ESIE04-01

Service Manual

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

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1 Introduction

1.1 About This Manual

Target group

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

Purpose of this manual

This service manual contains all the information you need to do the necessary repair and maintenance tasks for the Sky Air RZQ-series.

Five parts

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

Part	See page
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Introduction overview

The introduction contains the following topics:

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1.2 Combination Overview

Introduction

In the tables in this section:

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

FCQ, FFQ, FBQ

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

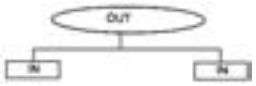
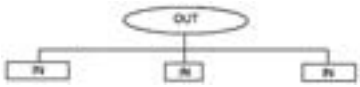
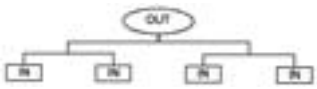
Indoor unit / Outdoor unit	950 x 950 Cassette						600 x 600 Cas.				Duct						
	FCQ35B7V1	FCQ50B7V1	FCQ60B7V1	FCQ71B7V3B	FCQ100B7V3B	FCQ125B7V3B	FFQ25BV1B	FFQ35BV1B	FFQ50BV1B	FFQ60BV1B	FBQ25B7V1	FBQ35B7V1	FBQ50B7V1	FBQ60B7V1	FBQ71B7V3B	FBQ100B7V3B	FBQ125B7V3B
RZQ71B7V3B	**2**	–	–	**P**	–	–	–	**2**	–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

FDQ, FHQ, FUQ, FAQ

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

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

Combination Matrix

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

Notes:

1 Possible indoor types:

- ➤ FCQ35-60
- ➤ FFQ35-60
- ➤ FHQ35-60
- ➤ FBQ35-60

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

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

1.3 Precautions on handling new refrigerants

1.3.1 Outline

About Refrigerant R410A

➤ Characteristics of new refrigerant, R410A

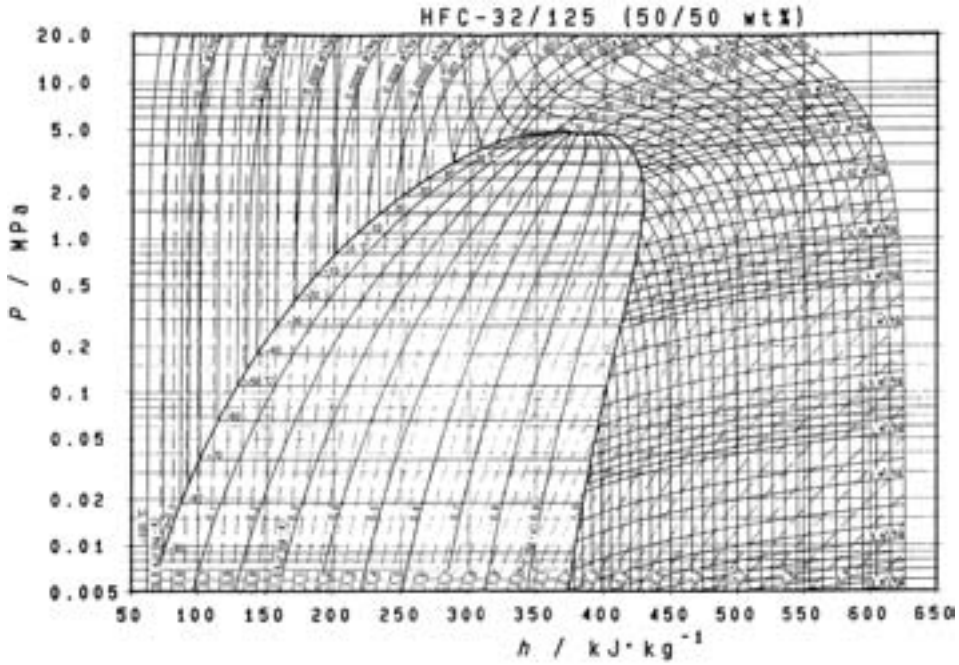
1 Performance
Almost the same performance as R22 and R407C.

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

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

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

*1. Non-azeotropic mixture refrigerant: mixture of two or more refrigerants having different boiling points.
*2. Quasi-azeotropic mixture refrigerant: mixture of two or more refrigerants having similar boiling points.
*3. The design pressure is different at each product. Please refer to the installation manual for each product.
(Reference) 1 Mpa ≒ 1 0.19716 kgf / cm^2



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

➤ Thermodynamic characteristic of R410A

DAIREP ver2.0

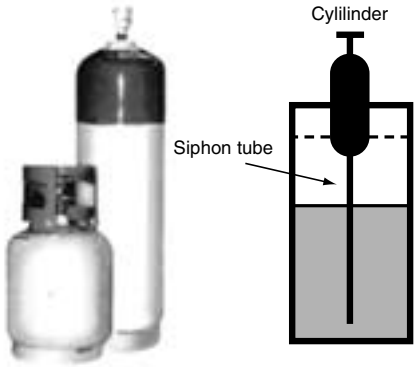
Temperature (℃)	Steam pressure (kPa)		Density (kg/m³)		Specific heat at constant pressure (kJ/kgK)		Specific enthalpy (kJ/kg)		Specific entropy (kJ/KgK)	
	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor
70	36.13	36.11	1410.7	1.582	1.372	0.695	100.8	390.6	0.649	2.074
-68	40.83	40.80	1404.7	1.774	1.374	0.700	103.6	391.8	0.663	2.066
66	46.02	45.98	1398.6	1.984	1.375	0.705	106.3	393.0	0.676	2.058
-64	51.73	51.68	1392.5	2.213	1.377	0.710	109.1	394.1	0.689	2.051
-62	58.00	57.94	1386.4	2.463	1.378	0.715	111.9	395.3	0.702	2.044
60	64.87	64.80	1380.2	2.734	1.379	0.720	114.6	396.4	0.715	2.037
-58	72.38	72.29	1374.0	3.030	1.380	0.726	117.4	397.6	0.728	2.030
56	80.57	80.46	1367.8	3.350	1.382	0.732	120.1	398.7	0.741	2.023
-54	89.49	89.36	1361.6	3.696	1.384	0.737	122.9	399.8	0.754	2.017
-52	99.18	99.03	1355.3	4.071	1.386	0.744	125.7	400.9	0.766	2.010
-51.58	101.32	101.17	1354.0	4.153	1.386	0.745	126.3	401.1	0.769	2.009
50	109.69	109.51	1349.0	4.474	1.388	0.750	128.5	402.0	0.779	2.004
-48	121.07	120.85	1342.7	4.909	1.391	0.756	131.2	403.1	0.791	1.998
46	133.36	133.11	1336.3	5.377	1.394	0.763	134.0	404.1	0.803	1.992
44	146.61	146.32	1330.0	5.880	1.397	0.770	136.8	405.2	0.816	1.987
-42	160.89	160.55	1323.5	6.419	1.401	0.777	139.6	406.2	0.828	1.981
-40	176.24	175.85	1317.0	6.996	1.405	0.785	142.4	407.3	0.840	1.976
-38	192.71	192.27	1310.5	7.614	1.409	0.792	145.3	408.3	0.852	1.970
-36	210.37	209.86	1304.0	8.275	1.414	0.800	148.1	409.3	0.864	1.965
-34	229.26	228.69	1297.3	8.980	1.419	0.809	150.9	410.2	0.875	1.960
32	249.46	248.81	1290.6	9.732	1.424	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	463.64	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	1.979	1.696	271.5	427.2	1.303	1.798
44	2672.2	2662.4	951.4	115.2	2.033	1.771	275.3	426.7	1.315	1.793
46	2800.7	2790.7	937.7	122.4	2.095	1.857	279.2	426.1	1.327	1.788
48	2933.7	2923.6	923.3	130.2	2.168	1.955	283.2	425.4	1.339	1.782
50	3071.5	3061.2	908.2	138.6	2.256	2.069	287.3	424.5	1.351	1.776
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	2.661	2.557	300.3	421.0	1.389	1.757
58	3671.3	3661.2	836.9	180.4	2.883	2.799	305.0	419.4	1.403	1.749
60	3834.1	3824.2	814.9	193.7	3.191	3.106	310.0	417.6	1.417	1.741
62	4002.1	3992.7	790.1	208.6	3.650	3.511	315.3	415.5	1.433	1.732
64	4175.7	4166.8	761.0	225.6	4.415	4.064	321.2	413.0	1.450	1.722

1.3.2 Refrigerant Cylinders

Cylinder specifications

➤ The cylinder is painted refrigerant color (pink).

➤ The cylinder valve is equipped with a siphon tube.



➤ Note:

1 Refrigerant can be charged in liquid state with cylinder in upright position.

2 Do not lay cylinder on its side during charging, since it causes refrigerant in gas state to enter the system.

Handling of cylinders

1 Laws and regulations
R410A is liquefied gas, and the High-Pressure Gas Safety Law must be observed in handling them. Before using, refer to the High-Pressure Gas Safety Law.
The Law stipulates standards and regulations that must be followed to prevent accidents with high-pressure gases. Be sure to follow the regulations.

2 Handing of vessels
Since R410A is high-pressure gas, it is contained in high-pressure vessels.
Although those vessels are durable and strong, careless handling can cause damage that can lead to unexpected accidents. Do not drop vessels, let them fall, apply impact or roll them on the ground.

3 Storage
Although R410A is not flammable, it must be stored in a well-ventilated, cool, and dark place in the same way as any other high-pressure gases.
It should also be noted that high-pressure vessels are equipped with safety devices that releases gas when the ambient temperature reaches more than a certain level (fusible plug melts) and when the pressure exceeds a certain level (spring-type safety valve operates).

1.3.4 Service Tools

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

Be sure to use dedicated tools and devices.

➤ Tool compatibility

Tool	Compatibility			Reasons for change
	HFC		HCFC	
	R410A	R407C	R22	
Gauge manifold Charge hose	X			➤ Do not use the same tools for R22 and R410A. ➤ Thread specification differs for R410A and R407C.
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			➤ Seal material is different between R22 and HFCs. ➤ Thread specification is different between R410A and others.
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 ϕ19.1 is changed to 1/2H material while the previous material is "O".

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

Copper tube material and thickness

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

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

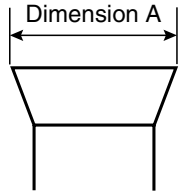
Flaring tool

Flare gauge

➢ Specifications
• Dimension A

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

➤ Differences
• Change of dimension A



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

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

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

Conventional tool with pipe extension margin adjustment can be used.

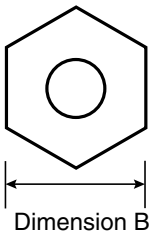
Torque wrench

➤ Specifications
• Dimension B Unit:mm

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

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

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



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

Vacuum pump with check valve

Vacuum pump adaptor
(Reverse flow preventive vacuum adaptor)

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

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

Leak tester

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

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

Refrigerant oil (Air compal)

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

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

Gauge manifold for R410A

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

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

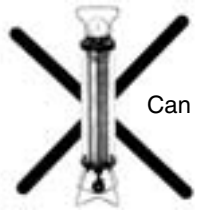
Charge hose for R410A

(Hose with ball valve)

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

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

Charging cylinder



Can not be used

➤ Specifications
- Use weigher for refrigerant charge listed below to charge directly from refrigerant cylinder.

➤ Differences
- The cylinder can not be used for mixed refrigerant since mixing ratio is changed during charging.

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

Weigher for refrigerant charge

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

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

Charge mouthpiece

➤ Specifications
- For R410A, 1/4"→ 5/16" (2min → 2.5min)
- Material is changed from CR to H-NBR.

➤ Differences
- Change of thread specification on hose connection side (For the R410A use)
- Change of sealer material for the HFCs use.

Part 1
System Outline

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

1 General Outline: Outdoor Units

1.1 What Is in This Chapter?

Introduction

This chapter contains the following information on the outdoor units:

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

General outline

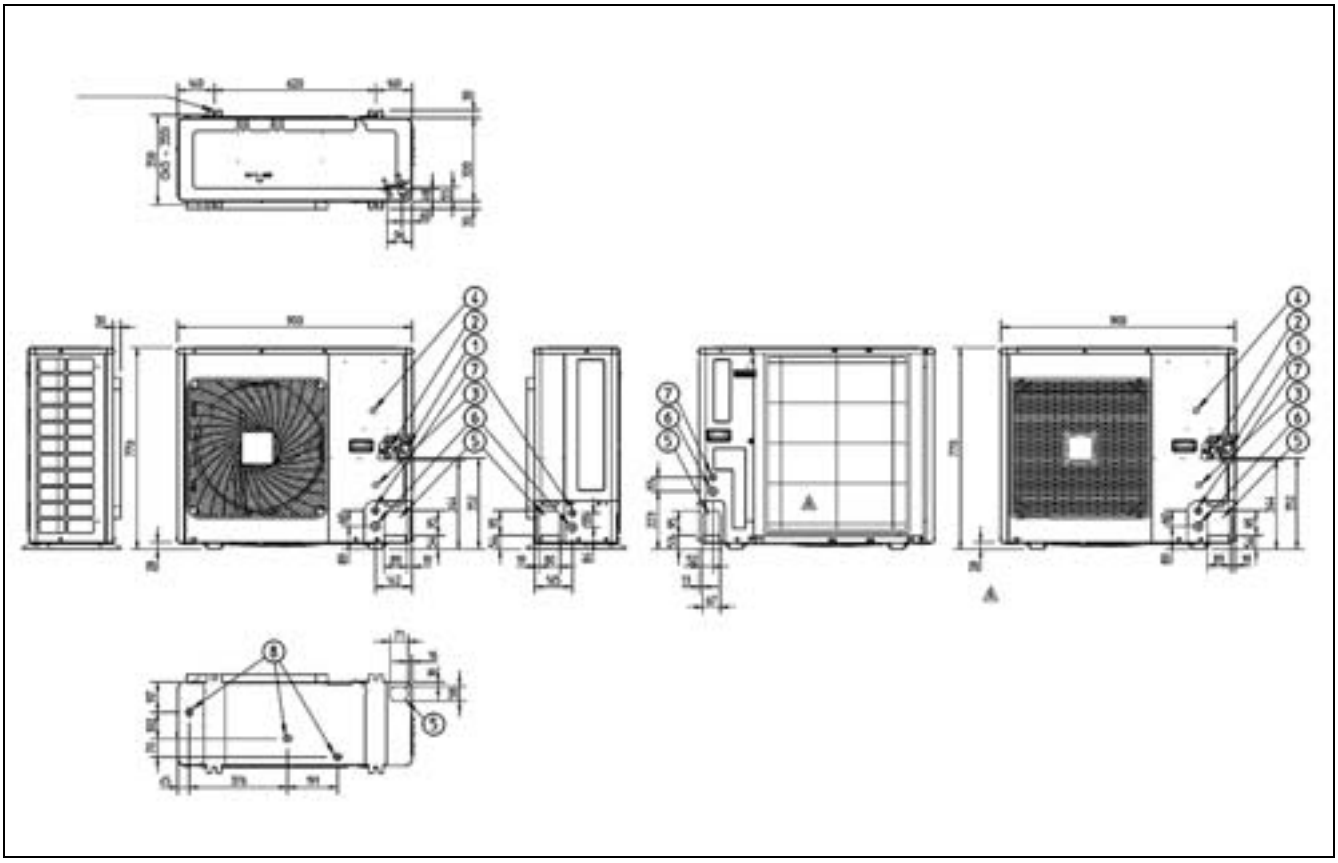
This chapter contains the following general outlines:

1

1.2 RZQ71: Outlook and dimensions

Outlook and dimensions

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



Installation and service space

See page 1–8.

Components

The table below contains the different components of the unit.

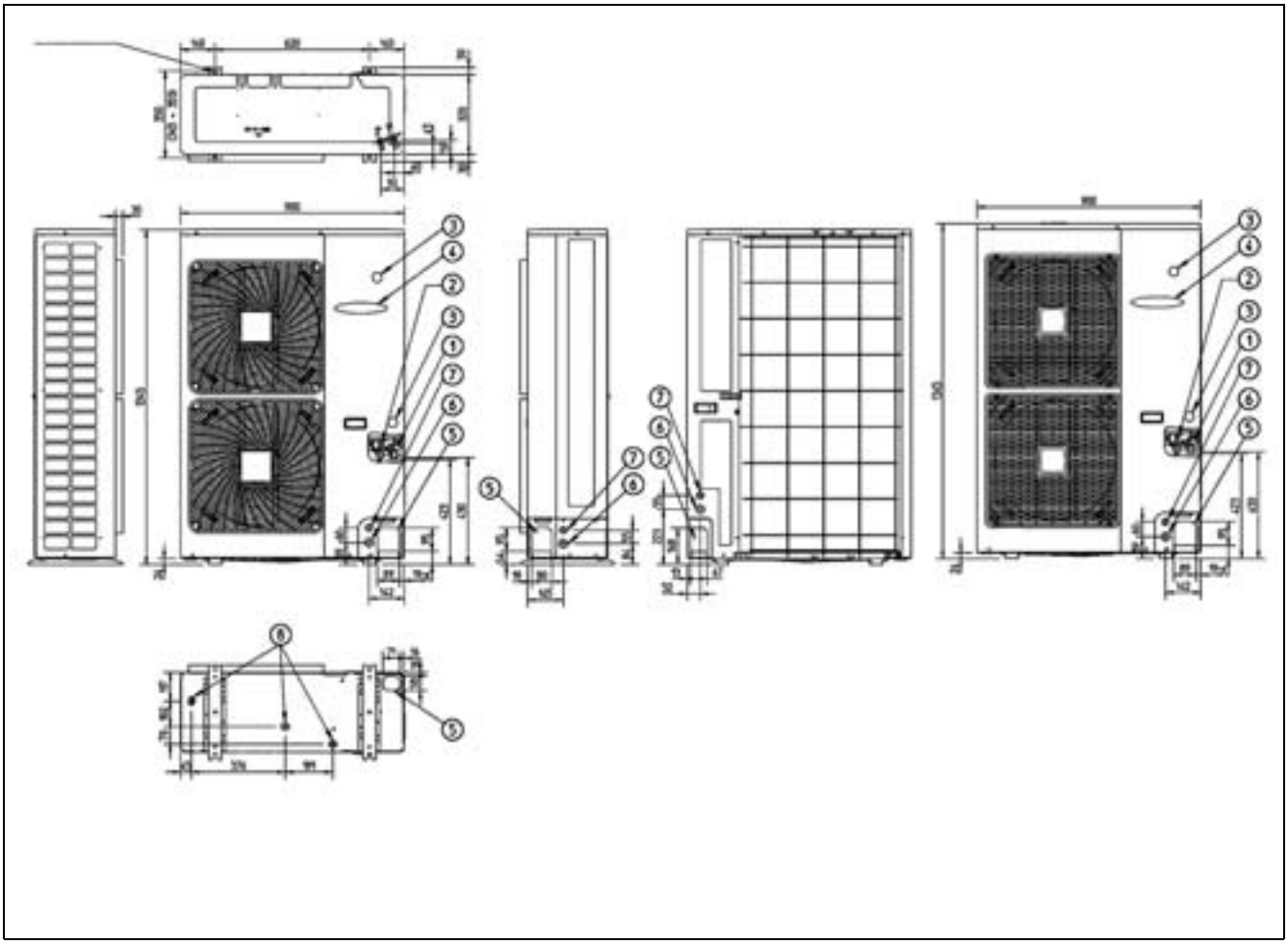
No.	Component
1	Gas pipe connection
2	Liquid pipe connection
3	Service port (inside the unit)
4	Grounding terminal M5 (inside the switch box)
5	Refrigerant piping intake
6	Power supply wiring intake
7	Control wiring intake
8	Drain outlet

1

1.3 RZQ100 and RZQ125: Outlook and dimensions

Outlook and dimensions

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



Installation and service space

See page 1–8.

Components

The table below contains the different components of the unit.

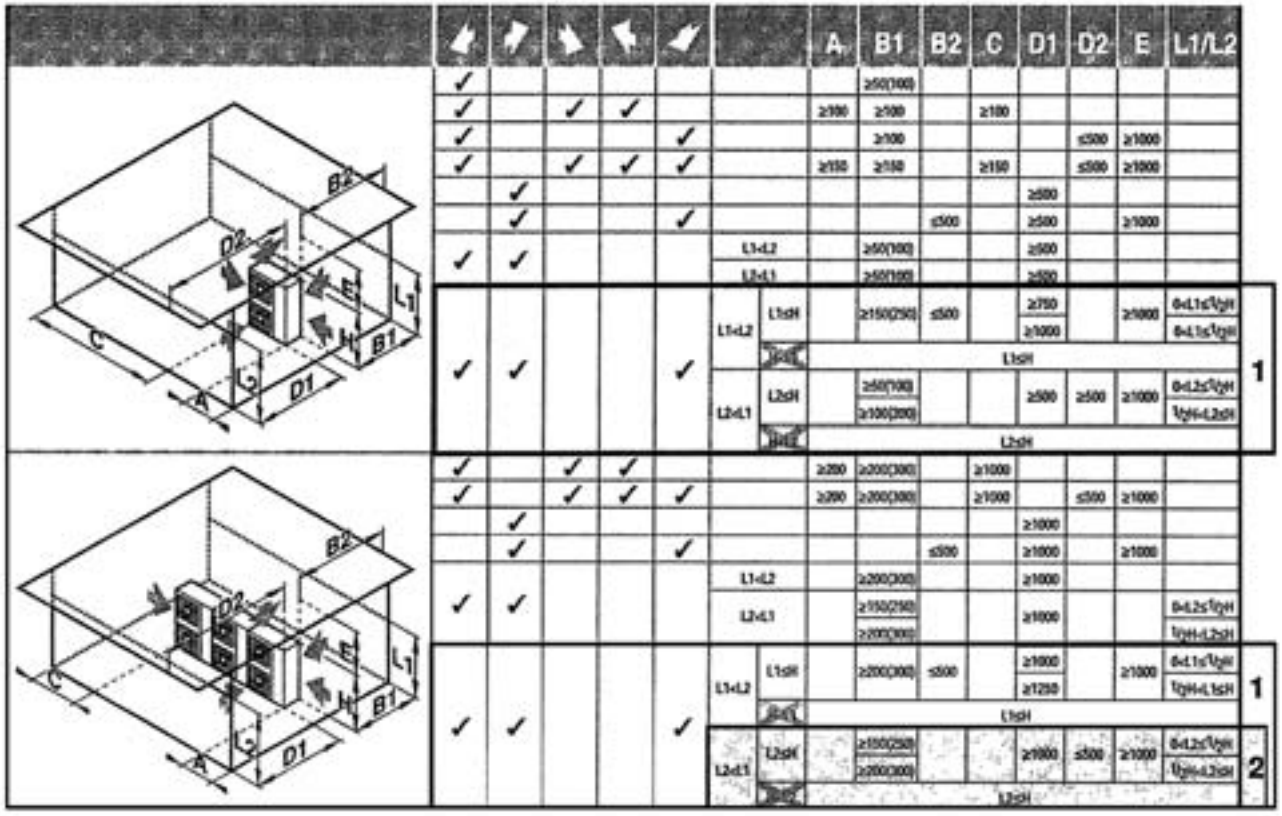
No.	Component
1	Gas pipe connection
2	Liquid pipe connection
3	Service port (inside the unit)
4	Electronic connection and grounding terminal M5 (inside the switch box)
5	Refrigerant piping intake
6	Power supply wiring intake
7	Control wiring intake
8	Drain outlet

1

1.4 RZQ71, RZQ100 and RZQ125: Installation and Service Space

Non stacked

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



							A	B1	B2	C	D1	D2	E	L1/L2	
✓								≥50(100)							
✓		✓	✓				≥100	≥100		≥100					
✓				✓				≥100				≤500	≥1000		
✓		✓	✓	✓			≥150	≥150		≥150		≤500	≥1000		
	✓										≥500				
	✓			✓					≤500		≥500		≥1000		
✓	✓					L1<L2		≥50(100)			≥500				
						L2<L1		≥50(100)			≥500				
✓	✓			✓	L1<L2	L1≤H		≥150(250)	≤500		≥750		≥1000	0<L1≤½H	1
											≥1000			½H<L1≤H	
						H<L1		L1≤H							
					L2<L1	L2≤H		≥50(100)			≥500	≥500	≥1000	0<L2≤½H	
								≥100(200)						½H<L2≤H	
						H<L2		L2≤H							
✓		✓	✓				≥250	≥200(300)		≥1000					
✓		✓	✓	✓			≥250	≥200(300)		≥1000		≤500	≥1000		
	✓										≥1000				
	✓			✓					≤500		≥1000		≥1000		
✓	✓					L1<L2		≥200(300)			≥1000				
						L2<L1		≥150(250)			≥1000			0<L2≤½H	
								≥200(300)						½H<L2≤H	
✓	✓			✓	L1<L2	L1≤H		≥200(300)	≤500		≥1000		≥1000	0<L1≤½H	1
											≥1250			½H<L1≤H	
						H<L1		L1≤H							
					L2<L1	L2≤H		≥150(250)			≥1000	≤500	≥1000	0<L2≤½H	2
								≥200(300)						½H<L2≤H	
						H<L2		L2≤H							

Suction side obstacle

Discharge side obstacle

Left side obstacle

Right side obstacle

Top side obstacle

✓ Obstacle is present

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

2 In these cases, only 2 units can be installed

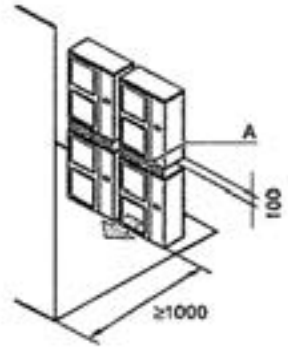
This situation is not allowed

Stacked

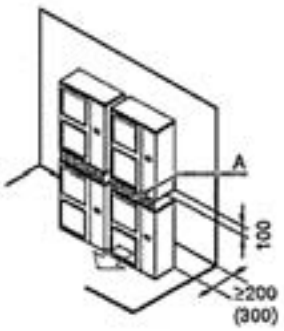
The illustration below shows the required installation and service space (mm). The values in brackets are for the 100 and 125 class.

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

Obstacles exist in front of the outlet side



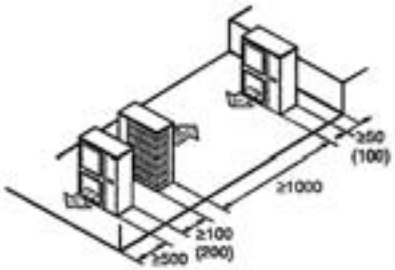
Obstacles exist in front of the air inlet



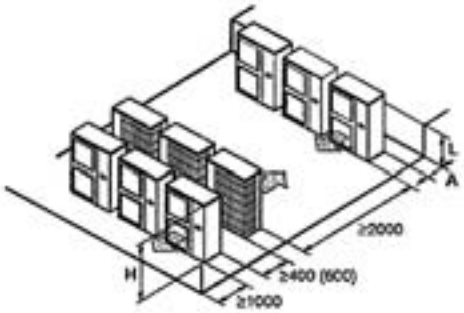
Multiple rows

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

Installation of one unit per row



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



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

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

1

2 General Outline: Indoor Units

2.1 What Is in This Chapter?

Introduction

This chapter contains the following information on the indoor units:

- ➤ Outlook and dimensions
- ➤ Components

General outline

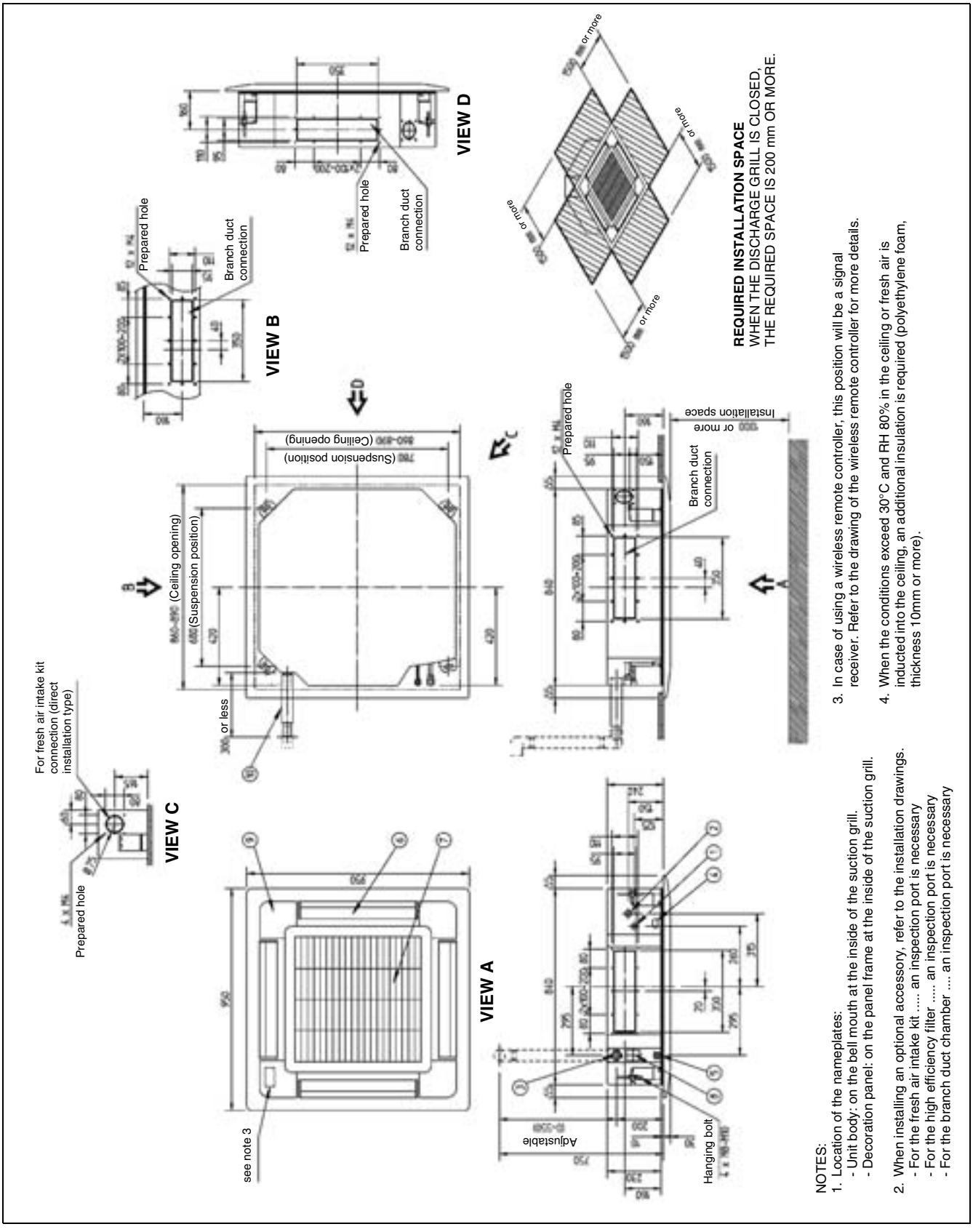
This chapter contains the following general outlines:

1

2.2 FCQ35B7V1 ~ FCQ71B7V3B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

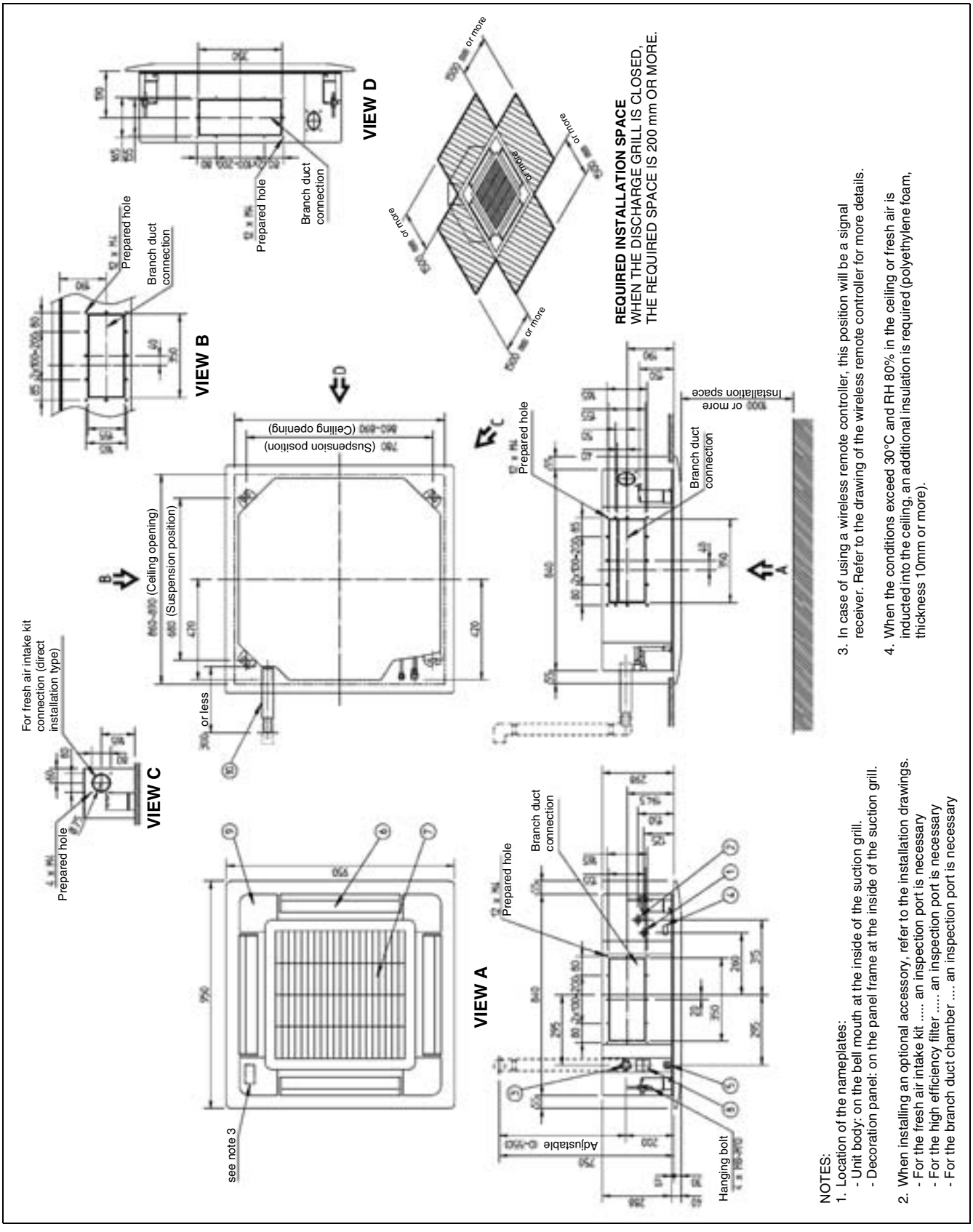
No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Power supply connection
5	Transmission wiring connection
6	Air discharge grille
7	Air suction grille
8	Water supply intake
9	Corner decoration cover
10	Drain hose

1

2.3 FCQ100~125B7V3B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

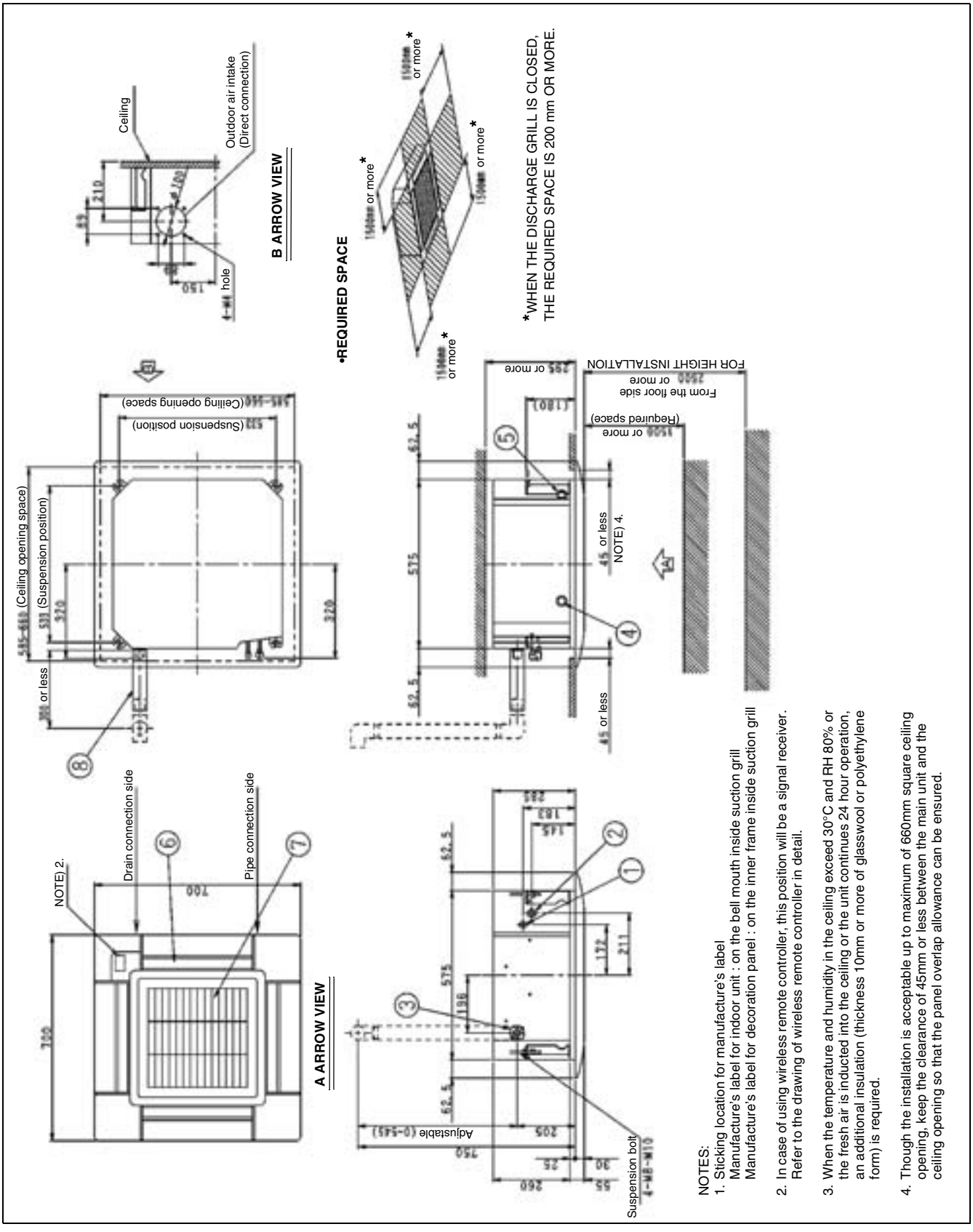
No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Power supply connection
5	Transmission wiring connection
6	Air discharge grille
7	Air suction grille
8	Water supply intake
9	Corner decoration cover
10	Drain hose

1

2.4 FFQ35~60BV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

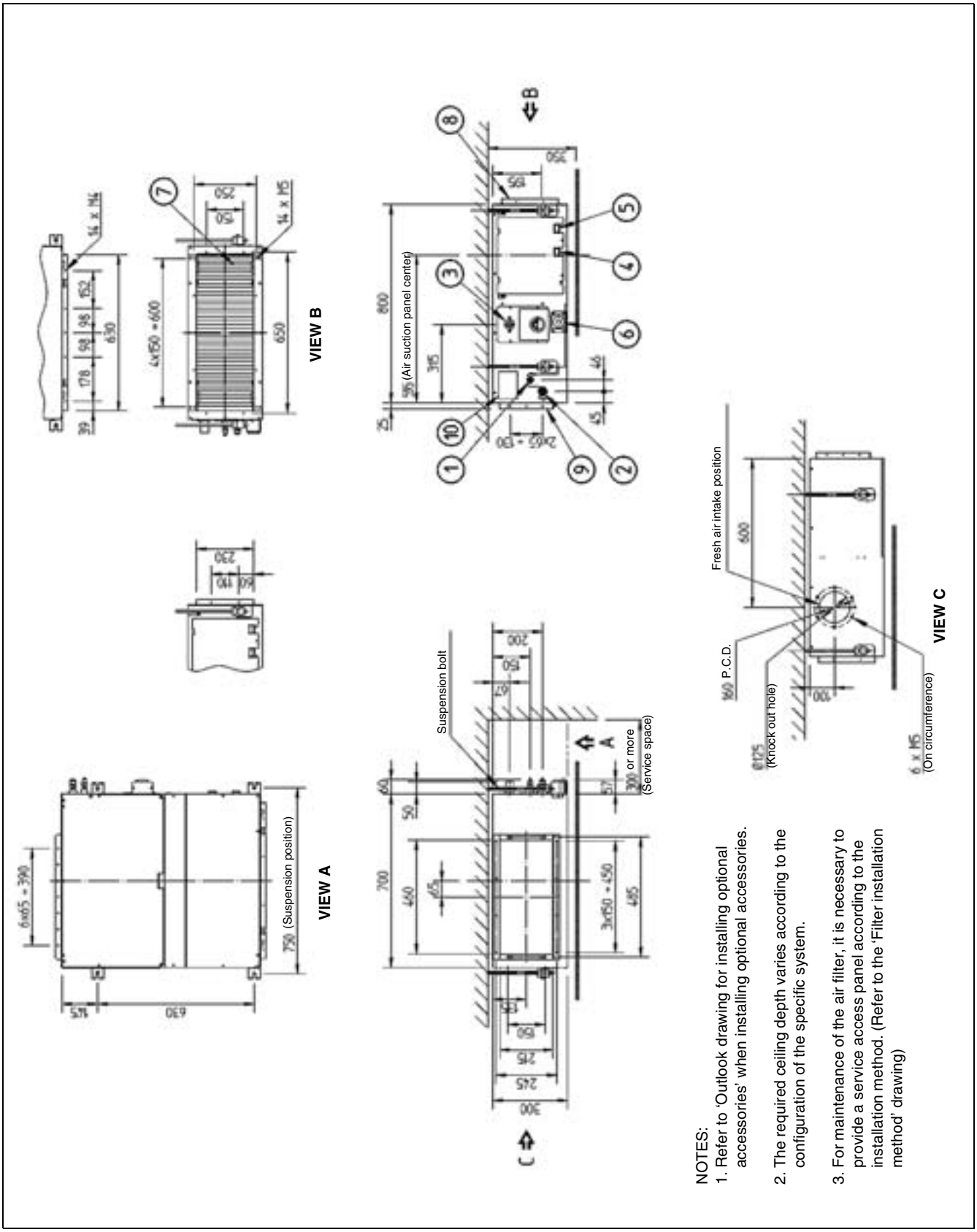
No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Power supply connection
5	Remote control code and control wiring connection
6	Air discharge grille
7	Suction grille
8	Drain hose

1

2.5 FBQ35B7V1 & FBQ50B7V1

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

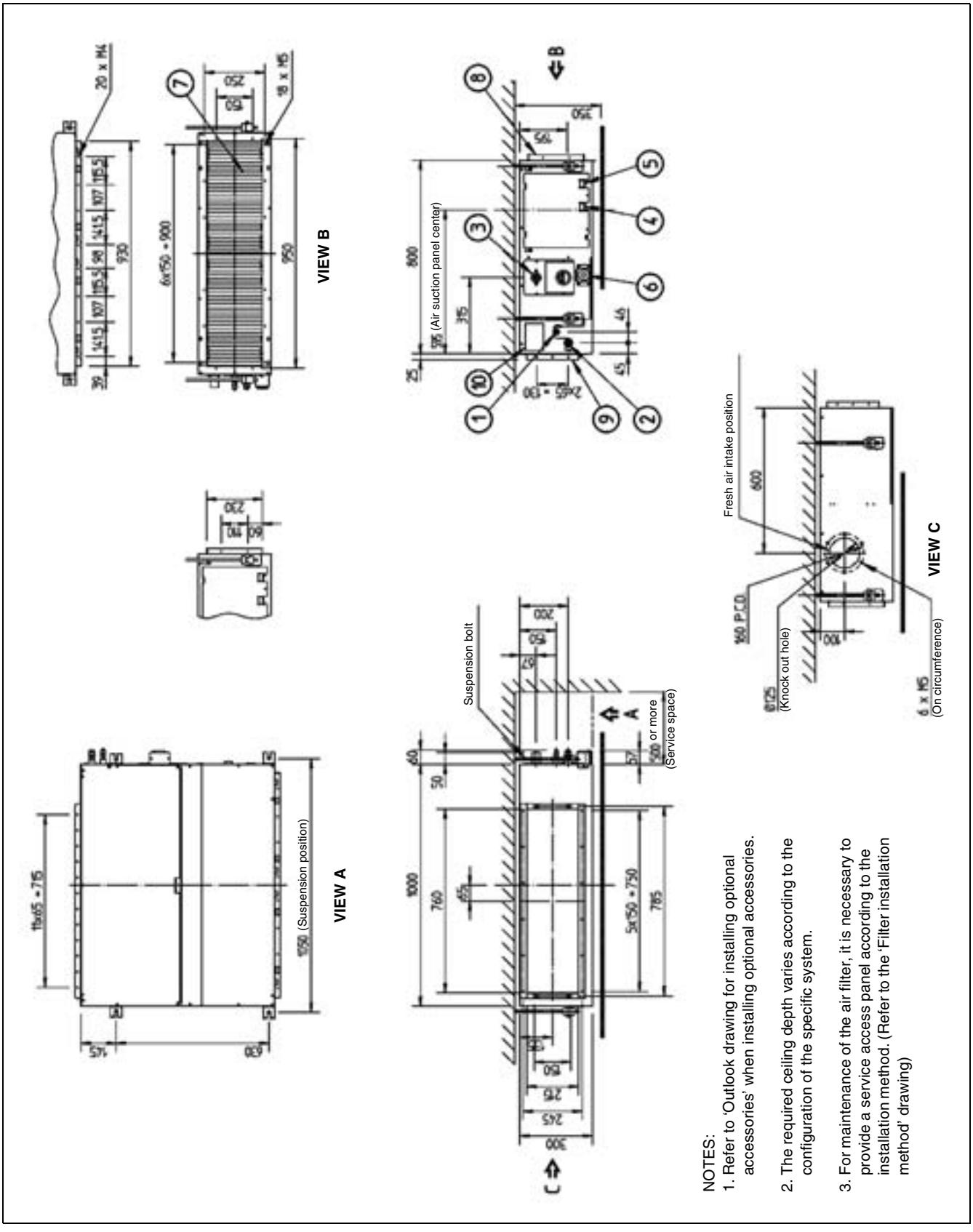
No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Remote controller wiring connection
5	Power supply connection
6	Drain hole
7	Air filter
8	Air suction side
9	Air discharge side
10	Nameplate

1

2.6 FBQ60B7V1 & FBQ71B7V3B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

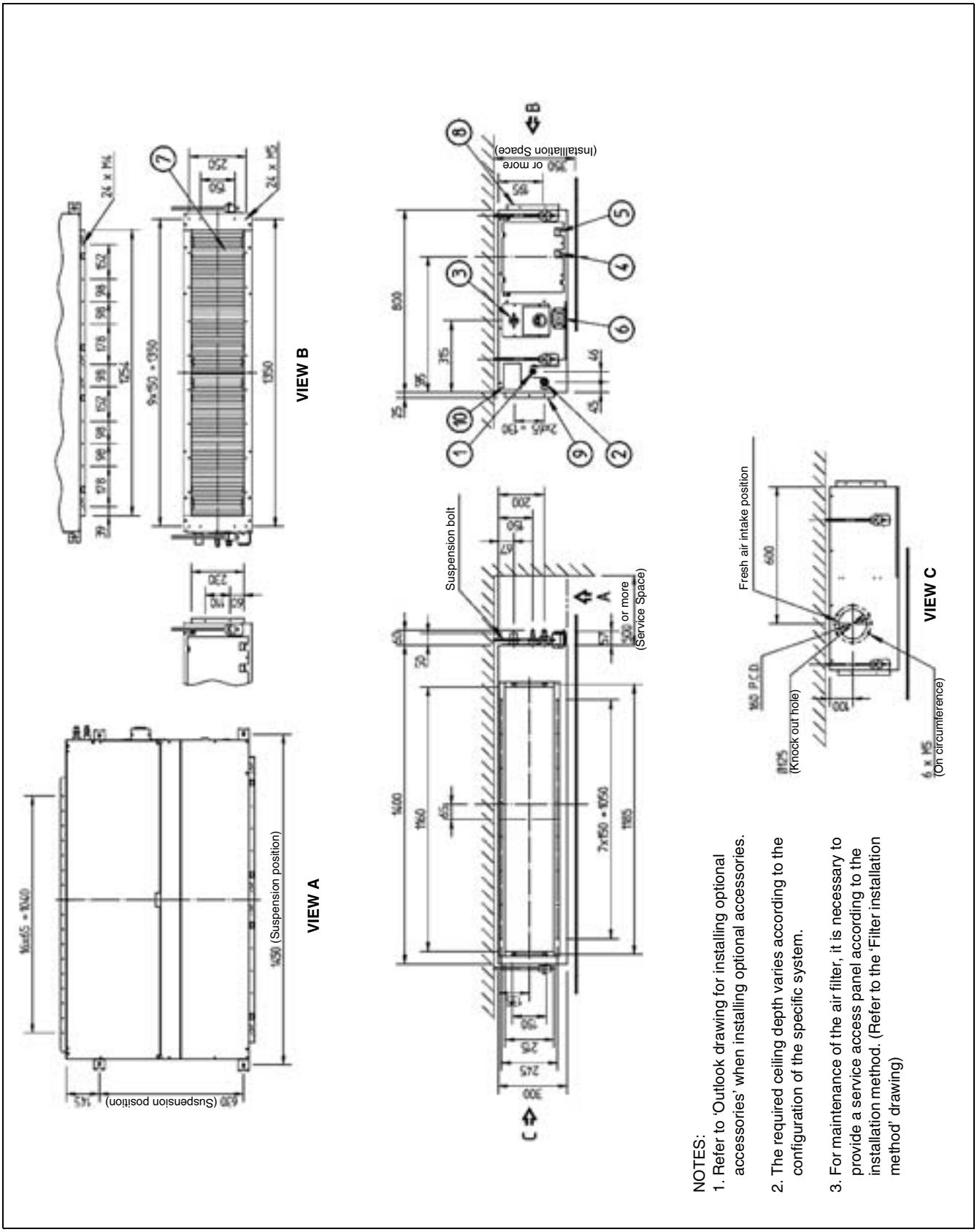
No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Remote controller wiring connection
5	Power supply connection
6	Drain hole
7	Air filter
8	Air suction side
9	Air discharge side
10	Nameplate

1

2.7 FBQ100B7V3B & FBQ125B7V3B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

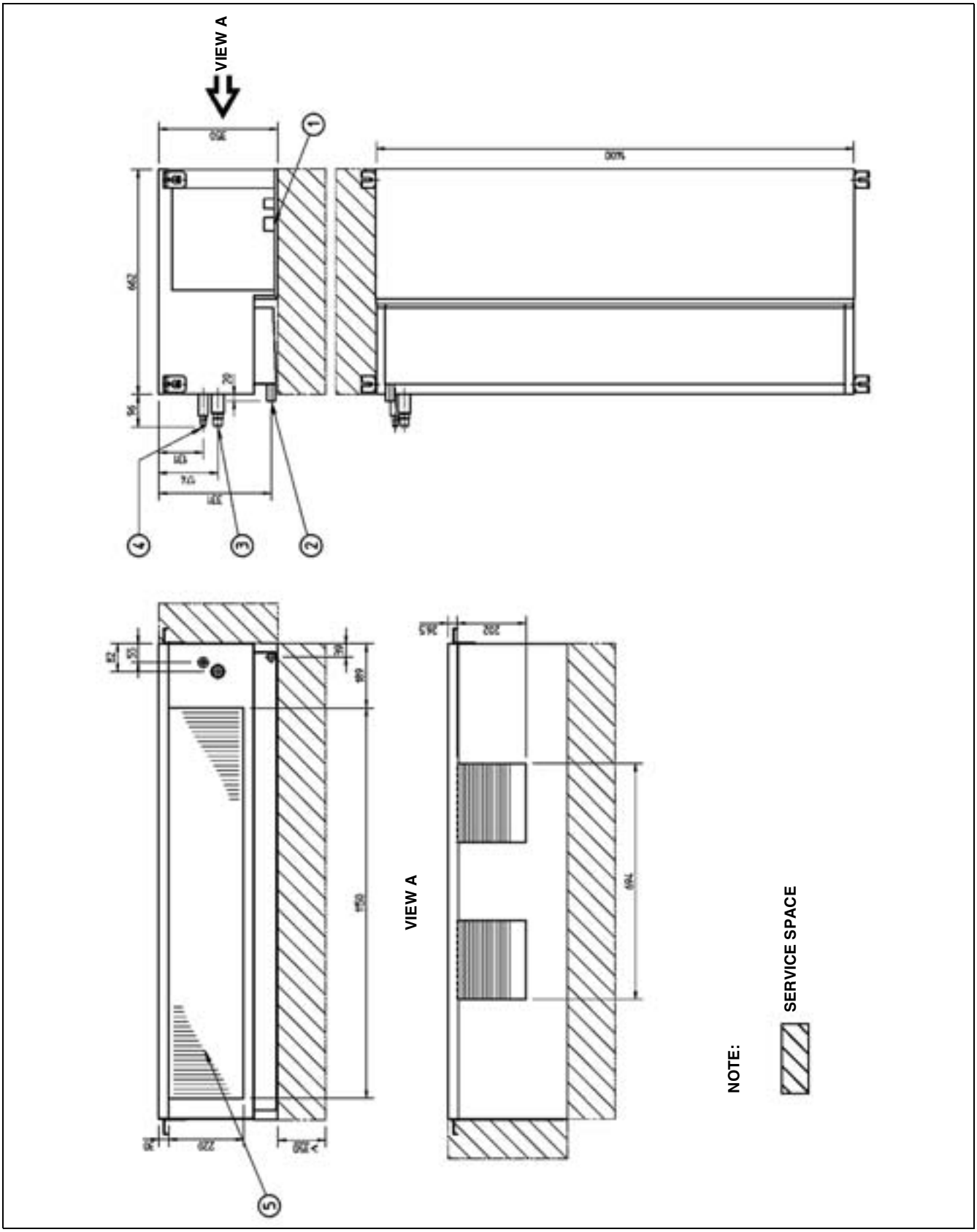
No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Remote controller wiring connection
5	Power supply connection
6	Drain hole
7	Air filter
8	Air suction side
9	Air discharge side
10	Nameplate

1

2.8 FDQ125B7V3B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

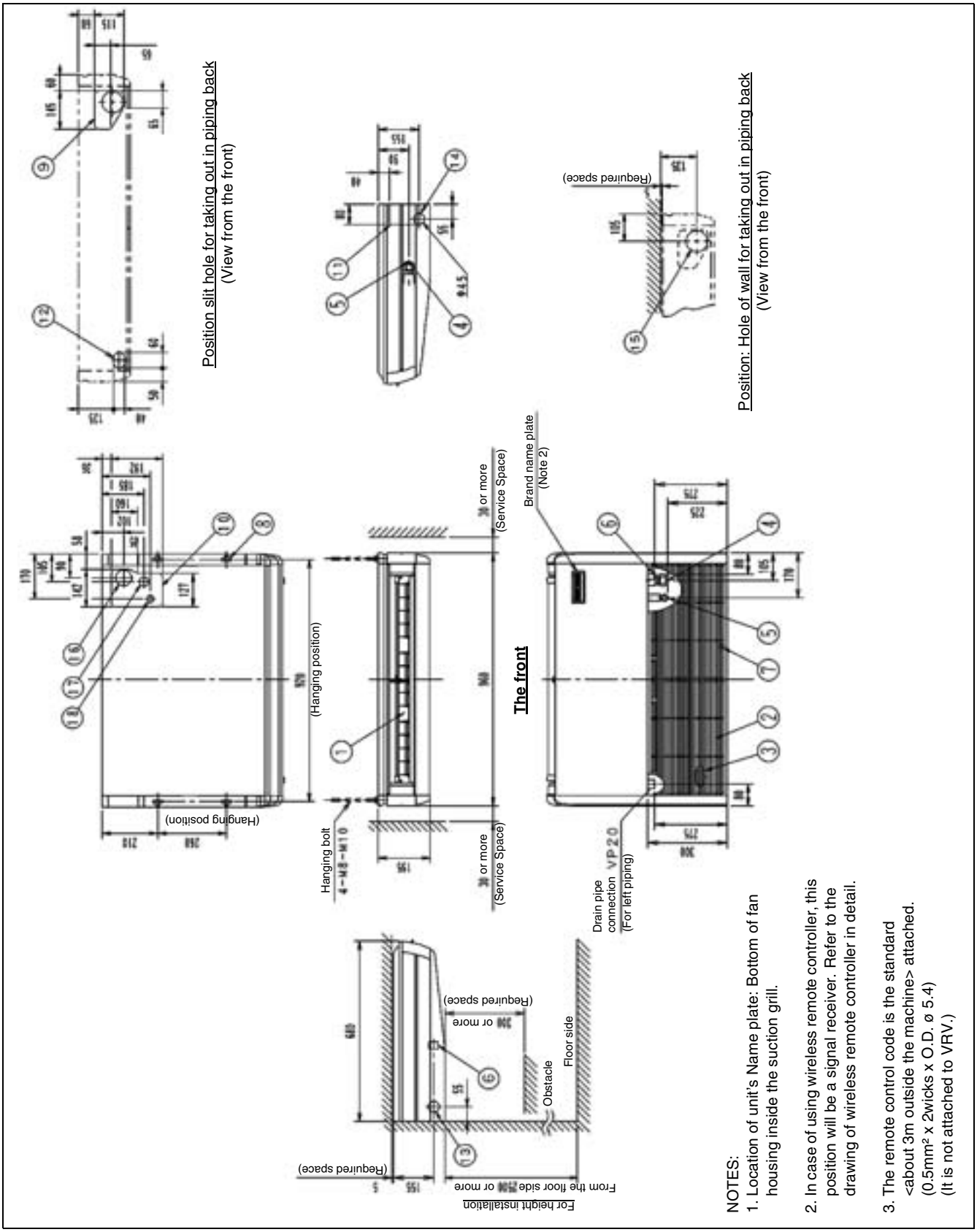
No.	Component
1	Power supply intake
2	Drain connection
3	Gas pipe connection single union
4	Liquid pipe connection single union
5	Filter

1

2.9 FHQ35BUV1 & FHQ50BUV1

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

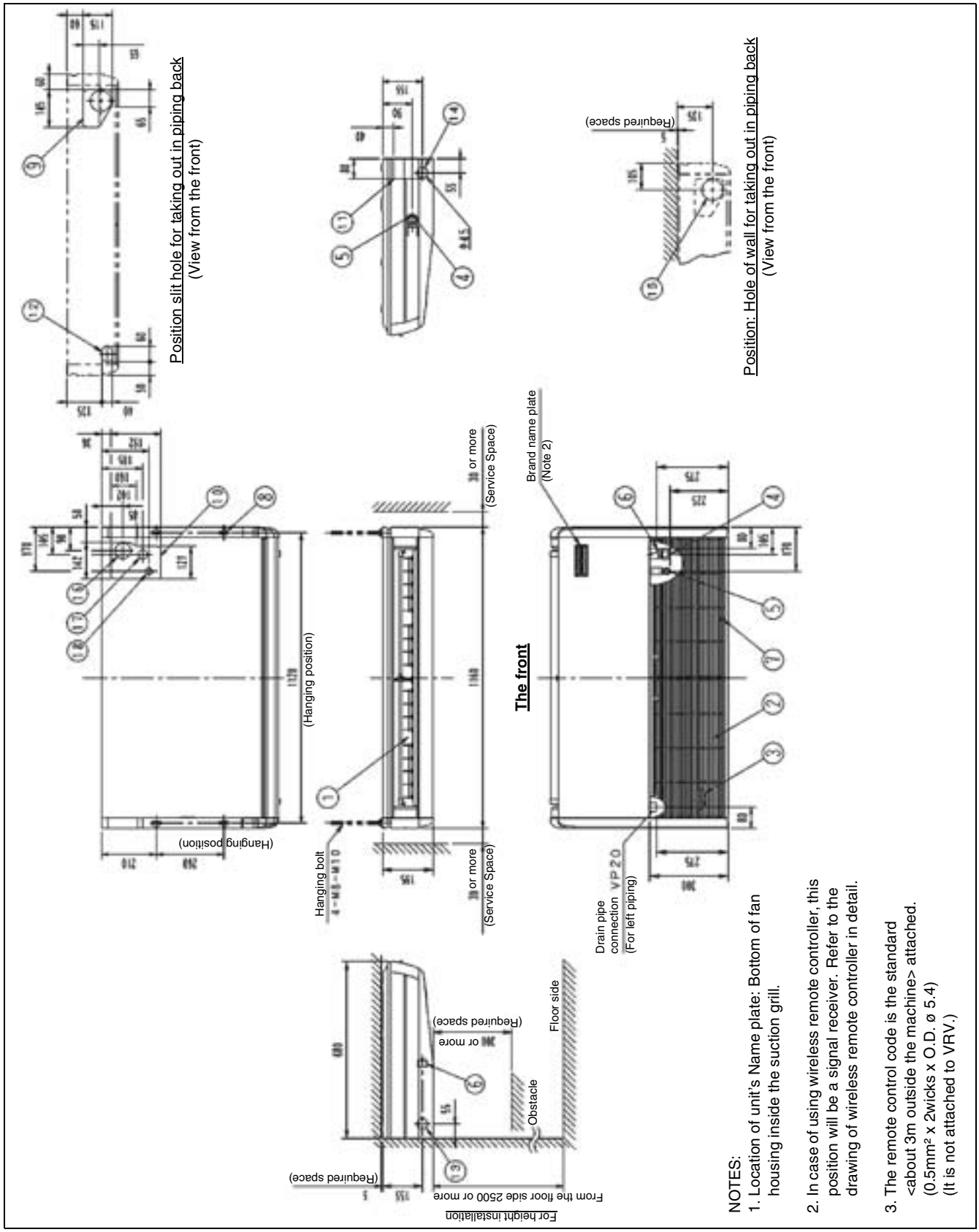
No.	Component
1	Air discharge grille
2	Air suction grille
3	Air filter
4	Gas pipe connection
5	Liquid pipe connection
6	Drain pipe connection
7	Earth terminal (Inside the electric components box)
8	Suspention bracket
9	Backward piping and wiring connection opening lid
10	Upward piping and wiring connection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

1

2.10 FHQ60BUV1 & FHQ71BUV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

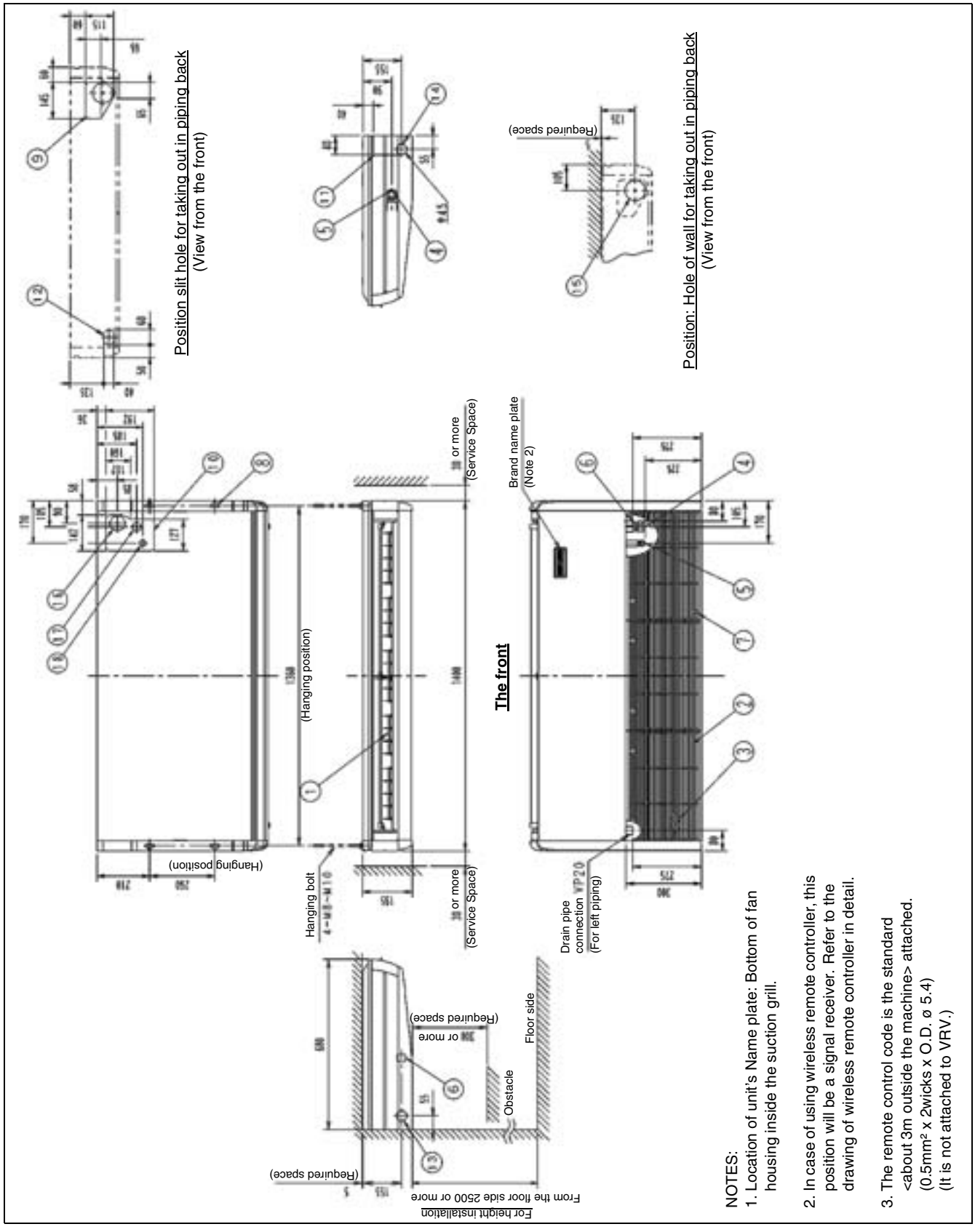
No.	Component
1	Air discharge grille
2	Air suction grille
3	Air filter
4	Gas pipe connection
5	Liquid pipe connection
6	Drain pipe connection
7	Earth terminal (Inside the electric components box)
8	Suspention bracket
9	Backward piping and wiring connection opening lid
10	Upward piping and wiring connection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

1

2.11 FHQ100BUV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

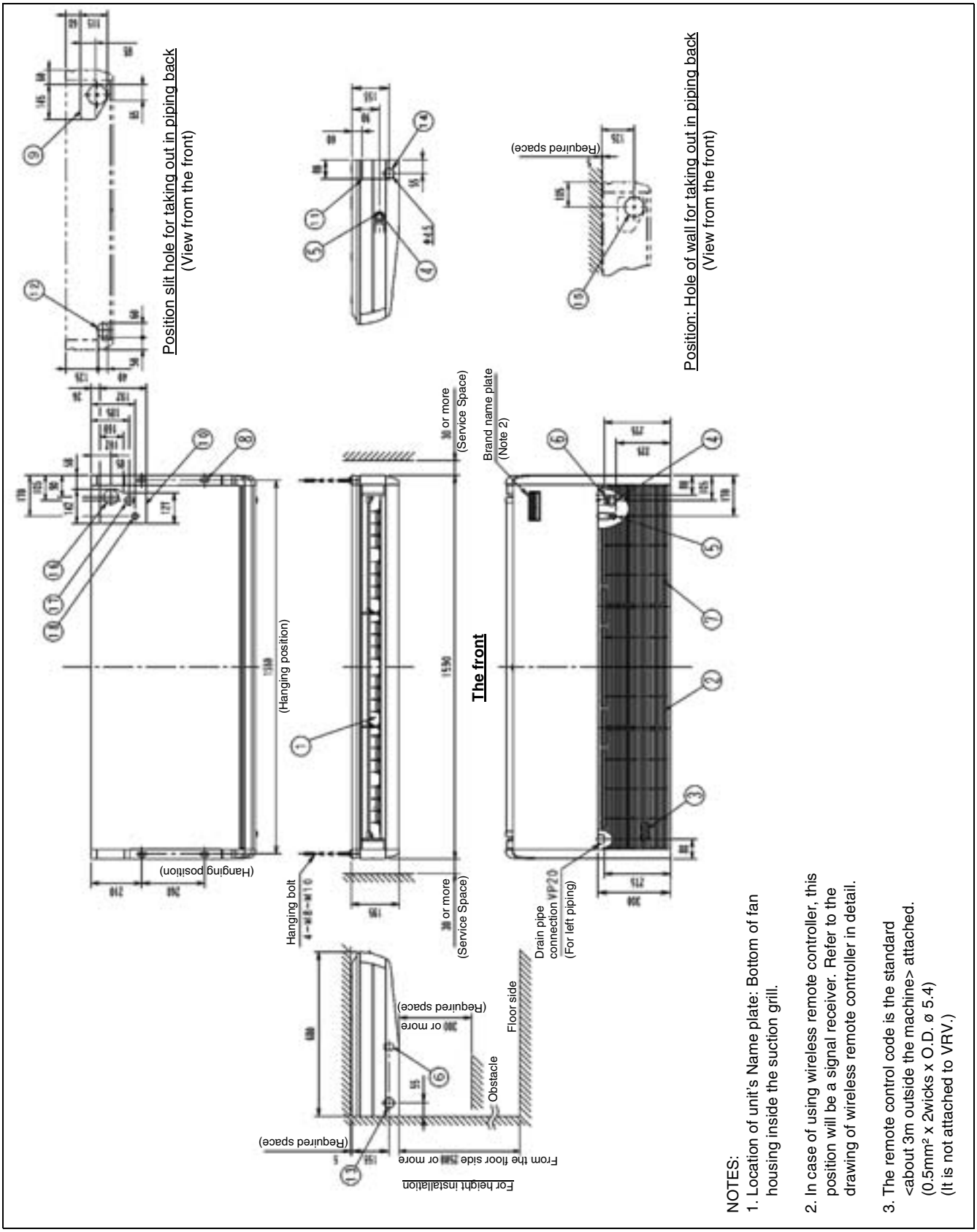
No.	Component
1	Air discharge grille
2	Air suction grille
3	Air filter
4	Gas pipe connection
5	Liquid pipe connection
6	Drain pipe connection
7	Earth terminal (Inside the electric components box)
8	Suspention bracket
9	Backward piping and wiring connection opening lid
10	Upward piping and wiring connection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

1

2.12 FHQ125BUV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

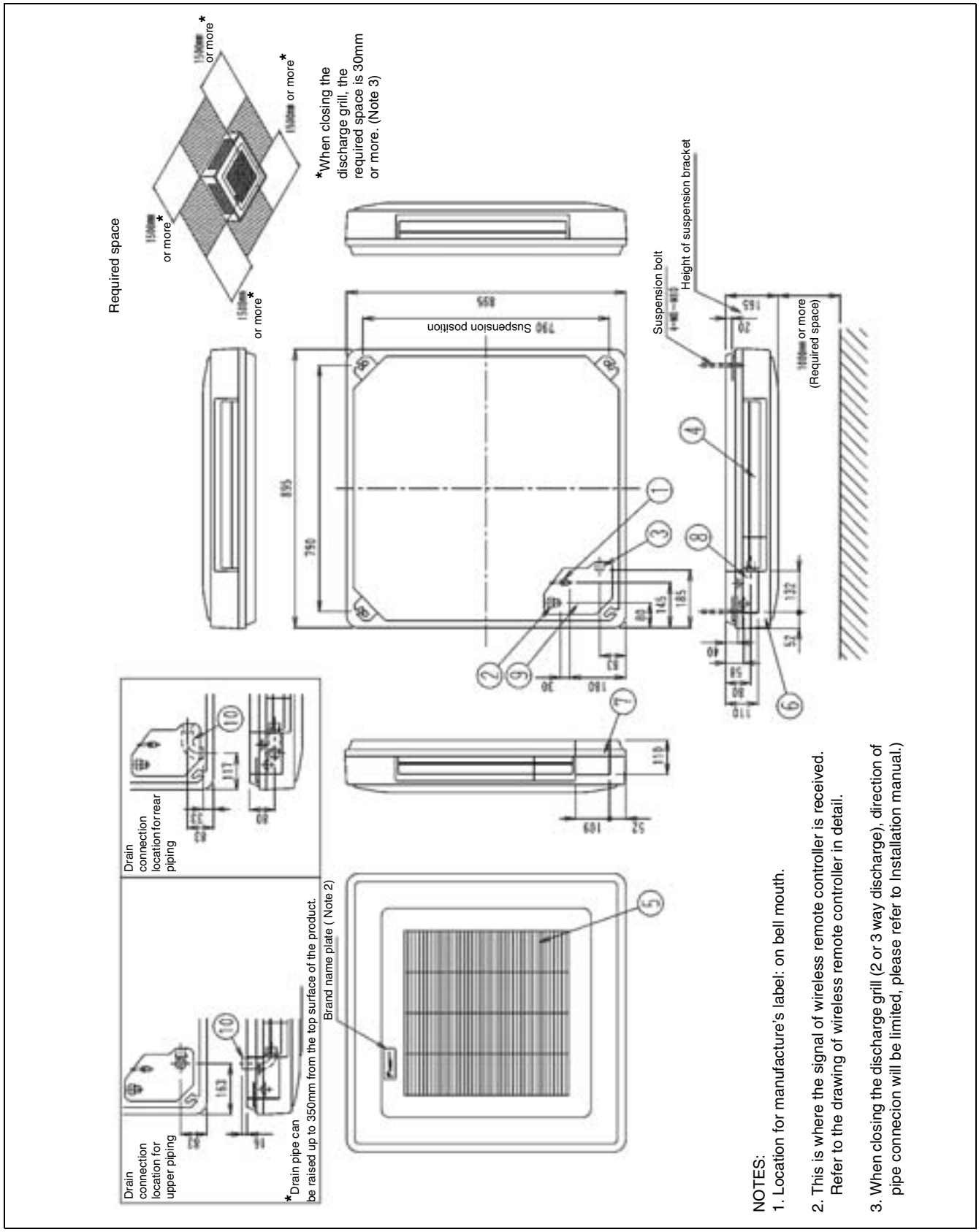
No.	Component
1	Air discharge grille
2	Air suction grille
3	Air filter
4	Gas pipe connection
5	Liquid pipe connection
6	Drain pipe connection
7	Earth terminal (Inside the electric components box)
8	Suspention bracket
9	Backward piping and wiring connection opening lid
10	Upward piping and wiring connection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

1

2.13 FUQ71BUV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

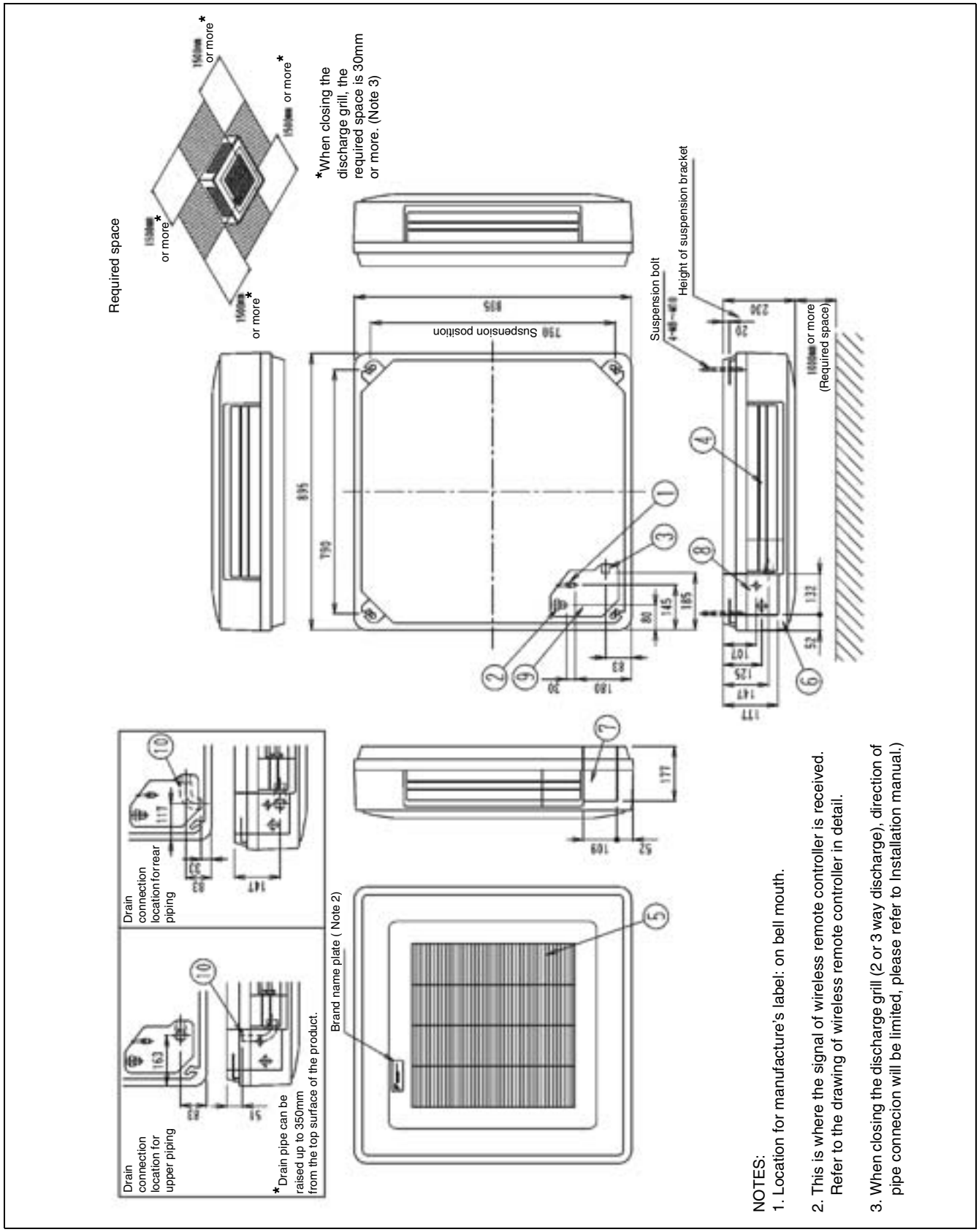
No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Air outlet
5	Air suction grille
6	Corner decoration cover
7	Right pipe/wiring connection
8	Rear pipe/wiring connection
9	Pipe through cover
10	Accessory drain elbow

1

2.14 FUQ100~125BUV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

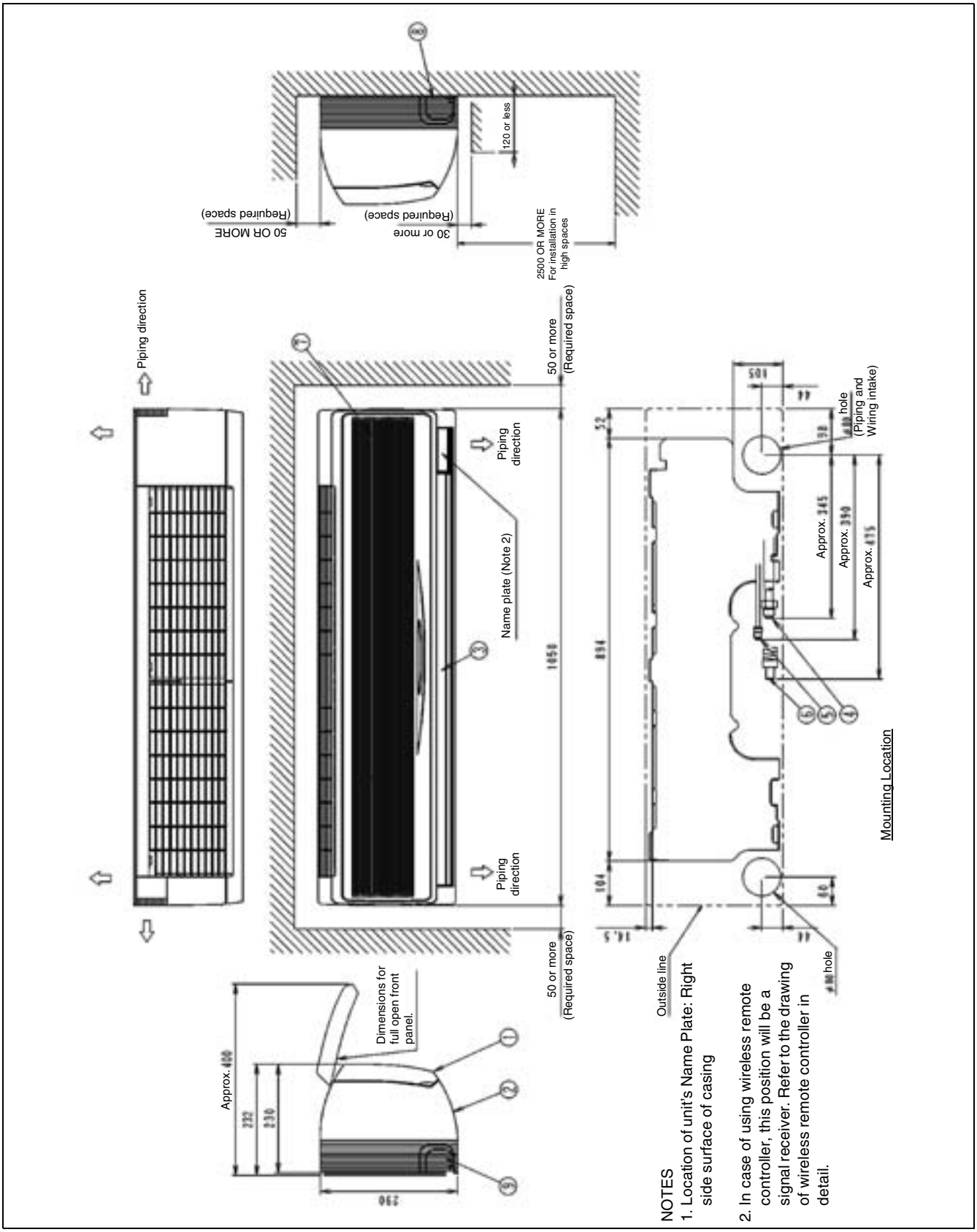
No.	Component
1	Liquid pipe connection
2	Gas pipe connection
3	Drain pipe connection
4	Air outlet
5	Air suction grille
6	Corner decoration cover
7	Right pipe/wiring connection
8	Rear pipe/wiring connection
9	Pipe through cover
10	Accessory drain elbow

1

2.15 FAQ71BUV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

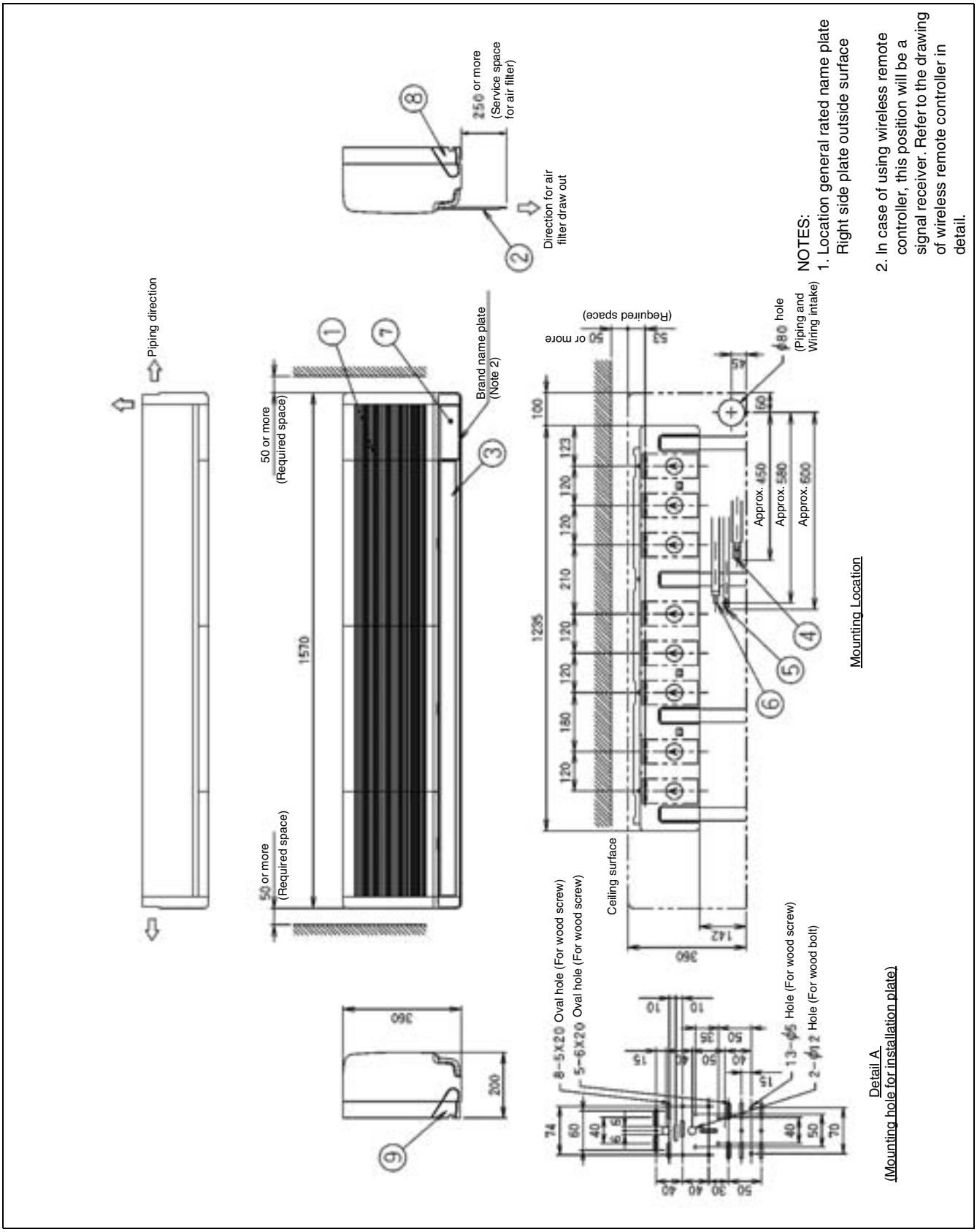
No.	Component
1	Front panel
2	Front grille
3	Air outlet
4	Gas pipe
5	Liquid pipe
6	Drain hose
7	Grounding terminal
8	Right side pipe connection hole
9	Left side pipe connection hole

1

2.16 FAQ100BUV1B

Outlook and dimensions

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



Components

The table below contains the different components of the unit.

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

1

3 Specifications

3.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- ➤ Technical specifications
- ➤ Electrical specifications
- ➤ Electrical data

Outdoor units

This chapter contains the following specifications:

Specifications	See page
3.2–RZQ71, RZQ100 and RZQ125	1–44

Indoor units

This chapter contains the following specifications:

Specifications	See page
3.3–FCQ	1–47
3.4–FFQ	1–48
3.5–FBQ	1–49
3.6–FDQ	1–50
3.7–FHQ	1–51
3.8–FUQ	1–52
3.9–FAQ	1–53

1

3.2 RZQ71, RZQ100 and RZQ125

Technical specifications

The table below contains the technical specifications.

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

Electrical specifications

The table below contains the electrical specifications.

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

Electrical data

Unit combination		Power supply					Compressor		OFM		IFM	
Indoor unit	Outdoor unit	Hz-Volts	Voltage range	MCA	TOCA	MFA	MSC	RLA	kW	FLA	kW	FLA
FCQ71B7V3B	RZQ71B7V3B	50-230	Max.50Hz-253V Min.50Hz-207V	17.1	17.1	20	16.2	16.2	0.07	0.3	0.045	0.6
FCQ35B7V1x2	RZQ71B7V3B	50-230		17.7	17.7	20	16.2	16.2	0.07	0.3	0.045x2	0.6x2
FFQ35BV1Bx2	RZQ71B7V3B	50-230		17.7	17.7	20	16.2	16.2	0.07	0.3	0.055x2	0.6x2
FBQ71B7V3B	RZQ71B7V3B	50-230		17.4	17.4	20	16.2	16.2	0.07	0.3	0.125	0.9
FBQ35B7V1x2	RZQ71B7V3B	50-230		17.5	17.5	20	16.2	16.2	0.07	0.3	0.065x2	0.5x2
FHQ71BUV1B	RZQ71B7V3B	50-230		17.1	17.1	20	16.2	16.2	0.07	0.3	0.062	0.6
FHQ35BUV1Bx2	RZQ71B7V3B	50-230		17.7	17.7	20	16.2	16.2	0.07	0.3	0.062x2	0.6x2
FAQ71BUV1B	RZQ71B7V3B	50-230		16.8	16.8	20	16.2	16.2	0.07	0.3	0.043	0.3
FUQ71BUV1B	RZQ71B7V3B	50-230		17.2	17.2	20	16.2	16.2	0.07	0.3	0.045	0.7
FCQ100B7V3B	RZQ100B7V3B	50-230	Max.50Hz-253V Min.50Hz-207V	21.0	21.0	30	19.4	19.4	0.07+0.07	0.3+0.3	0.090	1.0
FCQ50B7V1x2	RZQ100B7V3B	50-230		21.2	21.2	30	19.4	19.4	0.07+0.07	0.3+0.3	0.045x2	0.6x2
FCQ35B7V1x3	RZQ100B7V3B	50-230		21.8	21.8	30	19.4	19.4	0.07+0.07	0.3+0.3	0.045x3	0.6x3
FFQ50BV1Bx2	RZQ100B7V3B	50-230		21.4	21.4	30	19.4	19.4	0.07+0.07	0.3+0.3	0.055x2	0.7x2
FFQ35BV1Bx3	RZQ100B7V3B	50-230		21.8	21.8	30	19.4	19.4	0.07+0.07	0.3+0.3	0.055x3	0.6x3
FBQ100B7V3B	RZQ100B7V3B	50-230		21.0	21.0	30	19.4	19.4	0.07+0.07	0.3+0.3	0.135	1.0
FBQ50B7V1x2	RZQ100B7V3B	50-230		21.4	21.4	30	19.4	19.4	0.07+0.07	0.3+0.3	0.085x2	0.7x2
FBQ35B7V1x3	RZQ100B7V3B	50-230		21.5	21.5	30	19.4	19.4	0.07+0.07	0.3+0.3	0.065x3	0.5x3
FHQ100BUV1B	RZQ100B7V3B	50-230		20.7	20.7	30	19.4	19.4	0.07+0.07	0.3+0.3	0.130	0.7
FHQ50BUV1Bx2	RZQ100B7V3B	50-230		21.2	21.2	30	19.4	19.4	0.07+0.07	0.3+0.3	0.062x2	0.6x2
FHQ35BUV1Bx3	RZQ100B7V3B	50-230		21.8	21.8	30	19.4	19.4	0.07+0.07	0.3+0.3	0.062x3	0.6x3
FAQ100BUV1B	RZQ100B7V3B	50-230		20.4	20.4	30	19.4	19.4	0.07+0.07	0.3+0.3	0.049	0.4
FUQ100BUV1B	RZQ100B7V3B	50-230		21.1	21.1	30	19.4	19.4	0.07+0.07	0.3+0.3	0.090	1.1

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Unit combination		Power supply					Compressor		OFM		IFM	
FCQ125B7V3B	RZQ125B7V3B	50-230		25.0	25.0	30	23.4	23.4	0.07+0.07	0.3+0.3	0.090	1.0
FCQ60B7V1x2	RZQ125B7V3B	50-230		25.2	25.2	30	23.4	23.4	0.07+0.07	0.3+0.3	0.045x2	0.6x2
FCQ50B7V1x3	RZQ125B7V3B	50-230		25.8	25.8	30	23.4	23.4	0.07+0.07	0.3+0.3	0.045x3	0.6x3
FCQ35B7V1x4	RZQ125B7V3B	50-230		26.4	26.4	30	23.4	23.4	0.07+0.07	0.3+0.3	0.045x4	0.6x4
FFQ60BV1Bx2	RZQ125B7V3B	50-230		25.4	25.4	30	23.4	23.4	0.07+0.07	0.3+0.3	0.055x2	0.7x2
FFQ50BV1Bx3	RZQ125B7V3B	50-230		26.1	26.1	30	23.4	23.4	0.07+0.07	0.3+0.3	0.055x3	0.7x3
FFQ35BV1Bx4	RZQ125B7V3B	50-230		26.4	26.4	30	23.4	23.4	0.07+0.07	0.3+0.3	0.055x4	0.6x4
FBQ125B7V3B	RZQ125B7V3B	50-230		25.4	25.4	30	23.4	23.4	0.07+0.07	0.3+0.3	0.225	1.4
FBQ60B7V1x2	RZQ125B7V3B	50-230	Max.50Hz-253V Min.50Hz-207V	25.8	25.8	30	23.4	23.4	0.07+0.07	0.3+0.3	0.125x2	0.9x2
FBQ50B7V1x3	RZQ125B7V3B	50-230		26.1	26.1	30	23.4	23.4	0.07+0.07	0.3+0.3	0.085x3	0.7x3
FBQ35B7V1x4	RZQ125B7V3B	50-230		26.0	26.0	30	23.4	23.4	0.07+0.07	0.3+0.3	0.065x4	0.5x4
FHQ125BUV1B	RZQ125B7V3B	50-230		24.7	24.7	30	23.4	23.4	0.07+0.07	0.3+0.3	0.130	0.7
FHQ60BUV1Bx2	RZQ125B7V3B	50-230		25.2	25.2	30	23.4	23.4	0.07+0.07	0.3+0.3	0.062x2	0.6x2
FHQ50BUV1Bx3	RZQ125B7V3B	50-230		25.8	25.8	30	23.4	23.4	0.07+0.07	0.3+0.3	0.062x3	0.6x3
FHQ35BUV1Bx4	RZQ125B7V3B	50-230		26.4	26.4	30	23.4	23.4	0.07+0.07	0.3+0.3	0.062x4	0.6x4
FUQ125BUV1B	RZQ125B7V3B	50-230		25.1	25.1	30	23.4	23.4	0.07+0.07	0.3+0.3	0.090	1.1
FDQ125B7V3B	RZQ125B7V3B	50-230		28.2	28.2	30	23.4	23.4	0.07+0.07	0.3+0.3	0.500	4.2

Symbols:

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

Notes:

1 RLA is based on the following conditions:
- ➤ Power supply: 50Hz 230V
- ➤ Indoor temp. - cooling: 27°C DB/19.0°C WB
- ➤ Indoor temp. - heating: 20.0°C DB
- ➤ Outdoor temp. - cooling: 35.0°C DB
- ➤ Outdoor temp. - heating: 7.0°C DB/6.0°C WB

2 TOCA means the total value of each OC set.

3 Voltage range
Units are suitable for use on electrical systems where voltage supplied to unit terminals is not below or above listed range limits.

4 Maximum allowable voltage variation between phases is 2%.

5 MCA represents maximum input current.
MFA represents capacity which may accept MCA. (Next lower standard fuse rating, minimum 15A)

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

7 MFA is used to select the circuit breaker and the ground fault circuit interruptor. (earth leakage circuit breaker)

3.3 FCQ

Technical specifications

The table below contains the technical specifications.

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

Electrical specifications

The table below contains the electrical specifications.

Specification		FCQ35B7V1	FCQ50B7V1	FCQ60B7V1	FCQ71B7V3B	FCQ100B7V3B	FCQ125B7V3B
Unit	Phase	1~					
	Voltage	230V					
	Frequency	50 Hz					
Fan motor	FLA (Full Load Amps)	0.6 A					
	Power consumption	140 W					
	No. of motors x output	1 x 45 W					

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3.4 FFQ

Technical specifications

The table below contains the technical specifications.

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

Electrical specifications

The table below contains the electrical specifications.

Specification		FFQ35BV1B	FFQ50BV1B	FFQ60BV1B
Unit	Phase	1~		
	Voltage	230V		
	Frequency	50 Hz		
Fan motor	Running current (cooling)	0.40 A	0.49 A	0.61 A
	Running current (heating)	0.36 A	–	0.56 A
	Power consumption (cooling)	84 W	97 W	120 W
	Power consumption (heating)	76 W	–	111 W
	No. of motors x output	1 x 55 W		

3.5 FBQ

Technical specifications

The table below contains the technical specifications.

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

Electrical specifications

The table below contains the electrical specifications.

Specification		FBQ35B7V1	FBQ50B7V1	FBQ60B7V1	FBQ71B7V3B	FBQ100B7V3B	FBQ125B7V3B
Unit	Phase	1~					
	Voltage	230 V					
	Frequency	50Hz					
Fan motor	Nominal running current	0.5 A	0.7 A	0.9 A			
	Power consumption	65 W	85 W	125 W			
	No. of motors x output	1 x 65 W	1 x 85 W	1 x 125 W	1 x 125 W	1 x 135 W	1 x 225 W

1

3.6 FDQ

Technical specifications

The table below contains the technical specifications.

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

Electrical specifications

The table below contains the electrical specifications.

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

3.7 FHQ

Technical specifications

The table below contains the technical specifications.

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

Electrical specifications

The table below contains the electrical specifications.

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

1

3.8 FUQ

Technical specifications

The table below contains the technical specifications.

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

Electrical specifications

The table below contains the electrical specifications.

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

3.9 FAQ

Technical specifications

The table below contains the technical specifications.

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

Electrical specifications

The table below contains the electrical specifications.

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

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4 Functional Diagrams

4.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- ➤ Functional diagrams
- ➤ Pipe connection diameters.

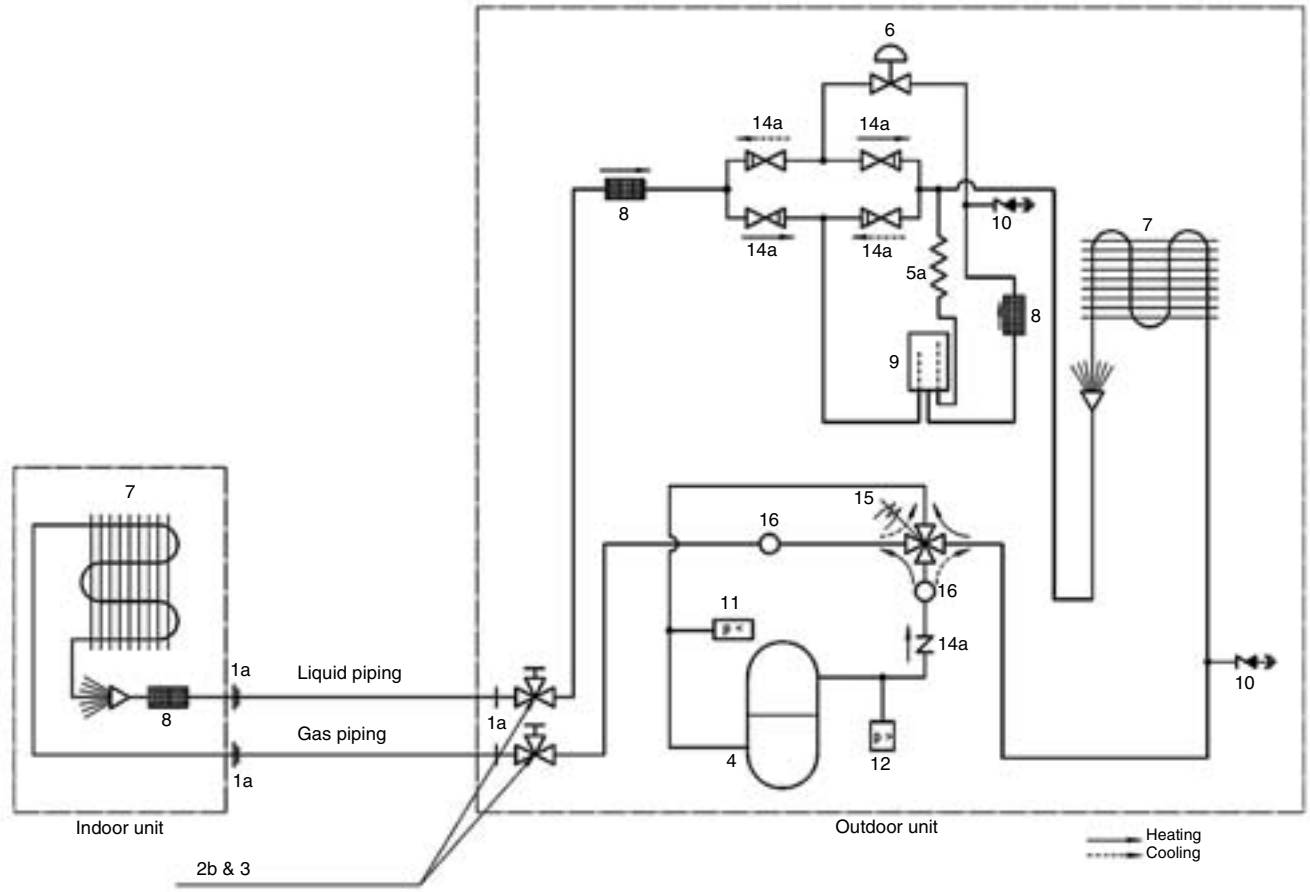
Functional diagrams

This chapter contains the following functional diagrams:

1

4.2 Pair system

RZQ71



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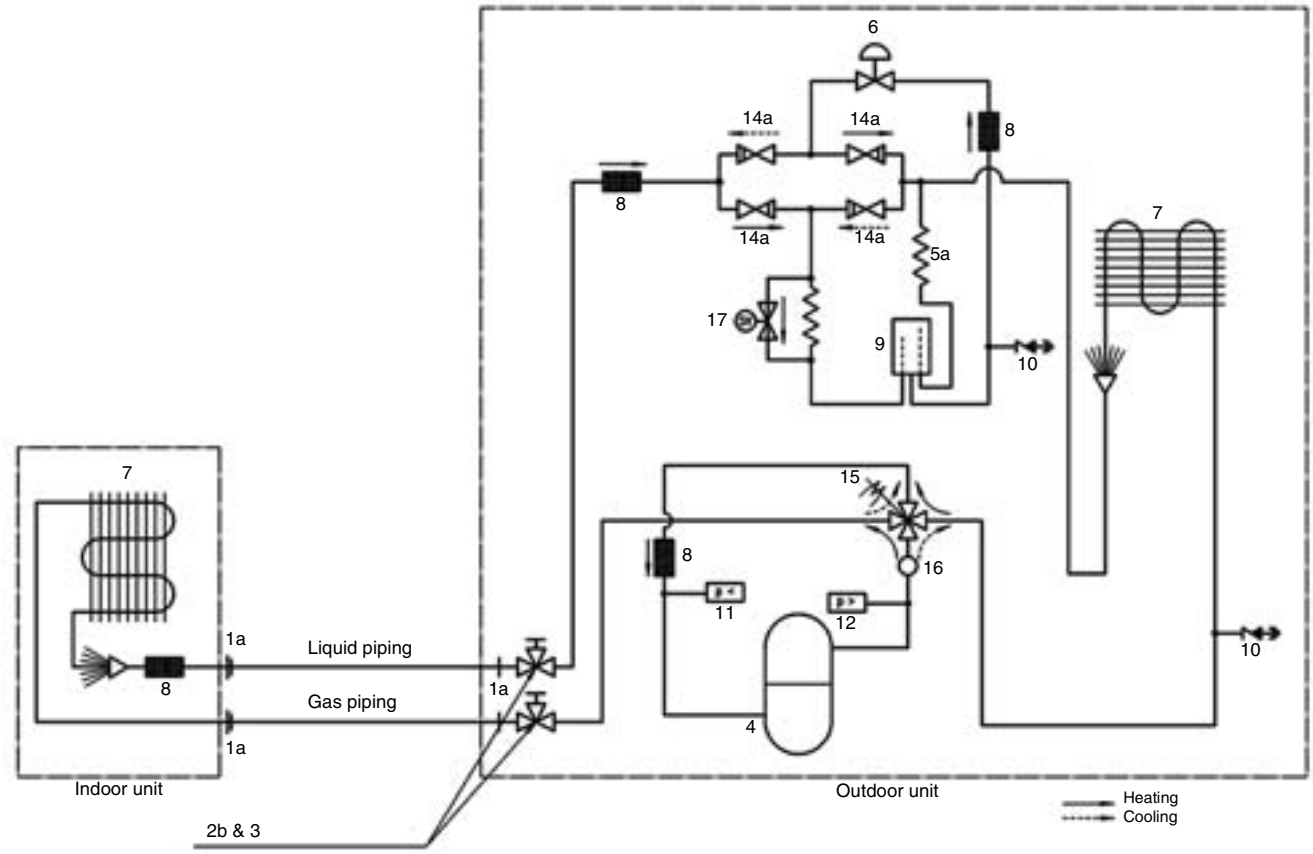
RZQ100~125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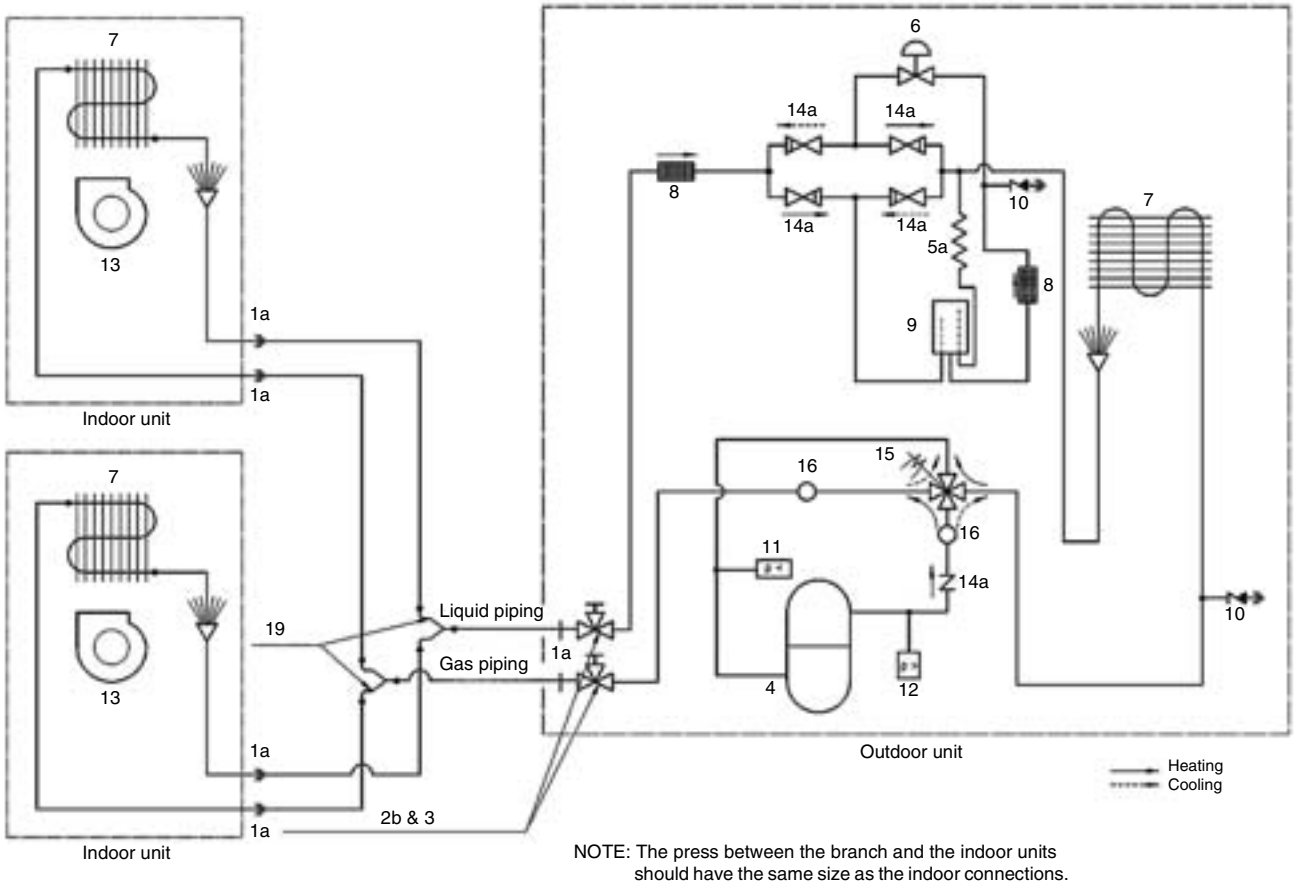
14a
14a
8
8
14a
14a
5a
7
17
9
10
7
15
8
16
11
12
10
1a
Liquid piping
8
1a
Gas piping
1a
4
Indoor unit
Outdoor unit
Heating
Cooling
2b & 3

1

4.3 Twin System

RZQ71



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

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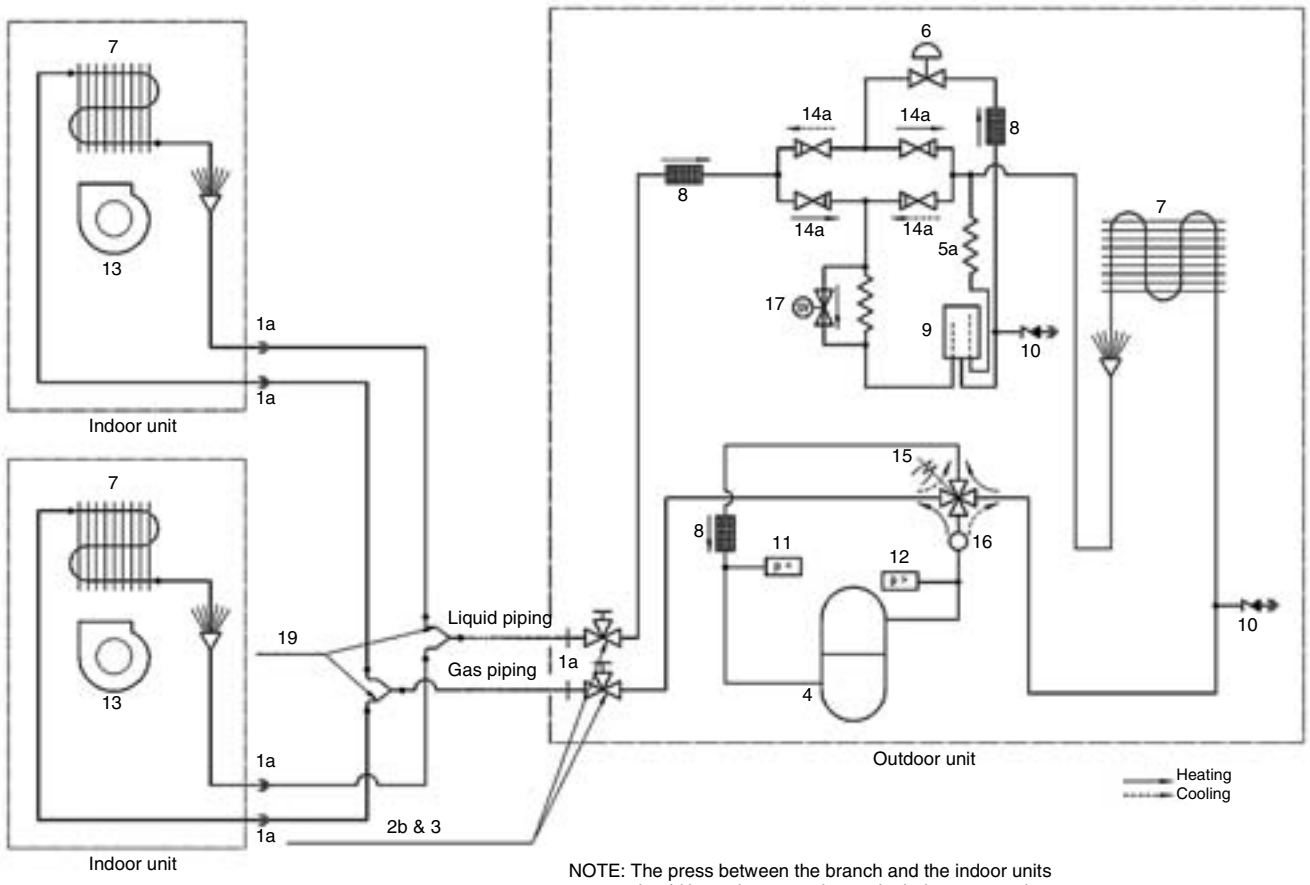
RZQ100~125



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

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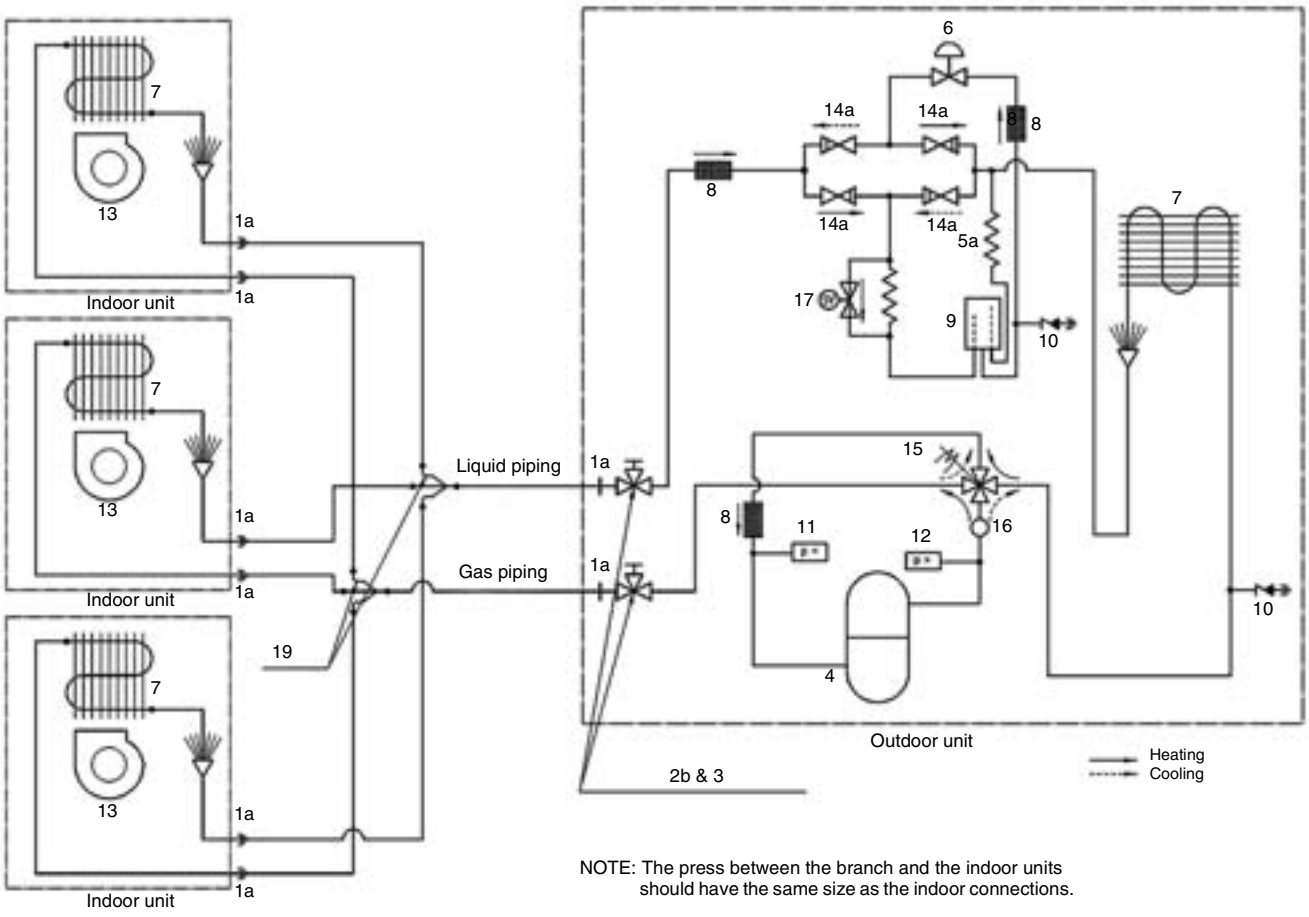
4.4 Triple System

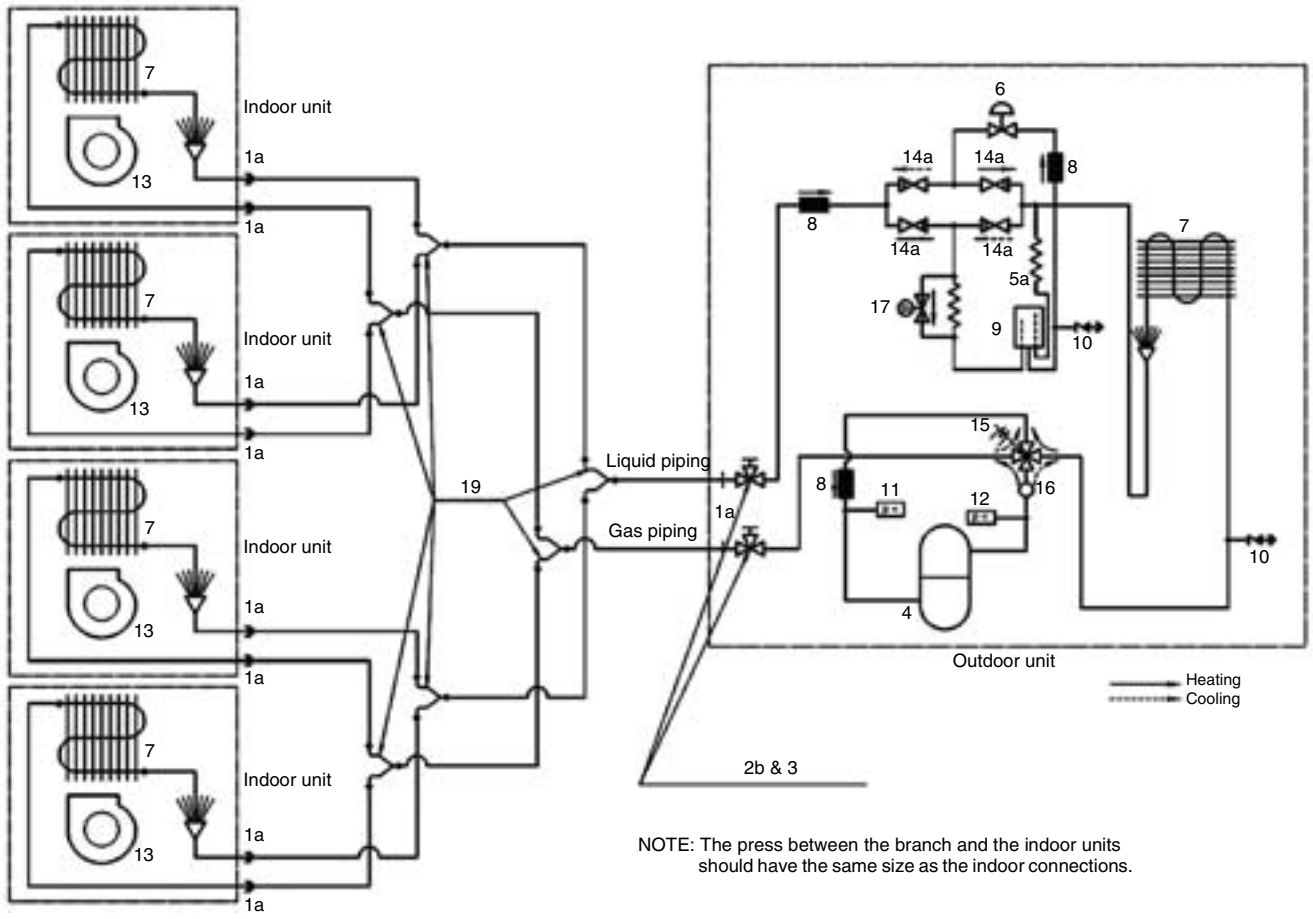
RZQ100~125



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

4.5 Double Twin System

RZQ100~125

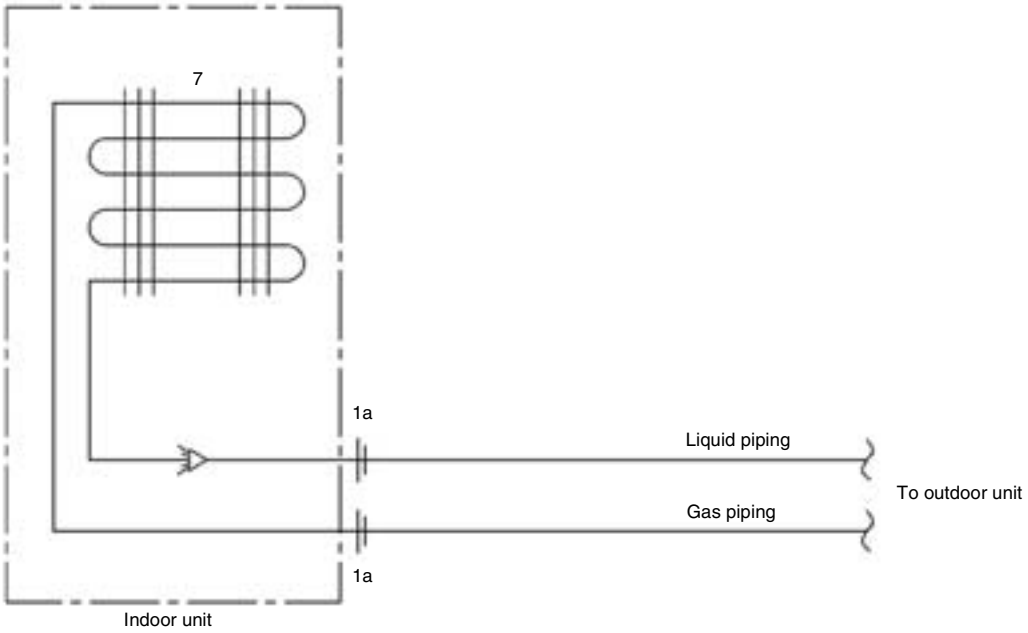


NOTE: The press between the branch and the indoor units should have the same size as the indoor connections.

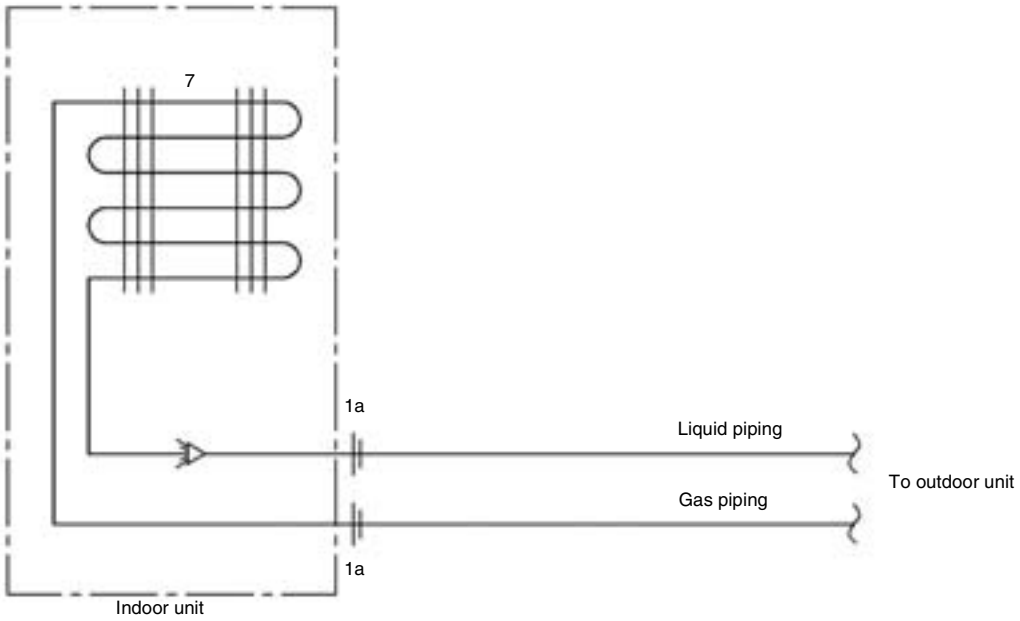
1

4.6 Indoor piping

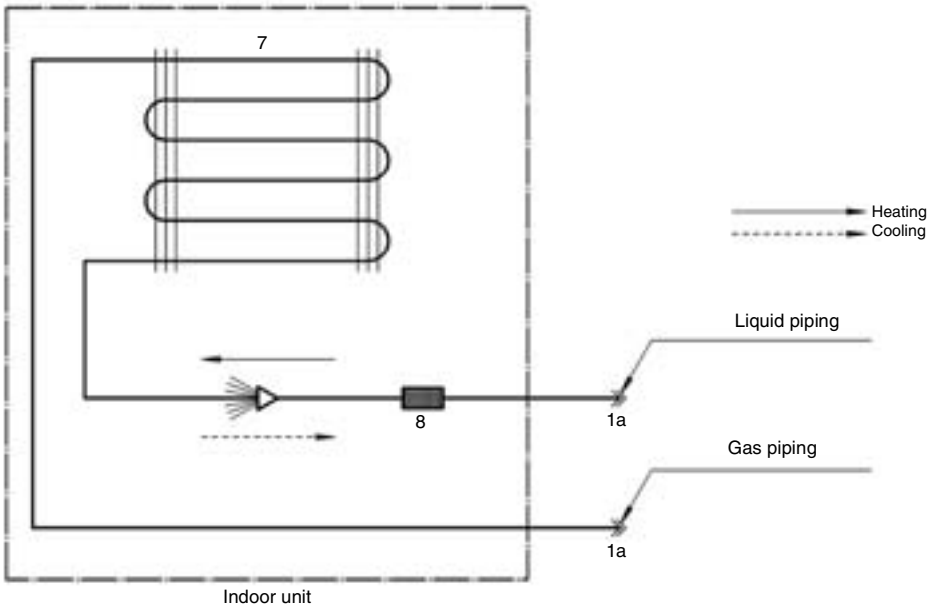
FFQ



FHQ, FUQ, FAQ



FCQ, FBQ, FDQ


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

1

4.7 Pipe connection diameters

Outdoor units

The table below contains the refrigerant pipe connection diameters.

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

Indoor units

The table below contains the refrigerant pipe connection diameters.

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

1

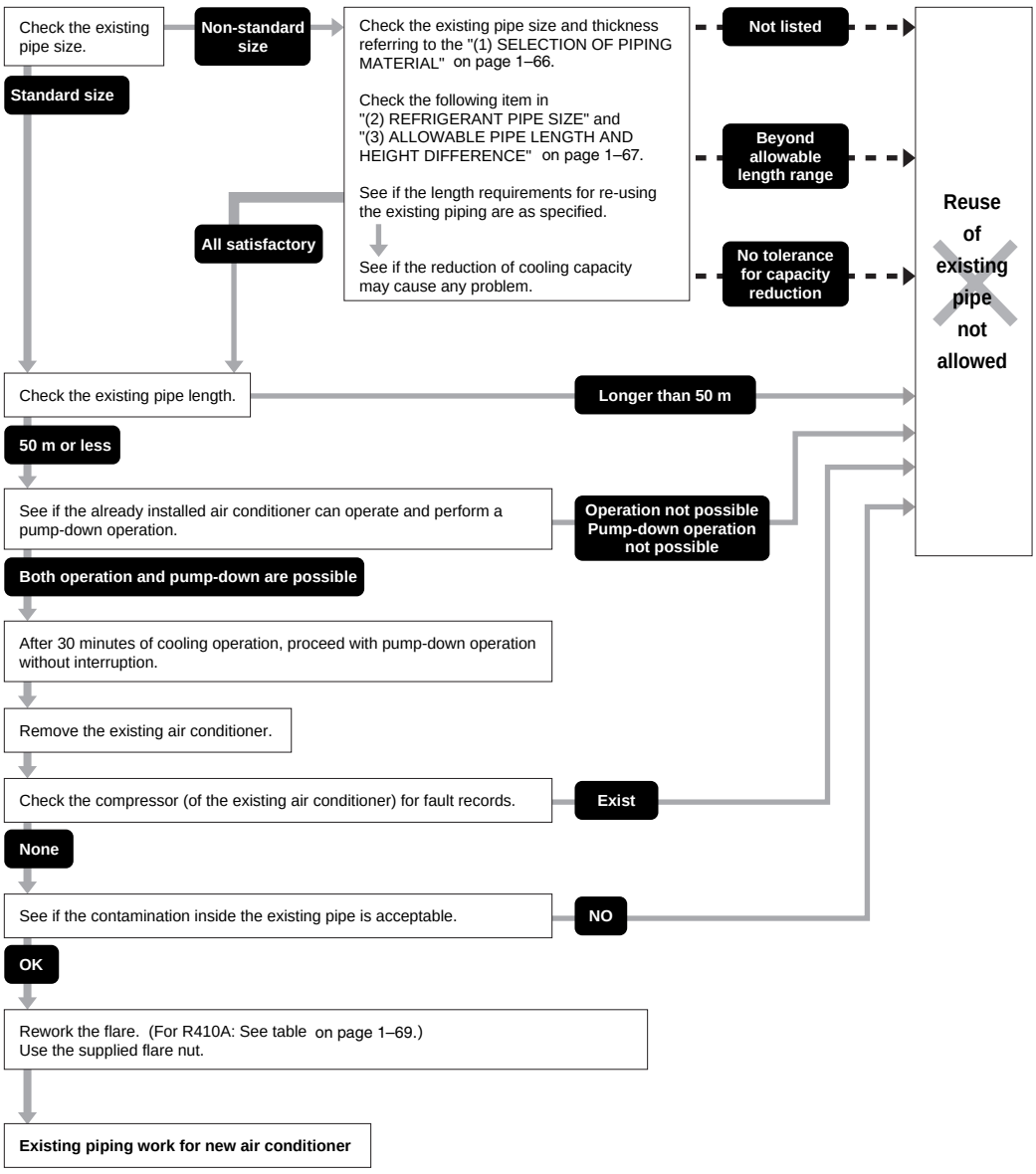
4.8 Re-using existing field piping

Introduction

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

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

How to re-use existing piping?



Notes:

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

Caution:

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

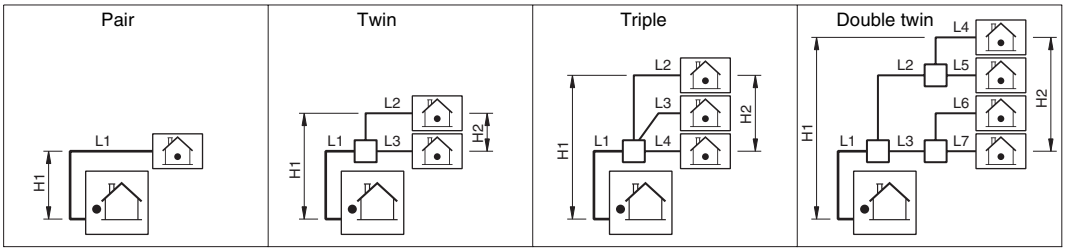
1

Precautions on refrigerant piping

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

Notes for Twin, Triple and Double Twin

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



Selection of piping material

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

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

O = Annealed

1/2H = Half hard

1

Refrigerant pipe size

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

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

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

1

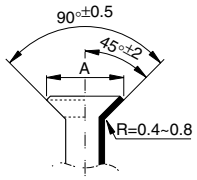
Allowable pipe length and heigth difference

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

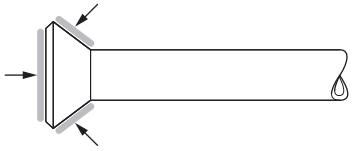
	Liquid pipe size	Model RZQ-B7 71	100	125
Maximum allowable piping length (*)				
Pair: L1 Twin and triple: L1 + L2 Double twin: L1 + L2 + L4	size-down	10 m (15 m)		
	standard	**50 m (70 m)**	**50 m (70 m)**	**50 m (70 m)**
	size-up	25 m (35 m)	35 m (45 m)	35 m (45 m)
Maximum total one-way piping length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

Caution for flare connections

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

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

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



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

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4.9 Piping Components

Components

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

No.	Component	Function / remark
1a	Flare connection	See pipe connection diameter.
2a	Liquid stop valve	The liquid stop valve is used as shut-off valve in case of a pump-down.
2b	Liquid stop valve with service port	
3	Gas stop valve with service port	The gas stop valve is used as shut-off valve in case of a pump-down.
4	Compressor	The compressor can restart after 3 min from last stop.
5a	Capillary tube	The capillary tube allows pressure equalization during a compressor OFF-cycle.
5b		The capillary tube expands the liquid to enable evaporation in the evaporator.
6	Electronic expansion valve	The expansion valve expands the liquid to enable evaporation in the evaporator. The opening degree is controlled to obtain the optimum discharge temperature.
7	Heat exchanger	The heat exchanger is of the multi louvre fin type. Hi-X -tubes and coated waffle louvre fins are used.
8	Filter	The filter is used to collect impurities, which may enter the system during installation and is also used to avoid blockage of the capillaries and other fine mechanical parts of the unit.
9	Liquid receiver	The liquid receiver is used to make sure only completely liquefied refrigerant is sent to the expansion valve. It is also used as a container in which surplus refrigerant is stored.
10	Check valve with service port	The check valve allows you to connect a gauge.
11	Low-pressure switch	The low-pressure switch stops the operation of the unit when the pressure becomes abnormally low.
12	High-pressure switch	The high-pressure switch stops the operation of the unit when the pressure becomes abnormally high.
13	Propeller fan and fan motor	The propeller fan creates air displacement across the heat exhanger.
14a	One-way valve	The one-way valve is used to force the refrigerant liquid to flow through the receiver and the expansion valve in the same direction both in cooling and heating.
14b		The one-way valve is used to release overpressure in the liquid receiver during stand-still.
15	4-way valve (reversing solenoid valve)	The 4-way valve is used to select refrigerant flow in cooling or heating mode. When the 4-way valve switches from ON to OFF, a timer starts counting up to 150 as soon as the cooling or defrosting operation is stopped. This delay time is to eliminate the switching sound.
16	Muffler	The muffler is used to absorb the refrigerant noise from the compressor.
17	Solenoid valve	➤ Y1S: Capacity control solenoid valve ➤ Y3S: Liquid injection solenoid valve ➤ SV: Solenoid valve (Purge liquid receiver)
18	Thermistor	➤ R1T: Air thermistor ➤ R2T: Coil thermistor ➤ R3T: Discharge pipe thermistor
19	Branch pipe	

5 Switch Box Layout

5.1 What Is in This Chapter?

Introduction

This chapter shows the switch box components.

Outdoor units

This chapter contains the following switch box layouts:

Switch box layout	See page
5.2–RZQ71B7V3B	1–74
5.3–RZQ100B7V3B	1–75

Indoor units

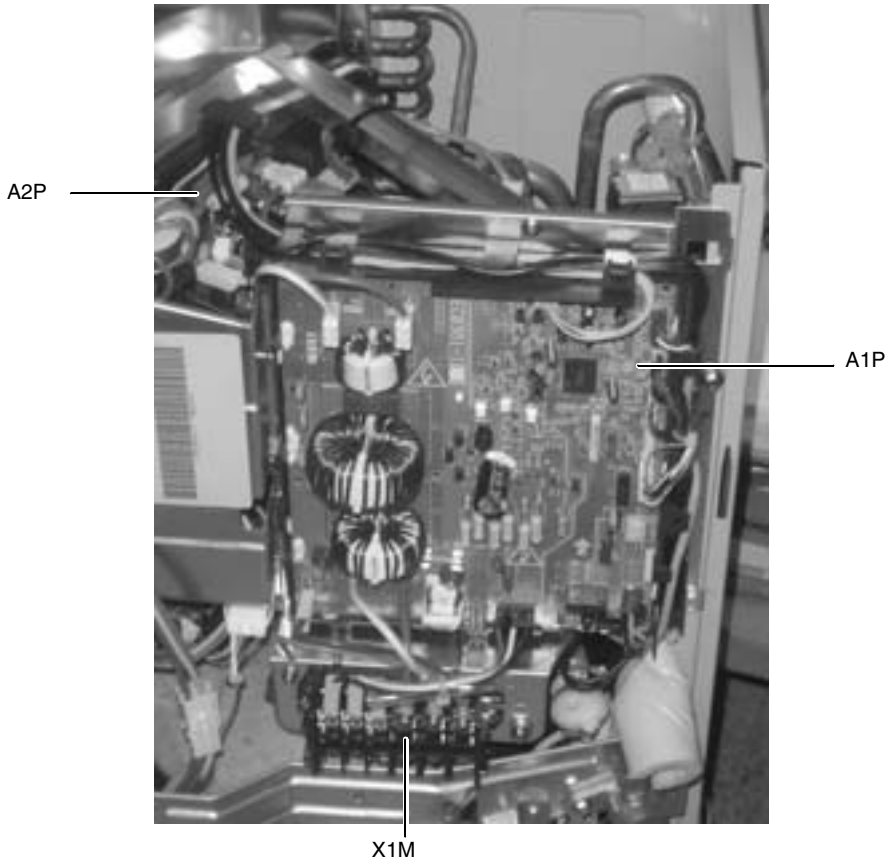
This chapter contains the following switch box layouts:

PCB layout	See page
5.4–FCQ35B7V1 ~ FCQ71B7V3B	1–76
5.5–FCQ100~125B7V3B	1–77
5.6–FFQ35~60BV1B	1–78
5.7–FBQ35B7V1 ~ FBQ125B7V3B	1–79
5.8–FDQ125B7V3B	1–80
5.9–FHQ35BUV1 ~ FHQ125BUV1B	1–81
5.10–FUQ71~125BUV1B	1–82
5.11–FAQ71BUV1B	1–83
5.12–FAQ100BUV1B	1–84

1

5.2 RZQ71B7V3B

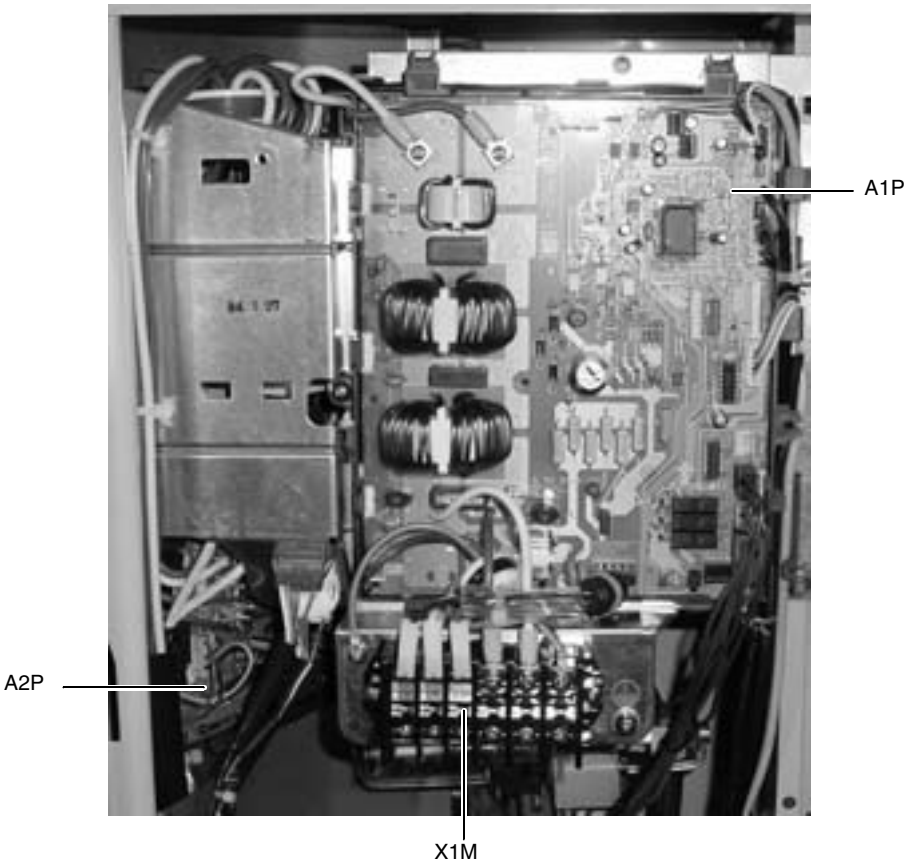
The illustration below shows the switch box layout:



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

5.3 RZQ100B7V3B

The illustration below shows the switch box layout:

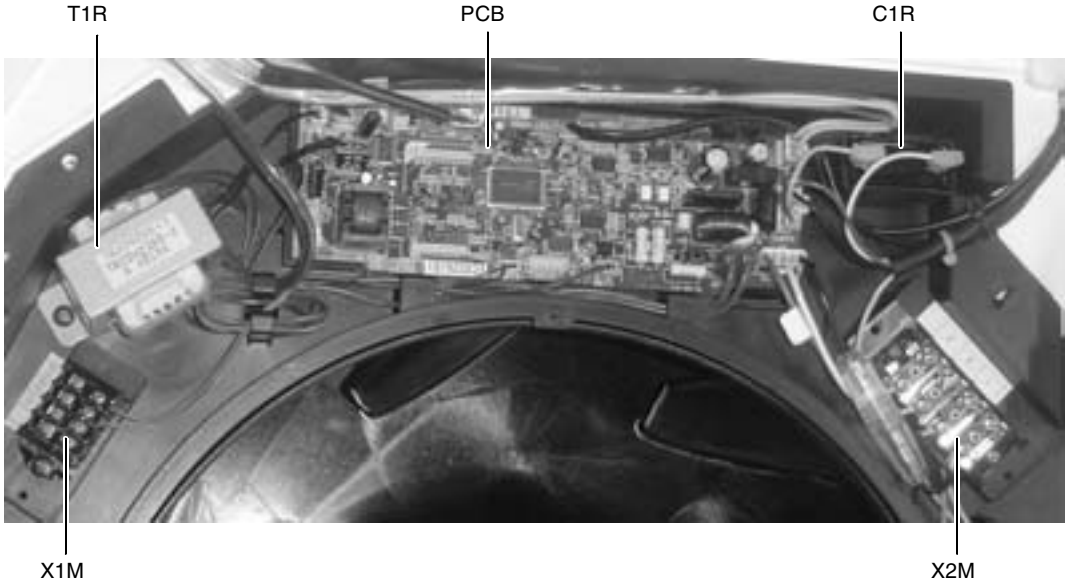


Item	Description
A1P	Printed circuit board (control)
A2P	Printed circuit board (inverter)
X1M	Terminal strip

1

5.4 FCQ35B7V1 ~ FCQ71B7V3B

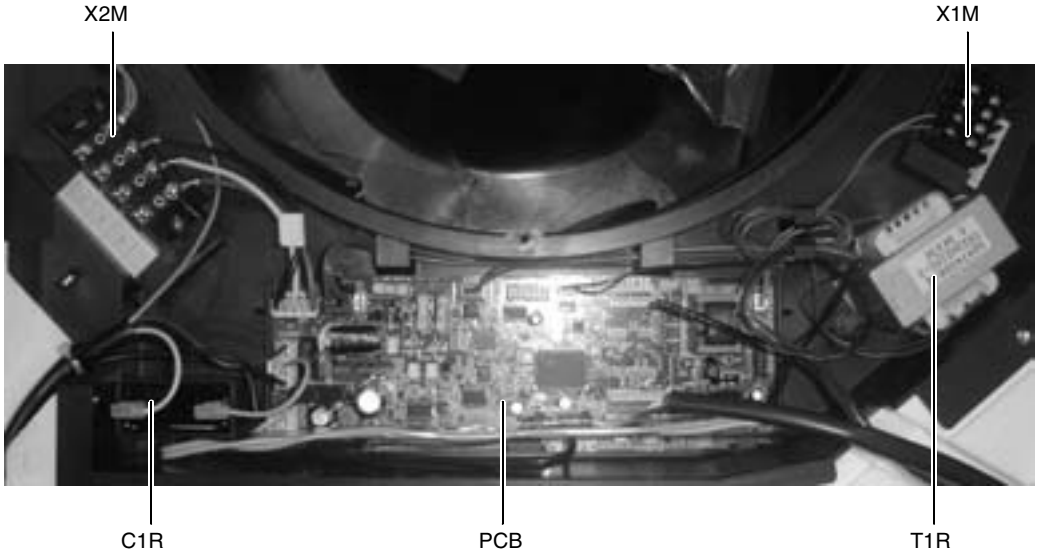
The illustration below shows the switch box layout:.



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

5.5 FCQ100~125B7V3B

The illustration below shows the switch box layout:

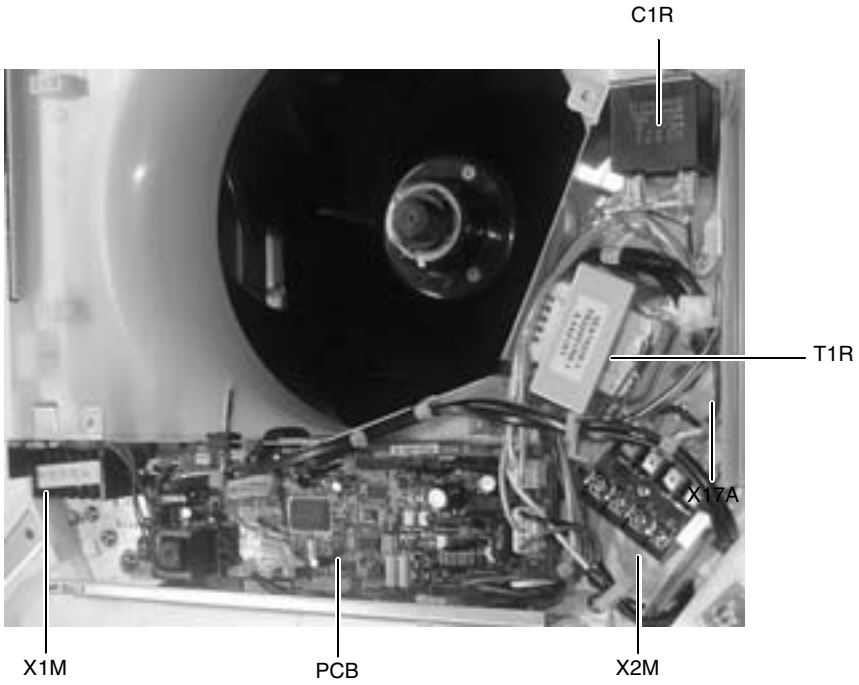


Item	Description
PCB	Printed circuit board
T1R	Transformer
C1R	Fan motor capacitor
X1M	Terminal strip (for remote control P1/P2)
X2M	Terminal strip (interconnection wiring)

1

5.6 FFQ35~60BV1B

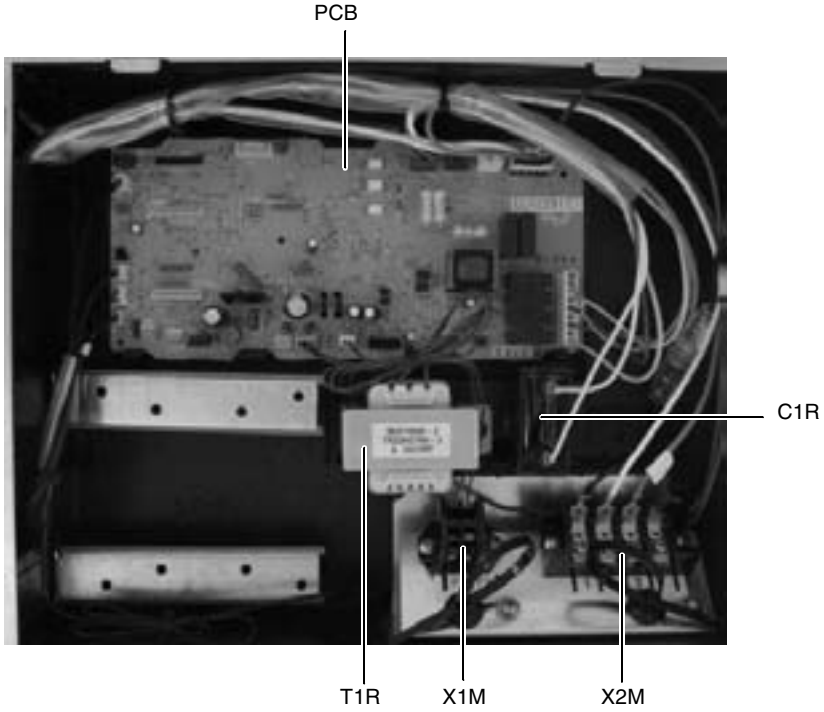
The illustration below shows the switch box layout:



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

5.7 FBQ35B7V1 ~ FBQ125B7V3B

The illustration below shows the switch box layout:.

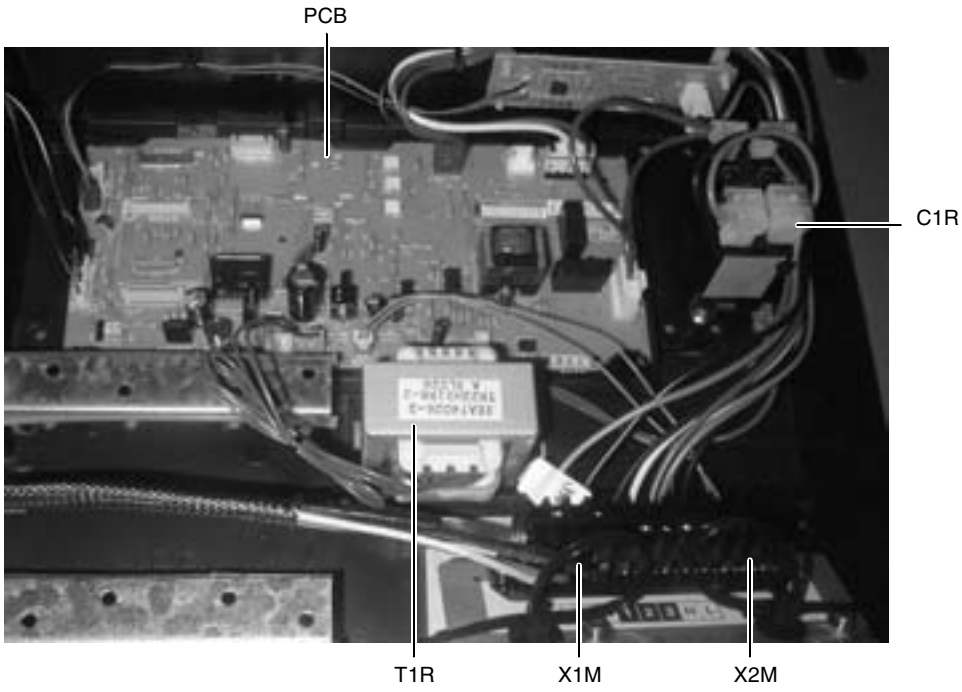


Item	Description
PCB	Printed circuit board
T1R	Transformer
C1R	Fan motor capacitor
X1M	Terminal strip (for remote control P1/P2)
X2M	Terminal strip (interconnection wiring)

1

5.8 FDQ125B7V3B

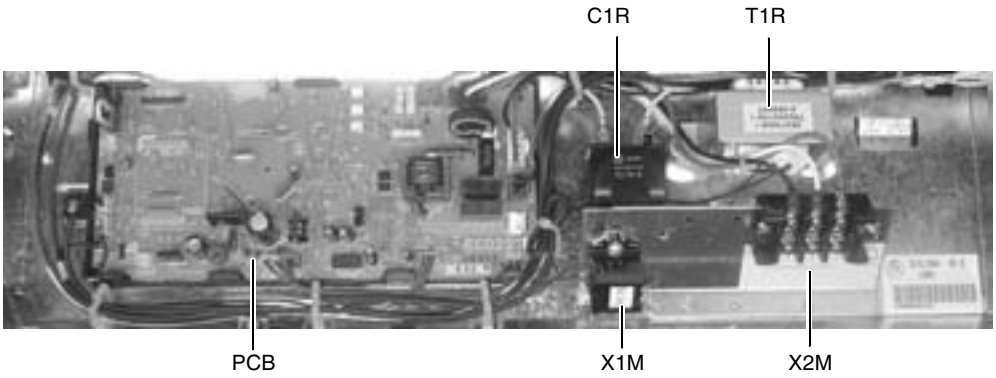
The illustration below shows the switch box layout:



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

5.9 FHQ35BUV1 ~ FHQ125BUV1B

The illustration below shows the switch box layout:

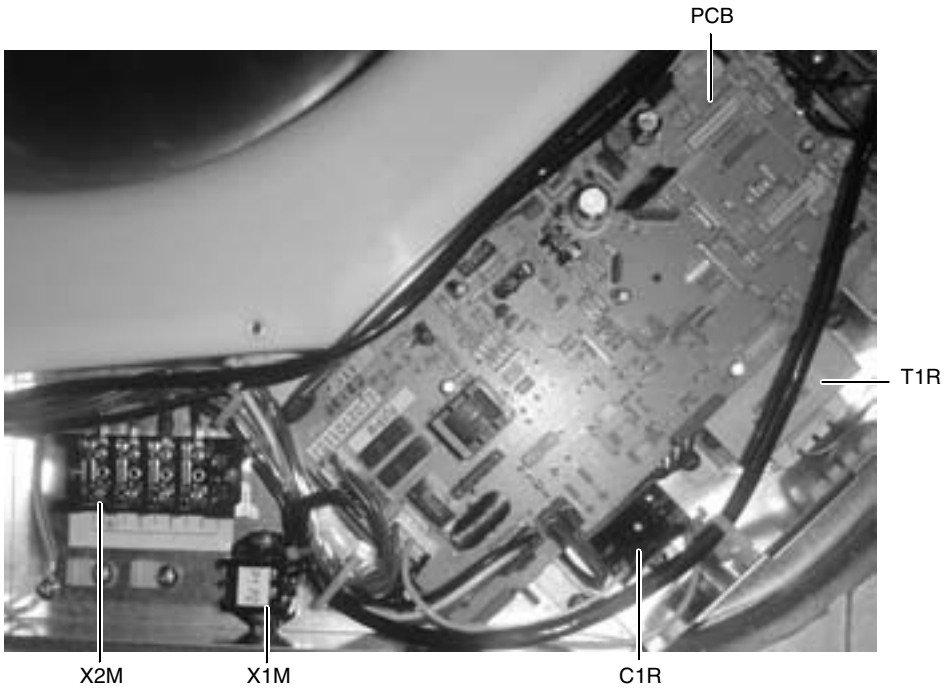


Item	Description
PCB	Printed circuit board
T1R	Transformer
C1R	Fan motor capacitor
X1M	Terminal strip (for remote control P1/P2)
X2M	Terminal strip (interconnection wiring)

1

5.10 FUQ71~125BUV1B

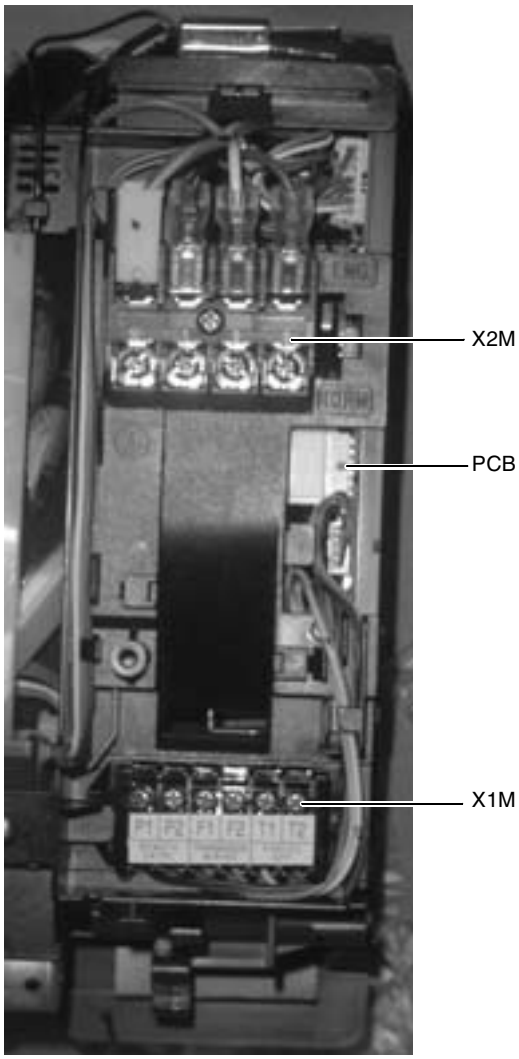
The illustration below shows the switch box layout:



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

5.11 FAQ71BUV1B

The illustration below shows the switch box layout:

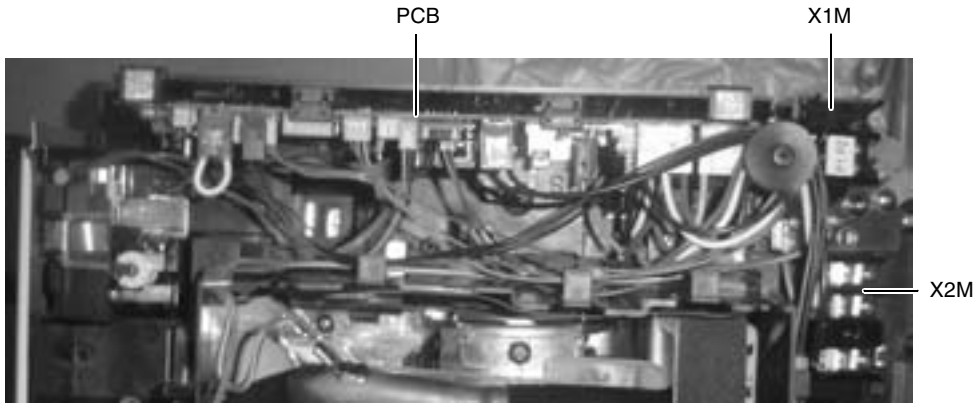


Item	Description
PCB	Printed circuit board
X1M	Terminal strip (for remote control P1/P2, F1/F2, T1/T2)
X2M	Terminal strip (interconnection wiring)

1

5.12 FAQ100BUV1B

The illustration below shows the switch box layout:



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

6 Wiring Diagrams

6.1 What Is in This Chapter?

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

Outdoor units: This chapter contains the following wiring diagrams:

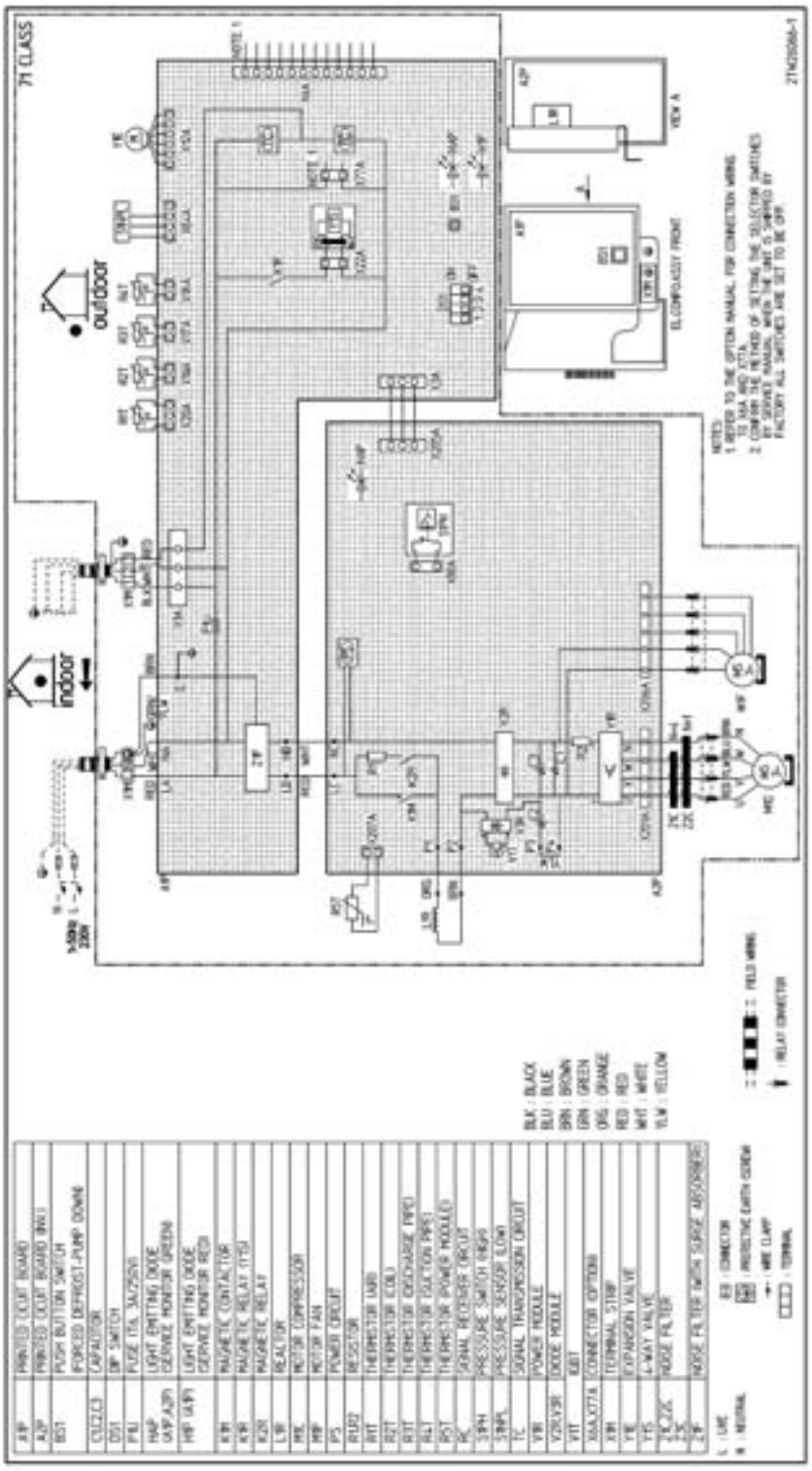
Indoor units: This chapter contains the following wiring diagrams:

1

6.2 RZQ71B7V3B

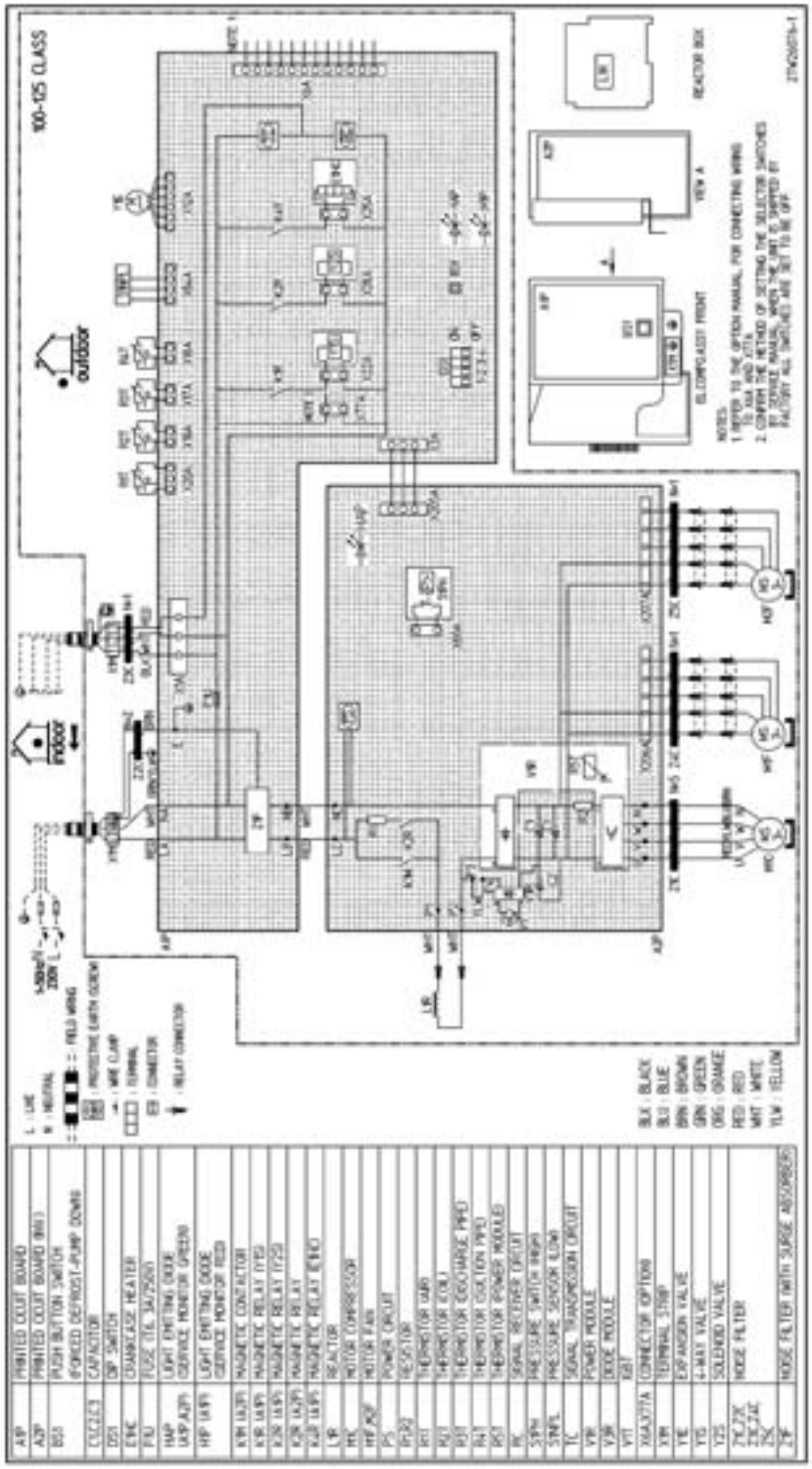
Wiring diagram

The illustration below shows the wiring diagram of the unit.



6.3 RZQ100~125B7V3B

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

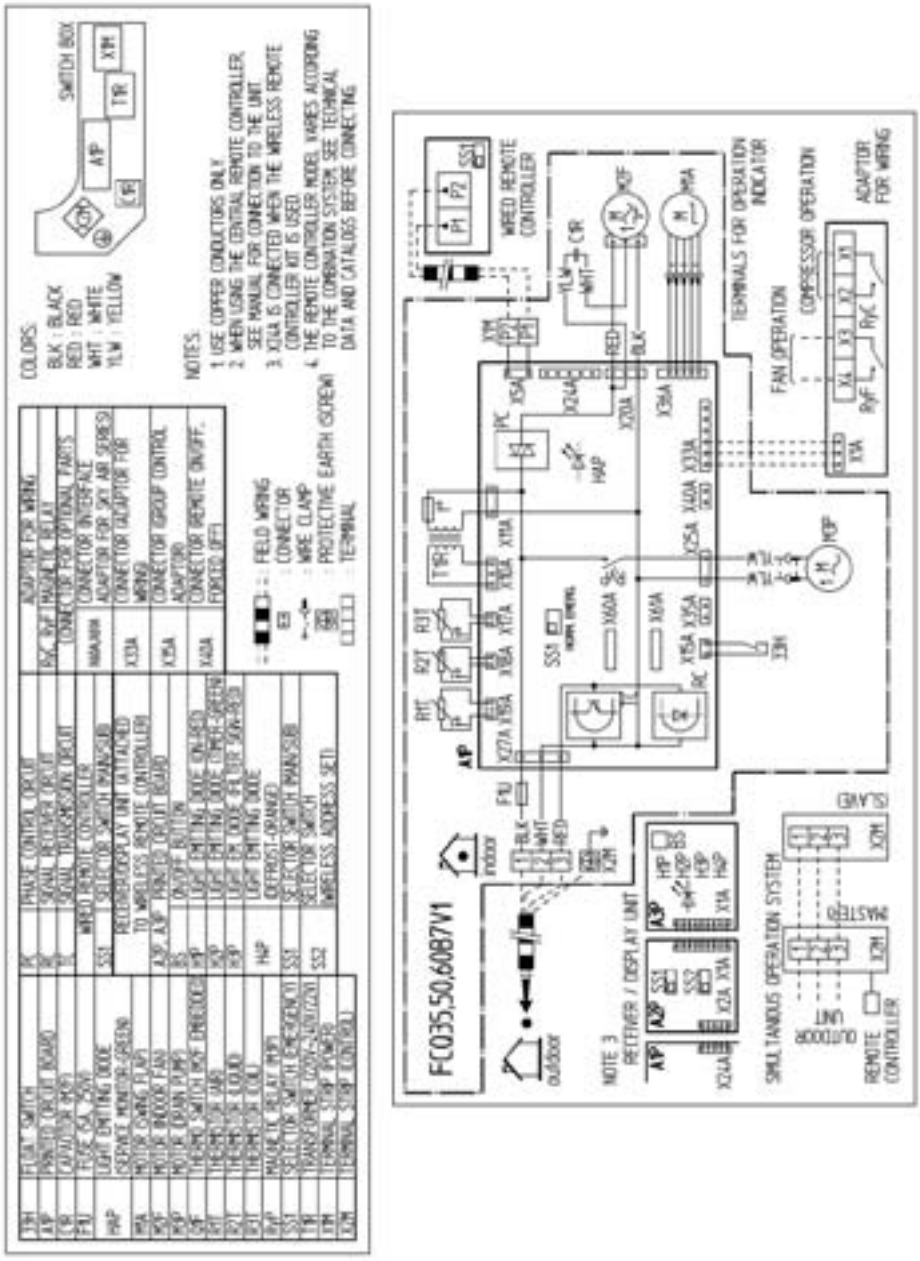


1

6.4 FCQ35~60B7V1

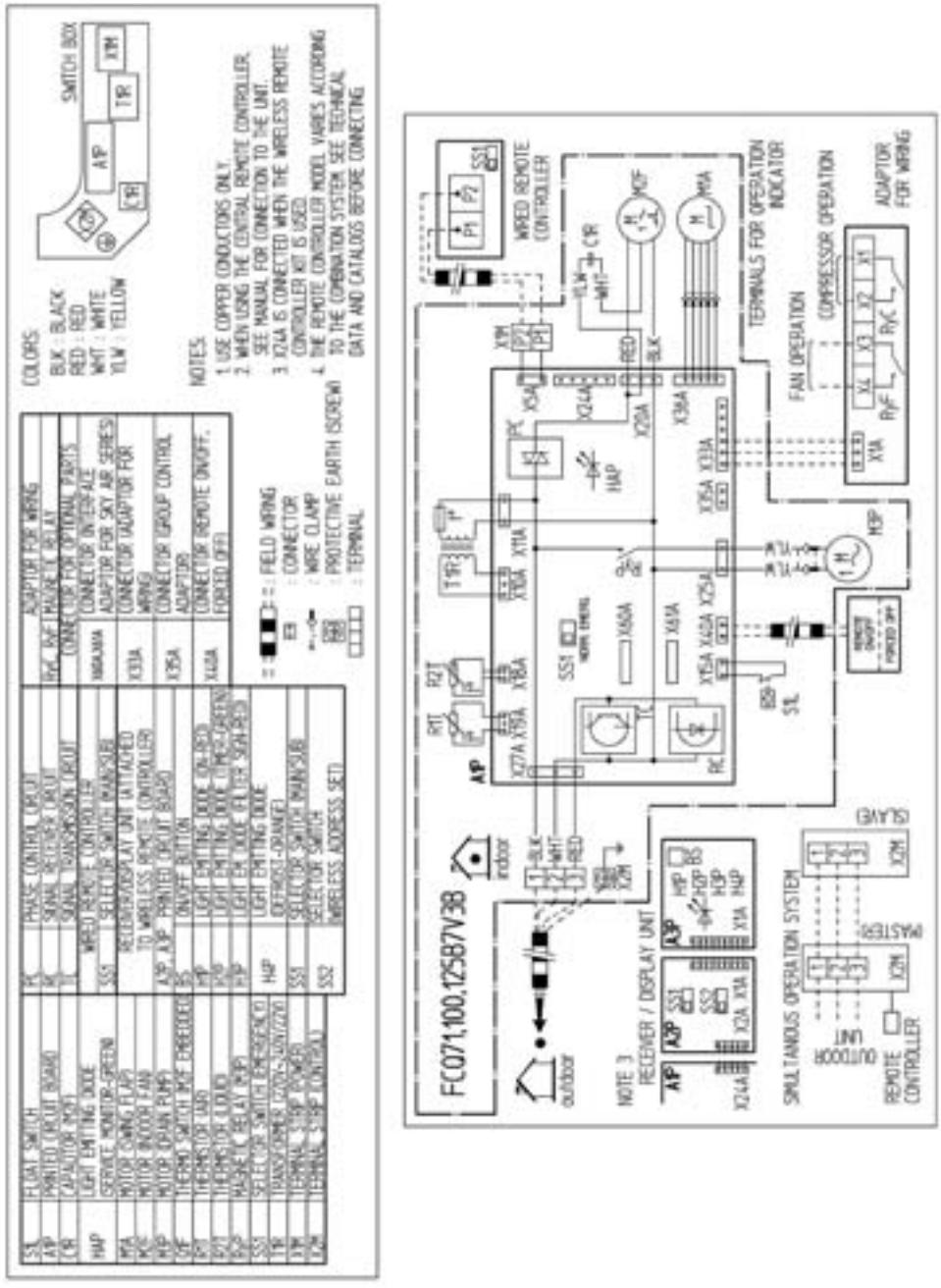
Wiring diagram

The illustration below shows the wiring diagram of the unit.



6.5 FCQ71~125B7V3B

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

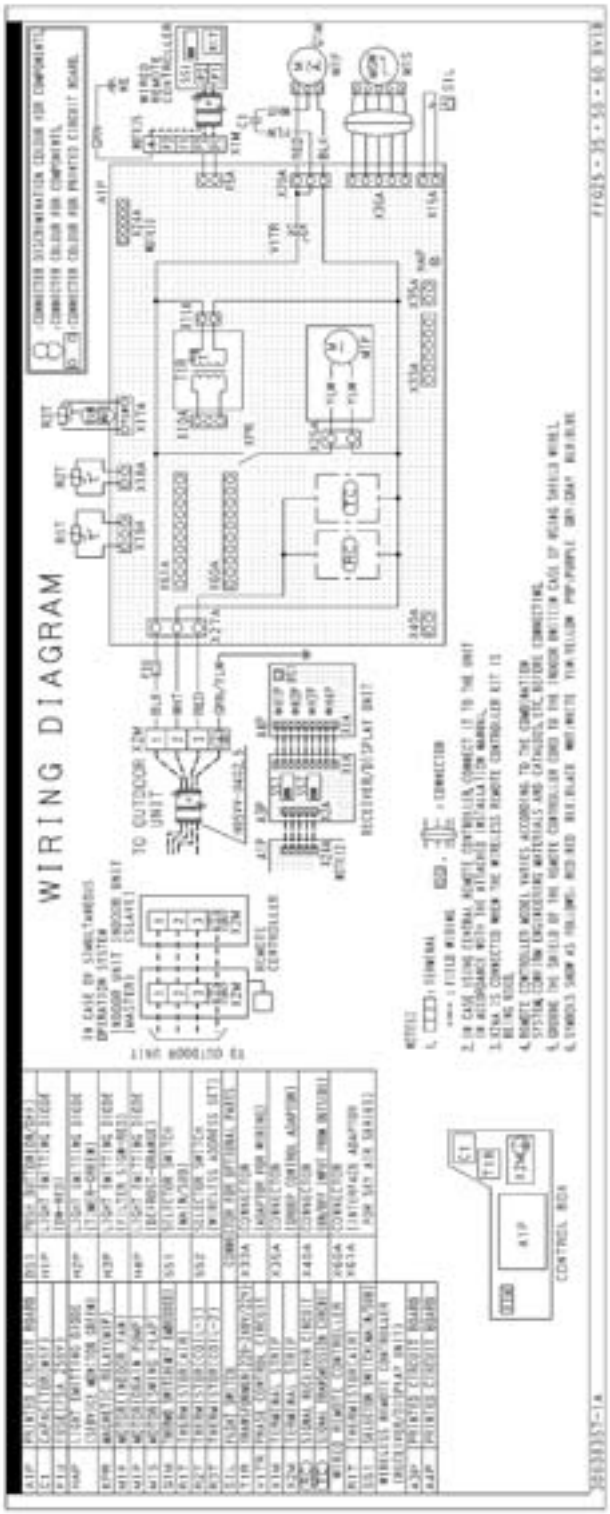


1

6.6 FFQ35~60BV1B

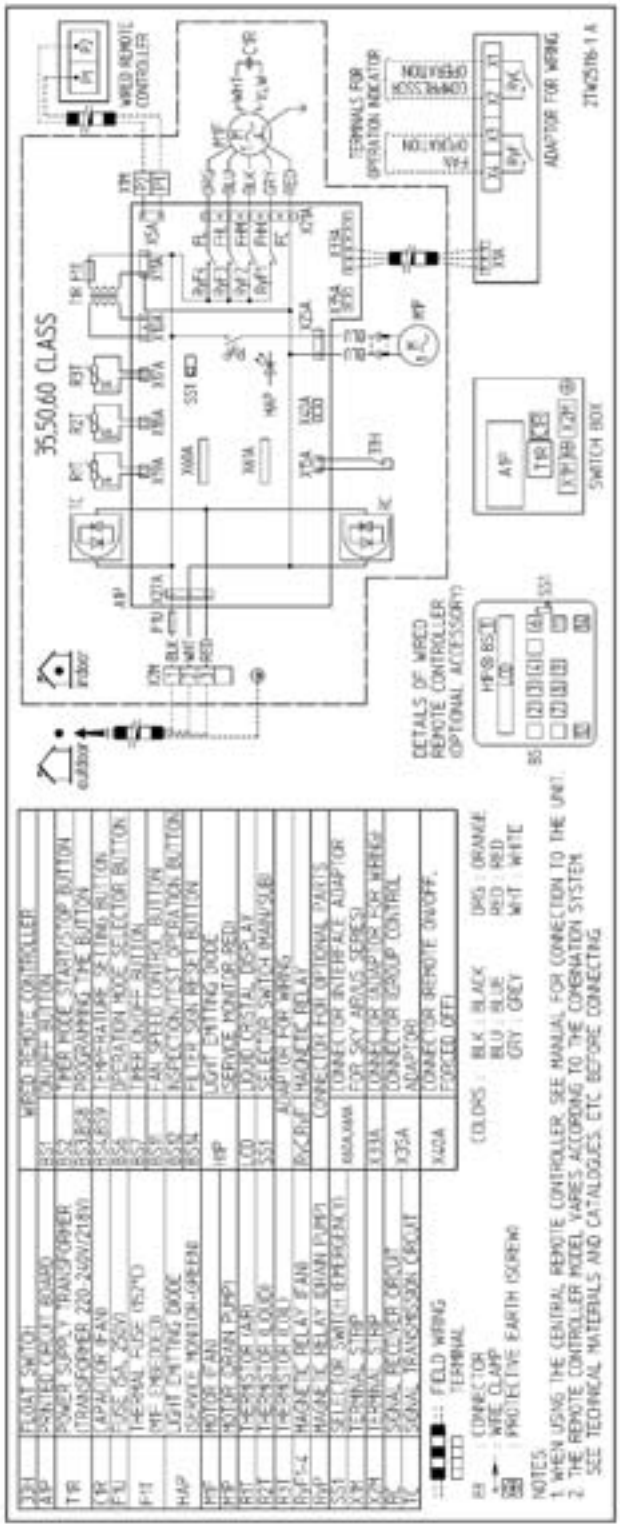
Wiring diagram

The illustration below shows the wiring diagram of the unit.



6.7 FBQ35~60B7V1

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



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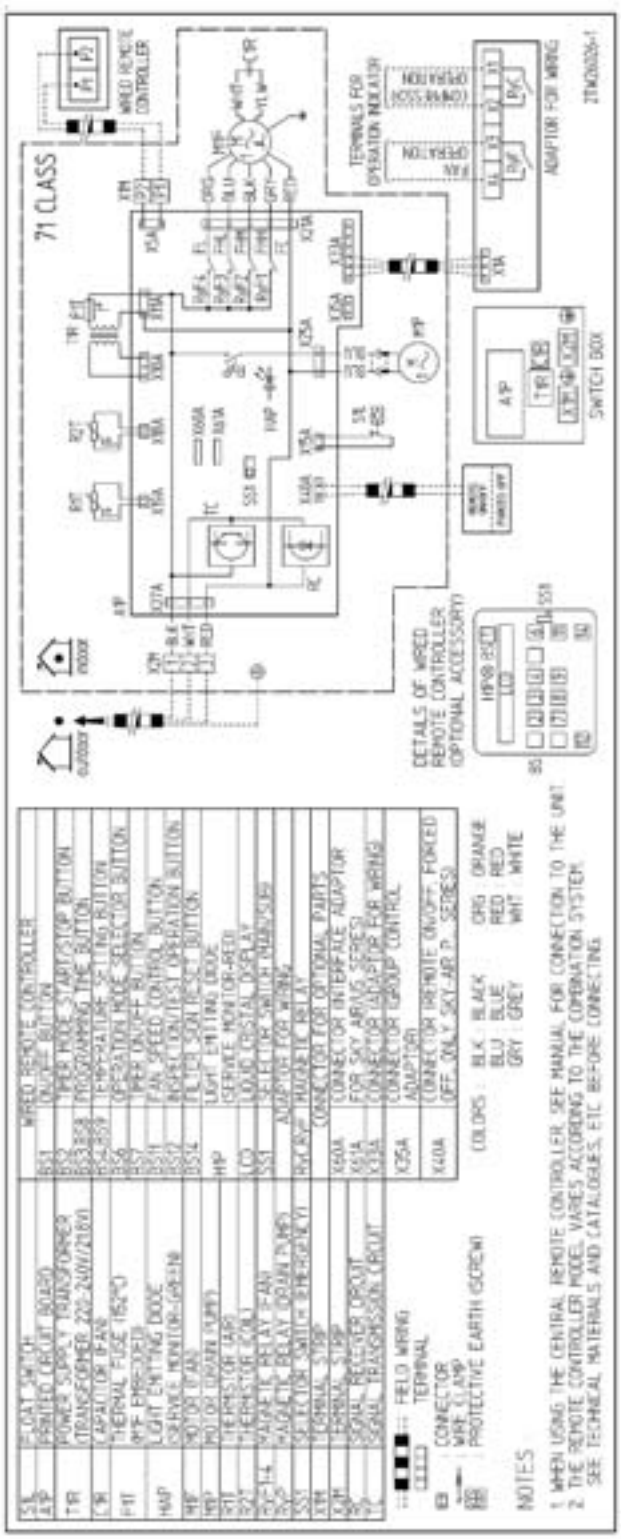
6.8 FBQ71B7V3B

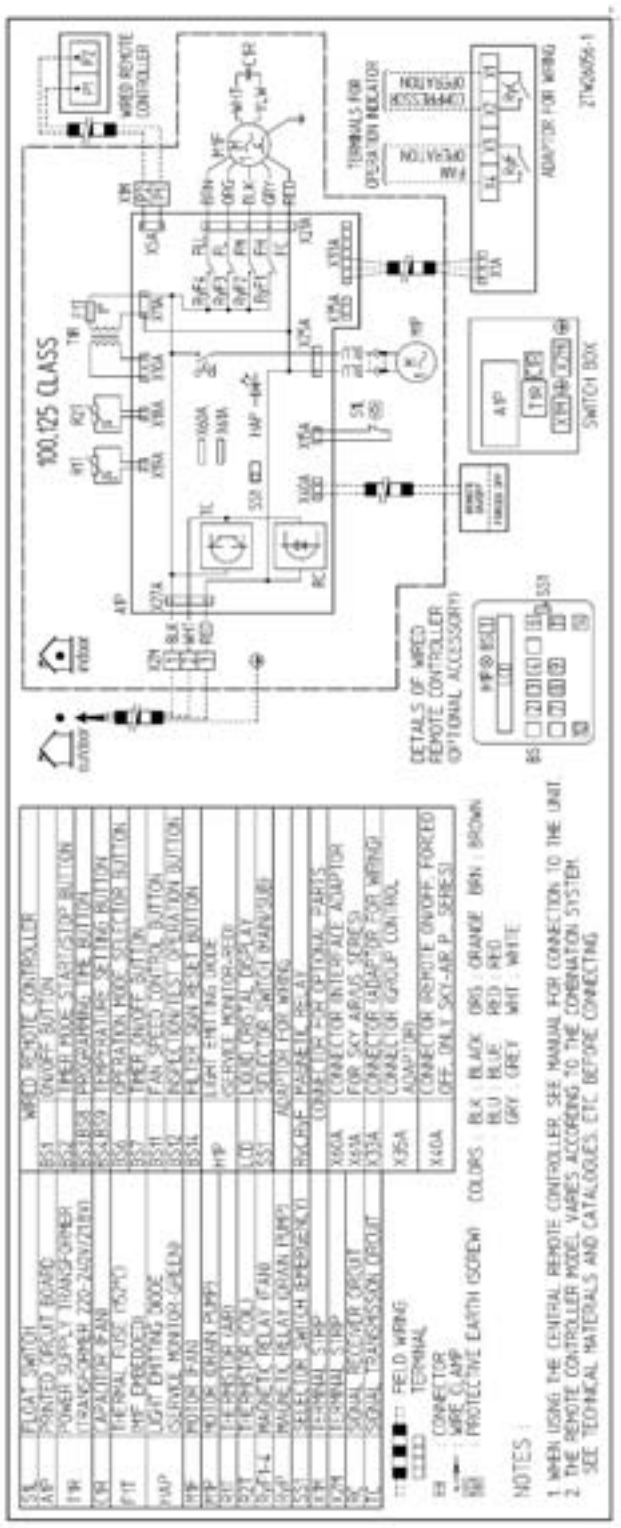
Wiring diagram

The illustration below shows the wiring diagram of the unit.



6.9 FBQ100~125B7V3B

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

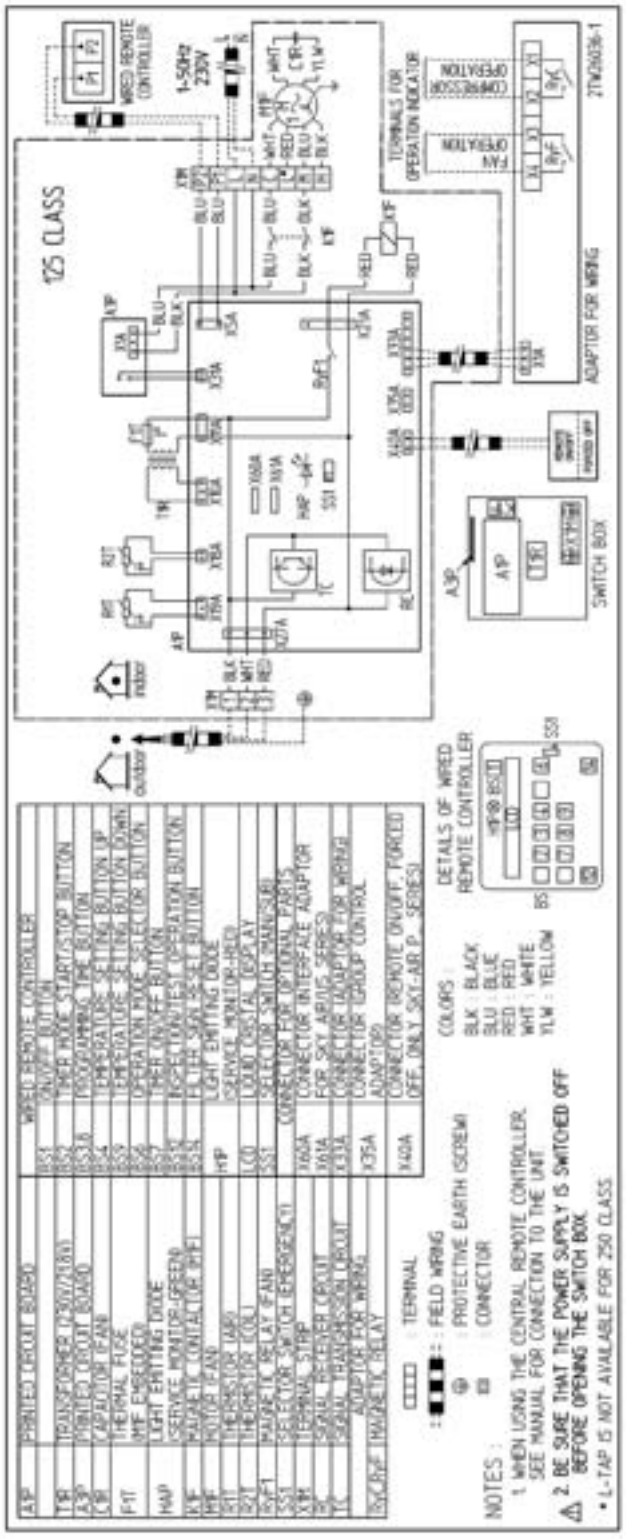


1

6.10 FDQ125B7V3B

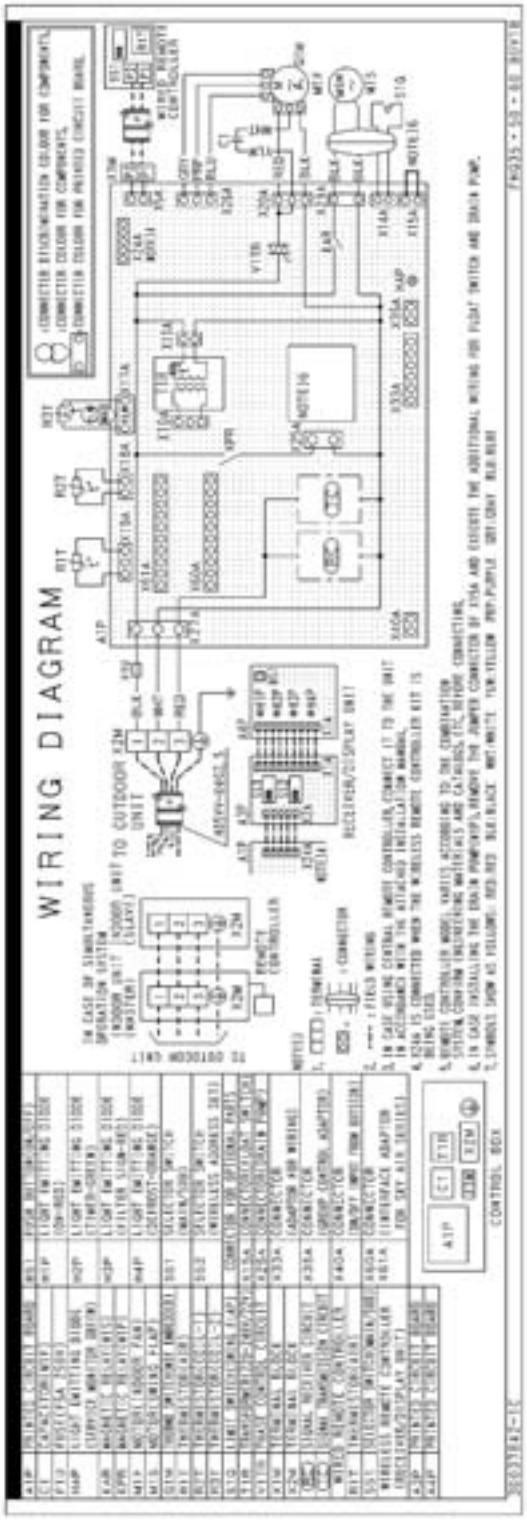
Wiring diagram

The illustration below shows the wiring diagram of the unit.



6.11 FHQ35~60BUV1

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



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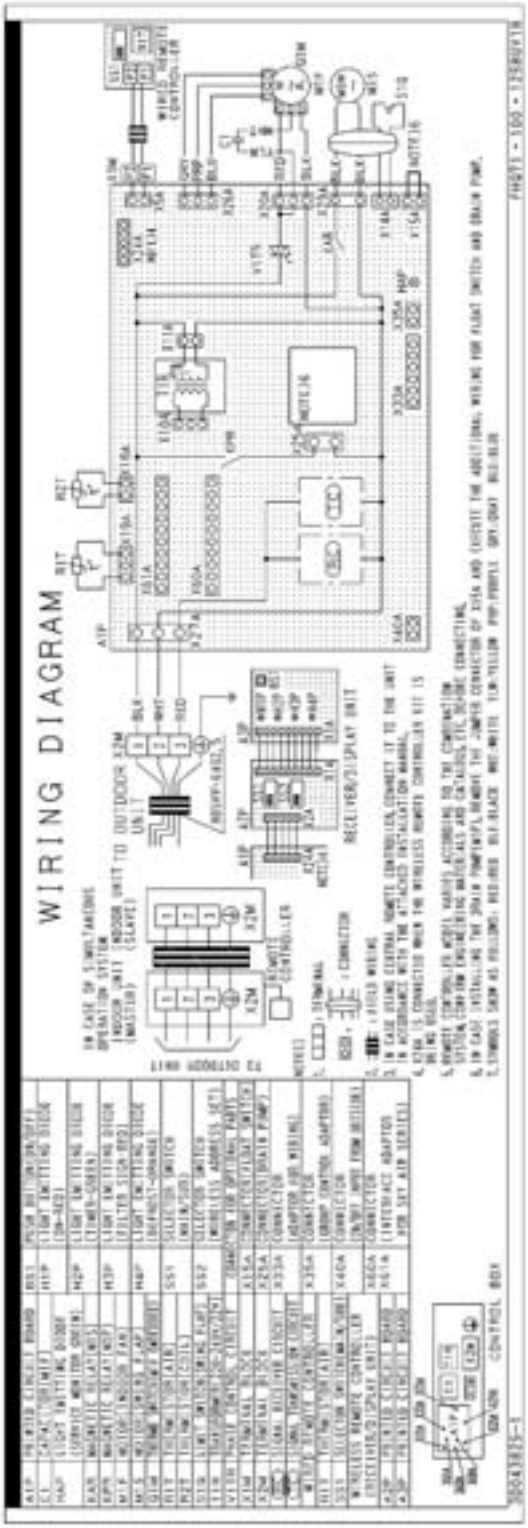
6.12 FHQ71~125BUV1B

Wiring diagram

The illustration below shows the wiring diagram of the unit.



6.13 FUQ71~125BUV1B

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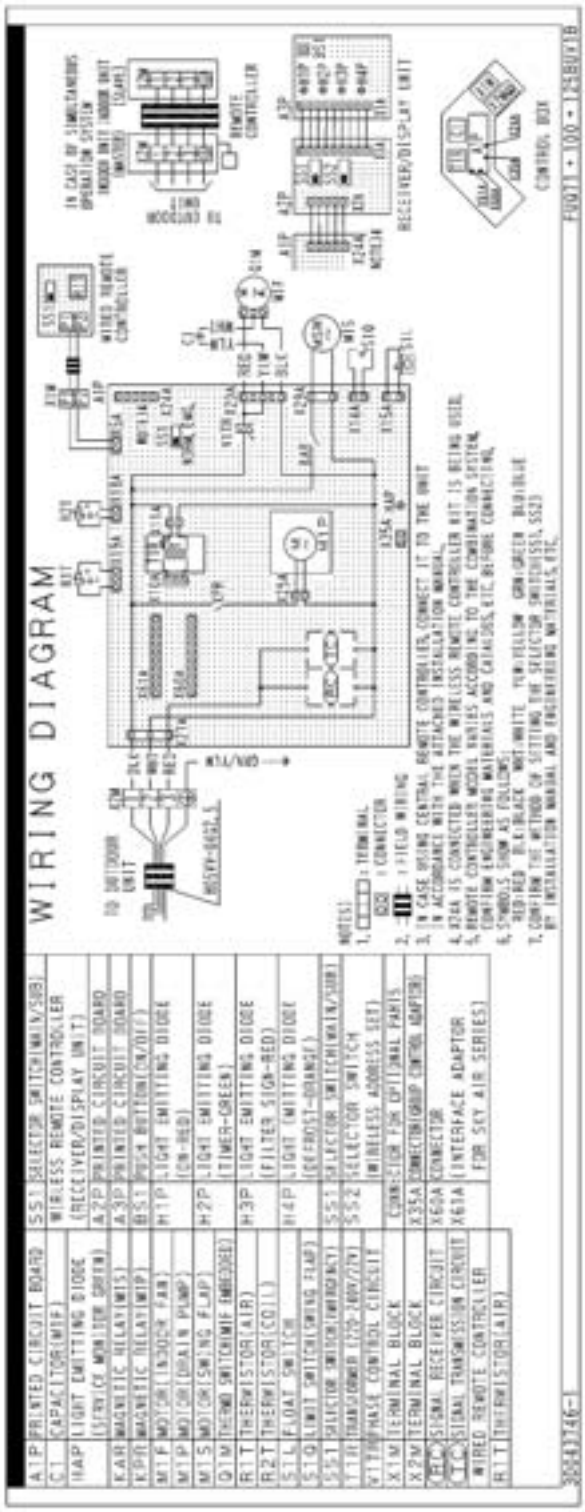
Wiring diagram The illustration below shows the wiring diagram of the unit.



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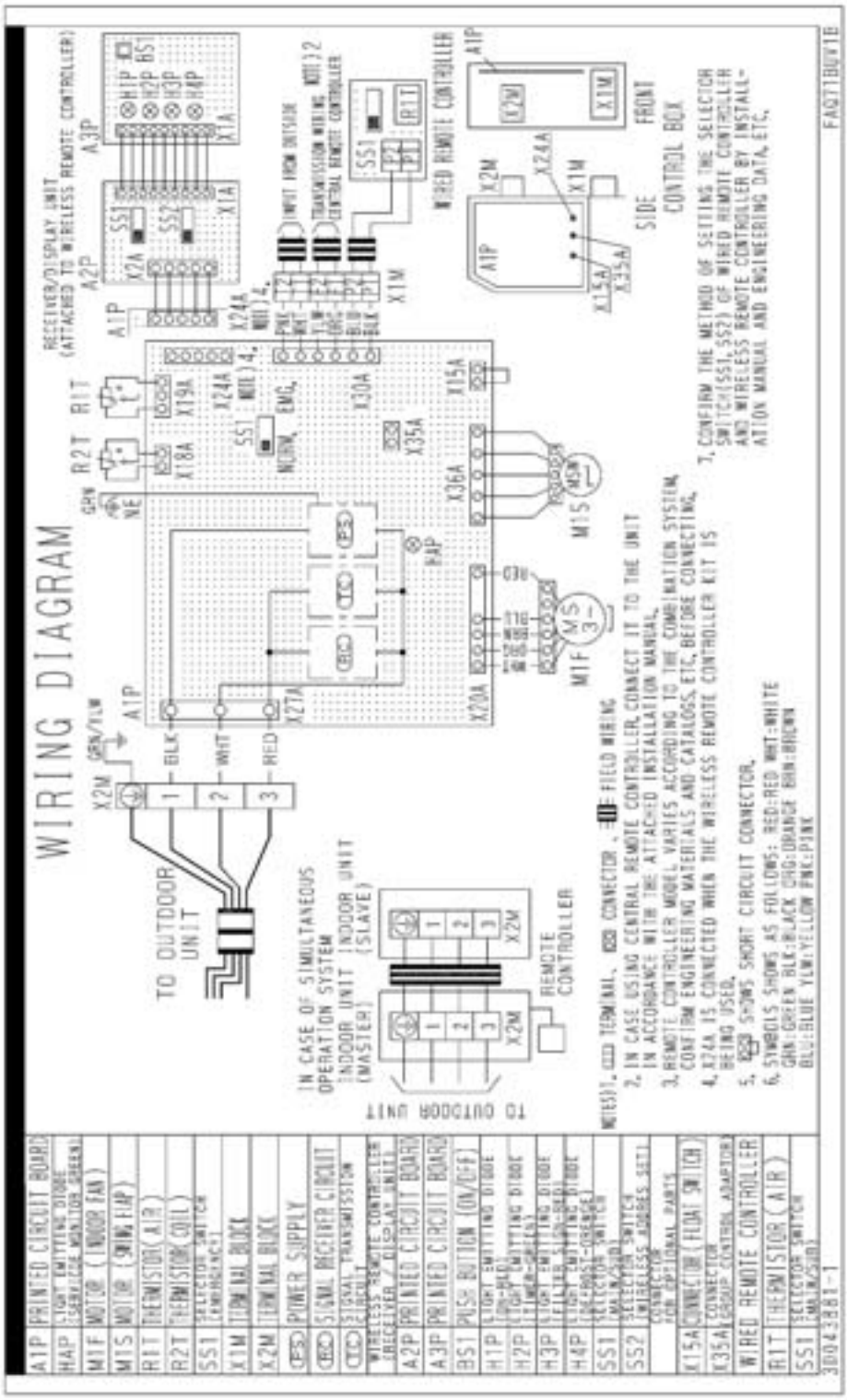
6.14 FAQ71BUV1B

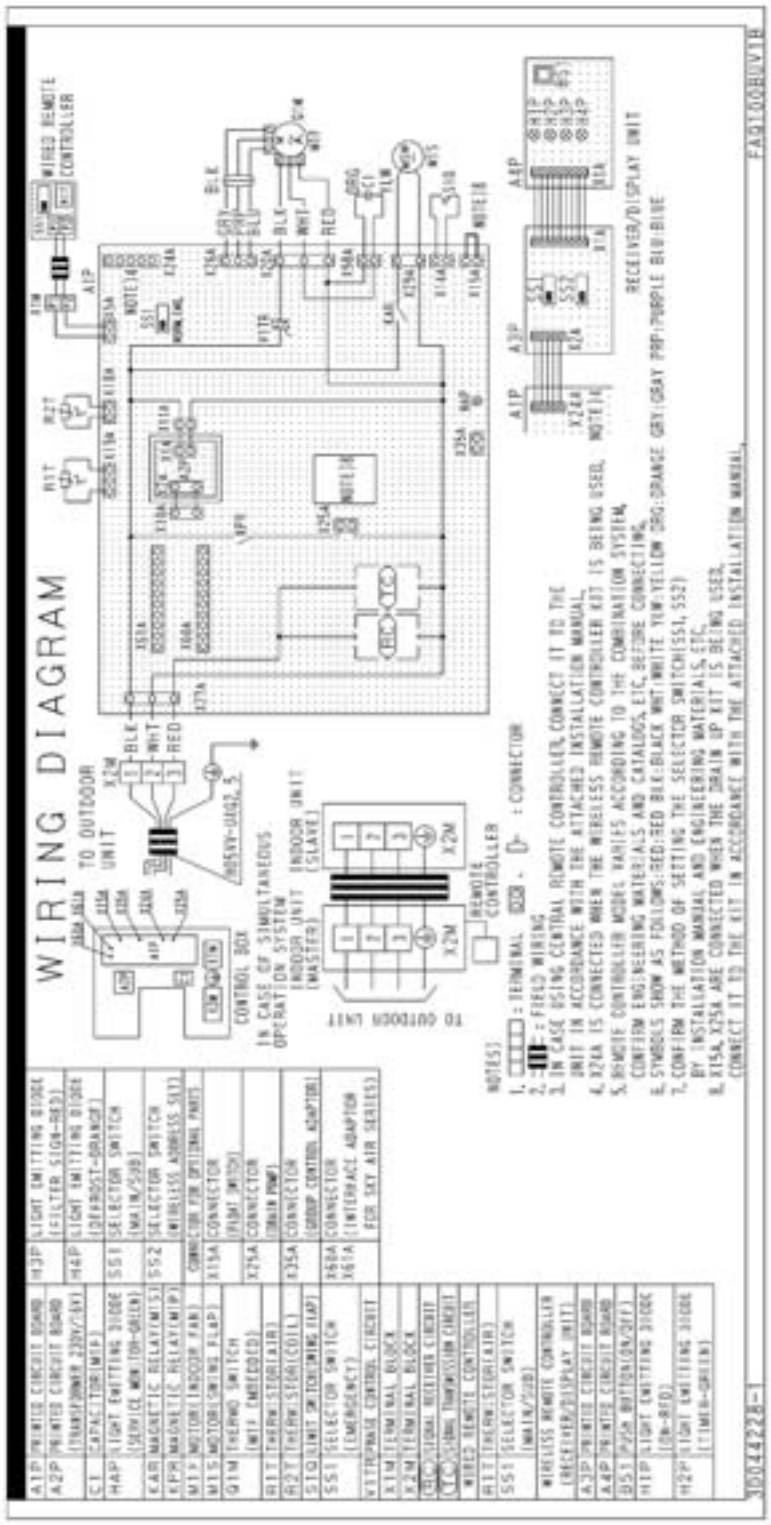
Wiring diagram

The illustration below shows the wiring diagram of the unit.



6.15 FAQ100BUV1B

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



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7 PCB Layout

7.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

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

Outdoor units

This chapter contains the following PCB layouts:

Indoor units

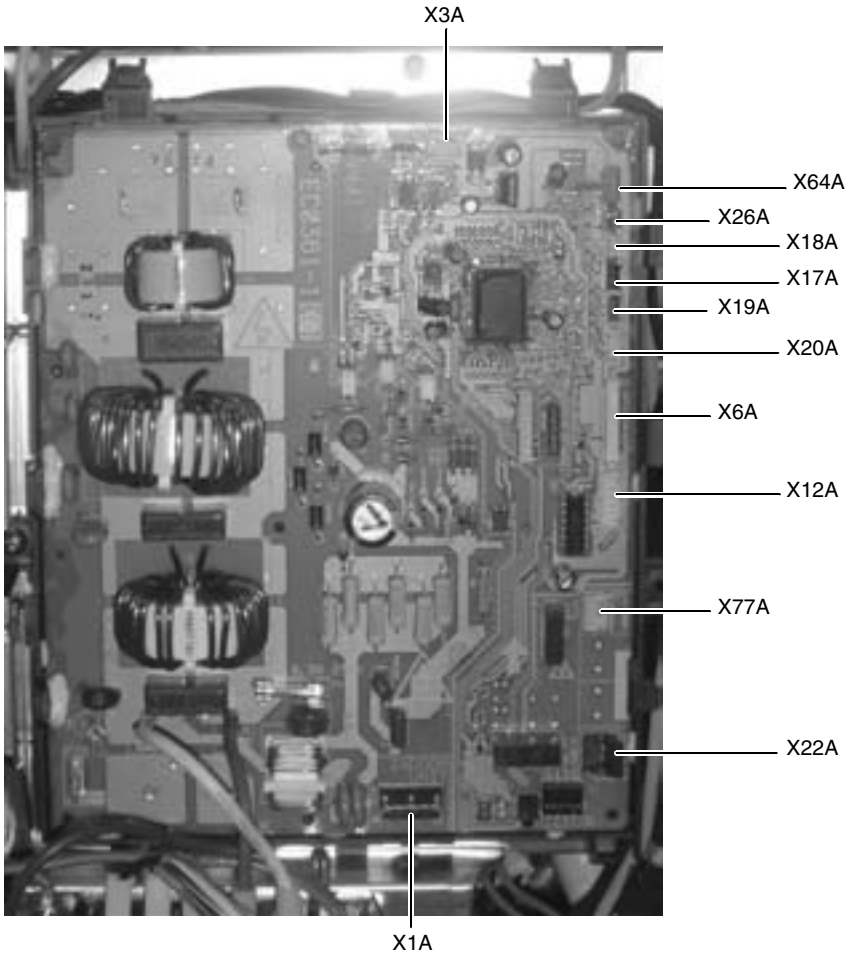
This chapter contains the following PCB layouts:

1

7.2 RZQ71B7V3B

Control PCB

The illustration below shows the PCB connectors.



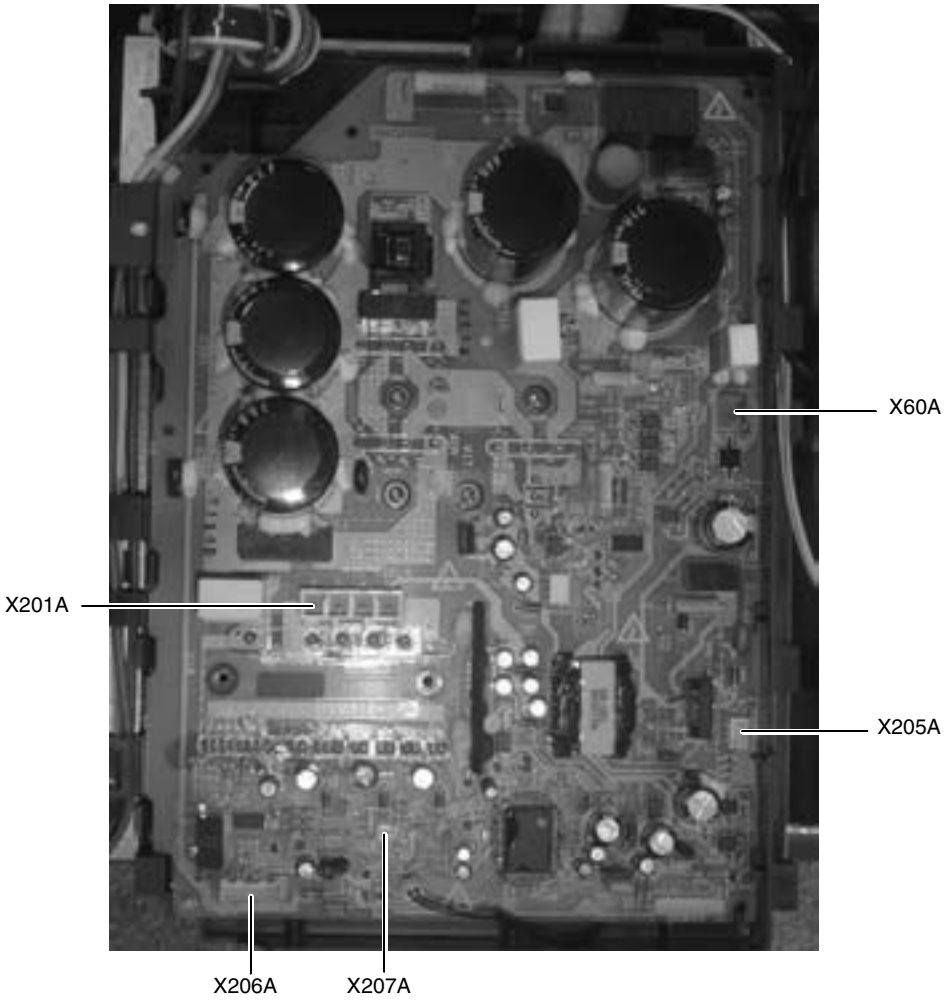
Connectors

The table below describes the PCB connectors.

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

Inverter PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

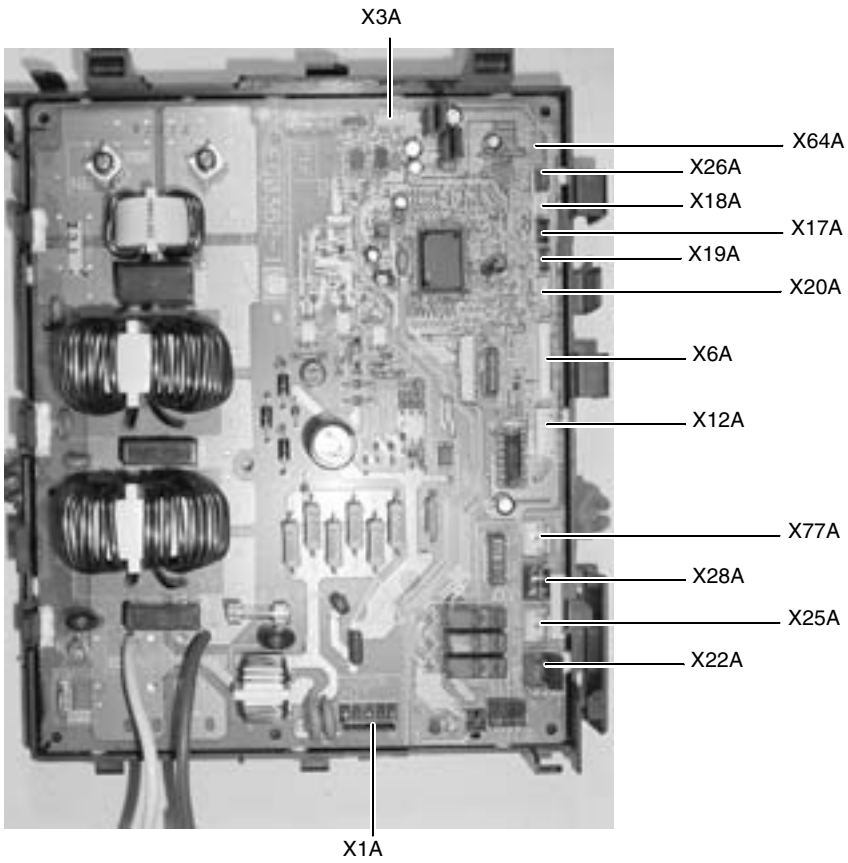
Connector	Connected to	Description
X60A	S1PH	High pressure switch
X201A	M1C	Compressor motor
X205A	X3A on control PCB	
X206A	M1F	Fan motor
X207A	R5T	Power module thermistor

1

7.3 RZQ100B7V3B

Control PCB

The illustration below shows the PCB connectors.



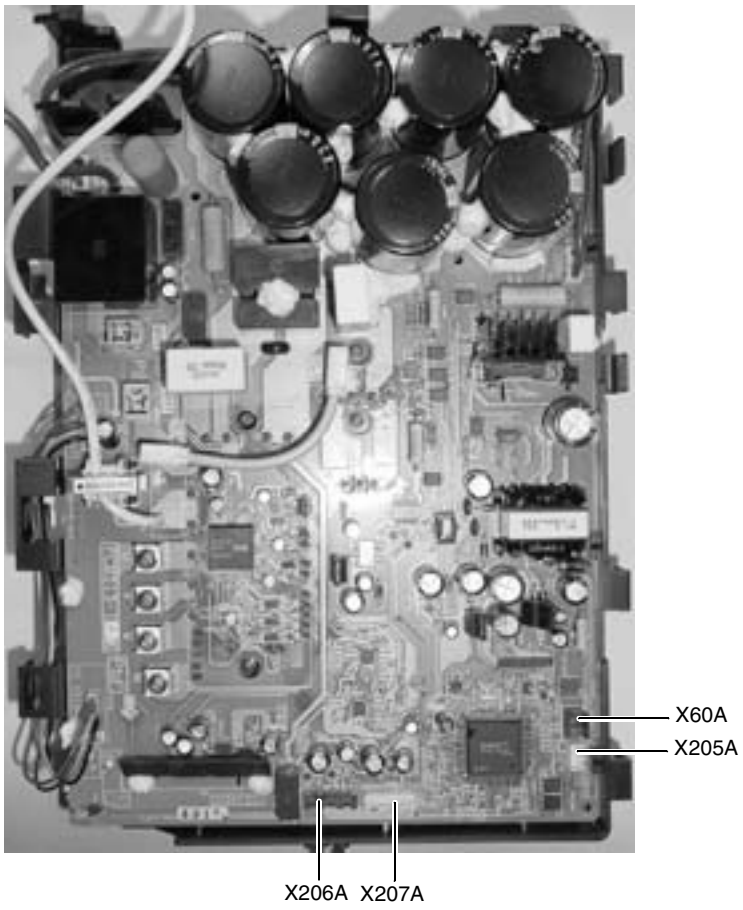
Connectors

The table below describes the PCB connectors.

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

Inverter PCB (A2P)

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

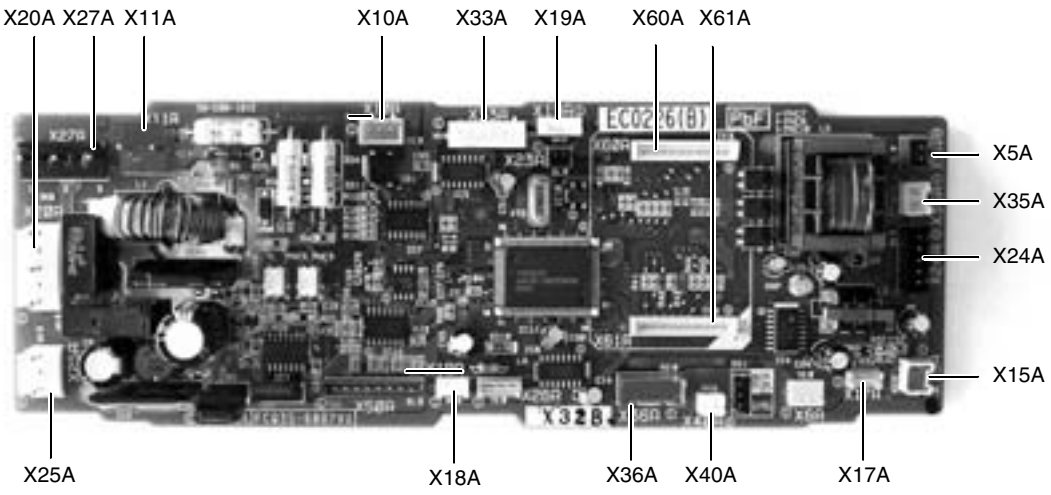
Connector	Connected to	Description
X60A	S1PH	High pressure switch
(U, V, W, N)	M1C	Compressor motor
X205A	X3A on control PCB	
X206A	M1F	Fan motor
X207A	M2F	Fan motor

1

7.4 FCQ35~60B7V1

PCB

The illustration below shows the PCB connectors.



Connectors

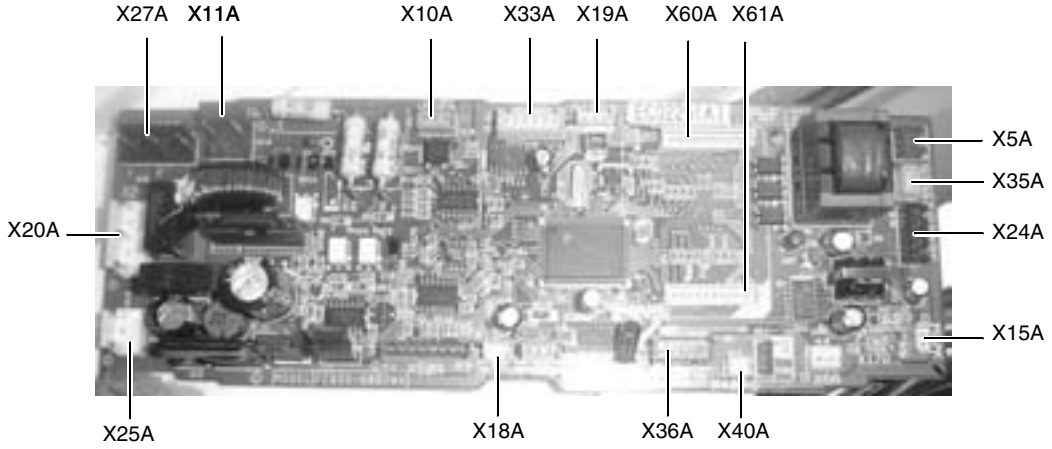
The table below describes the PCB connectors.

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

7.5 FCQ71~125B7V3B

PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

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

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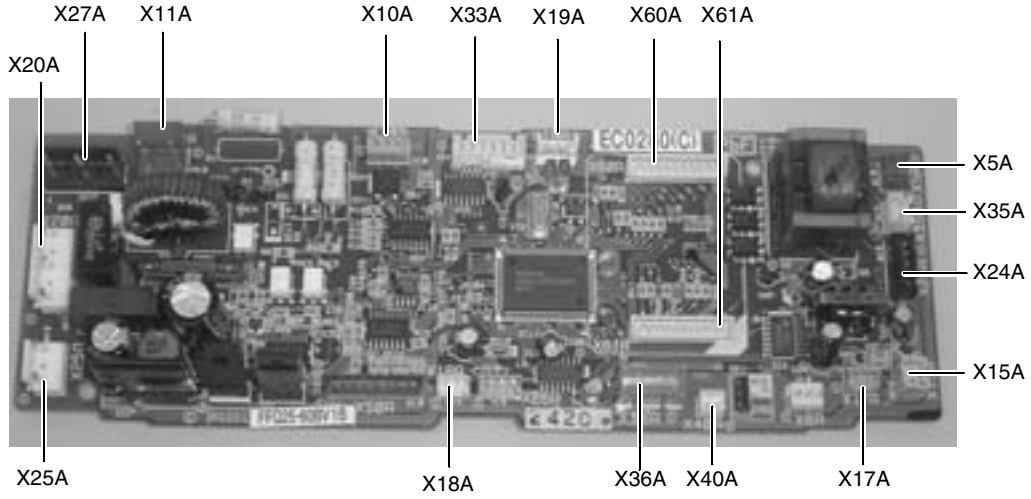
7.6 FFQ35~60BV1B

PCB

The illustration below shows the PCB connectors.



Connectors

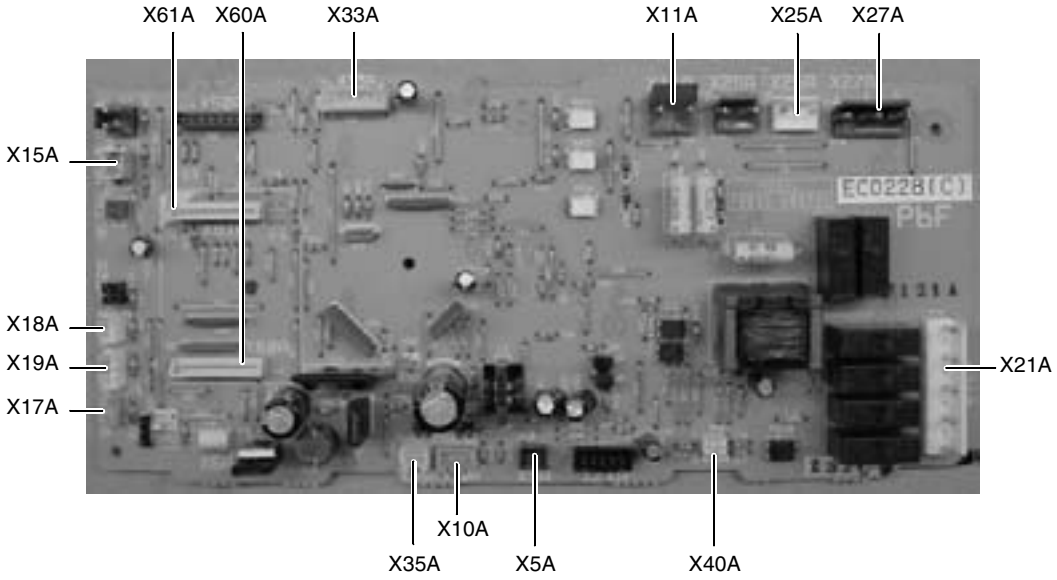
The table below describes the PCB connectors.

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

7.7 FBQ35~60B7V1

PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

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

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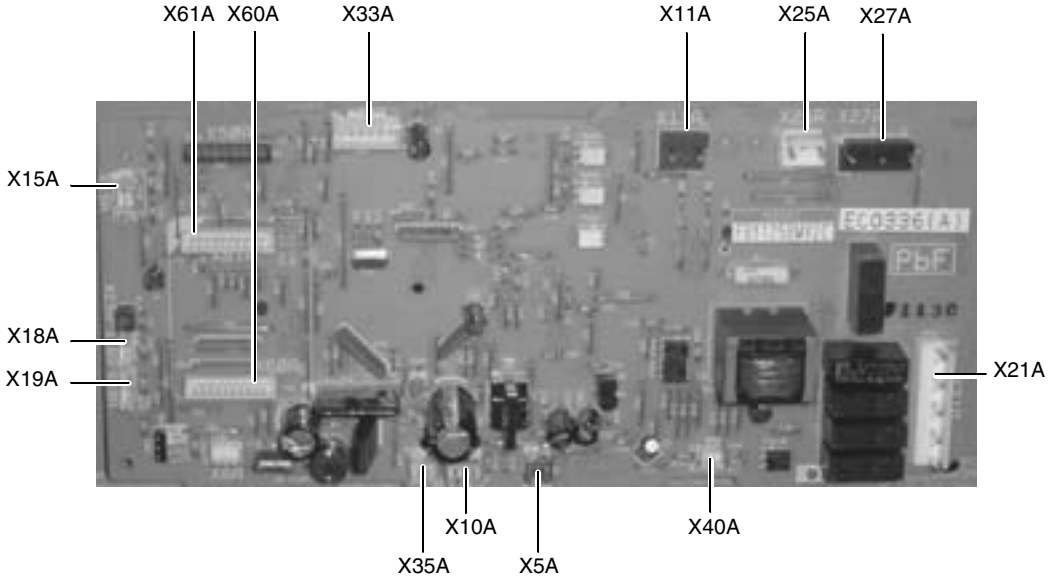
7.8 FBQ100~125B7V3B

PCB

The illustration below shows the PCB connectors.



Connectors

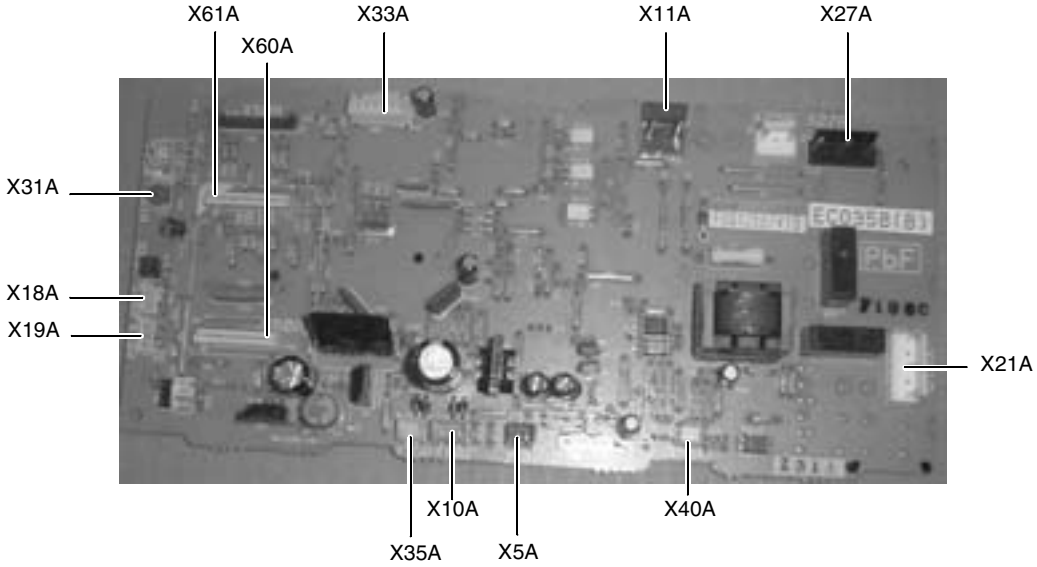
The table below describes the PCB connectors.

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

7.9 FDQ125B7V3B

PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

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

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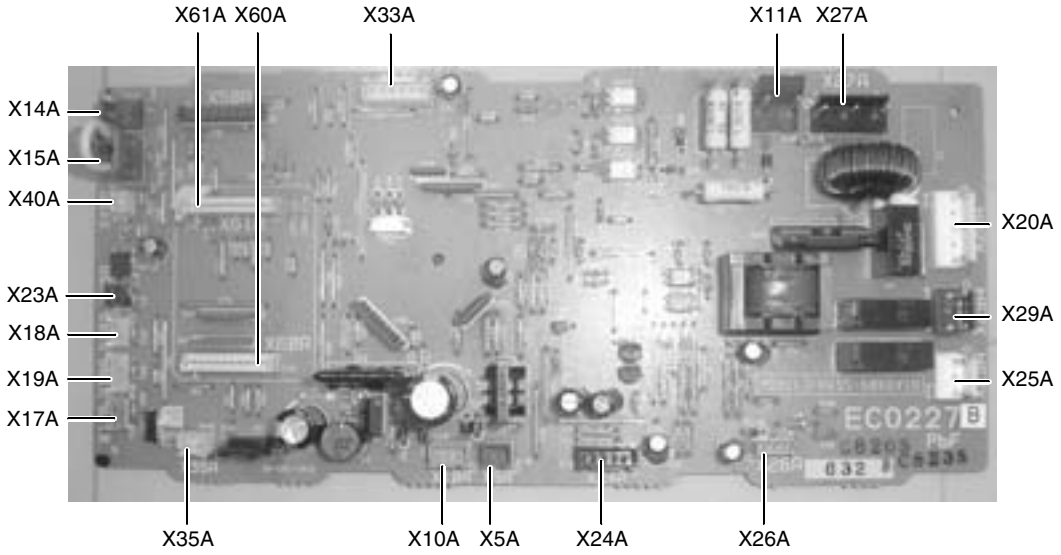
7.10 FHQ35~60BUV1

PCB

The illustration below shows the PCB connectors.



Connectors

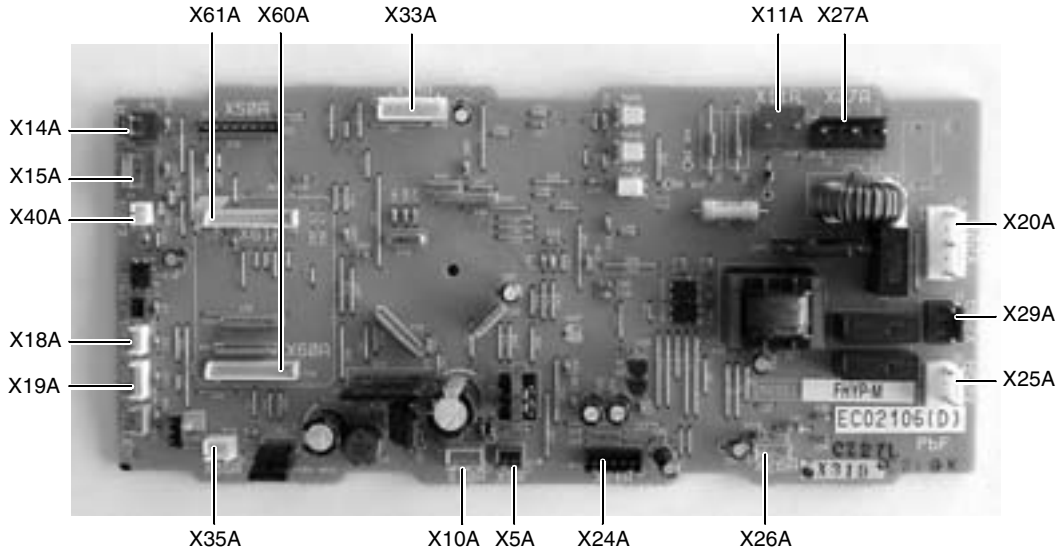
The table below describes the PCB connectors.

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

7.11 FHQ71~125BUV1B

PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

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

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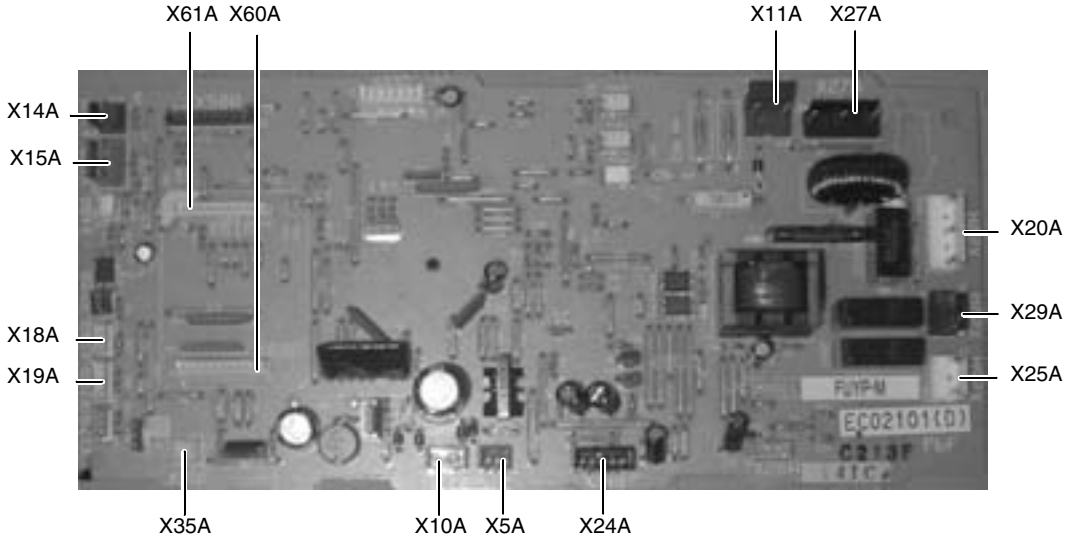
7.12 FUQ71~125BUV1B

PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

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

7.13 FAQ71BUV1B

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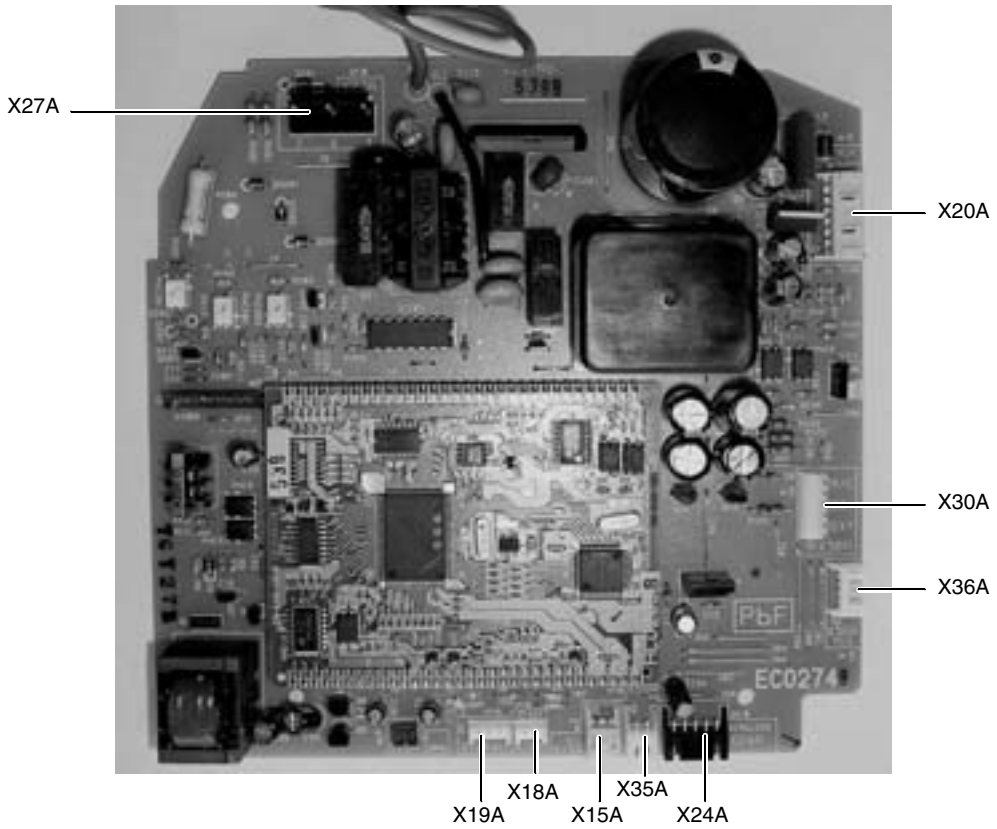
PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

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

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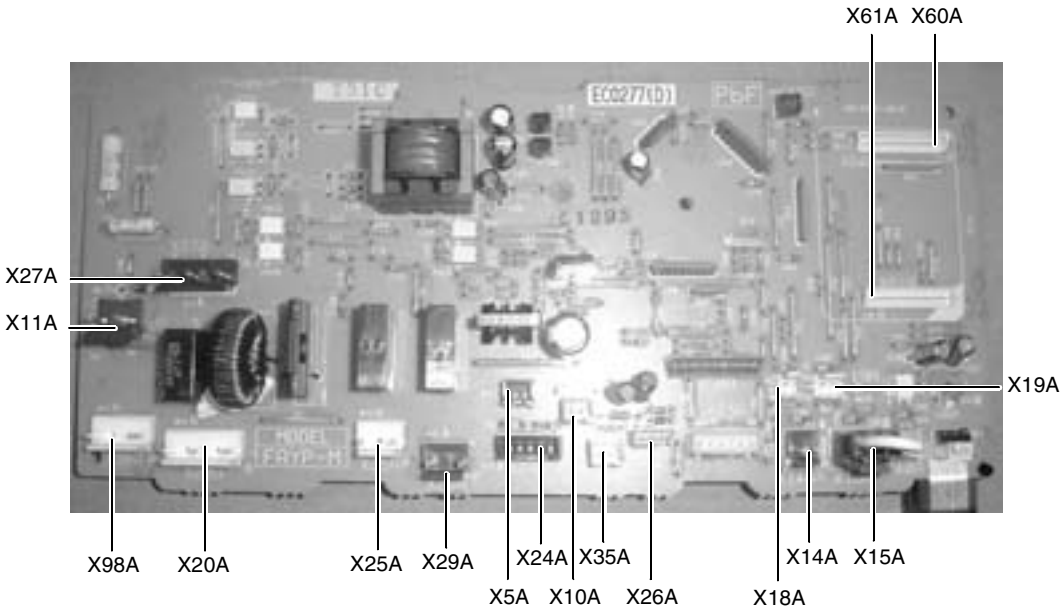
7.14 FAQ100BUV1B

PCB

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

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

Part 2
Functional Description

What is in this part?

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

Overview

This part contains the following chapters:

1 General Functionality

1.1 What Is in This Chapter?

Introduction

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

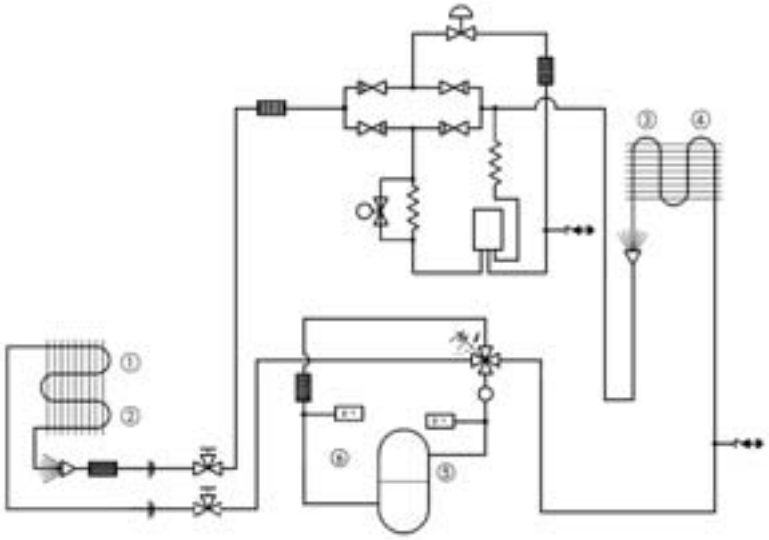
Overview

This chapter contains the following topics:

1.2 Functions of Thermistors

Locating the thermistors

.



Remark

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

Functions of the thermistors

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

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

1.3 Forced Operating Mode (Emergency Operation)

Purpose

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

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

Starting conditions

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

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

Ending conditions

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

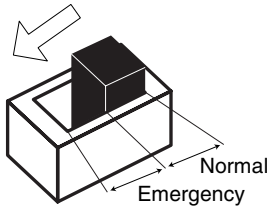
Emergency operation

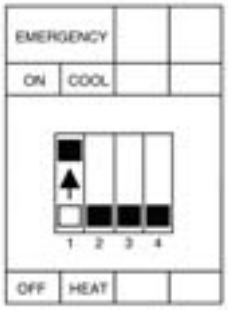
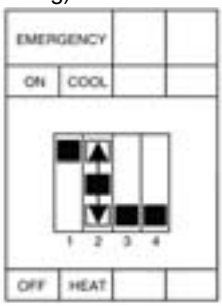
Below table explains what will happen when the switch is set to "emergency":

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

How to set Emergency Operation

To set emergency operation, proceed as follows:

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

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

Active components

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

Additional info

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

1.4 Outdoor Unit Identification Function

Purpose

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

Operating modes

The possible operating modes are:

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

Used input

The outdoor unit identification function uses the following inputs:

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

TC: Transmission circuit
RC: Receiving circuit

1.5 Simulated Operation Function

Outline

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

Sensors

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

Remark

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

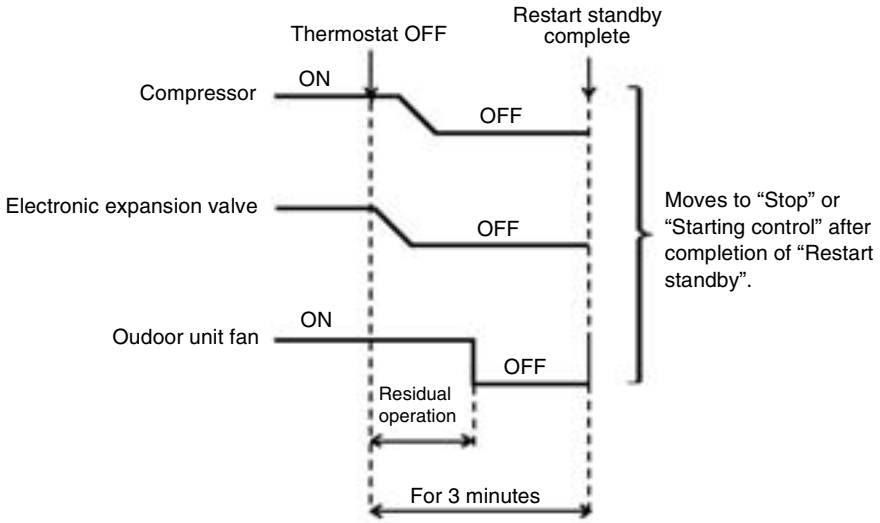
1.6 Restart Standby

Outline

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

2

Graph



1.7 Automatic Restart

Purpose

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

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

Precautions when turning OFF power

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

1.8 Using Conditions for Remote Controller Thermostat

Applicable

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

Method

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

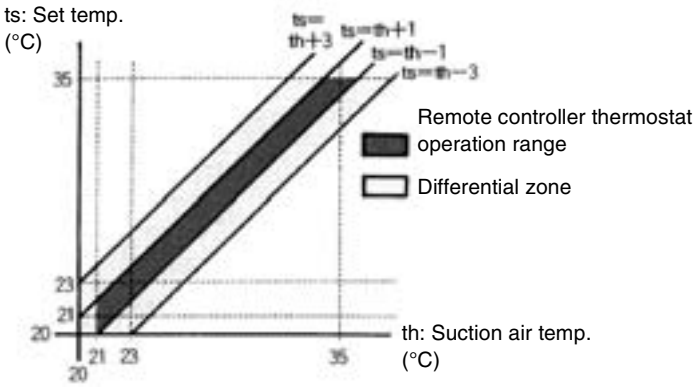
Conditions

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

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

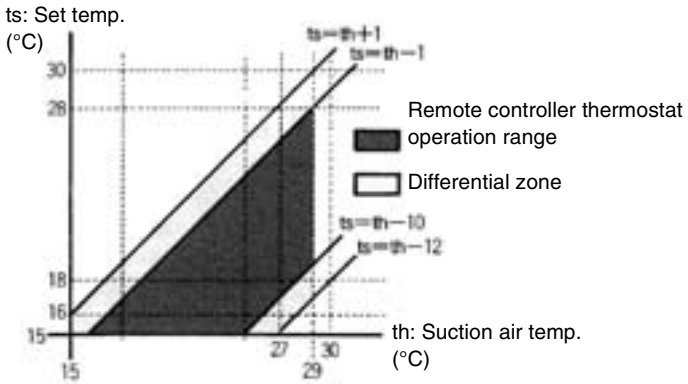
Cooling

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



Heating

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



1.9 Forced Thermostat OFF

Outline

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

Condition 1 (cooling)

Thermostat off due to freeze-up prevention.

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

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

Condition 2 (heating)

Thermostat off due to high outdoor temperature.

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

Reference

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

1.10 Test run control

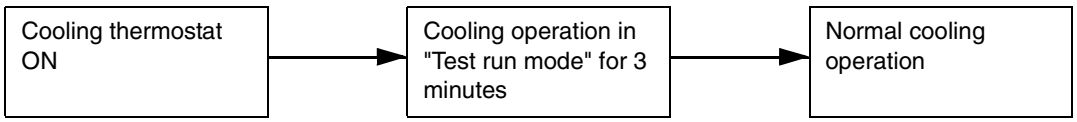
Purpose

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

2

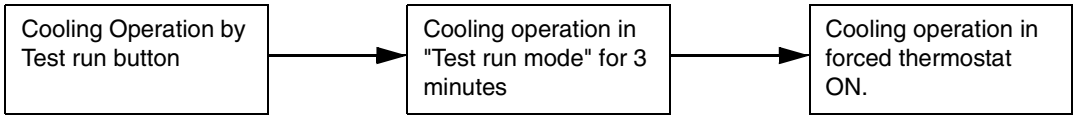
Situation 1

Cooling - first operation after installation in "Cooling mode"



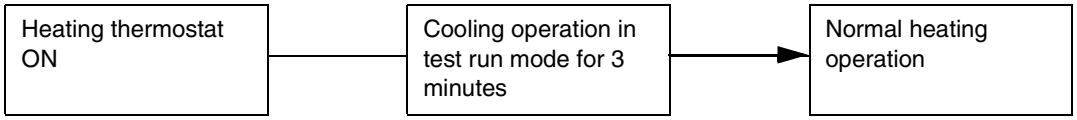
Situation 2

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



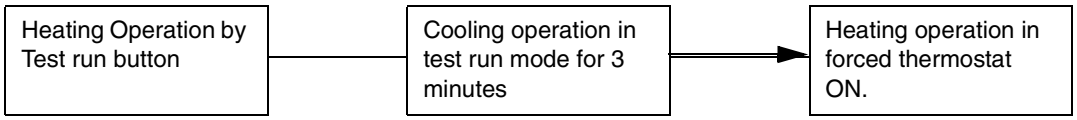
Situation 3

Heating - first operation after installation in "Heating mode"



Situation 4

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



Remarks

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

1.11 4-way Valve Control

Purpose

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

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

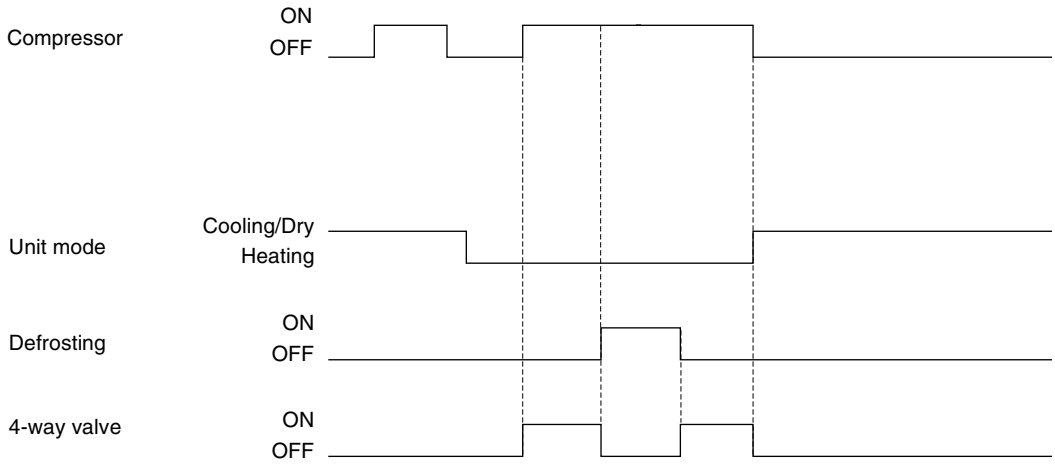
Method

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

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

Time chart

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



1.12 Pump Down Residual Operation

Outline

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

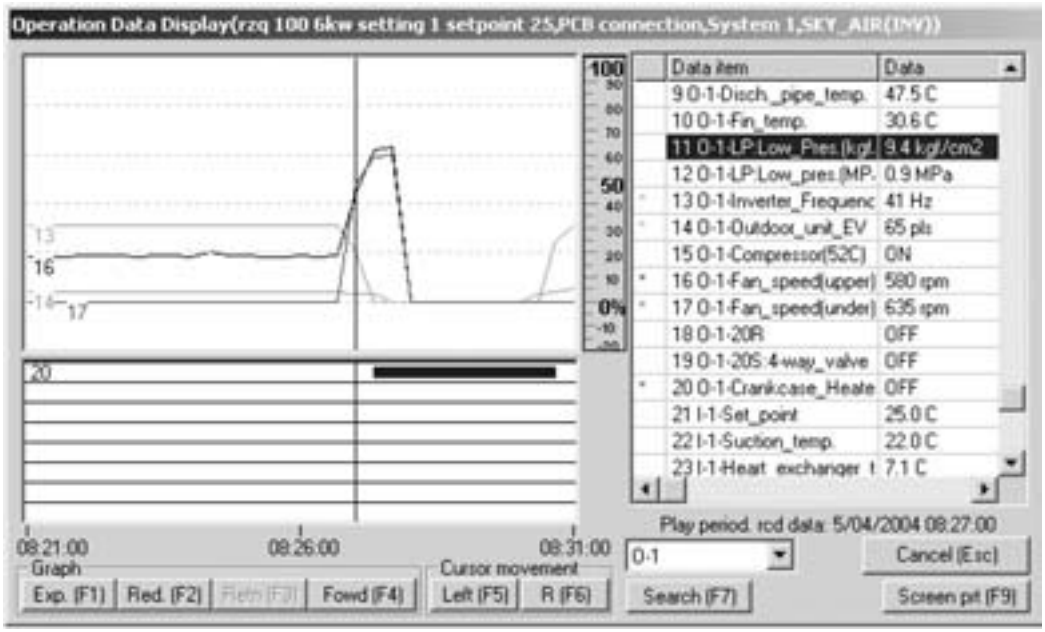
Purpose of this function is to collect the refrigerant in the liquid receiver and outdoor heat exchanger in order to prevent liquid refrigerant from remaining in the indoor heat exchanger.

2

Parameters

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

Graph



Ending condition

- ➤ 30 seconds have elapsed since start of residual operation

  OR

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

1.13 Pump Down Operation

Outline

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

Procedure

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

Cautions

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

1.14 Defrost Operation

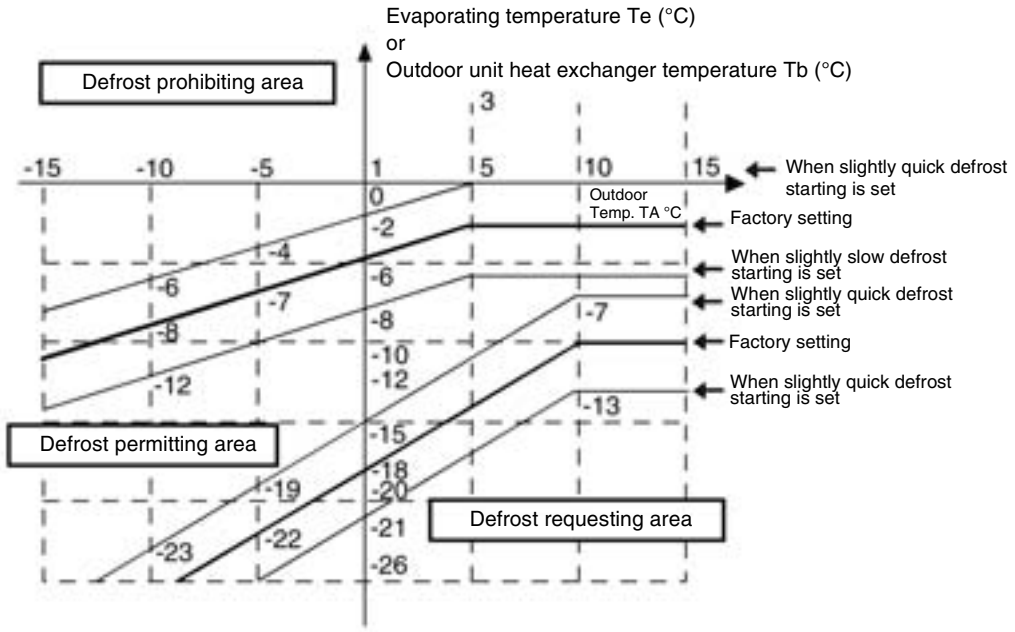
Outline

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

Defrost starting conditions

Defrost will start when the following conditions have been realized:

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

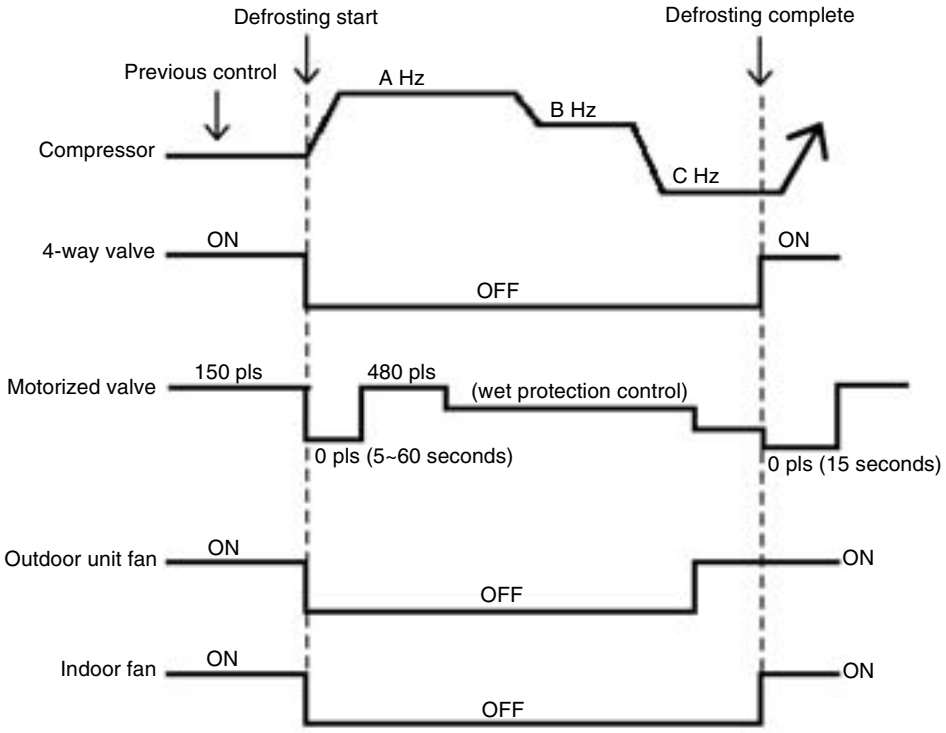


Areas

Defrost upper limit A

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

Defrost control



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

Defrost ending condition

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

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

1.15 Freeze Prevention Function

Purpose

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

2

Freeze Prevention start conditions

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

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

Freeze Prevention stop conditions

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

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

Parameters

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

Reference

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

1.16 PMV Control

Outline

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

The PMV index is a calculated average comfort level.

Refer to ISO 7730 for details.

Function

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

- Outdoor air temperature
- Indoor air temperature
- Remote controller set temperature

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

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

1.17 Preheating Operation Control

Applicable units

RZQ71

Outline

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

Trigger conditions

Starting conditions &
- ➤ or
  - ➤ Power supply ON to First operation
  - ➤ 60 minutes or more elapsed after compressor stop
- ➤ T2 (Discharge pipe temperature) < 20°C
- ➤ Ta (Outside temperature) < 20°C

Ending conditions or
- ➤ T2 (Discharge pipe temperature) > 23°C
- ➤ Ta (Outside temperature) > 23°C
- ➤ Thermostat ON confirmation

1.18 Crankcase Heater Control

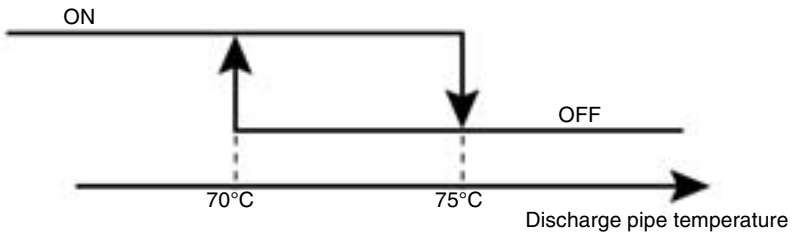
Applicable units

RZQ100 & 125

Outline

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

Trigger conditions



2

2 Indoor Unit Functional Concept

2.1 What Is in This Chapter?

Introduction

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

Overview

This chapter contains the following topics:

2.2 Thermostat Control

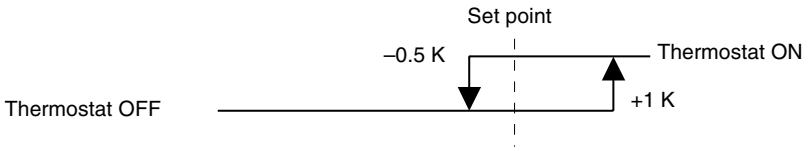
Purpose

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

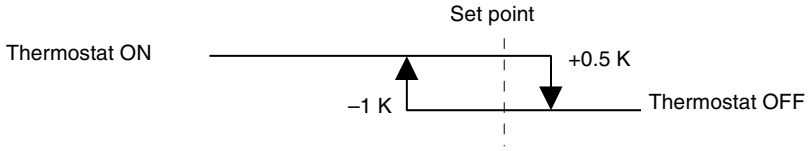
2

Thermostat control

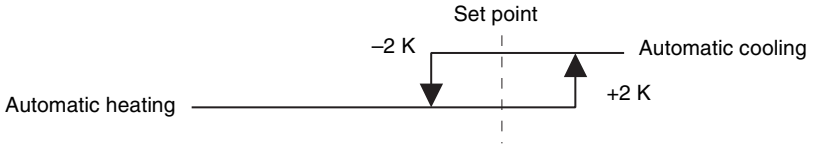
Cooling mode:



Heating mode:



Cool / heat changeover in automatic mode:



Preventing thermostat OFF conditions

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

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

Remark:

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

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

2.3 Drain Pump Control

Purpose

Control the water draining from the drain pan.

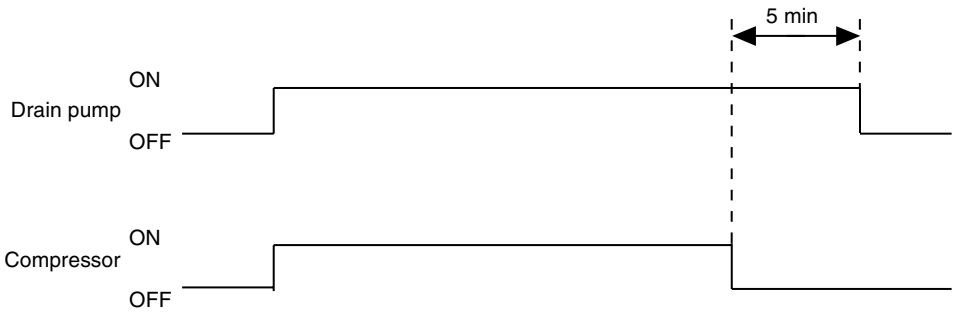
Starting conditions

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

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

Normal control

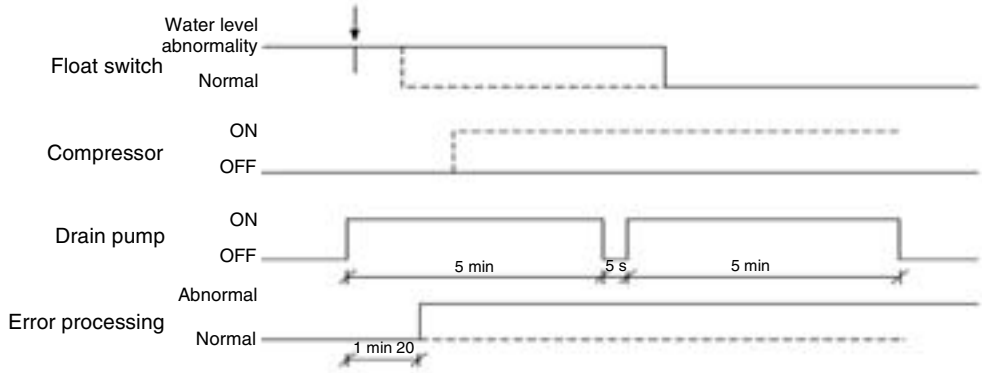
In normal control, the drain pump is turned ON at compressor starting and turned OFF 5 minutes after the compressor has stopped (residual operation).



Float switch activation during thermostat OFF

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

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

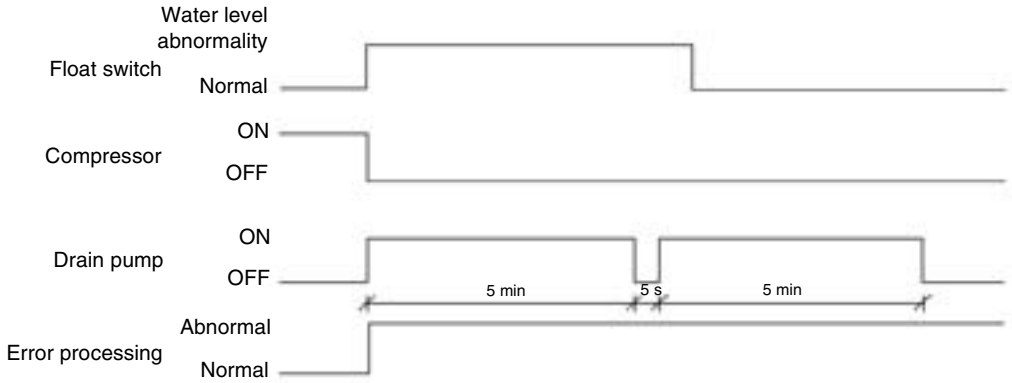


Float switch activation during thermostat ON

1 The thermostat is immediately turned OFF.

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

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



Used inputs

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

2.4 Condensation Avoidance Control

Purpose

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

Applicable units

This function is applicable for the FHQ units only.

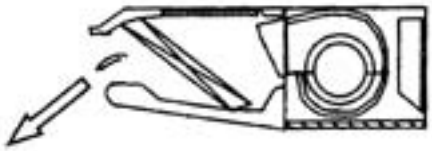
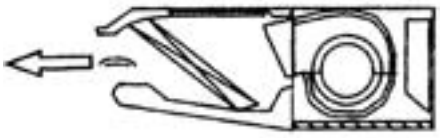
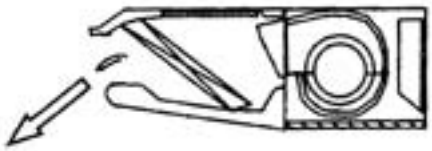
Method

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

- ➤ Cooling (automatic)
- ➤ Dry keep.

Method

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

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

2.5 Draft Avoidance Control 1

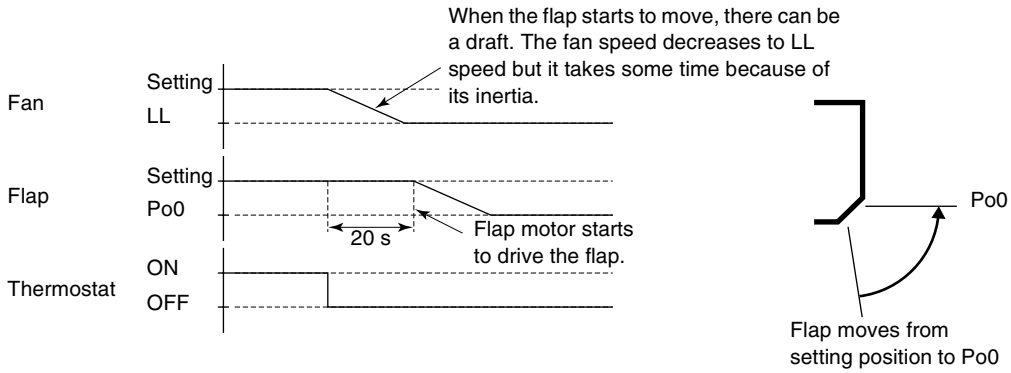
Purpose

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

2

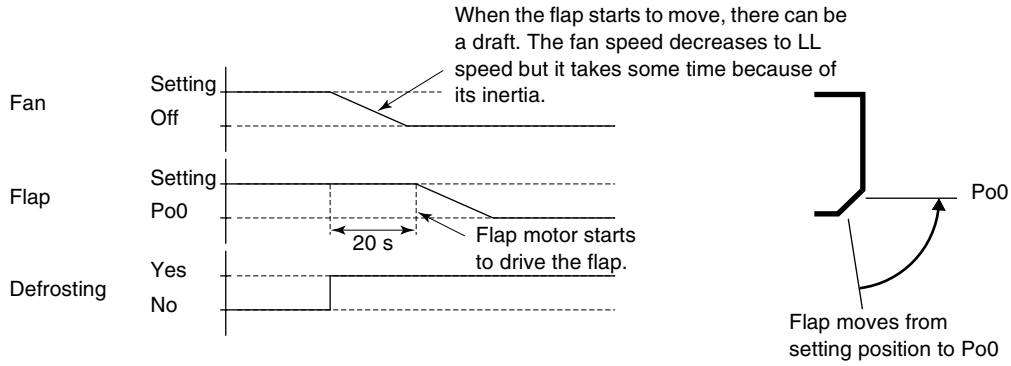
Heating thermostat OFF

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



Defrosting

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



Used inputs

The draft avoidance control 1 uses the following inputs:

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

2.6 Draft Avoidance Control 2

Purpose

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

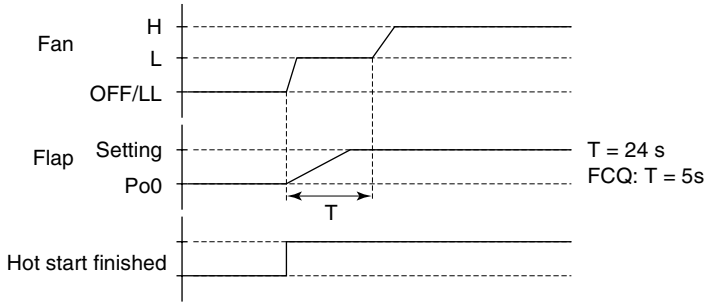
Starting conditions

The draft avoidance control 2 is activated when:

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

Time chart

If the fan speed is set to "H", the fan turns at low speed for a certain amount of time.



Used input

Draft avoidance control 2 uses the following inputs:

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

2.7 Fan and Flap Operations

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

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

(*) LL operation on cassette type units

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

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

2.8 Indoor unit fan control

Outline

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

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

Before compressor stop

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

Purpose:

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

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

During compressor stop

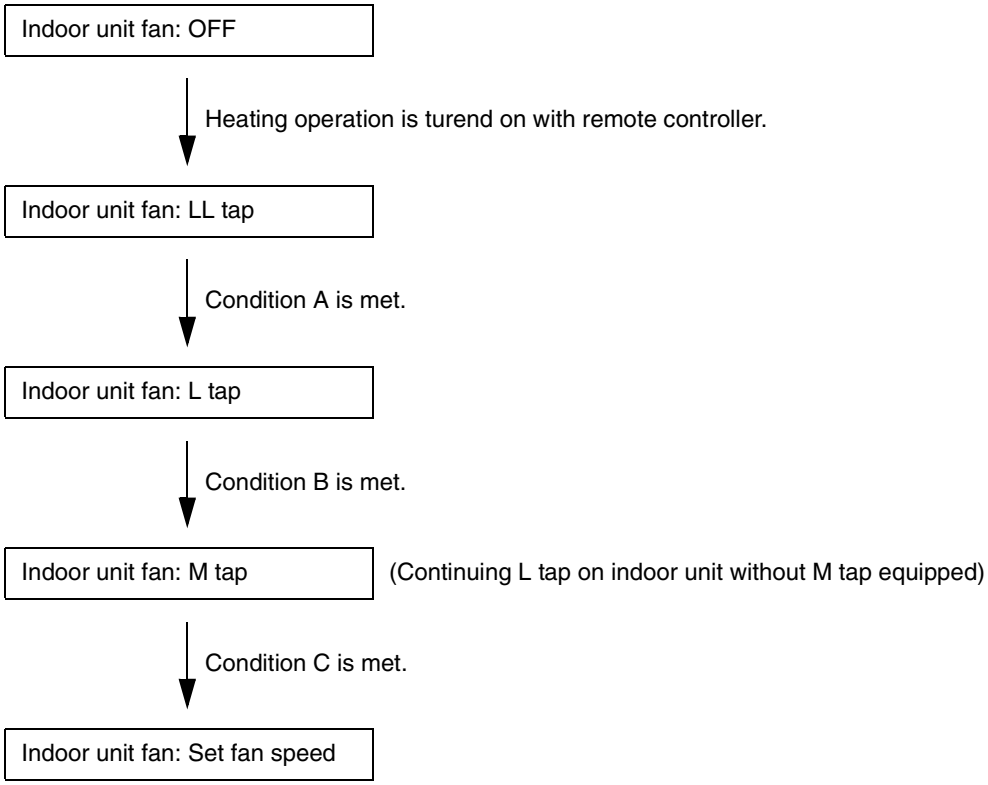
		Indoor fan tap
Indoor cooling / Automatic cooling	Thermostat OFF	Remote controller setting
	Remote controller OFF	OFF
Indoor heating / Automatic heating	Thermostat OFF	LL
	Remote controller OFF	OFF
Indoor drying	Thermostat OFF	OFF
	Remote controller OFF	OFF

Before compressor startup

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

At compressor startup

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



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