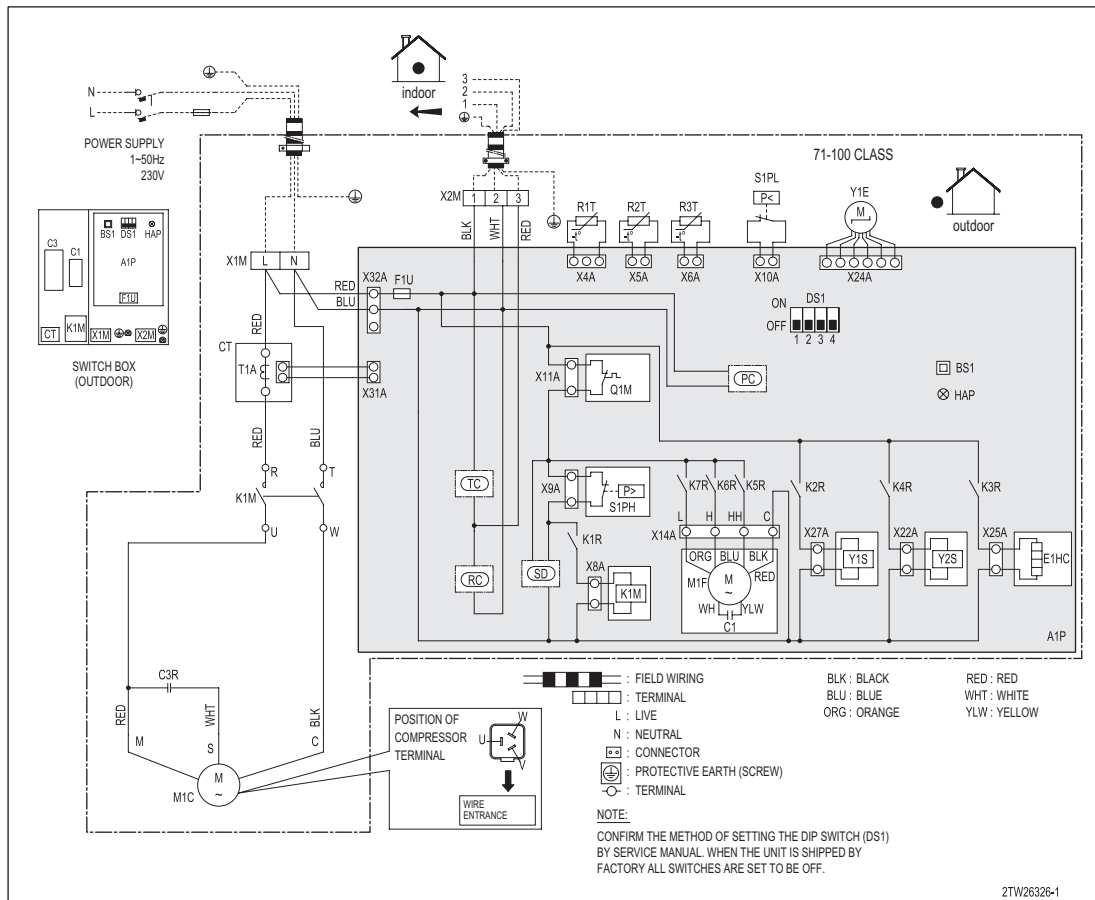
A1P	Printed circuit board	PC	Power circuit
BS1	Push button switch (Forced defrost-pump down)	Q1M	Thermo switch (M1F)
C1	Capacitor (M1F)	Q2M	Thermo switch (M2F)
C2	Capacitor (M2F)	Q1RP	Phase reverse circuit
DS1	Dip switch	R1T	Thermistor (Air)
E1HC	Crankcase heater	R2T	Thermistor (Coil)
F1U, F2U	Fuse (T6.3/250V)	R3T	Thermistor (Discharge pipe)
HAP	Light emitting diode (Service monitor green)	RC	Signal receiver circuit
K1M	Magnetic contactor (M1C)	S1PH	Pressure switch (High)
K1R	Magnetic relay (K1M)	S1PL	Pressure switch (Low)
K3R	Magnetic relay (E1HC)	SD	Safety devices input
K4R	Magnetic relay (Y2S)	T1A	Current transformer
K5R, K6R, K7R	Magnetic relay (M1F)	TC	Signal transmission circuit
K8R, K9R, K10R	Magnetic relay (M2F)	X1M, X2M	Terminal strip
M1C	Motor compressor	Y1E	Expansion valve (Electronic)
M1F, M2F	Motor fan	Y2S	Solenoid valve
		CT	Current transformer



## 5.5 RQ71-100B7V3B

### Wiring diagram

The illustration below shows the wiring diagram of the unit.

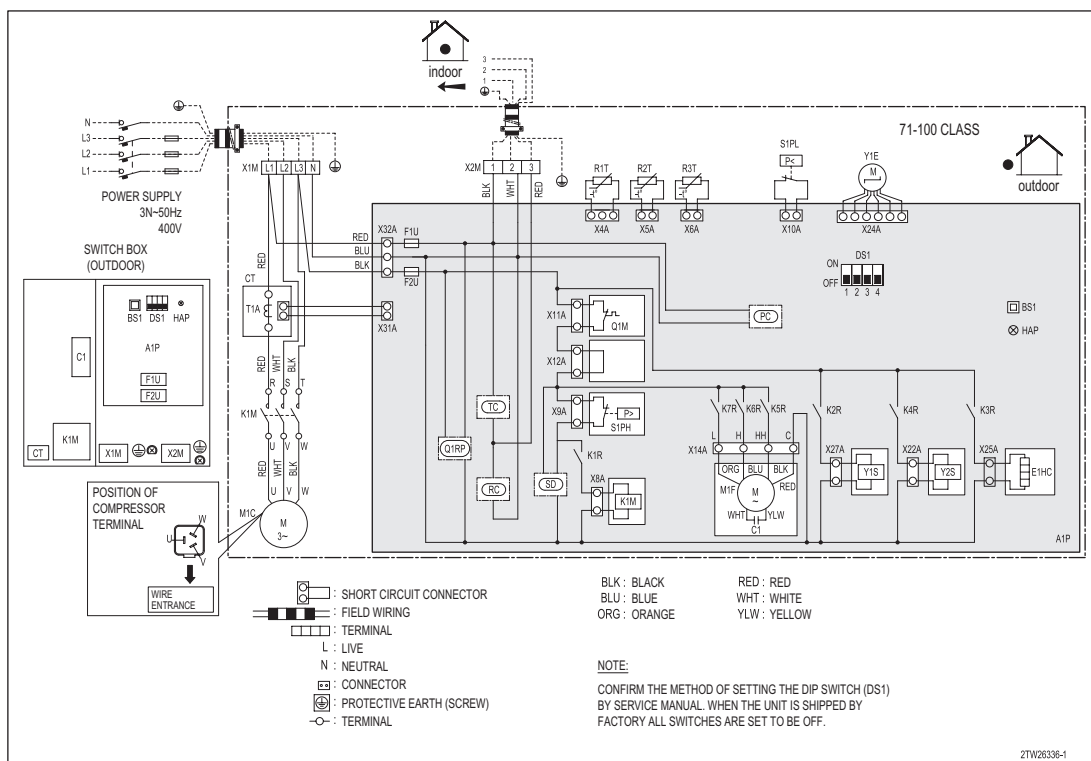


A1P	Printed circuit board	M1F	Motor fan
BS1	Push button switch (Forced defrost-pump down)	PC	Power circuit
C1	Capacitor (M1F)	Q1M	Thermo switch (M1F)
C3	Capacitor (M1C)	R1T	Thermistor (Air)
DS1	Dip switch	R2T	Thermistor (Coil)
E1HC	Crankcase heater	R3T	Thermistor (Discharge pipe)
F1U	Fuse (T6.3/250V)	RC	Signal receiver circuit
HAP	Light emitting diode (Service monitor green)	S1PH	Pressure switch (High)
K1M	Magnetic contactor (M1C)	S1PL	Pressure switch (Low)
K1R	Magnetic relay (K1M)	SD	Safety devices input
K2R	Magnetic relay (Y1S)	T1A	Current transformer
K3R	Magnetic relay (E1HC)	TC	Signal transmission circuit
K4R	Magnetic relay (Y2S)	X1M, X2M	Terminal strip
K5R, K6R, K7R	Magnetic relay (M1F)	Y1E	Expansion valve (Electronic)
M1C	Motor compressor	Y1S	4-way valve
		Y2S	Solenoid valve
		CT	Current transformer

## 5.6 RQ71-100B7W1B

### Wiring diagram

The illustration below shows the wiring diagram of the unit.

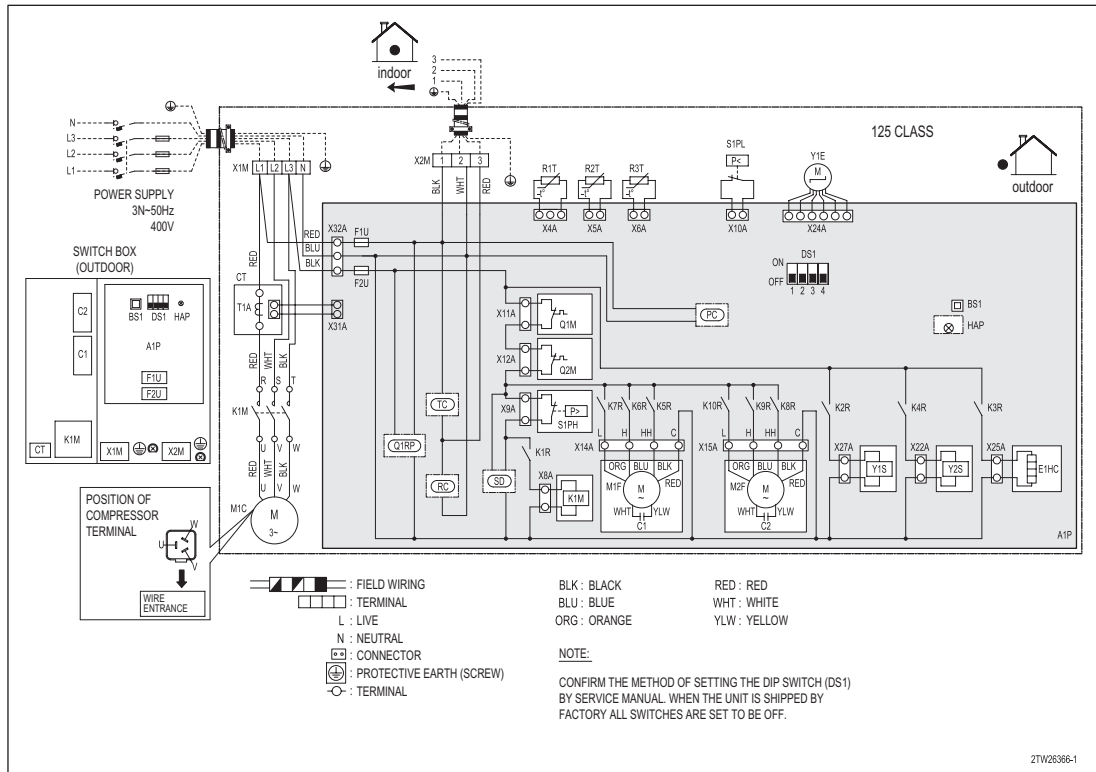


A1P	Printed circuit board	PC	Power circuit
BS1	Push button switch (Forced defrost-pump down)	Q1M	Thermo switch (M1F)
C1	Capacitor (M1F)	Q1RP	Phase reverse circuit
DS1	Dip switch	R1T	Thermistor (Air)
E1HC	Crankcase heater	R2T	Thermistor (Coil)
F1U, F2U	Fuse (T6.3/250V)	R3T	Thermistor (Discharge pipe)
HAP	Light emitting diode (Service monitor green)	RC	Signal receiver circuit
K1M	Magnetic contactor (M1C)	S1PH	Pressure switch (High)
K1R	Magnetic relay (K1M)	S1PL	Pressure switch (Low)
K2R	Magnetic relay (Y1S)	SD	Safety devices input
K3R	Magnetic relay (E1HC)	T1A	Current transformer
K4R	Magnetic relay (Y2S)	TC	Signal transmission circuit
K5R, K6R, K7R	Magnetic relay (M1F)	X1M, X2M	Terminal strip
M1C	Motor compressor	Y1E	Expansion valve (Electronic)
M1F	Motor fan	Y1S	4-way valve
		Y2S	Solenoid valve
		CT	Current transformer

## 5.7 RQ125B7W1B

### Wiring diagram

The illustration below shows the wiring diagram of the unit.



A1P	Printed circuit board	PC	Power circuit
BS1	Push button switch (Forced defrost-pump down)	Q1M	Thermo switch (M1F)
C1	Capacitor (M1F)	Q2M	Thermo switch (M2F)
C2	Capacitor (M2F)	Q1RP	Phase reverse circuit
DS1	Dip switch	R1T	Thermistor (Air)
E1HC	Crankcase heater	R2T	Thermistor (Coil)
F1U, F2U	Fuse (T6.3/250V)	R3T	Thermistor (Discharge pipe)
HAP	Light emitting diode (Service monitor green)	RC	Signal receiver circuit
K1M	Magnetic contactor (M1C)	S1PH	Pressure switch (High)
K1R	Magnetic relay (K1M)	S1PL	Pressure switch (Low)
K2R	Magnetic relay (Y1S)	SD	Safety devices input
K3R	Magnetic relay (E1HC)	T1A	Current transformer
K4R	Magnetic relay (Y2S)	TC	Signal transmission circuit
K5R, K6R, K7R	Magnetic relay (M1F)	X1M, X2M	Terminal strip
K8R, K9R, K10R	Magnetic relay (M2F)	Y1E	Expansion valve (Electronic)
M1C	Motor compressor	Y1S	4-way valve
M1F, M2F	Motor fan	Y2S	Solenoid valve
		CT	Current transformer

1

# 6     PCB Layout

## 6.1     What Is in This Chapter?

**Introduction**

This chapter contains the following information:

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

**PCB layouts**

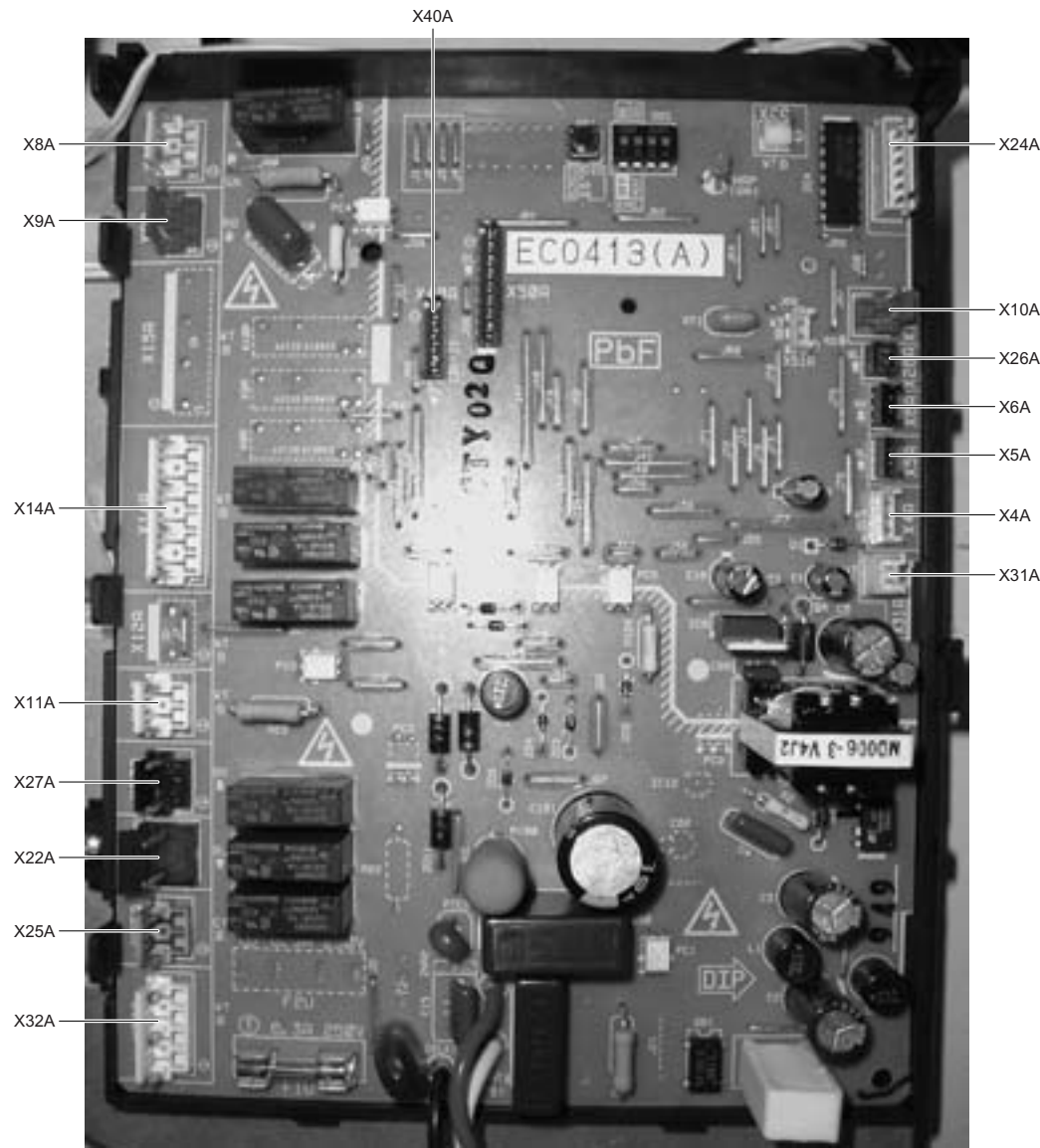
This chapter contains the following PCB layouts:

PCB layout	See page
6.2-RR/RQ71-100B7V3B (EC0413)	1-44
6.3-RR/RQ71~125B7W1B (EC0414)	1-46

6.2 RR/RQ71-100B7V3B (EC0413)

PCB

The illustration below shows the PCB connectors.



**Connectors**

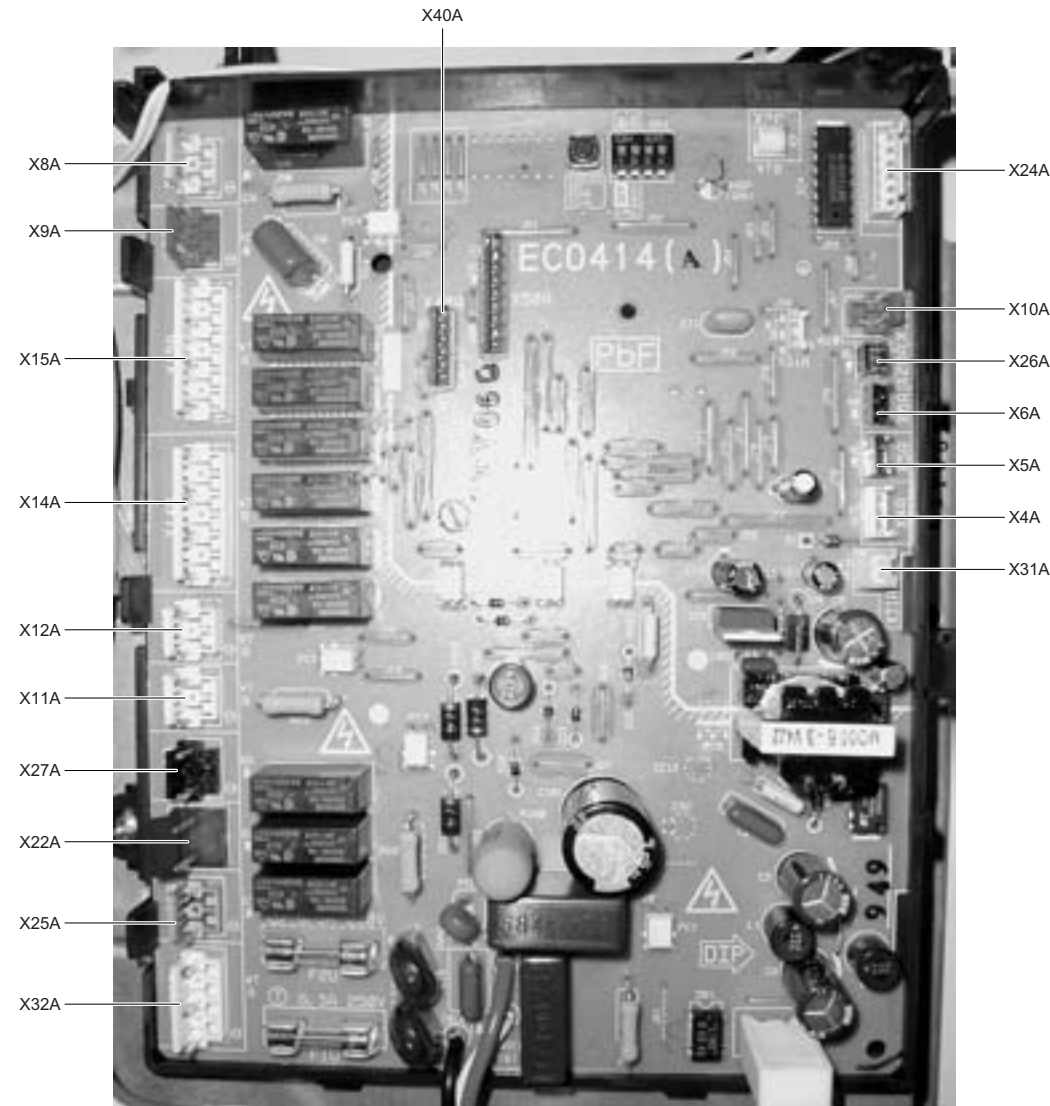
The table below describes the PCB connectors.

Connector	Connected to	Description
X4A	R1T	Thermistor (air)
X5A	R2T	Thermistor (coil)
X6A	R3T	Thermistor (discharge pipe)
X8A	K1M	Magnetic contactor (M1C)
X9A	S1PH	Pressure switch (high)
X10A	S1PL	Pressure switch (low)
X11A	Q1M	Thermo switch (M1F)
X14A	M1F	Fan motor
X22A	Y2S	Solenoid valve
X24A	Y1E	Electronic expansion valves
X25A	E1HC	Crankcase heater
X26A	—	Connector for capacity setting adaptor
X27A	Y1S	4-way valve (Not used for cooling only units)
X31A	T1A	Current transformer
X32A	X1M	Terminal strip
X40A	—	Connector for service checker

6.3 RR/RQ71~125B7W1B (EC0414)

PCB

The illustration below shows the PCB connectors.





**Connectors**

The table below describes the PCB connectors.

Connector	Connected to	Description
X4A	R1T	Thermistor (air)
X5A	R2T	Thermistor (coil)
X6A	R3T	Thermistor (discharge pipe)
X8A	K1M	Magnetic contactor (M1C)
X9A	S1PH	Pressure switch (high)
X10A	S1PL	Pressure switch (low)
X11A	Q1M	Thermo switch (M1F)
X12A	Q2M	Thermo switch (M2F), only for 125 class
X14A	M1F	Fan motor 1
X15A	M2F	Fan motor 2, only for 125 class
X22A	Y2S	Solenoid valve
X24A	Y1E	Electronic expansion valves
X25A	E1HC	Crankcase heater
X26A	—	Connector for capacity setting adaptor
X27A	Y1S	4-way valve (Not used for cooling only units)
X31A	T1A	Current transformer
X32A	X1M	Terminal strip
X40A	—	Connector for service checker

1

Part 2

Functional Description

2

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

Chapter	See page
1-General Functionality	2-3
2-Overview of the cooling mode functions	2-27
3-Overview of the heating mode functions	2-37

# 2

# 1 General Functionality

## 1.1 What Is in This Chapter?

### Introduction

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

### Overview

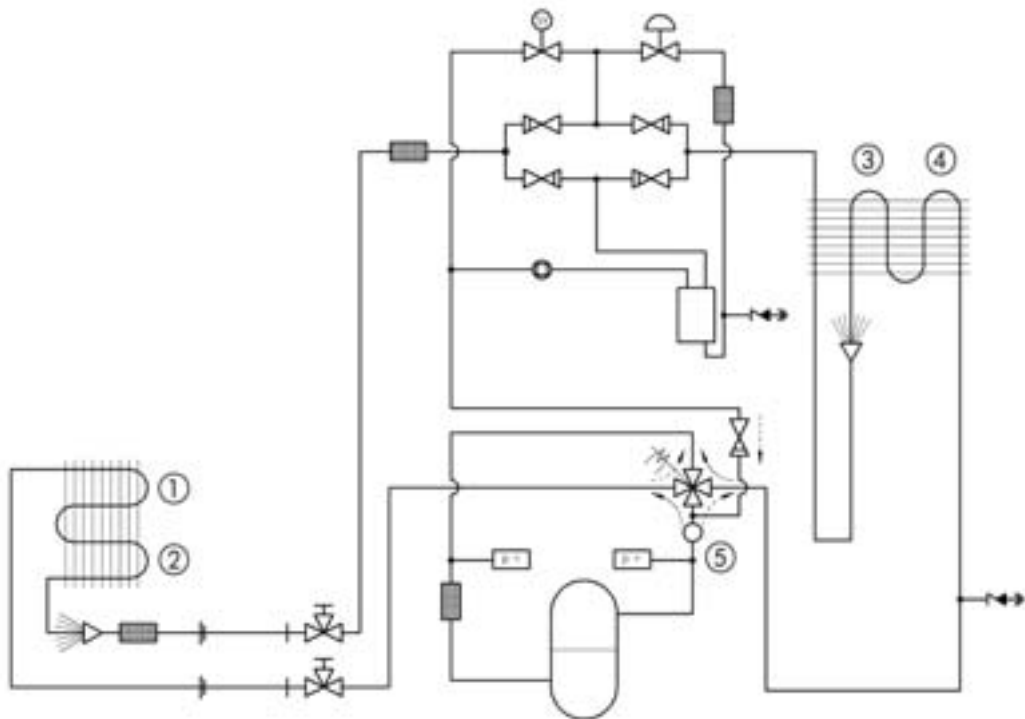
This chapter contains the following topics:

Topic	See page
1.2–Functions of Thermistors	2–4
1.3–Operating Modes and Control Modes	2–6
1.4–Forced Operating Mode (Emergency Operation)	2–7
1.5–Outdoor Unit Identification Function	2–10
1.6–Thermostat Control	2–11
1.7–Forced Thermostat OFF	2–13
1.8–HPS and LPS Function	2–15
1.9–Simulated Operation Function	2–16
1.10–Discharge Pipe Temperature Control	2–17
1.11–Gas Shortage Function	2–18
1.12–Drain Pump Control	2–19
1.13–Fan and Flap Operations	2–21
1.14–Auto-Restart Function	2–22
1.15–Using Conditions for Remote Controller Thermostat	2–23
1.16–Overcurrent Protection Function	2–24
1.17–Expansion Valve Control	2–25

1.2 Functions of Thermistors

Locating the thermistors

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



Functions of the thermistors

The table below contains the thermistor functions of the heat pump unit.

Ther-mistor	Location	Wiring symbol	Mode	Function
1	Indoor heat exchanger	R2T	Cooling	<ul style="list-style-type: none"><li>➤ Optimise discharge temp. (evap. temp.)</li><li>➤ Freeze-up thermostat</li></ul>
			Heating	<ul style="list-style-type: none"><li>➤ Optimise discharge temp. (cond. temp.)</li><li>➤ Integral capacity calculation (to determine defrost)</li><li>➤ Hot start indoor fan</li><li>➤ Peak cut-off</li><li>➤ Outdoor unit fan control</li></ul>

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

1.3 Operating Modes and Control Modes

**Operating modes**      The two operating modes are:

- Normal operating mode
- Forced operating mode.

**Control modes**      The table below contains the different control modes of the Sky Air R410A B-series air conditioners.

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



1.4 Forced Operating Mode (Emergency Operation)

Applicable units

The forced operating mode is applicable for the following units:

Model type	For this unit, you can go to...
RR71~125B	Forced cooling mode
RQ71~125B	<ul style="list-style-type: none"><li>➤ Forced cooling mode</li><li>➤ Forced heating mode</li></ul>

Purpose

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

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

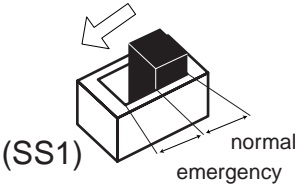
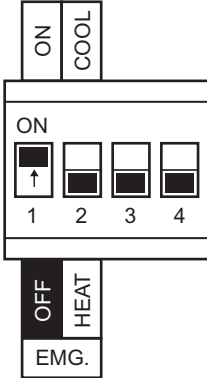
Before switching

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

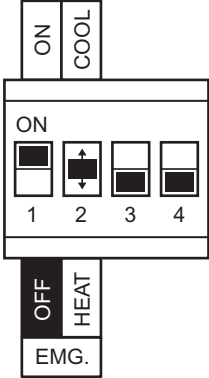
During emergency operation, do not attempt to operate the equipment from the remote controller. The remote controller displays 88 while the emergency operation is active on the indoor unit.

Switching

To switch to forced operating mode, proceed as follows:

Step	Action
1	Turn OFF the power.
2	Switch ON the emergency switch (SS1) on the indoor PCB. <div></div>
3	Switch ON the emergency switch on DS1 on the outdoor PCB. <div></div> <p>Switch 2 is not applicable for the c/o units.</p>

2

Step	Action
4	<div>Switch the emergency switch on DS1 on the outdoor PCB to the forced mode you prefer.</div> <div></div> <div>Switch 2 is not applicable for the c/o units.</div>
5	Turn ON the power.

Before switching back

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

Starting conditions

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

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

Ending conditions

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

Emergency operation

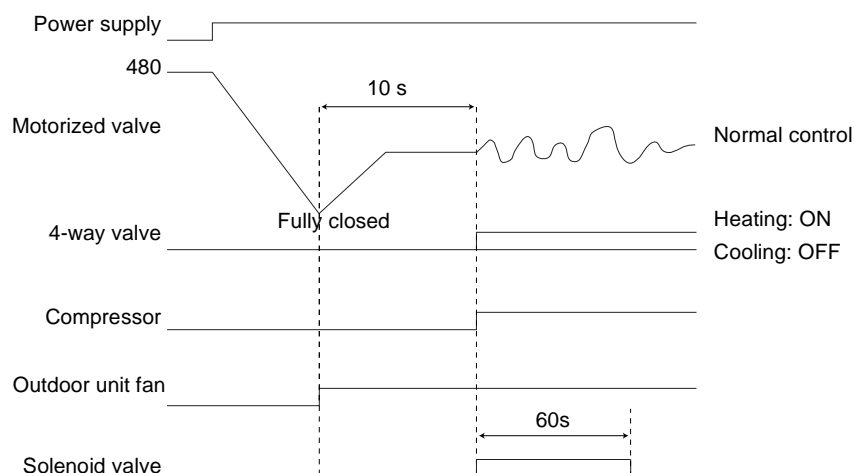
The table below describes what happens when you change the emergency switch to “emergency”.

Changing the emergency switch to “emergency” for the...	Switches ON...
Indoor unit	<div>➤ Indoor fan</div> <div>➤ Drain pump</div>
Outdoor unit	<div>➤ Compressor</div> <div>➤ Outdoor fan(s)</div>

**Time chart**

The time chart below illustrates emergency operation.

- In cooling, the unit runs for 20 min and then stops for 10 min in order to avoid freeze-up of the indoor coil.
- During emergency operation, do not attempt to operate the equipment from the remote controller. The remote controller shows **88** while the emergency operation is active on the indoor unit.

**Active components**

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

Component	Forced cooling	Forced heating	Forced defrosting
Compressor	ON	ON	ON
4-way valve	RQ71~125B: OFF	RQ71~125B: ON	RQ71~125B: OFF
Outdoor unit fan	H fan speed	H fan speed	OFF
Indoor unit fan	H fan speed	H fan speed	H fan speed
Drain pump	ON	OFF	ON

**Additional info**

To avoid misunderstandings, take the following into account:

- If the PCB or the motorized valve is malfunctioning, emergency operation cannot be carried out.
- No signal is transmitted between the indoor and outdoor units and remocon. "88" is displayed on the remote controller.
- If a safety device should be activated during emergency operation, all actuators are turned OFF.
- "Heat" cannot be set for c/o air conditioners.
- Emergency operation uses (and switches ON) both indoor and outdoor control PCBs. The outdoor control PCB determines the changeover.
- In heating, defrosting is activated once every hour.

## 1.5 Outdoor Unit Identification Function

### Applicable units

The outdoor unit identification function is applicable for the following units:

Model type	Model name
Cassette	FFQ, FCQ, FUQ
Ceiling	FHQ
Wall	FAQ
Duct	FBQ, FDQ

### Purpose

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

### Operating modes

The possible operating modes are:

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

### Used input

The outdoor unit identification function uses the following inputs:

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

TC: Transmission circuit

RC: Receiving circuit

## 1.6 Thermostat Control

### Applicable units

All units

### Purpose

The purpose of thermostat control is to control the compressor operation, by sensing the indoor return air temperature.

### Preventing thermostat OFF conditions

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

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

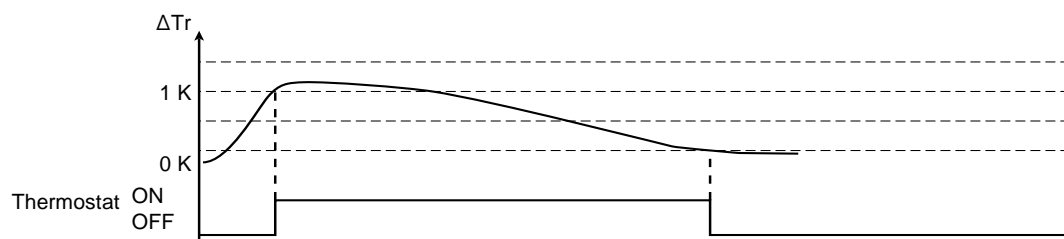
### $\Delta Tr$

The table below shows how to calculate  $\Delta Tr$ .

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

### Time chart

The time chart below illustrates the thermostat control.



### Thermostat

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

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

Preset temp. range

The table below illustrates the preset temperature range.

			16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34		
Cooling	Display		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div>Initial setting</div>																				
	Setting		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>																				
Heating	Display		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>																				
	Setting		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>																				
Remote controller	Cooling		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>																				
	Heating		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>																				
	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div>Automatic change-over</div>	Wired	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>																				
		Wireless	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div>Example</div> <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div>L</div> <div>(19)</div> <div>(21)</div> <div>(22)</div> <div>(23)</div> <div>(25)</div> <div>H</div>																				
	Cool/heat selection		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div>(When the display is "25" or "H")</div> <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div>-2°C</div> <div>(25)</div> <div>+2°C</div> <div>Automatic cooling</div> <div>Automatic heating</div>																				
	Thermostat ON/OFF	Cooling	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div>Thermostat ON</div> <div>Thermostat OFF</div> <div>+1°C</div>																				
		Heating	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div>Thermostat ON</div> <div>Thermostat OFF</div> <div>-1°C</div>																				

## 1.7 Forced Thermostat OFF

**Applicable units** All indoor units

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

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

Thermostat OFF control	Indicator	Starting conditions	Result	Reset
Freeze-up function: See page 2–29.				
Cooling overload	Outdoor heat exchanger temperature Tc	Tc > A°C for 90 s continuously (min. B - max. C°C for practice function)	The thermostat is turned OFF. Next start, initial opening E.V.: + 70 pulses (cooling) + 80 pulses (heating)	Remocon OFF
Heating overload (peak cut-off)	Indoor heat exchanger temperature Tc	Tc > 60°C for 90 s continuously (min. 57 - max. 63°C for practice function)		
Discharge pipe high temperature	Discharge pipe temperature T2	Td > 120°C for 20 s continuously		
Td disconnection	Discharge pipe thermistor T2	Td is determined to be disconnected from the piping 5 min after the compressor starts. Td < 55°C Td < Ta + 10°C $\Delta Td \leq 5$ K within 5 min after start	Retry 6 x until final error "F3"	

### Parameters

	71	100	125
A	58 °C	57 °C	59 °C
B	53 °C	52 °C	54 °C
C	61 °C	60 °C	62 °C

**Remarks**

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

Used input

The forced thermostat OFF control uses the following inputs:

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

Remark

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



## 1.8 HPS and LPS Function

**Applicable units** RR/RQ71~125B

**Purpose**

**HPS (High-Pressure Switch)**

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

**LPS (Low-Pressure Switch)**

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

**Method**

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

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

**Used input**

The HPS and LPS detection function uses the following inputs:

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

## 1.9 Simulated Operation Function

**Applicable units** RR/RQ71~125B

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

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

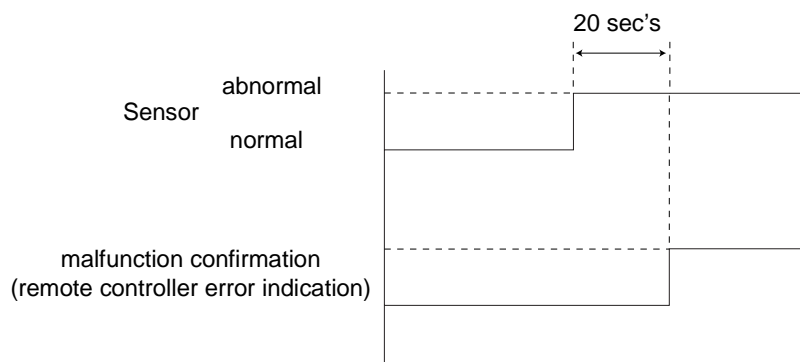
**Used input** The simulated operation function uses the following inputs:

Input	Connection on indoor PCB	Connection on outdoor PCB
Outdoor air thermistor	—	R1T-X4A
Outdoor heat exchanger thermistor	—	R2T-X5A
Indoor air thermistor	R1T-X19A	—
Indoor heat exchanger thermistor	R2T-X18A	—
Discharge pipe thermistor	—	R3T-X6A

**Parameters**

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

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



## 1.10 Discharge Pipe Temperature Control

**Applicable units** RR/RQ71~125B

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

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

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

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

Function / description	Starting conditions	F3-error occurs if the conditions...
Detects too high discharge gas temperatures.	$T_d \geq 120^{\circ}\text{C}$ for 20 s continuously	Are repeated 6 times.

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

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

1.11 Gas Shortage Function

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

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

To check the gas shortage error (U1), see page 3-62.

**Used input** The gas shortage function uses the following inputs:

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

## 1.12 Drain Pump Control

### Applicable units

The drain pump control is applicable for the following units:

Model type	Model name
Cassette	FCQ (standard) and FUQ (standard)
Duct	FBQ (standard)
Ceiling	FHQ (optional)

### Purpose

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

### Starting conditions

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

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

### Method

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

The table below describes the activation at open float switch.

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

### Used input

The drain pump control uses the following inputs:

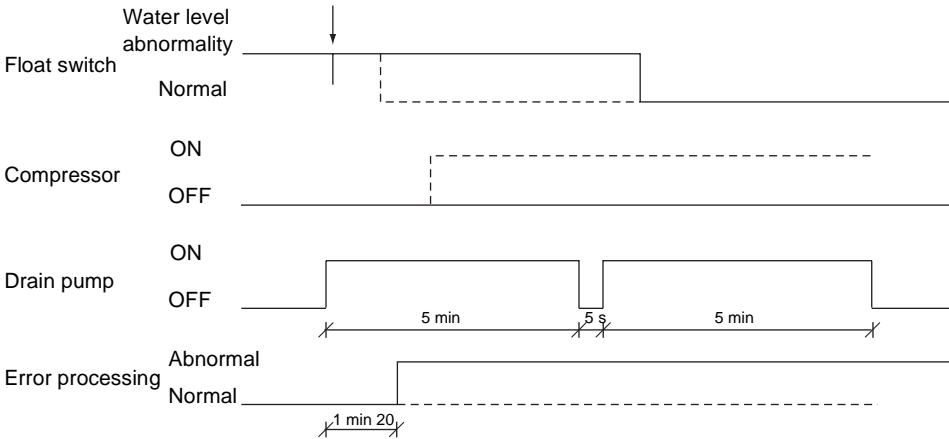
Input	Connection on indoor PCB	Connection on outdoor PCB
Float switch (33H)	X15A	—
Magnetic relay drain pump (RyP)	X25A	—

Detection system

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

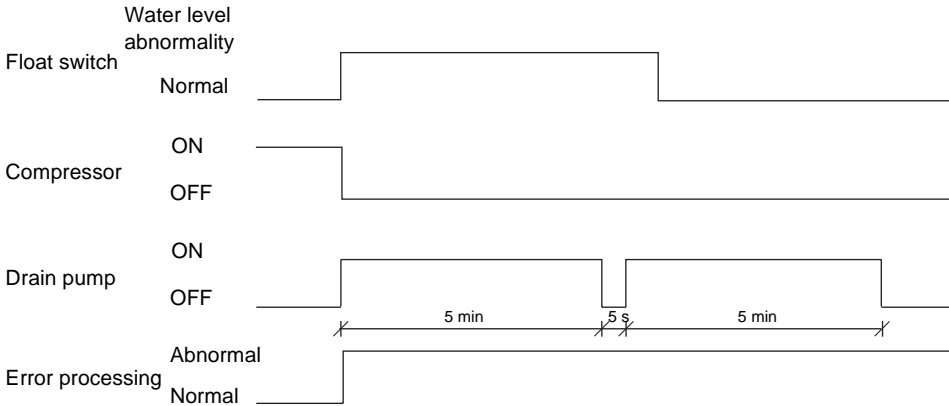
Float type: During start-up

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



Float type: During operation (compr. ON)

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



## 1.13 Fan and Flap Operations

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

Function	In...	Fan	Flap (FCQ and FHQ)	Flap (FAQ)	Remote controller 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	

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

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

1.14 Auto-Restart Function

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



1.15 Using Conditions for Remote Controller Thermostat

Applicable units

All units

Wired remote controllers

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

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

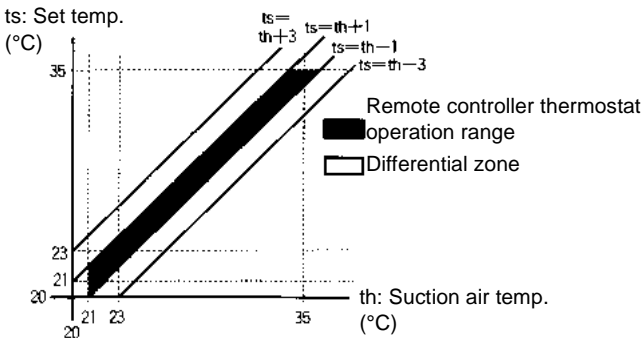
Even when the “use remote controller thermostat” is selected in service mode, the remote controller thermostat is not always used.

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

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

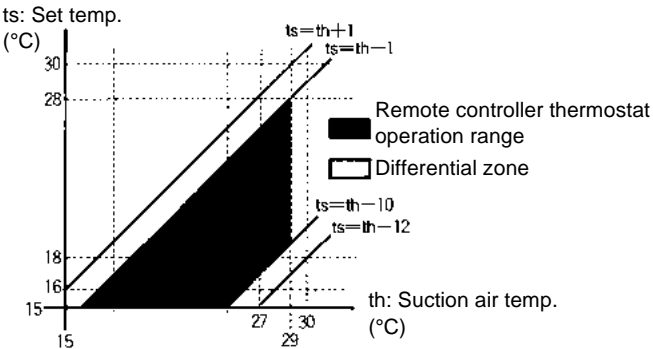
Cooling

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



Heating

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



1.16 Overcurrent Protection Function

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

**Method** If the Current Transducer detects an overcurrent, the unit will trip on E6 error after 4 times detection.

Unit	Compressor	Current (A)
RR/RQ71B7V3B	JT90G-V1N	25.3
RR/RQ71B7W1B	JT90G-YE	11.5
RR/RQ100B7V3B	JT125G-V1N	38
RR/RQ100B7W1B	JT125G-YE	11.5
RR/RQ125B7W1B	JT160G-YE	15

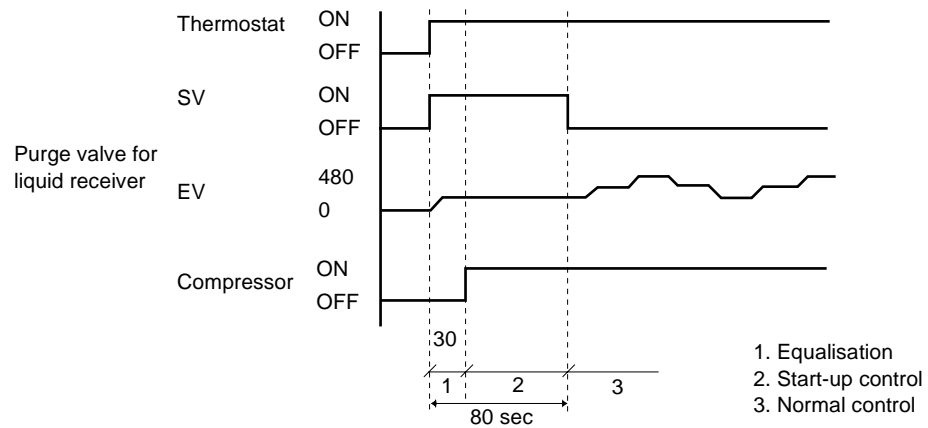
“J2” will be displayed if the overcurrent detection sensor has a malfunction.

### 1.17 Expansion Valve Control

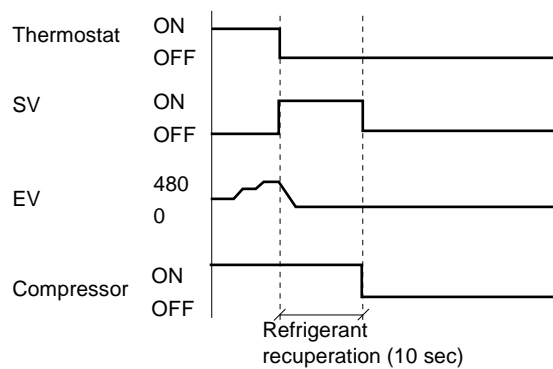
Applicable units RR/RQ71~125B

**Start-up control** When the compressor starts, a pump down operation is carried out in order to avoid liquid pumping. The liquid receiver fills up and a minimum refrigerant amount is passed to the compressor. This minimum refrigerant amount is required to avoid abnormal high discharge pipe temperatures via the purge valve.

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



**Pump down residual operation** The unit conducts a pump down residual operation after thermostat OFF or stop operation from remote control. The purpose of this function is to collect the refrigerant in the liquid receiver in order to prevent refrigerant from remaining in the indoor heat exchanger.



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

**Opening degree: Self-learning function**

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

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

**Normal control**

The optimum discharge pipe temperature is calculated based on:

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

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

**Used input**

The motor operated valve control uses the following inputs:

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

# 2 Overview of the cooling mode functions

## 2.1 What Is in This Chapter?

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

**Overview** This chapter contains the following topics:

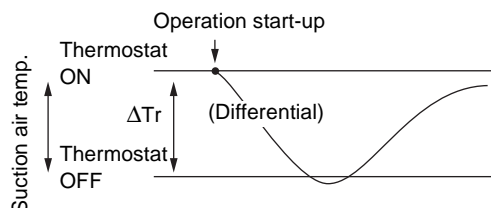
Topic	See page
2.2–Dry Keep Mode	2–28
2.3–Freeze-Up Function	2–29
2.4–Outdoor Fan Starting Control in Cooling or Dry Keep Mode	2–30
2.5–Normal Outdoor Fan Control in Cooling Operation	2–33
2.6–High Pressure Protection Control in Cooling Operation	2–35

## 2.2 Dry Keep Mode

**Applicable units** All units

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

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



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

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

**Operation condition** The table below describes the operation condition.

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

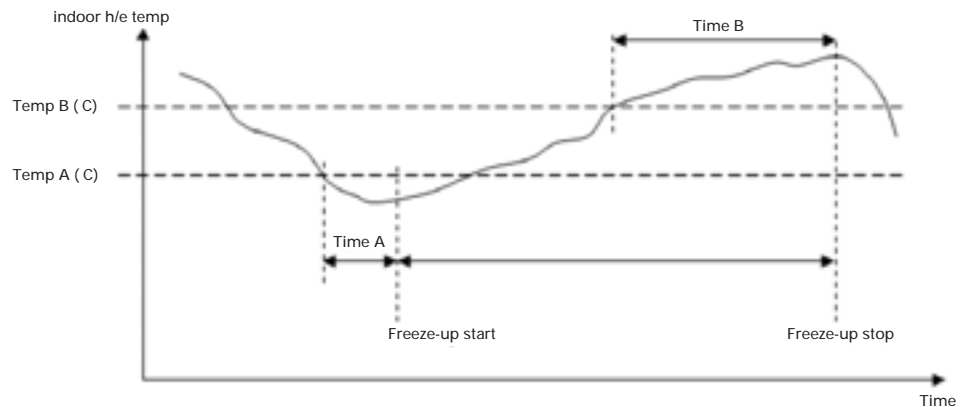
**Used input** The dry keep function uses the following inputs:

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

2.3 Freeze-Up Function

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

**Graph**



**Conditions**

Start Conditions (OR)	Stop Conditions
<ul style="list-style-type: none"><li>➤ <math>T_e \leq -1^{\circ}\text{C}</math> for 25 min accumulated compressor operation time</li><li>➤ <math>T_e \leq A^{\circ}\text{C}</math> for 1 minute continuous after <math>\geq 8</math> minutes continuous compressor operation time</li><li>➤ <math>T_e \leq -1^{\circ}\text{C}</math> for 1 minute after <math>\geq 20</math> minutes continuous compressor operation time</li></ul>	<ul style="list-style-type: none"><li>➤ <math>T_e &gt; 10^{\circ}\text{C}</math> for 10 minutes continuously</li></ul>

**Parameters**

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

Indoor unit	Value "A"
FAQ	-1°C
FHQ	-3°C
All other indoor models	-5°C

2.4 Outdoor Fan Starting Control in Cooling or Dry Keep Mode

Applicable units RR/RQ71~125B

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

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

Operating mode	Outdoor air temp. Ta	Starting fan speed	See further in this section...
Cooling mode, dry keep mode	area 1: Ta < 3°C	L speed (20 s (*) after compressor start)	Fan speed for Ta < 3°C
	area 2: 3°C ≤ Ta < 10°C	L speed	Different fan speeds
	area 3: 10°C ≤ Ta < 23°C	L speed	
	area 4: Ta ≥ 23°C	HH speed	

(\*) When cutting jumper J3, the 20 second timer is changed to 5 seconds

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

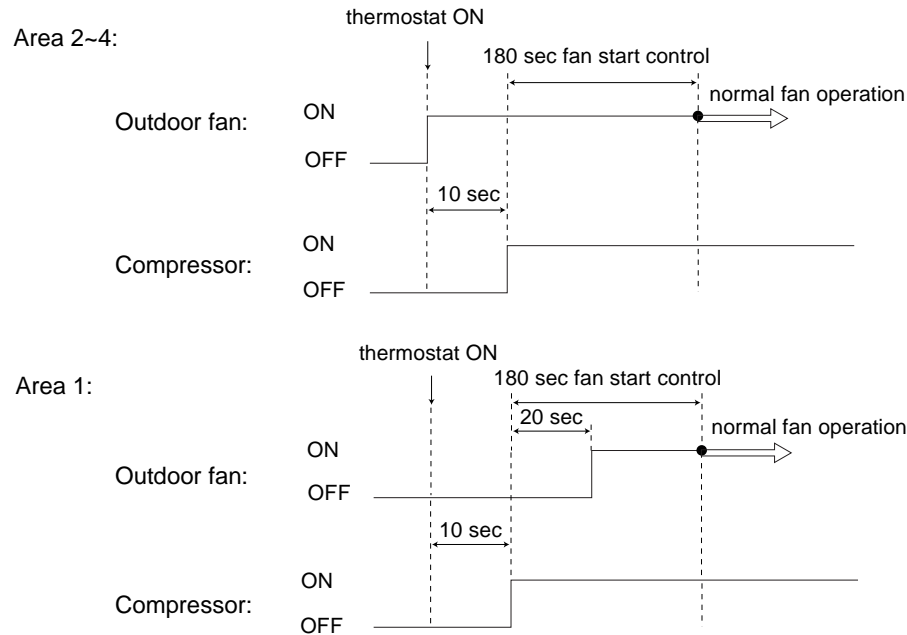
- minimize the stress to the compressor at startup
- avoid a heat draft after fan startup
- maximize the capacity at startup



Fan speed for  
Ta < 3°C

This fan starting control is made to be able to build up the compression ratio as soon as possible because this has two advantages:

- It is better for the compressor to increase the compression ratio because the lubrication must be done by the pressure difference between low and high pressure.
- The pressure difference is necessary for the h/p models to keep the 4-way valve in its correct position.



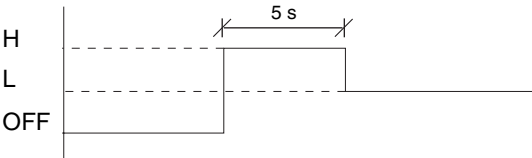
Different fan speeds

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

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

L-tap starting compensation

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



Used input

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

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

## 2.5 Normal Outdoor Fan Control in Cooling Operation

**Applicable units** RR/RQ71~125B

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

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

Condition	Fan Speed
$T_a < -7^{\circ}\text{C}$	OFF
$T_a < 41.7 - 0.84 \times T_r$	L speed
$T_a > 45.7 - 0.84 \times T_r$	H speed
$T_c > 53^{\circ}\text{C}$	HH speed

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

**Different fan speeds**

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

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

**Used input**

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

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

**Low outside temperature control (Year round cooling)**

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

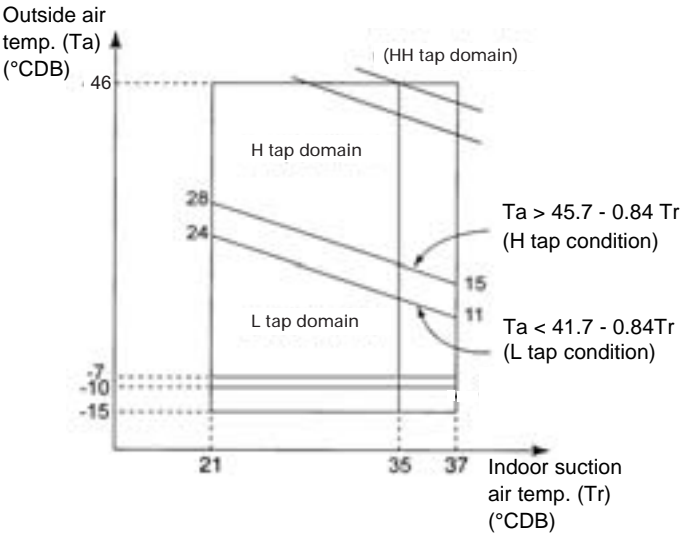
The control is activated when the outdoor temperature drops below  $(41.7 - 0.84 \times T_r)$ . At this temperature, the outdoor fan speed switches to L-tap.

The differential for the return is 4 K.

The control is not activated during start-up control.

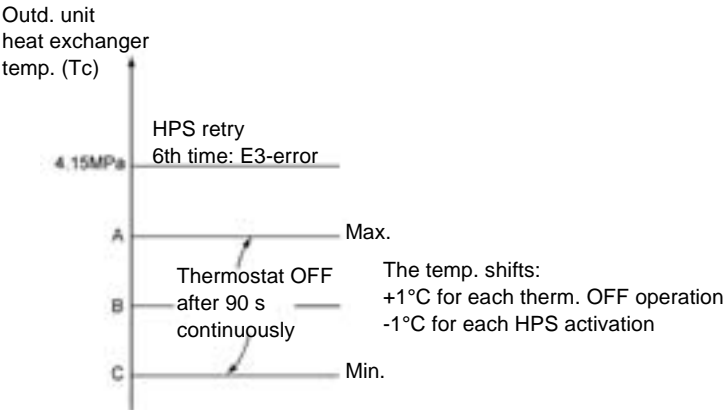
Fan speed control graph

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



2.6 High Pressure Protection Control in Cooling Operation

Applicable units	RR/RQ71~125B
Purpose	The purpose of the high pressure protection is to prevent a shutdown due to an error.
Method	The thermostat turns OFF immediately before HPS activation according to the outdoor heat exchanger temperature (Tc).



Parameters

	71	100	125
A	61 °C	60 °C	62 °C
B	58 °C	57 °C	59 °C
C	53 °C	52 °C	54 °C

2

# 3 Overview of the heating mode functions

## 3.1 What Is in This Chapter?

### Introduction

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

### Overview

This chapter contains the following topics:

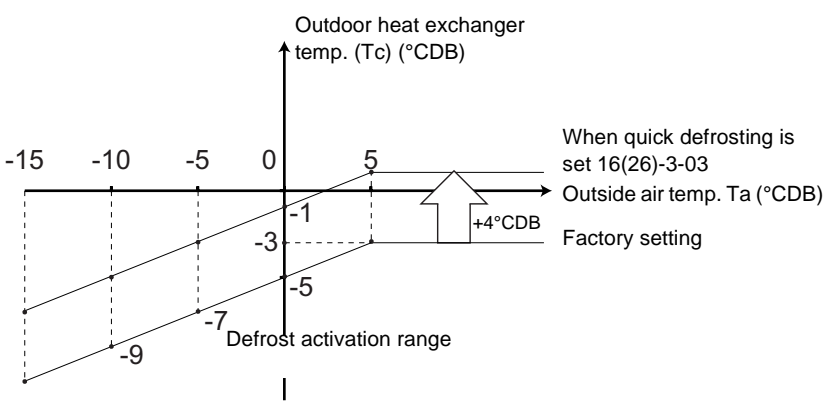
Topic	See page
3.2-Defrost Control	2-38
3.3-4-way Valve Control	2-41
3.4-Starting Outdoor Fan Control in Heating Mode	2-42
3.5-Normal Outdoor Fan Control in Heating Mode	2-44

3.2 Defrost Control

Applicable units RQ71~125B

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

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

Condition 1	Condition 2
The compressor has been running for a total of 25 min accumulated since the start of heating operation or since the end of the previous defrosting.	
<div><div><div>➤ Outdoor heat exchanger temp. <math>\leq -3^{\circ}\text{C}</math>, and</div><div>➤ Outdoor heat exchanger temp. <math>\leq 0.4 \times \text{Ta} - 5^{\circ}\text{C}</math></div></div><div></div></div>	
<div><div>➤ Compressor ON <math>\geq 5</math> min continuously, and integral heating capacity diminishes (see further in this section), AND</div><div>➤ Defrost upper limit time A is met.</div></div>	Above condition for 10 min accumulated.
Outdoor fan is ON (not in overload control)	Outdoor fan is OFF (overload control)

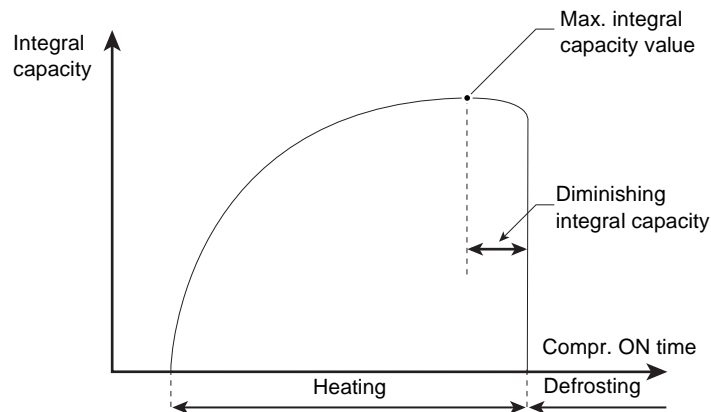
**Defrost upper limit A**

	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 temp $> -5^{\circ}\text{C}$	40 minutes	3 hours	24 hours
Outdoor temp $\leq -5^{\circ}\text{C}$	40 minutes	6 hours	24 hours



### Heating integral capacity

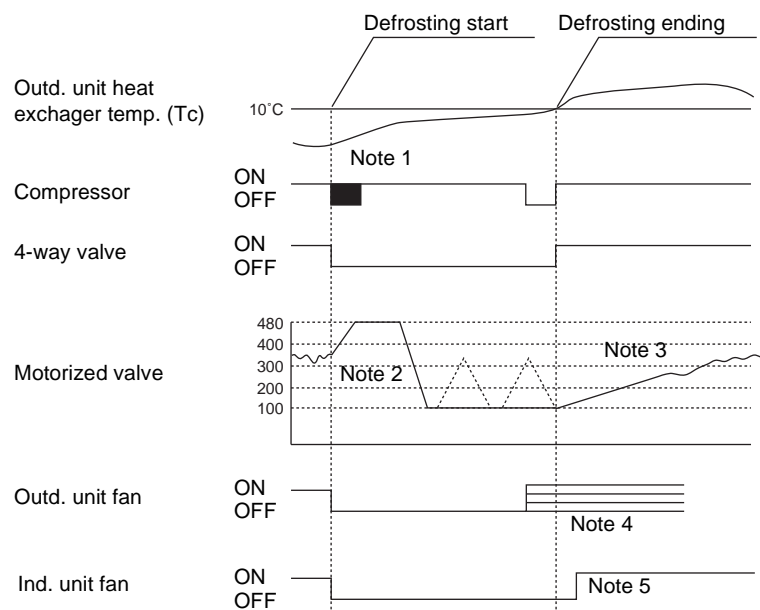
The integral heating capacity is calculated by using the indoor unit data (R2T - R1T) divided by the compressor running time.



At the same time of setting field setting 16(26)-3-03, defrost starting becomes 4°C higher.

### Defrost control

The illustration below shows the defrost control.



Note	Control and time	Description
1	Compressor operation at defrost start	Compressor OFF for 90 seconds only in case outdoor ambient > 9°C and indoor ambient > 24°C.
2	Motorized valve control during defrost operation	After a defrost activation, the defrost motorized valve is at 480 pulses for a certain amount of time, and is then closed gradually to 100 pulses. Only when the discharge pipe temperature is high during defrost, the motorized valve opens at intervals.
3	Motorized valve control after defrost operation	The motorized valve is controlled to an optimum opening and the most suitable operating speed, according to the operating conditions after defrost activation.

Note	Control and time	Description
4	Outdoor unit fan after defrost operation	The fan operates at optimum fan tap, according to the operating conditions after defrost activation.
5	Hot start after defrost	The unit remains in the hot start standby (indoor unit fan OFF) mode for: <ul style="list-style-type: none"> <li>➤ 40 s after defrost ending, or</li> <li>➤ Until the indoor heat exchanger temperature increases.</li> </ul>

**Defrost ending**

The defrost operation ends:

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

**Hot start after defrosting**

The hot start function is activated:

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

**Used input**

The defrost control uses the following inputs:

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

### 3.3 4-way Valve Control

**Applicable units** RQ71~125B

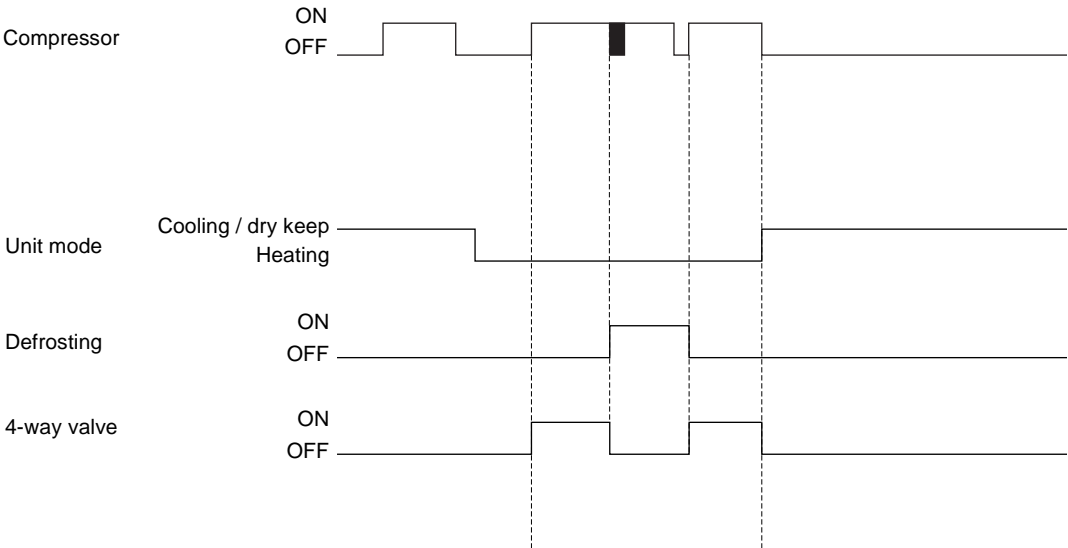
**Purpose** The purpose of the 4-way valve control is to control how the superheated refrigerant passes through the 4-way valve. The 4-way valve control carries out the changeover switching of the 4-way valve. This changeover switching is only carried out during operation, because pressure difference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

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

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

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

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



**Used input** The 4-way valve control uses the following inputs:

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

### 3.4 Starting Outdoor Fan Control in Heating Mode

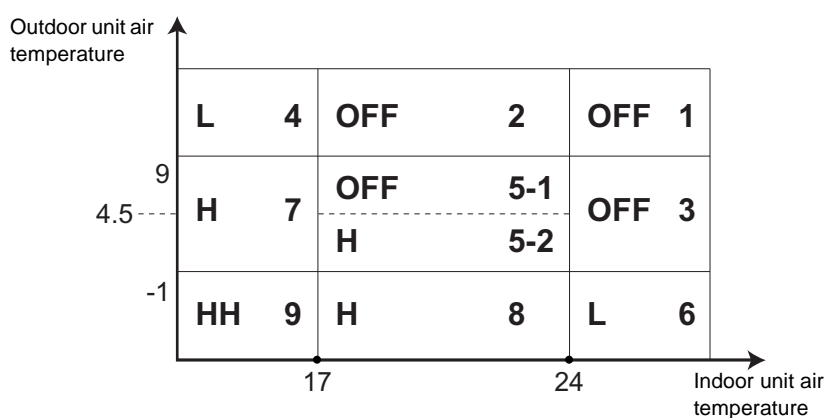
**Applicable units** RQ71~125B

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

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

- LPS is not detected for 3 min after start-up.
- Units operate with the starting air flow volume for at least 5 minutes. The air flow volume stays at H for the first 5 seconds if it is switched from OFF to L.

The fan operating areas 1 ~ 9 are indicated.



#### Different fan speeds

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

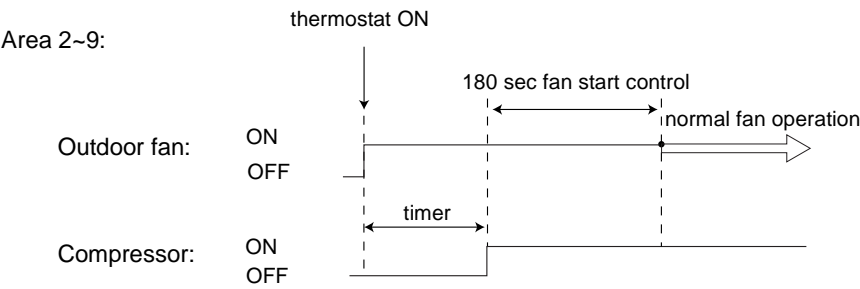
Fan operation	71 and 100	125	
	1 fan	Upper fan (MF1)	Lower fan (MF2)
OFF	OFF	OFF	OFF
L	L	L	L
H	H	H	H
HH	HH	HH	HH

#### Used input

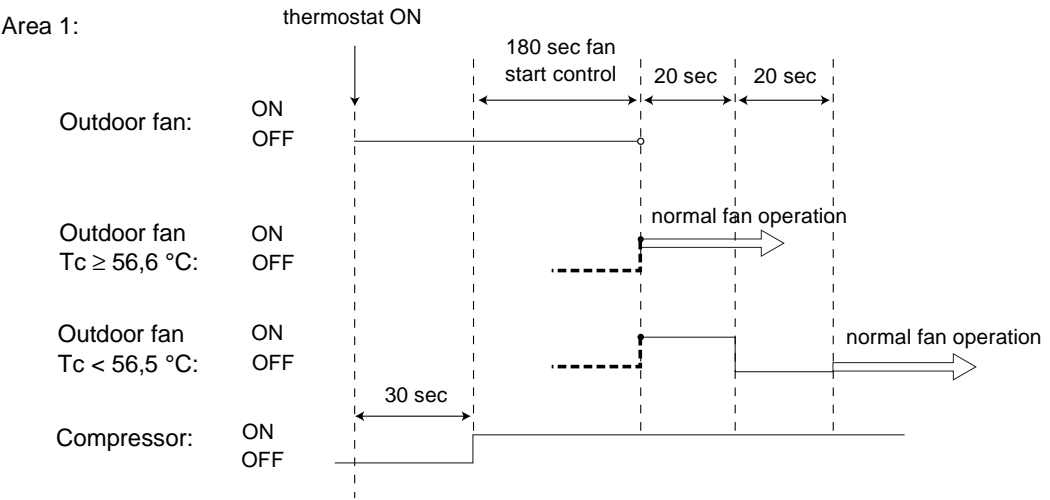
The outdoor fan starting control in heating mode uses the following inputs:

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

Time charts



	Area 1, 2, 3	Area 4, 5, 6, 7, 8, 9
Timer	30 seconds	10 seconds



### 3.5 Normal Outdoor Fan Control in Heating Mode

Applicable units	RQ71~125B
Purpose	<div>The purpose of the normal outdoor fan control is to:</div> <div><div>➤ Reduce the chance of overload during high ambient temperature.</div><div>➤ Reduce the chance of icing up.</div></div>
Method	<div>Normal fan control operation is done after 5 min of starting fan control operation.</div> <div>The operation range is divided into two areas (A and B).</div> <div><div><div>Outdoor air temp. (°CDB)</div><div><div><div><div>21</div><div>9</div><div>6</div><div>4,5</div><div>-1</div><div>-10</div></div><div><div><div>10</div><div>17</div><div>24</div><div>30</div></div><div>Indoor air temp. (°CDB)</div></div><div><div>A</div><div>B</div></div></div><div><div>Indoor heat exchanger temp.</div><div><div><div><div>60</div><div>54</div><div>53</div><div>52</div><div>51</div><div>50</div><div>49</div><div>47.3</div></div><div><div><div>OFF</div><div>L</div><div>H</div><div>HH</div></div><div><div><div>OFF</div><div>L</div><div>H</div><div>HH</div></div></div></div><div><div>A</div><div>B</div></div></div></div></div><div>Example</div><div><div>For area A, the fans go:</div><div><div>➤ From L speed to OFF at 51°C</div><div>➤ From OFF to L speed at 49°C.</div></div></div></div></div></div>

**Different fan speeds**

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

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

**Used input**

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

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

2



# Part 3

## Troubleshooting

What is in this part?

This part contains the following chapters:

Chapter	See page
1-Troubleshooting	3-3
2-Error Codes: Indoor Units	3-25
3-Error Codes: Outdoor Units	3-37
4-Error Codes: System Malfunctions	3-61
5-Additional Checks for Troubleshooting	3-71

# 3

# 1 Troubleshooting

## 1.1 What Is in This Chapter?

### Introduction

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

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

### Overview

This chapter contains the following topics:

Topic	See page
1.2–Overview of General Problems	3–4
1.3–ON/OFF Operation in Case of Wireless Remote Controller	3–6
1.4–Checking with the Wired Remote Controller	3–6
1.5–Procedure of Self-Diagnosis by Remote Controller	3–8
1.6–Checking with the Wireless Remote Controller Display	3–9
1.7–Self-Diagnosis by Wired Remote Controller	3–13
1.8–Remote Controller Display Malfunction Code and Contents	3–14
1.9–Troubleshooting with the Indoor Unit LEDs and the Remote Controller	3–16
1.10–Troubleshooting with the Remote Controller: Outdoor Malfunctions	3–17
1.11–Troubleshooting with the Remote Controller: System Malfunctions	3–18
1.12–Overview of the Outdoor Safety Devices	3–19
1.13–Outdoor Safety Device: Thermal Protector Fan Motor	3–20
1.14–Outdoor Safety Device: Reverse Phase Protector	3–21
1.15–Outdoor Safety Device: High-Pressure Switch	3–22
1.16–Outdoor Safety Device: Low-Pressure Switch	3–23

## 1.2 Overview of General Problems

### Introduction

The general problems are:

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

### None of the indoor units operates

To troubleshoot, check the following:

- Make sure the rated voltage is supplied.
- Make sure the indoor unit type is compatible with the outdoor unit.
- Troubleshoot with the indoor unit LEDs. See page 3-16.
- Troubleshoot with the remote control: outdoor malfunctions. See page 3-17.
- Make sure the address for the remote controller and indoor unit are set correctly. See page 4-5.

### Equipment operates but stops sometimes

To troubleshoot, check the following:

- A power failure of 2 to 10 sine wave cycles can stop air conditioner operation.
- Troubleshoot with the indoor unit LEDs. See page 3-16.

### Some indoor units do not operate (twin / triple)

To troubleshoot, check the following:

- Make sure the indoor unit type is compatible with the outdoor unit.
- Troubleshoot with the indoor unit LEDs. See page 3-16.
- Troubleshoot with the remote control: outdoor malfunctions. See page 3-17.

### Equipment operates but is not able to cool

To troubleshoot, check the following:

- Make sure the thermistor is not disconnected from the pipe holder.
- Troubleshoot with the indoor unit LEDs. See page 3-16.
- Troubleshoot with the remote control: outdoor malfunctions. See page 3-17.
- Check for gas shortage. See page 3-62.

**Abnormal operating noise and vibrations**

Make sure the required space for installation is provided. See chapter "General Outline: Outdoor Units".

**Equipment does not operate (operation light OFF)**

To troubleshoot, check the following:

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

**Poor cooling or heating**

To troubleshoot, check the following:

- Check if the filters are clean.
- Check if there is no obstruction of the air inlet or outlet of the indoor and outdoor units.
- Check if the temperature settings are correct.
- Check if all windows and doors are closed.
- Check if the air flow and air direction are set correctly.
- Check if the unit is not set to "fan-only" operation.

**Operation stops suddenly (operation light flashes)**

To troubleshoot, check the following:

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

The operation light flashes when the following errors are detected:

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

**Abnormal functioning**

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

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

### 1.3 ON/OFF Operation in Case of Wireless Remote Controller

---

When the wireless remote controller is not available or its battery is dead, you can use the ON/OFF button on the front panel of the indoor unit :

- To start the automatic mode, press the ON/OFF button.
  - To stop the automatic mode, press the button again.
-

## 1.4 Checking with the Wired Remote Controller

---

### Checking with the wired remote controller

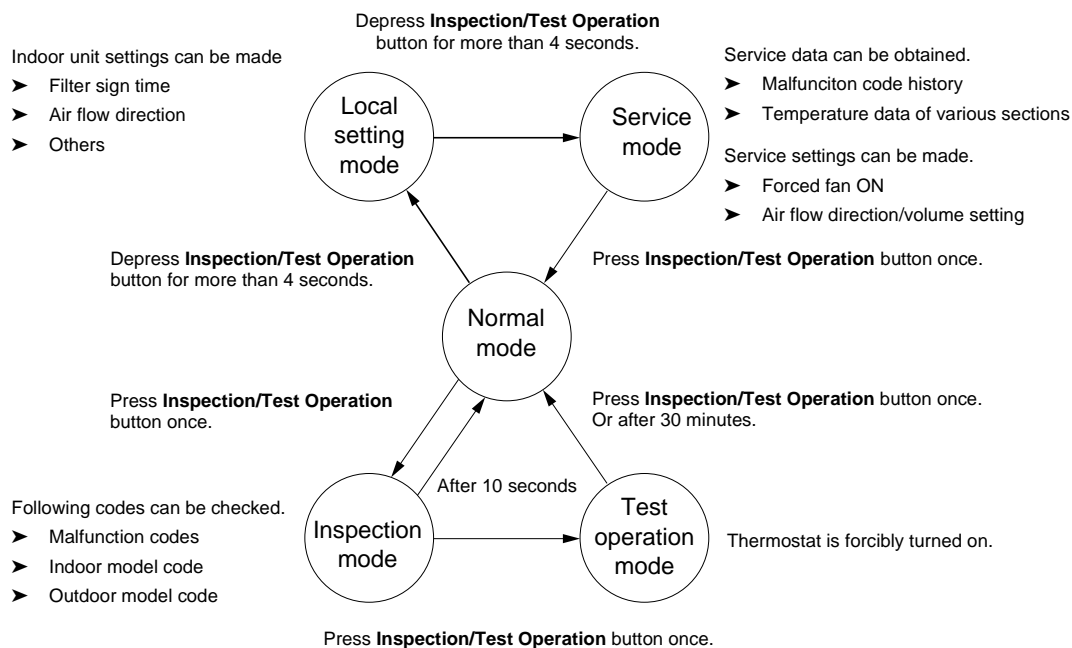
If the operation stops due to a malfunction, the remote controller's operation LED flashes, and the controller displays the error code. The error code helps you to troubleshoot. See page 3-16, 3-17 and 3-18.

---

## 1.5 Procedure of Self-Diagnosis by Remote Controller

### The Inspection/Test Button: explanation

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

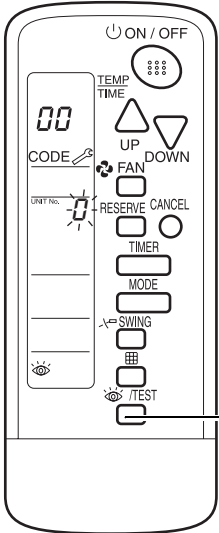




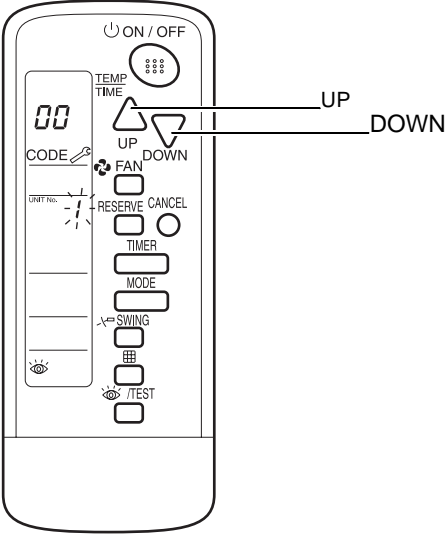
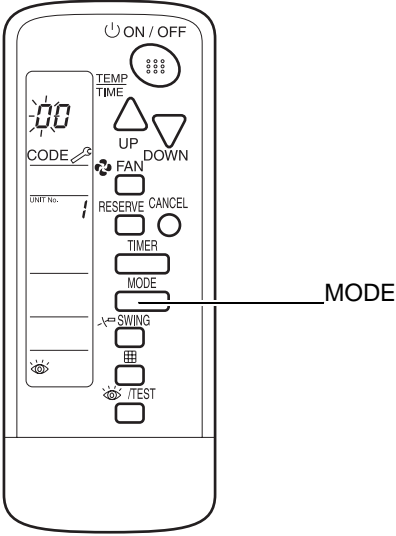
1.6 Checking with the Wireless Remote Controller Display

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

**Checking** To find the error code, proceed as follows:

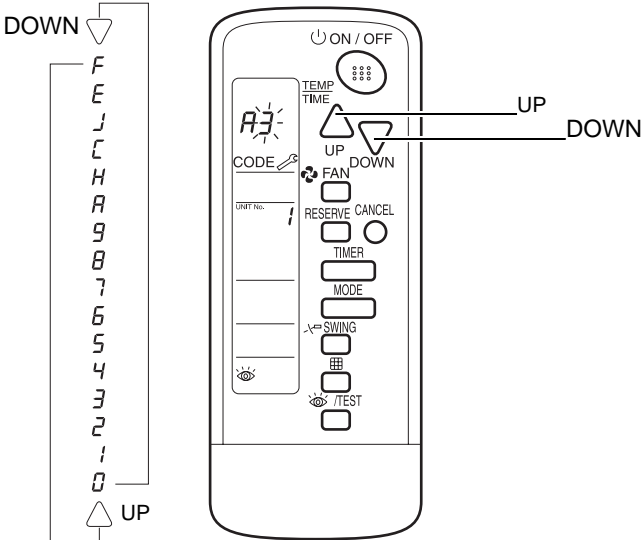
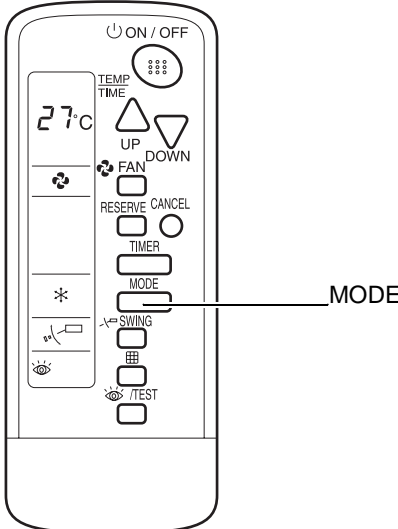
Step	Action
1	<p>Press the INSPECTION/TEST button to select “inspection”. The equipment enters the inspection mode. “0” flashes in the UNIT No. display.</p> <div><p>INSPECTION/TEST</p></div>

3

Step	Action								
2	<div>Press the UP or DOWN button and change the UNIT No. until the receiver of the remote controller starts to beep.</div> <div></div> <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>	If you hear...	Then...	3 short beeps	Follow all steps below.	1 short beep	Follow steps 3 and 4. Continue the operation in step 4 until you hear a continuous beep. This continuous beep indicates that the error code is confirmed.	1 continuous beep	There is no abnormality.
If you hear...	Then...								
3 short beeps	Follow all steps below.								
1 short beep	Follow steps 3 and 4. Continue the operation in step 4 until you hear a continuous beep. This continuous beep indicates that the error code is confirmed.								
1 continuous beep	There is no abnormality.								
3	<div>Press the MODE selector button. The left "0" (upper digit) indication of the error code flashes.'</div> <div></div>								

Step	Action								
4	<div><p>Press the UP or DOWN button to change the error code upper digit until the receiver of the remote controller starts to beep.</p><div><div><div>DOWN</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>U</div><div>P</div><div>L</div><div>J</div><div>F</div><div>H</div><div>E</div><div>C</div><div>A</div><div>D</div><div>UP</div></div><div><div>ON / OFF</div><div>TEMP TIME</div><div>AD</div><div>CODE</div><div>UNIT No.</div><div>UP</div><div>DOWN</div><div>FAN</div><div>RESERVE</div><div>CANCEL</div><div>TIMER</div><div>MODE</div><div>SWING</div><div>TEST</div></div><div><div>UP</div><div>DOWN</div></div></div></div> <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>	If you hear...	Then...	2 short beeps	The upper digit matches.	1 short beep	No digits match.	1 continuous beep	Both upper and lower digits match.
If you hear...	Then...								
2 short beeps	The upper digit matches.								
1 short beep	No digits match.								
1 continuous beep	Both upper and lower digits match.								
5	<div><p>Press the MODE selector button. The right "0" (lower digit) indication of the error code flashes.</p><div><div>ON / OFF</div><div>TEMP TIME</div><div>AD</div><div>CODE</div><div>UNIT No.</div><div>UP</div><div>DOWN</div><div>FAN</div><div>RESERVE</div><div>CANCEL</div><div>TIMER</div><div>MODE</div><div>SWING</div><div>TEST</div></div><div>MODE</div></div>								

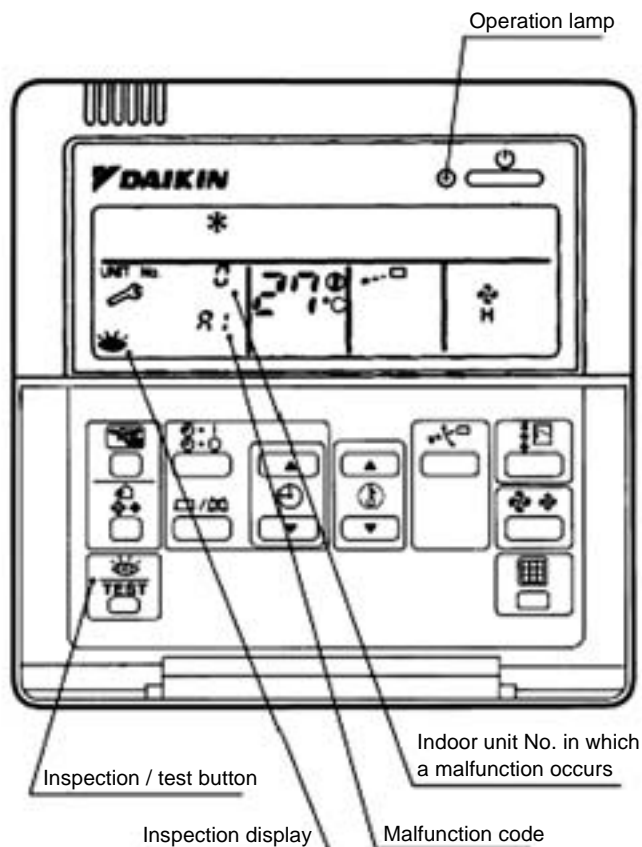
3

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

## 1.7 Self-Diagnosis by Wired Remote Controller

### Explanation

If the operation stops due to a malfunction, the remote controller's operation LED blinks, and malfunction code is displayed. (Even if stop operation is carried out, malfunction contents are displayed when inspection mode is entered.) The malfunction code enables you to tell what kind of malfunction caused operation to stop. See page 3-14 for malfunction code and malfunction contents.  
<New Remote Controller> BRC1D527



## 1.8 Remote Controller Display Malfunction Code and Contents

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

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

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

**Note**

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

1.9 Troubleshooting with the Indoor Unit LEDs and the Remote Controller

Shutdown

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

Malfunction overview

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

If...			Then...				
LED front panel	Indoor unit LED		Remote controller display	Location of the malfunction		Malfunction description	See page
	H1P (HAP)	H2P (HBP)		Other than PCB	PCB ind. unit		
●	☀	☀	Note 1	—	—	Normal	—
☀	☀	☀	A1	—	○	Malfunctioning Indoor PCB (A1)	3-26
	☀	●					
	☀	—					
	●	—					
	☀	☀	A3	⊙	—	Malfunctioning Drain Water Level System (A3)	3-27
			A6	⊙	□	Indoor Unit Fan Motor Lock (A6)	3-29
			AF	⊙	○	Malfunctioning Drain System (AF)	3-31
			AJ	⊙	○	Malfunctioning Capacity Setting (AJ)	3-32
			C4 or C9	⊙	□	Thermistor Abnormality (C4 or C9)	3-34
			CJ	⊙	○	Malfunctioning Remote Controller Air Thermistor (CJ)	3-36

Symbols and notes

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

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



## 1.10 Troubleshooting with the Remote Controller: Outdoor Malfunctions

### Malfunction overview

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

Outdoor Unit Malfunctions	Remote Controller Display	Location of Malfunction				Contents of Malfunction	Details of Malfunction (Reference page)
		Other than PC Board	PC Board				
			Outdoor Unit	Indoor unit	Remote Contr.		
	<i>E0</i>	⊙	□	—	—	Actuation of safety device	3-38
	<i>E1</i>	—	○	—	—	Outdoor P.C. board malfunction	3-42
	<i>E3</i>	⊙	—	—	—	High pressure system (HPS) malfunction	3-43
	<i>E4</i>	⊙	—	—	—	Low pressure system (LPS) malfunction	3-45
	<i>E6</i>	⊙	□	—	—	Compressor Overcurrent	3-47
	<i>E9</i>	⊙	□	—	—	Malfunction of electronic expansion valve	3-49
	<i>F3</i>	⊙	□	—	—	Discharge pipe temperature malfunction	3-51
	<i>H3</i>	⊙	□	—	—	Failure of high pressure switch	3-53
	<i>H9</i>	⊙	□	—	—	Malfunction of outdoor air temperature sensor system	3-54
	<i>J2</i>	—	○	—	—	Malfunction of current sensor system	3-57
	<i>J3</i>	⊙	□	—	—	Malfunction of discharge pipe temperature sensor system	3-55
	<i>J6</i>	⊙	□	—	—	Malfunction of heat exchanger temperature sensor system	3-56
	<i>PJ</i>	⊙	□	—	—	Failure of capacity setting	3-59

### Symbols and notes

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

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

## 1.11 Troubleshooting with the Remote Controller: System Malfunctions

### Malfunction overview

The table below contains an overview of the system malfunctions.

If...	Then...					
Rem. contr. display	Location of the malfunction				Malfunction description	See page
	Other than PCB	PCB outd. unit	PCB ind. unit	Rem. contr.		
<i>U0</i>	⊙	—	—	—	Gas Shortage Detection (U0)	3-62
<i>U1</i>	⊙	□	—	—	Reverse Phase (U1)	3-63
<i>U4 or UF</i>	⊙	○	○	—	Transmission Error between Indoor and Outdoor Unit (U4 or UF)	3-65
<i>U5</i>	⊙	—	○	○	Transmission Error between Indoor Unit and Remote Controller (U5)	3-67
<i>U8</i>	⊙	—	○	○	Transmission Error between MAIN Remote Controller and SUB Remote Controller (U8)	3-68
<i>UA</i>	⊙	—	○	—	Malfunctioning Field Setting Switch (UA)	3-69

### Symbols and notes

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

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

## 1.12 Overview of the Outdoor Safety Devices

### Overview

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

Applicable outdoor unit	Reverse phase protector	Overload contact compressor	Thermal protector fan motor	Overcurrent relay compressor	High-pressure switch	Low-pressure switch
RR71B7V3B	—	—	X	—	X	X
RQ71B7V3B						
RR71B7W1B	X					
RQ71B7W1B						
RR100B7V3B	—					
RQ100B7V3B						
RR100B7W1B	X					
RQ100B7W1B						
RR125B7W1B						
RQ125B7W1B						

1.13 Outdoor Safety Device: Thermal Protector Fan Motor

Thermal protector fan motor

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

Applicable outdoor unit	Wiring symbol	Location safety	Settings		Type
			Abnormal	Reset	Reset
RR71B7V3B	Q1M	Outdoor fan motor  Q1M connected to X11A	> 135±5°C	< 95±15°C	Automatic
RQ71B7V3B					
RR71B7W1B					
RQ71B7W1B					
RR100B7V3B					
RQ100B7V3B					
RR100B7W1B					
RQ100B7W1B					
RR125B7W1B	Q1M and Q2M	Q2M connected to X12A			
RQ125B7W1B					

## 1.14 Outdoor Safety Device: Reverse Phase Protector

### Reverse phase protector

The table below describes the reverse phase protector.

Applicable outdoor unit	Wiring symbol	Location safety	Type
			Reset
RR71B7V3B	No reverse phase protector		
RQ71B7V3B			
RR71B7W1B	PRC	Switch Box	Automatic and power OFF
RQ71B7W1B			
RR100B7V3B	No reverse phase protector		
RQ100B7V3B			
RR100B7W1B	PRC	Switch box	Automatic and power OFF
RQ100B7W1B			
RR125B7W1B			
RQ125B7W1B			

1.15 Outdoor Safety Device: High-Pressure Switch

High-pressure switch

The table below describes the high-pressure switch.

Applicable outdoor unit	Wiring symbol	Location safety	Settings		Type
			Abnormal	Reset	Reset
RR71B7V3B	S1PH	Discharge pipe	> 41.5 Bar	< 32 Bar	Automatic
RQ71B7V3B					
RR71B7W1B					
RQ71B7W1B					
RR100B7V3B					
RQ100B7V3B					
RR100B7W1B					
RQ100B7W1B					
RR125B7W1B					
RQ125B7W1B					

## 1.16 Outdoor Safety Device: Low-Pressure Switch

### Low-pressure switch

The table below describes the low-pressure switch.

Applicable outdoor unit	Wiring symbol	Location safety	Settings		Type
			Abnormal	Reset	Reset
RR71B7V3B	S1LP	Low-pressure switch located in suction pipe	< -0.3 bar	> +0.5 bar	Automatic
RQ71B7V3B					
RR71B7W1B					
RQ71B7W1B					
RR100B7V3B					
RQ100B7V3B					
RR100B7W1B					
RQ100B7W1B					
RR125B7W1B					
RQ125B7W1B					

3



## 2 Error Codes: Indoor Units

### 2.1 What Is in This Chapter?

#### Introduction

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

#### Shutdown

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

#### Overview

This chapter contains the following topics:

Topic	See page
2.2—Malfunctioning Indoor PCB (A1)	3-26
2.3—Malfunctioning Drain Water Level System (A3)	3-27
2.4—Indoor Unit Fan Motor Lock (A6)	3-29
2.5—Malfunctioning Drain System (AF)	3-31
2.6—Malfunctioning Capacity Setting (AJ)	3-32
2.7—Thermistor Abnormality (C4 or C9)	3-34
2.8—Malfunctioning Remote Controller Air Thermistor (CJ)	3-36









## 2.2 Malfunctioning Indoor PCB (R1)

### Error code

R1

### LED indications

The table below shows the LED indications.

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

### Error generation

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

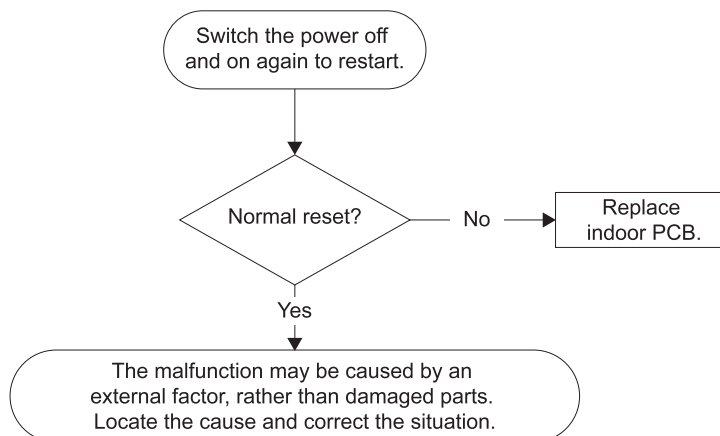
EEPROM (Electrically Erasable Programmable Read Only Memory): A memory chip that holds its content without power. It can be erased, either within the computer or externally and usually requires more voltage for erasure than the common +5 volts used in logic circuits. It functions like non-volatile RAM,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

### Causes

The possible cause is a malfunctioning indoor PCB.

### Troubleshooting

To troubleshoot, proceed as follows:



### Caution

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.





## 2.3 Malfunctioning Drain Water Level System (R3)

### Error code

R3

### LED indications

The table below shows the LED indications.

Operation	HAP (green)	HBP (green)
Normal		
Malfunctioning		

### Error generation

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

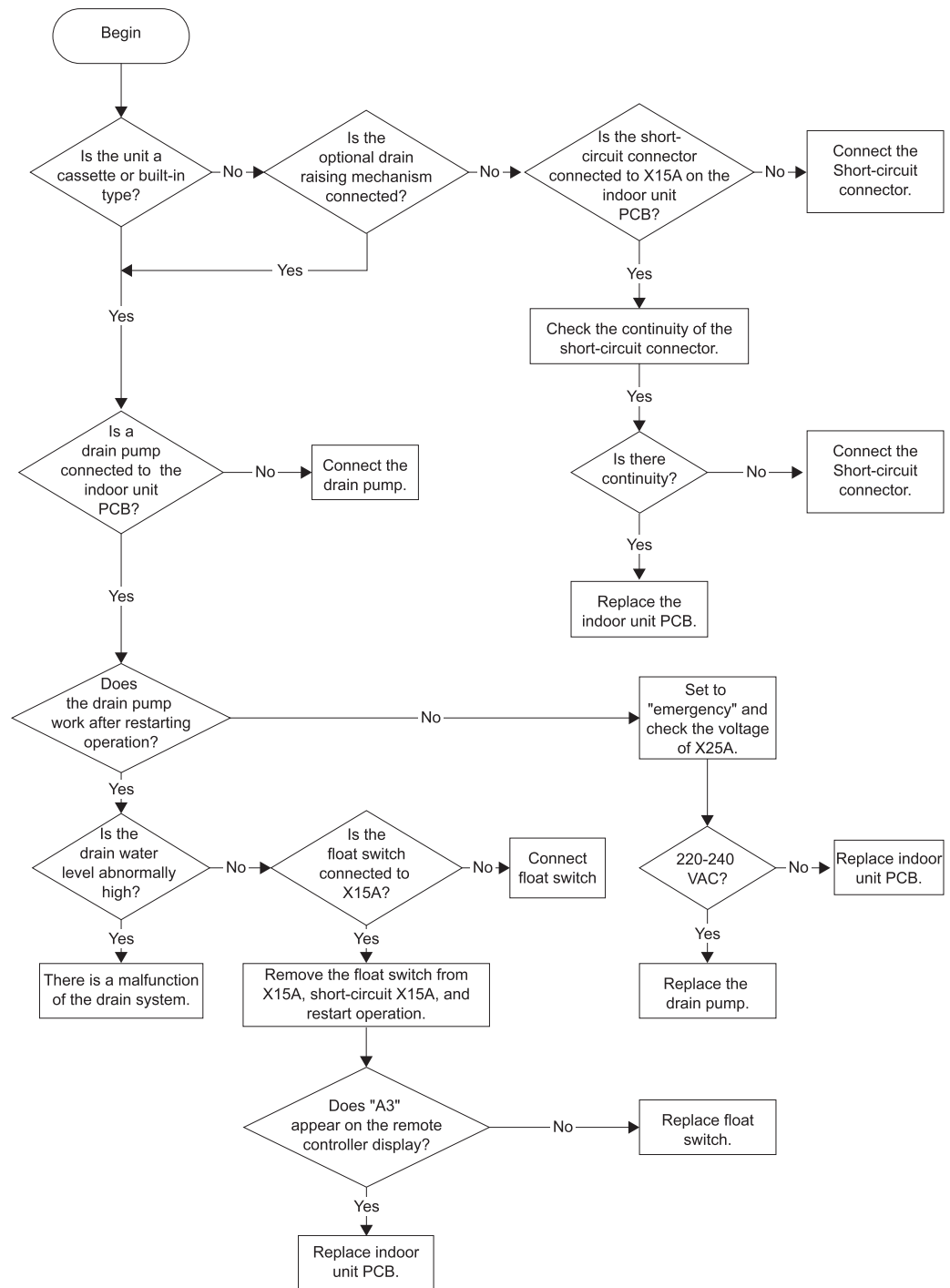
### Causes

The possible causes are:

- Malfunctioning drain pump
- Improper drain piping work
- Drain piping clogging
- Malfunctioning float switch
- Malfunctioning indoor unit PCB
- Malfunctioning short-circuit connector X15 on PCB.

## Troubleshooting

To troubleshoot, proceed as follows:



## Remark

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

## Caution

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.





## 2.4 Indoor Unit Fan Motor Lock (R6)

### Error code

R6

### LED indications

The table below shows the LED indications.

Operation	HAP (green)	HBP (green)
Normal		
Malfunctioning		

### Error generation

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

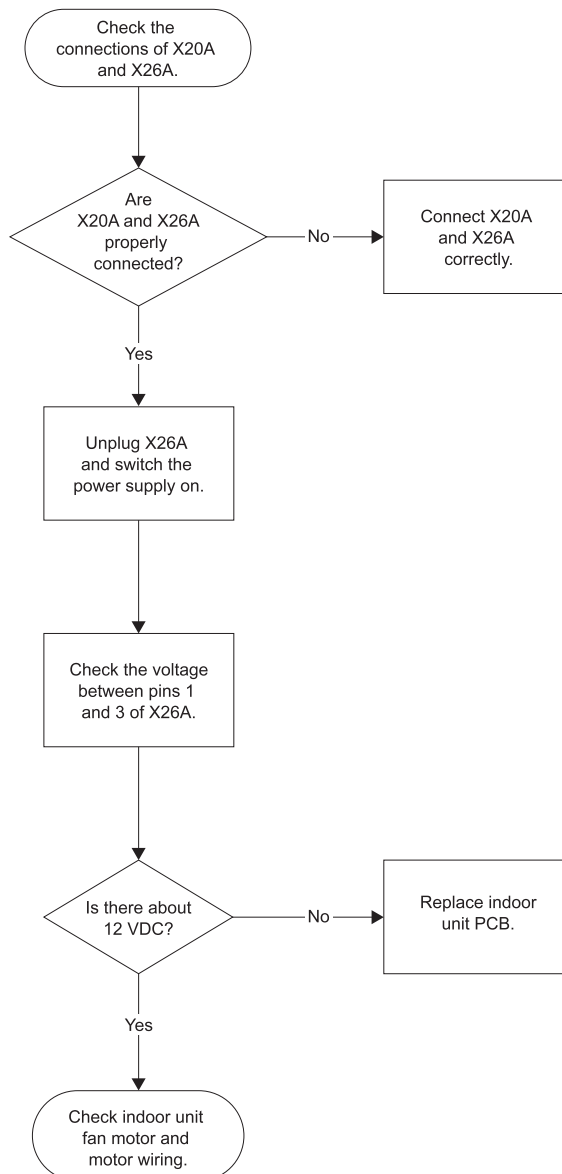
### Causes

The possible causes are:

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

**Troubleshooting**

To troubleshoot, proceed as follows:

**Caution**

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.





## 2.5 Malfunctioning Drain System (RF)

### Error code

RF

### LED indications

The table below shows the LED indications.

Operation	HAP (green)	HBP (green)
Normal		
Malfunctioning		

### Error generation

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

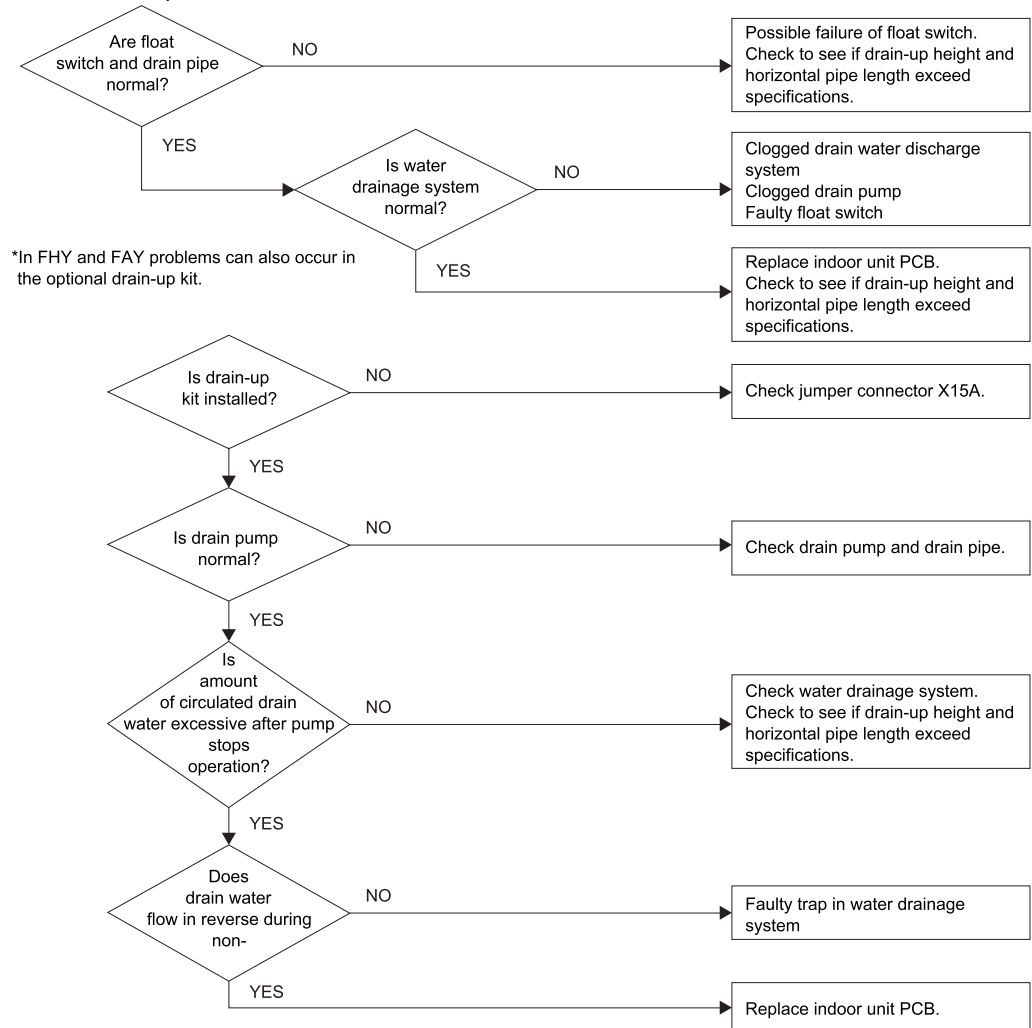
### Causes

The possible causes are:

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

### Troubleshooting

To troubleshoot, proceed as follows:



### Caution

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.





## 2.6 Malfunctioning Capacity Setting (R<sub>U</sub>)

### Error code

R<sub>U</sub>

### LED indications

The table below shows the LED indications.

Operation	HAP (green)	HBP (green)
Normal		
Malfunctioning		

### Error generation

The error is generated when the following conditions are fulfilled:

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

### Causes

The possible causes are:

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

### Capacity setting adaptor

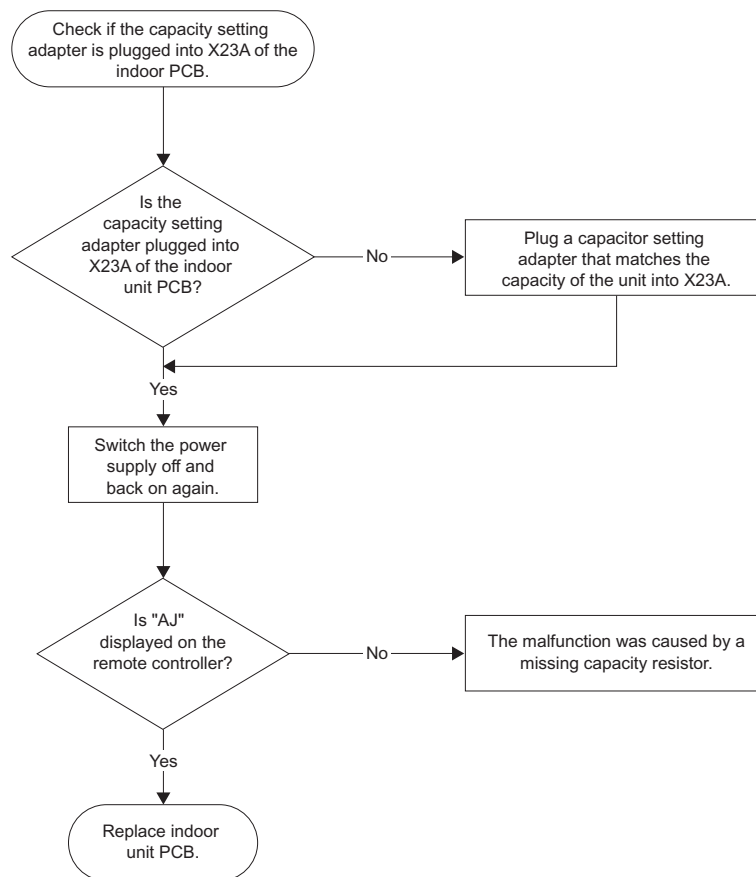
The capacity is set in the PCB's memory IC. A capacity setting adaptor that matches the capacity of the unit is required in the following case:

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**

To troubleshoot, proceed as follows:

**Caution**

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

## 2.7 Thermistor Abnormality (C4 or C9)





### Error code

The table below describes the two thermistor abnormalities.

Error	Description
C4	Malfunctioning heat exchanger thermistor system.
C9	Malfunctioning suction air thermistor system.

### LED indications

The table below shows the LED indications.

Operation	HAP (green)	HBP (green)
Normal		
Malfunctioning		

### 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:

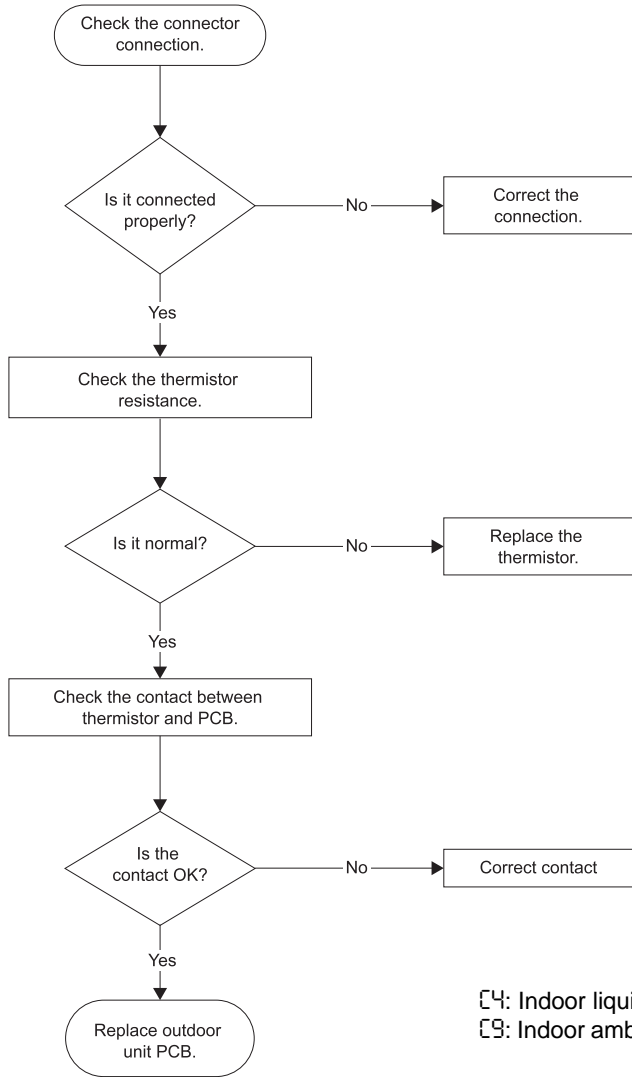
- Malfunctioning connector connection
- Malfunctioning thermistor
- Malfunctioning PCB
- Broken or disconnected wire.

### Checking thermistors

See page 3–76.

Troubleshooting

To troubleshoot, proceed as follows:



E4: Indoor liquid pipe thermistor (R2T).  
E9: Indoor ambient temperature thermistor (R1T).

Caution

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

## 2.8 Malfunctioning Remote Controller Air Thermistor (CJ)

### Error code

CJ

### LED indications

The table below shows the LED indications.

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

### Error generation

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

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

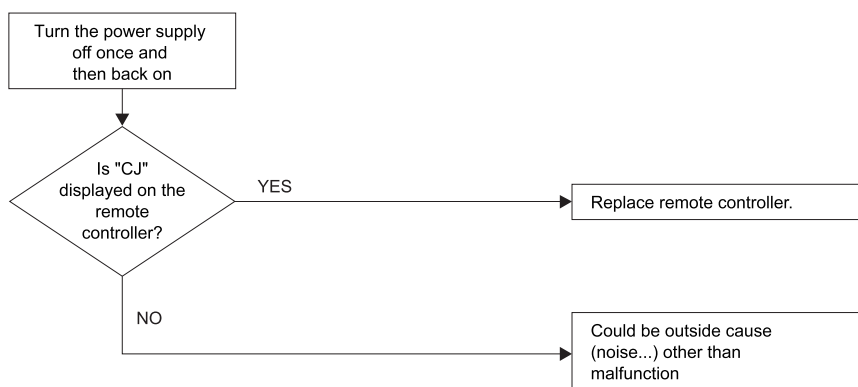
### Causes

The possible causes are:

- Malfunctioning thermistor
- Broken wire.

### Troubleshooting

To troubleshoot, proceed as follows:



### Caution

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

## 3 Error Codes: Outdoor Units

### 3.1 What Is in This Chapter?

#### Introduction

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

#### Overview

This chapter contains the following topics:

Topic	See page
3.2—Activation of Safety Device (EO)	3-38
3.3—Failure of Outdoor Unit PC Board (E1)	3-42
3.4—Abnormal High Pressure (Detected by the HPS) (E3)	3-43
3.5—Abnormal Low Pressure (Detected by the LPS) (E4)	3-45
3.6—Compressor Overcurrent (E6)	3-47
3.7—Malfunctioning Electronic Expansion Valve (E9)	3-49
3.8—Malfunctioning in Discharge Pipe Temperature (F3)	3-51
3.9—Malfunctioning HPS (H3)	3-53
3.10—Malfunctioning Outdoor Thermistor System (H9)	3-54
3.11—Malfunctioning Discharge Pipe Thermistor System (J3)	3-55
3.12—Malfunctioning Heat Exchanger Thermistor System (J6)	3-56
3.13—Malfunction of Current Sensor System (J2)	3-57
3.14—Failure of Capacity Setting (PJ)	3-59

### 3.2 Activation of Safety Device (E0)

**Error code** E0

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

**Causes**

The possible causes are:

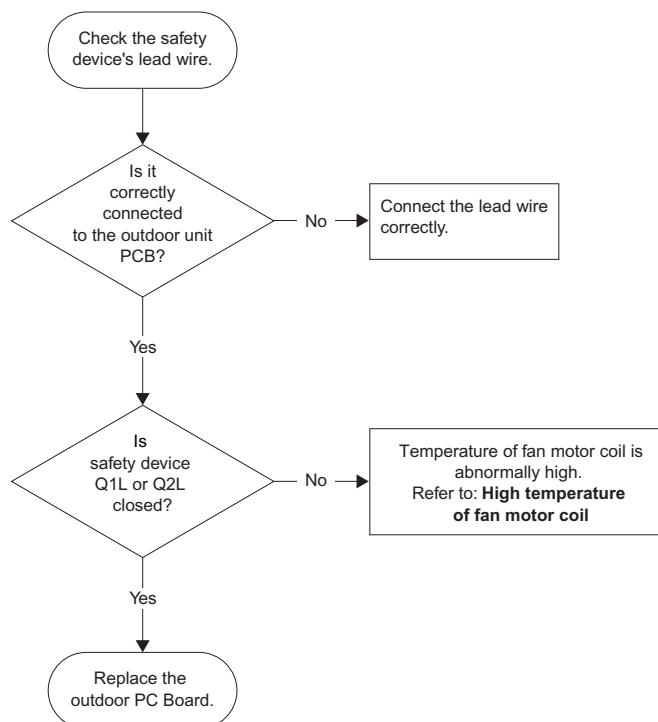
- Malfunctioning safety device input connection
- Broken or disconnected safety device harness
- Clogging refrigerant piping circuit
- Air short-circuit
- Malfunctioning outdoor PCB.

**Overview outdoor safety devices**

See page 3–19.

**Troubleshooting**

To troubleshoot, proceed as follows:

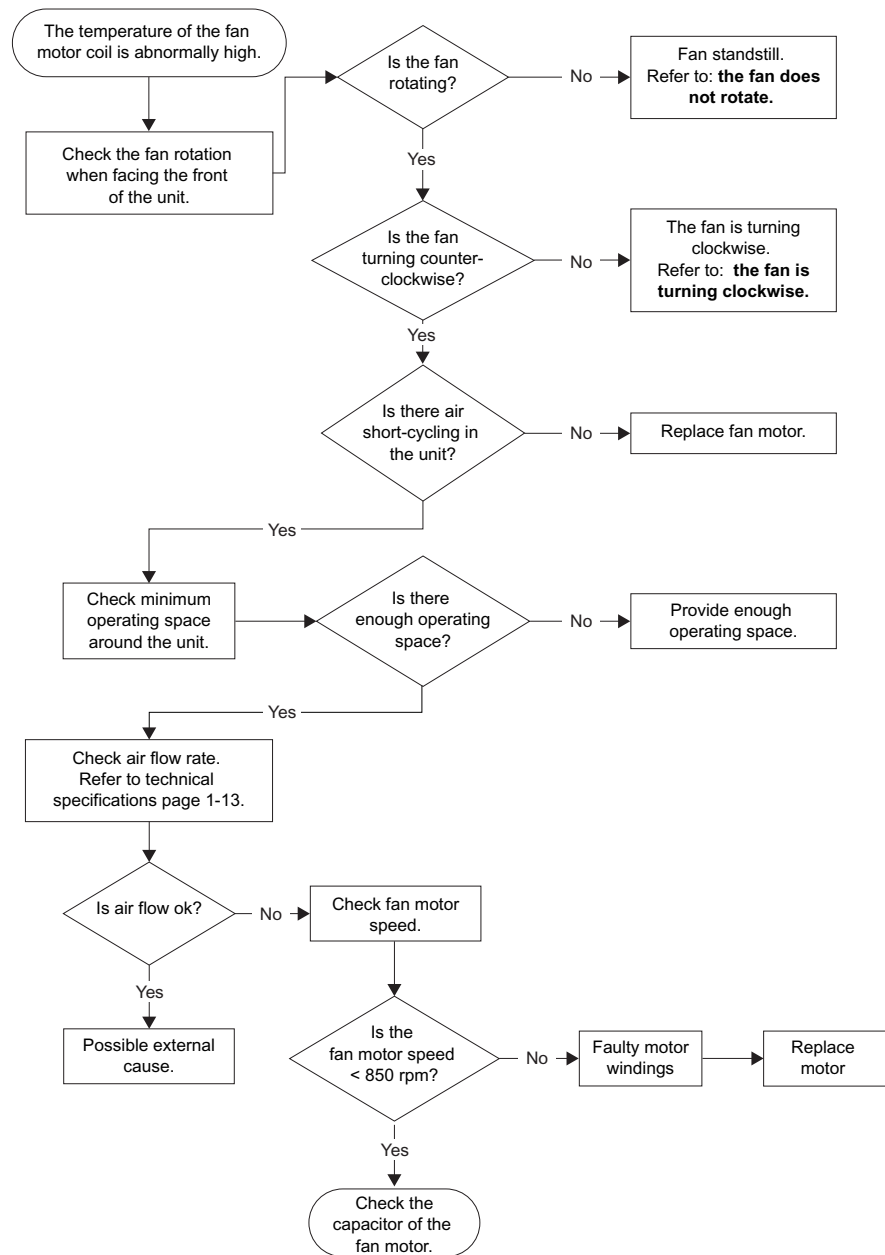


**Caution**

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

**High temperature of fan motor coil**

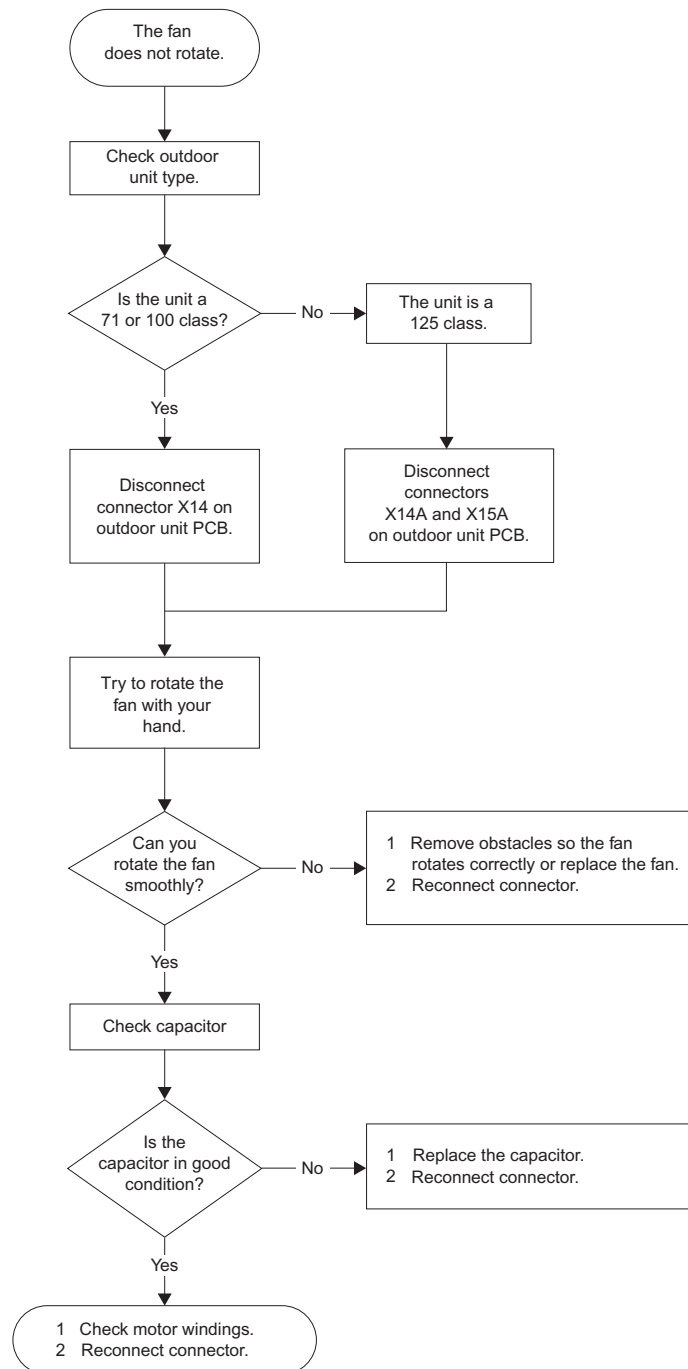
To troubleshoot, proceed as follows:

**Caution**

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

### The fan does not rotate

To troubleshoot, proceed as follows:



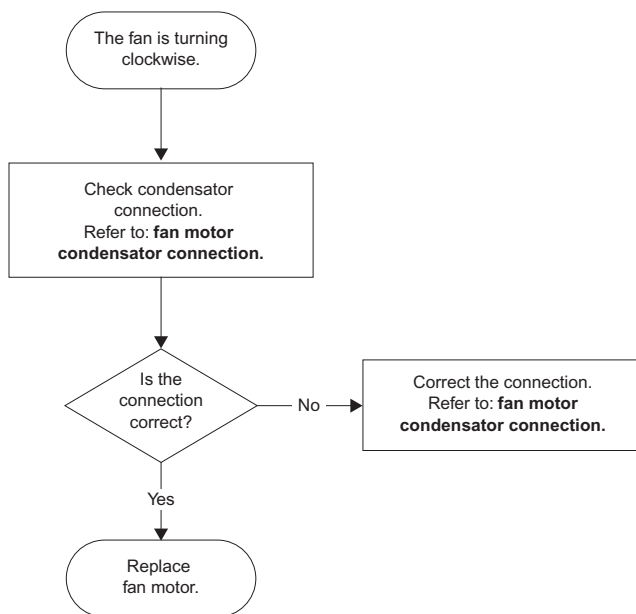
### Caution

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.



**The fan is turning clockwise**

To troubleshoot, proceed as follows:

**Caution**

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

3.3 Failure of Outdoor Unit PC Board (E1)

Remote Controller  
Display

E1

Method of  
Malfunction  
Detection

A microcomputer checks whether or not E<sup>2</sup>PROM is normal.

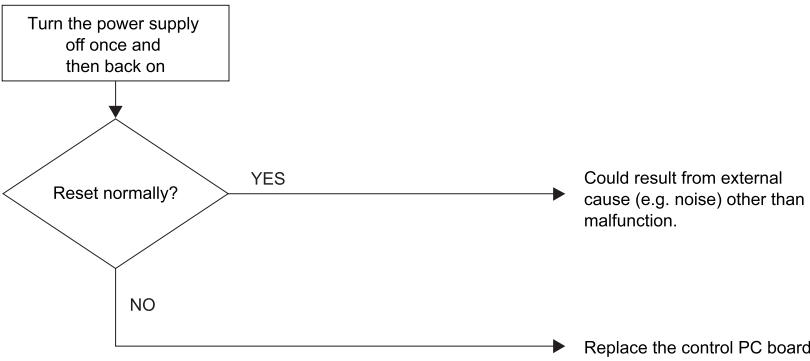
Malfunction  
Decision  
Conditions

The E<sup>2</sup>PROM is malfunctioning when the power supply is turned on.

Possible Causes

- Faulty outdoor unit PC board

Troubleshooting



Caution

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

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

**Error code** E3

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

**Causes**

The possible causes are:

- Abnormal high pressure caused by too much refrigerant or by non-condensable gas (air or nitrogen)
- Inaccuracy of the high-pressure switch
- Broken or disconnected high-pressure switch harness
- Malfunctioning high-pressure switch connector connection
- Malfunctioning outdoor unit PCB
- Malfunctioning refrigerant piping circuit
- Indoor unit air filter is clogged (Heat mode)
- Outdoor heat exchanger dirty (Cool mode)
- Outdoor fan malfunction (Cool mode)
- Stop valves are not opened

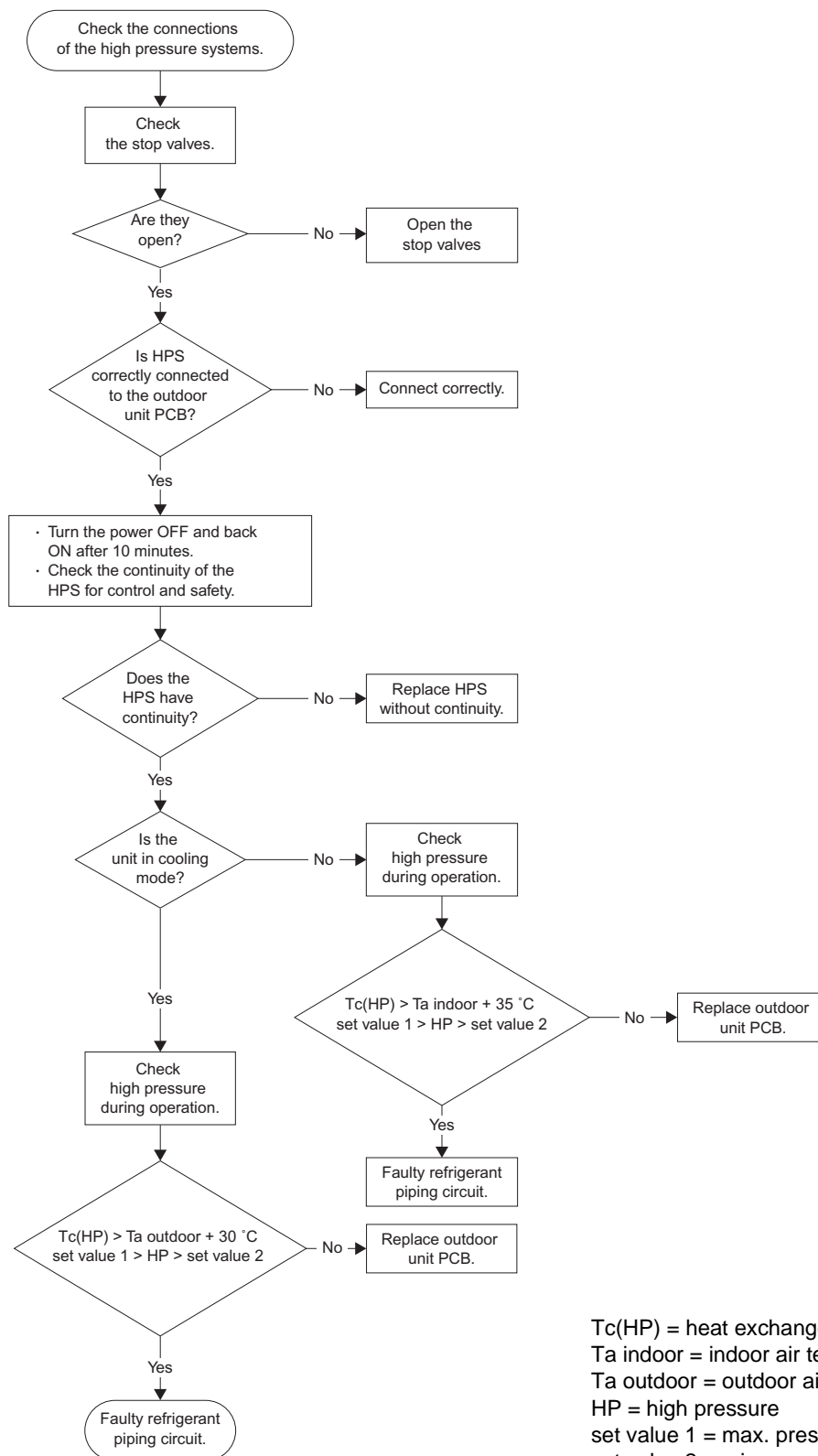
**HPS settings**

The table below contains the preset HPS values.

Applicable units	Abnormal	Reset
RR/RQ71~125B	> 41.5 bar	< 32 bar

## Troubleshooting

To troubleshoot, proceed as follows:



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

## Caution

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

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

**Error code** E4

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

**Causes**

The possible causes are:

- Malfunctioning refrigerant piping circuit
- Malfunctioning low-pressure switch
- Disconnected or broken low-pressure switch harness
- Malfunctioning low-pressure switch connector connection
- Malfunctioning outdoor unit PCB.
- Stop valves are not opened

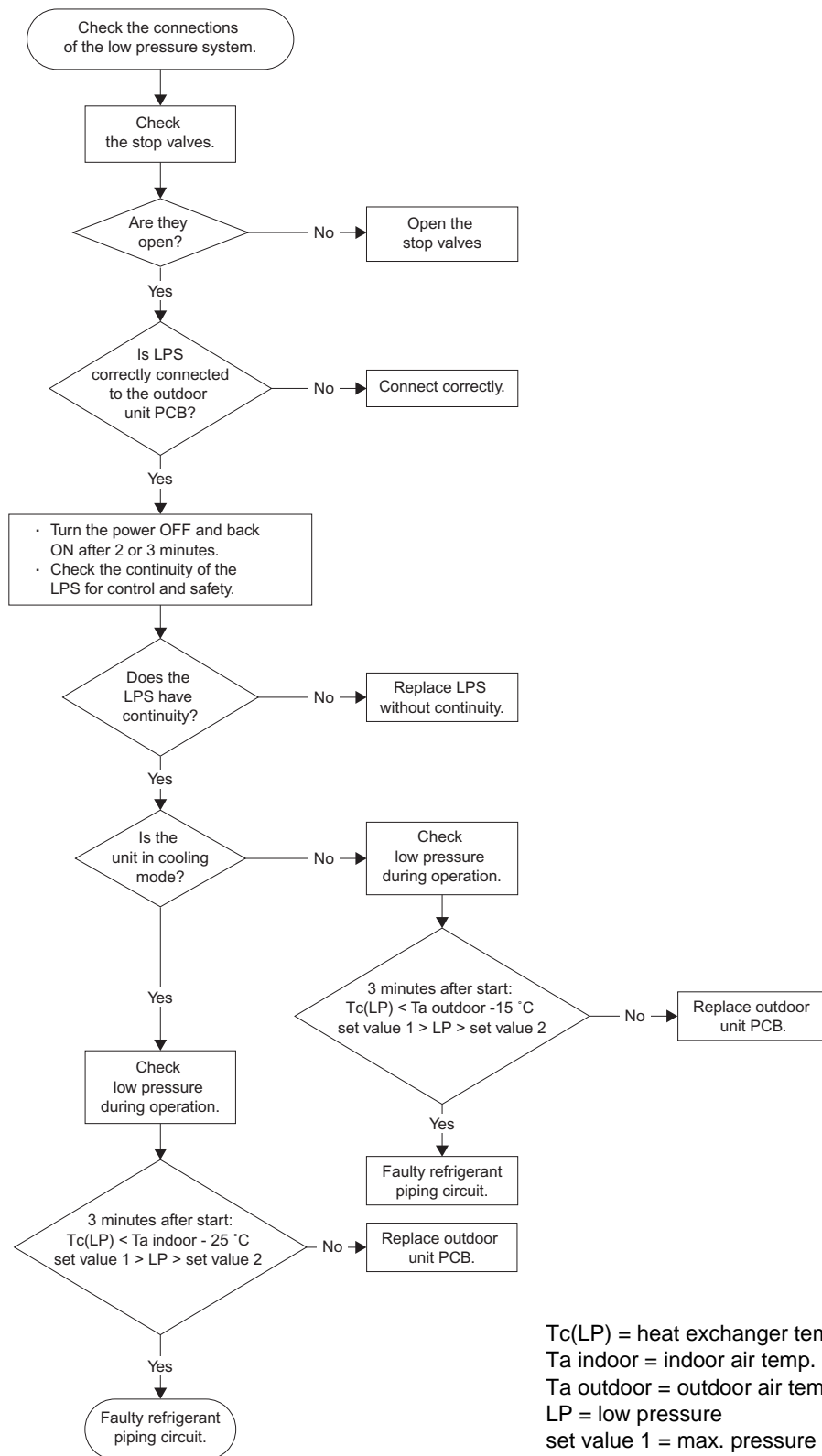
**LPS settings**

The table below contains the preset LPS values.

Applicable units	Abnormal	Reset
RR/RQ71~125B	< -0.3 bar	> +0.5 bar

## Troubleshooting

To troubleshoot, proceed as follows:



## Caution

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

### 3.6 Compressor Overcurrent (E6)

**Remote Controller  
Display**

E6

**Method of  
Malfunction  
Detection**

The input current value is detected with a current sensor.

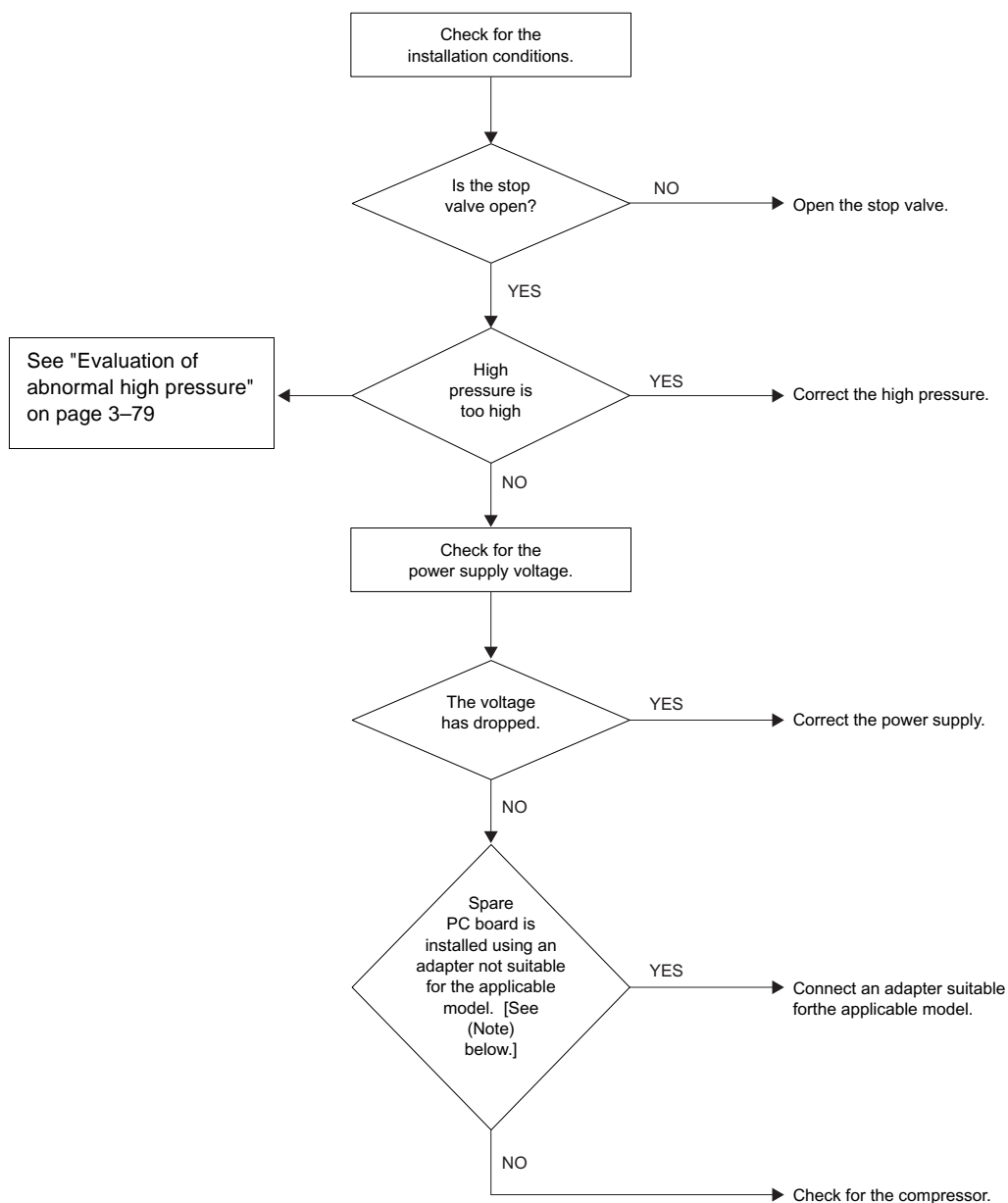
**Malfunction  
Decision  
Conditions**

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

**Possible Causes**

- High pressure increased too high
- Voltage drop
- Stop valves are not opened
- Faulty compressor (compressor lock)

## Troubleshooting



### Caution

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

### Note

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

Approximate Input current value:

		Input current value
RQ(RR)71B7V3B	JT90G-V1N	25.3
RQ(RR)71B7W1B	JT90G-YE	11.5
RQ(RR)100B7V3B	JT125G-V1N	38.0
RQ(RR)100B7W1B	JT125G-YE	11.5
RQ(RR)125B7W1B	JT160G-YE	15.0



### 3.7 Malfunctioning Electronic Expansion Valve (E9)

**Error code** E9

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

**Resistance values** The table below contains the reference resistance values.

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

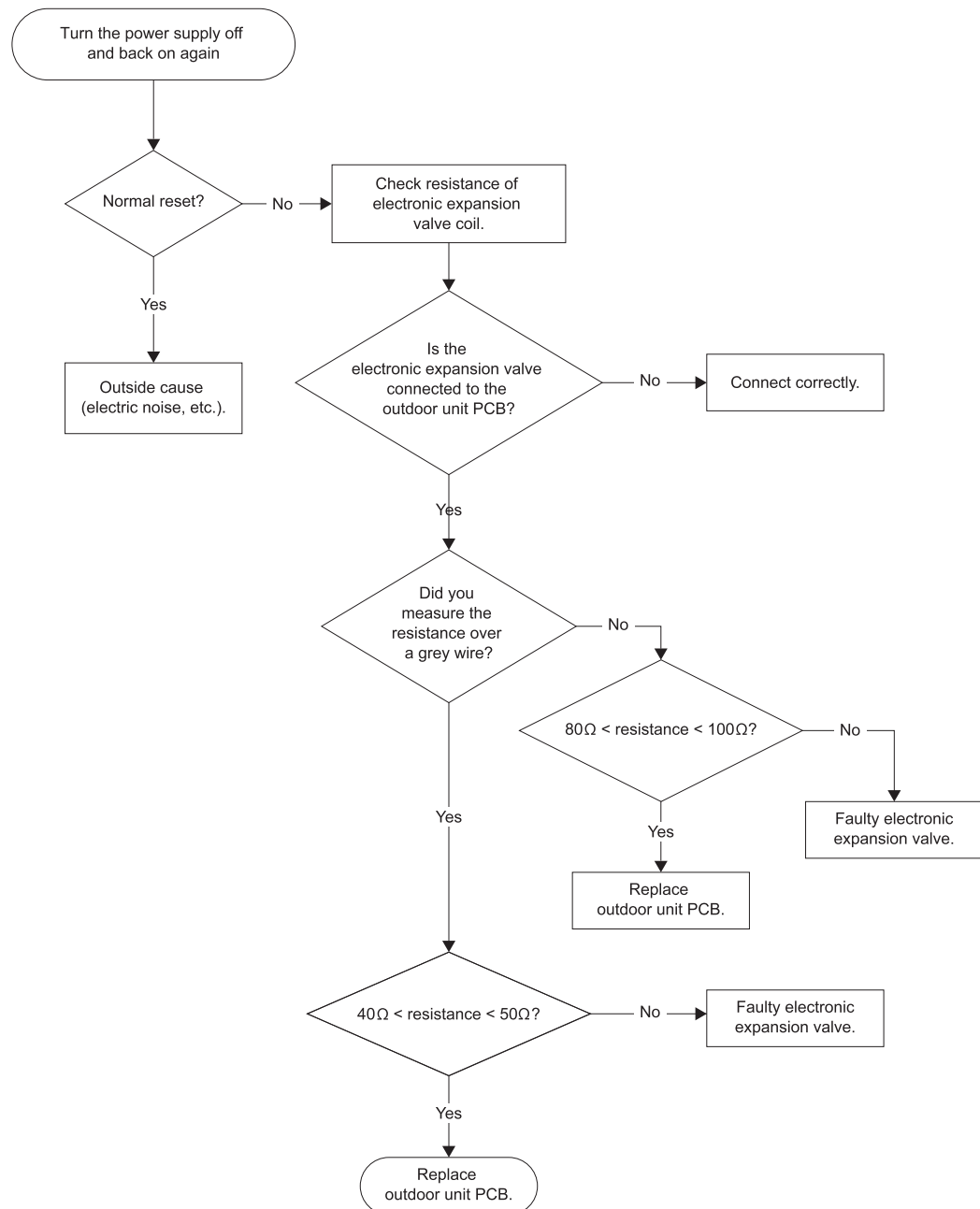
**Causes**

The possible causes are:

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

## Troubleshooting

To troubleshoot, proceed as follows:



## Caution

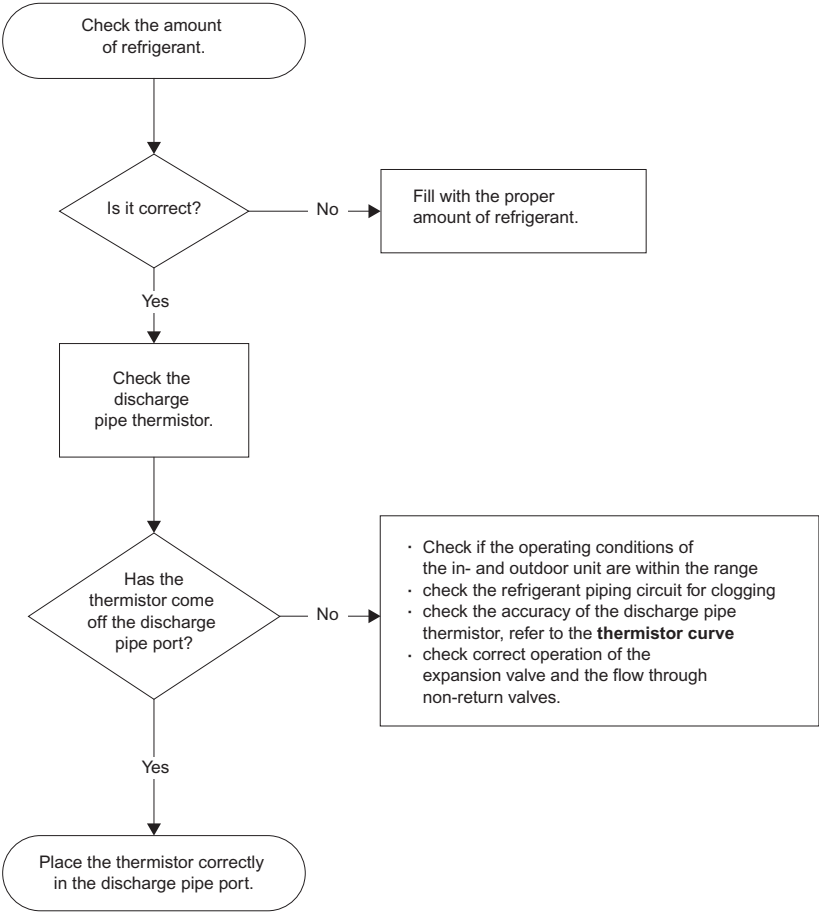
Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

3.8 Malfunctioning in Discharge Pipe Temperature (F3)

Error code	F3
Error generation	<p>The error is generated when:</p> <ul style="list-style-type: none"><li>➤ Discharge pipe temperature becomes abnormally high</li><li>➤ Discharge pipe temperature rises suddenly</li><li>➤ Discharge pipe thermistor is not in its holder.</li></ul>
Causes	<p>The possible causes are:</p> <ul style="list-style-type: none"><li>➤ Improper refrigerant amount</li><li>➤ Clogging refrigerant piping circuit</li><li>➤ Discharge temperature that is too low due to too much refrigerant or due to the discharge thermistor being out of its holder</li><li>➤ Electronic expansion valve coil is disconnected from valve body</li><li>➤ Discharge temperature that is too high. The possible causes are:</li></ul> <div><div>Excessively high discharge temperature</div><div>caused by</div><div>Refrigeration shortage</div><div>caused by</div><div><div>insufficient suction gas to compressor</div><div>incorrect operation of expansion valve</div></div><div>caused by</div><div><div>• electrical fault coil</div><div>• mechanical fault body</div><div>• discharge thermistor inaccuracy</div></div></div>

Troubleshooting

To troubleshoot, proceed as follows:



Thermistor curve

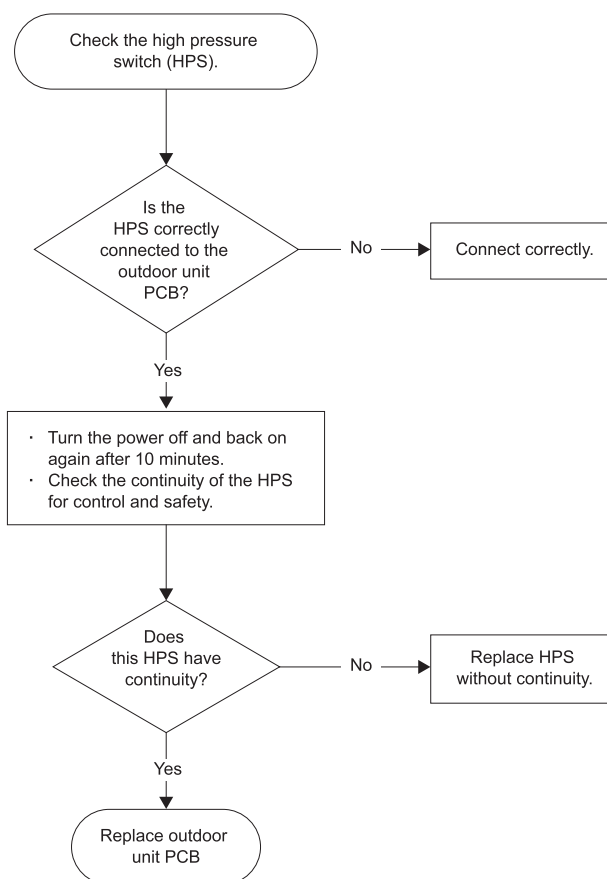
See page 3-78.

Caution

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

### 3.9 Malfunctioning HPS (H3)

Error code	H3
Error generation	The error is generated when there is no continuity in the high-pressure switch during compressor OFF.
Causes	<p>The possible causes are:</p> <ul style="list-style-type: none"> <li>➤ Malfunctioning high-pressure switch</li> <li>➤ Broken or disconnected high-pressure switch harness</li> <li>➤ Malfunctioning high-pressure switch connector connection</li> <li>➤ Malfunctioning outdoor unit PCB.</li> </ul>
Troubleshooting	To troubleshoot, proceed as follows:



Caution	Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.
---------	---

### 3.10 Malfunctioning Outdoor Thermistor System (H9)

**Error code** H9

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

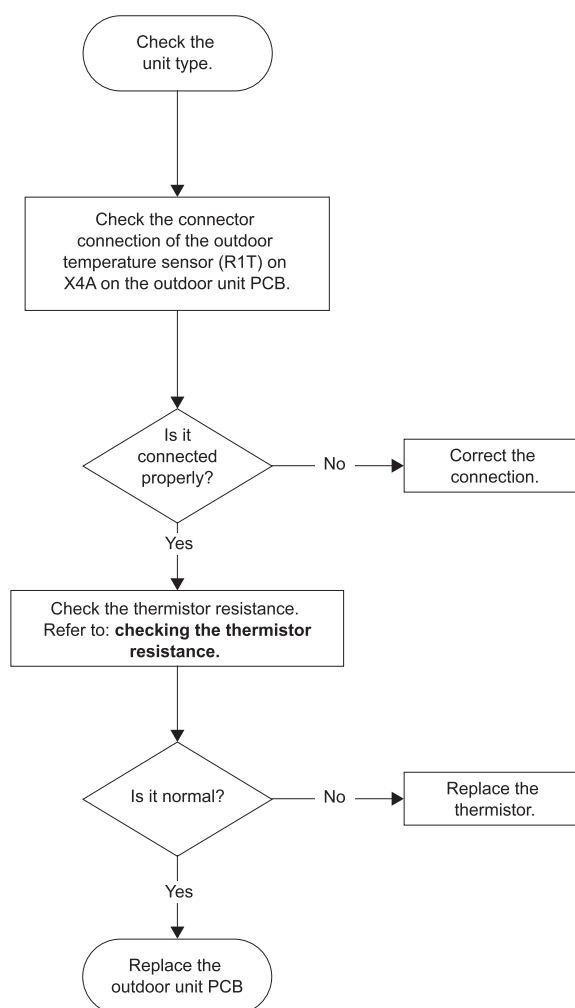
**Causes**

The possible causes are:

- Malfunctioning outdoor thermistor
- Malfunctioning outdoor thermistor connector connection
- Malfunctioning outdoor unit PCB.

**Troubleshooting**

To troubleshoot, proceed as follows:



**Checking the thermistor resistance**

See page 3-77.

**Caution**

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

### 3.11 Malfunctioning Discharge Pipe Thermistor System (J3)

**Error code** J3

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

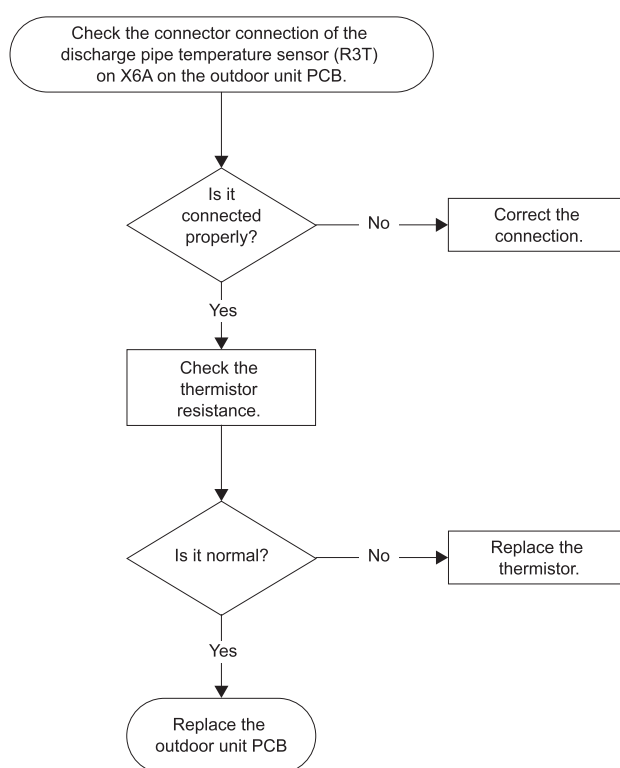
**Causes**

The possible causes are:

- Malfunctioning discharge pipe thermistor
- Malfunctioning discharge pipe thermistor connector connection
- Malfunctioning outdoor unit PCB.

**Troubleshooting**

To troubleshoot, proceed as follows:



**Caution**

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

### 3.12 Malfunctioning Heat Exchanger Thermistor System (J6)

**Error code** J6

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

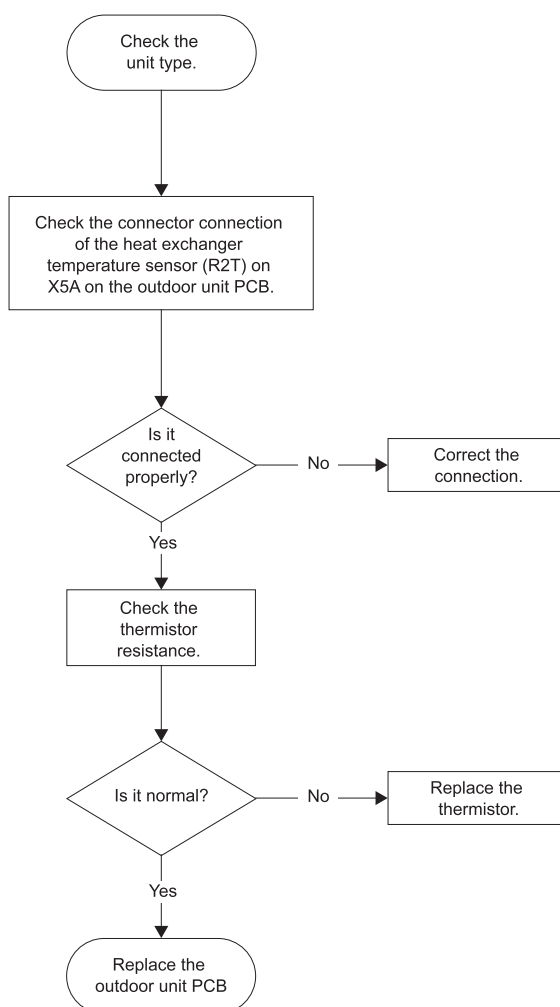
**Causes**

The possible causes are:

- Malfunctioning heat exchanger thermistor
- Malfunctioning heat exchanger thermistor connector connection
- Malfunctioning outdoor unit PCB.

**Troubleshooting**

To troubleshoot, proceed as follows:



**Caution**

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.



### 3.13 Malfunction of Current Sensor System (J2)

Remote Controller  
Display

J2

Method of  
Malfunction  
Detection

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

Malfunction  
Decision  
Conditions

**While in operation:**

When the current detected with the current sensor is not more than a constant value.

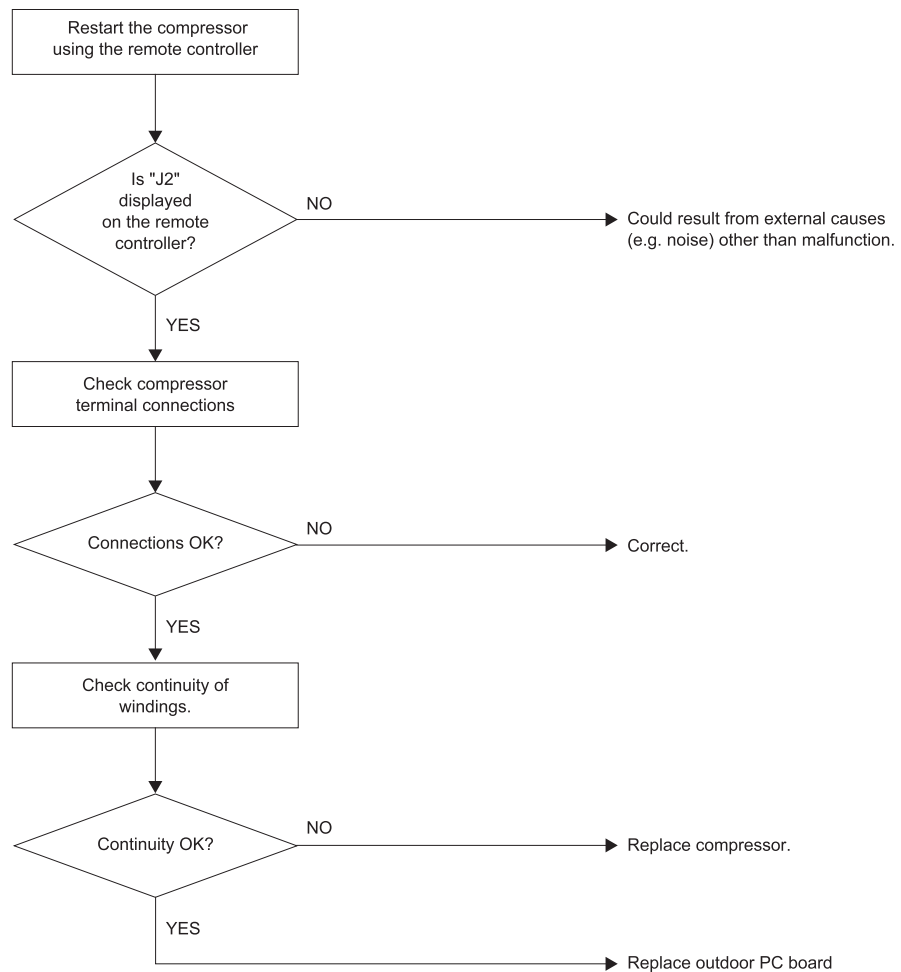
**While in stopping:**

When the current detected with the current sensor is not less than a constant value.

Possible Causes

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

Troubleshooting



**Caution**

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

### 3.14 Failure of Capacity Setting (P<sub>U</sub>)

Remote Controller  
Display

P<sub>U</sub>

Method of  
Malfunction  
Detection

Check whether set value (i.e., factory set value) written in E<sup>2</sup>PROM or set value with the (replaced) capacity setting adaptor (X26A) is the same as that of outdoor unit capacity.

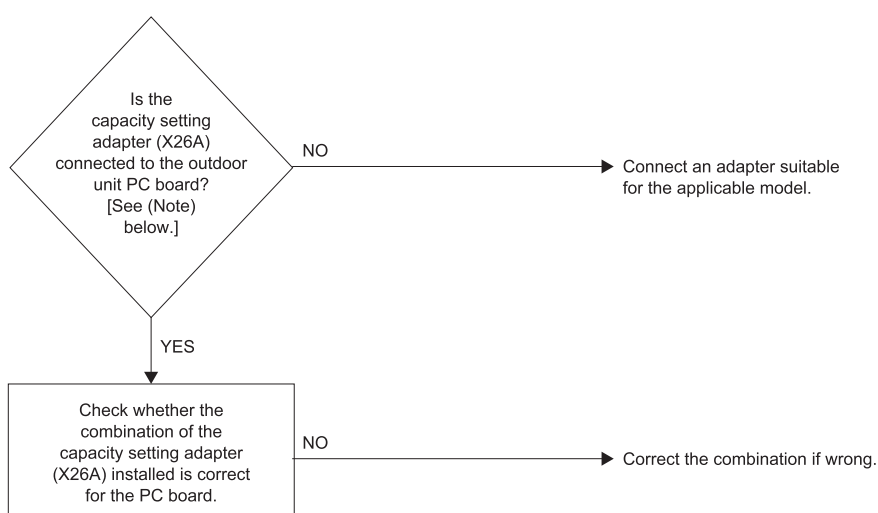
Malfunction  
Decision  
Conditions

When the set value with the E<sup>2</sup>PROM differs from that of the outdoor unit capacity or any capacity setting adaptor other than that suitable for the applicable PC board is installed. (However, the failure decision is made only when the power supply is turned on.)

Possible Causes

- Improper set value with E<sup>2</sup>PROM
- Improper capacity setting adaptor installed
- Faulty outdoor unit PC board

Troubleshooting



Caution

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

Notes

- The capacity setting adaptor is not connected at the time of shipment from factory. (The capacity is written in the E<sup>2</sup>PROM.) This capacity setting adaptor is required only when the PC board is replaced with a spare PC board.
- Refer to instructions on how to set Spare Part outdoor PC board on page 4-18.



# 4 Error Codes: System Malfunctions

## 4.1 What Is in This Chapter?

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

**Overview** This chapter contains the following topics:

Topic	See page
4.2–Gas Shortage Detection (UO)	3–62
4.3–Reverse Phase (U1)	3–63
4.4–Transmission Error between Indoor and Outdoor Unit (U4 or UF)	3–65
4.5–Transmission Error between Indoor Unit and Remote Controller (U5)	3–67
4.6–Transmission Error between MAIN Remote Controller and SUB Remote Controller (U8)	3–68
4.7–Malfunctioning Field Setting Switch (UA)	3–69

## 4.2 Gas Shortage Detection (U0)

**Error code** U0

**Error method** The discharge pipe thermistor detects the malfunction temperature at which there can be a gas shortage. If the discharge temperature exceeds 120°C during more than 20 s, the outdoor unit will stop and retry when the guard timer is OFF (3 min have passed).

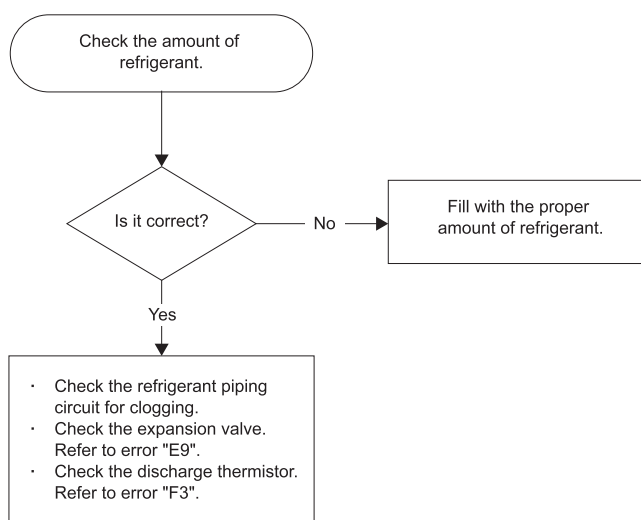
During the retrial, the expansion valve will be opened 90 pulses more than in case of the previous start. When the unit restarts with a fully opened expansion valve, the remote controller displays "U0" after pressing the test button.

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

**Causes** The possible causes are:

- Refrigerant shortage
- Clogging of the refrigerant piping circuit.

**Troubleshooting** To troubleshoot, proceed as follows:



**Caution** Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

### 4.3 Reverse Phase (U1)

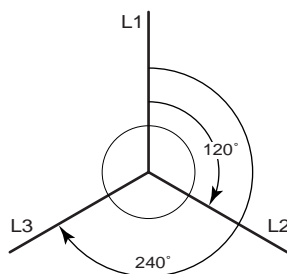
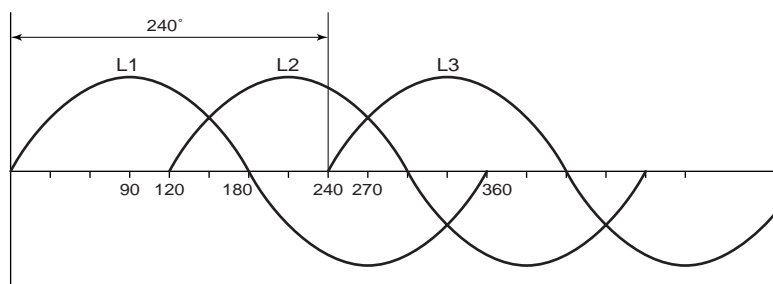
**Error code**

U1

This error code is only for 3-phase equipment.

**Error generation**

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

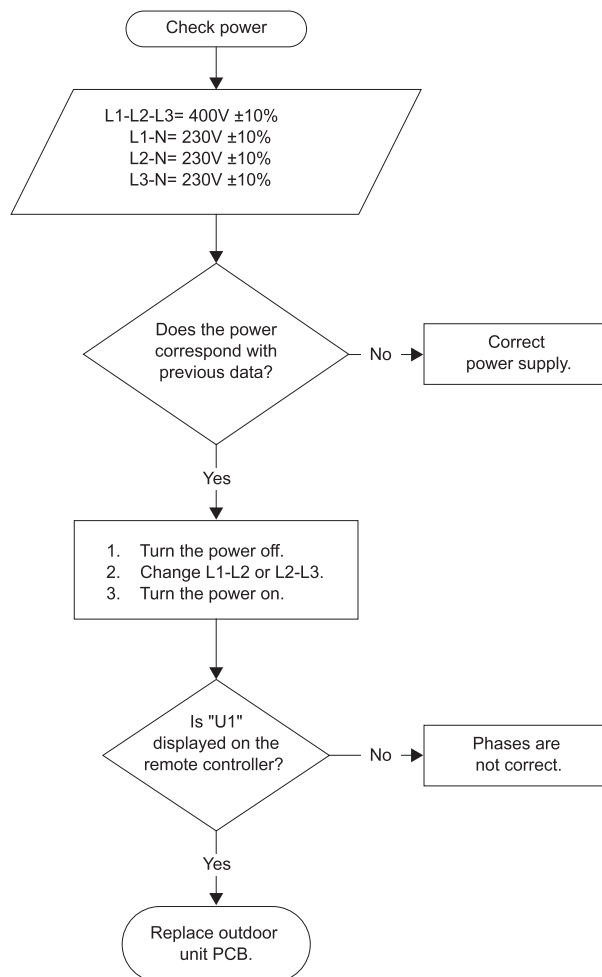
**Causes**

The possible causes are:

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

### Troubleshooting

To troubleshoot, proceed as follows:



### Caution

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.



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

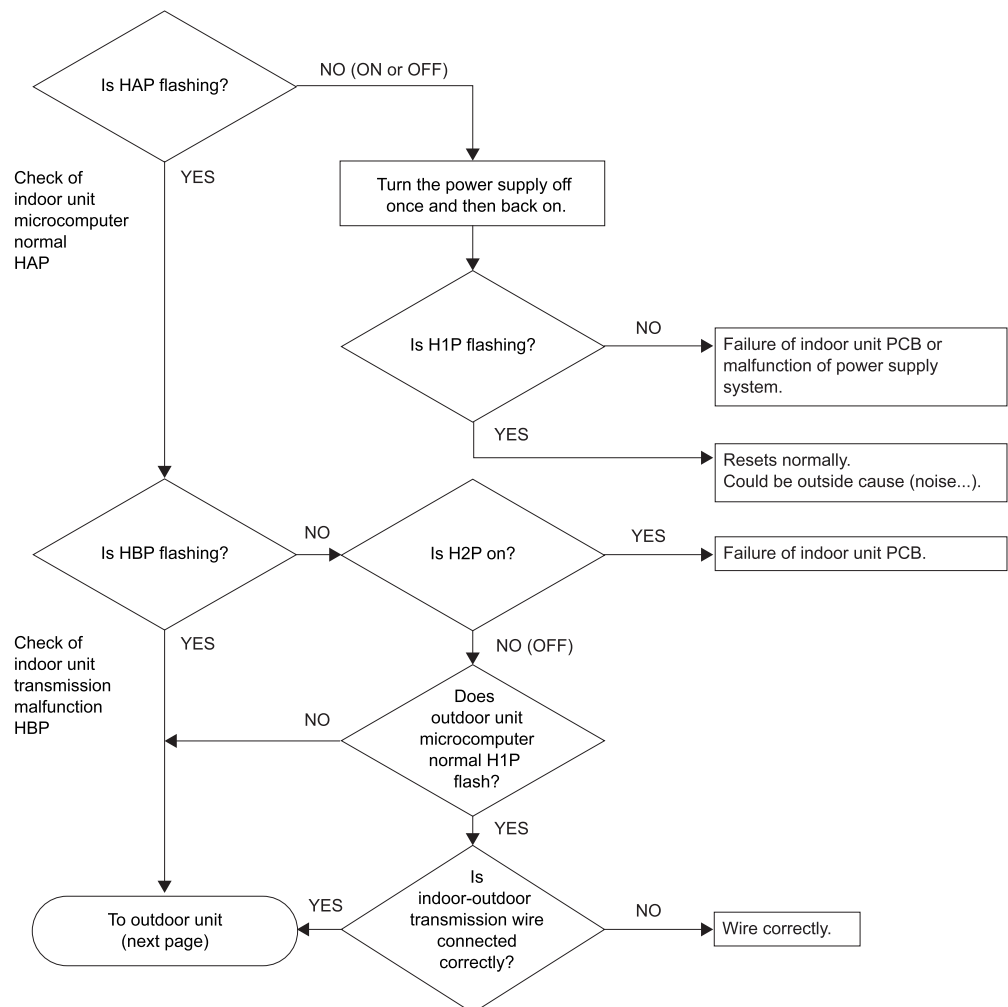
**Error code** U4 or UF

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

**Causes** The possible causes are:

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

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

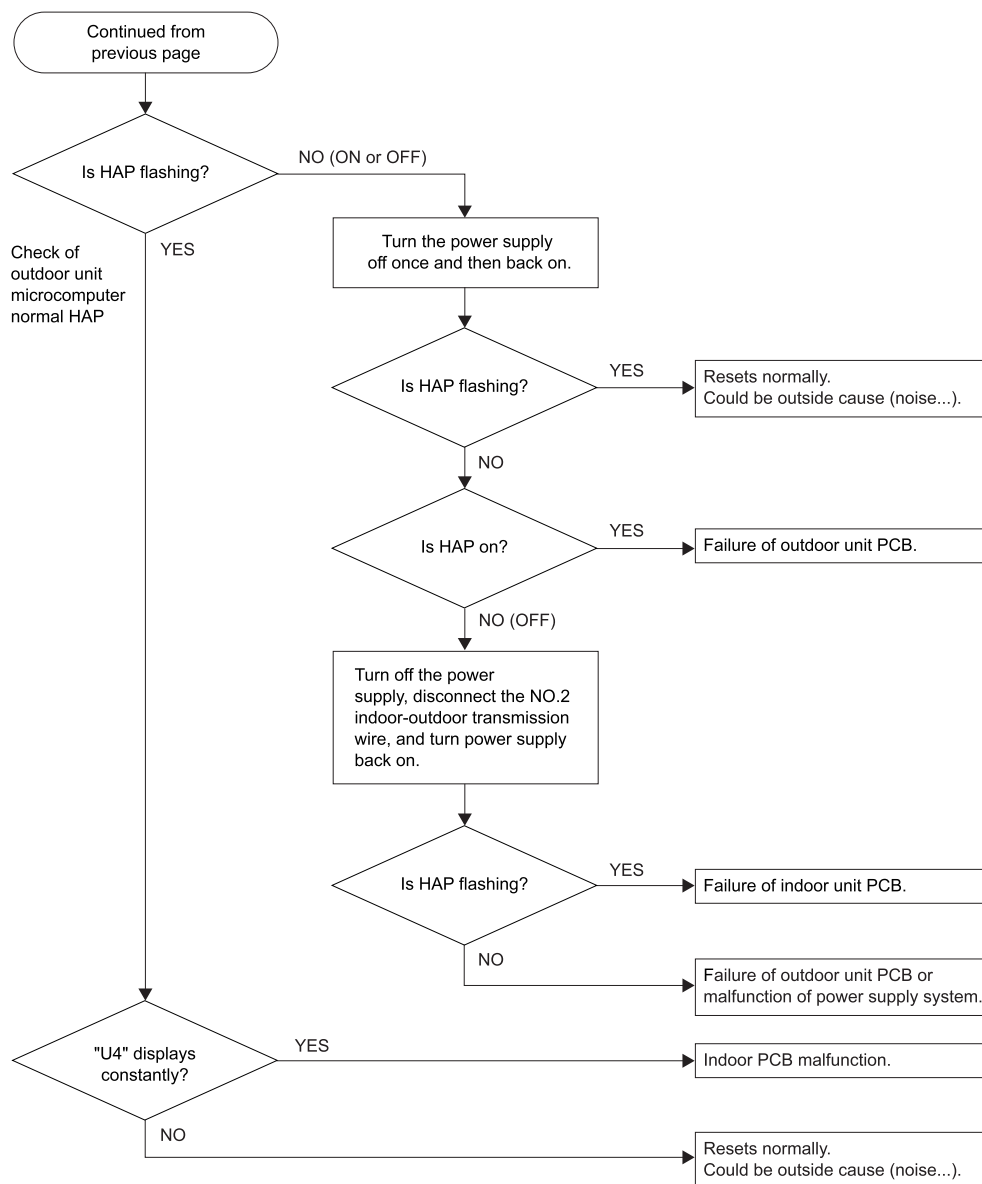


### Caution

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

## Troubleshooting 2

To troubleshoot, proceed as follows:

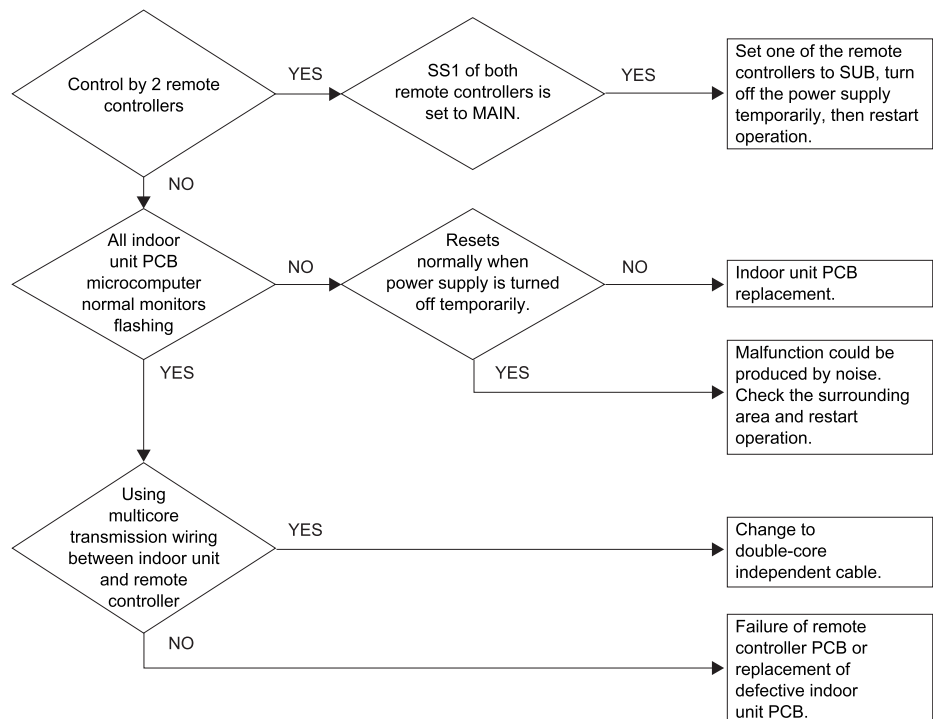


### Caution

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

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

Error code	U5
Error generation	The error is generated when the microprocessor detects that the transmission between the indoor unit and the remote controller is not normal over a certain amount of time.
Causes	<p>The possible causes are:</p> <ul style="list-style-type: none"> <li>➤ Malfunctioning remote controller</li> <li>➤ Malfunctioning indoor PCB</li> <li>➤ Outside cause (noise...)</li> <li>➤ Connection of two master remote controllers (when using two remote controllers).</li> </ul>
Troubleshooting	To troubleshoot, proceed as follows:



Caution	Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.
---------	---

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

**Error code** U8

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

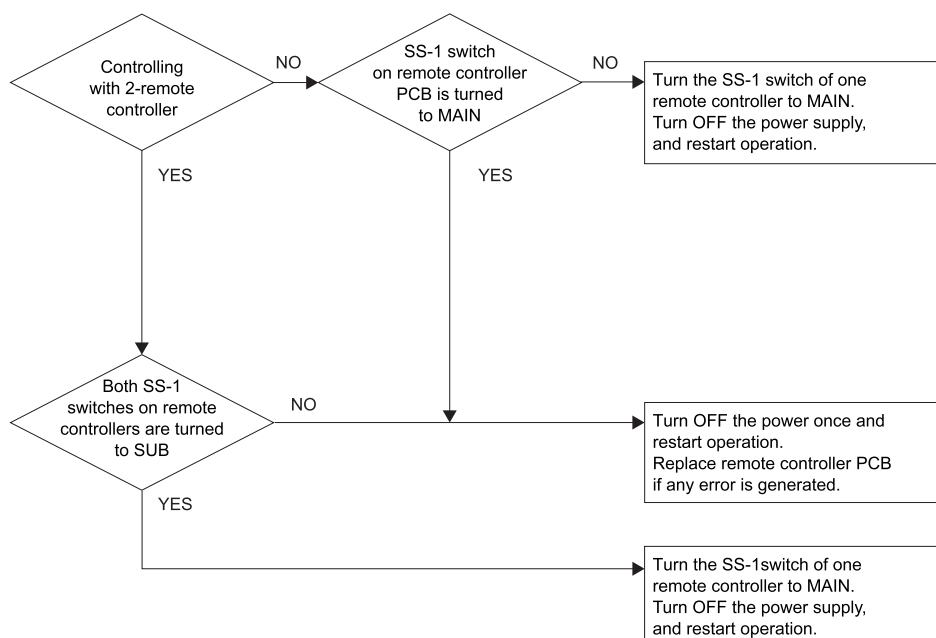
### Causes

The possible causes are:

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

### Troubleshooting

To troubleshoot, proceed as follows:



### Caution

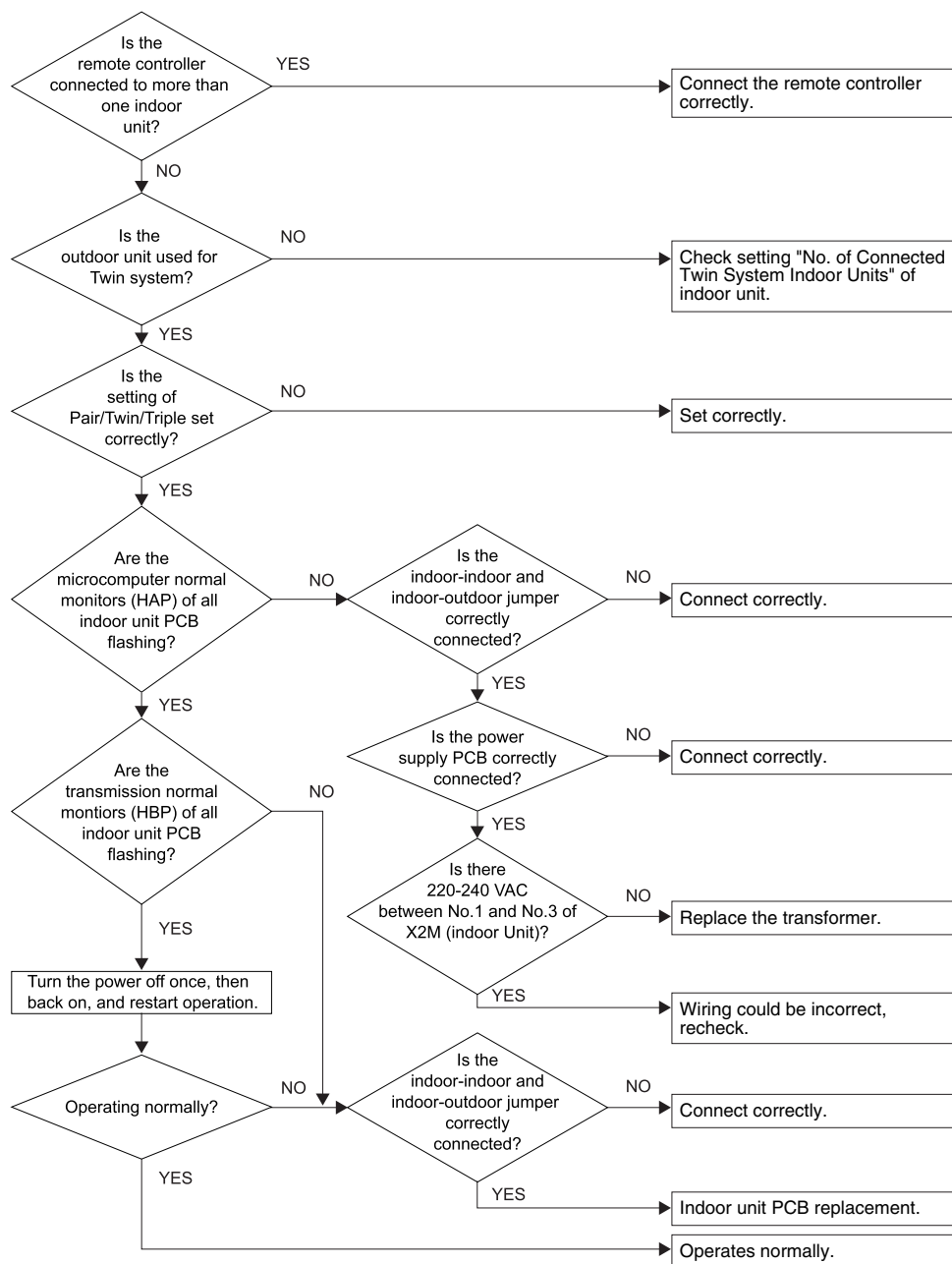
Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

## 4.7 Malfunctioning Field Setting Switch (UR)

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

## Troubleshooting

To troubleshoot, proceed as follows:



## Caution

Be sure to turn off power switch before connecting or disconnecting the connector, or parts damage may occur.

## 5 Additional Checks for Troubleshooting

### 5.1 What Is in This Chapter?

#### Introduction

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

#### Overview

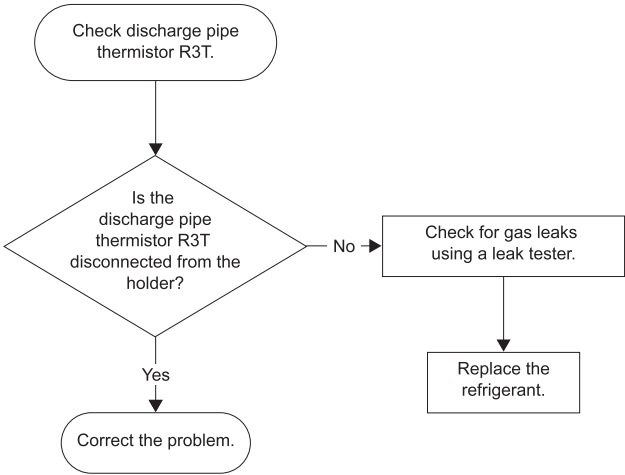
This chapter contains the following topics:

Topic	See page
5.2—Checking the Refrigerant System	3-72
5.3—Checking the Installation Condition	3-73
5.4—Checking the Expansion Valve	3-74
5.5—Checking the Thermistors	3-76
5.6—R1T and R2T	3-77
5.7—R3T	3-78
5.8—Evaluation of abnormal high pressure	3-79
5.9—Evaluation of abnormal low pressure	3-80
5.10—Check for Clogged Points	3-81

5.2 Checking the Refrigerant System

Checking

To check the refrigerant system, proceed as follows:

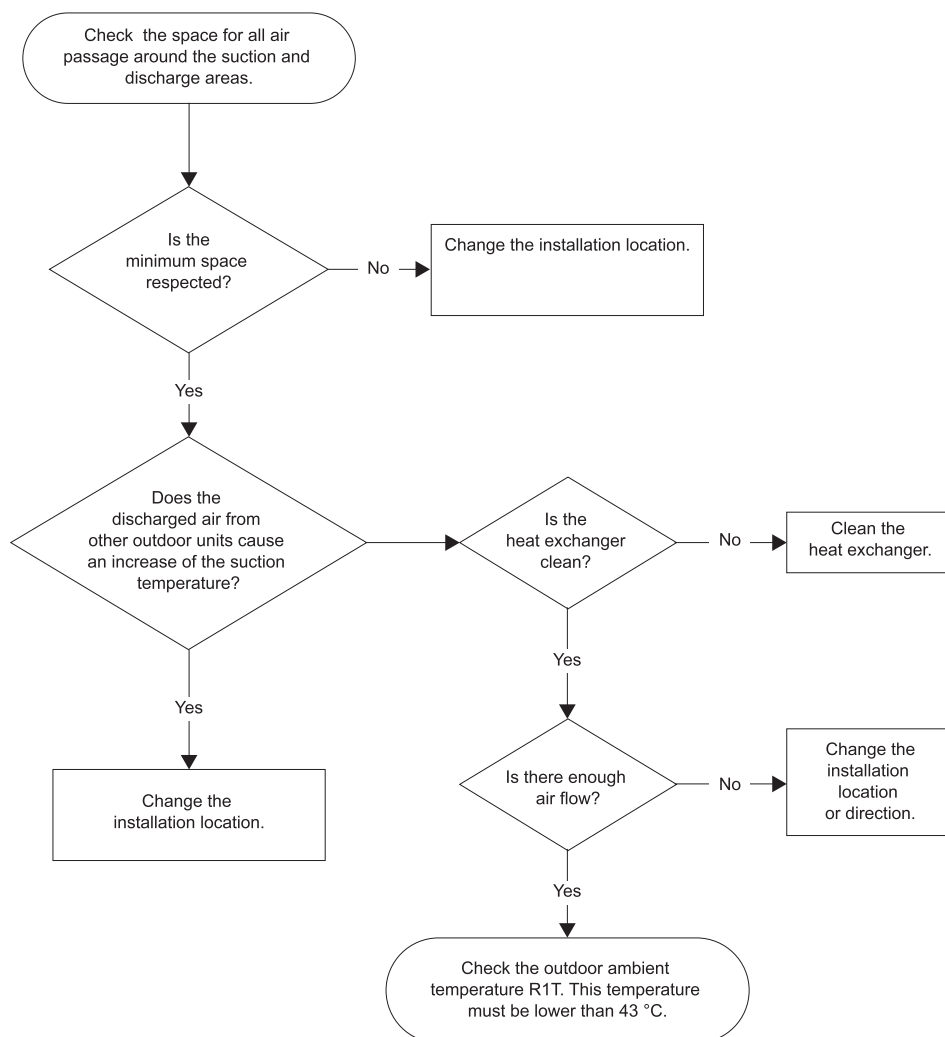




## 5.3 Checking the Installation Condition

### Checking

To check the installation condition, proceed as follows:



## 5.4 Checking the Expansion Valve

### Checking

To check the electronic expansion valve, proceed as follows:

Step	Action																																																																																																		
1	Check if the expansion valve connector is correctly inserted in the X24A of PCB 1.																																																																																																		
2	Compare the expansion valve unit with the number of the connector to make sure it is correctly connected.																																																																																																		
3	Switch the power OFF.																																																																																																		
4	Switch the power ON to check whether the expansion valve is producing a clicking sound. <table><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>	If...	Then...	The expansion valve has no clicking sound	Disconnect the valve connector without the clicking sound and proceed to step 5.																																																																																														
If...	Then...																																																																																																		
The expansion valve has no clicking sound	Disconnect the valve connector without the clicking sound and proceed to step 5.																																																																																																		
5	<p>Check the coil current: Open circuit &lt; normal &lt; short circuit</p> <p>The table below contains the reference resistance values for the 71 class.</p> <table><tr><th></th><th>Red</th><th>Brown</th><th>Blue</th><th>Orange</th><th>Yellow</th><th>White</th></tr><tr><th>Red</th><td>—</td><td>∞</td><td>∞</td><td>45 Ω</td><td>∞</td><td>45 Ω</td></tr><tr><th>Brown</th><td>∞</td><td>—</td><td>45 Ω</td><td>∞</td><td>45 Ω</td><td>∞</td></tr><tr><th>Blue</th><td>∞</td><td>45 Ω</td><td>—</td><td>∞</td><td>90 Ω</td><td>∞</td></tr><tr><th>Orange</th><td>45 Ω</td><td>∞</td><td>∞</td><td>—</td><td>∞</td><td>90 Ω</td></tr><tr><th>Yellow</th><td>∞</td><td>45 Ω</td><td>90 Ω</td><td>∞</td><td>—</td><td>∞</td></tr><tr><th>White</th><td>45 Ω</td><td>∞</td><td>∞</td><td>90 Ω</td><td>∞</td><td>—</td></tr></table> <p>The table below contains the reference resistance values for the 100/125 class.</p> <table><tr><th></th><th>Orange</th><th>Red</th><th>Yellow</th><th>Black</th><th>Gray</th><th>White</th></tr><tr><th>Orange</th><td>—</td><td>∞</td><td>90 Ω</td><td>∞</td><td>45 Ω</td><td>∞</td></tr><tr><th>Red</th><td>∞</td><td>—</td><td>∞</td><td>90 Ω</td><td>∞</td><td>45 Ω</td></tr><tr><th>Yellow</th><td>90 Ω</td><td>∞</td><td>—</td><td>∞</td><td>45 Ω</td><td>∞</td></tr><tr><th>Black</th><td>∞</td><td>90 Ω</td><td>∞</td><td>—</td><td>∞</td><td>45 Ω</td></tr><tr><th>Gray</th><td>45 Ω</td><td>∞</td><td>45 Ω</td><td>∞</td><td>—</td><td>∞</td></tr><tr><th>White</th><td>∞</td><td>45 Ω</td><td>∞</td><td>45 Ω</td><td>∞</td><td>—</td></tr></table>		Red	Brown	Blue	Orange	Yellow	White	Red	—	∞	∞	45 Ω	∞	45 Ω	Brown	∞	—	45 Ω	∞	45 Ω	∞	Blue	∞	45 Ω	—	∞	90 Ω	∞	Orange	45 Ω	∞	∞	—	∞	90 Ω	Yellow	∞	45 Ω	90 Ω	∞	—	∞	White	45 Ω	∞	∞	90 Ω	∞	—		Orange	Red	Yellow	Black	Gray	White	Orange	—	∞	90 Ω	∞	45 Ω	∞	Red	∞	—	∞	90 Ω	∞	45 Ω	Yellow	90 Ω	∞	—	∞	45 Ω	∞	Black	∞	90 Ω	∞	—	∞	45 Ω	Gray	45 Ω	∞	45 Ω	∞	—	∞	White	∞	45 Ω	∞	45 Ω	∞	—
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White	∞	45 Ω	∞	45 Ω	∞	—																																																																																													

Step	Action
6	Check the clicking sound again.

### 5.5 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 4.

**Overview of thermistors**

The table below contains an overview of the thermistors:

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

**Checking**

To check the thermistors, proceed as follows:

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

## 5.6 R1T and R2T

### Temperature – resistance

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

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

5.7 R3T

Temperature – resistance

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

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

## 5.8 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.

## 5.9 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

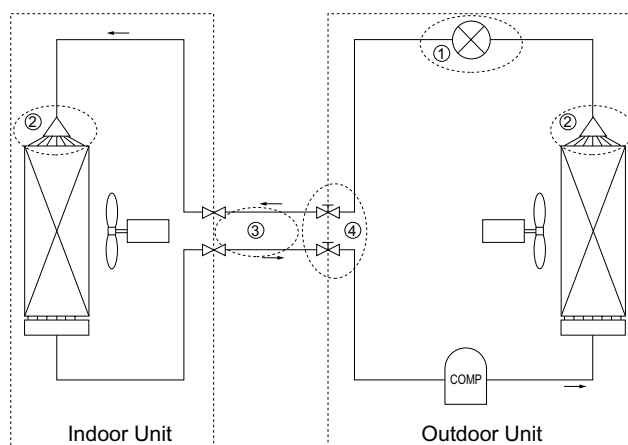
Check items (Possible causes)	Judgment
Does the outdoor unit fan run normally?	Visual inspection
Is the outdoor unit heat exchanger clogged?	Visual inspection
Is the outdoor unit installed under such conditions that short circuit easily occurs?	Visual inspection
Is there clogging before or after the 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.



## 5.10 Check for Clogged Points

### Checks

Temperature differences must occur before or after the clogged points!



Check points		Check factor	Causes	Remedies
1	Around expansion mechanism	Temperature difference	<ul style="list-style-type: none"> <li>➤ Dust</li> <li>➤ Choked moisture</li> <li>➤ Reduced effective pipe diameter due to adherent contamination, etc.</li> </ul>	Replace the expansion valve.
2	Distributor	Temperature difference	<ul style="list-style-type: none"> <li>➤ Dust</li> <li>➤ Choked moisture</li> <li>➤ Reduced effective pipe diameter due to adherent contamination, etc.</li> </ul>	Replace the heat exchanger or distributor.
3	Field piping	Temperature difference	<ul style="list-style-type: none"> <li>➤ Collapsed pipe</li> </ul>	Replace the pipe.
4	Stop valve	Temperature difference	<ul style="list-style-type: none"> <li>➤ The stop valve is not fully open.</li> </ul>	Open the stop valve fully.

3

# Part 4

## Commissioning and Test Run

What is in this part?

This part contains the following chapters:

Chapter	See page
1–Pre-Test Run Checks	4–3
2–Field settings	4–9
3–Test Run and Operation Data	4–27

# 4

# 1 Pre-Test Run Checks

## 1.1 What Is in This Chapter?

### Introduction

This chapter contains the following information:

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

### Overview

This chapter contains the following topics:

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

## 1.2 Test Run Checks

### Checks before test run

Before carrying out a test run, proceed as follows:

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

### Test run checks

To carry out a test run, check the following:

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

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

1.3 Setting the Wireless Remote Controller

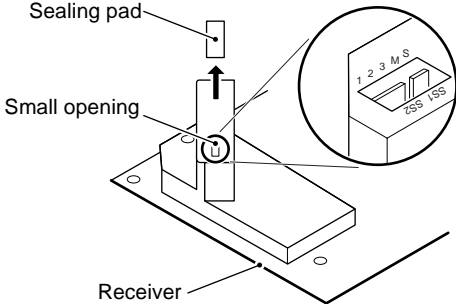















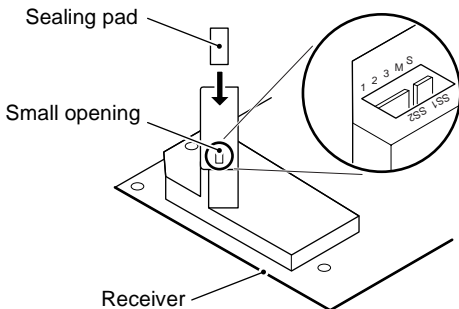
Introduction

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

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

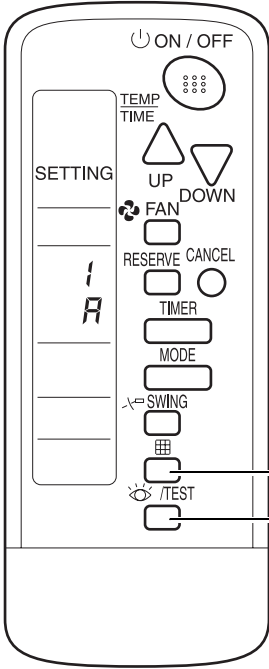
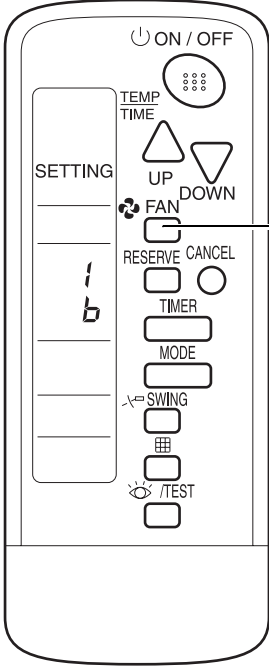
Setting the address for the receiver

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

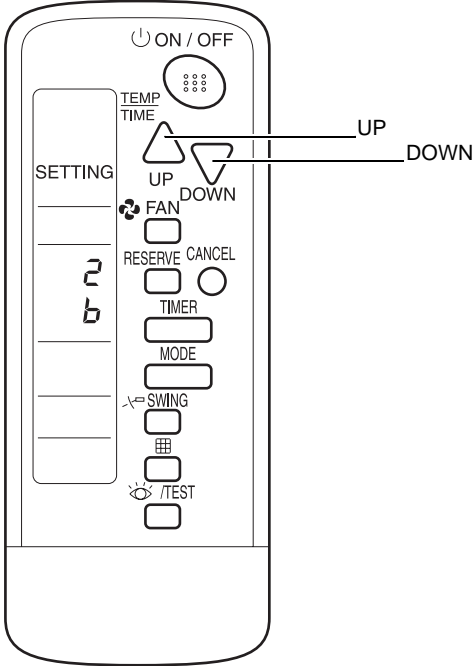
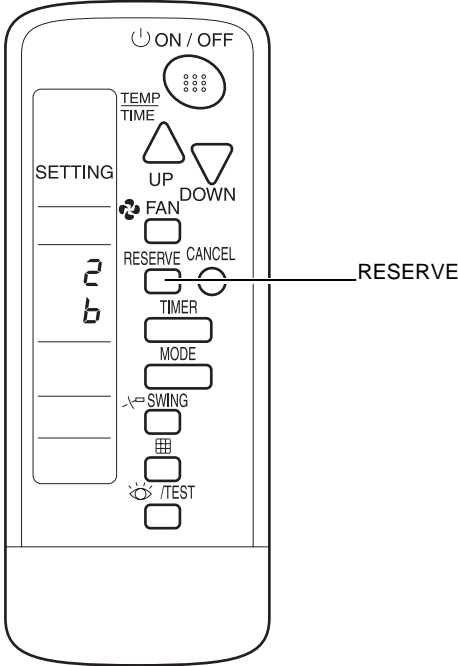
Step	Action								
1	Turn OFF the power.								
2	<p>Remove the sealing pad on the top of the receiver.</p> 								
3	<p>Set the wireless address switch (SS2) according to the table below. You can find the wireless address switch attached on the PCB of the receiver and it is visible through the small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

Setting the address for the wireless remote controller

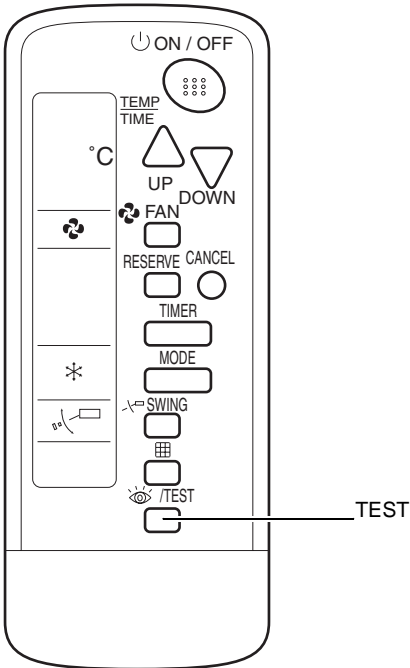
The address for the wireless remote controller is factory set to 1. To change this setting, proceed as follows:

Step	Action
1	<p>Hold down the FILTER RESET button and the TEST button for at least 4 s, to go to field set mode. The display indicates the field set mode.</p> <div><p>The diagram shows a remote control with a digital display showing '1 A'. The '1' is in the first line and 'A' is in the second line. The 'SETTING' label is to the left of the display. The 'FAN' button is highlighted with a circle. The 'FILTER RESET' button (a button with a grid icon) and the 'TEST' button (a button with a light icon) are both highlighted with circles and lines pointing to labels on the right. Other buttons visible include ON/OFF, TEMP TIME, UP, DOWN, RESERVE, CANCEL, TIMER, MODE, SWING, and a button with a fan icon.</p></div>
2	<p>Press the FAN button to select a multiple setting (A/b), see 'Multiple settings A/b' further in this section. Each time you press the button, the display switches between “A” and “b”.</p> <div><p>The diagram shows the same remote control, but the display now shows '1 b'. The 'FAN' button (a button with a fan icon) is highlighted with a circle and a line pointing to a label on the right. Other buttons visible include ON/OFF, TEMP TIME, UP, DOWN, RESERVE, CANCEL, TIMER, MODE, SWING, and a button with a light icon.</p></div>



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

4

Step	Action
5	<div>Press the TEST button to quit the field set mode and return to the normal display.</div> <div>A diagram of a remote control interface. It features a vertical column of buttons. From top to bottom, the buttons are: a power button labeled 'ON / OFF', a 'TEMP TIME' button, an 'UP' arrow button, a 'DOWN' arrow button, a 'FAN' button with a fan icon, a 'RESERVE' button, a 'CANCEL' button, a 'TIMER' button, a 'MODE' button, a 'SWING' button with a swing icon, and a 'TEST' button with an eye icon. A line points from the text 'TEST' to the 'TEST' button.</div>

Multiple settings  
A/b

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

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

## 2 Field settings

### 2.1 What Is in This Chapter?

#### Introduction

This chapter contains the following information:

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

#### Overview

This chapter contains the following topics:

Topic	See page
2.2—How to Change the Field Settings with the Wired Remote Controller	4-10
2.3—How to Change the Field Settings with the Wireless Remote Controller	4-12
2.4—Overview of the Field Settings of the Indoor Units	4-13
2.5—Overview of the Factory Settings of the Indoor Units	4-14
2.6—MAIN/SUB Setting when Using Two Remote Controllers	4-15
2.7—Setting the Centralized Group No.	4-16
2.8—Field settings when using a spare part PCB of Sky-Air B-series outdoor unit	4-18
2.9—The Field Setting Levels	4-21
2.10—Overview of the Field Settings: RR/RQ71~125B	4-24
2.11—Jumpers	4-25

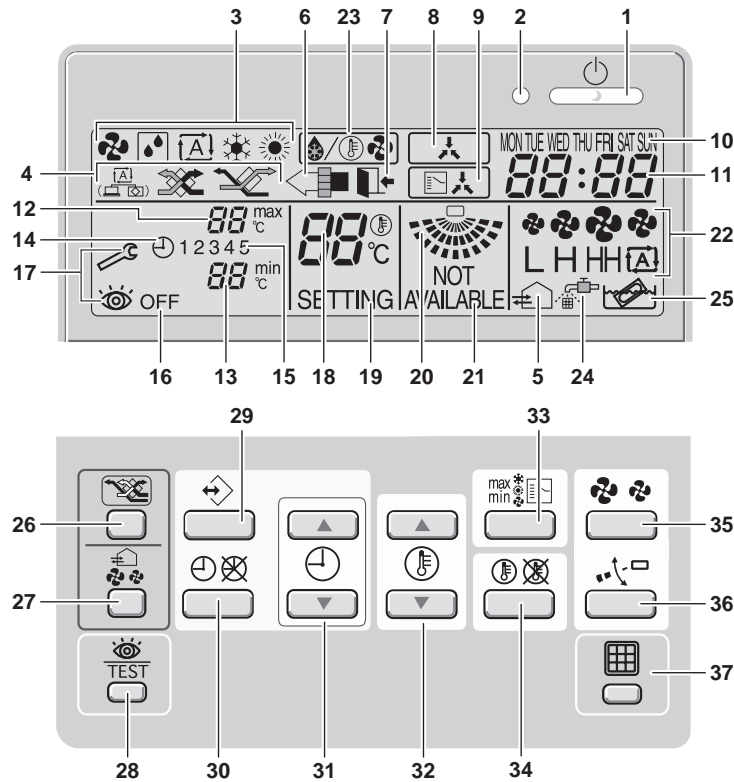
2.2 How to Change the Field Settings with the Wired Remote Controller

Installation conditions

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

Wired remote controller

The illustration below shows the wired remote controller.



Components

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

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

**Setting**

To set the field settings, you have to change:

- "Mode No."
- "First code No."
- "Second code No."

To change the field settings, proceed as follows:

Step	Action
1	Hold down the INSPECTION/TEST button for at least 4 s during normal mode to enter the "Field setting mode".
2	Press the TEMPERATURE CONTROL button until the desired "Mode No." appears.
3	<ul style="list-style-type: none"> <li>➤ 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.</li> <li>➤ 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.</li> </ul>
4	Press the upper part of the PROGRAMMING TIME button to select the "First code No."
5	Press the lower part of the PROGRAMMING TIME button to select the "Second code No".
6	Press the CONFIRMATION button to confirm the changed setting.
7	Press the INSPECTION/TEST button to return to "Normal mode".

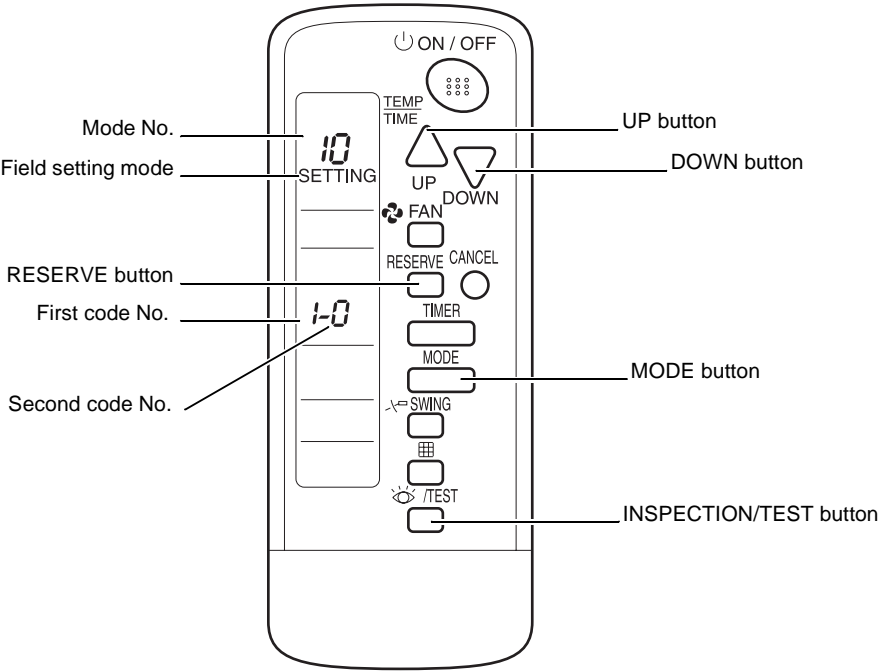
2.3 How to Change the Field Settings with the Wireless Remote Controller

Optional accessories

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

Wireless remote controller

The illustration below shows the wireless remote controller.



Setting

To set the field settings, you have to change:

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

To change the field settings, proceed as follows:

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

## 2.4 Overview of the Field Settings of the Indoor Units

### Field settings

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

Mode No.	First code No.	Description of the setting	Second code No.			
			01	02	03	04
10 or 20	0	Filter counter	Light contamination	heavy contamination	—	—
	1	Filter type	Long	Super long	External	Oil mist
	2	Remote thermistor of the remote controller	TH1 = rem. controller	TH1 = air return	—	—
	3	Filter display	Filter indic.	No filter indic.	—	—
11 or 21	0	Number indoor to 1 outdoor	Pair	Twin	Triple	Double twin
	1	Unified or indiv. set twin	Group setting	Indiv. setting	—	—
	2	Fan OFF at thermostat OFF	LL-speed	OFF	—	—
12 or 22	0	KRP1B51/52/53 X1/X2 output	Thermostat ON	Option	Operation	Malfunction
	1	EKRORO	Forced OFF	ON/OFF operation	—	—
	3	Fan speed heating thermostat OFF	LL-speed	Set speed	—	—
	5	Automatic restart	Disabled	Enabled	—	—
13 or 23	0	Ceiling height setting	Normal	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 installed).	4-way flow	3-way flow	2-way flow	—
	3	Horizontal discharge grill	Enabled	Disabled	—	—
	4	Air flow direction adjust range setting	Draft prevention	Standard	Ceiling soil prevention	—
	5	Field fan speed changeover air outlet (domestic only)	Standard	Option 1	Option 2	—
14 or 24	0	Additional timer to guard timer	0 s	5 s	10 s	15 s
	1	Permission level setting	Level 2	Level 3	—	—
1b (only when using BRC1D527)	1	Leave home function	Not permitted	Permitted	—	—
	2	Thermostat sensor in remote controller (for limit operation and leave home function only)	Use	Not use	—	—

2.5 Overview of the Factory Settings of the Indoor Units

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

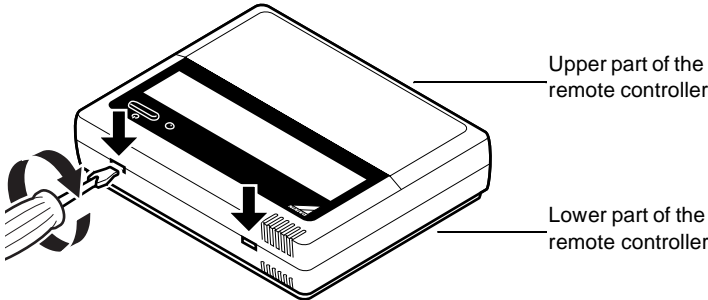
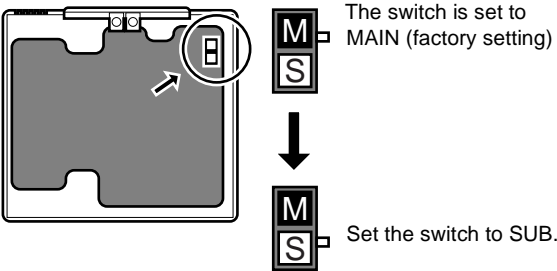
Mode No.	First code No.	Second code No.						
		FCQ	FFQ	FBQ	FAQ	FDQ	FUQ	FHQ
10 or 20	0	01	01	01	01	01	01	01
	1	01	01	01	—	02	01	—
	2	02	02	02	—	02	02	02
	3	01	01	01	01	01	01	01
11 or 21	0	01	01	01	01	01	01	01
	1	01	01	01	01	01	01	01
	2	01	01	01	01	01	01	01
12 or 22	0	01	01	01	01	01	01	01
	3	01	01	01	—	—	—	—
	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 MAIN/SUB Setting when Using Two Remote Controllers

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

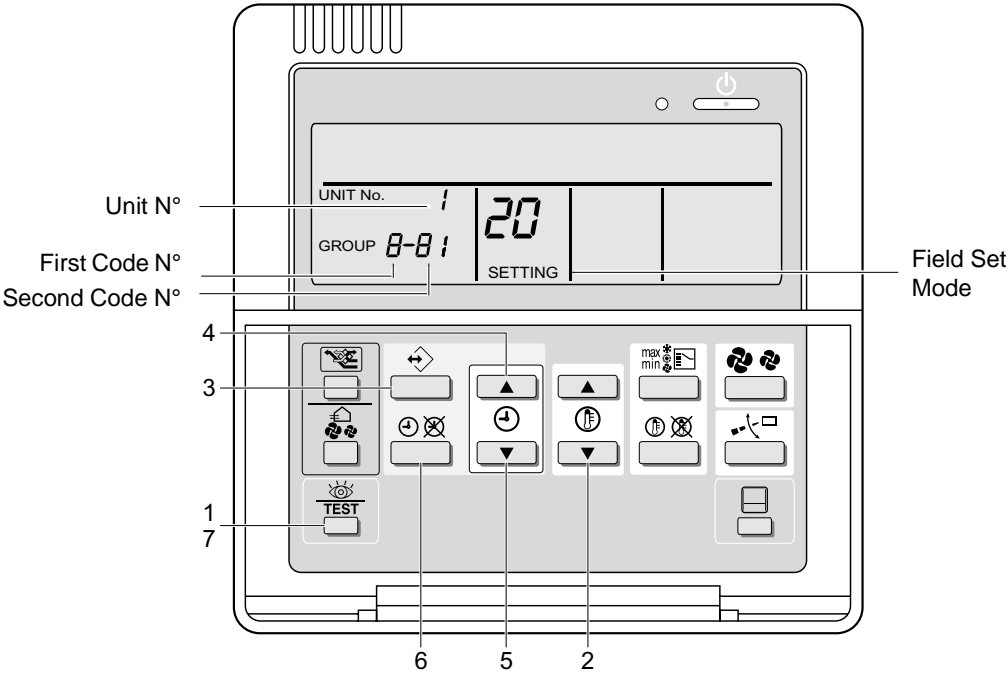
**Setting** The remote controllers are factory set to MAIN, so you only have to change one remote controller from MAIN to SUB. To change a remote controller from MAIN to SUB, proceed as follows:

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

2.7 Setting the Centralized Group No.

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

**Wired remote controller** The illustration below shows the wired remote controller.



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

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

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

**Note**

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

## 2.8 Field settings when using a spare part PCB of Sky-Air B-series outdoor unit

### When

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

### Required action

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

Attention on service!

- 1 Please be sure to work after turning off all related circuit breakers.
- 2 Before starting the work, please touch the metal part of the product to discharge static electricity.

The parts for replacement

1 The PCB ass'y

Accessories

1 Capacity setting adaptor

2 Connector for protection (Only RR/RQ71-100B7W1B)

3 Connector for short-circuit (Only RR/RQ71-100B7W1B)

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

The flow to setup the printed circuit board ass'y

<Please check the capacity of the unit.>

↓ Please attach the capacity setting adaptor (fig. 3) to X26A.  
(Refer to fig. 2 [Nr. 1])

<Is the model  
RQ/RR71-125B7W1B?>

No

<RQ/RR71-100B7V3B>

Yes

<Is the capacity of the unit 71 or  
100?>

No

<RQ/RR125B7W1B>

Yes

In the case of 71 or 100

Please attach 2 connectors of accessories to printed circuit board ass'y

- Please attach the connector for terminal protection to X15A. (Refer to fig. 2 [Nr. 2])
- Please attach a short circuit connector to X12A. (Refer to fig. 2 [Nr. 3])

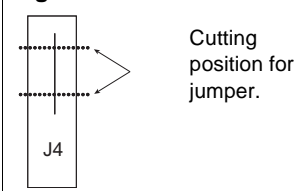
<Is it a C/O or H/P?>

H/P

C/O

↓ Please cut jumper J4, as shown in fig. 1 on this page.  
(Refer to fig. 2 [Nr. 4])

Figure 1



<Replacement of the PCB ass'y>

**<Replacement of the PCB ass'y>**

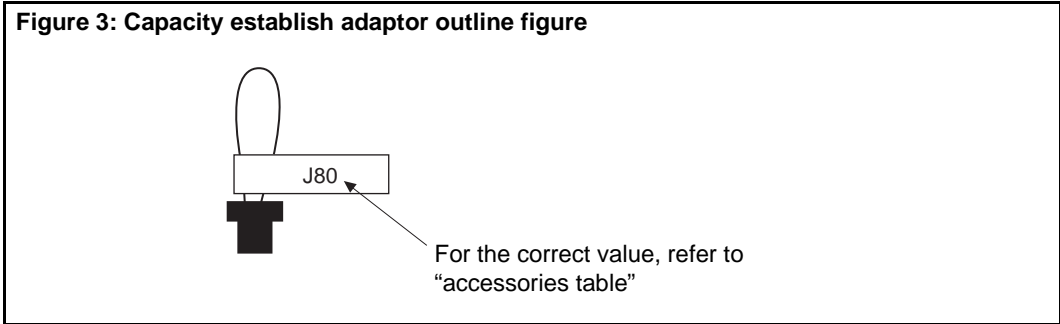
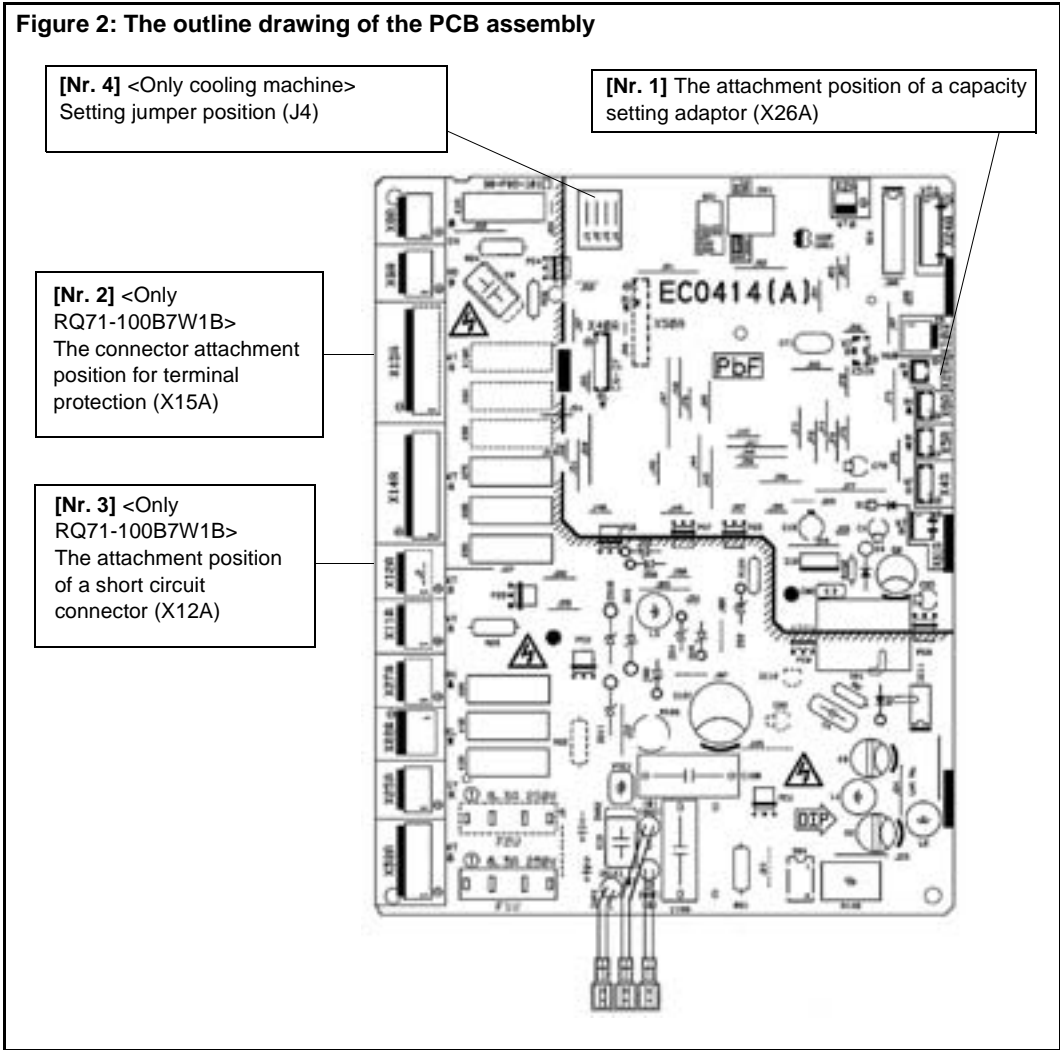
(CAUTION)

**How to exchange PCB ass'y from a resin case:**

- 1 Resin cover is removed.
- 2 All connectors are removed.
- 3 Three hooks on the left side of a resin case are moved and PCB ass'y is removed. Beware not to damage the CT wire (yellow wire).
- 4 PCB ass'y is exchanged.
- 5 Please reconnect all connectors as before according to the electric wiring diagram.
- 6 Resin cover is attached.

**<Test run>**

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



## 2.9 The Field Setting Levels

### Introduction

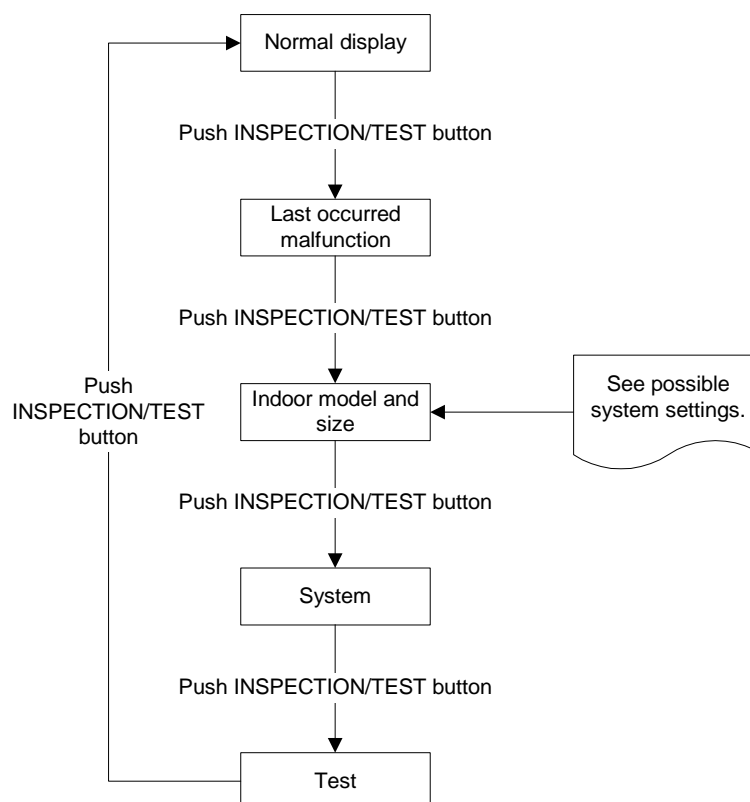
The three field setting levels are:

- Inspection level
- Monitoring level
- Maintenance mode settings.

### The inspection level

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

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



**Possible system settings**

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

Size		Software	Type	
Settings	Display		Settings	Display
35	35	5	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 controller display
40	History error codes	Display malfunction history	
		The history No. can be changed with the programming time button.	
41	Thermistor data display	Select the display thermistor with the programming time button.	
		Thermistor: 0. Remote control thermistor 1. Suction thermistor 2. Heat exchanger thermistor.	
43	Forced fan ON	Turns the fan ON for each unit individually.	
44	Individual setting	Sets fan speed and air flow direction for each unit individually when using group control.	
		Settings are made using the "air flow direction adjust" and "fan speed adjust" buttons. Confirmation by the confirmation button is required.	
45	Unit No. change	Changes unit No.	
		Set the unit No. after changing with the programming time buttons. Confirmation by the confirmation button is required.	

## 2.10 Overview of the Field Settings: RR/RQ71~125B

### Jumpers

The table below contains the jumper field settings.

Jumper	Label on PCB	Function	Applicable units	See page
J1	Thermo CTR	Change thermostat OFF control indoor unit	➤ RR71~125B	4-25
J3	Thermo CTR2	Change thermostat ON control indoor unit	➤ RQ71~125B	4-25

### DIP switches

The table below contains the DIP switch field settings.

DIP switch	Function	Details	Applicable units	See page
DS1-1	Emergency ON/OFF	Switch emergency operation outdoor unit ON	RR/RQ71~125B	2-7
DS1-2	Cool / Heat	Select emergency cooling / heating operation on outdoor unit		2-7
DS1-3	NOT USED			
DS1-4	NOT USED			

### Remote controller settings

The table below contains the remote controller settings.

Mode N°	First code N°	Description	Second Code N°			Refer to
			01	02	03	
16(or26)	3	Defrost start setting	Factory setting	Defrost slow starting	Defrost quick starting	2-38

### BS

The table below contains the BS field setting.

BS	Label on PCB	Function	Applicable units	Details
BS1	Pump down / forced defrost	Cooling/fan only: Pump down (see further in this section) Heating: Forced defrosting (RQ only)	➤ RR71~125B ➤ RQ71~125B	—

### Pump down

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

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

2.11 Jumpers

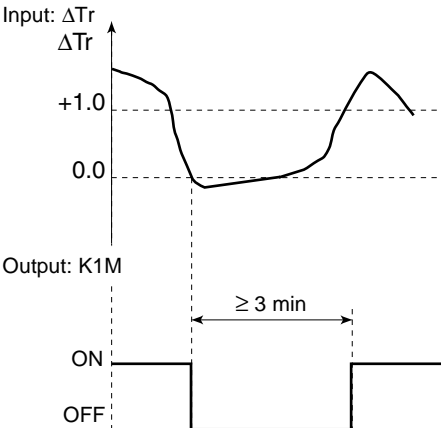
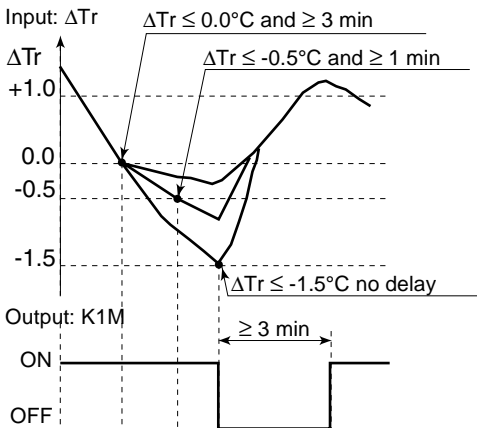
Input and output

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

Item	Description			
Input	$\Delta Tr$	Cooling	$\Delta Tr = Tr - Ts$	<p>➤ Tr = indoor unit suction air temp.</p> <p>➤ Ts = temp. set by the remote controller</p>
		Heating	$\Delta Tr = Ts - Tr$	
Output	Magnetic switch compressor K1M			

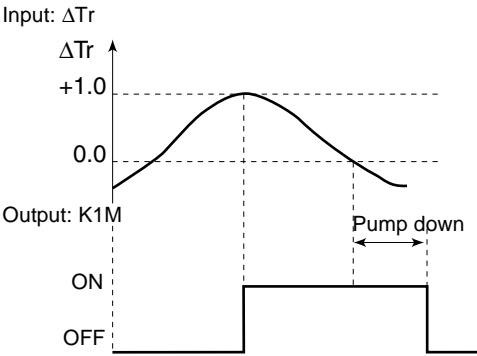
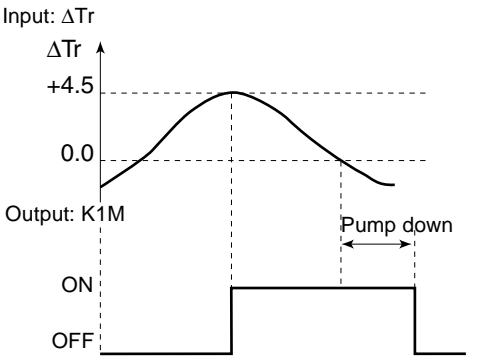
J1

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

Factory setting (closed state)	Field setting (open state)
Thermostat goes into OFF-state when $\Delta Tr \leq 0.0^{\circ}\text{C}$	Thermostat goes into OFF-state when <ul style="list-style-type: none"><li><math>-0.5^{\circ}\text{C} &lt; \Delta Tr \leq 0.0^{\circ}\text{C}</math> for 3 min, or</li><li><math>-1.5^{\circ}\text{C} &lt; \Delta Tr \leq -0.5^{\circ}\text{C}</math> for 1 min, or</li><li><math>\Delta Tr \leq -1.5^{\circ}\text{C}</math></li></ul>
	

J3

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

Factory setting (closed state)	Field setting (open state)
Thermostat goes into ON-state when $\Delta Tr \geq 1.0^{\circ}\text{C}$	Thermostat goes into ON-state when $\Delta Tr \geq 4.5^{\circ}\text{C}$
	

4

### 3     Test Run and Operation Data

**Introduction**

This chapter contains the following information:

- General operation data
- Operation ranges.

**Overview**

This chapter contains the following topics:

Topic	See page
3.1-General Operation Data	4-28
3.2-RR71~125B	4-30
3.3-RQ71~125B	4-31

### 3.1 General Operation Data

#### During cooling mode and dry keep

The operating conditions must be as follows:

Items	Operating modes	If the operation is out this range...
Outdoor temp.	<ul style="list-style-type: none"> <li>➤ c/o: -15 to +46°CDB</li> <li>➤ h/p: -5 to +46°CDB</li> </ul>	<ul style="list-style-type: none"> <li>➤ A safety device may stop the operation.</li> <li>➤ Condensation may occur on the indoor unit and start dripping.</li> </ul>
Indoor temp.	+12 to +28°CWB	
Indoor humidity	80%	

The operation values are guidelines in the operation range:

- LP: 6 bar ~ 9.8 bar (low pressure)
- HP: 26.2 bar ~ 33.9 bar (high pressure)
- Td: 60 ~ 100°C (discharge pipe temperature compressor)
- Ts: -2 ~ 15°C (suction pipe temperature compressor)
- ΔTi: 8 ~ 16°C (indoor temperature difference | air return – air outlet |).

#### During heating mode

The operating conditions must be as follows:

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

The operation values are guidelines in the operation range:

- LP: 5.3 bar ~ 9.5 bar (low pressure)
- HP: 25.3 bar ~ 32.7 bar (high pressure)
- Td: 60 ~ 100°C (discharge pipe temperature compressor)
- Ts: -15 ~ 10°C (suction pipe temperature compressor)
- ΔTi: 12 ~ 32°C (indoor temperature difference | air return – air outlet |).

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

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

**When Cooling**

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

**When Heating**

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

**Note**

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

## 3.2 RR71~125B

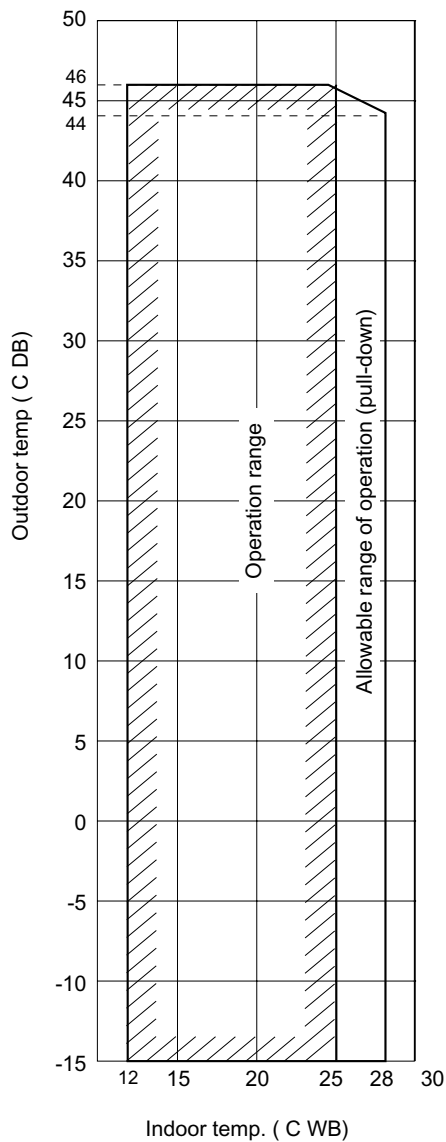
### Conditions

The illustration in this section is based on the following conditions:

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

### Operation range

The illustration below shows the operation range.



### 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.



### 3.3 RQ71~125B

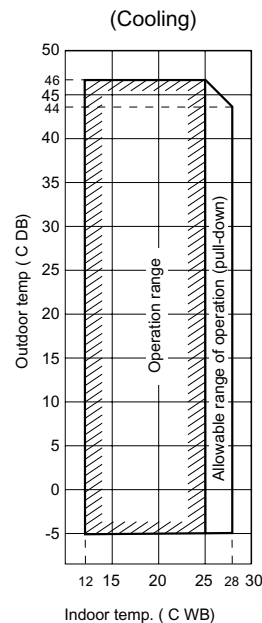
#### Conditions

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.

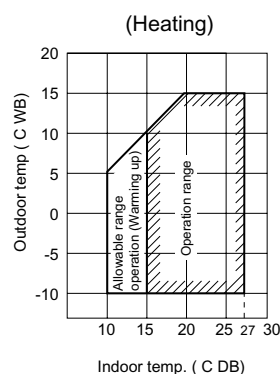
#### Operation range: Cooling

The illustration below shows the operation range.



#### Operation range: Heating

The illustration below shows the operation range.



#### 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.

# 4

# Part 5

## Disassembly and Maintenance

**What is in this part?**

This part contains the following chapters:

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

# 5

# 1     Disassembly and Maintenance: Outdoor Units

## 1.1     What Is in This Chapter?

### Introduction

This chapter contains the following information on the outdoor units:

- Exploded views
- Components.

### Overview

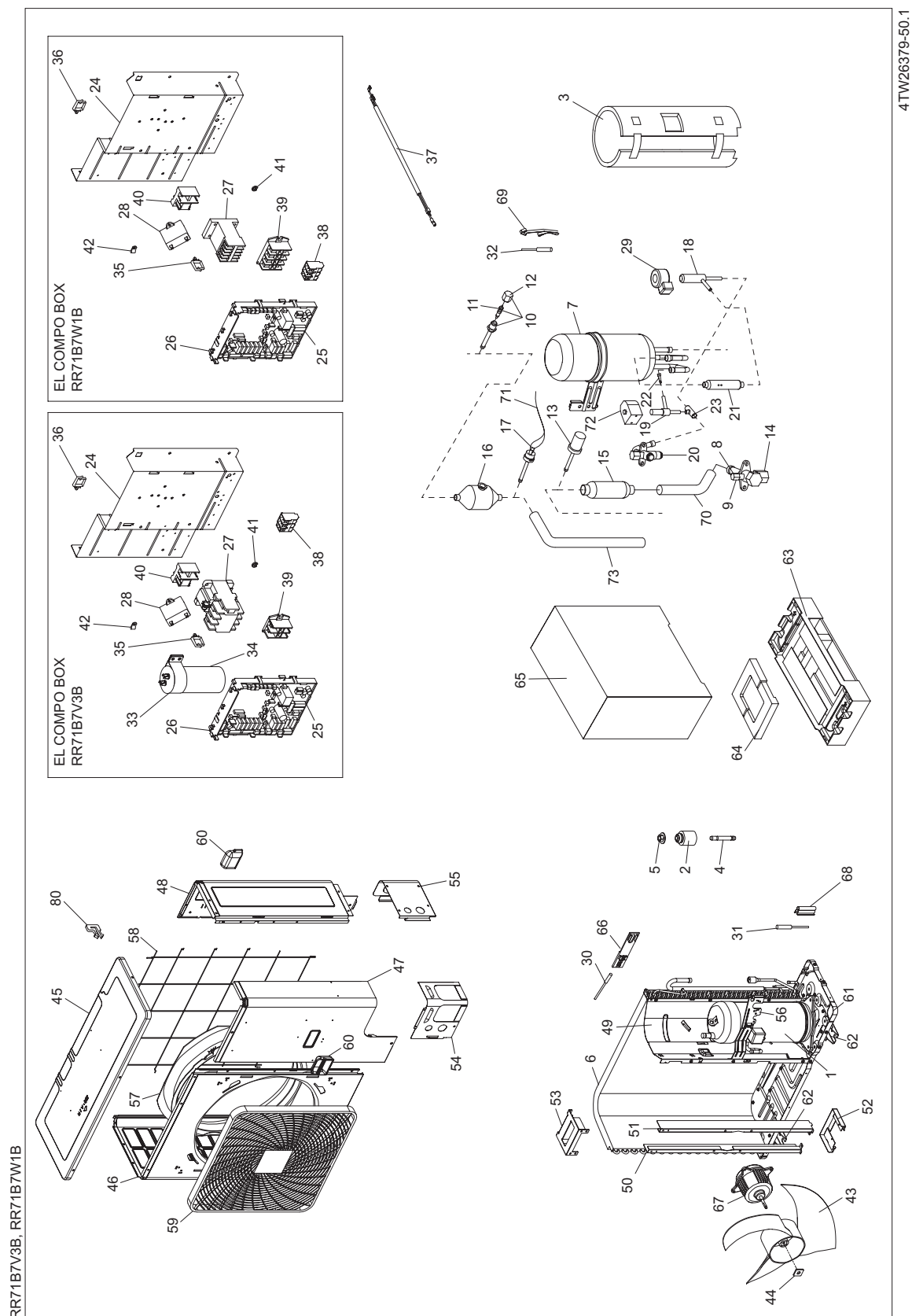
This chapter contains the following topics:

Topic	See page
1.2-RR71V7V3B, RR71V7W1B	5-4
1.3-RR100B7V3B, RR100B7W1B	5-6
1.4-RR125B7W1B	5-8
1.5-RQ71B7V3B, RQ71B7W1B	5-10
1.6-RQ100B7V3B, RQ100B7W1B	5-12
1.7-RQ125B7W1B	5-14

## 1.2 RR71V7V3B, RR71V7W1B

### Exploded view

The illustration below shows the exploded view.



**Components**

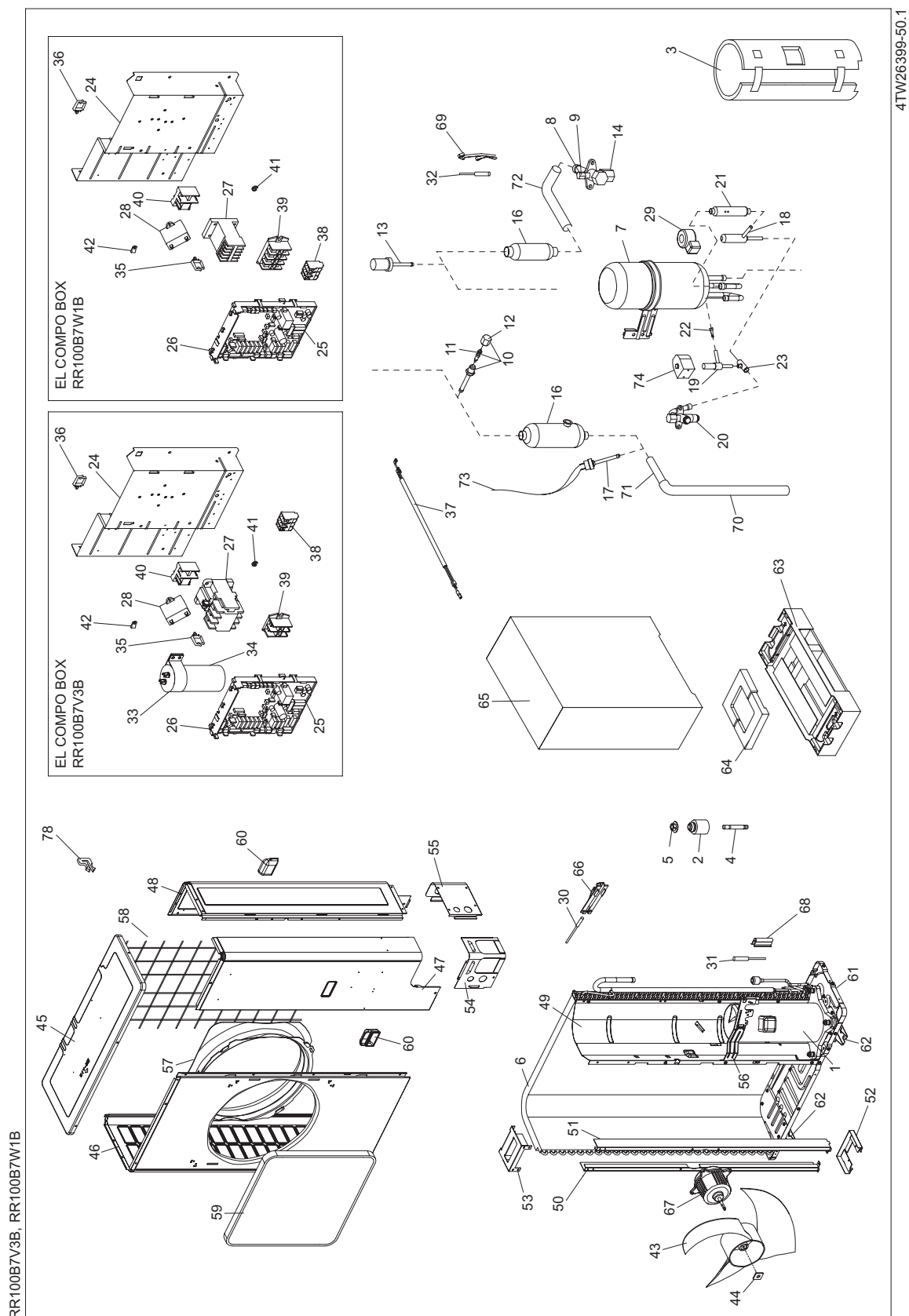
The table below contains the components of the exploded view.

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

### 1.3 RR100B7V3B, RR100B7W1B

#### Exploded view

The illustration below shows the exploded view.





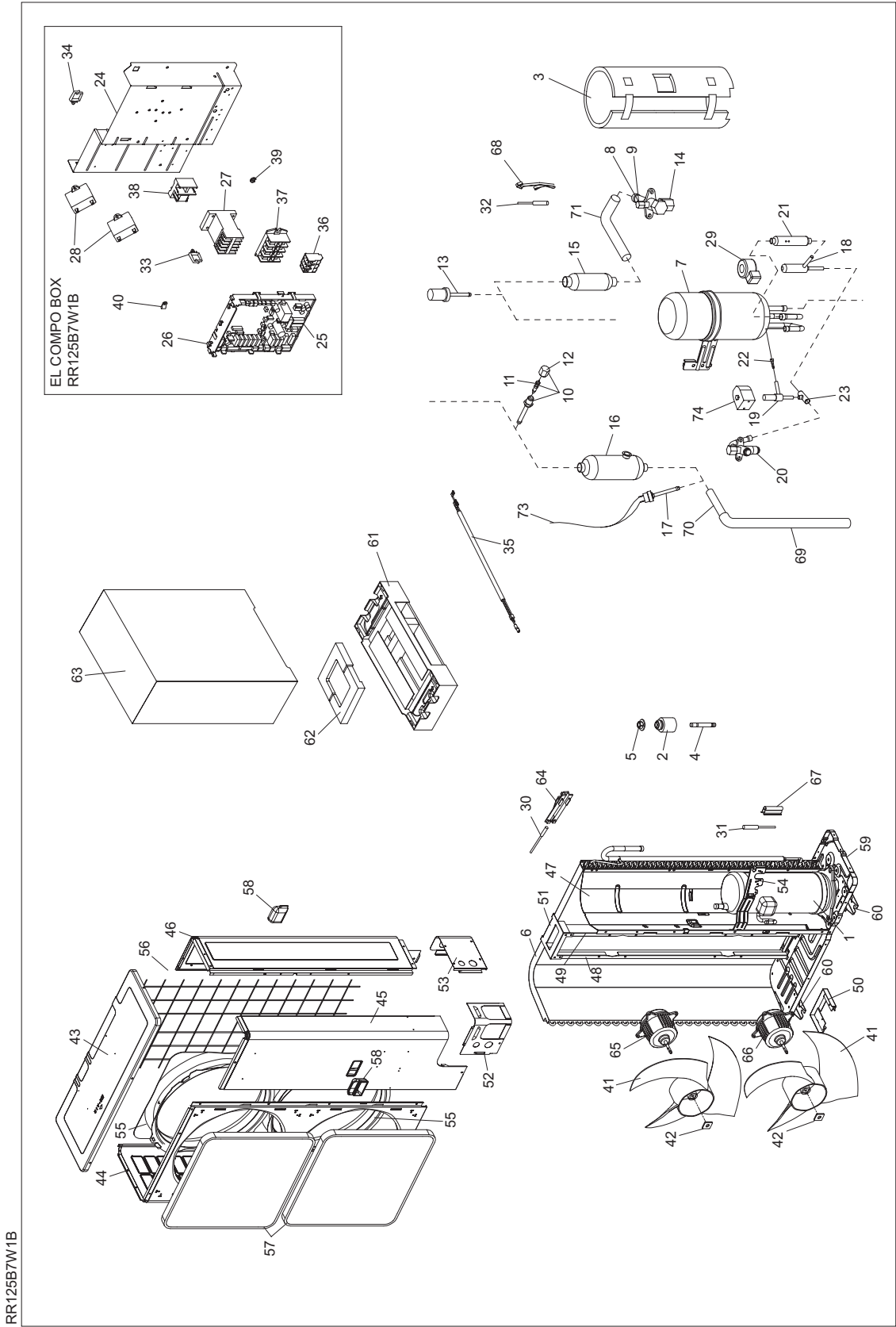
**Components**

The table below contains the components of the exploded view.

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

1.4 RR125B7W1B

Exploded view The illustration below shows the exploded view.



**Components**

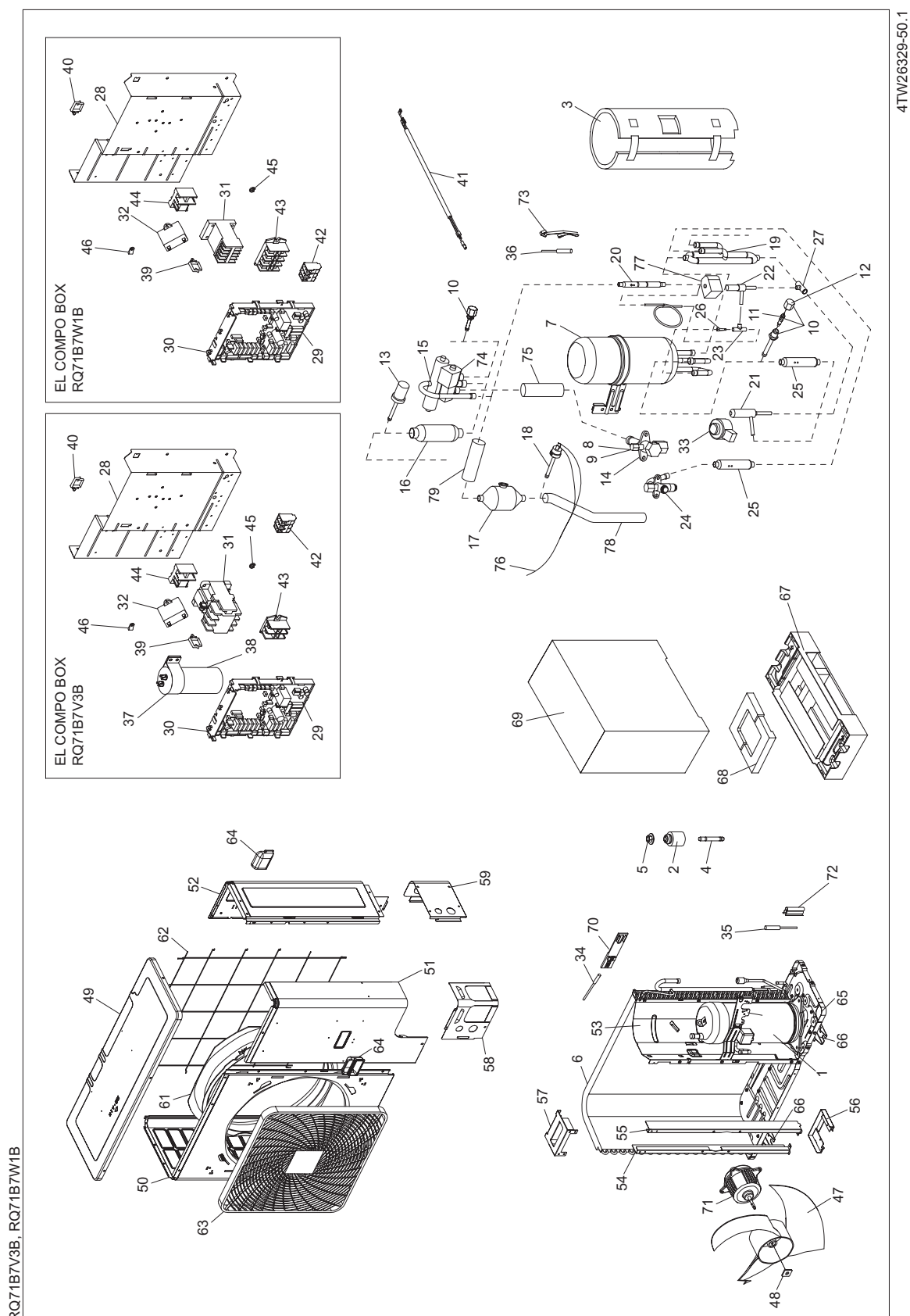
The table below contains the components of the exploded view.

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

## 1.5 RQ71B7V3B, RQ71B7W1B

### Exploded view

The illustration below shows the exploded view.



**Components**

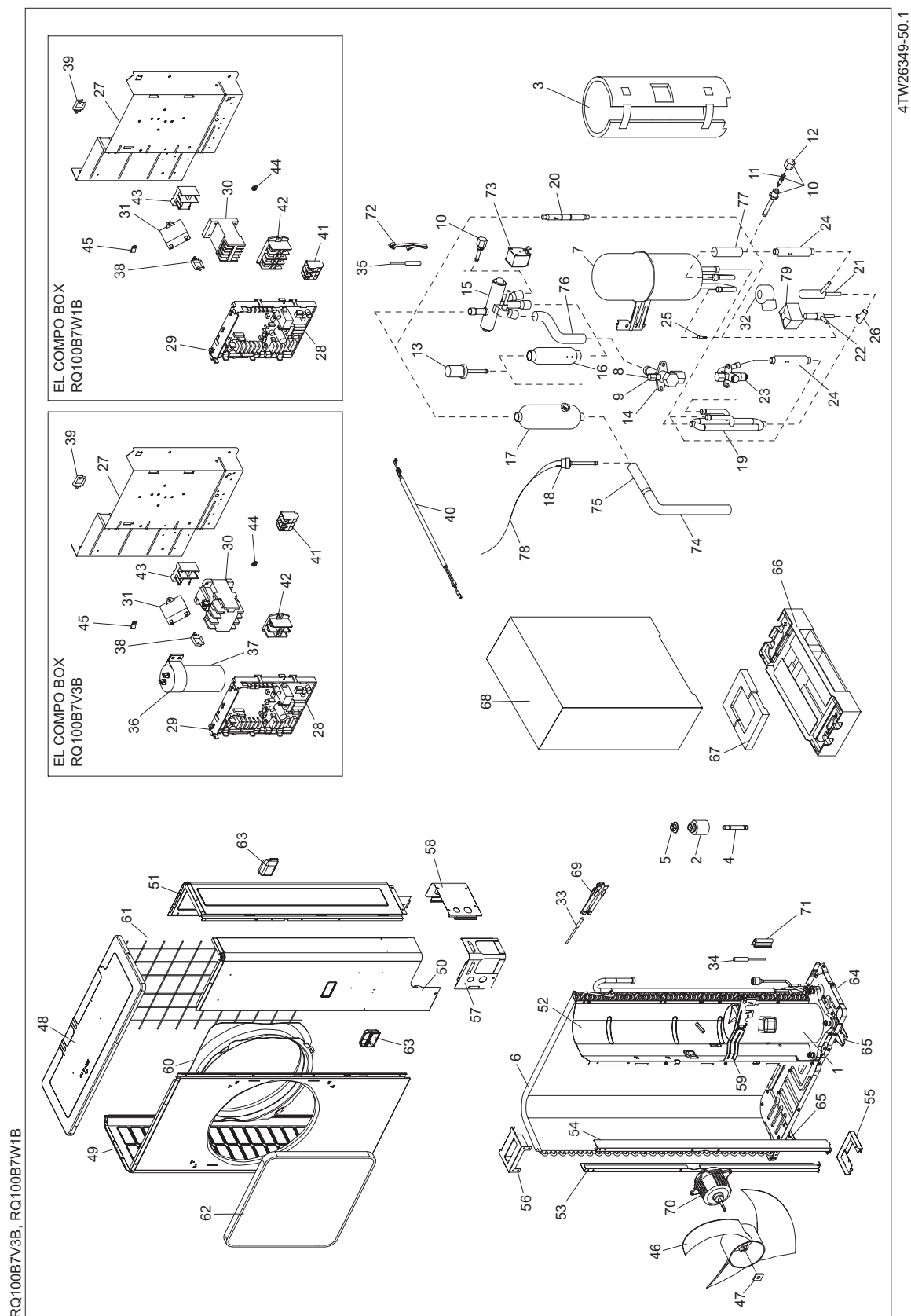
The table below contains the components of the exploded view.

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

## 1.6 RQ100B7V3B, RQ100B7W1B

### Exploded view

The illustration below shows the exploded view.



**Components**

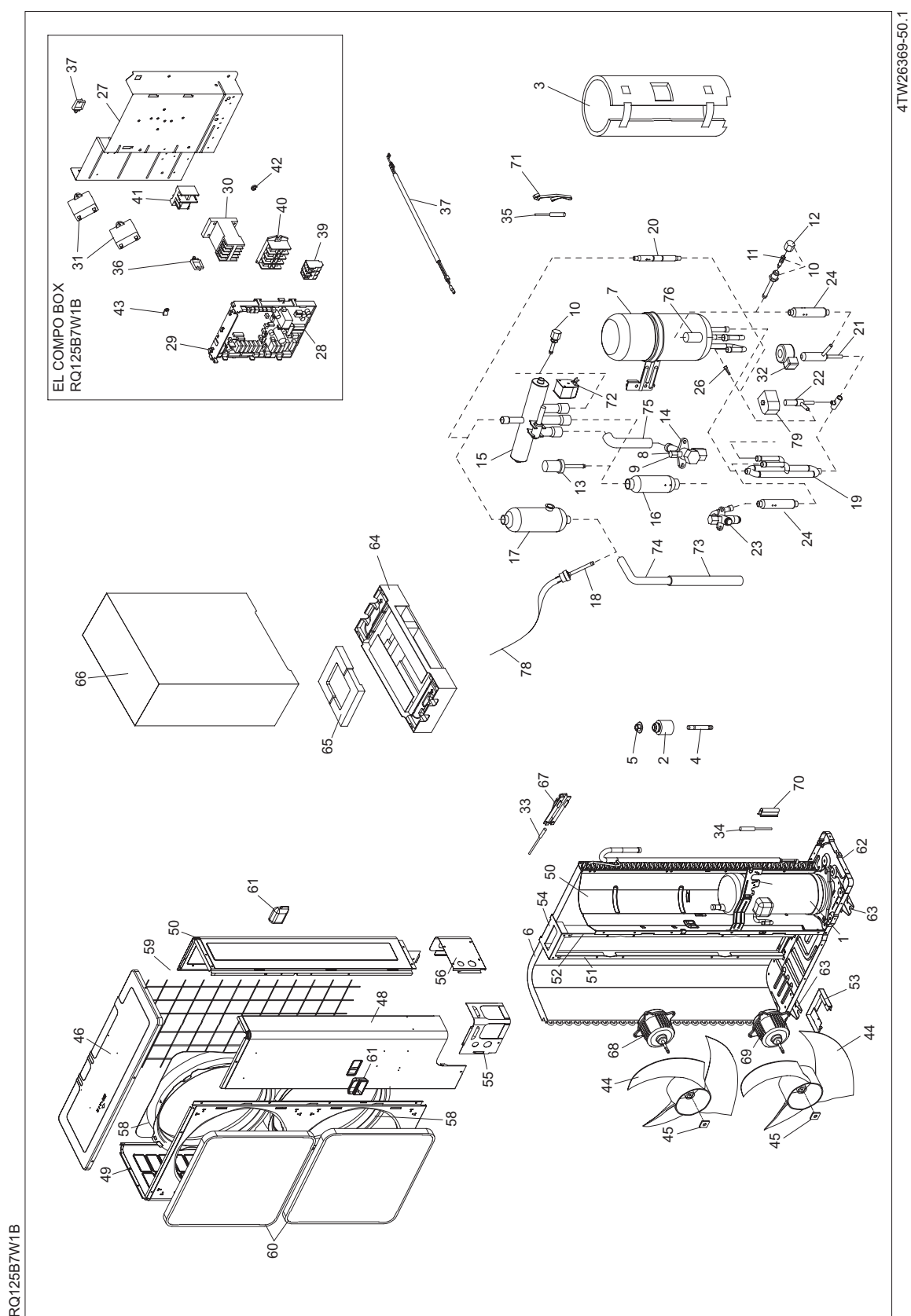
The table below contains the components of the exploded view.

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

## 1.7 RQ125B7W1B

### Exploded view

The illustration below shows the exploded view.





**Components**

The table below contains the components of the exploded view.

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



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