R410A

Commercial Air Conditioners

Service Manual

V8S Series VRF

MV8S-252WV2GN1

MV8S-280WV2GN1

MV8S-335WV2GN1

MV8S-400WV2GN1

MV8S-450WV2GN1

MV8S-500WV2GN1

MV8S-560WV2GN1

MV8S-615WV2GN1

MV8S-670WV2GN1

CONTENTS

Part 1

General Information

1 Indoor and Outdoor Unit Capacities

1.1 Indoor Units

1.1.1 Standard indoor units

Table 1-1.1: Standard indoor unit abbreviation codes

Abbreviation code	Type
Q1	One-way Cassette
Q2	Two-way Cassette
Q4C	Compact Four-way Cassette
Q4	Four-way Cassette
T3	Arc Duct
T2	Medium Static Pressure Duct

Abbreviation code	Type
T1	High Static Pressure Duct
G	Wall-mounted
DL	Ceiling & Floor
F	Floor Standing (Exposed/Concealed)
FS	Floor Standing

Table 1-1.2: Standard indoor unit capacity range

Capacity		Capacity index	Q1	Q2	Q4C	Q4	T3	T2	T1	G	DL	F	FS
kW	HP												
1.5	0.5	15	—	—	15	—	15	15	—	15	—	—	—
1.8	0.6	18	18	—	—	—	—	—	—	—	—	—	—
2.2	0.8	22	22	22	22	—	22	22	—	22	—	22	—
2.8	1	28	28	28	28	28	28	28	—	28	—	28	—
3.6	1.25	36	36	36	36	36	36	36	—	36	36	36	—
4.5	1.6	45	45	45	45	45	45	45	—	45	45	45	—
5.6	2	56	56	56	56	56	56	56	56	56	56	56	—
6.3	2.25	63	—	—	63	—	—	—	—	—	—	—	—
7.1	2.5	71	71	71	—	71	71	71	71	71	71	71	—
8.0	3	80	—	—	—	80	80	80	80	80	80	80	—
9.0	3.2	90	—	—	—	90	90	90	90	—	90	—	—
10.0	3.6	100	—	—	—	100	—	—	—	—	100	—	—
11.2	4	112	—	—	—	112	112	112	112	—	112	—	—
12.5	4.5	125	—	—	—	—	—	125	125	—	125	—	—
14.0	5	140	—	—	—	140	—	140	140	—	140	—	—
16.0	6	160	—	—	—	160	—	160	160	—	—	—	—
18.0	6.4	180	—	—	—	180	—	—	—	—	—	—	—
20.0	7	200	—	—	—	—	—	—	200	—	—	—	—
22.4	8	224	—	—	—	—	—	—	224	—	—	—	—
25.2	9	252	—	—	—	—	—	—	252	—	—	—	252
28.0	10	280	—	—	—	—	—	—	280	—	—	—	280
33.5	12	335	—	—	—	—	—	—	335	—	—	—	335
40.0	14	400	—	—	—	—	—	—	400	—	—	—	—
45.0	16	450	—	—	—	—	—	—	450	—	—	—	450
56.0	20	560	—	—	—	—	—	—	560	—	—	—	560

1.1.2 Fresh air processing unit

Table 1-1.3: Fresh air processing unit capacity range

Capacity	9kW	14kW	16kW	22.4kW	25kW	28kW	33.5kW	45kW	56kW
Capacity index	90	140	160	224	250	280	335	450	560

1.2 Heat recovery ventilator

Table 1-1.4: Heat recovery ventilator capacity range

Airflow rate	200m³/h	300m³/h	400m³/h	500m³/h	800m³/h	1000m³/h	1500m³/h	2000m³/h

1.3 Outdoor Units

Table 1-1.5: Outdoor unit capacity range

Capacity	Model Name	Combination Type
8HP	MV8S-252WV2GN1	/
10HP	MV8S-280WV2GN1	/
12HP	MV8S-335WV2GN1	/
14HP	MV8S-400WV2GN1	/
16HP	MV8S-450WV2GN1	/
18HP	MV8S-500WV2GN1	/
20HP	MV8S-560WV2GN1	/
22HP	MV8S-615WV2GN1	/
24HP	MV8S-670WV2GN1	/
26HP	MV8S-735WV2GN1	12HP+14HP
28HP	MV8S-800WV2GN1	14HP+14HP
30HP	MV8S-850WV2GN1	14HP+16HP
32HP	MV8S-900WV2GN1	14HP+18HP
34HP	MV8S-950WV2GN1	16HP+18HP
36HP	MV8S-1000WV2GN1	18HP+18HP
38HP	MV8S-1070WV2GN1	14HP+24HP
40HP	MV8S-1115WV2GN1	18HP+22HP
42HP	MV8S-1170WV2GN1	18HP+24HP
44HP	MV8S-1230WV2GN1	22HP+22HP
46HP	MV8S-1285WV2GN1	22HP+24HP
48HP	MV8S-1340WV2GN1	24HP+24HP
50HP	MV8S-1400WV2GN1	14HP+18HP+18HP
52HP	MV8S-1470WV2GN1	14HP+14HP+24HP
54HP	MV8S-1500WV2GN1	18HP+18HP+18HP
56HP	MV8S-1570WV2GN1	14HP+18HP+24HP
58HP	MV8S-1615WV2GN1	18HP+18HP+22HP
60HP	MV8S-1670WV2GN1	18HP+18HP+24HP
62HP	MV8S-1730WV2GN1	18HP+22HP+22HP
64HP	MV8S-1785WV2GN1	18HP+22HP+24HP
66HP	MV8S-1845WV2GN1	22HP+22HP+22HP
68HP	MV8S-1900WV2GN1	22HP+22HP+24HP
70HP	MV8S-1955WV2GN1	22HP+24HP+24HP
72HP	MV8S-2010WV2GN1	24HP+24HP+24HP
74HP	MV8S-2070WV2GN1	14HP+18HP+18HP+24HP
76HP	MV8S-2115WV2GN1	18HP+18HP+18HP+22HP
78HP	MV8S-2170WV2GN1	18HP+18HP+18HP+24HP
80HP	MV8S-2230WV2GN1	18HP+18HP+22HP+22HP
82HP	MV8S-2285WV2GN1	18HP+18HP+22HP+24HP
84HP	MV8S-2340WV2GN1	18HP+18HP+24HP+24HP
86HP	MV8S-2400WV2GN1	18HP+22HP+22HP+24HP
88HP	MV8S-2460WV2GN1	22HP+22HP+22HP+22HP
90HP	MV8S-2515WV2GN1	22HP+22HP+22HP+24HP
92HP	MV8S-2570WV2GN1	22HP+22HP+24HP+24HP
94HP	MV8S-2625WV2GN1	22HP+24HP+24HP+24HP
96HP	MV8S-2680WV2GN1	24HP+24HP+24HP+24HP

Notes:

1. The combinations of units shown in the table are factory-recommended. For other combinations of units please contact your local distributor or technical support engineer.

2 External Appearance

2.1 Indoor Units

2.1.1 Standard indoor units

Table 1-2.1: Standard indoor unit appearance

One-way Cassette Q1 	Two-way Cassette Q2 
Compact Four-way Cassette Q4C 	Four-way Cassette Q4 
Arc Duct T3 	Medium Static Pressure Duct T2 
High Static Pressure Duct T1 	Floor Standing FS 
Wall-mounted G 	Ceiling & Floor DL 
Floor Standing F 	

2.1.2 Fresh air processing unit

Table 1-2.2: Fresh air processing unit appearance

Fresh Air Processing Unit FA 	Small Airflow Rate Fresh Air Processing Unit FA 

2.2 Heat Recovery Ventilator

Table 1-2.3: Heat recovery ventilator appearance

Heat Recovery Ventilator 

2.3 Outdoor Units

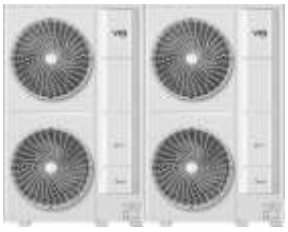
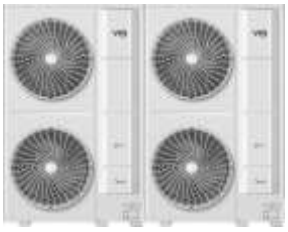
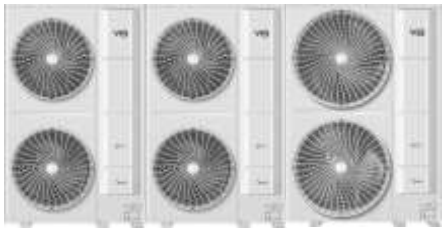
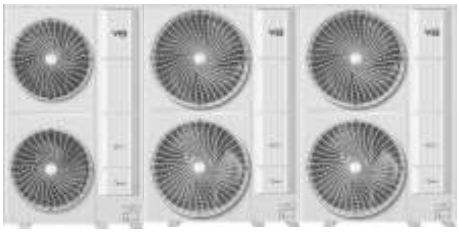
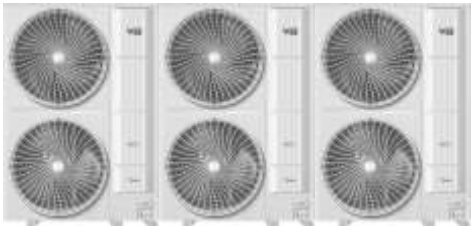
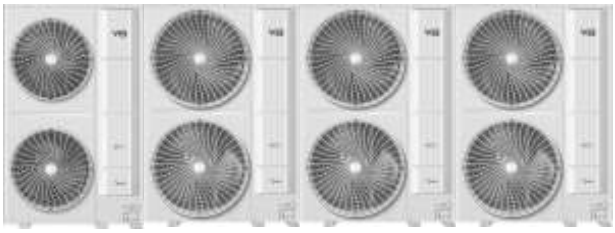
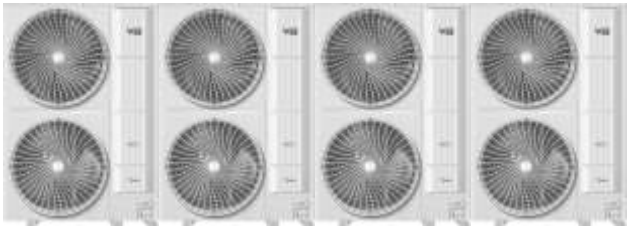
2.3.1 Single units

Table 1-2.4: Single outdoor unit appearance

8/10/12/14HP	16/18/20/22/24HP
	

2.3.2 Combinations of units

Table 1-2.5: Combination outdoor unit appearance

26/28HP	30/32/38HP
	
34/36/40/42/44/46/48HP	**52HP**
	
50/56HP	**54/58/60/62/64/66/68/70/72HP**
	
74HP	**76/78/80/82/84/86/88/90/92/94/96HP**
	

3 Outdoor Unit Combinations

Table 1-3.1: Outdoor unit combinations

System capacity		No. of units	Modules[1]									Outdoor branch joint kit[2]
kW	HP		8	10	12	14	16	18	20	22	24	
25.2	8	1	●									—
28.0	10	1		●								
33.5	12	1			●							
40.0	14	1				●						
45.0	16	1					●					
50.0	18	1						●				
56.0	20	1							●			
61.5	22	1								●		
67.0	24	1									●	
73.5	26	2			●	●						FQZHW-02N1E
80.0	28	2				●●						
85.0	30	2				●	●					
90.0	32	2				●		●				
95.0	34	2					●	●				
100.0	36	2						●●				
106.0	38	2				●					●	
112.0	40	2						●		●		
117.5	42	2						●			●	
123.0	44	2								●●		
128.5	46	2								●	●	
134.0	48	2									●●	
140.0	50	3				●		●●				FQZHW-03N1E
145.0	52	3				●●					●	
150.0	54	3						●●●				
156.0	56	3				●		●			●	
162.0	58	3						●●		●		
168.0	60	3						●●			●	
173.5	62	3						●		●●		
179.0	64	3						●		●	●	
184.5	66	3								●●●		
190.0	68	3								●●	●	
195.5	70	3								●	●●	
201.0	72	3									●●●	
206.0	74	4				●		●●			●	FQZHW-04N1G
212.0	76	4						●●●		●		
218.0	78	4						●●●			●	
224.0	80	4						●●		●●		
229.5	82	4						●●		●	●	
235.0	84	4						●●			●●	
240.5	86	4						●		●●	●	
246.0	88	4								●●●●		
251.5	90	4								●●●	●	
257.0	92	4								●●	●●	
262.5	94	4								●	●●●	
268.0	96	4									●●●●	

Notes:

1. The combinations of units shown in the table are factory-recommended. For other combinations of units please contact your local distributor or technical support engineer.
2. For systems with two or more outdoor units, outdoor branch joints (sold separately) are required.

4 Nomenclature

4.1 Indoor Units

4.1.1 Standard indoor units

V8 indoor units

M	IH	18	Q1	H	N18
①	②	③	④	⑤	⑥

Legend		
No.	**Code**	**Remarks**
1	M	Midea
2	IH	V8 VRF indoor unit
3	22	Capacity index (the capacity in kW multiplied by 10)
4	Q1	Indoor unit type Q1: One-way Cassette Q2: Two-way Cassette Q4C: Compact Four-way Cassette Q4: Four-way Cassette T3: Arc Duct T2: Medium Static Pressure Duct T1: High Static Pressure Duct G: Wall-mounted DL: Ceiling & Floor F: Floor Standing (Exposed/Concealed) FS: Floor Standing (Top/Side discharge)
5	H	Power supply Omit: 1 phase, 220-240V, 50Hz H: 1 phase, 220-240V, 50/60Hz
6	N18	Refrigerant type (N18: R410A&R32)

DC Indoor Units

M I 2 - 22 Q1 D H N1
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

Legend		
No.	**Code**	**Remarks**
1	M	Midea
2	I	VRF indoor unit
3	2	Generation code 2: The 2nd generation
4	22	Capacity index (the capacity in kW multiplied by 10)
5	Q1	Indoor unit type Q1: One-way Cassette Q2: Two-way Cassette Q4C: Compact Four-way Cassette Q4: Four-way Cassette T2: Medium Static Pressure Duct T1: High Static Pressure Duct G: Wall-mounted DL: Ceiling & Floor F: Floor Standing
6	D	Series category (D: DC series)
7	H	Power supply Omit: 1 phase, 220-240V, 50Hz H: 1 phase, 220-240V, 50/60Hz
8	N1	Refrigerant type (N1: R410A)

AC indoor units

MDV - D 18 - Q4 / N1 E (B)
① ② ③ ④ ⑤ ⑥ ⑦

Legend		
No.	**Code**	**Remarks**
1	MDV	Midea
2	D	VRF indoor unit
3	18	Capacity index (the capacity in kW multiplied by 10)
4	Q1	Indoor unit type Q1: One-way Cassette Q2: Two-way Cassette Q4C: Compact Four-way Cassette Q4: Four-way Cassette T2: Medium Static Pressure Duct T1: High Static Pressure Duct G: Wall-mounted DL: Ceiling & Floor F: Floor Standing
5	N1	Refrigerant N1: R410A
6	E	Design Code
7	(B)	Second Generation

4.1.2 Fresh air processing unit

V8 Fresh air processing unit

M IH 224 FA H N18
① ② ③ ④ ⑤ ⑥

Legend		
No.	**Code**	**Remarks**
1	M	Midea
2	IH	V8 VRF indoor unit
3	22	Capacity index (the capacity in kW multiplied by 10)
4	FA	Indoor unit type FA: Fresh Air Processing Unit FAS: Small Air Flow Fresh Air Processing Unit
5	H	Power supply Omit: 1 phase, 220-240V, 50Hz H: 1 phase, 220-240V, 50/60Hz
6	N18	Refrigerant type (N18: R410A&R32)

2nd Generation Fresh air processing unit

M I 2 - 280 FA D H N1 - S
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

Legend		
No.	**Code**	**Remarks**
1	M	Midea
2	I	VRF indoor unit
3	2	The 2nd generation VRF DC indoor unit
4	280	Capacity index (the capacity in kW multiplied by 10)
5	FA	Indoor unit type FA: Fresh Air Processing Unit
6	D	Series category (D: DC series)
7	H	Power supply Omit: 1 phase, 220-240V, 50Hz H: 1 phase, 220-240V, 50/60Hz
8	N1	Refrigerant type (N1: R410A)
9	S	Product series S: Small Airflow Rate

4.1.3 Heat recovery ventilator

AC Series

HRV - 200
① ②

Legend		
No.	**Code**	**Remarks**
1	HRV	Heat recovery ventilator
2	200	Airflow in m^3/h

HRV - D 200
① ② ③

Legend		
No.	**Code**	**Remarks**
1	HRV	Heat recovery ventilator
2	D	Series category (D: DC series)
3	200	Airflow in m^3/h

4.2 Outdoor Units

M V8S - 252 W V2 G N1
① ② ③ ④ ⑤ ⑥ ⑦

Legend		
No.	**Code**	**Remarks**
1	M	Midea
2	V8S	The 8th generation Side Flow VRF
3	252	Capacity index (the capacity in kW multiplied by 10)
4	W	Unit category (W: VRF outdoor unit)
5	V2	Type (V2: All DC inverter)
6	G	Power supply G:380-415V, 3N~, 50/60Hz R:380-415V, 3N~, 50Hz
7	N1	Refrigerant type (N1: R410A)

5 Combination Ratio

$$\text{Combination ratio} = \frac{\text{Sum of capacity indexes of the indoor units}}{\text{Capacity index of the outdoor units}}$$

Table 1-5.1: Indoor and outdoor unit combination ratio limitations

Type	Minimum combination ratio	Maximum combination ratio		
		Standard indoor units only	Fresh air processing units only	Fresh air processing units and standard indoor units together
V8S Series outdoor units	50%	200%[1,2,3] (Single ODU) 130% (Combined ODU)	100%	100%[4]

Notes:
1. All the indoor units connected should be indoor units with ø5mm size copper tube heater exchanger. This limitation is to avoid too big indoor unit exchanger cause reliability and performance problem.
2. Piping between farthest indoor unit and first indoor branch joint should less than 40m.
3. Combination ratio greater than 130% is available as a customization option.
4. When Small Airflow Fresh Air Processing Units are installed together with standard indoor units, the total capacity of the fresh air processing units must not exceed 30% of the total capacity of the outdoor units and the total combination ratio must not exceed 100%.

Table 1-5.2: Combinations of indoor and outdoor units

Outdoor unit capacity			Sum of capacity indexes of connected indoor units (standard indoor units only)	Sum of capacity indexes of connected indoor units (fresh air processing units and standard indoor units together)	Maximum number of connected indoor units
kW	HP	Capacity index			
25.2	8	252	126 to 327.6	126 to 252	13
28.0	10	280	140 to 364	140 to 280	16
33.5	12	335	167.5 to 435.5	167.5 to 335	19
40.0	14	400	200 to 520	200 to 400	23
45.0	16	450	225 to 585	225 to 450	26
50.0	18	500	250 to 650	250 to 500	29
56.0	20	560	280 to 728	280 to 560	33
61.5	22	615	307.5 to 799.5	307.5 to 615	36
67.0	24	670	335 to 871	335 to 670	39
73.5	26	735	367.5 to 955.5	367.5 to 735	43
80.0	28	800	400 to 1040	400 to 800	46
85.0	30	850	425 to 1105	425 to 850	50
90.0	32	900	450 to 1170	450 to 900	53
95.0	34	950	475 to 1235	475 to 950	56
100.0	36	1000	500 to 1300	500 to 1000	59
107.0	38	1070	535 to 1391	535 to 1070	63
111.5	40	1115	557.5 to 1449.5	557.5 to 1115	64
117.0	42	1170	585 to 1521	585 to 1170	
123.0	44	1230	615 to 1599	615 to 1230	
128.5	46	1285	642.5 to 1670.5	642.5 to 1285	
134.0	48	1340	670 to 1742	670 to 1340	
140.0	50	1400	700 to 1820	700 to 1400	
147.0	52	1470	735 to 1911	735 to 1470	
150.0	54	1500	750 to 1950	750 to 1500	
157.0	56	1570	785 to 2041	785 to 1570	
161.5	58	1615	807.5 to 2099.5	807.5 to 1615	
167.0	60	1670	835 to 2171	835 to 1670	
173.0	62	1730	865 to 2249	865 to 1730	
178.5	64	1785	892.5 to 2320.5	892.5 to 1785	
184.5	66	1845	922.5 to 2398.5	922.5 to 1845	
190.0	68	1900	950 to 2470	950 to 1900	
195.5	70	1955	977.5 to 2541.5	977.5 to 1955	
201.0	72	2010	1005 to 2613	1005 to 2010	
207.0	74	2070	1035 to 2691	1035 to 2070	
211.5	76	2115	1057.5 to 2749.5	1057.5 to 2115	
217.0	78	2170	1085 to 2821	1085 to 2170	
223.0	80	2230	1115 to 2899	1115 to 2230	
228.5	82	2285	1142.5 to 2970.5	1142.5 to 2285	
234.0	84	2340	1170 to 3042	1170 to 2340	
240.0	86	2400	1200 to 3120	1200 to 2400	
246.0	88	2460	1230 to 3198	1230 to 2460	
251.5	90	2515	1257.5 to 3269.5	1257.5 to 2515	
257.0	92	2570	1285 to 3341	1285 to 2570	
262.5	94	2625	1312.5 to 3412.5	1312.5 to 2625	
268.0	96	2680	1340 to 3484	1340 to 2680	

6 Selection Procedure

6.1 Procedure

Step 1: Establish design conditions

Design temperature and humidity (indoor and outdoor)
Required heat load of each room
System peak load
Piping length, level differences
Indoor unit specifications (type and quantity)

Step 2: Select indoor units

Decide indoor unit safety factor

Select indoor unit models ensuring that:
Indoor unit capacity corrected for indoor air temperature WB[1] ≥ Required heat load × Indoor unit safety factor

Step 3: Select outdoor units

Determine required total heat load on outdoor units

Use the sum of the peak load of each room

Use the system peak load

Provisionally select outdoor unit capacity based on combination ratio limitations

Confirm that the number of indoor units connected to the outdoor units is within limitation

Correct cooling and heating capacities of the outdoor units for the following items:
Outdoor air temperature / Indoor air temperature WB / Combination ratio / Piping length, level difference / Piping heat loss / Frost accumulation (for heating capacity only)

Is corrected outdoor unit capacity ≥ Required total heat load on outdoor units?

No

Yes

VRF system selection is complete

Notes:

1. If the indoor design temperature falls between two temperatures listed in the indoor unit's capacity table, calculate the corrected capacity by interpolation. If the indoor unit selection is to be based on total heat load and sensible heat load, select indoor units which satisfy not only the total heat load requirements of each room but also the sensible heat load requirements of each room. As with total heat capacity, the sensible heat capacity of indoor units should be corrected for indoor temperature, interpolating where necessary. For the indoor unit capacity tables, refer to the indoor unit technical manuals.

6.2 Example

The following is a selection example based on total heat load for cooling.

Figure 1-6.1: Room plan

<table>
<tr><td rowspan="2">Room A</td><td>Room H</td><td>Room G</td><td rowspan="2">Room F</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td rowspan="2">Room B</td><td colspan="2"></td><td rowspan="2">Room E</td></tr>
<tr><td>Room C</td><td>Room D</td></tr>
</table>

Step 1: Establish design conditions

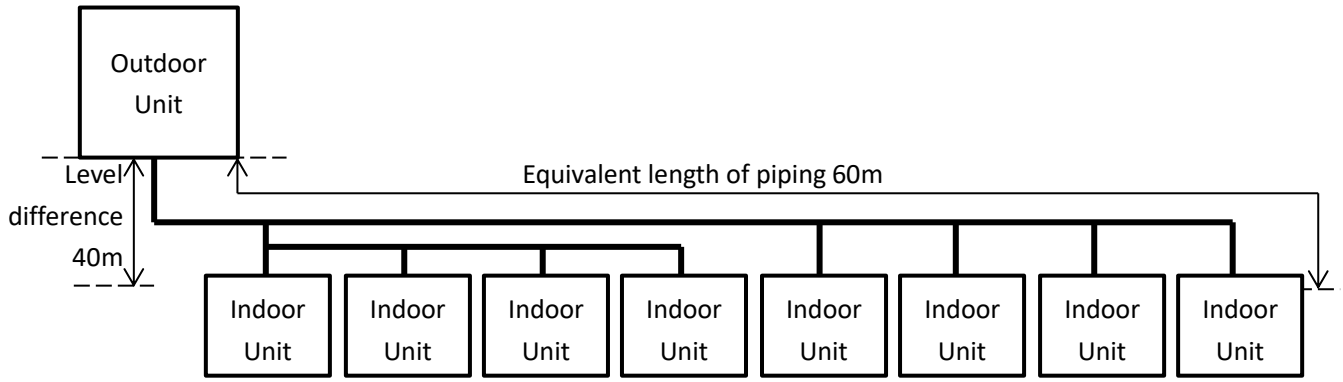
- Indoor air temperature 25.8°C DB, 18°C WB; outdoor air temperature 33°C DB.
- Determine peak load of each room and system peak load. As shown in Table 1-6.1, the system peak load is 50.7kW.

Table 1-6.1: Required heat load of each room (kW)

Time	Room A	Room B	Room C	Room D	Room E	Room F	Room G	Room H	Total
9:00	4.8	4.8	3.0	3.0	9.1	9.0	2.9	2.9	39.5
12:00	6.6	7.1	5.1	5.1	7.4	6.8	4.0	4.0	46.1
14:00	9.0	9.4	4.9	4.9	7.3	6.8	4.2	4.2	**50.7**
16:00	10.6	10.7	3.9	3.9	6.3	6.2	3.8	3.8	49.2

- The maximum piping lengths and level differences in this example are as given in Figure 1-6.2.

Figure 1-6.2: System diagram



- Indoor unit type for all rooms: Medium Static Pressure Duct (T2).

Step 2: Select indoor units

- In this example, a safety factor is not used (i.e. the safety factor is 1).
- Select indoor unit models using the medium static pressure duct cooling capacity table. Each indoor unit's corrected capacity needs to be greater than or equal to the peak load of the relevant room. The selected indoor units are shown in Table 1-6.3.

Table 1-6.2: Extract from medium static pressure duct (T2) cooling capacity table

Model	Capacity index	Indoor air temperature													
		14°C WB		16°C WB		18°C WB		19°C WB		20°C WB		22°C WB		24°C WB	
		20°C DB		23°C DB		26°C DB		27°C DB		28°C DB		30°C DB		32°C DB	
		TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC
T2	22	1.5	1.4	1.8	1.5	2.1	1.6	2.2	1.6	2.3	1.7	2.4	1.5	2.4	1.5
	28	1.9	1.7	2.3	1.9	2.6	2.1	2.8	2.1	3.0	2.1	3.1	2.0	3.1	1.9
	36	2.5	2.1	2.9	2.3	3.4	2.5	3.6	2.6	3.8	2.7	4.2	2.8	3.9	2.3
	45	3.1	2.6	3.7	2.8	4.2	3.1	4.5	3.2	4.8	3.2	4.9	3.1	5.1	2.9
	56	3.9	3.0	4.6	3.3	5.3	3.6	5.6	3.7	5.9	3.8	6.2	3.7	6.2	3.4
	71	4.9	3.9	5.8	4.3	6.7	4.7	7.1	4.9	7.5	4.8	7.8	4.6	7.8	4.3
	80	5.5	4.4	6.6	4.9	7.5	5.3	8.0	5.5	8.4	5.5	8.8	5.2	8.8	4.8
	90	6.2	5.3	7.3	5.8	8.4	6.3	9.0	6.4	9.6	6.5	9.9	6.1	9.9	5.7
	112	7.7	6.4	9.1	7.1	10.5	7.7	11.2	7.8	11.9	8.1	12.5	7.8	12.5	7.4
	140	9.7	7.8	11.3	8.6	13.2	9.6	14.0	9.8	14.8	9.8	15.7	9.7	15.4	8.8

Abbreviations:
TC: Total capacity (kW); SC: Sensible capacity (kW)

Table 1-6.3: Selected indoor units

	Room A	Room B	Room C	Room D
Peak heat load (kW)	10.6	10.7	5.1	5.1
Selected indoor unit	MI2-140T2DHN1	MI2-140T2DHN1	MI2-56T2DHN1	MI2-56T2DHN1
Corrected TC (kW)	13.2	13.2	5.3	5.3
	Room E	**Room F**	**Room G**	**Room H**
Peak heat load (kW)	9.1	9.0	4.2	4.2
Selected indoor unit	MI2-112T2DHN1	MI2-112T2DHN1	MI2-45T2DHN1	MI2-45T2DHN1
Corrected TC (kW)	10.5	10.5	4.2	4.2

Step 3: Select outdoor units

- Determine the required total heat load from the indoor units to the outdoor units based on either the sum of the peak loads of each room or the system peak load. In this example, it is determined based on the system peak load. Therefore, the required heat load is 50.7kW.
- Provisionally select outdoor units using the sum of the capacity indexes (CIs) of the selected indoor units (as shown in Table 1-6.4), ensuring that the combination ratio is between 50% and 130%. Refer to Table 1-6.5. As the sum of CIs of the indoor units is 706, outdoor units from 20HP to 50HP are potentially suitable. Start from the smallest, which is the 20HP unit.

Table 1-6.4: Sum of indoor unit capacity indexes

Model	Capacity Index	No. of units
MI2-140T2DHN1	140	2
MI2-112T2DHN1	112	2
MI2-56T2DHN1	56	2
MI2-45T2DHN1	45	2

Sum of CIs	**706**

Table 1-6.5: Extract from Table 1-5.2 Combinations of Indoor and outdoor units

Outdoor unit capacity			Sum of capacity indexes of connected indoor units (standard indoor units only)	Maximum number of connected indoor units
kW	HP	Capacity index		
50.0	18	500	250 to 650	29
56.0	20	560	280 to 728	33
61.5	22	615	307.5 to 799.5	36
67.0	24	670	335 to 871	39
73.5	26	735	367.5 to 955.5	43
80.0	28	800	400 to 1040	46
85.0	30	850	425 to 1105	50
90.0	32	900	450 to 1170	53
95.0	34	950	475 to 1235	56
100.0	36	1000	500 to 1300	59
107.0	38	1070	535 to 1391	63
111.5	40	1115	557.5 to 1449.5	64
117.0	42	1170	585 to 1521	
123.0	44	1230	615 to 1599	
128.5	46	1285	642.5 to 1670.5	
134.0	48	1340	670 to 1742	
140.0	50	1400	700 to 1820	
147.0	52	1470	735 to 1911	

- The number of connected indoor units is 8 and the maximum number of connected indoor units on the 20HP outdoor unit is 33, so the number of connected indoor units is within the limitation.
- Calculate the corrected capacity of the outdoor units:
  a) The sum of the indoor unit CIs is 706 and the CI of the 20HP outdoor unit MV8S-560WV2GN1 is 560, so the combination ratio is 706 / 560 = 126%.
  b) Using the outdoor units' cooling capacity table, interpolate to obtain the capacity ("B") corrected for outdoor air temperature, indoor air temperature, and combination ratio. Refer to Tables 1-6.6 and 1-6.7.

Table 1-6.6: Extract from Table 2-8.7 MV8S-560WV2GN1 cooling capacity

CR	Outdoor air temp. (°C DB)	Indoor air temp. (°C DB / °C WB)	
		25.8 / 18.0	
		TC	PI
		kW	kW
130%	31	62.05	15.47
	33	60.99	15.98
	35	59.94	16.50
120%	31	60.25	15.40
	33	59.21	15.92
	35	58.19	16.43

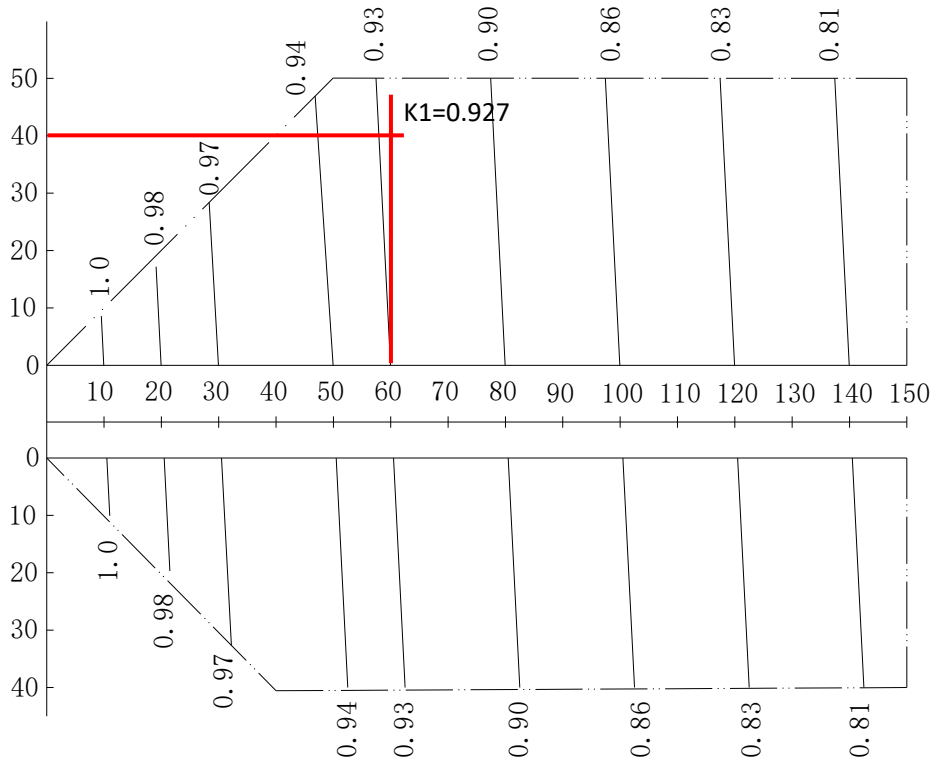
Table 1-6.7: Cooling capacity calculated by interpolation

CR	Outdoor air temp. (°C DB)	Indoor air temp. (°C DB / °C WB)	
		25.8 / 18.0	
		TC	PI
		kW	kW
130%			
	33	60.99	15.98
	B = 60.28[1]		
120%	33	59.21	15.92

Notes:
1. 59.21 + (60.99 − 59.21) × (126 − 120) / (130 − 120) =60.28

c) Find the correction factor for piping length and level difference ("K1")

Figure 1-6.3: V8S rate of change in cooling capacity



Notes:

1. The horizontal axis shows equivalent length of piping between farthest indoor unit and first outdoor branch joint; the vertical axis shows the largest level difference between indoor unit and outdoor unit. For level differences, positive values indicate that the outdoor unit is above the indoor unit, negative values indicate that the outdoor unit is below the indoor unit.

d) Calculate the corrected capacity of MV8S-560WV2GN1 ("C") by using K1:

$$C = B \times K1 = 60.28 \times 0.927 = 55.88kW$$

- The corrected capacity 55.88kW is larger than required total heat load 50.7kW, so selection is complete. (In the event that the corrected capacity is lower than the required total heat load, Step 3 should be repeated from the point where the outdoor unit capacity is provisionally selected.)

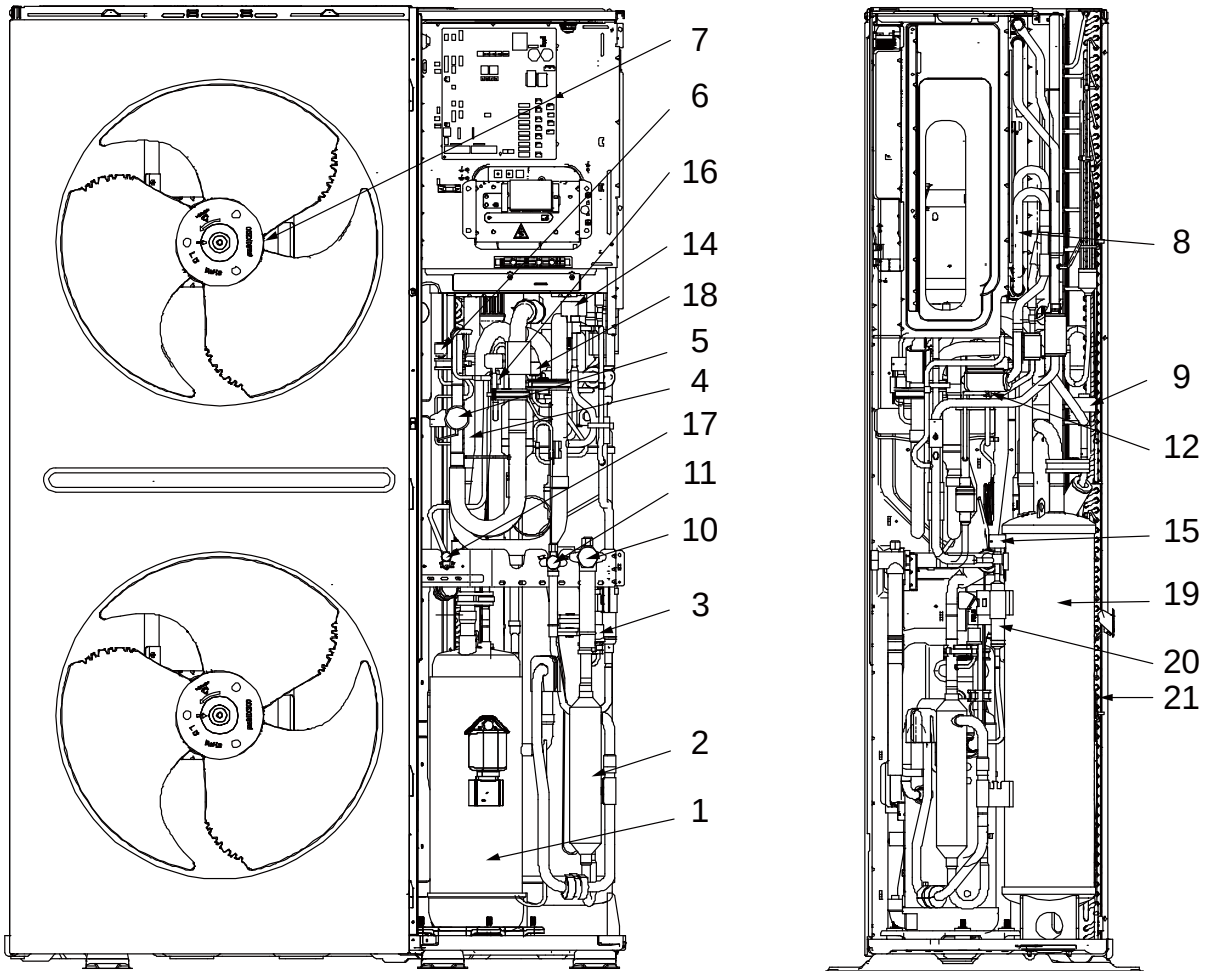
Part 2

Component Layout and Refrigerant Circuits

1 Layout of Functional Components

1.1 8-14HP layout of functional components

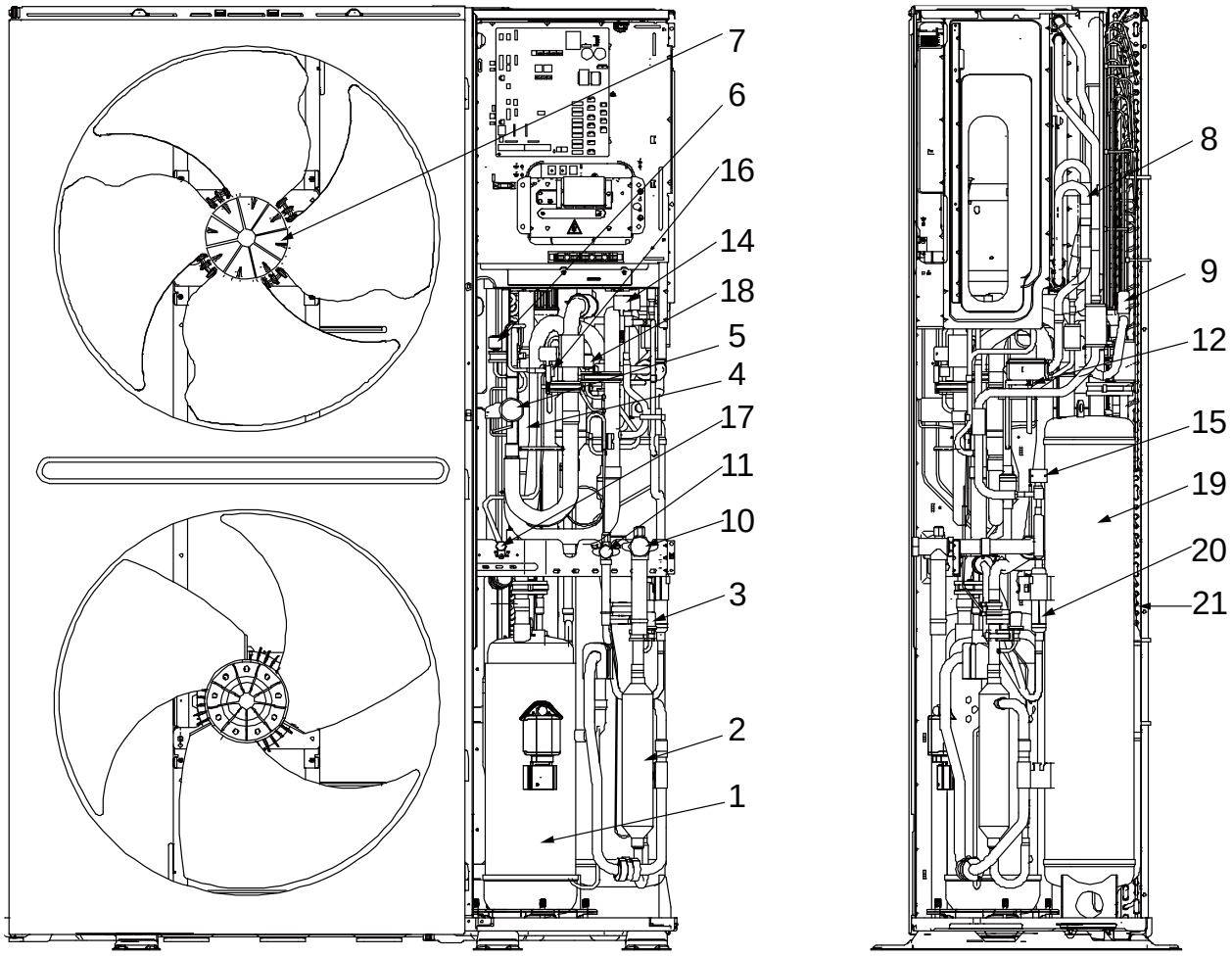
Figure 2-1.1: 8-14HP layout of functional component



Legend			
No.	**Parts name**	**No.**	**Parts name**
1	Inverter compressor	11	Stop valve (liquid side)
2	Oil separator	12	Electronic expansion valve (EEVC)
3	High pressure switch	13	Electronic expansion valve (EEVE)(Optional)
4	Check value	14	Injection bypass solenoid valve(SV5)
5	Four-way valve	15	Compressor vapor injection valve (SV8A)
6	High pressure sensor	16	Hot gas bypass solenoid valve(SV7)
7	Inverter fan	17	Charge port
8	Microchannel heat exchanger	18	Low pressure sensor
9	Electronic expansion valve (EEVA)	19	Gas-liquid separator
10	Stop valve (gas side)	20	Muffler
		21	Heat exchanger

1.2 16-24HP layout of functional components

Figure 2-1.2: 16-24HP layout of functional components



Legend			
No.	**Parts name**	**No.**	**Parts name**
1	Inverter compressor	11	Stop valve (liquid side)
2	Oil separator	12	Electronic expansion valve (EEVC)
3	High pressure switch	13	Electronic expansion valve (EEVE)(Optional)
4	Check value	14	Injection bypass solenoid valve(SV5)
5	Four-way valve	15	Compressor vapor injection valve (SV8A)
6	High pressure sensor	16	Hot gas bypass solenoid valve(SV7)
7	Inverter fan	17	Charge port
8	Microchannel heat exchanger	18	Low pressure sensor
9	Electronic expansion valve (EEVA)	19	Gas-liquid separator
10	Stop valve (gas side)	20	Muffler
		21	Heat exchanger

Note:

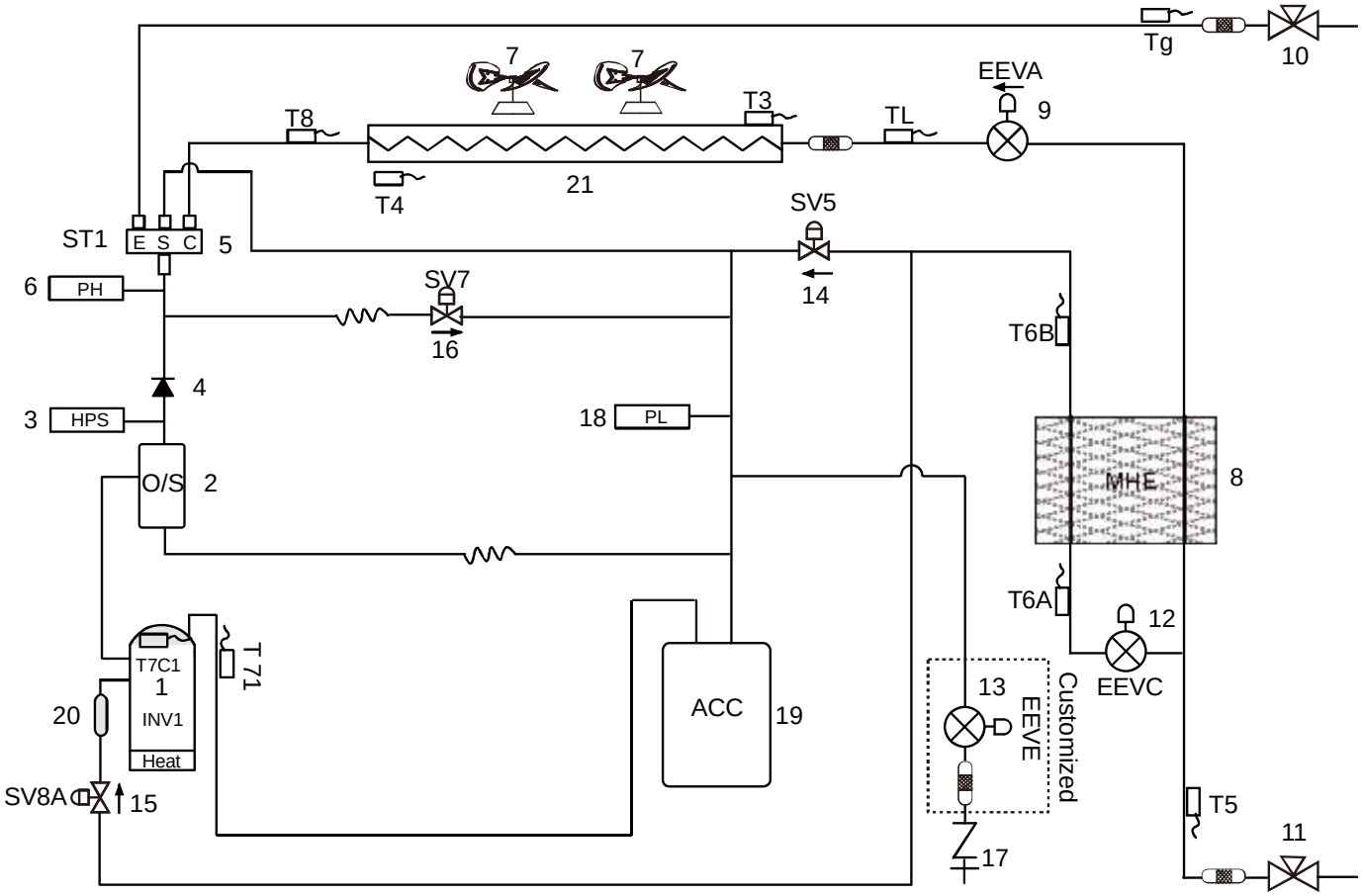
There is no SV8A for 20/22/24HP outdoor units.

2 Piping Diagrams

2.1 8-14HP piping diagram

Figure 2-2.1: 8-14HP piping diagram

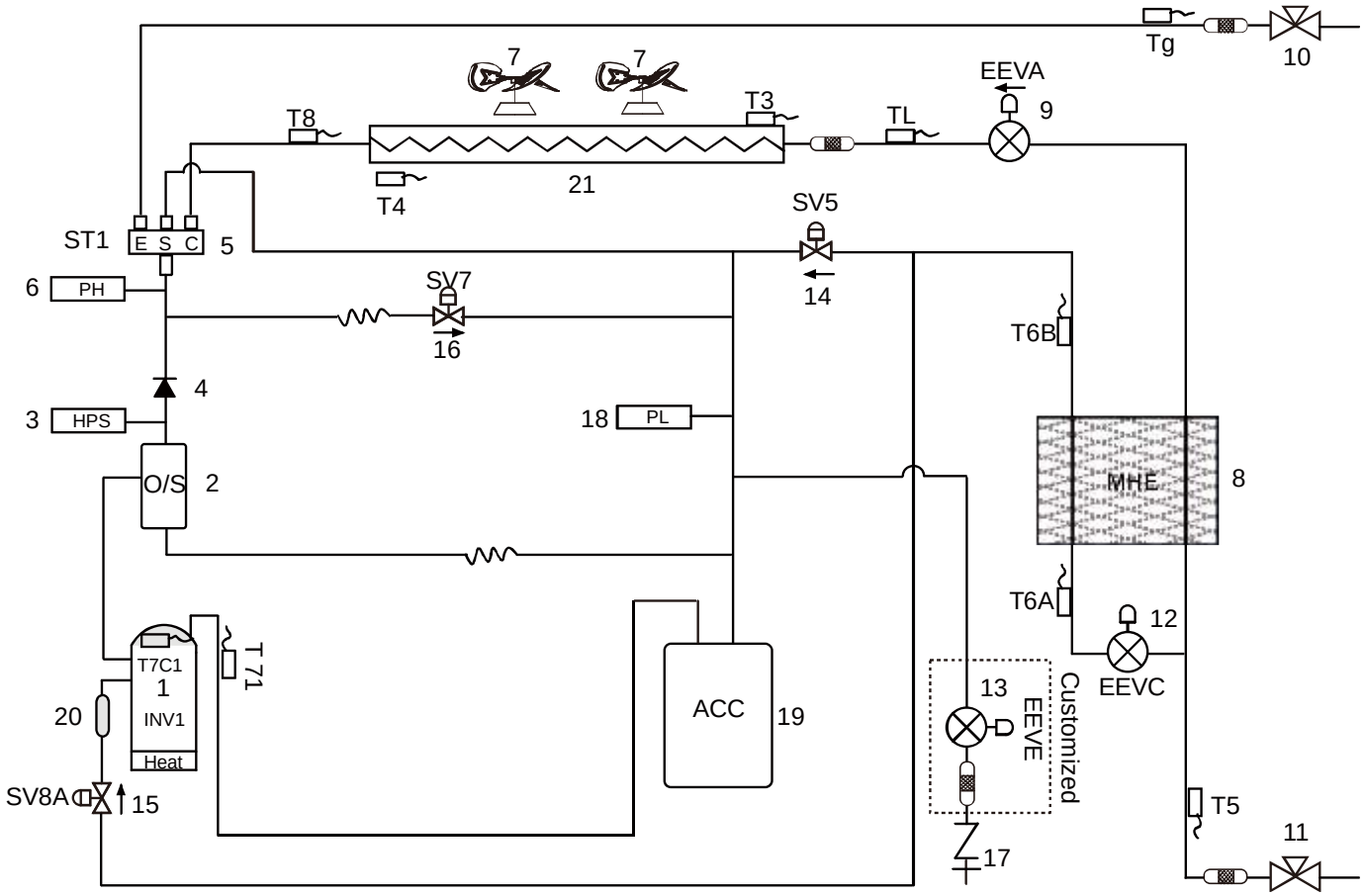
8-14 HP



Legend			
No.	**Parts name**	**No.**	**Parts name**
1	Inverter compressor	17	Charge port
2	Oil separator	18	Low pressure sensor
3	High pressure switch	19	Gas-liquid separator
4	Check value	20	Muffler
5	Four-way valve	21	Heat exchanger
6	High pressure sensor	**Sensor Code**	**Description**
7	Inverter fan	T3	Main exchanger pipe temperature sensor
8	Microchannel heat exchanger	T4	Outdoor ambient temperature sensor
9	Electronic expansion valve (EEVA)	T5	Liquid pipe temperature sensor
10	Stop valve (gas side)	T6A	Microchannel heat exchanger inlet pipe temperature sensor
11	Stop valve (liquid side)	T6B	Microchannel heat exchanger outlet pipe temperature sensor
12	Electronic expansion valve (EEVC)	T71	Suction temperature sensor
13	Electronic expansion valve (Optional EEVE)	T8	Heat exchanger gas temperature sensor
14	Injection bypass solenoid valve (SV5)	Tg	Gas pipe temperature sensor
15	Compressor vapor injection valve (SV8A)	TL	Heat exchanger liquid temperature sensor
16	Hot gas bypass solenoid valve (SV7)	T7C1	Compressor discharge temperature sensor

2.2 16-24HP piping diagram

Figure 2-2.2: 16-24HP piping diagram



Legend			
No.	**Parts name**	**No.**	**Parts name**
1	Inverter compressor	17	Charge port
2	Oil separator	18	Low pressure sensor
3	High pressure switch	19	Gas-liquid separator
4	Check value	20	Muffler
5	Four-way valve	21	Heat exchanger
6	High pressure sensor	**Sensor Code**	**Description**
7	Inverter fan	T3	Main exchanger pipe temperature sensor
8	Microchannel heat exchanger	T4	Outdoor ambient temperature sensor
9	Electronic expansion valve (EEVA)	T5	Liquid pipe temperature sensor
10	Stop valve (gas side)	T6A	Microchannel heat exchanger inlet pipe temperature sensor
11	Stop valve (liquid side)	T6B	Microchannel heat exchanger outlet pipe temperature sensor
12	Electronic expansion valve (EEVC)	T71	Suction temperature sensor
13	Electronic expansion valve (Optional EEVE)	T8	Heat exchanger gas temperature sensor
14	Injection bypass solenoid valve (SV5)	Tg	Gas pipe temperature sensor
15	Compressor vapor injection valve (SV8A)	TL	Heat exchanger liquid temperature sensor
16	Hot gas bypass solenoid valve (SV7)	T7C1	Compressor discharge temperature sensor

Note:

There is no SV8A for 20/22/24HP outdoor units.

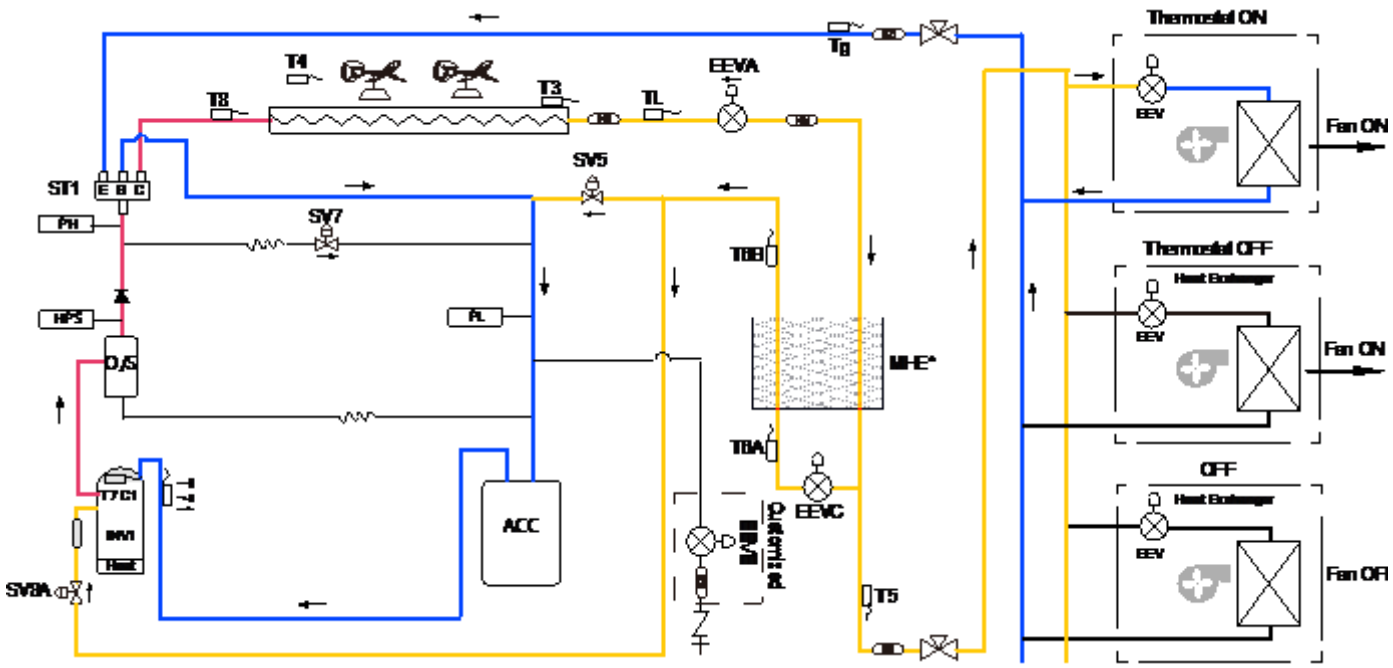
2.3 Key components

1. **Oil separator:**
   Separates oil from gas refrigerant pumped out of the compressor and quickly returns it to the compressor. Separation efficiency is up to 99%.
2. **Gas-liquid separator:**
   Separates liquid refrigerant from gas refrigerant, stores liquid refrigerant and oil to protect compressor from liquid hammering.
3. **Electronic expansion valve (EEVA):**
   Controls refrigerant flow and reduces refrigerant pressure.
4. **Four-way valve:**
   Controls heat exchanger function. When open, the heat exchanger functions as an evaporator; When closed, the heat exchanger functions as a condenser. Refer to part 3, “Heat Exchanger Control”.
5. **Microchannel heat exchanger:**
   In cooling mode, it can improve super-cooling degree and the super-cooled refrigerant can achieve better heat exchange in indoor units. In heating mode, the refrigerant comes from the microchannel heat exchanger going to the compressor can increase the refrigerant volume and improve the heating capacity in low ambient temperature. Refrigerant volume in microchannel heat exchanger is controlled according to temperature different between microchannel heat exchanger inlet and outlet or the temperature different between discharge temperature and target discharge temperature.
6. **Solenoid valve SV5:**
   Controls the refrigerant from microchannel heat exchanger to gas-liquid separator.
7. **Solenoid valve SV7:**
   Bypass pressure at start-up stage and control capacity at low load condition; High-pressure-rise prevention; Discharge superheat protection.
8. **Solenoid valve SV8A:**
   Allows refrigerant from microchannel heat exchanger inject directly to the compressor. SV8A opens when compressor startup and closes when compressor stop.
9. **High pressure switch:**
   Regulate system pressure. When system pressure rises above the upper limit, the high pressure switch turn off, stopping the compressor. When the high pressure protection recovers, the compressor restarts.
10. **High/Low pressure sensor**
    Used to detect the system high/low pressure.

3 Refrigerant Flow Diagrams

3.1 Cooling operation

Figure 2-3.1: 8-24HP refrigerant flow during cooling operation

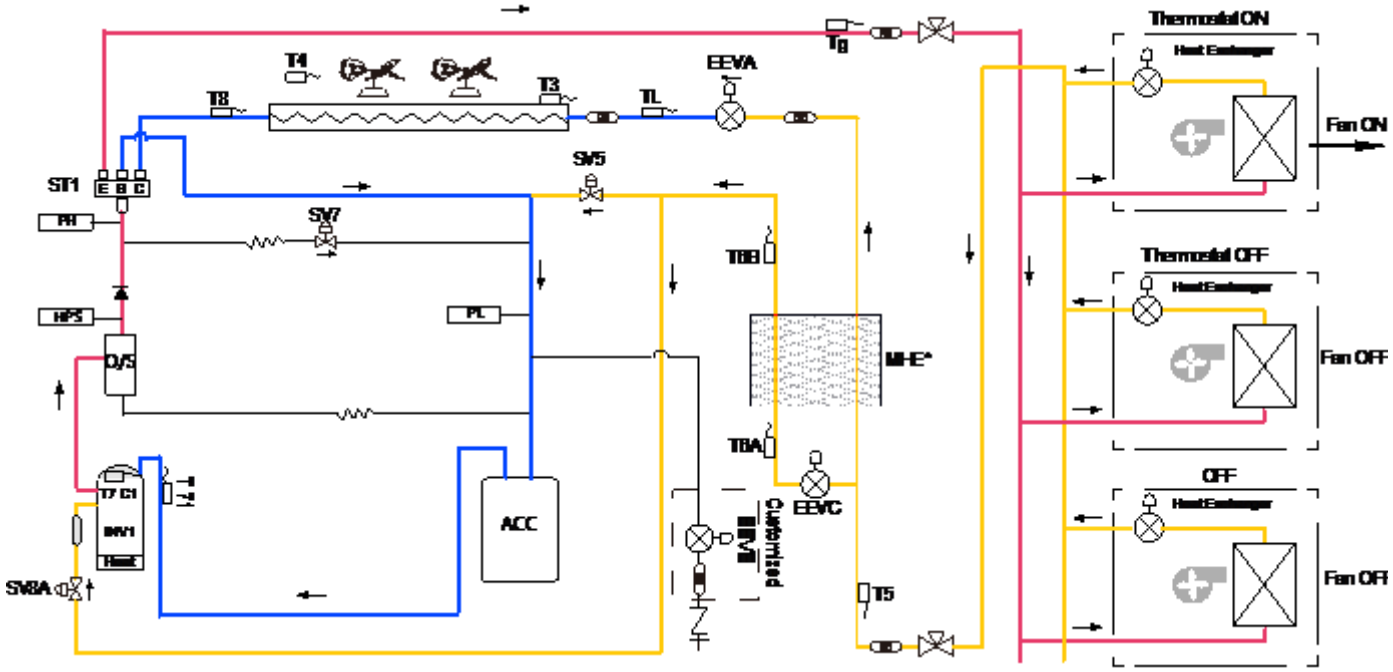


Note： There is no SV8A for 20/22/24HP outdoor units.

High temperature, high pressur
High temperature, high pressur
Low temperature, low pressure

3.2 Heating operation

Figure 2-3.2: 8-24HP refrigerant flow during heating operation

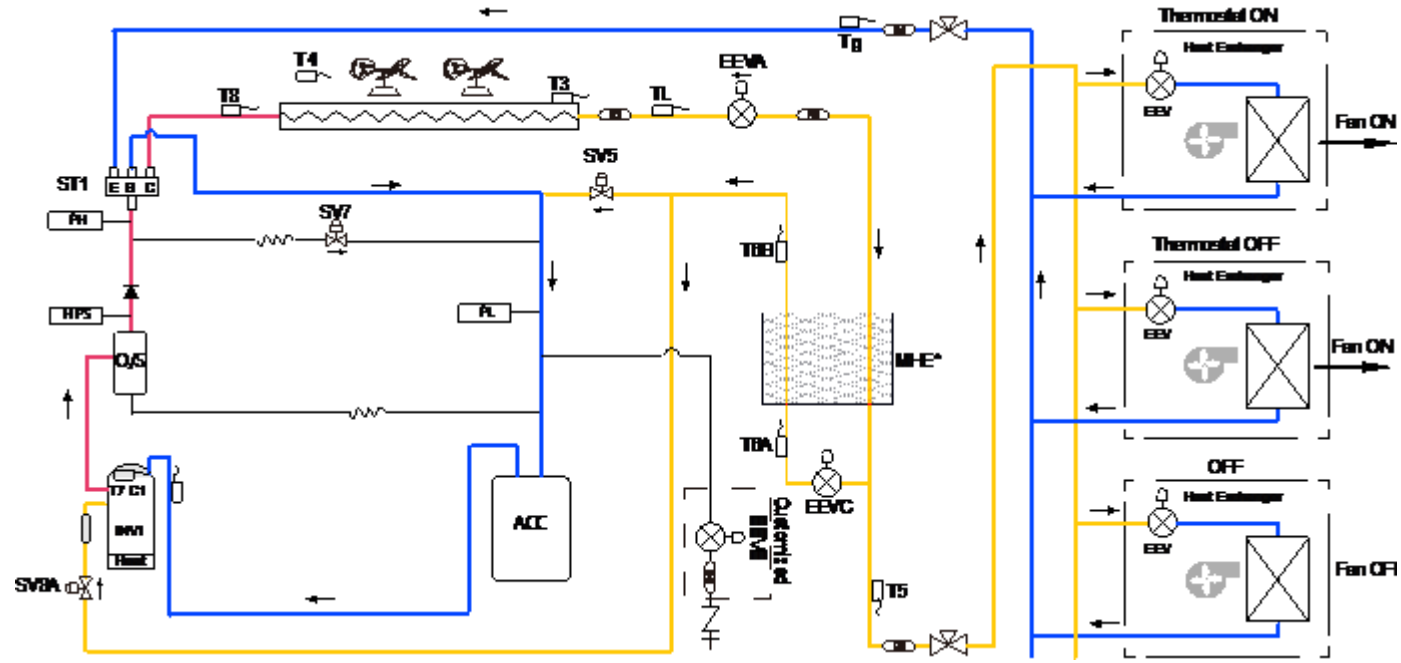


Note： There is no SV8A for 20/22/24HP outdoor units

High temperature, high pressur
High temperature, high pressur
Low temperature, low pressure

3.3 Oil return operation in cooling mode

Figure 2-3.3: 8-24HP refrigerant flow during oil return operation in cooling mode

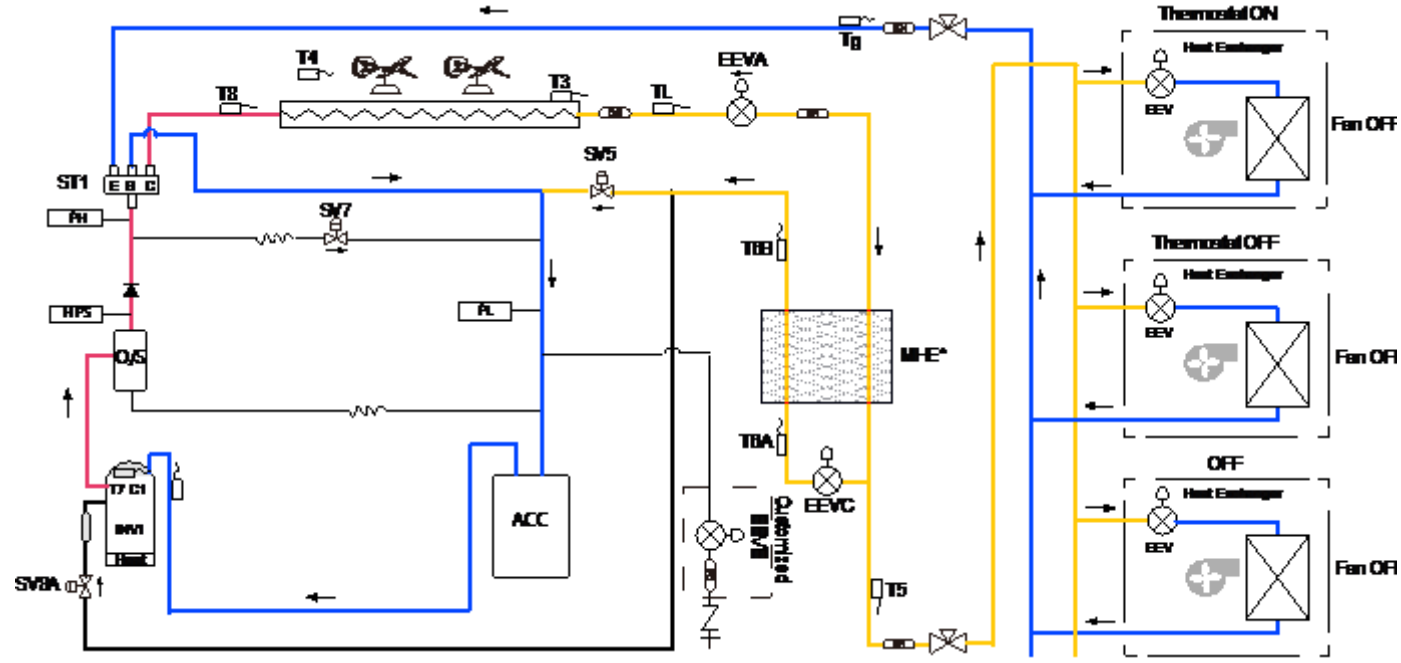


Note： There is no SV8A for 20/22/24HP outdoor units.

High temperature, high pressur
High temperature, high pressur
Low temperature, low pressure

3.4 Oil return operation in heating mode and defrosting operation (4-way valve change direction)

Figure 2-3.4: 8-24HP refrigerant flow during oil return operation in heating mode and defrosting operation (4-way valve change direction)



Note： There is no SV8A for 20/22/24HP outdoor units.

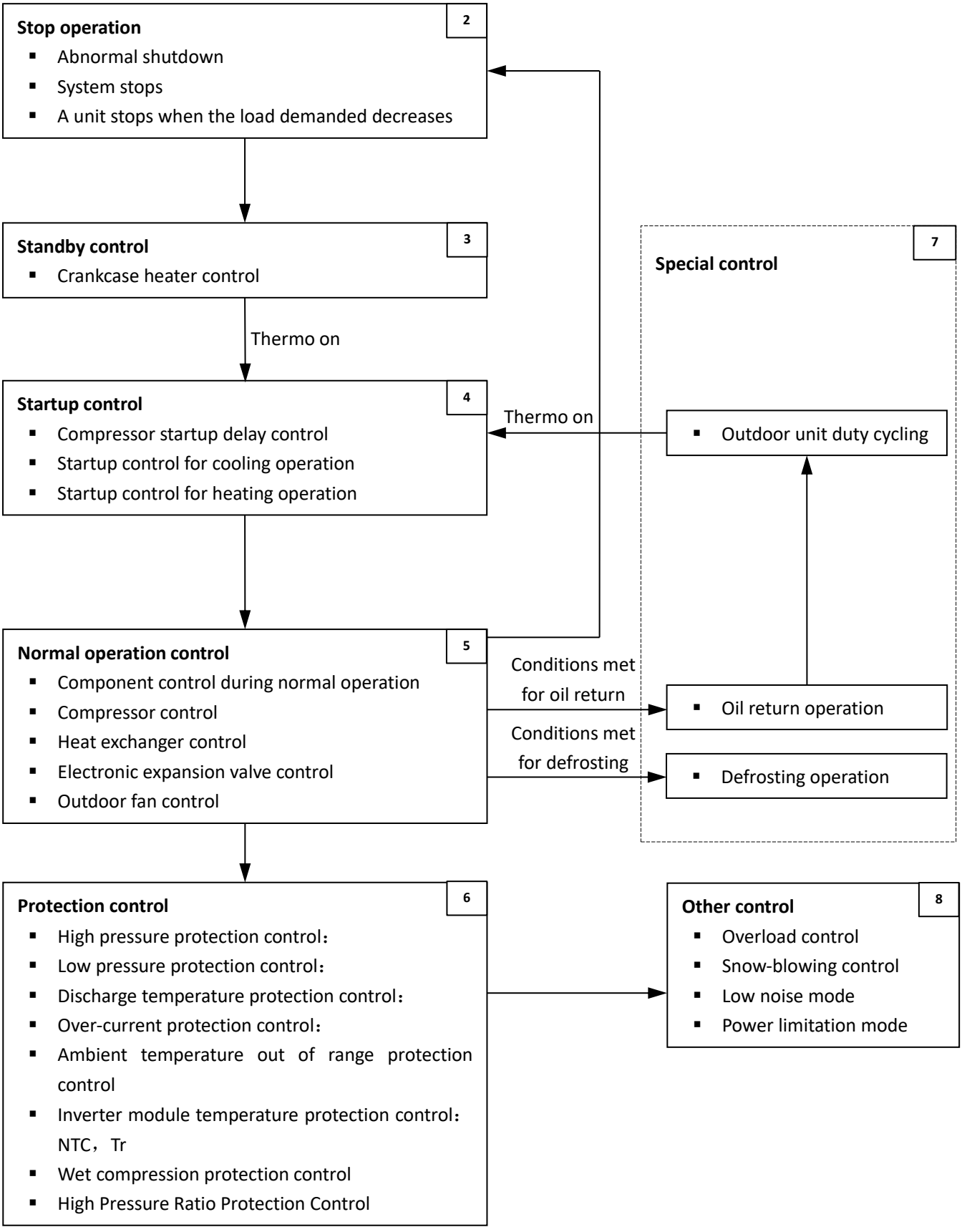
High temperature, high pressur
High temperature, high pressur
Low temperature, low pressure

Part 3

Control

1 General Control Scheme Flowchart

Sections 2 to 8 on the following pages detail when each of the controls in the flowchart below is activated.



Legend
Numbers in the top right-hand corners of boxes indicate the relevant section of text on the following pages.

2 Stop Operation

The stop operation occurs for one of the three following reasons:

1. Abnormal shutdown: in order to protect the compressors, if an abnormal state occurs， the system will makes a 'stop with thermos-off' operation and an error code will be displayed on the outdoor unit digital displays.
2. The system stops when the set temperature of all indoor unit has been reached, or all indoor units has stop or error.
3. The ambient temperature is greater than 30°C and the number of cooling Thermo ON indoor unit is 0.

Table 3-2.1: Component control during stop operation

Part Name		Symbol	Stop control
ODU	Inverter compressor	INV1	OFF
	Inverter fan 1	FANA	Keeps for 2 min, then OFF
	Inverter fan 2	FANB	
	Four way valve	ST1	Holds
	Electronic expansion valve	EEVA	cooling mode: 2880pls heating mode: 0pls
		EEVC	0pls
	Solenoid valve	SV5	ON for 140sec → OFF
		SV7	OFF
		SV8A(1)	OFF

Notes:

1.There is no SV8A for 20/22/24HP outdoor units

3 Standby Control

3.1 Crankcase Heater Control

The crankcase heater is used to prevent refrigerant from mixing with compressor oil when the compressors are stopped. The crankcase heater is controlled mainly according to the minimum of discharge temperatures.

When the minimum of discharge temperatures is above 45°C, the crankcase heater is off;

When the minimum of discharge temperatures is below 40°C, the crankcase heater turns on if one of the three following conditions is matched:

1. The first time powered on
2. In defrost operation
3. Ambient temperature < 10 °C and the compressor stops for more than 4 hours

4 Startup Control

4.1 Startup Sequence and Frequency Control in Combination Modules

During the start-up process, the control of the compressor and the heat exchange mode is uniformly judged by the master outdoor unit, and the electronic expansion valve and solenoid valve are self-judged by the salve unit according to its own sensor status.

During the start-up process, the compressor frequency is based on the displacement frequency of the 60cc compressor. After the main outdoor unit is weighted and evenly distributed to each slave unit according to the maximum frequency, each slave unit performs the displacement frequency and convert it to actual frequency.

When combinational modules are started in parallel, the master outdoor unit is started first, and each slave outdoor unit is started with a delay of 5s.

4.2 Compressor Startup Delay Control

In initial startup control, compressor startup is delayed for 3 minutes in order to let the master unit search for the indoor units' addresses.

In restart control (except in oil return operation and defrosting operation), compressor startup is delayed such that a minimum of 3 minutes and a maximum of 12 minutes has elapsed since the compressor stopped, in order to prevent frequent compressor on/off and to equalize the pressure within the refrigerant system.

4.3 Startup Control for Cooling Operation

Table 3-4.1: Component control during startup in cooling mode

Component		Wiring diagram label	Before startup[1]	Startup control				
				STEP1	STEP2	STEP3	STEP4	STEP5
ODU	Inverter compressor	INV1	0Hz	0Hz	0Hz	0Hz	Initial step for 30S, then+8Hz×Nodu / 10S. (Until it reaches (Pc-Pe)_min ≥ 0.4MPa)	adjust according to the high pressure and low pressure etc.
	Inverter fan 1	FANA	0 Step	If T4 exceeds the operating range, off 2min after the 12th gear is operated for 2min, and then off after 3 cycles at most	0 step	0 step	Start: 0 step, then adjust according to the high pressure and low pressure	PI control
	Inverter fan 2	FANB						
	Four way valve	ST1	Maintains previous position	Maintains previous position		Determined based on the initial mode of the heat exchanger		
	Electronic expansion valve	EEVA	0pls	Compressor operation： T4<5℃ 480P EEV：135pls；3000P EEV：1000pls， T4≥5℃ 480P EEV：320pls；3000P EEV：2000pls Compressor not operation, 0pls				
		EEVC	0pls	0pls			Compressor operation, 17pls→ +8pls per 20S based on high pressure or discharge temperature. Compressor not operation, 0pls.	
	Solenoid valve	SV5	OFF	ON				
		SV8A(1)	OFF	OFF			Compressor operation, ON Compressor not operation, OFF	
		SV7	OFF→ON for 1min	OFF			ON if Pc≥3.3MPa or Pe < 0.18MPa, else OFF.	
IDU	Fan	Fan	0 step	Setting speed by owners				
	Electronic expansion valve	EEV	0pls	0pls			Maintain 120pls for 2min	
Ending conditions			60S	T4≥-15 and T4≤55	30s	30s	(Pc-Pe)_min≥0.4MPa or 60s	End if startup time arrives 5 min or the minimum superheat of discharge temperature ≥10°C or Tc_max > 50°C.

Notes:

1. There is no SV8A for 20/22/24HP outdoor units

4.4 Startup Control for Heating Operation

Table 3-4.2: Component control during startup in heating mode

Component		Wiring diagram label	Before startup	Startup control				
				STEP1	STEP2	STEP3	STEP4	STEP5
ODU	Inverter compressor	INV1	0Hz	0Hz	0Hz	0Hz	Initial step for 30S, then+8Hz×Nodu / 10S. (Until it reaches (Pc-Pe)_min ≥ 0.3MPa)	Adjust according to the high pressure and low pressure etc.
	Inverter fan 1	FANA	0 Step	0 step	0 step	0 step	Start: 0 step, then adjust by the high pressure and low pressure	PI control
	Inverter fan 2	FANB						
	Four way valve	ST1	Maintains previous position	Maintains previous position		Determined based on the initial mode of the heat exchanger		
	Electronic expansion valve	EEVA	0pls	0pls			Evaporator, adjusted according to the difference between ambient temperature and low-pressure saturation temperature.	
		EEVC	0pls	0pls			Compressor operation, 17pls→ +8pls per 20S based on high pressure or low pressure etc. Compressor not operation, 0pls.	
	Solenoid valve	SV5	OFF	ON				
		SV8A	OFF	OFF			Compressor operation, ON Compressor not operation, OFF	
		SV7	OFF→ON for 1min	OFF			ON if Pc≥3.3MPa or Pe < 0.18MPa, else OFF.	
IDU	Fan	Fan	0 step	Setting speed by owners(Anti-cold wind function is effective)				
	Electronic expansion valve	EEV	300pls	300pls		Maintain 300pls for 3min		
Ending conditions			60S	T4≤30	30sec	30sec	Pc-Pe>0.3MPa or 60sec	End if startup time arrives 10 min or the minimum superheat of discharge temperature≥10°C for 5min or Tc_max > 50°C.

Notes:

1. There is no SV8A for 20/22/24HP outdoor units

5 Normal Operation Control

5.1 Component Control during Normal Operation

Table 3-5.1: Outdoor unit component control during normal operation

Component	Wiring diagram label	Cooling	Heating
Inverter compressor	COMP(A)	PI control, High pressure protection, Low pressure protection, Discharge temperature protection, Inverter Over-current protection control, Inverter module temperature protection control, Wet compression protection control, High Pressure Ratio Protection Control	
Inverter fan 1	FANA	PI control	PI control
Inverter fan 2	FANB		
Electronic expansion valve	EEVA	Sub-cooling control	ODU superheat control, discharge pipe temperature superheat control
	EEVC	Superheat control	Superheat control
Four-way valve	ST1	OFF	ON
Solenoid valve (fast defrosting (in heating) and unloading (in cooling))	SV5	ON	OFF: Ambient temperature <12°C and heat exchanger act as evaporator and DSH ⩾20°C otherwise: ON
Solenoid valve (indoor units bypass)	SV7	ON when the low pressure is too low or the high pressure is too high	
Solenoid valve (inverter compressor A/B vapor injection)	SV8A	Compressor operation, ON Compressor not operation, OFF	

Notes:

1. There is no SV8A for 20/22/24HP outdoor units

Table 3-5.2: Indoor unit component control during normal operation

Component		Cooling	Heating
Fan	Thermo ON unit	Remote controller setting	Remote controller setting
	Stopping unit	OFF	OFF
	Thermo OFF unit	Remote controller setting	Remote controller setting
Electronic expansion valve (EEV)	Thermo ON unit	Superheat control	Subcooling control
	Stopping unit	0pls	56pls / 72pls/ (according setting)
	Thermo OFF unit	0pls	56pls / 72pls/ (according setting)

5.2 Compressor Control

Cooling operation

Compressor frequency is PI controlled to keep low pressure at target temperature.

Te: Low pressure equivalent saturation temperature (°C)

Tes: Target Te value.

Tes will be decided by Te setting, if you choose Auto that means except Te setting, the Tes would be adjusted according to the ambient temperature, refrigerant pipe length, etc.

Table 3-5.7: Te setting

Setting	0	1	2	3(Default)	4	5	6	7	8
Tes(C)	-3 Fixed	0 Fixed	3 Fixed	6 Auto	7 Fixed	8 Fixed	9 Fixed	10 Fixed	11 Fixed

Heating operation

Compressor frequency is PI controlled to keep high pressure at target temperature.

Tc: High pressure equivalent saturation temperature (°C)

Tcs: Target Tc value.

Tcs will be decided by Tc setting, if you choose Auto that means except Tc setting, the Tcs would be adjusted according to the ambient temperature, refrigerant pipe length, etc.

Table 3-5.8: Tc setting

Setting	0	1	2	3	4	5	6(Default)	7
Tcs(C)	41 Fixed	42 Fixed	43 Fixed	44 Fixed	45 Auto	46 Fixed	48 Fixed	51 Fixed

Simultaneous cooling and heating operation

It controls compressor capacity to adjust Tc to target value (Tcs) and Te to target value (Tes).

5.3 Rotation of outdoor units

In order to make operating time equal for each outdoor unit, outdoor units are used in rotation. Figures 3-5.1 to 3-5.2 show the compressor rotation in systems with two and three units. The master unit and slave units 1 and 2 are shown from left to right in that order, and the circled numbers (①, ②, ③, ④, ⑤, ⑥) indicate the rotation sequence

The following rotation sequence is only for example, the actual rotation is based on the cumulative time of operation of the unit. If all outdoor units are not needed to start at the same time, the one with less cumulative running time will be started first.

Figure 3-5.1: Compressor priority and rotation – two outdoor units

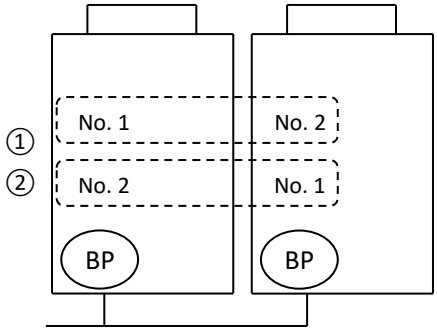
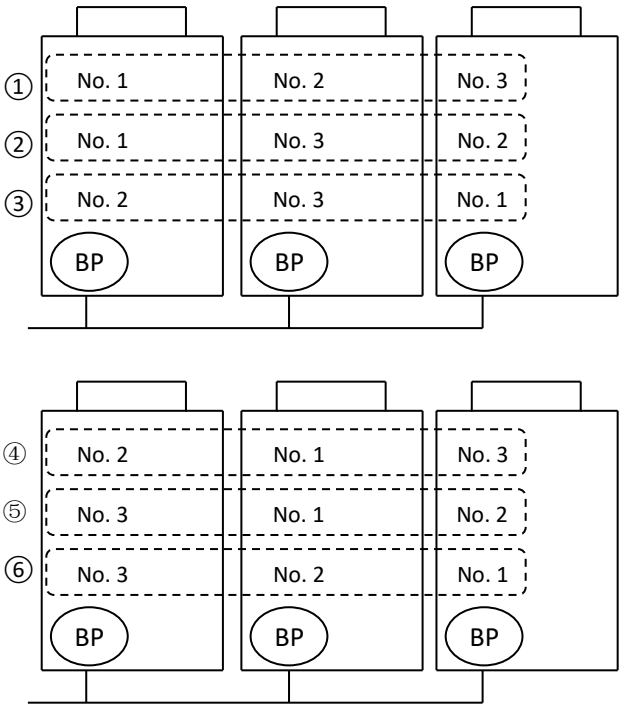


Figure 3-5.2: Compressor priority and rotation – three outdoor units



5.4 Heat Exchanger Control

The mode of the outdoor units is uniformly controlled by the master outdoor unit: the master outdoor unit check status of the outdoor unit heat exchanger and sends the calculation result to each slave unit, and each slave unit control their own four-way valve, fan and EEVA.

5.5 Electronic Expansion Valve Control

5.5.1 EEVA control

The positions of electronic expansion valves EEVA are controlled in steps from 0/0 (fully closed) to 480/2880 (fully open).

5.5.1.1 Outdoor unit heat exchanger is performed via the evaporator

when outdoor temperature ≥- 8°C:

This function is used to exert PI control on the electronic expansion valve EEVA so that the evaporator outlet superheated degree (SH) will become constant.

SH =T8 – Te

SH: Evaporator outlet superheated degree (°C)

T8: Evaporator outlet temperature (°C)

Te: Low pressure equivalent saturation temperature (°C)

when outdoor temperature <-10°C:

This function is used to exert PI control on the electronic expansion valve EEVA so that the minimum of discharge temperatures (T7C_min) will become T7CS.

T7CS=3*Pr +12 + Tc

T7CS: Target discharge temperature value

T7C_min: the minimum of discharge temperatures

Tc: High pressure equivalent saturation temperature (°C)

PR: pressure ratio, Pr = (Pc+0.11)/(Pe+0.1)

5.5.1.2 Outdoor unit heat exchanger is performed via the condenser

This function is used to exert PI control on the electronic expansion valve EEVA so that the condenser outlet subcooled degree (SC) will become constant.

SC = Tc – TL

SC: Condenser outlet subcooled degree (°C)

TL: Condenser outlet temperature (°C)

Tc: High pressure equivalent saturated

5.5.2 EEVC control

The positions of electronic expansion valves EEVC are controlled in steps from 0 (fully closed) to 480 (fully open).

In order to make the maximum use of the Microchannel heat exchanger, this function is used to exert PI control on the electronic expansion valve EEVC so that the Microchannel heat exchanger outlet superheated degree(SH)or discharge temperature(T7C1) will become constant.

SH = T6B – T6A

SH: Microchannel heat exchanger outlet superheated degree (°C)

T6A: Microchannel heat exchanger inlet temperature.

T6B: Microchannel heat exchanger outlet temperature.

5.6 Outdoor Fan Control

The speed of the outdoor unit fans is adjusted in steps, as shown in Table 3-5.9

Table 3-5.9: Outdoor fan speed steps

Fan speed index	Fan speed (rpm)				Note	
	8-14HP		16-24HP		cooling	heating
	FANA	FANB	FANA	FANB	Stop operation Startup or defrosting control	Startup or defrosting control
0	0	0	0	0		
1	170	170	150	170		
2	170	170	150	170		
3	170	170	150	170		
4	170	170	150	170		
5	170	170	150	170		
6	200	200	180	200		
7	230	230	210	230		
8	260	260	240	260		
9	280	280	260	280		
10	300	300	280	300		
11	330	330	310	330		
12	360	360	340	360		
13	390	390	370	390		
14	420	420	400	420		
15	460	460	440	460		
16	500	500	480	500		
17	540	540	520	540		
18	580	580	560	580		
19	620	620	600	620		
20	660	660	640	660		
21	710	710	690	710	16	
22	760	760	740	760	18/20	16/20
23	810	810	790	810	8/22	8/18/22
24	840	840	820	840	10/12/14/24	10/24
25	880	880	840	860		12/14
26	960	960	890	910		
27	1030	1030	1000	1020		
28	1090	1090	1050	1070		
29	1160	1160	1090	1110		
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						

Notes:

1. For example: When Stop operation, Startup or defrosting in cooling mode, the maximum Fan speed index that 16HP can be achieved is 21.
2. Standard step means the max. step in standard static pressure mode (0Pa default).

Table 3-5.10 Upper limit fan step in static pressure mode

cooling

Static Pressure mode	Outdoor unit/HP								
	8	10	12	14	16	18	20	22	24
0Pa	24	25	25	25	22	23	23	24	25
20Pa	25	26	26	26	23	24	25	25	26
40Pa	26	27	27	27	24	25	26	26	27
60Pa	27	28	28	28	25	26	27	27	28
80Pa	28	29	29	29	26	27	28	28	29

Heating

Static Pressure mode	Outdoor unit/HP								
	8	10	12	14	16	18	20	22	24
0Pa	24	25	25	25	22	23	23	24	25
20Pa	25	26	26	26	23	24	25	25	26
40Pa	26	27	27	27	24	25	26	26	27
60Pa	27	28	28	28	25	26	27	27	28
80Pa	28	29	29	29	26	27	28	28	29

Note:

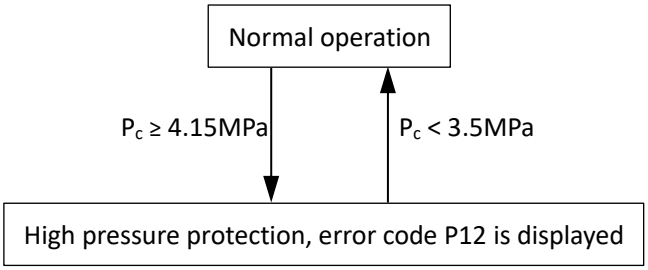
1. Standard models can provide 35Pa maximum external static pressure. High static pressure models can provide 80Pa maximum external static pressure.
2. If the external static pressure you needed over 35Pa, please contact us by suppliers for customized high static pressure models.

6 Protection Control

6.1 High Pressure Protection Control

This control protects the system from abnormally high pressure and protects the compressors from transient spikes in pressure.

Figure 3-6.1: High pressure protection control



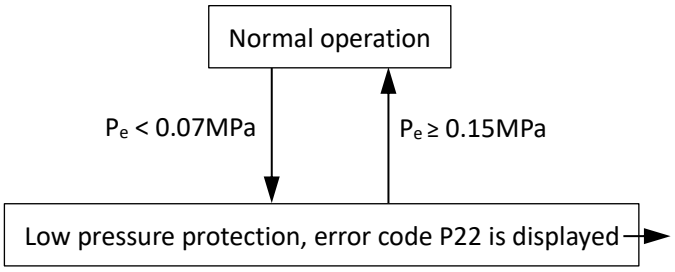
Notes:

1. P_c: Discharge pressure

6.2 Low Pressure Protection Control

This control protects the system from abnormally low pressure and protects the compressors from transient drops in pressure.

Figure 3-6.3: Low pressure protection control in cooling operation



When P22 protection occurs 3 times in 60 minutes, the P25 error is displayed. When an P25 error occurs, a manual system restart is required before the system can resume operation.

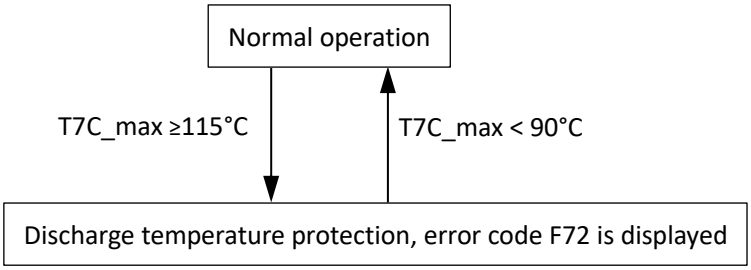
Notes:

1. P_e : Suction pressure

6.3 Discharge Temperature Protection Control

This control protects the compressors from abnormally high temperatures and transient spikes in temperature. It is performed for each compressor.

Figure 3-6.5: Discharge temperature protection control



Notes:

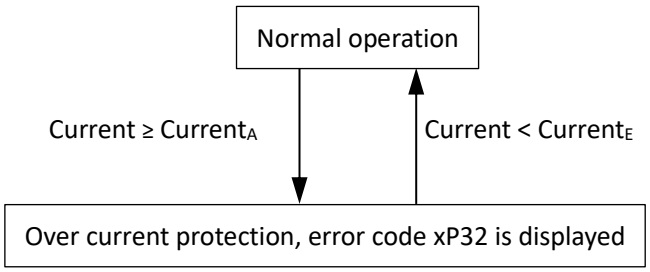
1. T7C_max: Max temperature of compressor discharge temperatures

When the Max temperature of compressor discharge temperature rises above 115°C the system displays F72 protection and all units stop running. When F72 protection occurs 3 times in 100 minutes, the F7A error is displayed. When an F7A error occurs, a manual system restart is required before the system can resume operation.

6.4 Over-current Protection Control

Over current protection control is performed to prevent tripping due to transient inverter over-current. It protects the compressors from abnormally high currents. It is performed for each compressor.

Figure 3-6.6: Over-current protection control

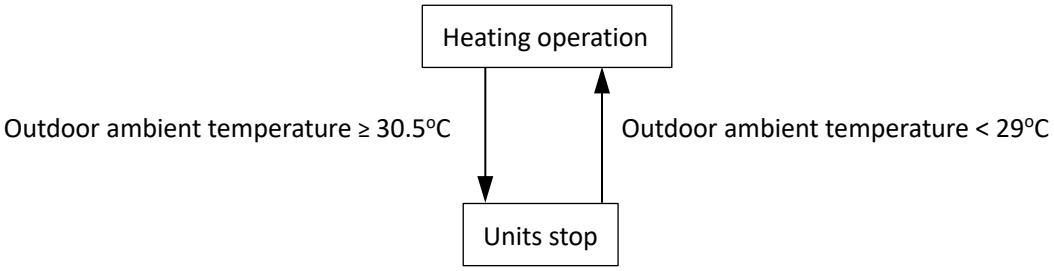


Model	8HP	10HP	12HP	14HP	16HP	18HP	20HP	22HP	24HP
$Current_A$	31.5	31.5	31.5	31.5	39	39	48	48	48
$Current_E$	26.5	26.5	26.5	26.5	34.5	34.5	43	43	43

6.5 Ambient temperature out of range protection control

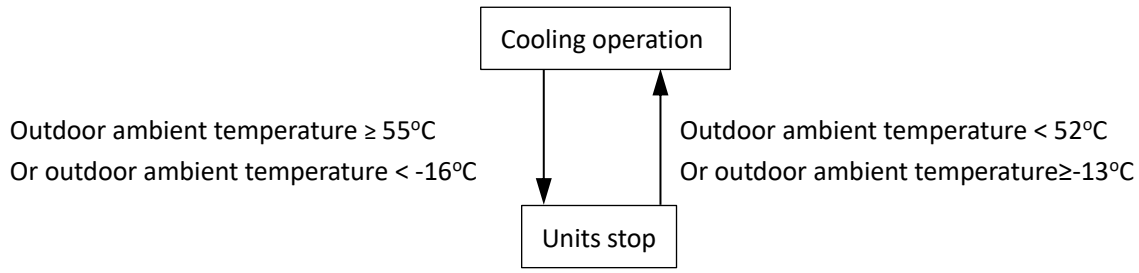
When the outdoor ambient temperature rises above 30.5°C heating mode is disabled to prevent the mechanical load on compressors becoming too high and to prevent low compression ratios which can result in insufficient compressor internal oil lubrication.

Figure 3-6.7: Disable heating control



When the outdoor ambient temperature rises above 55°C or outdoor ambient temperature drops below -16°C, cooling mode is disabled to protect the compressor.

Figure 3-6.8: Disable cooling control



Notes:

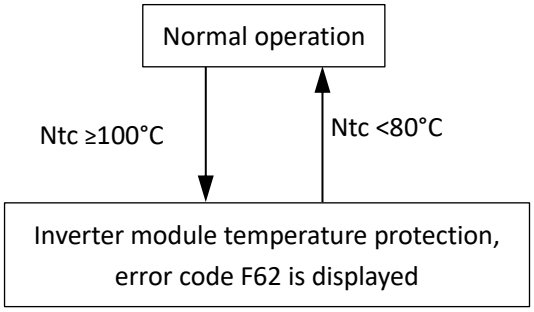
1. If the indoor unit operates in cooling mode below -5 ° C, the temperature of the indoor unit's air outlet may be lower than 0 degrees.

6.6 Inverter Module Temperature Protection Control

This control protects the compressors from abnormally high currents and protects the inverter modules from abnormally high temperatures. It is performed for each compressor and inverter module.

6.6.1 Error code F62

Figure 3-6.9: Inverter module temperature protection control

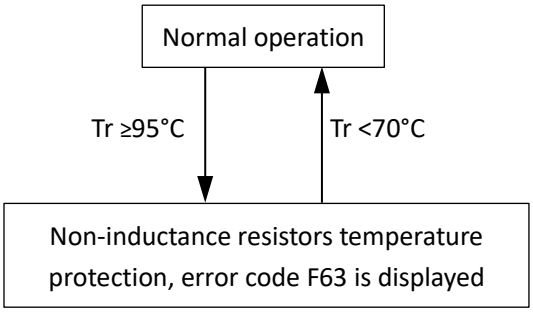


When F62 protection occurs 3 times in 100 minutes, the F6A error is displayed. When a F6A error occurs, a manual system restart is required before the system can resume operation.

Notes:
1. Ntc: Inverter module temperature

6.6.2 Error code F63

Figure 3-6.10: Non-inductance resistors temperature protection control

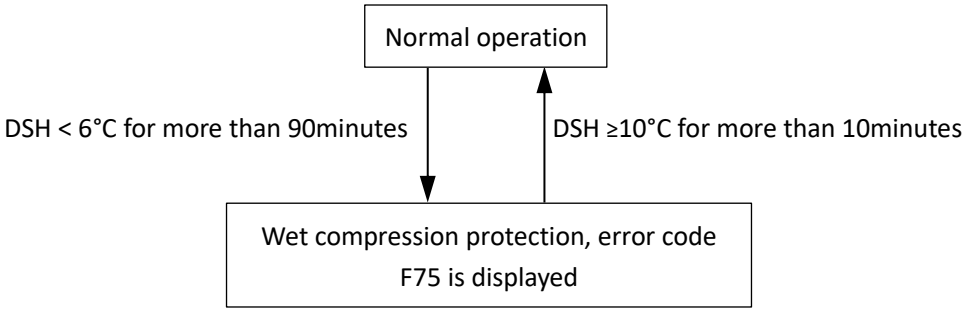


Notes:
1. Tr: Non-inductance resistors temperature

6.7 Wet Compression Protection Control

This protection is used to prevent compressor from damaging for the long time wet compression so that it can't be lubricated well. This control is performed for each compressor.

Figure 3-6.10: Wet compression protection control

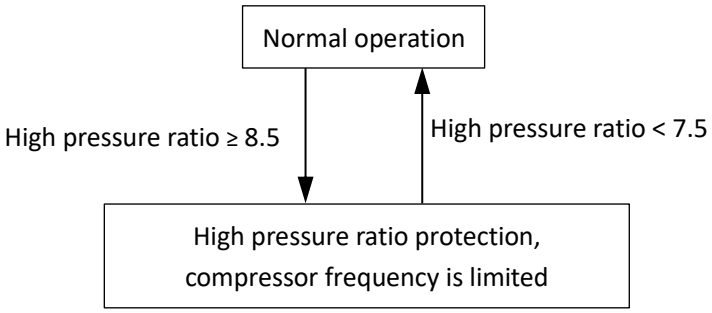


Notes:
1. DSH: Superheat of discharge temperature

6.8 High Pressure Ratio Protection Control

This high pressure ratio protection control is used to prevent the activation of protection devices due to abnormal increase of high pressure ratio, and to protect compressors against the transient increase of high pressure ratio. It is performed for entire system.

Figure 3-6.11: High pressure ratio protection control



Notes:

1. P_c: Discharge pressure P_e: Suction pressure
2. Pressure Ratio = (Pc+0.11)/(Pe+0.10)

7 Special Control

7.1 Oil Return Operation

In order to prevent compressors from running out of oil, the oil return operation is conducted to recover oil that has flowed out of the compressor(s) and into the piping system. This operation is performed for all units including units that are in standby.

When the outdoor unit is running in Oil Return Operation, the digital display on outdoor main PCB will display “d0”.

7.1.1 Cooling Mode Oil Return Control

Timing of oil return operation:

- Calculated oil discharge has reached to specified level. The higher the compressor frequency step is, the more oil discharge.
- Initial cumulative compressor operating time reaches 2 hours.
- Cumulative compressor operating time reaches 8 hours.

Tables 3-7.1 and Tables 3-7.2 show component control during oil return operation in cooling mode.

Table 3-7.1: Outdoor unit control during oil return operation in cooling mode

Component		Wiring diagram label	Cooling oil return control			
			STEP1	STEP2	STEP3	STEP5
ODU	Inverter compressor A	INV1	PI control	PI control, the minimum step is as follows: 8HP 27Hz 10HP 39Hz 12-14HP 52Hz 16-24HP 69Hz	PI control, initial ODU number is decided	PI control
	Inverter fan 1	FANA	PI control			
	Inverter fan 2	FANB				
	Four way valve	ST1	OFF			
	Electronic expansion valve	EEVA	PI control	2880pls	PI control	
		EEVC	OFF , then 17 pls	17 pls	17 pls	PI control
	Solenoid valve	SV5	ON			
		SV8A(1)	compressor ON:ON otherwise: OFF			
		SV7	Turn ON/OFF based on the low pressure and the high pressure etc.			
Ending conditions			End if startup time arrives 180S.	End if startup time arrives 6 min or the compressor discharge volume ≥ Target value for 4min.	After 20S.	After 2 min.

Notes:

1. There is no SV8A for 20/22/24HP outdoor units

Cooling indoor unit		500P EEV
FAN	Thermo ON unit	Keep the previous fan speed
	Thermo OFF unit	
	Stop or Fan	
Electronic expansion valve (EEV)	Thermo ON unit	Superheat control
	Thermo OFF unit	80pls
	Stop or Fan	80pls

7.1.2 Heating Oil Return Control

It's basically identical with defrosting operation, refer to 7.2 Defrosting Operation

7.2 Defrosting Operation

In order to recover heating capacity, the defrosting operation is conducted when the outdoor unit heat exchanger is performing as an evaporator. The defrosting operation is controlled according to outdoor ambient temperature, outdoor heat exchanger temperature, indoor heat exchanger temperature and outdoor units running time. When the outdoor unit is running in defrosting, the digital display on outdoor main PCB will display “df”.

Reverse Cycle Defrosting Operation

Timing of reverse cycle defrosting operation:

- Te <-2°C and T4<20°C, meeting either of the points below:
  1) When there is an obviously drop in the temperature of outdoor unit heat exchanger outlet
  2) When cumulative operating time after the latest defrosting control arrives an hour
- Compulsive defrosting or oil return set manually after PI control 1min.

Table 3-7.3: Outdoor unit component control during defrosting operation

Component		Wiring diagram label	Defrosting operation control		
			Control before Defrosting	Defrosting control	Control after Defrosting
ODU	Inverter compressor A	INV1	Reduce frequency step	8-14HP:84Hz 16-18HP: 98Hz 20-24HP: 128Hz	Reduce frequency step ,then Startup control ,then PI control
	Inverter fan 1	FANA	PI control	Initial OFF But if the high pressure is larger than 2.2MPa , turn to 10 Step or higher	Initial step then PI control
	Inverter fan 2	FANB			
	Four way valve	ST1	ON	OFF	ON
	Electronic expansion valve	EEVA/EXVB	2880pls/480pls		
		EEVC	0pls	Initial 17 step ,then +32pls or -32pls per 30S based on high pressure or discharge temperature etc.	17pls, then PI control
	Solenoid valve	SV5	ON		
		SV8A	Compressor operation, ON Compressor not operation, OFF	OFF	Compressor operation, ON Compressor not operation, OFF
		SV7	Turn ON/OFF based on the low pressure and the high pressure etc.		
Ending conditions			End if Pc-Pe<0.4MPa, Maximum 120S	Defrost completion condition judgment, maximum time is 9min	9min

Notes:

1. There is no SV8A for 20/22/24HP outdoor units

Defrosting control time is no less than 135Sec and fulfill one of the conditions below:

- Pc-max ≥ 3.0MPa.
- Total defrosting control time has reached 9 minutes.
- T3_min >Target value for a certain time.

Table 3-7.4: Indoor unit component control during defrosting operation

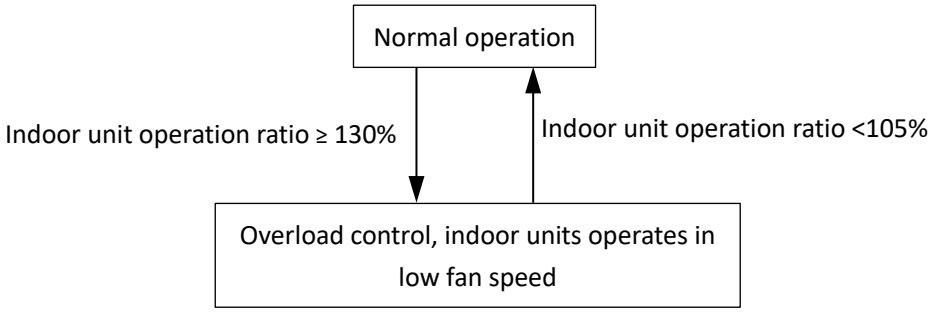
Heating indoor unit (ODU operates cooling main operation)		500PEEV
FAN	Thermo ON unit	OFF
	Thermo OFF unit	OFF
	Stop	OFF
Electronic expansion valve (EEV)	Thermo ON unit	Within 2min: 480pls 2-4min: 300pls After 4min: 120pls
	Thermo OFF unit	
	Stop or error stop	

8 Other Control

8.1 Overload control

Overload control is used to maintain comfort requirement (i.e. outlet air temperature) and keep proper system pressure.

Figure 3-8.1: Overload control



Notes:

1. Indoor unit operation ratio = Indoor unit operates capacity index (in the same mode)/ outdoor unit capacity index

8.2 Vacuum control

This control is used to open solenoid valves and electronic expansion valves in the whole system.

- During the vacuum work, the high/low pressure sensor error and low pressure protection should be ineffective (Use short connectors if not).
- The four-way valve is OFF, and compressors or fans are prohibited to run.

8.3 Auto Snow-blowing Control

Auto snow-blowing control is used to prevent the fans of stopped outdoor units from destroying by heavy snow.

Timing of auto snow-blowing operation:

T4≤3°C and outdoor units stops time elapse for TA.

Table 3-8.3: Snow-blowing control

Model	Fan Step	TA: Level a (Menu mode n261)	TA: Level b (Menu mode n262)	Disabled (Menu mode n260, default)
8-24HP	15	30min	15min	/

When T4＞3°C or the outdoor unit starts operation, the time accumulated for auto snow-blowing is reset to 0.

8.4 Low Noise Mode

Low noise mode is used to decrease the noise produced by outdoor units. There are 14 kinds of low noise mode: Silent mode1~ Silent mode14. When low noise mode activating, both the fan step and compressor are limited.

Table 3-8.4: Low noise mode-1

ODU		Silent mode 1		Silent mode 2		Silent mode 3		Silent mode 4		Silent mode 5		Silent mode 6		Silent mode 7	
		Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step
8HP	Cooling	23	90	22	86	22	80	22	75	21	75	21	65	20	65
	Heating	23	110	22	105	21	105	21	95	21	90	20	85	19	85
10HP	Cooling	24	98	23	98	23	90	23	80	23	75	22	75	21	75
	Heating	24	126	23	120	22	105	22	95	22	90	21	85	20	85
12HP	Cooling	24	100	23	100	23	95	22	95	22	85	21	85	21	80
	Heating	25	130	24	122	23	120	22	115	21	100	21	95	21	90

Table 3-8.4: Low noise mode-1

ODU		Silent mode 1		Silent mode 2		Silent mode 3		Silent mode 4		Silent mode 5		Silent mode 6		Silent mode 7	
		Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step
14HP	Cooling	24	126	24	110	23	110	23	106	23	100	22	95	22	85
	Heating	25	126	23	120	22	115	22	100	22	95	21	95	21	90
16HP	Cooling	21	111	20	111	20	106	20	100	19	100	19	90	18	87
	Heating	22	127	21	127	20	121	19	121	19	111	19	94	18	90
18HP	Cooling	22	126	22	117	21	111	20	106	20	100	19	100	18	90
	Heating	23	137	22	137	21	127	20	127	20	111	20	94	19	90
20HP	Cooling	22	114	21	114	21	108	20	108	20	97	20	89	19	89
	Heating	22	128	22	120	21	120	21	110	20	110	20	104	20	94
22HP	Cooling	23	120	22	114	21	114	21	104	21	97	20	97	20	89
	Heating	23	130	22	130	22	120	22	110	21	110	21	104	20	94
24HP	Cooling	24	130	23	124	22	124	22	114	21	104	20	104	19	100
	Heating	24	134	23	134	22	130	22	124	22	118	22	108	21	99

Table 3-8.4: Low noise mode-2

ODU		Silent mode 8		Silent mode 9		Silent mode 10		Silent mode 11		Silent mode 12		Silent mode 13		Silent mode 14	
		Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step	Max. Fan step	Max. frequency step
8HP	Cooling	20	60	19	60	18	55	18	50	18	45	17	40	16	40
	Heating	18	80	18	70	17	70	17	65	16	65	16	60	15	55
10HP	Cooling	21	65	20	65	19	60	19	55	19	50	17	45	16	45
	Heating	19	80	19	70	18	70	18	65	17	65	16	60	16	55
12HP	Cooling	21	72	20	65	19	65	19	55	18	55	17	55	16	50
	Heating	20	85	19	75	19	70	18	70	18	62	17	60	16	55
14HP	Cooling	21	85	21	80	20	75	20	65	19	65	18	60	17	55
	Heating	20	85	19	80	19	75	18	70	18	65	18	60	17	55
16HP	Cooling	17	87	17	78	16	78	16	60	15	60	14	55	14	50
	Heating	17	90	17	86	16	82	15	82	15	75	14	72	14	60
18HP	Cooling	18	87	17	87	17	78	16	78	15	60	14	60	14	55
	Heating	18	90	18	86	17	82	16	82	16	75	15	72	15	60
20HP	Cooling	19	79	19	71	17	71	17	63	17	54	16	54	15	44
	Heating	19	94	18	84	17	84	17	77	16	69	16	63	15	59
22HP	Cooling	19	89	19	81	18	71	17	71	17	63	16	63	16	54
	Heating	20	94	19	92	18	84	17	77	17	69	16	63	15	59
24HP	Cooling	19	91	19	83	18	81	18	73	17	70	16	60	16	54
	Heating	21	94	20	94	19	84	19	77	18	69	17	63	17	59

8.5 Power Limitation Mode

The energy saving mode is used to limit the system power. It can be used to limit the line selection current or to reduce the peak current.

Table 3-8.5: Power limitation mode

Power limitation mode setting	Power limitation mode level	Correction factor
n23 40 ~n23 100	n23 40	40%
	n23 41	41%
	n23 42	42%
	~	
	n23 98	98%
	n23 99	99%
	n23 100 (Default)	100%

Part 4

Field Settings

1. Overview

This chapter describes how the system configuration can be implemented once the installation is completed , and other relevant information.

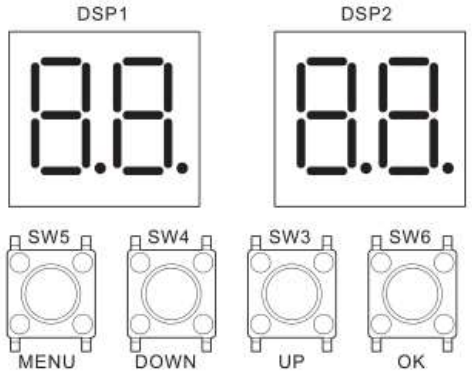
It contains the following information:

- Implement field settings
- Using the Check function

INFORMATION

The installation personnel should read this chapter.

2. Digital display and button settings



2.1 Digital display output

Table 4-2.1: Digital display output

Outdoor unit state	Parameters displayed on DSP1	Parameters displayed on DSP2
Standby	The address of outdoor unit	The number of indoor units in communication with the outdoor units
Normal operation	---	Running speed of the compressor in rotations per second
Error or protection	Placeholder and error or protection cod	
In menu mode	Display menu mode code	
System check	Display system check code	

2.2 Function of buttons SW3 to SW6

Table 4-2.2 Function of buttons SW3 to SW6

Button	Function
SW3(UP)	In menu mode: previous and next buttons for menu modes.
SW4(DOWN)	Not in menu mode: previous and next buttons for system check information.
SW5(MENU)	Enter / exit menu mode.
SW6(OK)	Confirm to enter specified menu mode.

2.3 Menu mode

Only master unit has the full menu functions, slave units only have error codes check and cleaning functions.

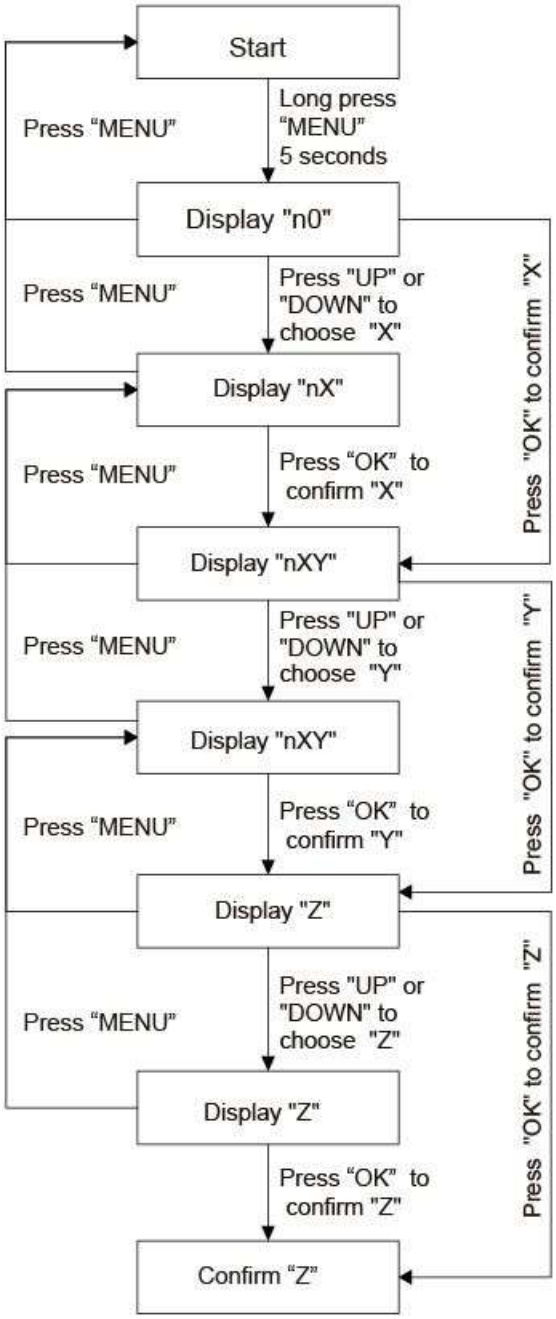
1. Long press SW5 "MENU" button for 5 seconds to enter menu mode, and the digital display displays "n0".
2. Press SW3 / SW4 "UP / DOWN" button to select the first level menu "n0" to "n9"or "nc".
3. Press SW6 "OK" button to enter specified first level menu, for example, enter "n2" mode.
4. Press SW3 / SW4 "UP / DOWN" button to select the second level menu from "n20" to "n28".
5. Press SW6 "OK" button to enter specified second level menu, for example, enter "n22" mode.
6. Press SW3 / SW4 "UP / DOWN" button to select the parameter value, for example , from "0" to"4"
7. Press SW6 "OK" button to confirm the parameter.

⚠ CAUTION

- Operate the switches and push buttons with an insulated stick (such as a closed ball-point pen) to avoid touching of live parts.

Menu mode selection flowchart:

Figure 4-2.1 Menu mode selection flowchart:



Menu mode function:

Table 4-2.3 Menu mode function:

First level menu	Second level menu	Specified menu mode	Description	Default
n0 (Information query)	0 (History error)	0	Query History error (last ten error codes)	-
		1	Cleaning history error	
	1 (address)	0	Query Indoor unit's address	
		2	Query the address of Indoor unit in power-off condition	
	2	1	Driver's version(compressor and fan displayed in turn)	
	4	-	Accumulated running time of compressor	
n1 (Installation and commissioning)	0	-	Shield C26 and C28 error in 3 hours	-
	1[1] (System test)	0	Cooling Test	
		1	Heating Test	
		2	Test running	
		4	System refrigerant quantity detection	
	2[1] (Refrigerant recovery)	0	Recycle Refrigerant to outdoor unit	
		1	Recycle Refrigerant to indoor unit	
		2	Balance system refrigerant	
	3[1] (Refrigerant charge)	0	Manual refrigerant charge	
		1	Auto refrigerant charge(Customized)	
	4	-	Exit special mode (System test; Refrigerant recovery; Refrigerant charge; Vacuum mode)	
	5	-	Vacuum mode[2]	
	6	-	Setting the VIP IDU address (Default:No.63)	
n2 (Mode setting)	0[1] (Priority mode)	0	Automatic priority mode	√
		1	Cooling priority mode	-
		2	VIP indoor unit voting priority mode	
		3	In response to heating mode only	
		4	In response to cooling mode only	
		5	Heating priority mode	
		6	Change over	
		7	Voting priority mode	
		8	First on priority mode	
		9	Capability requirements priority mode	
	1 (Silent mode)	0	Non silent mode	√
		1	Silent mode 1	-
		2	Silent mode 2	
		3	Silent mode 3	
		4	Silent mode 4	
		5	Silent mode 5	
		6	Silent mode 6	
		7	Silent mode 7	

Notes:

1. For details of mode, refer to *2.4 Special mode introduction*
2. This setting must be performed when vacuumizing.

Table 4-2.3 Menu mode function(continue)

First level menu	Second level menu	Specified menu mode	Description	Default
n2 (Mode setting)	1 (Silent mode)	8	Silent mode 8	-
		9	Silent mode 9	
		A	Silent mode 10	
		b	Silent mode 11	
		C	Silent mode 12	
		d	Silent mode 13	
		E	Silent mode 14	
	2 (static pressure)	0	0Pa static pressure	√
		1	20Pa static pressure	-
		2	40Pa static pressure(Customized)	
		3	60Pa static pressure(Customized)	
		4	80Pa static pressure(Customized)	
	3 (Power limitation mode)	40	Power limitation mode, Maximum current =MCA * setting value	-
		41		
		42		
		~		
		98		
		99		
		100		√
	4 (Meta)	0	Meta function unavailable	-
		1	Meta function available	√
	5 (°C or °F)	0	Celsius will be enable on display	√
		1	Fahrenheit will be enable on display	-
	6[1] (Auto snow-blowing)	0	Auto snow-blowing function unavailable	√
		1	Auto snow-blowing function available, mode 1	-
		2	Auto snow-blowing function available, mode 2	
	7[2] (Auto dust-clean)	0	Auto dust-clean function unavailable	√
		1	Auto dust-clean function available	-
	8 (Dry contact)	0	Dry contact closing effective	√
		1	Dry contact opening effective	-
	9[3] (Automatic priority mode)	0	Mode Switching temperature:10°C	√
		1	Mode Switching temperature:16°C	-
		2	Mode Switching temperature:21°C	
n3 (Installation parameters)	2[4] (Level difference)	0	0m level difference between indoor unit and outdoor unit	√
		1	20m level difference between indoor unit and outdoor unit	-
		2	40m level difference between indoor unit and outdoor unit	
		3	50m level difference between indoor unit and outdoor unit	

Notes:

1. When the outdoor unit is in standby, the fan will turn on to clear the snow on the fan blade, and the effect of mode 2 is better than that of mode 1.
2. When the outdoor unit is in standby, the fan will start to remove the dust of heat exchanger.
3. For details of mode, refer to *2.4 Special mode introduction*
4. If the horizontal height of the outdoor unit is higher than that of the indoor units, it needs to be set to improve the reliability of the system.

Table 4-2.3 Menu mode function(continue)

First level menu	Second level menu	Specified menu mode	Description	Default
n3 (Installation parameters)	7 (Ambient temperature)	0	Enable Internal ambient temperature sensor(T4)	√
		1	Enable External ambient temperature sensor(T10-Optional)	-
	8	0	Reserved	-
		1	Reserved	√
	E	0	Reserved	-
		1	Reserved	√
n4 (address)	0	-	Set address of Outdoor unit	-
	1	-	Set Network address of Outdoor unit	0
	2	-	Set number of indoor units	1
	4	0	Auto addressing (indoor and outdoor units address)	-
		1	Clear address (indoor and outdoor units address, network address)	
	5 (communication protocol)	0	V8 communication protocol (RS-485 (P Q) communication)	√
		1	Non-V8 communication protocol (RS-485 (P Q E) communication)	-
		2	HyperLink (M1 M2) communication -IDUs uniform power supplied	
		3	HyperLink (M1 M2) communication -IDUs separate power supplied	
	6 (auto-addressing starting address)	-	To clear the address, the n46 menu must be reset after clearing the address for it to work.	
n5[1] (Backup)	0 (Fan, compressor and outdoor unit)	0	Fan and outdoor units backup unavailable	-
		1	Fan and outdoor units backup available[2]	√
	1 (Sensors)	0	Sensors backup running unavailable	-
		1	Sensors backup running available (Manual)	√
		2	Sensors backup running available (Automatic)	-
	2 (Backup operation time)	0	Backup operation time setting(1 day)	-
		1	Backup operation time setting(2 days)	
		2	Backup operation time setting(3 days)	
		3	Backup operation time setting(4 days)	
		4	Backup operation time setting(5 days)	
		5	Backup operation time setting(6 days)	
		6	Backup operation time setting(7 days)	√
n6 (evaporation and condensation temperature)	0 (target evaporation temperature of the indoor unit)	0	-3°C	-
		1	0°C	
		2	3°C	
		3	6°C	√
		4	7°C	-
		5	8°C	
		6	9°C	
		7	10°C	
		8	11°C	

Notes:

1. Only one compressor backup, one fan backup or one sensor backup can be started at the same time
2. For the combined system, if the compressor is damaged, start the outdoor unit backup function directly.

Table 4-2.3 Menu mode function(continue)

First level menu	Second level menu	Specified menu mode	Description	Default
n6 (evaporation and condensation temperature)	2 (target condensation temperature of the indoor unit)	0	41°C	-
		1	42°C	
		2	43°C	
		3	44°C	
		4	45°C	
		5	46°C	
		6	48°C	√
		7	51°C	-
n8	7 (Low noise defrosting)	0	Low noise defrosting mode unavailable	√
		1	Low noise defrosting mode available	-
n9	1 (Rotation)	0	Rotation function unavailable	-
		1	Reserved	-
		2	Outdoor unit Rotation function available	√
		3	Reserved	-
	5	-	Release central controller emergency stop statue	-
	7	0	Digital electricity meter	√
		1	Pulse electricity meter	-
nc[1] (Dry contact function)	0	0	Dry contact 1 function selection (Force cooling only)	-
		1	Dry contact 1 function selection (Force heating only)	
		2	Dry contact 1 function selection (Force incapacity requirements)	
		3	Dry contact 1 function selection (Force stop)	√
	1	0	Dry contact 2 function selection (Force cooling only)	-
		1	Dry contact 2 function selection (Force heating only)	
		2	Dry contact 2 function selection (Force incapacity requirements)	
		3	Dry contact 2 function selection (Force stop)	√
	2	0	Dry contact 3 function selection (Operation signal)	-
		1	Dry contact 3 function selection (Alarm signal)	√
		2	Dry contact 3 function selection (Compressor running signal)	-
		3	Dry contact 3 function selection (Defrosting signal)	
		4	Dry contact 3 function selection (Refrigerant leakage signal)	

Notes:

Using with setting [n2-8-0] or [n2-8-1].

2.4 Special mode introduction

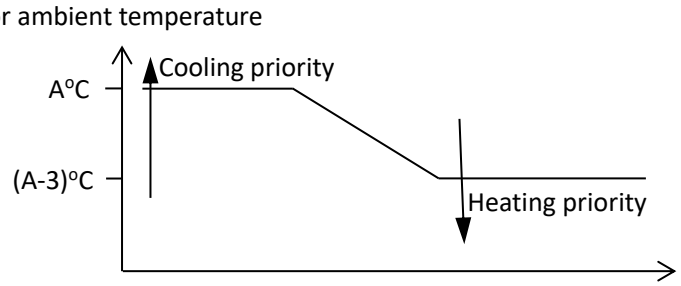
2.4.1 Priority mode setting

Priority mode can only be set on the master unit. When an indoor unit is in mode conflict with the outdoor units the unit displays the mode conflict error. The digital display on indoor main PCB will display error code E0.

There are ten priority mode options:

1. **Auto priority mode (default):** In auto priority mode, the outdoor unit will operate in heating priority mode or cooling priority mode according to the outdoor ambient temperature.
   In this function, the mode switching temperature is **A**, and A can be set by menu *n2-9-0/1/2*
   a) When the outdoor ambient temperature is below (**A-3**)℃, the outdoor units run in heating priority mode. The heating priority mode does not change until the outdoor ambient temperature is above **A**℃.
   b) When the outdoor ambient temperature is above **A**℃, the outdoor units run in cooling priority mode. The cooling priority mode does not change until the outdoor ambient temperature is below (**A-3**)℃.
   c) When the outdoor units restart under the outdoor ambient between (**A-3**)℃ and **A**℃, the outdoor units run the same priority as before the last stop.
   d) When the outdoor unit is initial startup under outdoor ambient temperature between (**A-3**)℃ and **A**℃, the outdoor units run in heating priority mode.

Figure 4-2.2: Auto priority mode control



2. **Cooling priority mode**:
   a) **During heating operation:** If an indoor unit requests cooling, the outdoor units stop and then restart in cooling mode after 5 minutes. Indoor units requesting cooling then start in cooling mode and indoor units requesting heating display the mode conflict error.
   b) **During cooling operation:** If an indoor unit requests heating, the outdoor units ignore the request and continue to run in cooling mode. The indoor unit requesting heating displays the mode conflict error. If all the indoor units requesting cooling are later turned off and one or more indoor units are still requesting heating, the outdoor units restart in heating mode after 5 minutes and any indoor units requesting heating then start in heating mode.
3. **Heating priority mode:**
   a) **During cooling operation:** If an indoor unit requests heating, the outdoor units stop and then restart in heating mode after 5 minutes. Indoor units requesting heating then start in heating mode and indoor units requesting cooling display the mode conflict error.
   b) **During heating operation:** If an indoor unit requests cooling, the outdoor units ignore the request and continue to run in heating mode. The indoor unit requesting cooling displays the mode conflict error. If all the indoor units requesting heating are later turned off and one or more indoor units are still requesting cooling, the outdoor units restart in cooling mode after 5 minutes and any indoor units requesting cooling then start in cooling mode.
4. **VIP priority mode:** The default VIP address is 63, the VIP address also can be changed through menu mode“n1-6”.
   In VIP priority mode, if the VIP indoor unit is operating, the outdoor units will operate in the mode of the VIP indoor unit. In the meantime indoor units, which are in a mode different to that of the VIP unit, will display the mode conflict error (E0).

5. **Changeover mode:** Before using this mode, you need to set the VIP indoor unit address. The default VIP address is 63, the VIP address also can be changed through menu mode“n1-6”.
   In changeover mode, if the VIP indoor unit is operating, the outdoor units will operate in the mode of the VIP indoor unit. The other units in the system will follow the mode of the VIP indoor unit, so there will be no mode conflict.
   In the changeover mode, the VIP indoor unit can select the auto mode, so that the system can run the auto mode, and other indoor unit can follow the VIP indoor unit without mode conflict.
6. **Voting priority mode:** In voting priority mode, the outdoor units operate in whichever of heating and cooling modes is being requested by the larger number of indoor units.
7. **First on priority mode:** The outdoor units will operate in the mode of the indoor unit (first open in the system). In the meantime indoor units, which are in a mode different to that of the first open unit, will display the mode conflict error (E0).
8. **Capability requirements priority mode:** In Capability requirements priority mode, the outdoor units operate in whichever of heating and cooling modes is being requested by the larger Capability requirements of indoor units.
9. **Heating only mode:** The outdoor units only operate in heating mode. Indoor units requesting heating operate in heating mode. Indoor units requesting cooling or in fan only mode display the mode conflict error.
10. **Cooling only mode:** The outdoor units only operate in cooling mode. Indoor units requesting cooling operate in cooling mode; indoor units in fan only mode operate in fan only mode. Indoor units requesting heating display the mode conflict error.

2.4.2 System test

1. Cooling Test/ Heating Test

After the outdoor unit enter this mode, all indoor units in the system are forced to run cooling or heating mode, which is consistent with the normal operation.

How to exit test:

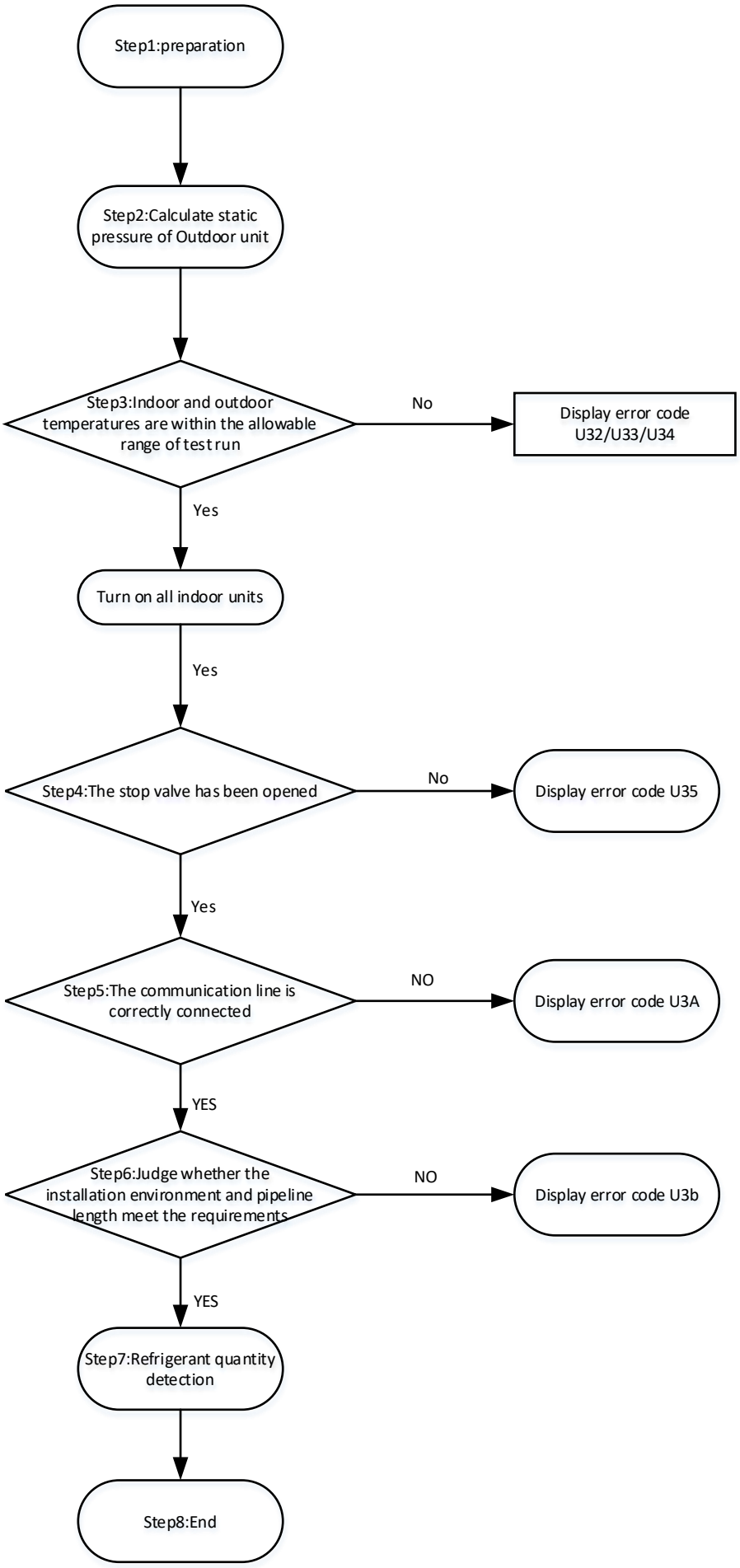
a) Press and hold the OK key for 5s to exit
b) Automatic exit in case of failure during operation
c) Automatic exit after 240 minutes of test.

2. Test running

This operation checks and determines the following items:

a) Check if there is a wiring error (with the communication check of the indoor unit)
b) Check if the stop valve is open
c) Determine the length of the pipe

There are 8 steps in the test running, and the specific process is as follow:



Notes: After the fault is removed, long press the OK key for 5 seconds to restart the test run.

3. System refrigerant quantity detection

After entering this mode, the system will automatically run and finally output the diagnostic results of the system refrigerant quantity.

Diagnostic results:

a) Normal: Digital display “d34”

b) Significantly excessive: Digital display “d32”

c) Excessive: Digital display “d33”

d) Insufficient: Digital display “d35”

e) Significantly insufficient: Digital display “d36”

f) No result- The system operation conditions do not meet the functional requirements: Digital display “d31”

2.4.3 Refrigerant recovery

In this mode, the operation process is as follows:

a) Refrigerant recovery to outdoor unit:

(1) First, close the liquid pipe stop valve and keep the gas pipe stop valve open;

(2) Menu setting [n1-2-0], the system enters the refrigerant recovery mode, when the digital display alternately "End" and the system low pressure value, close the gas pipe stop valve.

b) Refrigerant recovery to indoor unit:

(1) First, manually close the liquid pipe stop valve and keep the gas pipe stop valve open;

(2) Menu setting [n1-2-1], the system enters the refrigerant recovery mode, when the digital display alternately displays "End" and the system low pressure value, close the gas pipe stop valve.

c) Balance system refrigerant:

(1) Ensure that both the gas pipe stop valve and the liquid pipe stop valve are open.

(2) Menu setting [n1-2-2], the system enters the Balance system refrigerant mode.

2.4.4 Refrigerant charge

a) Manual refrigerant charge:

(1) Without customized refrigerant charging valve (EEVE)

Charge the refrigerant through the stop valve

(2) With customized refrigerant charging valve (EEVE)

Menu setting [n1-3-0], refrigerant charging valve (EEVE) will open, you can charge the refrigerant through EEVE.

b) Auto refrigerant charge :

The refrigerant charging valve (EEVE) must be customized to use this function.

Menu setting [n1-3-1], refrigerant charging valve (EEVE) will open, the system will automatically charge refrigerant through EEVE. When refrigerant charging is completed, the digital displays “End” and EEVE will close.

3. System Parameter Check

3.1 UP / DOWN system check button

Before pressing UP or DOWN button, allow the system to operate steadily for more than an hour. On pressing UP or DOWN button, the parameters listed in below table will be displayed in sequence.

Table 4-3.1 system check list:

DSP1 content	Parameters displayed on DSP2	Remarks
----	"Standby (ODU address + IDU quantity) /frequency/special status"	
0.--	Outdoor unit address	Master unit: 0; slave units: 1,2,3 255 represents invalid address
1.--	Outdoor unit capacity	Actual value = value displayed (HP)
2.--	Number of outdoor units	$1\sim4^{(1)}$
3.--	Number of indoor units (set by master unit)	$1\sim64^{(1)}$
4.--	Total capacity of outdoor unit	$\text{Only available for master unit}^{(2)}$
5.--	Target frequency of this ODU	$\text{Displacement frequency}^{(3)}$
6.--	Target frequency of ODU system	Target frequency= value displayed ×10
7.--	Inverter compressor A actual frequency(Hz)	Actual value = value displayed
8.--	Reserved	-
9.--	Operating mode	0: OFF
		2: Cooling
		3: Heating
10.--	Fan A speed index (rpm)	Actual value = value displayed
11.--	Fan B speed index (rpm)	Actual value = value displayed
12.--	Indoor heat exchanger pipe (**T2**) average temperature (°C)	$\text{Actual value} = \text{value displayed}^{(1)}$
13.--	Indoor heat exchanger pipe (**T2B**) average temperature (°C)	$\text{Actual value} = \text{value displayed}^{(1)}$
14.--	Main heat exchanger pipe (**T3**) temperature (°C)	Actual value = value displayed
15.--	Outdoor ambient (**T4**) temperature (°C)	Actual value = value displayed
16.--	Liquid pipe (**T5**) temperature (°C)	Actual value = value displayed
17.--	Microchannel heat exchanger inlet pipe (**T6A**) temperature (°C)	Actual value = value displayed
18.--	Microchannel heat exchanger outlet pipe (**T6B**) temperature (°C)	Actual value = value displayed
19.--	Inverter compressor A discharge (**T7C1**)temperature (°C)	Actual value = value displayed
20.--	Reserved	
21.--	Inverter compressor A suction (**T71**) temperature (°C)	Actual value = value displayed
22.--	Reserved	
23.--	(**T8**) temperature (°C)	Actual value = value displayed
24.--	Inverter module heatsink (**Ntc**)temperature (°C)	Actual value = value displayed
25.--	heat recovery unit's (**T9)** temperature (°C)(Reserved)	Actual value = value displayed
26.--	Outdoor Heat exchanger liquid (**TL)**temperature (°C)	Actual value = value displayed
27.--	Discharge superheat degree (°C)	Actual value = value displayed

DSP1 content	Parameters displayed on DSP2	Remarks
28.--	Primary current(A)	Actual value = value displayed /10
29.--	Inverter compressor A current (A)	Actual value = value displayed /10
30.--	Reserved	-
31.--	EEVA position	Actual value = value displayed × 24
32.--	Reserved	-
33.--	EEVC position	Actual value = value displayed × 4
34.--	EEVE position	Actual value = value displayed × 4
35.--	Compressor discharge pressure (MPa)	Actual value = value displayed × 0.01
36.--	Compressor suction pressure(MPa)	Actual value = value displayed × 0.01
37.--	Quantity of indoor units online	Actual value = value displayed(1)
38.--	Quantity of indoor units online	Actual value = value displayed(1)
39.--	Heat exchanger status(Outdoor unit)	【0】OFF
		【1】C1:Cooling mode
		【2】D1: Disabled(Cooling mode)(4)
		【3】D2:Compressor OFF(Cooling mode)
		【4】E1:Heating mode
		【5】F1: Disabled(Heating mode)(4)
		【6】F2:Compressor OFF(Heating mode)
40.--	Special state	【0】No special mode
		【1】Oil return
		【2】Defrost
		【3】Start-up
		【4】Stop
		【5】Quick check
		【6】Self cleaning
41.--	Silent mode	0~14 ,14 represents the most silent
42.--	Static pressure mode	【0】0Pa
		【1】20Pa
		【2】40Pa
		【3】60Pa
		【4】80Pa
43.--	Tes (Target evaporating temperature) (°C)	Actual value = value displayed(5)
44.--	Tcs (Target condensing temperature) (°C)	Actual value = value displayed(5)
45.--	DC Voltage (V)	Actual value = value displayed
46.--	AC Voltage (V)	Actual value = value displayed
47.--	Quantity of cooling mode IDUs	Actual value = value displayed
48.--	Quantity of heating mode IDUs	Actual value = value displayed
49.--	Capacity of cooling mode IDUs (HP)	Actual value = value displayed(1)
50.--	Capacity of heating mode IDUs (HP)	Actual value = value displayed(1)

DSP1 content	Parameters displayed on DSP2	Remarks
51.--	Refrigerant volume judgment(1)	【0】:No result
		【1】:Significantly insufficient
		【2】:insufficient
		【3】:Normal
		【4】:excessive
		【5】:Significantly excessive
52.--	Dirty blockage rate (outdoor heat exchanger)	0~10, 10 represents the worst
53.--	Fan historical error	
54.--	Software version	
55.--	Last error or protection code	
56.--	Reserved	
57.--	Reserved	
58.--	Reserved	
--		

Notes:

(1) Only available for master unit (Combined system).

(2) Only available for master unit (Combined system), 0 displayed on slave units has no sense.

(3) Need to convert to current compressor output volume, example: compressor output volume is 98, Target frequency =Actual frequency * 98 / 60.

(4) Only available for Heat recovery unit

(5) Te: Low pressure equivalent saturation temperature (°C) Tes: Target Te value.
Tc: High pressure equivalent saturation temperature (°C) Tcs: Target Tc value.

Part 5

Electrical Components and Wiring Diagrams

1. Outdoor Unit Electric Control Box Layout

Figure 5-1.1: 8-24HP top layer of electric control box

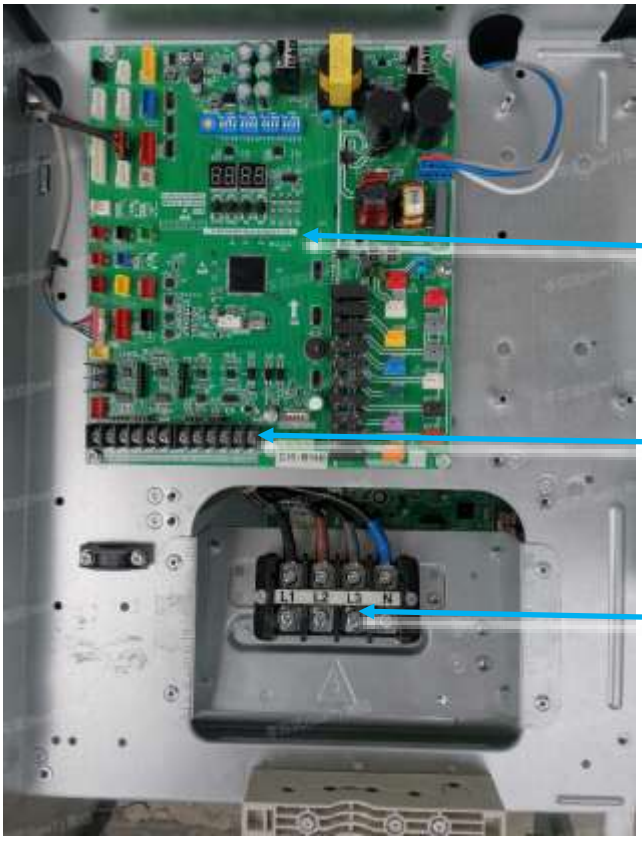
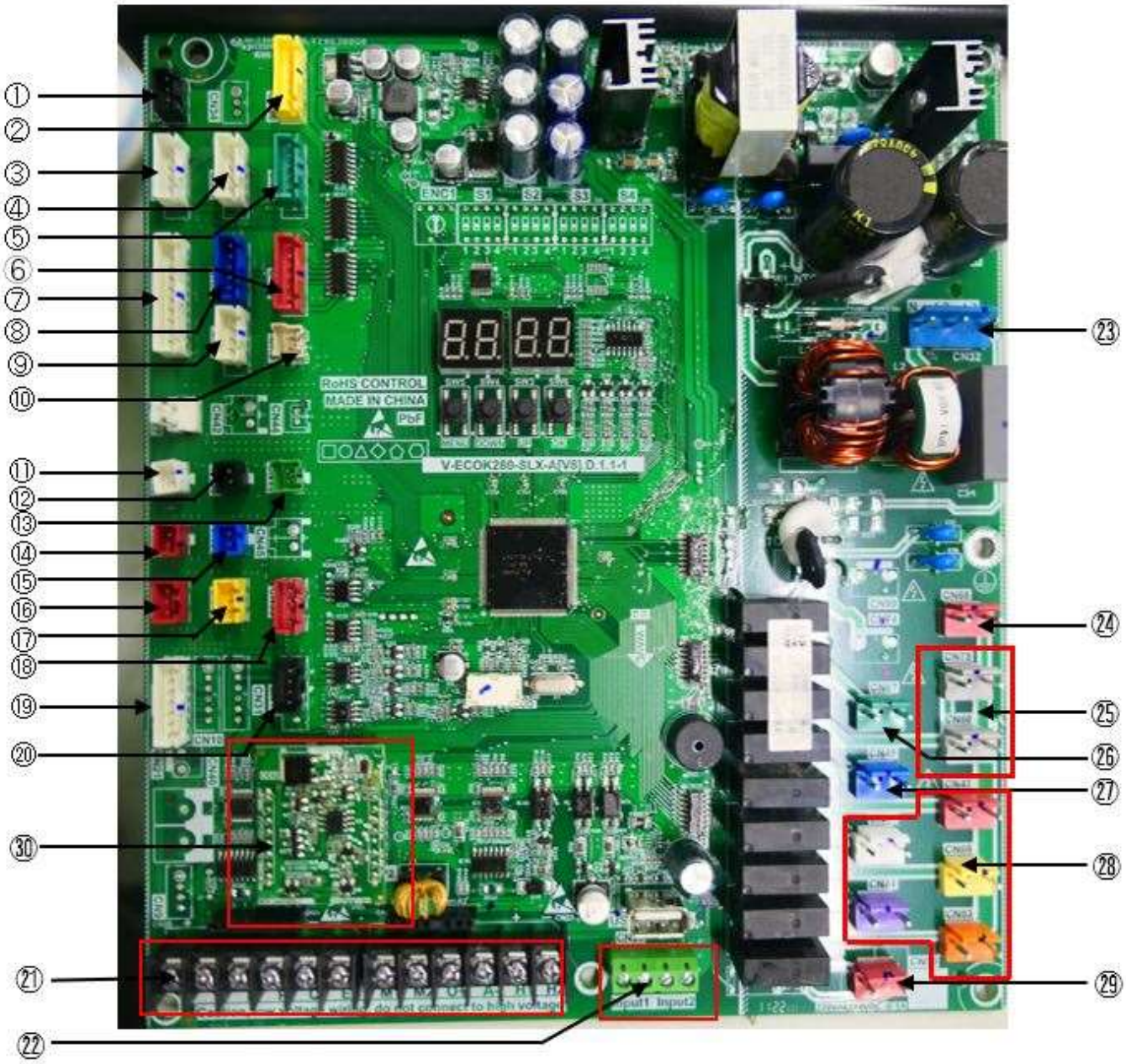


Figure 5-1.2: 8-24HP bottom layer of electric control box

2. Outdoor Unit Main Control Board

2.1 Outdoor unit main Control Board ports

Figure 5-2.1: Outdoor unit main Control Board ports[1]



Notes:
Label descriptions are given in *Table 5-2.1: Main Control Board port*
.

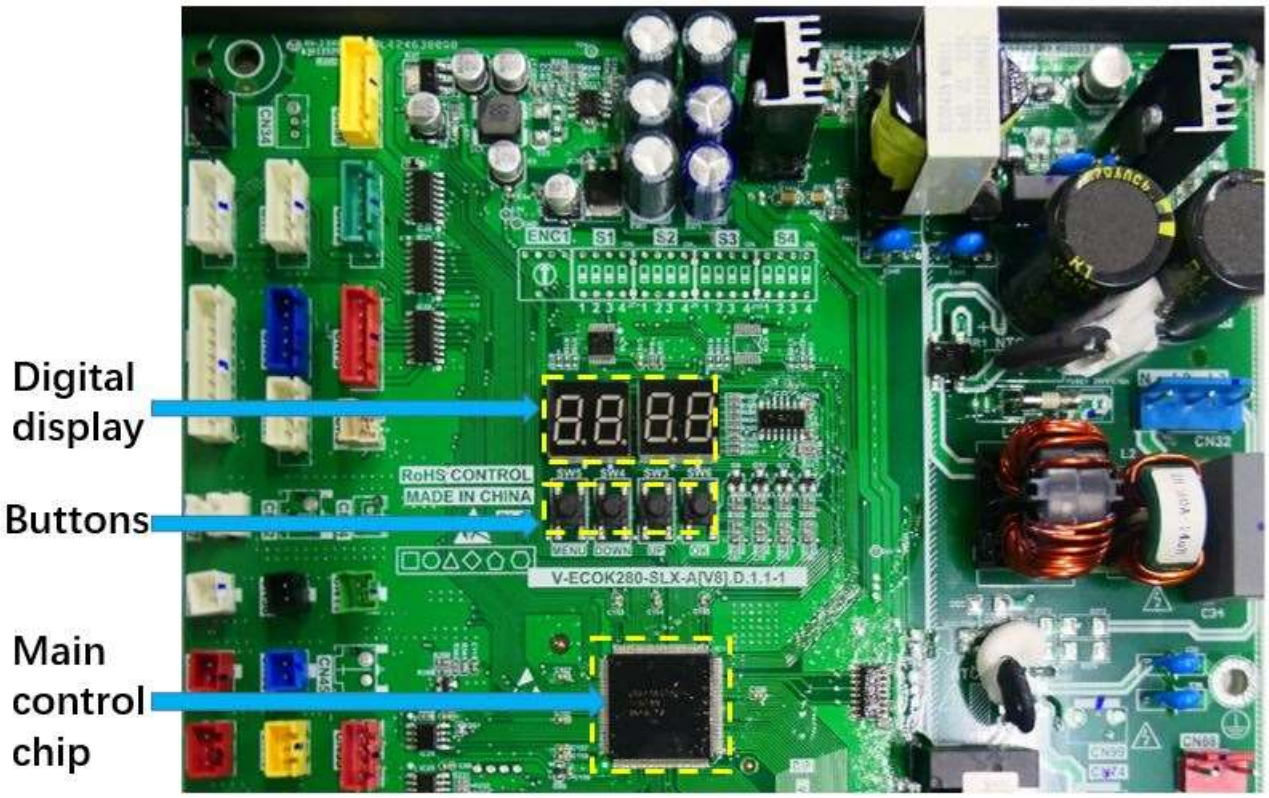
Table 5-2.1: Main Control Board port

Label in Figure 5-2.1	Port code	Content	Port voltage
1	CN82	Reserved	5Vdc
2	CN36	Reserved	3.3Vdc
3	CN70	EEVA drive port	12Vdc
4	CN71	EEVB drive port(Reserved)	12Vdc
5	CN72	EEVC drive port	12Vdc
6	CN73	EXVE drive port	12Vdc
7	CN4	Microchannel heat exchanger inlet temperature sensor(**T6A**) /Liquid pipe inlet temperature sensor(**T5**) /Microchannel heat exchanger outlet temperature sensor(**T6B**) /Suction temperature sensor 1 (**T71**) /Discharge temperature sensor 1 (**T7C1**) (**From top to bottom**)	3.3Vdc
8	CN35	Electric control box chamber Temperature & Humidity sensor(**Tb**)	3.3Vdc
9	CN8	Condenser inlet temperature sensor(**T8**)/Main exchanger pipe temperature sensor(**T3**) (**From top to bottom**)	3.3Vdc
10	CN3	Condenser outlet temperature sensor(**TL**)	3.3Vdc
11	CN16	Gas pipe temperature sensor(**Tg**)	3.3Vdc
12	CN38	Reserved	3.3Vdc
13	CN11	Reserved	3.3Vdc
14	CN37	Reserved	3.3Vdc
15	CN30	Outdoor ambient temperature sensor(**T4**)	3.3Vdc
16	CN41	Low pressure sensor	5Vdc
17	CN40	High pressure sensor	5Vdc
18	CN33	Expanded communication port	12Vdc
19	CN26	Communication port to Compressor & Fan Drive Board	5Vdc+12Vdc
20	CN14	Communication port to data transfer module	12Vdc
21	CN22/CN23	Communication port	0-5V DC (varying)
22	CN28	Emergency stop port	0V or Open
23	CN32	Power input of main board	176Vac~264Vac
24	CN68	Reserved	176Vac~264Vac
25	CN75/CN66	Power supply to compressor crankcase heater	176Vac~264Vac
26	CN67	Solenoid valve drive ports (Reserved)	176Vac~264Vac
27	CN48	Four-way valve drive ports(**ST1**)	176Vac~264Vac
28	CN47 /CN49/CN69 /CN84/CN83	Solenoid valve drive ports CN47-SV6 ; CN49-SV5 ; CN69-SV7 ; CN84-SV8A; CN83-SV8B	176Vac~264Vac
29	CN93	Dry contact output	0V or Open
30	-	HyperLink board	-

2.2 Outdoor unit main Control Board components

2.2.1 Layout

Figure 5-2.2: Outdoor unit main Control Board components



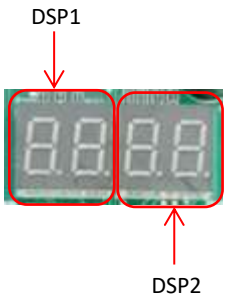
2.2.2 Function of buttons SW3 to SW6

Table 5-2.2: Function of buttons SW3 to SW6

Button	Function
SW3 (UP)	In menu mode: previous and next buttons for menu modes. Not in menu mode: previous and next buttons for system check information.
SW4 (DOWN)	
SW5 (MENU)	Enter / exit menu mode.
SW6 (OK)	Confirm to enter specified menu mode.

2.2.3 Digital display output

Table 5-2.4: Digital display output in different operating states

Outdoor unit state		Parameters displayed on DSP1	Parameters displayed on DSP2	
Standby		The address of outdoor unit	The number of indoor units in communication with the outdoor units	
Normal operation	For single compressor units	--	Running speed of the compressor in rotations per second	
Other operation state		Operation state code	Operation state step	
Error or protection		Placeholder and error or protection cod		
In menu mode		Display menu mode code Refer to *Table 4-2.3 Menu mode function:*		
System check		Display system check code Refer to *Table 4-3.1 system check list*		

3. Compressor & Fan drive board

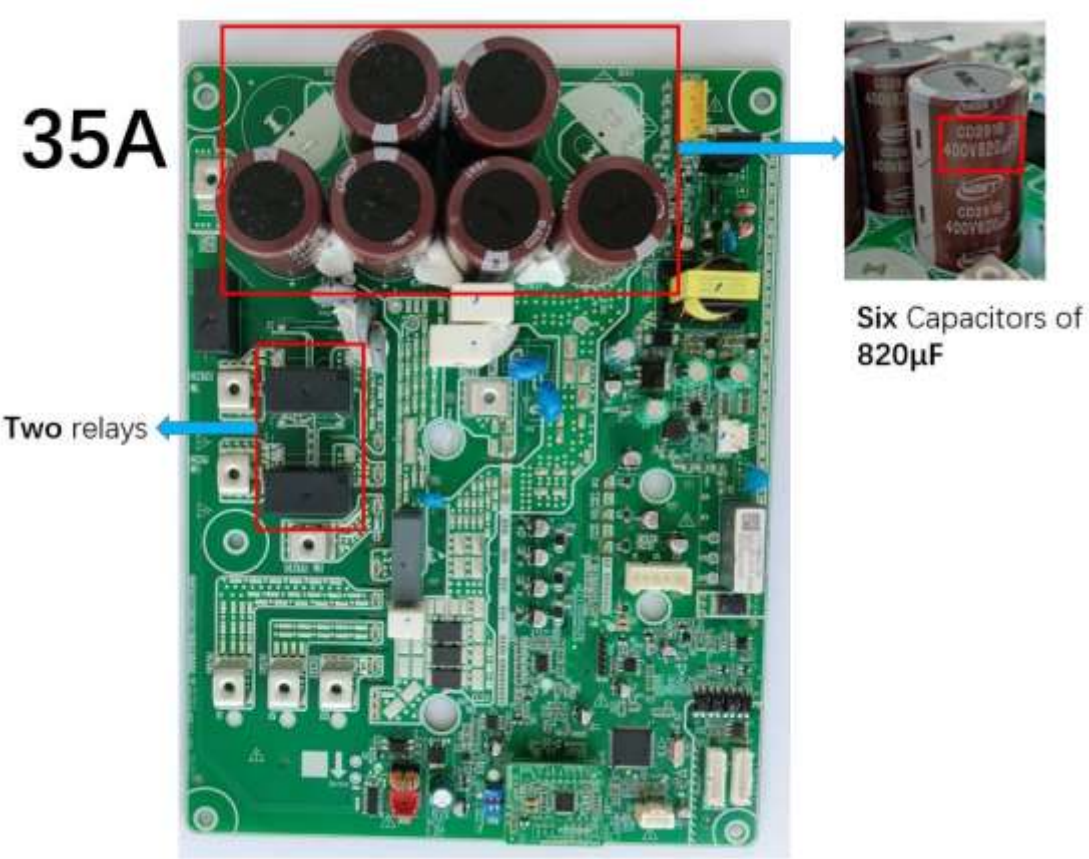
3.1 Corresponding table of Compressor & Fan drive board and outdoor units

Table 5-2.5: Corresponding table of Compressor & Fan drive board and outdoor units

Compressor & Fan drive board model	Model
35A	8-14HP
50A	16-18HP
75A	20-24HP

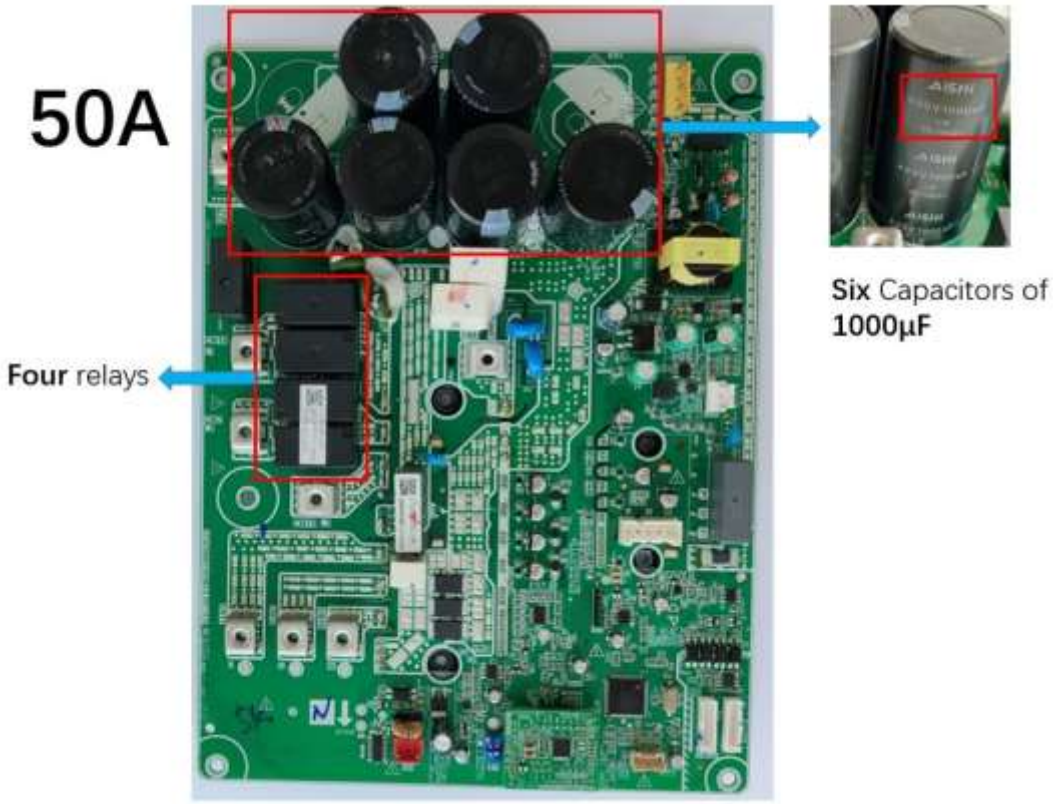
3.2 Compressor & Fan drive board of 35A

Figure 5-2.3: Compressor & Fan drive board of 35A



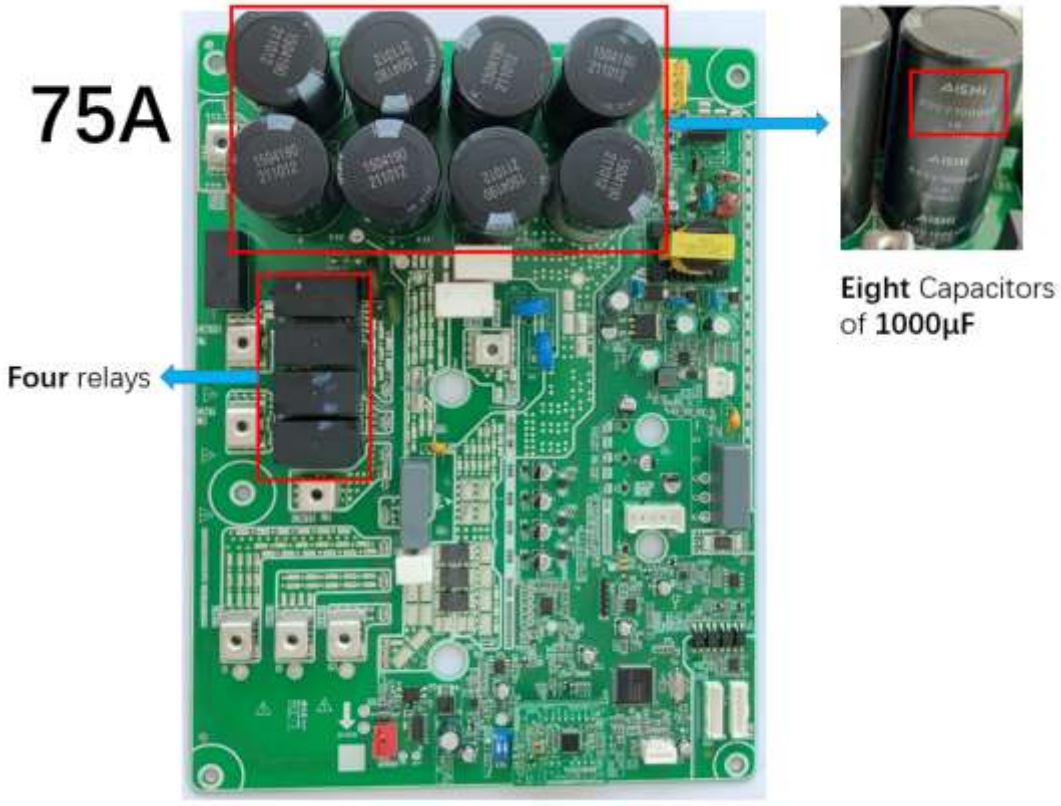
3.3 Compressor & Fan drive board of 50A

Figure 5-2.4: Compressor & Fan drive board of 50A



3.4 Compressor & Fan drive board of 75A

Figure 5-2.5: Compressor & Fan drive board of 75A



3.5 Compressor & Fan drive board ports

Figure 5-2.6: Compressor & Fan drive board ports of 50A

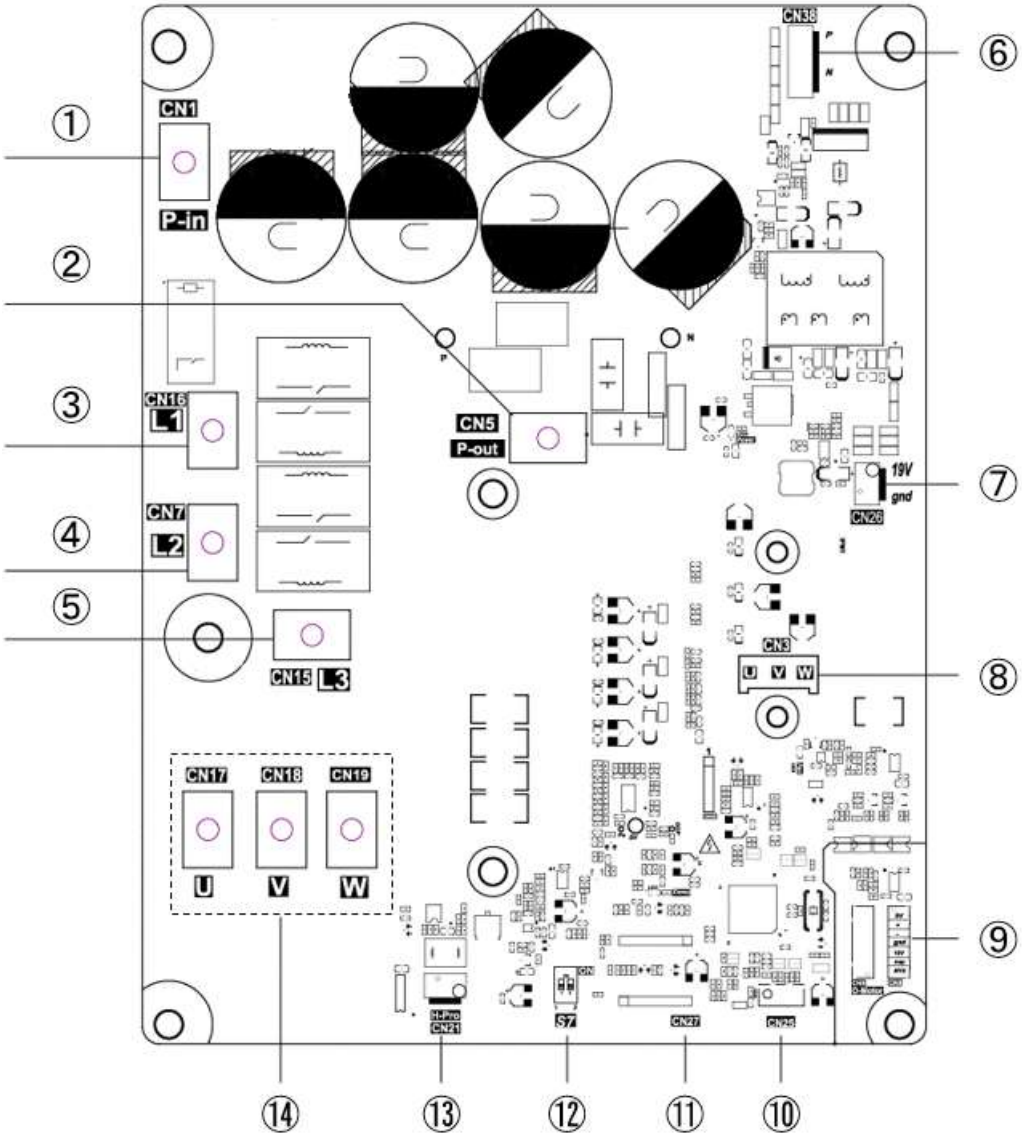


Table 5-2.6: Compressor & Fan drive board port

Label in Figure 5-2.5	Port code	Feature identifier	Content	Port voltage
1	CN1	P-in	Positive pole Input terminal of the high voltage capacitors (connected to reactor)	438Vdc-650Vdc(Rated at 540Vdc)
2	CN5	P-out	Positive pole output terminal of the three-phase rectifier (connected to reactor)	438Vdc-650Vdc(Rated at 540Vdc)
3	CN16	L1	Three phase power input of L1 phase	310Vac-460Vac(Rated 380Vac between phases)
4	CN7	L2	Three phase power input of L2 phase	310Vac-460Vac(Rated 380Vac between phases)
5	CN15	L3	Three phase power input of L3 phase	310Vac-460Vac(Rated 380Vac between phases)

Table 5-2.6: Compressor & Fan drive board port

Label in Figure 5-2.5	Port code	Feature identifier	Content	Port voltage
6	CN38	-	Power supply terminal for DC fan drive board (P,N) (Reserved)	438Vdc~650Vdc(Rated 540Vdc; P is positive, N is negative)
7	CN26	-	Fan module controls power supply(Reserved)	19V
8	CN3	DCFAN	Three phase output of the inverter ,connected to the DC fan	0~100%*input voltage(varying)
9	CN8/CN9	O-Motor	Communication port between main control board and Inverter drive board	Ports from top to bottom are defined as follows: 5V, +, -, GND, 12V, empty, and Ry2.
10	CN25	-	Debug port	--
11	CN27	-	PED Diagnostic Module	--
12	S7	-	Dial switches of address setting (Compressor & Fan drive module)	--
13	CN21	H-Pro	High pressure switch connection	Close: 0 Vdc ; Open: 6 Vdc
14	CN17/18/19	U/V/W	Three phase output of the inverter ,connected to the compressor	0~100%*input voltage(varying)

Notes:

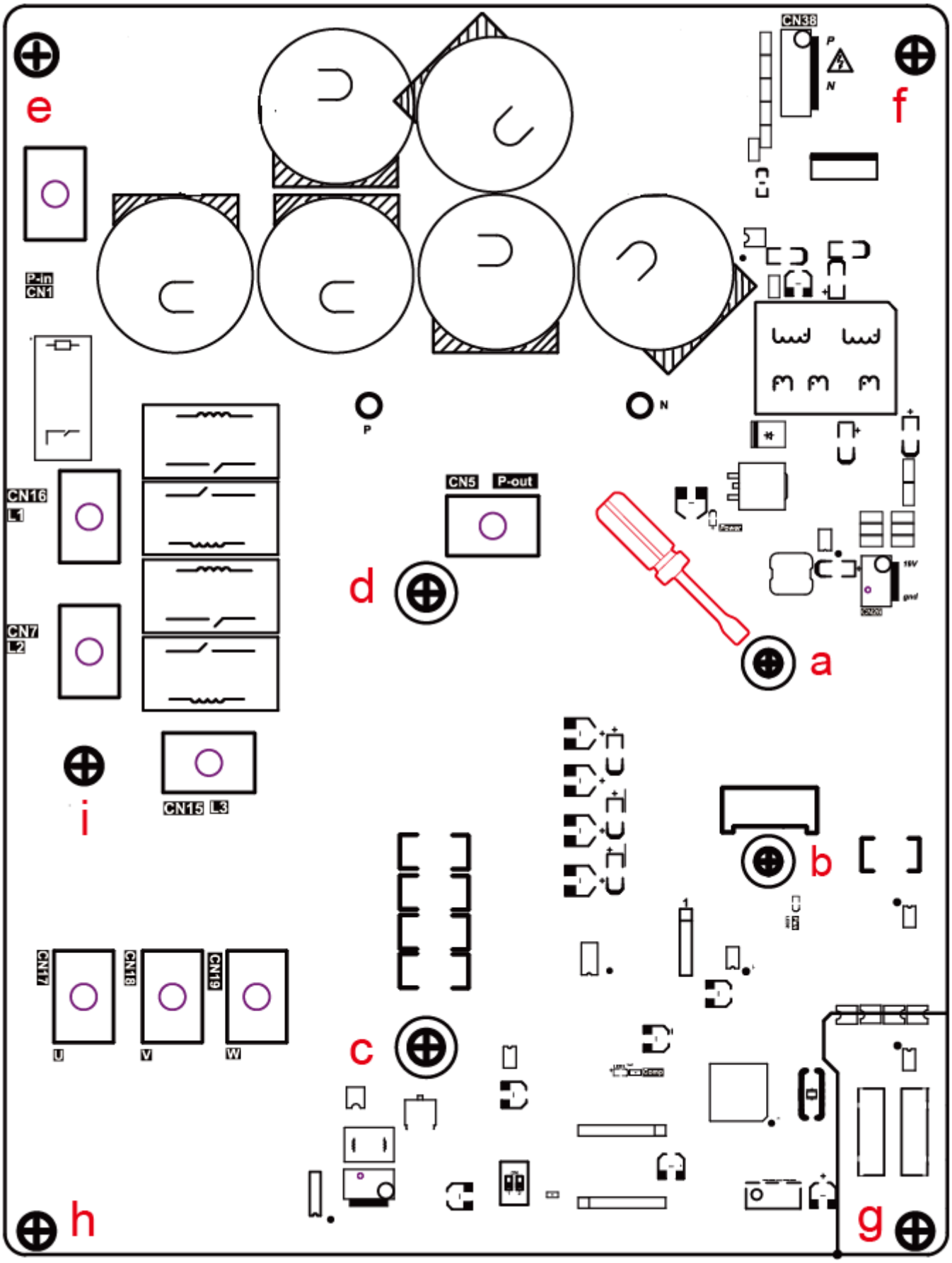
The Compressor & Fan drive board ports of 35A and 75A is same as 50A.

Table 5-2.7: Compressor & Fan drive board switch settings

Switch	Setting	Switch positions1	Description
S7 	Serial number		Fan A
			Fan B

3.6 The installation guide of Compressor & Fan drive board

Figure 5-2.7: The installation guide of Compressor & Fan drive board



1. Before maintaining or repairing the outdoor unit, cut off the power supply of the outdoor unit for 5 minutes and use a mustimeter to ensure that the voltage is zero to avoid electric shock. Notice The unit has the low-power standby function. After entering this mode, only the power indicator of the main board is on.

2. Perform the following steps to install the module board:

①. Evenly apply thermal silicone grease on the IPM (The cooling panel on the back of Compressor & Fan drive board)

②. Pre-fix screws a, b, c and d respectively, and then tighten them successively after pre-fix;

③. Fix e, f, g, h and i screws.

④. The order of steps ②③ cannot be reversed; Do not tighten the module directly without pre-fixing, otherwise the module will be damaged by force when other screws are fixed.

⑤. Do not directly fix e and f screws, hang the module board and then fix other screws;

3.7 Fan drive board

Figure 5-2.8: Fan drive board

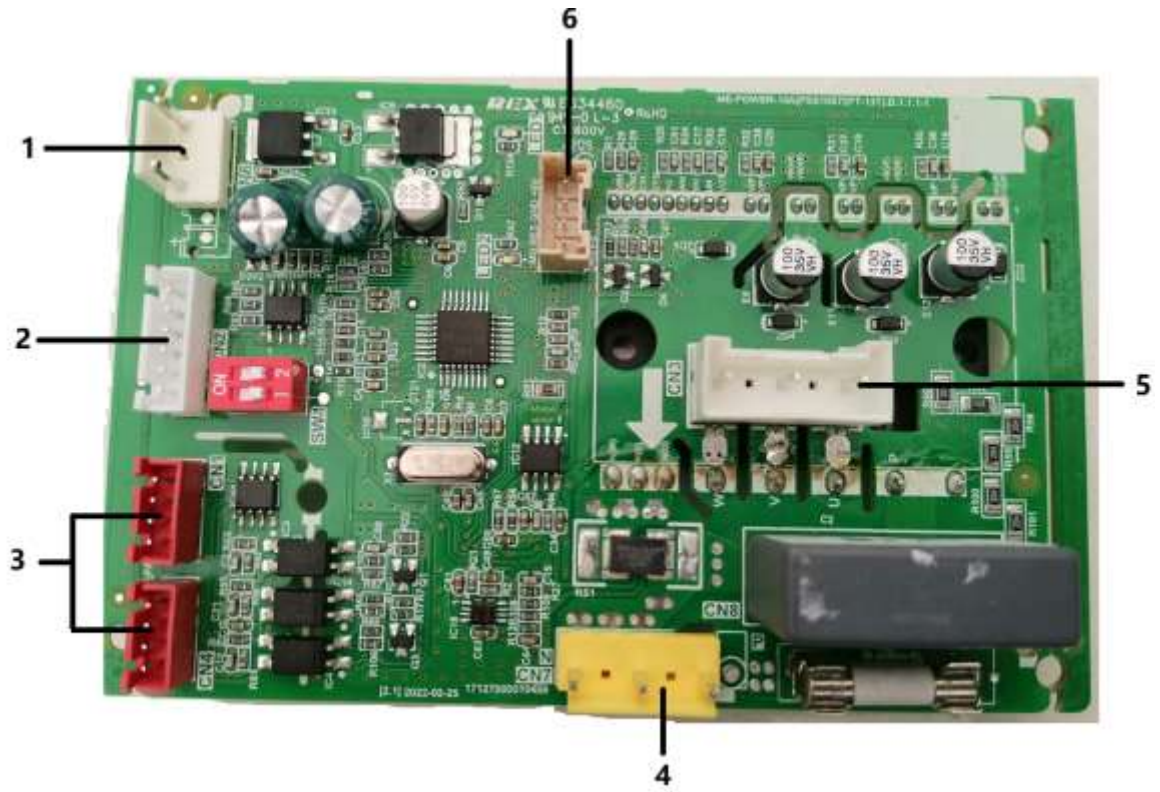
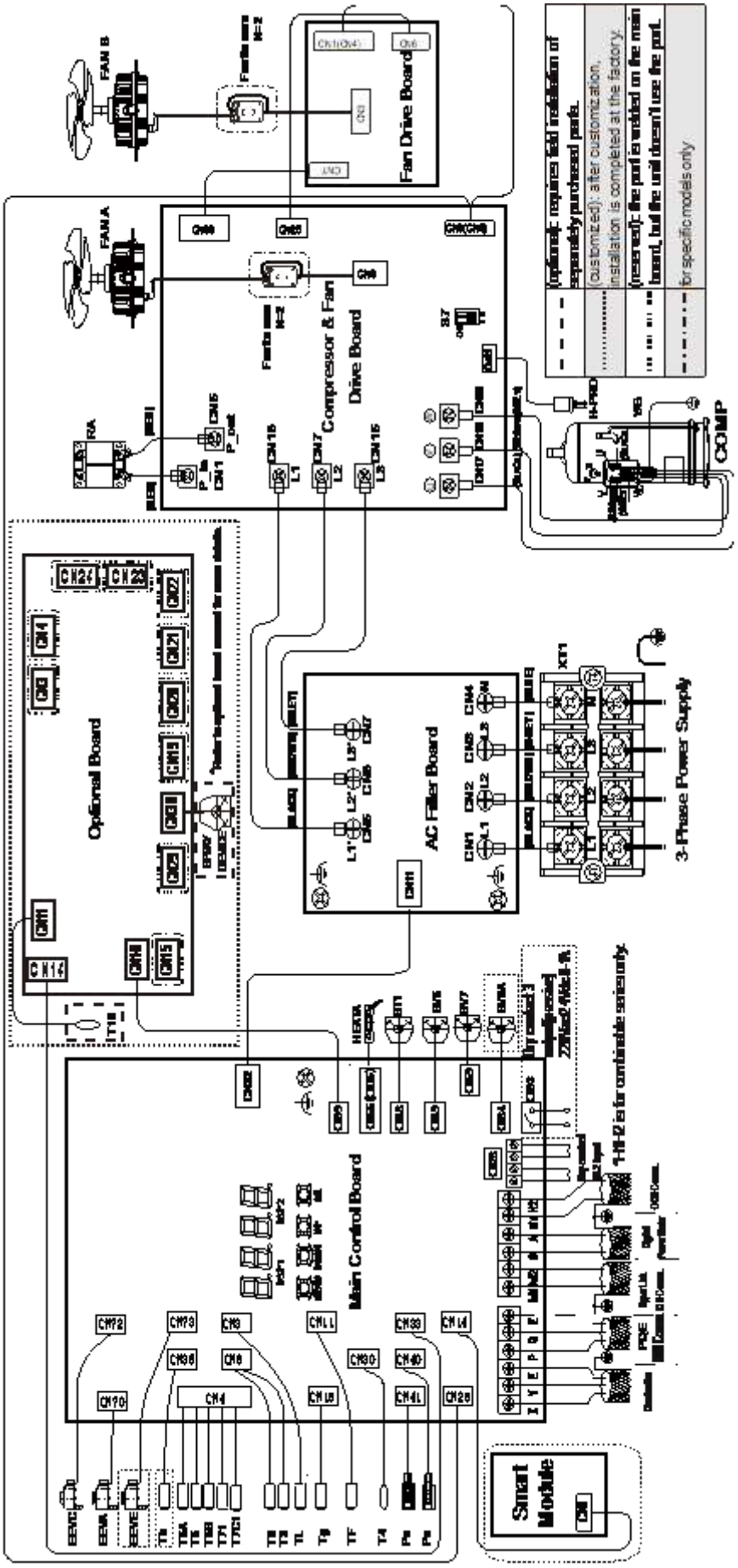


Table 5-2.6: Compressor & Fan drive board port

Label in Figure 5-2.5	Port code	Content	Port voltage
1	CN6	Fan module controls power supply(Reserved)	19V
2	CN2	EEPROM Program burning port	5V
3	CN4\CN1	Communication port between main control board and Fan drive board	5V
4	CN7	Power supply terminal for DC fan drive board (P,N) From main control board.	Rated voltage 540V DC P(+), N(-)
5	CN3	Output power supply for fan motor	46~460V AC
6	CN9	Main Program burning port	--

4. Wiring Diagrams

Figure 5-3.1: V8S outdoor unit wiring diagram



Part 6
Diagnosis and Troubleshooting

1 Error Code Table

1.1 Outdoor Error code table

Table 6-1.1 Outdoor Error code table

Error code	Error description	Remarks	Manual re-start required[2]
A01	Emergency shutdown	Outdoor unit's fault	NO
AAx	No.x Inverter driver board does not match the main control board	Outdoor unit's fault	NO
xA61	No.x slave unit error	Salve unit's fault	NO
xb53	No.x Heat dissipation fan error	System failure	YES
C13	The address of outdoor Unit is repeated	Communication failure	NO
C21	Communication error between indoor and master outdoor unit	Communication failure	NO
C26	Number of indoor units detected by master unit has decreased or less than the setting amount	Communication failure	NO
C28	Number of indoor units detected by master unit has increased or more than the setting amount	Communication failure	NO
xC31	Communication error between No.x slave outdoor unit and master outduoor unit	Communication failure	NO
C32	Number of slave units detected by master unit has decreased	Communication failure	NO
C33	Number of slave units detected by master unit has increased	Communication failure	NO
xC41	Communication Error between main control board and No.x inverter driver board	Communication failure	NO
E41	Outdoor ambient temperature sensor (T4) error(open/short)	Sensor error	NO
F31	Microchannel heat exchanger outlet temperature sensor(T6B) error(open/short)	Sensor error	NO
F41	Main heat exchanger pipe temperature sensor (T3) error(open/short)	Sensor error	NO
F51	Microchannel heat exchanger inlet temperature sensor(T6A) error(open/short)	Sensor error	NO
F62	Inverter driver board temperature (Tf) protection	Temperature proteection	NO
F63	Non-inductive resistance temperature(Tr)protection	Temperature proteection	NO
F6A	F62 protection occurs 3 times in 100 minutes	Temperature proteection	YES
xF71	No.(x) compressor discharge temperature sensor(T7C1/T7C2) error (open/short)	Sensor error	YES
xF72	No.(x) compressor discharge temperature(T7C1/T7C2) protection	Temperature proteection	NO
F75	Compressor discharge insufficient superheat protection	Temperature proteection	NO
F7A	F72 protection occurs 3 times in 100 minutes	Temperature proteection	YES
F81	Gas pipe temperature sensor (Tg) error (open/short)	Sensor error	NO
F91	Liquid pipe temperature sensor (T5) error (open/short)	Sensor error	NO
FA1	Outdoor Heat exchanger gas temperature sensor (T8) error (open/short)	Sensor error	NO
FC1	Outdoor heat exchanger liquid temperature sensor (TL) error (open/short)	Sensor error	NO
xFd1	Compressor suction temperature sensor (T71/T72) error (open/short)	Sensor error	NO
FL1	T10 outdoor ambient temperature sensor fault (open circuit/short circuit)	Sensor error	NO

Table continued on next page …

Table 6-1.1 Outdoor Error code table (continued)

Error code	Error description	Remarks	Manual re-start required[2]
P11	High pressure sensor error	Sensor error	NO
P12	High pressure protection	Pressure protection	NO
P13	High pressure switch protection	Pressure protection	NO
P14	P12 protection occurs 3 times in 60 minutes	Pressure protection	YES
P21	Low pressure sensor error	Sensor error	YES
P22	low pressure protection	Pressure protection	NO
P24	Abnormal rise of low pressure	Pressure protection	NO
P25	P22 protection occurs 3 times in 100 minutes	Pressure protection	YES
xP32	No.(x) compressor high DC bus current protection	Current protection	NO
xP33	xP32 protection occurs 3 times in 100 minutes	Current protection	YES
P51	High AC voltage protection	Voltage protection	NO
P52	Low AC voltage protection	Voltage protection	NO
P53	Phase B and N of the power cable are connected to the opposite protection	Power protection	YES
P54	DC bus low voltage protection	Voltage protection	NO
P55	DC bus ripple over protection	Power protection	YES
xP56	No.(x) Inverter driver board DC bus low voltage error	Power protection	YES
xP57	No.(x) Inverter driver board DC bus high voltage error	Power protection	YES
xP58	No.(x) Inverter driver board DC bus excessively high voltage error	Power protection	YES
xP59	No. (x) inverter module bus voltage drop fault	Power protection	No
P71	EEPROM error	E party error	YES
Pb1	HyperLink overcurrent error	Current overload error	No
Pd1	Anti-condensation protection	Condensation	NO
Pd2	Pd1 protection occurs 2 times in 60 minutes	Condensation	YES
1b01	Electronic expansion valve (EEVA) error	Missing Connection	YES
2b01	Electronic expansion valve (EEVB) error	Missing Connection	YES
3b01	Electronic expansion valve (EEVC) error	Missing Connection	YES
4b01	Electronic expansion valve (EEVE) error	Missing Connection	YES
bA1	HyperLink cannot control indoor unit’s electronic expansion valve	Missing Connection	NO

Note:

'x' is a placeholder for the fan or compressor address, with 1 representing fan A or compressor A and 2 representing fan B or compressor B.

1.2 Installation and debugging error code table

Table 6-1.2 Installation and debugging error code table

Error code	Error description	Remarks	Manual re-start required[2]
U11	Outdoor unit model is not set	System configuration	YES
U12	Outdoor unit Capacity setting error	System configuration	YES
U21	System contains the old Indoor Unit with old platforms	System configuration	YES
U25	Non-common Indoor Unit in the system	System configuration	YES
U26	Outdoor unit and Indoor Unit mismatch	System configuration	YES
U31	The test run was never successful, and did not run within 30 minutes after power-on	Pilot run	YES
U32	Outdoor temperature out of operating range	Pilot run	YES
U33	Indoor temperature out of operating range	Pilot run	YES
U34	Outdoor and indoor temperature out of operating range	Pilot run	YES
U35	Liquid side stop valve is not opened	Pilot run	YES
U37	Gas side stop valve is not opened	Pilot run	YES
U38	Outdoor unit has No address	Outdoor Unit set	YES
U3A	The refrigerant pipe connection is not consistent with the communication cable	Pilot run	NO
U3b	The installation environment is abnormal	Pilot run	YES
U3C	The VIP indoor unit is not set (valid in Changeover priority mode)	Pilot run	NO
U4x	Overconnection ratio contains U41-U48	System configuration	YES
U51	Outdoor unit of Individual Series is installed in combined system.	System configuration	YES
U53	Different series of outdoor units are detected in the same VRF system.	System configuration	YES

1.3 Compressor drive error code table

Table 6-1.3 Compressor drive error code table

Error code	Error description	Remarks	Manual re-start required[2]
xL01	xL1* or xL2* error occurs 3 times in 60 minutes	Current overload error	Yes
xL1E	Hardware overcurrent		NO
xL11	Software overcurrent		NO
xL12	Software overcurrent protection last 30s		NO
xL2E	Module overtemperature protection	Over-temperature error	NO
xL33	Bus voltage drop fault	Power supply error	NO
XL43	The current sampling bias is abnormal	Hardware error	NO
xL45	Motor code mismatch	Motor error	NO
xL46	IPM protection (FO)	IPM error	NO
xL47	Module type mismatch	Module error	NO
xL4E	EEPROM error	E party error	NO
xL5E	Startup failed	Control error	NO

Table continued on next page …

Table 6-1.3 Compressor drive error code table (continued)

Error code	Error description	Remarks	Manual re-start required[2]
xL51	Out-of-step error	Control error	NO
xL52	Locked-rotor protection	Motor error	NO
xL6E	Compressor motor lack of phase protection	Diagnosis error	NO
xLBE	High pressure switch operation	Pressure protection	NO
xLB7	Other check exceptions	Diagnosis error	NO

Note:'x' is a placeholder for the fan or compressor address, with 1 representing fan A or compressor A and 2 representing fan B or compressor B.

1.4 Fan motor error code table

Table 6-1.4 Fan motor error code table

Code	Error description	Remarks	Manual re-start required2
xJ01	xJ1* or xJ2* error occurs 10 times in 60 minutes	Current overload error	YES
xJ1E	Hardware overcurrent		NO
xJ11	Software overcurrent		NO
xJ12	Software overcurrent protection last 30s		NO
xJ2E	Module overtemperature protection	Over-temperature error	NO
xJ43	The current sampling bias is abnormal	Hardware error	NO
xJ5E	Startup failed	Control error	NO
xJ51	Out-of-step error		NO
xJ52	Locked-rotor protection		NO
xJ6E	Motor lack of phase protection	Diagnosis error	NO

Note: 'x' is a placeholder for the fan address, with 1 representing fan A and 2 representing fan B

1.5 Status prompt code table

Table 6-1.5 Status prompt code table

Status code	Code description	Remarks	Manual re-start required2
d0x	Oil return,”x” is the current step node	Status hint	NO
dfx	Defrost, ”x” is the current step node	Status hint	NO
d11	The outdoor ambient temperature exceeds the upper limit (Heating mode)	Status hint	NO
d12	The outdoor ambient temperature exceeds the lower limit (Heating mode)	Status hint	NO
d13	The outdoor ambient temperature exceeds the upper limit (Cooling mode)	Status hint	NO
d14	The outdoor ambient temperature exceeds the lower limit (Cooling mode)	Status hint	NO
d31	Refrigerant judgment: no result	Status hint	NO
d32	Refrigerant quantity judgment:Significantly excessive	Status hint	NO
d33	Refrigerant quantity judgment:Slightly excessive	Status hint	NO
d34	Refrigerant quantity judgment:normal	Status hint	NO
d35	Refrigerant quantity judgment:Slightly insufficient	Status hint	NO

Table continued on next page …

Table 6-1.5 Status prompt code table (continued)

Status code	Code description	Remarks	Manual re-start required2

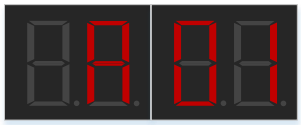
d36	Refrigerant quantity judgment:Significantly insufficient	Status hint	NO
d37	IDU connected to system is not common	Status hint	NO
d38	Too low proportion of running IDUs	Status hint	NO
d39	Failed to detect refrigerant amount during backup	Status hint	NO
d42	Communication error between the outdoor unit and the optional board	Status hint	NO

Note: the above non-error code, no troubleshooting

2 Error in Main Control

2.1 A01: Emergency shutdown of Outdoor Units

2.1.1 Digital display output



2.1.2 Description

- Compressor protection shut down
- All Outdoor Units stop running
- Error codes are displayed only on master uint.

2.1.3 Trigger / recover condition

Scenario 1: ODU menu item n28 is set to 0:

- Trigger condition: The dry contact is closed (as shown in Figure B below, the two terminal blocks of Input1 of port CN28 ① and ② or the two terminal blocks of Input 2 ③ and ④ are connected).
- Restoration condition: The dry contact is open (terminal blocks ① and ② and terminal blocks ③ and ④ are simultaneously disconnected).
- Reset method: Resume automatically upon dry contact opening

Scenario 2: ODU menu item n28 is set to 1:

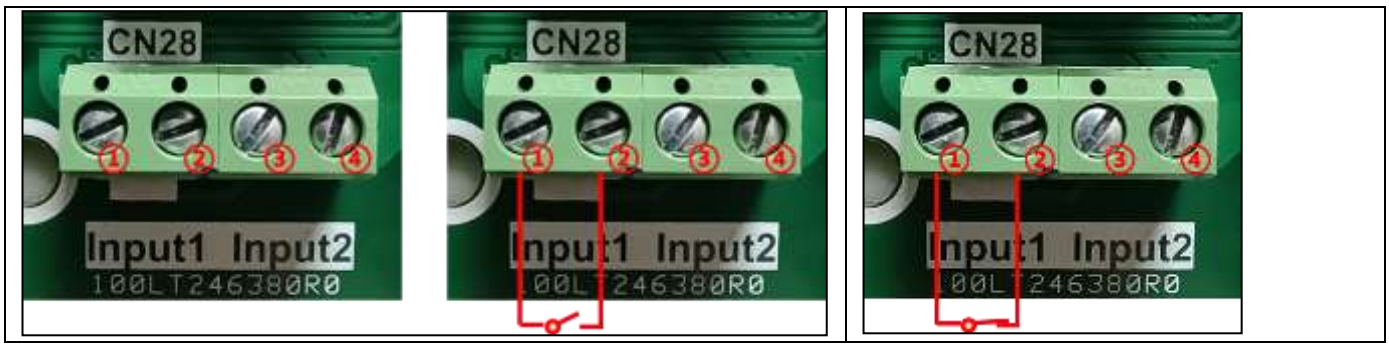
- Trigger condition: The dry contact is open (as shown in Figure A below, the two terminal blocks of Input1 of port CN28 ① and ② or the two terminal blocks of Input 2 ③ and ④ are disconnected).
- Restoration condition: The dry contact is closed (terminal blocks ① and ② and terminal blocks ③ and ④ are simultaneously connected).
- Reset method: Resume automatically upon dry contact closure

Scenario 3: An emergency shutdown command is sent from the centralized controller

- Trigger condition: Centralized controller sends an emergency shutdown command.
- Restoration condition: Centralized controller cancels the emergency shutdown command.
- Reset method: Resume automatically

Figure A The dry contact is open (taking Input1 as an example)

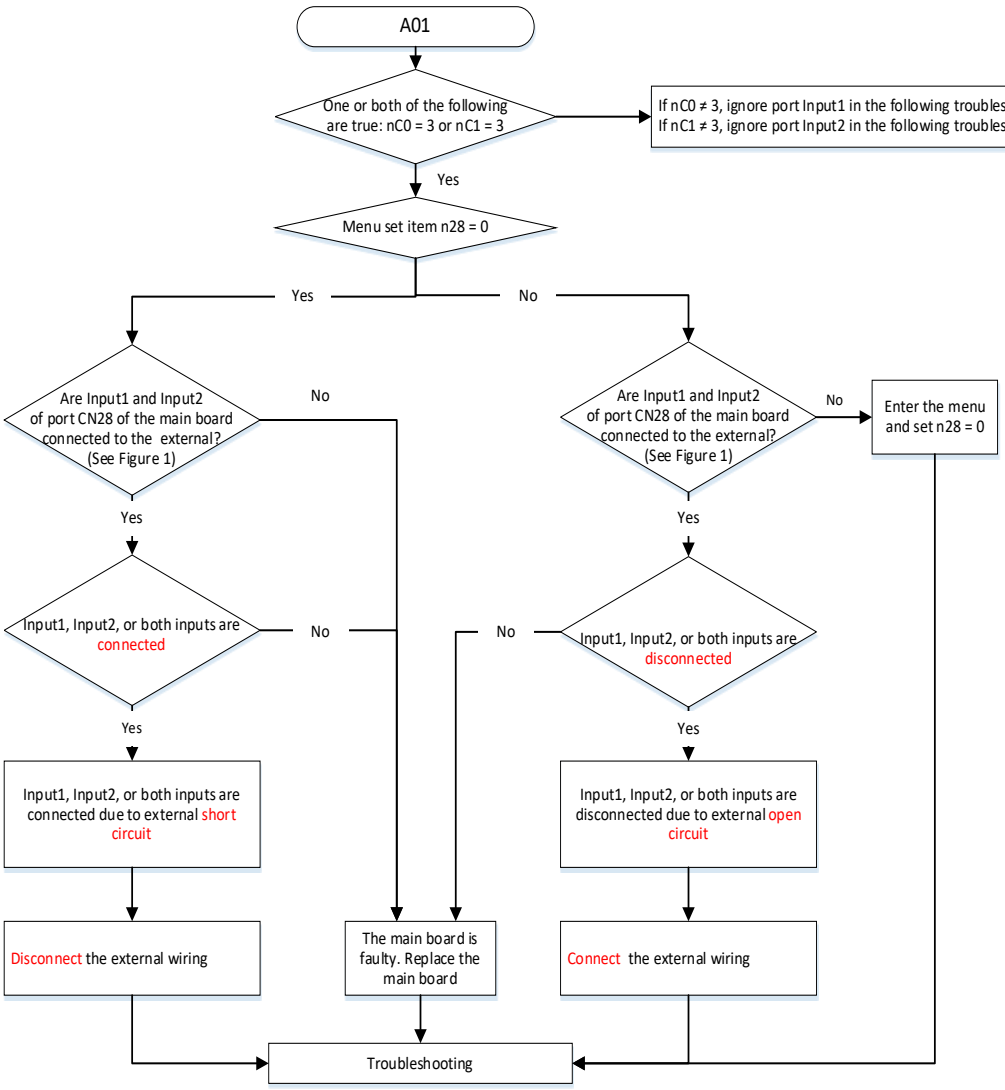
Figure B The dry contact is closed (taking Input1 as an example)



2.1.4 Possible causes

- External causes triggers emergency shutdown.
- Centralized controller sends an emergency shutdown command.
- The ODU main board is damaged.

2.1.5 Procedure



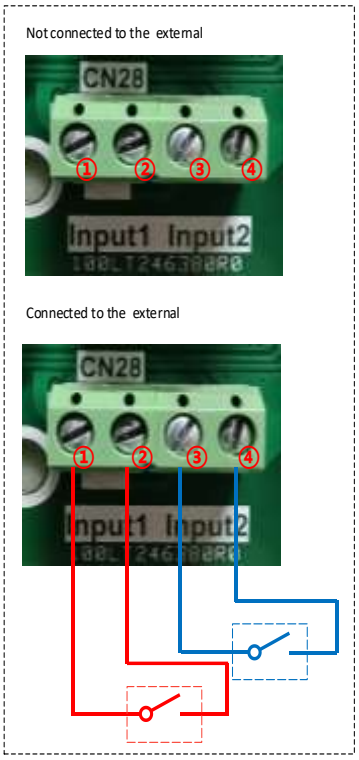
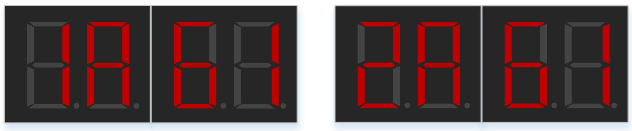


Figure 1

2.2 xA61: No.x slave unit error

2.2.1 Digital display output



2.2.2 Description

- xA61 shows a slave unit error with the ODU address of x (x = 1,2).
- All Outdoor Units stop running
- Error code are displayed only on master unit.

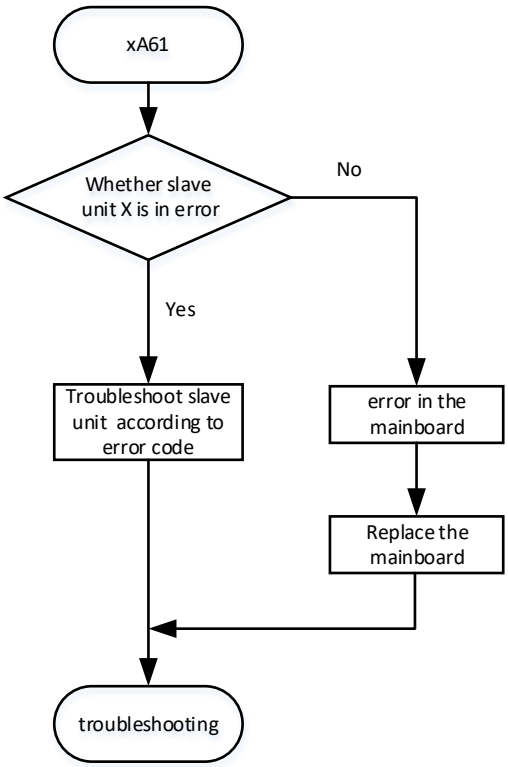
2.2.3 Trigger / recover condition

- Trigger condition: Slave unit is in error.
- Recover condition: Error of slave unit recover
- Reset method: Resume automatically

2.2.4 Possible causes

- Slave unit is in error

2.2.5 Procedure



2.3 AAx: Inverter driver board X does not match the main control board

2.3.1 Digital display output

2.3.2 Description

- No.x Inverter driver board does not match the main control board
- All units stop running.
- Error code is displayed on the unit with the error

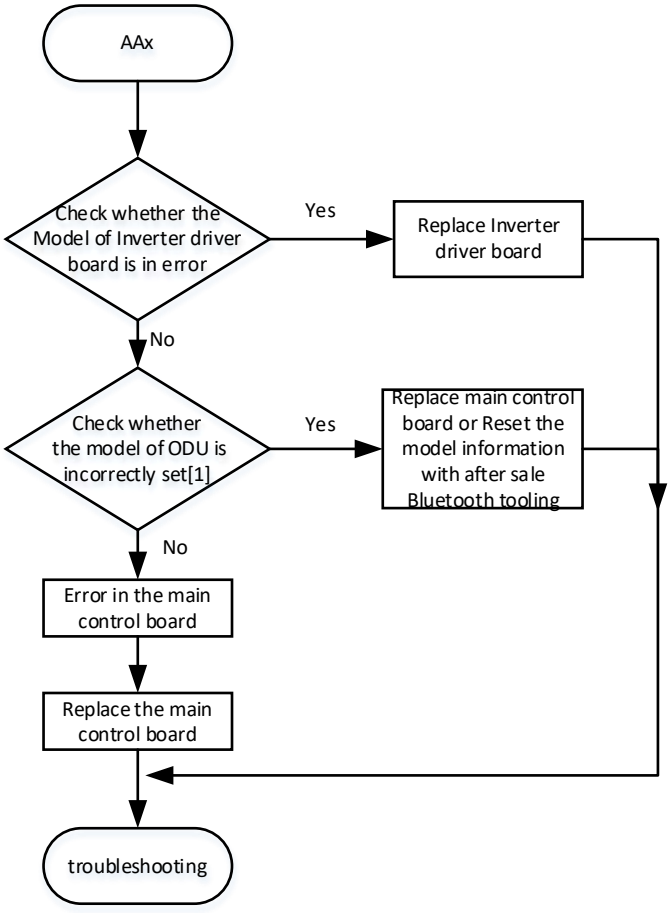
2.3.3 Trigger / recover condition

- Trigger condition: Parameters of the built-in drive in the module board do not match Outdoor Units
- Recover condition: Parameters of the built-in drive in the module board match Outdoor Units
- Reset method: Resume manually

2.3.4 Possible causes

- Model error of Inverter driver board
- The model of Outdoor Unit is incorrectly set.
- Main control board is damaged

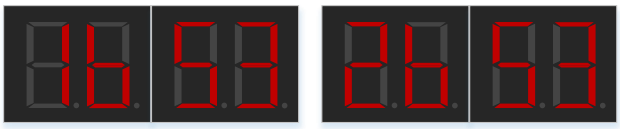
2.3.5 Procedure



Notes:
[1]. Use after-sale Bluetooth tooling connect with outdoor unit can check the model of ODU.

2.4 xb53: No.x Recirculation fan error

2.4.1 Digital display output



2.4.2 Description

- No.x Recirculation Fan[1] is in error
- Unit with the error stop running.
- Error code is displayed on the unit with the error

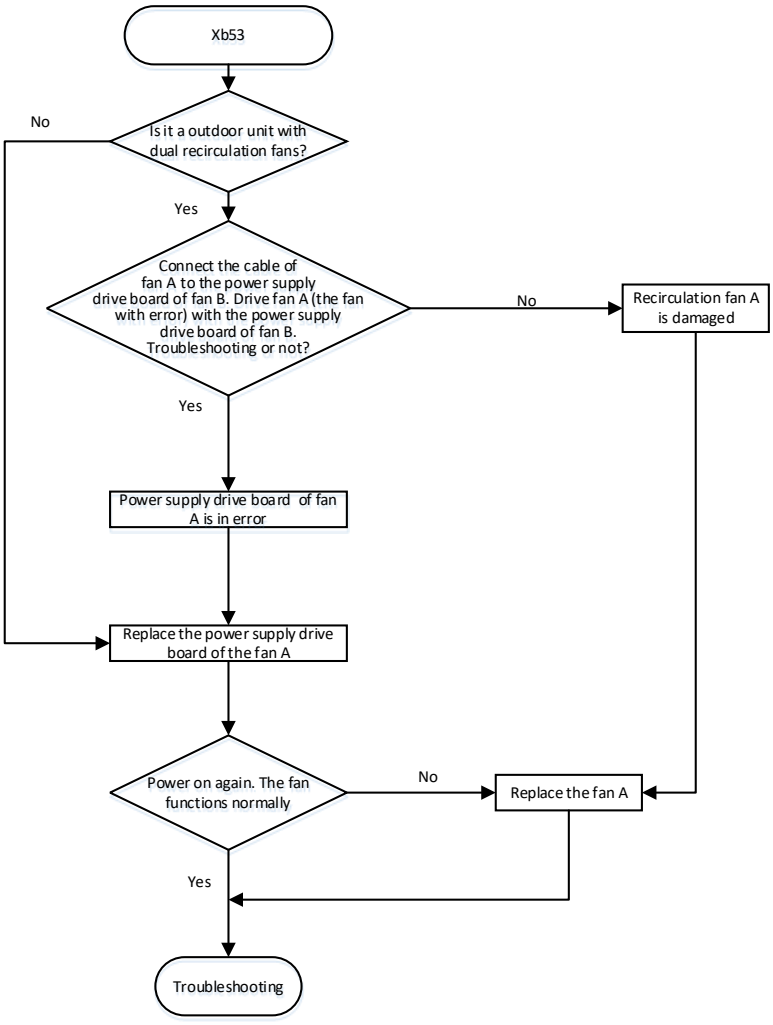
2.4.3 Trigger / recover condition

- Trigger condition: the difference between the actual fan speed and the set fan speed is 300rpm, lasting for 50s.
- Recover condition: the difference between the actual fan speed and the set fan speed is within 300rpm
- Reset method: Rectify the error and power-on again

2.4.4 Possible causes

- The cable connect Recirculation Fan and Recirculation Fan power supply disconnected.
- The Recirculation Fan is damaged
- The Recirculation Fan power supply is damaged
- ODU main control board is damaged

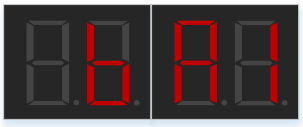
2.4.5 Procedure



Notes:
[1]. The fan runs only when the fan or compressor is running, but does not run in standby mode

2.5 bA1: HyperLink cannot open or close IDU's Electronic expansion valve

2.5.1 Digital display output



2.5.2 Description

- When some IDUs are powered off, HyperLink fail to close their EEV.
- All units stop running.
- Error code is only displayed on the master unit
- Error is generated only under the M1M2 communication protocol.

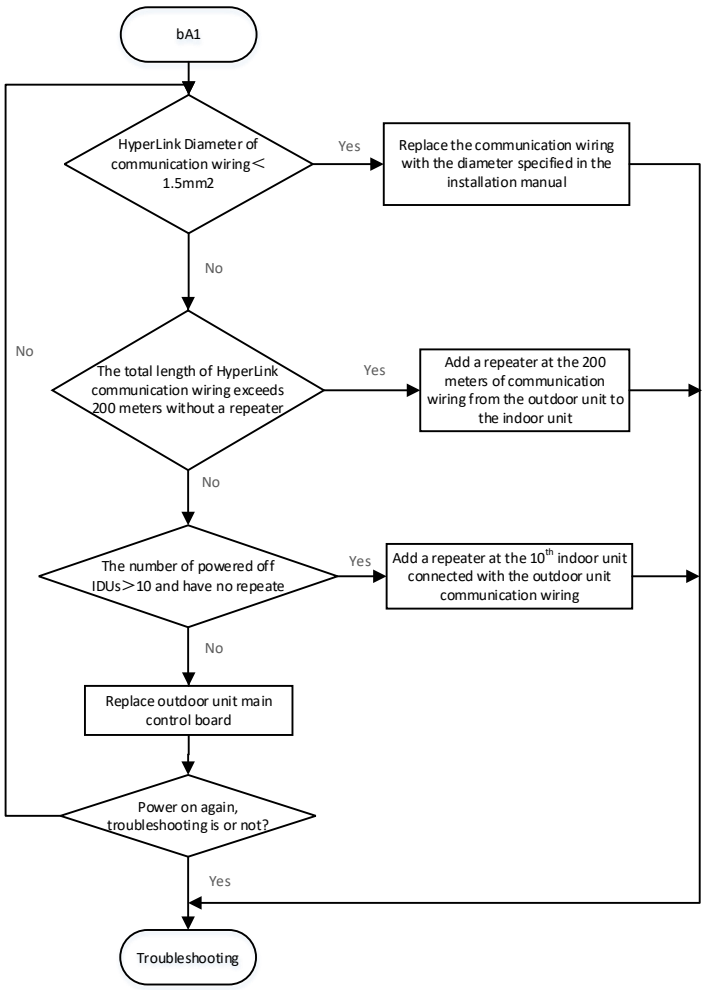
2.5.3 Trigger / recover condition

- Trigger condition:when some IDUs in the system are powered off, HyperLink board voltage＜17V
- Recover condition: HyperLink board voltage＞17V
- Reset method: Resume manually

2.5.4 Possible causes

- HyperLink diameter of communication wiring＜1.5mm^2;
- The total length of HyperLink communication wiring exceeds 200 meters without a repeater;
- The number of powered off IDUs＞10 and have no repeater:
- Indoor main control board is damaged;
- Outdoor main control board is damaged.

2.5.5 Procedure



2.6 1b01/2b01 Disconnection of EEVA/EEVB

2.6.1 Digital display output

2.6.2 Description

- All units stop running
- Error code is displayed on the outdoor unit with the error.

2.6.3 Trigger / recover condition

- Trigger condition: The main control board has not detected signals from the EEV for 2 minutes.
- Recover condition: The main control board detects a signal from the EEV.
- Reset condition: Resume automatically

2.6.4 Possible causes

- EEVA, EEVB is disconnected or loose.
- EEVA, EEVB wiring harness is damaged.
- Outdoor unit main control board is damaged.

2.6.5 Procedure

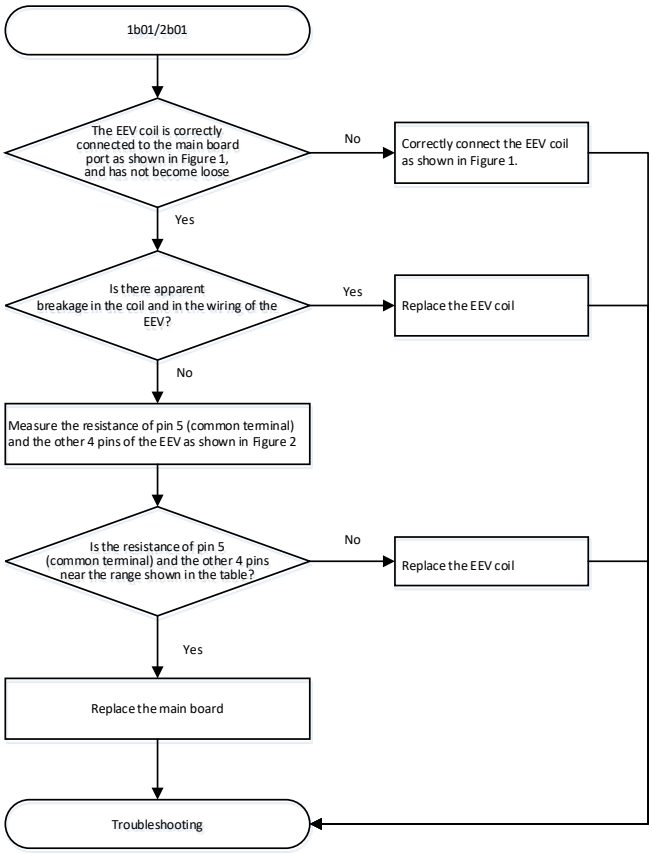
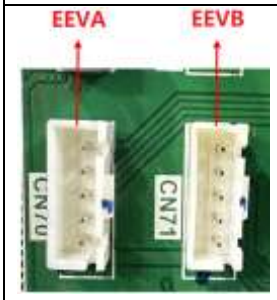
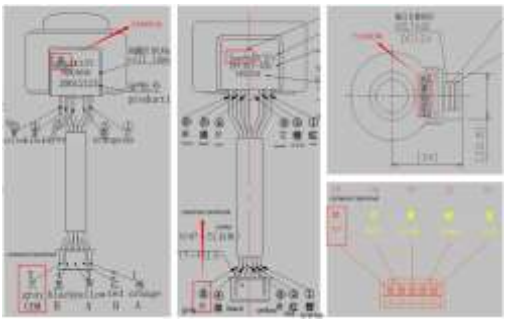


Figure 1 Main boar port



Note: The CN70/71 is in the upper left corner of the main board.

Figure 2 Five pin of EEV



Note: If the EEV coil is SANHUA, pin 5 is gray. If it is Fujikoki, pin 5 is red. Measure the resistance sequentially from pin 5 to the other 4 pins (for SANHUA coils, the sequence is gray-black, gray-yellow, gray-red, and gray-orange.)

Type	Outdoor unit model	Coil Brand	Coil resistance (between the common terminal and the other four pins; ambient temperature: 20°C)
EEVA	8-18HP	SANHUA	46±3.7 Ω
		DUNAN	46±3.7 Ω
	20-42HP	SANHUA	150±15 Ω
		FUJIKOKI	100±10 Ω

2.7 3b01 Disconnection of EEVC

2.7.1 Digital display output

2.7.2 Description

- All units stop running
- Error code is displayed on the outdoor unit with the error.

2.7.3 Trigger / recover condition

- Trigger condition: The main control board has not detected signals from the EEV for 2 minutes.
- Recover condition: The main control board detects a signal from the EEV.
- Reset condition: Resume automatically

2.7.4 Possible causes

- EEVC is disconnected or loose.
- EEVC wiring harness is damaged.
- Outdoor unit main control board is damaged.

2.7.5 Procedure

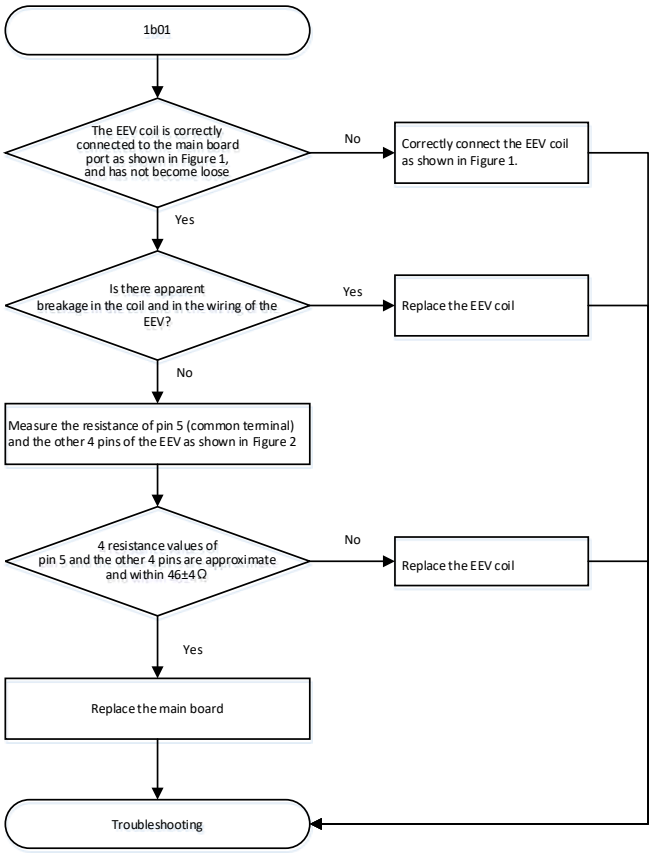
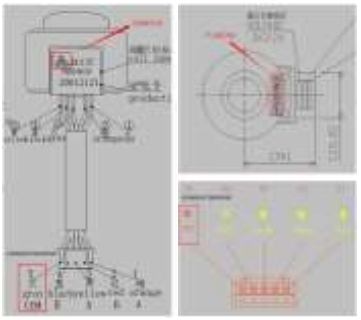


Figure 1 Main boar port

Note: The CN72 is in the upper left corner of the main board.

Figure 2 Five pin of EEV



Note: If the EEV coil is SANHUA, pin 5 is gray. If it is Fujikoki, pin 5 is red. Measure the resistance sequentially from pin 5 to the other 4 pins (for SANHUA coils, the sequence is gray-black, gray-yellow, gray-red, and gray-orange.)

Type	Outdoor unit model	Coil Brand	Coil resistance (between the common terminal and the other four pins; ambient temperature: 20°C)
EEVC	8-42HP	FUJIKOKI	46±4 Ω
		SANHUA	46±3.7 Ω

2.8 C13: The address of Outdoor Unit is repeated

2.8.1 Digital display output

2.8.2 Description

- The address of Outdoor Unit is repeated.
- Error code is displayed on the master outdoor unit.

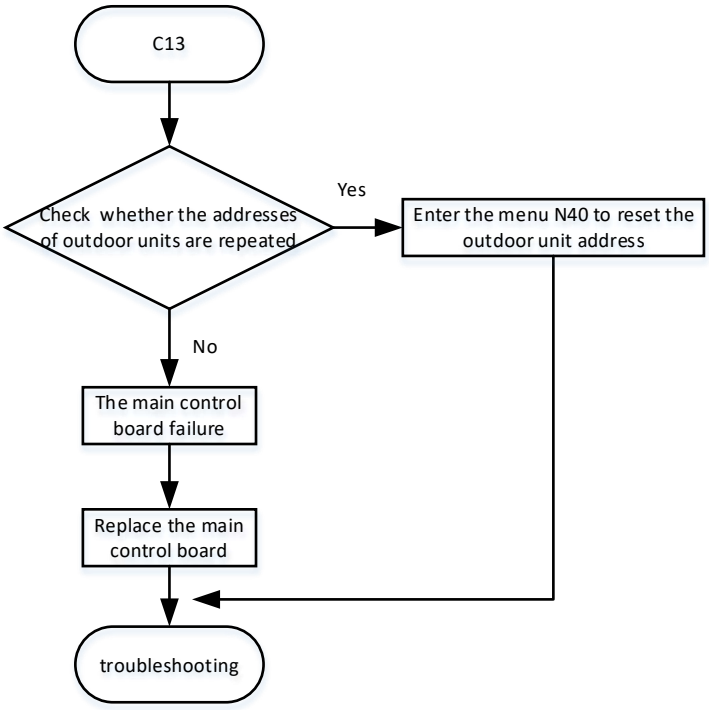
2.8.3 Trigger /recover condition

- Trigger:Two or more outdoor units in the combined system have the same address
- Recover condition: The address of master and slave unit are set to be 0~3 successively
- Reset method: Manually restart

2.8.4 Possible causes

- Two or more outdoor units in the Combined system have the same address
- Damaged outdoor main control board

2.8.5 Procedurem



Notes:

After setting the outdoor unit address, waiting for 30 seconds then, powering off the device, next waiting another 30 seconds, and then powering on the device again. The master address must be set to 0

2.9 C21: Communication error between IDU and ODU.

2.9.1 Digital display output

2.9.2 Description

- Communication error between IDU and ODU
- All units stop running.
- Error code is only displayed on the master unit.

2.9.3 Trigger / recover condition

- Trigger condition: 1. 20 minutes after the outdoor unit is power on,the communication signal from the IDU cannot be received by ODU for two minutes

  2. The IDU is not detected after automatic addressing.
- Recover condition: ODU receives the communication signal from the IDU.
- Reset method: Resume automatically

2.9.4 Possible causes

1. Error caused by communication interfaces and protocols

Table 6.2.1 Communication troubleshooting list:

ODU interface	IDU interface	IDU type	Communication protocol	Digital display output	Solution
PQE	PQE	V8	n45-0, V8 protocol P Q communication	/	/
			n45-1, V6 protocol PQE communication	/	/
			n45-2, V8 HyperLink protocol IDU uniform power supplied	/	It is recommended to be changed to V8 protocol PQ communication (n45-0).
			n45-3, V8 HyperLink protocol IDU separate power supply	/	It is recommended to be changed to V8 protocol PQ communication (n45-0).
M1M2	M1M2	V8	n45-0, V8 protocol P Q communication	C21	Modify the communication protocol. n45-3 is recommended.
			n45-1, V6 protocol PQE communication	C21	Modify the communication protocol. n45-3 is recommended.
			n45-2, V8 HyperLink protocol IDU uniform power supplied	/	/
			n45-3, V8 HyperLink protocol IDU separate power supply	/	/
PQE	PQE	V6	n45-0, V8 protocol P Q communication	C21	Modify the communication protocol. n45-1 is recommended.
			n45-1, V6 protocol PQE communication	/	/
			n45-2, V8 HyperLink protocol IDU uniform power supplied	C21	Modify the communication protocol. n45-1 is recommended.
			n45-3, V8 HyperLink protocol IDU separate power supply	C21	Modify the communication protocol. n45-1 is recommended.
PQE	M1M2	V8	All protocols	C21	It is recommended to connect M1M2 to the ODU port and adopt the n45-3 communication protocol.
M1M2	PQE	V8	All protocols	C21 (the IDU board may be damaged)	It is recommended to connect PQE to the ODU port and adopt the n45-0 communication protocol.
M1M2	PQE	V8 + V6	All protocols	C21 (the IDU board may be damaged)	Connect PQE to the ODU port and adopt the n45-1 communication protocol.
M1M2	PQE + M1M2	V8 + V6	All protocols	C21 (the PQE communication IDU board may be damaged)	Connect PQE to the ODU/IDU port and adopt the n45-1 communication protocol.
PQE	PQE + M1M2	V8 + V6	All protocols	C21	Connect PQE to the ODU/IDU port and adopt the n45-1 communication protocol.

2. Faults caused by other factors

(1) All indoor units are not set address;

(2) All indoor units are not powered on;

(3) The communication wiring between the master unit and the first IDU is not reliably connected:

- The communication wiring between the ODU and the first IDU is not tightened, or the surface contact of the power supply terminal is poor.
- The communication wiring between the ODU and the first IDU is disconnected or short-circuited for some reason.
- In PQ communication, the sequence of PQ and E is incorrect (for example, PEQ or QEP connection).

(4) The main communication wiring is connected to the slave ODU;

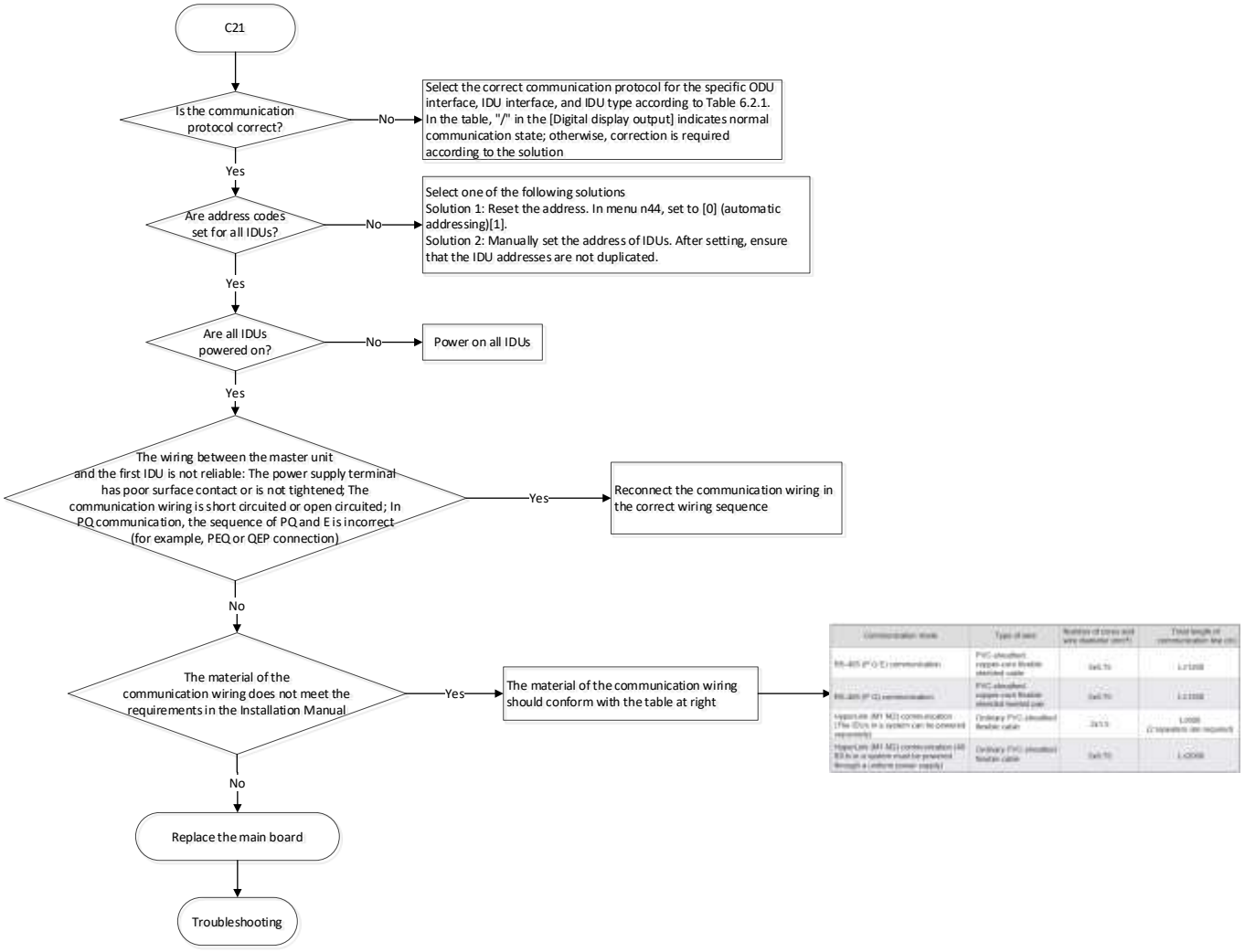
(5) Three-core shielded cable is used or the shielded layer is not grounded in PQ communication;

(6) When the function of IDU separate power supply in M1M2 communication is enabled, the diameter of the communication wiring is less than 1.5mm^2;

(7) The total length of the communication wiring exceeds range requirements: In PQE communication, the total length of the communication wiring (L) is less than or equal to 1200m; in M1M2 communication, the total length of the communication wiring (L) is less than or equal to 2000m. In M1M2 communication when the function of IDU separate power supply is enabled, the total length of the communication wiring (L) is less than or equal to 600m.

(8) The communication wiring is interfered with by a strong electromagnetic wave.

2.9.5 Procedure



Note:

[1] Addressing will last for 10min, during which no operation is allowed.

2.10 C26 Abnormal reduction in the number of indoor units

2.10.1 Digital display output

2.10.2 Description

- The number of online indoor units is smaller than the configured number
- All units stop running.
- Error code is only displayed on the master unit

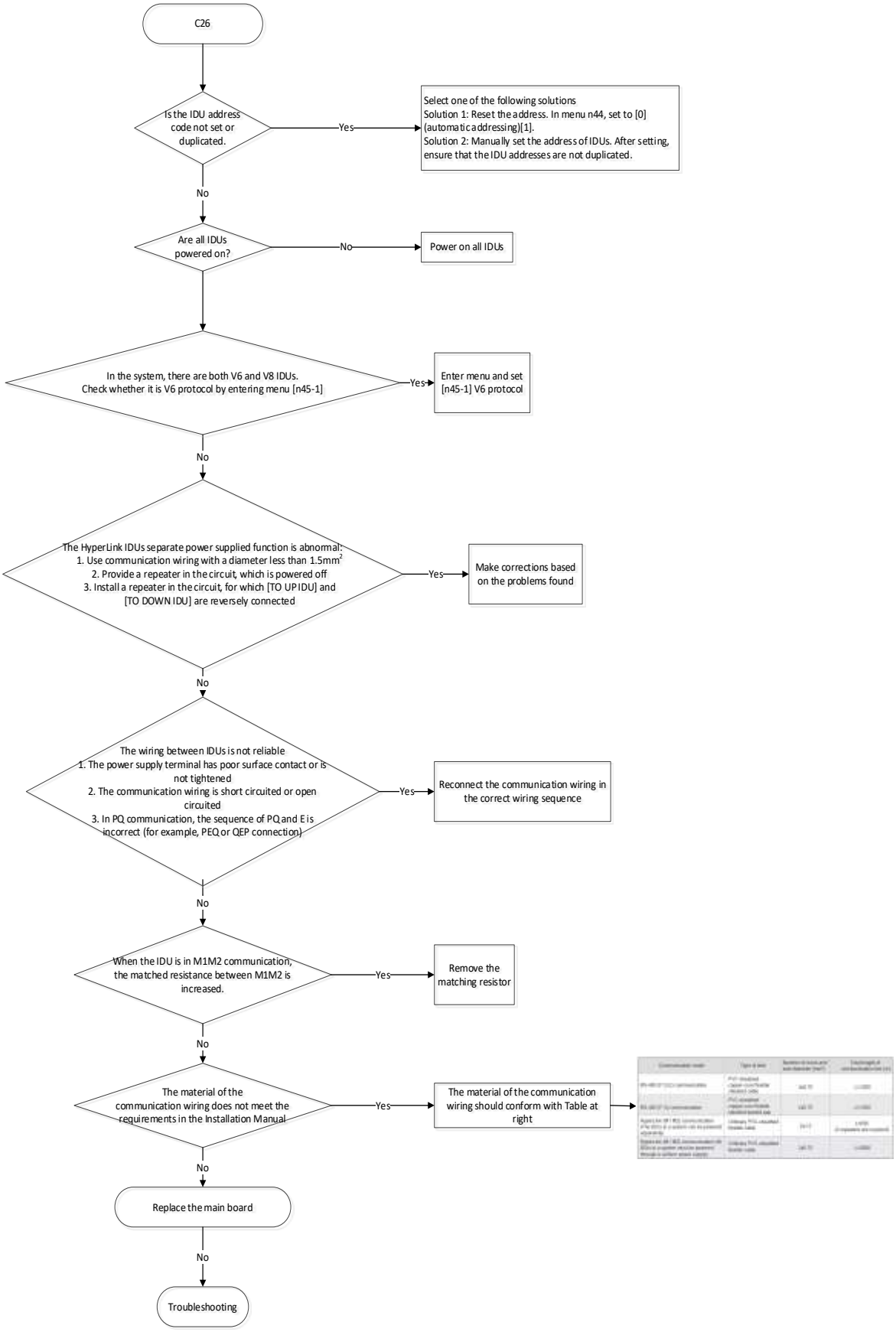
2.10.3 Trigger / recover condition

- Trigger condition: N0: The number of IDU set by ODU; N1: The number of online IDUs.
  1) When the unit is installed and commissioned, enter the number of IDUs (N0). The number of IDUs detected by the system is N1. If N1 < N0 lasts for 2min at any time, C26 is reported.
  2) If the number of IDUs (N1) detected within 20 min of initial power-on is less than the set number (N0), the outdoor unit does not start up (except for the quick check or service mode), but no error is reported. After 20 min, C26 is reported.
- Recover condition:
  N1 = N0 for 60 seconds
- Reset method: Resume automatically

2.10.4 Possible causes

- The IDU address code is not set or is duplicated.
- The IDU is not powered on or the power supply cable is incorrectly connected.
- In the system, there are V6 IDUs but the V6 protocol has not been set.
- When adopting the function of IDU separate power supply enabled in HyperLink communication, the communication wiring is improperly installed:
  When adopting the function of IDU separate power supply enabled in HyperLink communication with a repeater, the repeater is powered off;
  When adopting the function of IDU separate power supply enabled in HyperLink communication with a repeater, the repeater is incorrectly wired;
  The diameter of the communication wiring is less than 1.5mm^2.
- The IDU communication wiring is incorrectly connected:
  The communication wiring is not tightened or there is poor surface contact with the power supply terminal.
  The communication wiring is open-circuited or short-circuited for a certain reason.
  In PQ communication, the communication wiring is not connected in chain or the sequence of PQ and E is incorrect (for example, PEQ or QEP connection).
- When the IDU is in M1M2 communication, the matched resistance between M1M2 is increased.
- The material of the communication wiring does not meet requirements:
  Three-core shielded cable is used or the shielded layer is not grounded in PQ communication;
  The total length of the communication wiring exceeds range requirements: In PQE communication, the total length of the communication wiring (L) is less than or equal to 1200m; in M1M2 communication, the total length of the communication wiring (L) is less than or equal to 2000m. In M1M2 communication when the function of IDU separate power supply is enabled, the total length of the communication wiring (L) is less than or equal to 600m.
- The set number of IDUs does not match the actual number of IDUs.
- The communication wiring is interfered with by a strong electromagnetic wave.
- The IDU's main control board is damaged.

2.10.5 Procedure



Note:

[1] Addressing will last for 10min, during which no operation is allowed.

2.11 C28: Abnormal increase in the number of indoor units

2.11.1 Digital display output

2.11.2 Description

- The number of online indoor units is greater than the configured number
- All units stop running.
- Error code is only displayed on the master unit

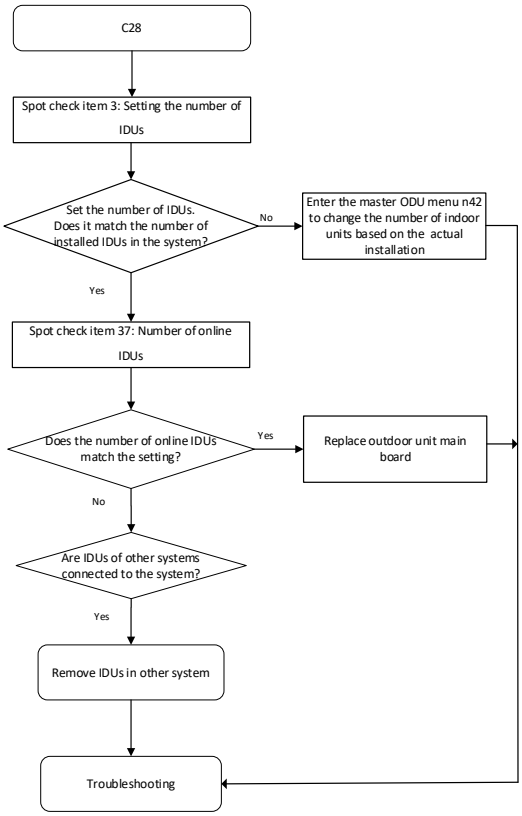
2.11.3 Trigger / recover condition

- Trigger condition: N0: The number of IDU set by ODU; N1: The number of online machines.
  1) When the unit is installed and commissioned, enter the number of IDUs (N0). The number of IDUs detected by the system is N1. If N1>N0 lasts for 2min at any time, C28 is reported.
  2) If the number of IDUs (N1) detected within 20 min of initial power-on is greater than the set number (N0), the outdoor unit does not start up (except for the quick check or service mode), but no error is reported. After 20 min, C26 is reported.
- Recover condition:
  N1 = N0 for 60 seconds
- Reset method: Resume automatically.

2.11.4 Possible causes

- The set number of IDUs is inconsistent with the number of IDUs installed in the system.
- The IDUs of other systems are connected to the system.
- The IDU communication wiring of the system (A) and system B are reversely connected, and the total number of IDUs of system B is greater than that of system A.

2.11.5 Procedure



Note:
[1] Check the Number of indoor units (set by master unit) refer to the *Part 4 - 4.4.1*

2.12 xC31: Communication error between No.x slave outdoor unit and master outduoor unit.

2.12.1 Digital display output

2.12.2 Description

- The No.x outdoor slave unit cannot communicate with the outdoor master unit.
- Outdoor units that display the error code stop running.
- Error code is only displayed on the slave unit with the error.

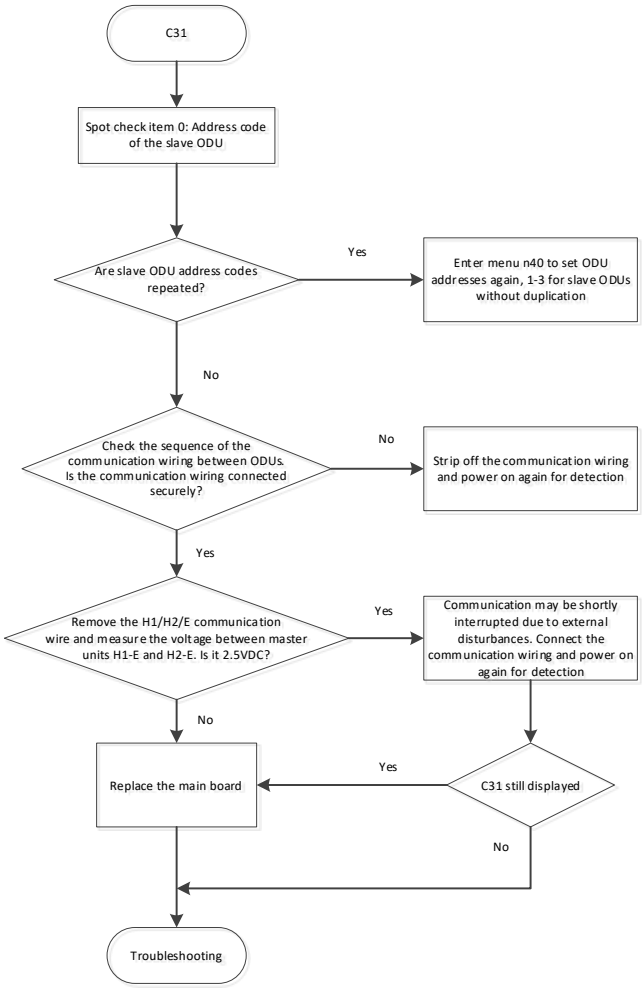
2.12.3 Trigger / recover condition

- Trigger condition:The communication between the slave unit and the master unit of the combined system is interrupted for more than 2 minute
- Recover condition:The communication between the slave unit and the master unit of the combined system is recovered
- Reset method:Power off the unit for 30s and then power it on again

2.12.4 Possible causes

- The address of slave outdoor unit is repeated.
- The communication wiring is not tightened or there is poor surface contact with the power supply terminal.
- The communication wiring between the master unit and the slave unit is disconnected.
- The main board of the slave outdoor unit is damaged.

2.12.5 Procedure



2.13 C32: Abnormal reduction in the number of outdoor units

2.13.1 Digital display output

2.13.2 Description

- The number of online slave outdoor units detected by the master outdoor unit decreases
- All units stop running.
- Error code is only displayed on the master unit

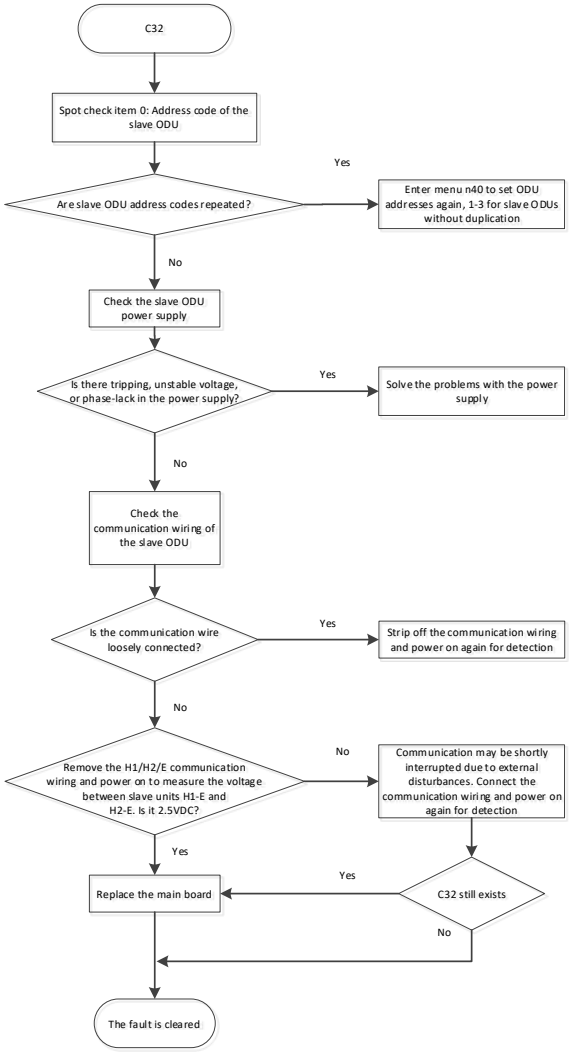
2.13.3 Trigger / recover condition

- Trigger condition:The number of online outdoor slave units detected by the outdoor master unit decreases
- Recover condition: The number of outdoor units online restored to actual connections
- Reset method: Resume automatically

2.13.4 Possible causes

- Some outdoor slave units are powered off
- The slave outdoor units' address are repeated
- The communication wiring between the master and slave units is disconnected, the communication wiring of the ODU has poor contact
- Outdoor main control board is damaged

2.13.5 Procedure



2.14 C33: Abnormal increase in the number of outdoor units

2.14.1 Digital display output

2.14.2 Description

- The number of online outdoor slave units detected by the outdoor master unit increases
- All units stop running.
- Error code is only displayed on the master unit

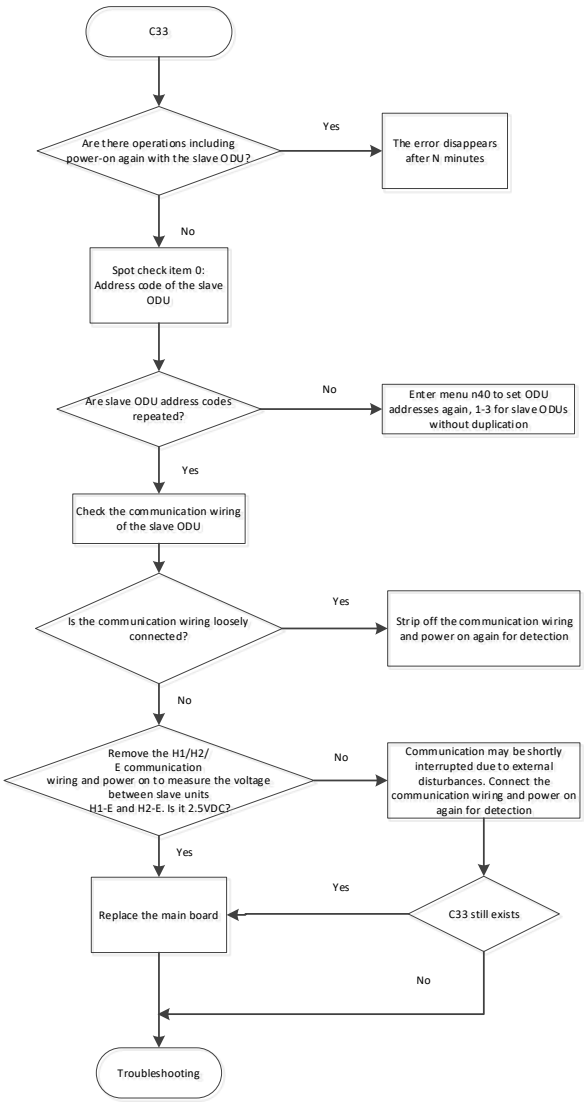
2.14.3 Trigger / recover condition

- Trigger condition:One or more slave Outdoor unit is newly connected during system operation
- Recover condition: Number of outdoor units online restored to actual connections
- Reset method: Resume manually

2.14.4 Possible causes

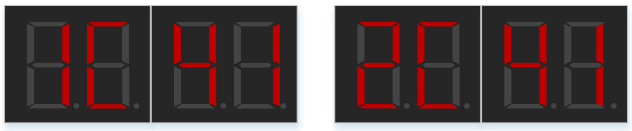
- An additional new ODU is connected to a combined system.
- The address of the slave ODU is corrected after a fault of ODU address setting occurs.
- The address of the slave ODU is repeated.
- Communication is interrupted due to poor contact of the slave ODU communication wiring.

2.14.5 Procedure



2.15 xC41: Communication Error between main control board and No.x inverter driver board

2.15.1 Digital display output



2.15.2 Description

- The communication between the main control board and No.x inverter driver board is error
- All units stop running.
- Error code is displayed on the unit with the error

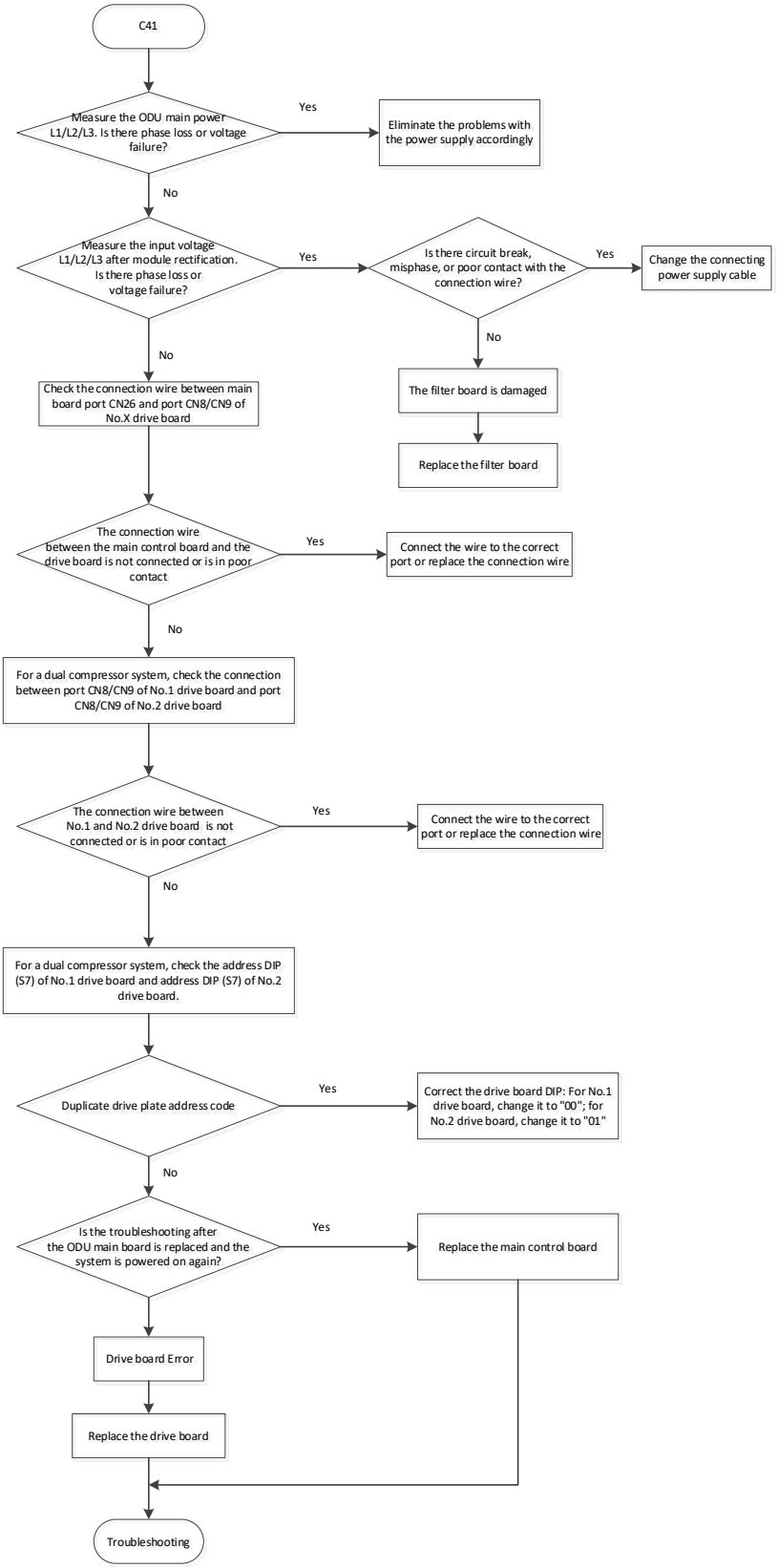
2.15.3 Trigger / recover condition

- Trigger condition: Communication between main control board and No.x inverter driver board is interrupted for more than 2 minutes
- Recover condition:Communication between the main control board and No.x inverter driver board is restored
- Reset method: Resume automatically.

2.15.4 Possible causes

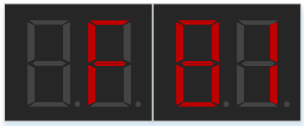
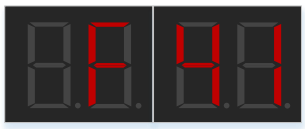
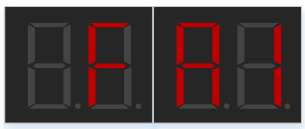
- The connection wire between port CN8/CN9 of No. x drive board and port CN26 of the ODU main control board is poorly connected or disconnected.
- In a dual-compressor system, the connection wire between port CN8 of No. 1 drive board and port CN9 of No. 2 drive board is poorly connected or disconnected.
- In a dual-compressor system, the address of DIP switch S7 of No. 1 drive board and that of DIP switch S7 of No. 2 drive board are duplicate (the correct addresses are: "00"  for No. 1 drive board and "01"  for No. 2 drive board).
- The main power has L1/L2/L3 misphase or abnormal voltage.
- The filter board is damaged.
- No. x inverter drive board is damaged.
- The ODU main control board is damaged

2.15.5 Procedure



2.16 E41,F31,F41,F51,xF71,F81,F91,FA1,FC1,xFd1,Fp1: Temperature sensor error

2.16.1 Digital display output

Error code	Error description	Remarks	Digital display output
E41	Outdoor ambient temperature sensor (**T4**) error(open/short)	sensor error	
F81	Gas pipe temperature sensor (**Tg**) error (open/short)	sensor error	
FC1	Outdoor heat exchanger liquid temperature sensor (**TL**) error (open/short)	sensor error	
Fp1	Electric control box chamber temperature sensor (**Tb**) error (open/short)	sensor error	
F31	Microchannel heat exchanger outlet temperature sensor(**T6B**) error(open/short)	sensor error	
F41	Main heat exchanger pipe temperature sensor (**T3**) error(open/short)	sensor error	
F51	Microchannel heat exchanger inlet temperature sensor(**T6A**) error(open/short)	sensor error	
F91	Liquid pipe temperature sensor (**T5**) error (open/short)	sensor error	
FA1	Outdoor heat exchanger inlet temperature sensor (**T8**) error (open/short)	sensor error	
xFd1	Compressor suction temperature sensor (**T71/T72**) error (open/short)	sensor error	
xF71	Discharge temperature sensor(**T7C1/T7C2**) error (open/short)	sensor error	

2.16.2 Description

- Temperature sensor error
- All units stop running.
- Error code is displayed on the unit with the error

2.16.3 Trigger / recover condition

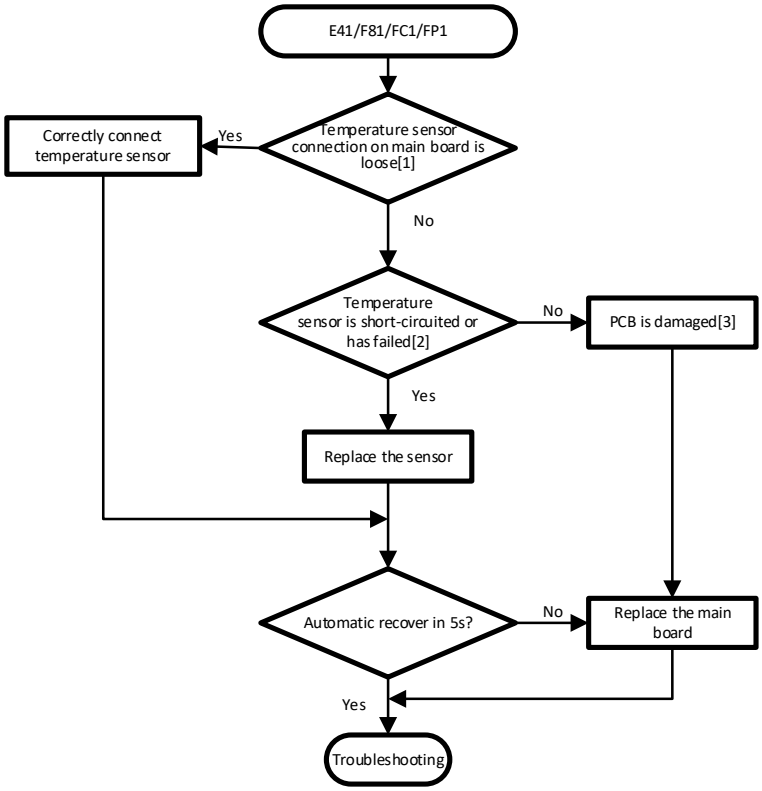
- Trigger condition:The main control board cannot obtain the normal AD value of the temperature sensor
- Recover condition:The main control board obtain the normal AD value of the temperature sensor
- Reset method: Resume automatically.

2.16.4 Possible causes

- The temperature sensor is not properly connected to the main control board.
- The sensor is short-circuited or fails.
- The main control board is damaged

2.16.5 Procedure

1. E41/F81/FC1/FP1



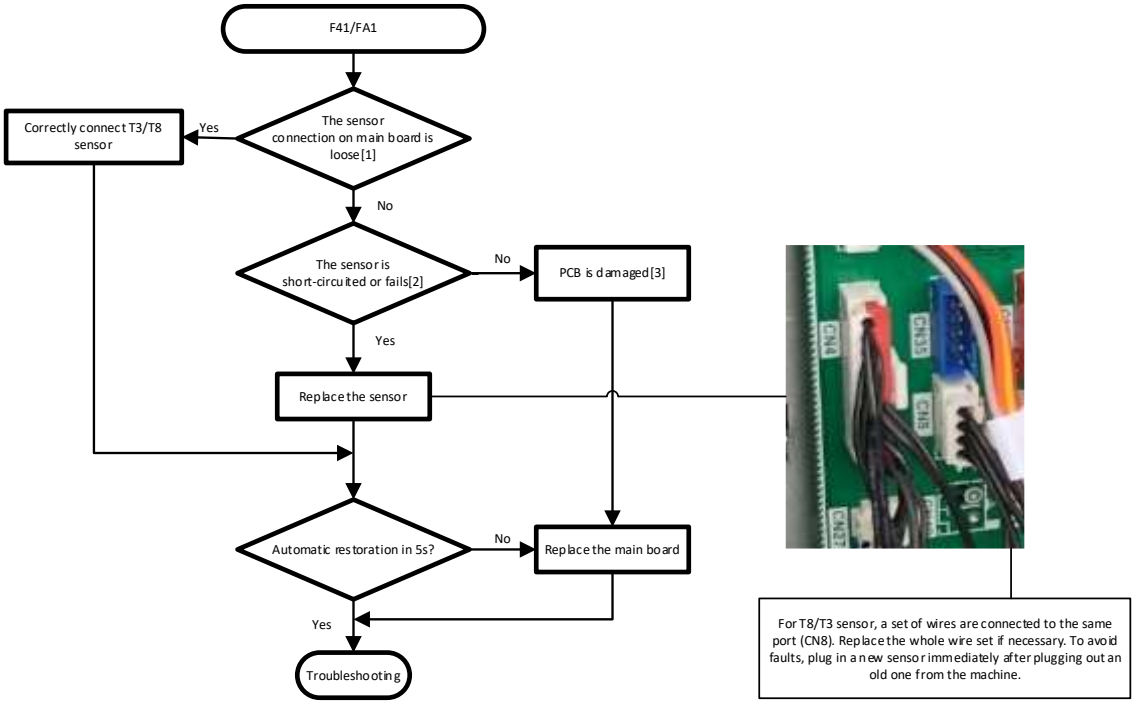
Notes:

[1].The port CN30 (T4), CN16 (Tg), CN3 (TL) and CN11 (Tb) on the main control board corresponding to the Temperature sensor refer to *Table5.2.1: Main Control Board port*.

[2].Measure sensor resistance. Removing the sensor and Use a multimeter to measure the sensor access resistance: If the resistance value is smaller than 0.5 kΩ, the sensor is short-circuited, whereas, if the impedance is very higher than 380 kΩ, the sensor is open-circuited (Refer to *Table 6.5.2: Temperature sensor temperature resistance characteristic table*)

[3]. Measure the voltage of the port CN30 (T4), CN16 (Tg), CN3 (TL) and CN11 (Tb) on main control board. If the sensor resistance is normal, then use a multimeter to measure the port voltage: If the port voltage is not 3.3V with main control board is powered on, the main control board is damaged and needs to be replaced.

2. F41/FA1



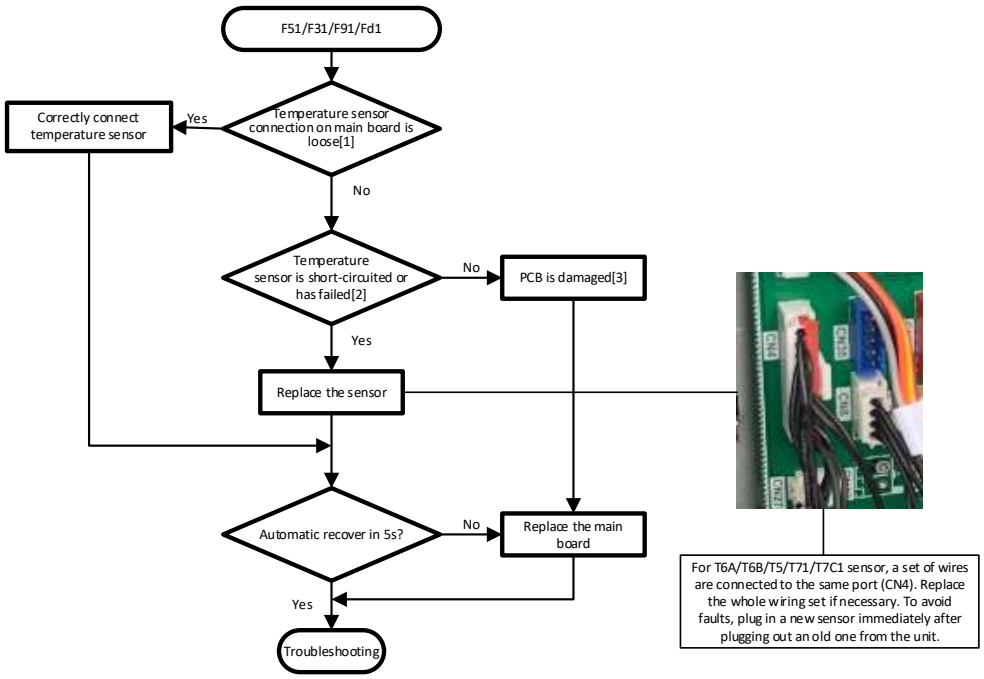
Notes:

[1].The port CN8 (T3/T8) on the main control board corresponding to the Temperature sensor refer to *Table5.2.1: Main Control Board port*.

[2].Measure sensor resistance. Removing the sensor and Use a multimeter to measure the sensor access resistance: If the resistance value is smaller than 0.5 kΩ, the sensor is short-circuited, whereas, if the impedance is very higher than 380 kΩ, the sensor is open-circuited (Refer to *Table 6.5.2: Temperature sensor temperature resistance characteristic table*)

[3]. Measure the voltage of the port CN8 (T3/T8) on main control board. If the sensor resistance is normal, then use a multimeter to measure the port voltage: If the port voltage is not 3.3V with main control board is powered on, the main control board is damaged and needs to be replaced

3. F51/F31/F91/Fd1



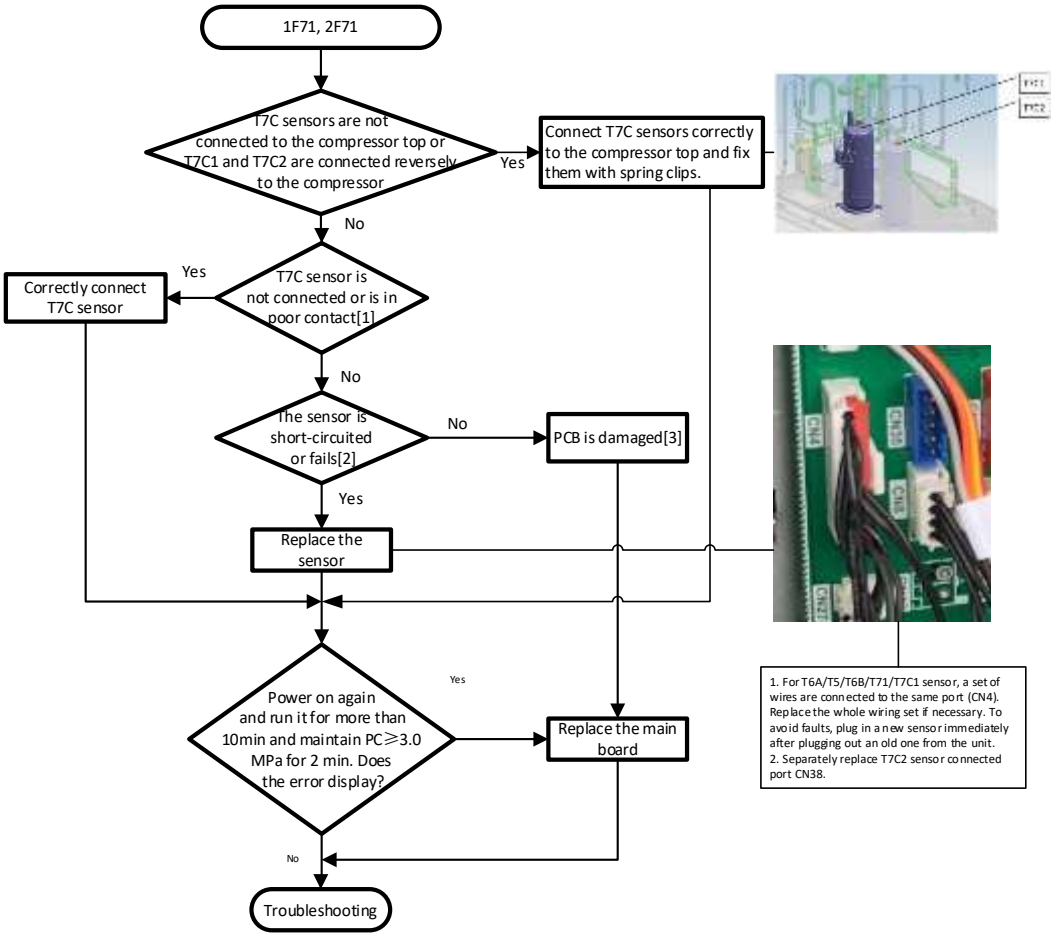
Notes:

[1].The port CN4 (T6A, T6B, T5, T71) on the main control board corresponding to the Temperature sensor refer to *Table5.2.1: Main Control Board port*.

[2].Measure sensor resistance. Removing the sensor and Use a multimeter to measure the sensor access resistance: If the resistance value is smaller than 0.5 kΩ, the sensor is short-circuited, whereas, if the impedance is very higher than 380 kΩ, the sensor is open-circuited (Refer to *Table 6.5.2: Temperature sensor temperature resistance characteristic table*)

[3]. Measure the voltage of the port CN4 (T6A, T6B, T5, T71) on main control board. If the sensor resistance is normal, then use a multimeter to measure the port voltage: If the port voltage is not 3.3V with main control board is powered on, the main control board is damaged and needs to be replaced

4. xF71



Notes:

[1].The port CN4 pin (T7C1) on the main control board and port CN38 (T7C2) on the main control board corresponding to the Temperature sensor refer to *Table5.2.1: Main Control Board port*.

[2].Measure sensor resistance. Removing the sensor and Use a multimeter to measure the sensor access resistance: If the resistance value is smaller than 0.97 kΩ, the sensor is short-circuited, whereas, if the impedance is very higher than 743 kΩ, the sensor is open-circuited (Refer to *Table 6.5.2: Temperature sensor temperature resistance characteristic table*)

[3]. Measure the voltage of the port CN4 (T6A, T6B, T5, T71) on main control board. If the sensor resistance is normal, then use a multimeter to measure the port voltage: If the port voltage is not 3.3V with main control board is powered on, the main control board is damaged and needs to be replaced

2.17 F62, F6A: Tf/Ntc radiator overtemperature protection

2.17.1 Digital display output

2.17.2 Description

- The temperature of the Tf/Ntc radiator is too high.
- All units stop running
- Error code is displayed on the outdoor unit with the Error

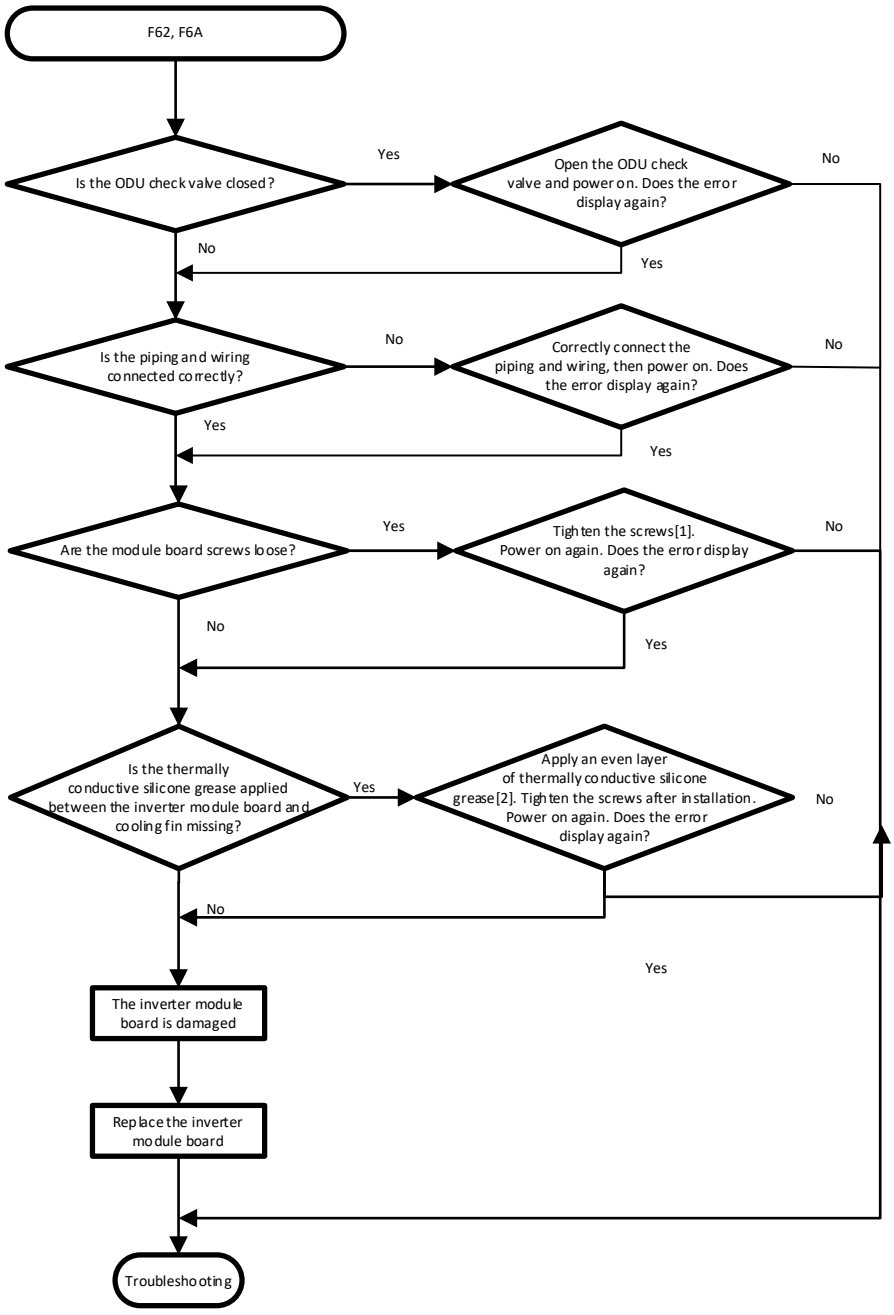
2.17.3 Trigger/ Recover condition

- Trigger condition:
  F62: The temperature of the internal NTC of the compressor module board or fan module is higher than 100°C.
  F6A: F62 protection occurs 3 times in 100 min.
- Recover condition: The temperature of the internal NTC of the compressor module board or fan module is lower than 80°C.
- Reset method:
  F62: Resume automatically
  F6A: Manually restart

2.17.4 Possible causes

- The contact between the inverter drive module and radiator is poor.
- Thermally conductive silicone grease layer is missing.
- Inverter driver board is damaged
- The ODU check valve is not opened.
- Piping and wiring are inconsistent. For example, the piping for system A is connected to system A and the communication wiring is connected to system B.

2.17.5 Procedure



Notes:

[1]. Reinstall the Inverter driver board refer to **Part 5-3.5** The installation guide of Compressor & Fan drive board

[2]. The thermally conductive silicone grease layer is applied between the module board and radiator, about 0.2mm thick. If the thermally conductive silicone grease layer has deteriorated, this will cause poor radiation effect. It needs to be removed and re-applied.

2.18 F63: Non-inductive resistance Tr overtemperature protection

2.18.1 Digital display output

2.18.2 Description

- The temperature of the Tr non-inductive resistance NTC is too high.
- All units stop running
- Error code is displayed on the outdoor unit with the Error

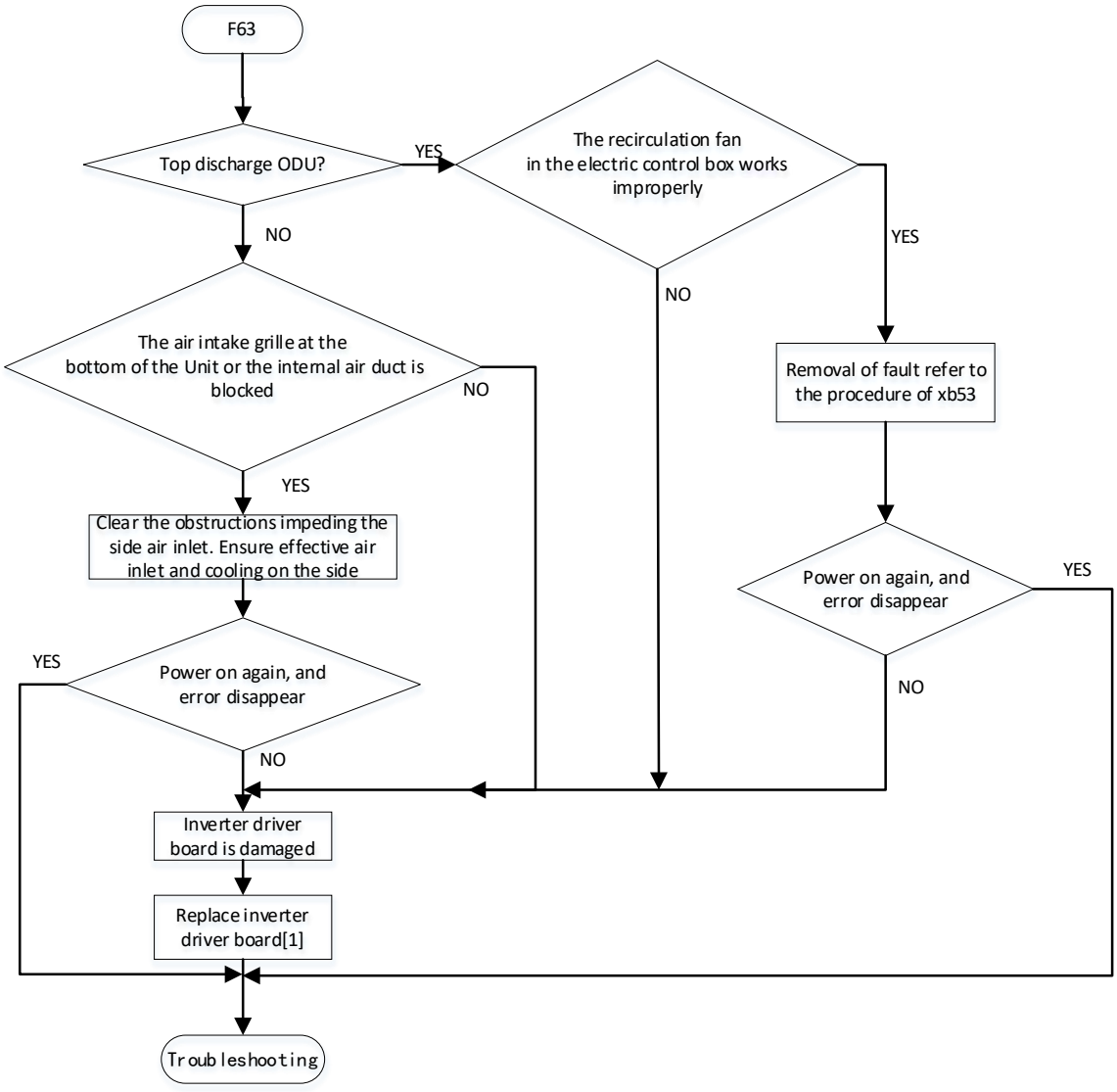
2.18.3 Trigger/ Recover condition

- Trigger condition: The non-inductive resistance temperature exceeds 95 ° C
- Recover condition: The non-inductive resistance temperature is lower than 70 ° C
- Reset method: Resume automatically

2.18.4 Possible causes

- The recirculation fan in the electric control box works improperly(Top Flow Series)
- The air intake grille at the bottom of the machine or the internal air duct is blocked(Side Flow Series)
- Inverter driver board is damaged

2.18.5 Procedure



Notes:

[1]. Reinstall the Inverter driver board refer to **Part 5**-*3.5 The installation guide of Compressor & Fan drive board*

2.19 F72, F7A: Discharge Temperature protection

2.19.1 Digital display output

2.19.2 Description

- Discharge Temperature is over the limit.
- All outdoor Unit stop running
- Error code is displayed on the unit with the error

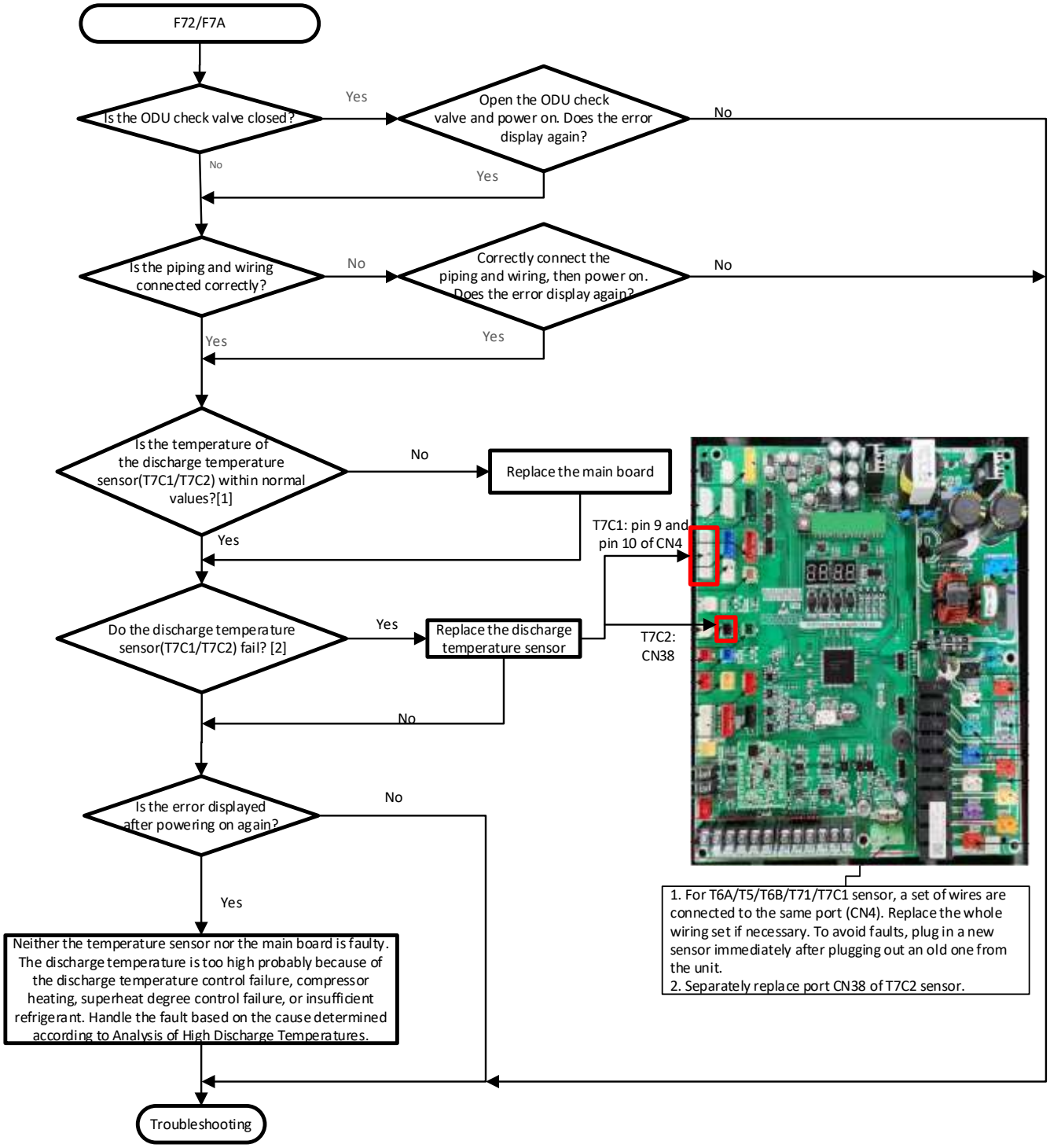
2.19.3 Trigger / Recover condition

- Trigger condition:
  F72: Discharge Temperature (T7C1/T7C2) ≥ 115°C.
  F7A:F72 protection occurs 3 times in 100 minutes
- Recover condition: Discharge Temperature (T7C1/T7C2) < 90 °C.
- Reset method:
  F72: Resume automatically
  F7A: Manually restart

2.19.4 Possible causes

- The ODU check valve is not opened.
- Piping and wiring are inconsistent. For example, the piping for system A is connected to system A and the communication wiring is connected to system B.
- The discharge temperature sensor (T7C1/T7C2) has failed.
- The main board PCB is damaged.
- The system has insufficient refrigerant, SV7 has seized and cannot be opened, the ODU or IDU EEV cannot be opened normally, or the ODU check valve is not opened.

2.19.5 Procdure



Notes:

[1]. Connect 10K resistor to pin 9 and pin 10 of CN4, Spot check item 19: If the discharge temperature of T7C1 is not within 69±5°C, the main board failure, should replace the main board; Connect 10K resistor to CN38, Spot check item 20: If the temperature of T7C2 is not within 69±5°C. (Not required for a single compressor system)

[2]. Pull T7C1 and T7C2 sensors out of the compressor and let them rest in the air for 5min. Spot-check the difference between item 19 (T7C1 temperature) and item 20 (T7C2) temperature (not required for a single compressor system) and item 15 (ambient temperature T4). If the difference is greater than 5°C, the sensor has failed.

2.20 F75: Compressor discharge insufficient superheat protection

2.20.1 Digital display output

2.20.2 Description

- Superheat degree of compressor discharge temperature is too low, triggering protection shutdown
- Determination during operation of outdoor unit.
- All units stop running.
- The error code is displayed on the outdoor unit with error.

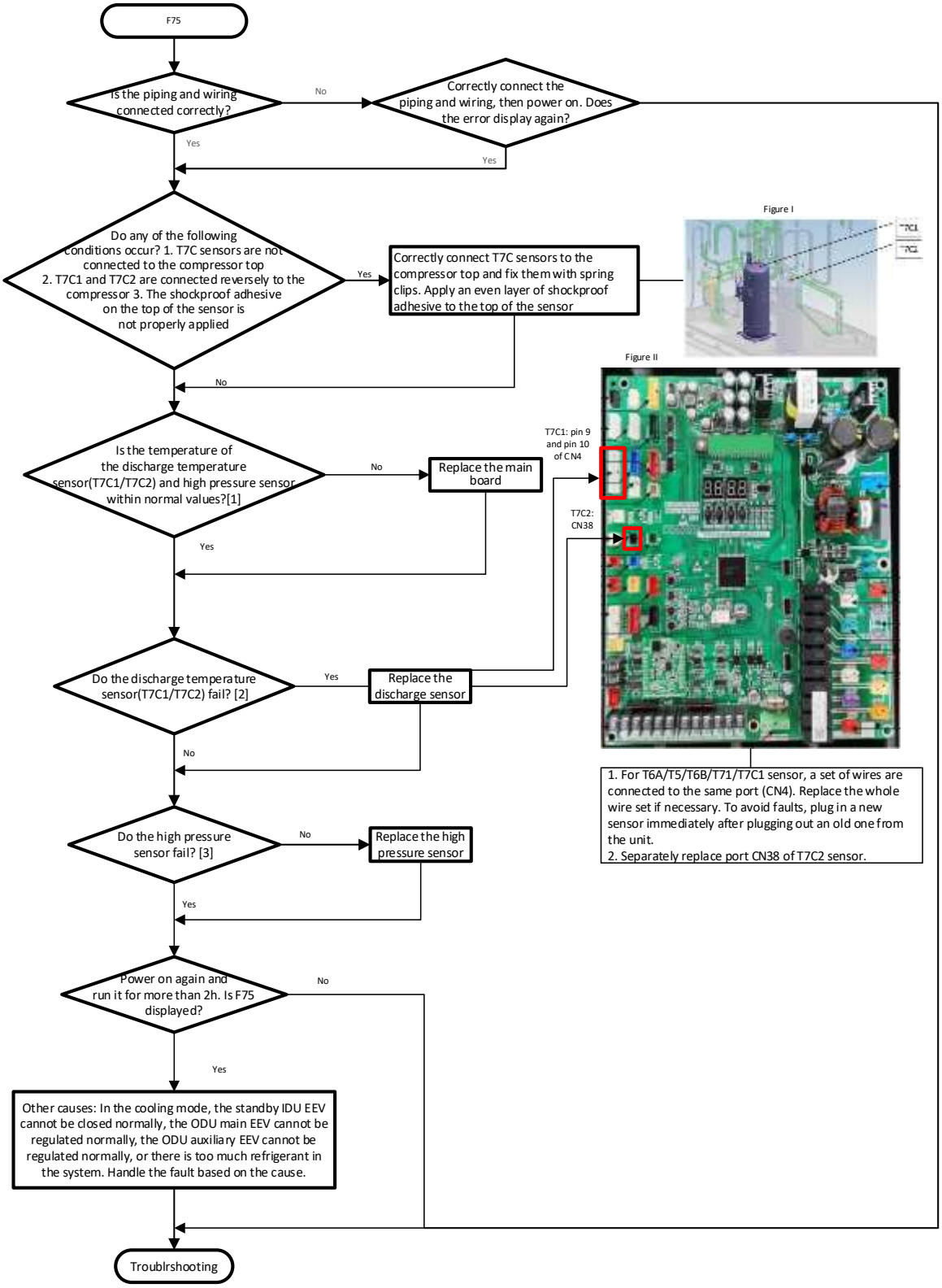
2.20.3 Trigger / recover condition

- Trigger condition: During the system operation, the discharge superheat of the compressor is lower than 6 ° C and lasts for more than 90 minutes
- Recover condition: Resume automatically after 30 seconds of downtime
- Reset method: Resume automatically

2.20.4 Possible causes

- Piping and wiring are inconsistent. For example, the piping for system A is connected to system A and the communication wiring is connected to system B.
- The discharge temperature sensor is not correctly connected or has failed.
- The high pressure sensor is not correctly connected or has failed.
- The ODU main board is damaged.
- Certain IDU EEVs that are not opened in the cooling mode are not closed properly.
- The ODU main EEV cannot be adjusted normally.
- The ODU auxiliary EEV cannot be adjusted normally.
- There is too much refrigerant in the system.

2.20.5 Procedure



Notes:

[1]. Connect 10K resistor to pin 9 and pin 10 of CN4, Spot check item 19: If the discharge temperature of T7C1 is not within 69±5°C, the main board failure, should replace the main board; Connect 10K resistor to CN38, Spot check item 20: If the temperature of T7C2 is not within 69±5°C, the main board failure, should replace the main board. (Not required for a single compressor system); Connect 10K resistor to pin 2 and pin 3 of CN40. Spot check item 35: If the high pressure is not within 3.73±0.2 MPa, the main board failure, should replace the main board

[2]. Pull T7C1 and T7C2 sensors out of the compressor and let them rest in the air for 5min. Spot-check the difference between item 19 (T7C1 temperature) and item 20 (T7C2) temperature (not required for a single compressor system) and item 15 (ambient temperature T4). If the difference is greater than 5°C, the sensor has failed.

[3]. Enter the MENU vacuum mode (n15) after power off. After 5min, spot-check item 35 (HP pressure) and item 36 (LP pressure); If the P_{HP}-P_{LP} ＞ 0.2MPa, the high pressure sensor failure, should replace the high pressure sensor.

2.21 P11: High pressure sensor error

2.21.1 Digital display output

2.21.2 Description

- Open/short circuit error of high pressure sensor
- All units stop running.
- The error code is displayed on the Outdoor Unit with error.

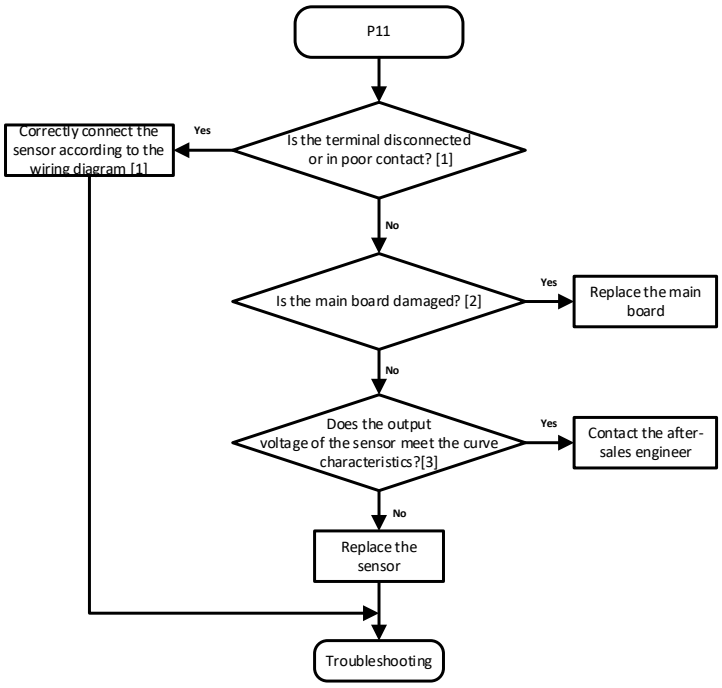
2.21.3 Trigger / recover condition

- Trigger condition: The high pressure sensor is open-circuited (the output voltage is 0V) or short-circuited.
- Recover condition: The voltage detected by the pressure sensor is within 0-5.0V.
- Reset method: Resume automatically.

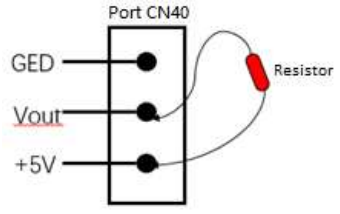
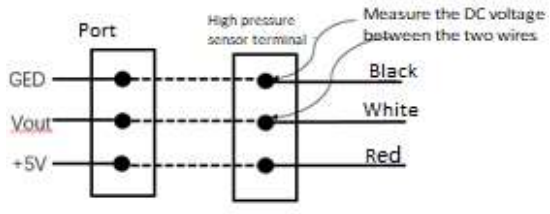
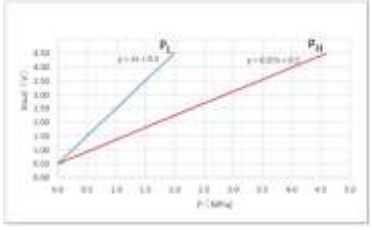
2.21.4 Possible causes

- The high pressure sensor is not properly connected to the main control board, or it fails.
- The main control board is damaged

2.21.5 Procedure

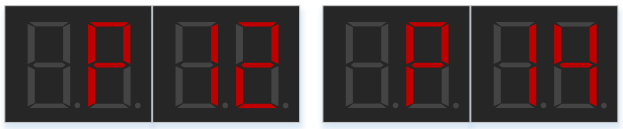


Notes:
[1]. The ports on the main control board corresponding to the high pressure sensor are CN40; ensure that the sensor port is free of contaminants such as water.
[2] How to determine main board failure: The unit is powered on and in standby, the sensor is unplugged. Connect 10K resistor to the two pin holes under port CN40 of the main board, as shown in Figure 1. Observe whether P11 disappears. The main board is normal if the error disappears; otherwise, the main board is damaged.
[3] Measure the output voltage of a sensor as shown in Figure 2. The relationship between HP pressure and output voltage characteristics as shown in Figure 3.

Figure 1: Resistor connection method	Figure 2: Measure the output voltage of a sensor	Figure 3: High pressure and output voltage characteristics
		

2.22 P12/P14: High pressure protection

2.22.1 Digital display output



2.22.2 Description

- P12: The high pressure is over the limit.
- P14: 3 times P12 in 100 minutes
- All units stop running
- Error code is displayed on the unit with the Error

2.22.3 Trigger / recover condition

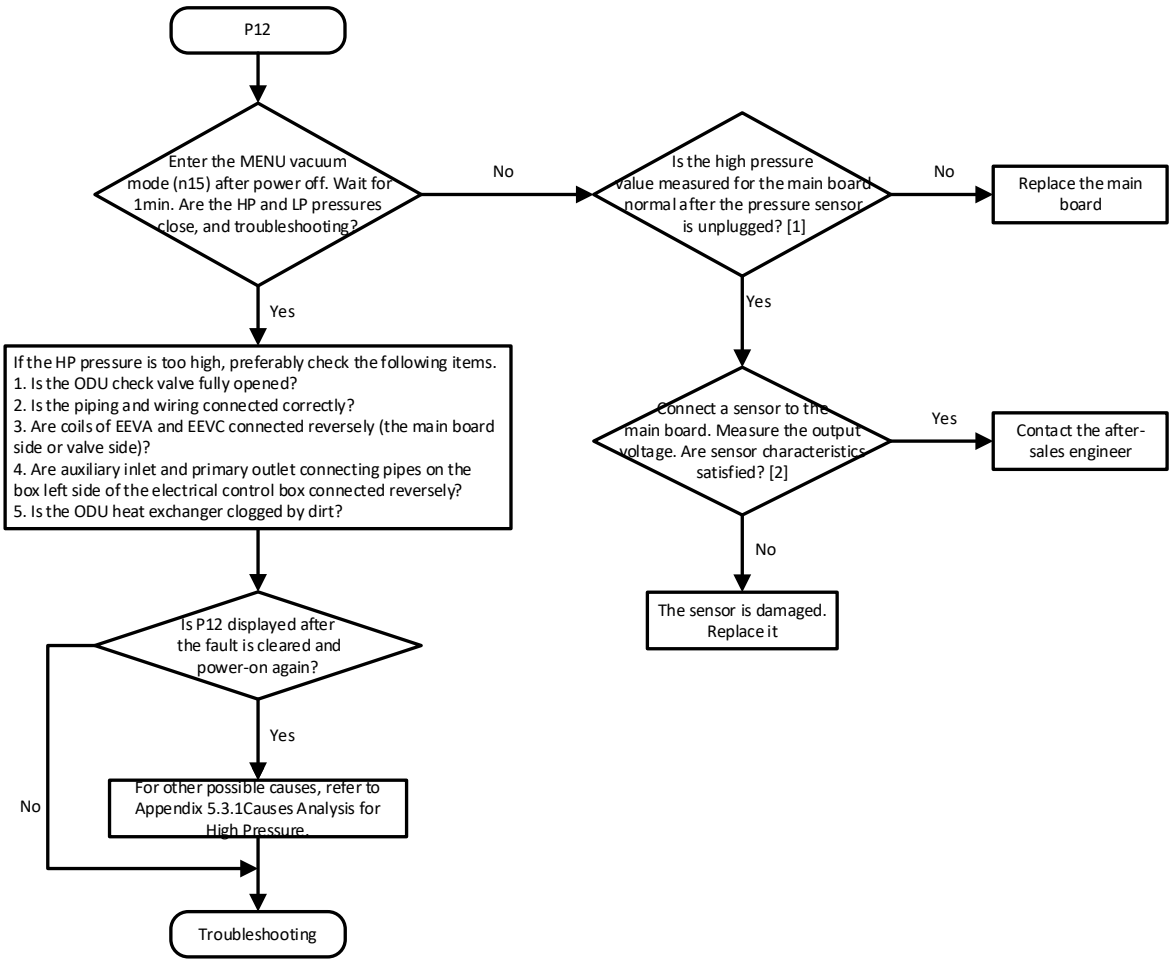
- Trigger condition:
  - P12: $P_{high\ pressure} \geqslant$ 4.15 MPa.
  - P14: P12 occurs 3 times within 100 minutes
- Recover condition:
  - P12: $P_{high\ pressure}$ < 3.5MPa
  - P14: Remove high pressure protection from Outdoor Unit
- Reset method:
  - P12: Resume automatically.
  - P14: Resume manually

2.22.4 Possible causes

- Pressure sensor damaged
- Outdoor main control board damaged.
- Refer to Appendix 5.3.1 - Cause Analysis of too high Pressure.

  Common causes of high pressure in operation:
  - The ODU check valve is not opened.
  - Piping and wiring are inconsistent. For example, the piping for system A is connected to system A and the communication wiring is connected to system B.
  - Coils of EEVA and EEVC are connected reversely (the main board side or valve side).
  - The auxiliary inlet and primary outlet connecting pipes on the left side of the electrical control box are connected reversely.
  - The ODU heat exchanger is clogged by dirt.

2.22.5 Procedure



Notes:

[1] The ports on the main control board corresponding to the high pressure sensor are CN40, ensure that the sensor port is free of contaminants such as water. There are two ways to determine whether the detected high pressure value of the main board is correct:

1.1 Connect the T4 ambient temperature sensor terminal (CN30) to the two pins of the port of the high pressure sensor, as shown in Figure 1, the temperature-pressure relationship as shown in Figure 2.

1.2 Connect 10K resistor to the two pins of the port of the high pressure sensor, as shown in Figure 1. Spot-check the HP pressure = 3.73 (±0.2) MPa. If so, the main board is normal; otherwise, the main board is damaged.

[2] Measure the output voltage of a sensor as shown in Figure 3. The relationship between HP pressure and output voltage characteristics as shown in Figure 4.

Figure 1: Resistor connection method

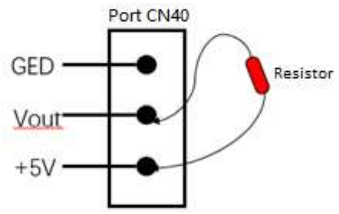


Figure 2: Temperature-pressure relationship

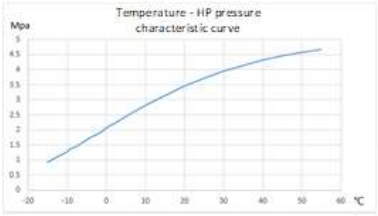


Figure 3: Measure the output voltage of a sensor

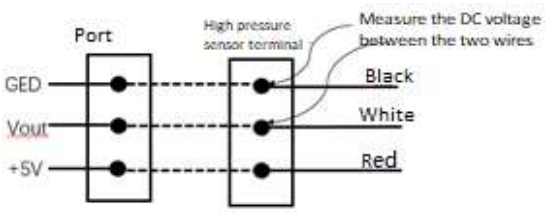
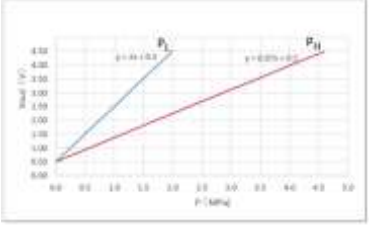


Figure 4: High pressure and output voltage characteristics



2.23 P13: High pressure switch protection

2.23.1 Digital display output

2.23.2 Description

- All units stop running
- Error code is displayed on the unit with the Error

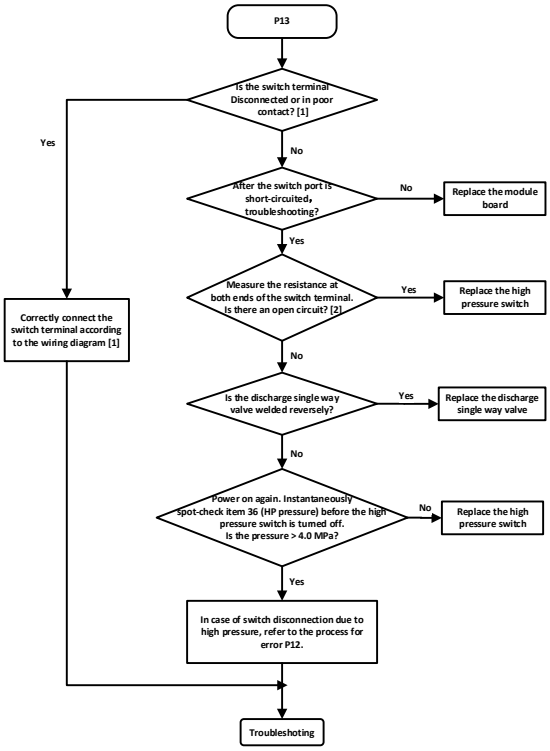
2.23.3 Trigger / recover condition

- Trigger condition: discharge pressure≥ 4.1MPa or the switch is open-circuited.
- Recover condition: pressure switch is closed.
- Reset method: Resume automatically.

2.23.4 Possible causes

- Discharge single way valve is welded reversely.
- Pressure switch is not correctly connected or is damaged.
- Outdoor main control board damaged.
- For other causes, refer to Appendix 5.3.1 - Cause Analysis of too high Pressure.

2.23.5 Procedure



Note:
[1]. The High pressure switch port is connected to the Outdoor Unit Inverter driver board port CN21, the port is red and the switch wiring is yellow, as shown in figure below. Ensure that the sensor port is free of contaminants such as water.
[2]. Unplug the pressure switch and measure the resistance at both ends. If the resistance is 0-2 Ω, the switch is normal; if the resistance is infinite, there is an open circuit, and the switch is faulty.
[3]. Caution: There is high voltage at the port. Power off before operation

2.24 P21: Low pressure sensor error

2.24.1 Digital display output

2.24.2 Description

- Open/short circuit Error in suction pressure sensor
- All units stop running.
- Error code is only displayed on the unit with the error.

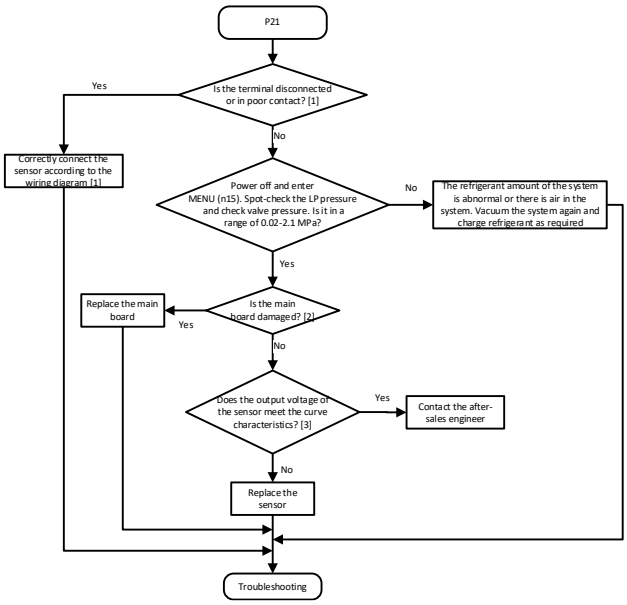
2.24.3 Trigger / recover condition

- Trigger condition: $P_{Low\ Pressure}$＜0.02MPa or $P_{Low\ Pressure}$＞2.1MPa (including sensor open circuit).
- Recover condition: 0.02Mpa≤$P_{Low\ Pressure}$≤2.1Mpa
- Reset method: Resume automatically.

2.24.4 Possible causes

- There is air in the system.
- Low pressure sensor is not correctly connected to the main board.
- There is no refrigerant in the system.
- Pressure exceeds the operating range.
- Outdoor unit main board is damaged.
- Pressure sensor has failed.

2.24.5 Procedure

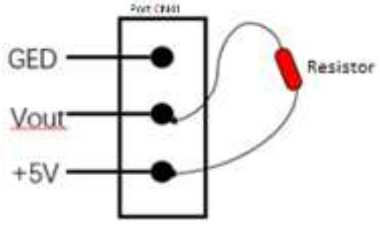
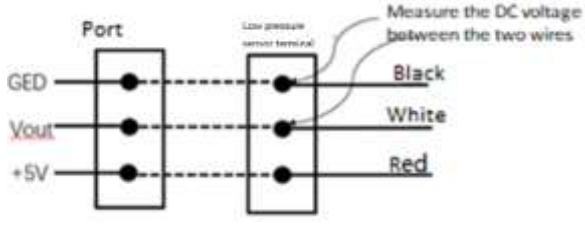
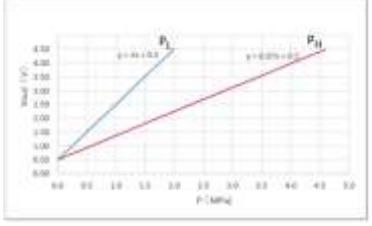


Notes:

[1]. The ports on the main control board corresponding to the low pressure sensor are CN41; ensure that the sensor port is free of contaminants such as water.

[2] How to determine main board failure: The unit is powered on and in standby, the sensor is unplugged. Connect 10K resistor to the two pin holes under port CN41 of the main board, as shown in Figure 1. Observe whether P21 disappears. The main board is normal if the error disappears; otherwise, the main board is damaged.

[3] Measure the output voltage of a sensor as shown in Figure 2. The relationship between LP pressure and output voltage characteristics as shown in Figure 3.

Figure 1: Resistor connection method	Figure 2: Measure the output voltage of a sensor	Figure 3: Low pressure and output voltage characteristics
		

2.25 P22/P25: Low pressure protection

2.25.1 Digital display output

2.25.2 Description

- P22: Low pressure protection;
- P25: Low pressure protection occurs 3 times in 60 min.
- All units stop running.
- Error code is displayed on the unit with the error.

2.25.3 Trigger/ Recover condition

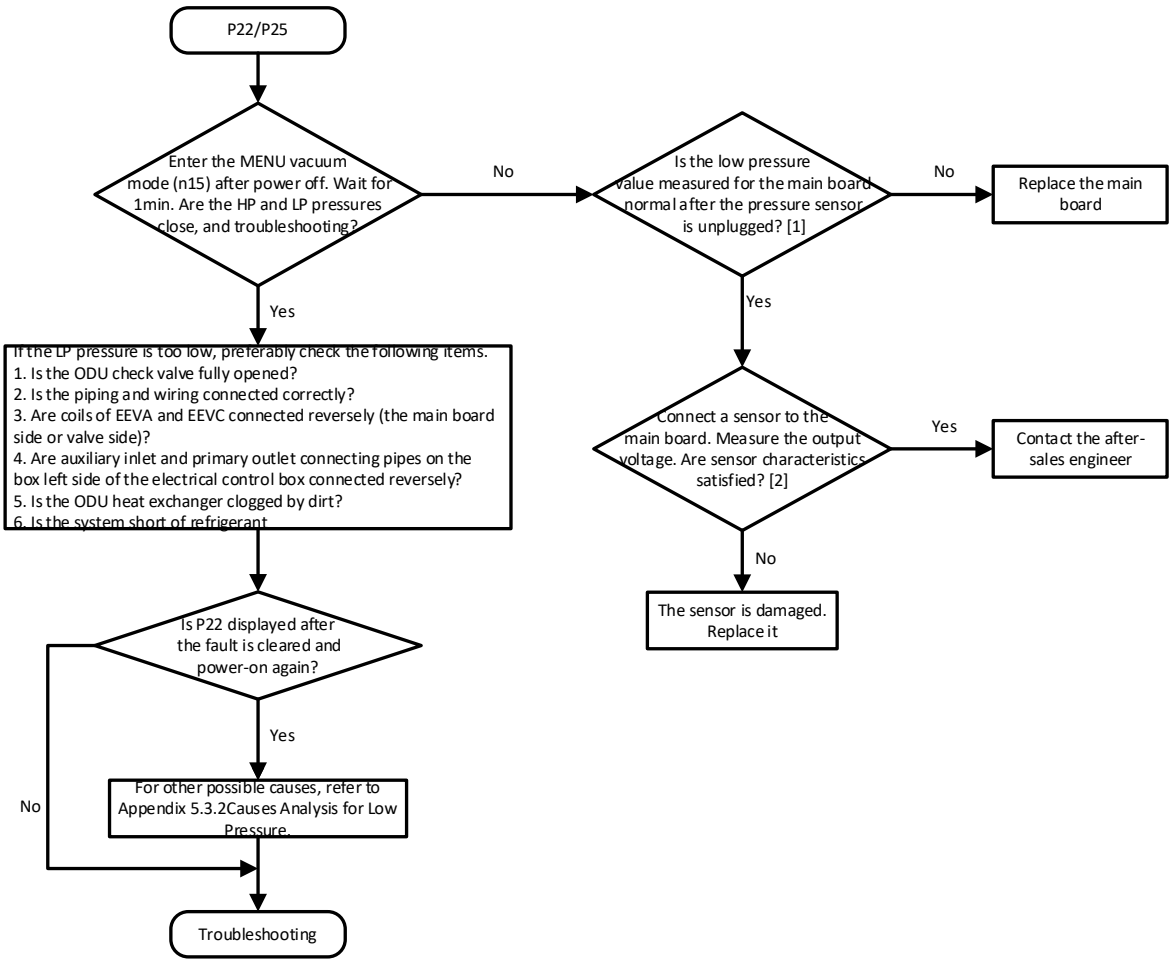
- Trigger condition:
  - P22: suction pressure < 0.07MPa.
  - P25: P22 occurs 3 times within 60 minutes
- Recover condition: Suction pressure >0.15MPa
- Reset method:
  - P22: Resume automatically
  - P25: Resume manually

2.25.4 Possible causes

- ODU check valve is not opened.
- Piping and wiring are inconsistent. For example, the piping for system A is connected to system A and the communication wiring is connected to system B.
- Sensor detection is abnormal.
- Outdoor unit main board is damaged.
- Refer to Appendix - Cause Analysis of too Low Pressure.

  Common causes of low pressure in operation:
  - Coils of EEVA and EEVC are connected reversely (the main board side or valve side).
  - The auxiliary inlet and primary outlet connecting pipes on the left side of the electrical control box are connected reversely.
  - EEVA is seized and cannot be opened in heating mode.
  - Insufficient refrigerant in the system.
  - Low-pressure side piping is clogged by ice.
  - Ourdoor unit heat exchanger is clogged by dirt.

2.25.5 Procedure



Notes:

[1] The ports on the main control board corresponding to the high pressure sensor are CN41, ensure that the sensor port is free of contaminants such as water. There are two ways to determine whether the detected high pressure value of the main board is correct:

1.1 Connect the T4 ambient temperature sensor terminal (CN31) to the two pins of the port of the low pressure sensor, as shown in Figure 1, the temperature-pressure relationship as shown in Figure 2.

1.2 Connect 10K resistor to the two pins of the port of the low pressure sensor, as shown in Figure 1. Spot-check the LP pressure = 1.61 (±0.05) MPa. If so, the main board is normal; otherwise, the main board is damaged.

[2] Measure the output voltage of a sensor as shown in Figure 3. The relationship between LP pressure and output voltage characteristics as shown in Figure 4.

Figure 1: Resistor connection method	Figure 2: Temperature-pressure relationship

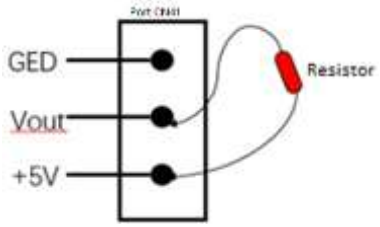
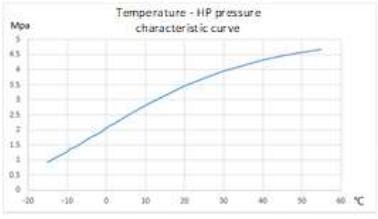
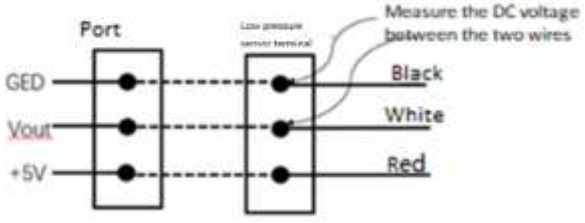
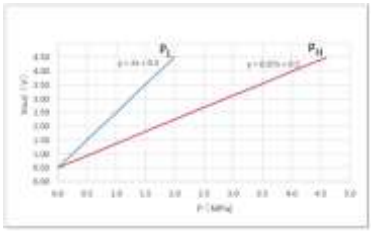

	

Figure 3: Measure the output voltage of a sensor	Figure 4: Low pressure and output voltage characteristics
	

2.26 P24: Low Pressure too High Protection

2.26.1 Digital display output

2.26.2 Description

- All units stop running.
- ODU fault is determined based on the sensor.
- Error code is displayed on the unit with the error

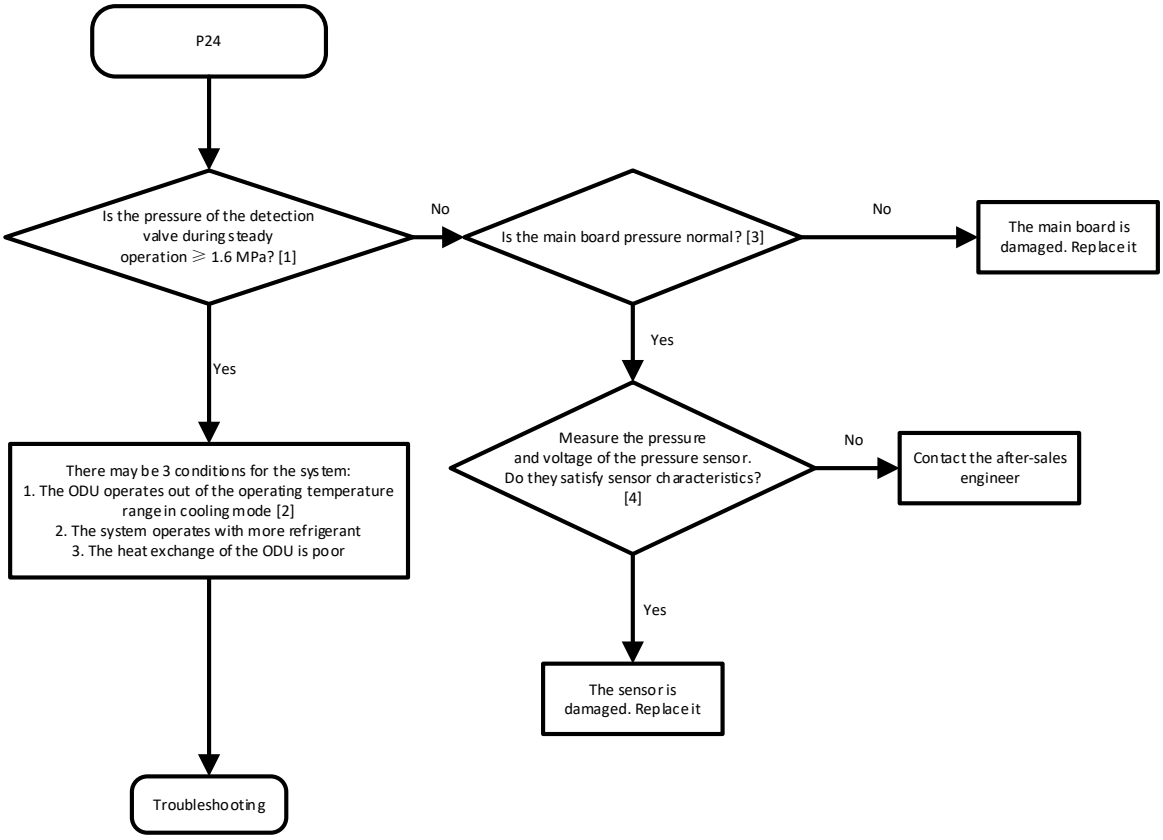
2.26.3 Trigger/ Recover condition

- Trigger condition: Suction pressure >1.6MPa and lasts 60 minutes
- Recover condition: Outdoor unit power off and resume automatically after 1 minute.
- Reset method: Resume automatically

2.26.4 Possible causes

- Low pressure of the system is too high:
  1. There is too much refrigerant.
  2. The ambient temperature of the Outdoor unit exceeds the operating range.
  3. Heat exchange of the ODU is severely poor.
- Outdoor unit main board is damaged.
- Sensor fault

2.26.5 Procedure



Notes:

[1] As shown in Figure 1, the position of the check port is the same as the position of the low pressure sensor. As a result, this pressure is an accurate reading.

[2] When the ambient temperature of an ODU is higher than 55°C, the LP pressure may be higher than expected.

[3] There are two ways to determine whether the detected Low pressure value of the main board is correct.

3.1 Connect the T4 ambient temperature sensor terminal to the lower two pins of the port of the low pressure sensor, as shown in Figure 2. The temperature-pressure relationship, as shown in Figure 3.

3.2 Connect 10K resistor to the lower two pins of the port of the low pressure sensor, as shown in Figure 3. Spot-check whether the LP pressure is equal to 1.61 (±0.2) MPa. If so, the main board is normal; otherwise, the main board is damaged.

[4] Measure the output voltage of a sensor as shown in Figure 4. The relationship between LP pressure and output voltage characteristics as shown in Figure 5

Figure 1: Position of the check port

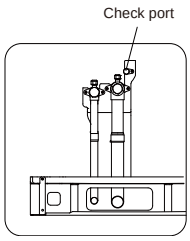


Figure 2: Resistor connection method

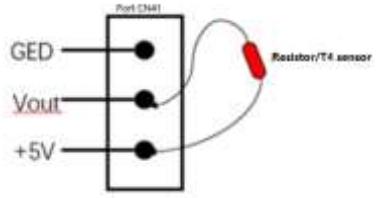


Figure 3: Temperature-pressure relationship

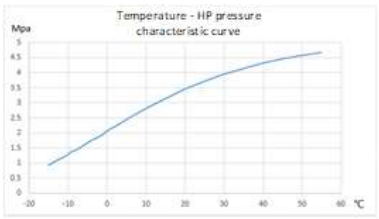


Figure 4: Measure the output voltage of a sensor

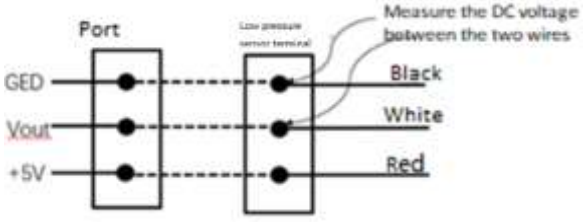
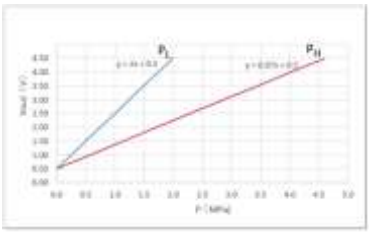


Figure 5: Low pressure and output voltage characteristics



2.27 P31: Primary Side Overcurrent Protection

2.27.1 Digital display output

2.27.2 Description

- The AC current at the device primary side is too high, which triggers protective shutdown. The current is transmitted by the module to the main control board.
- All units stop running
- Error code is displayed on the unit with the error

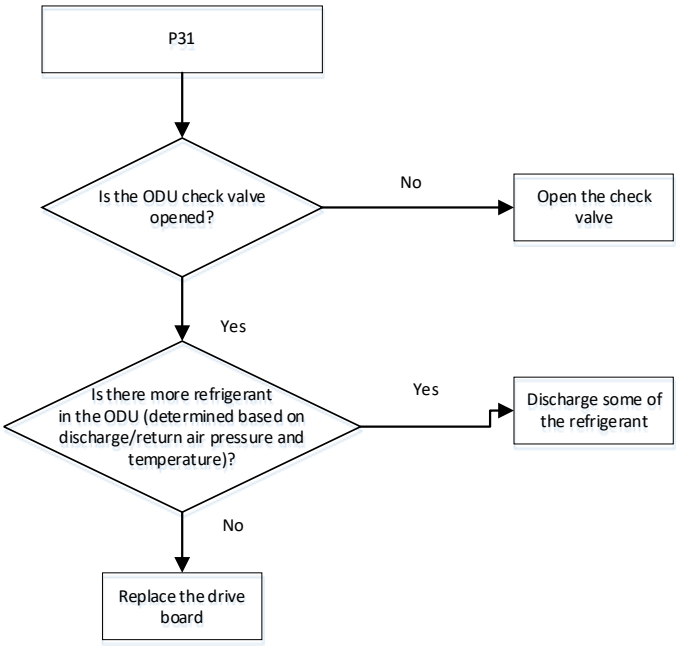
2.27.3 Trigger/ Recover condition

- Trigger condition: The primary-side AC current of the device exceeds the threshold.
- Recover condition: The primary-side AC current of the device is within the threshold.
- Reset method: Resume automatically

2.27.4 Possible causes

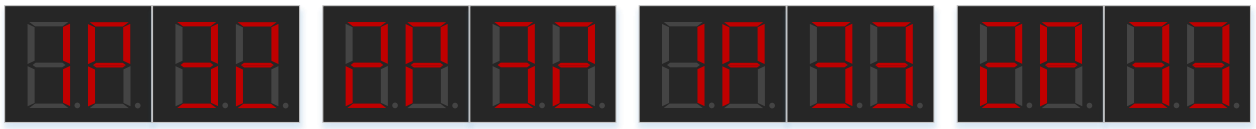
- The check valve is closed.
- The compressor experiences slugging due to excessive refrigerant in the system.
- The drive board fault.

2.27.5 Procedure



2.28 xP32, xP33: No.(x) compressor high DC bus current protection

2.28.1 Digital display output



2.28.2 Description

- The DC bus current of No.x compressor is too high, triggering protection shutdown
- All units stop running.
- Error code is displayed on the unit with the error.

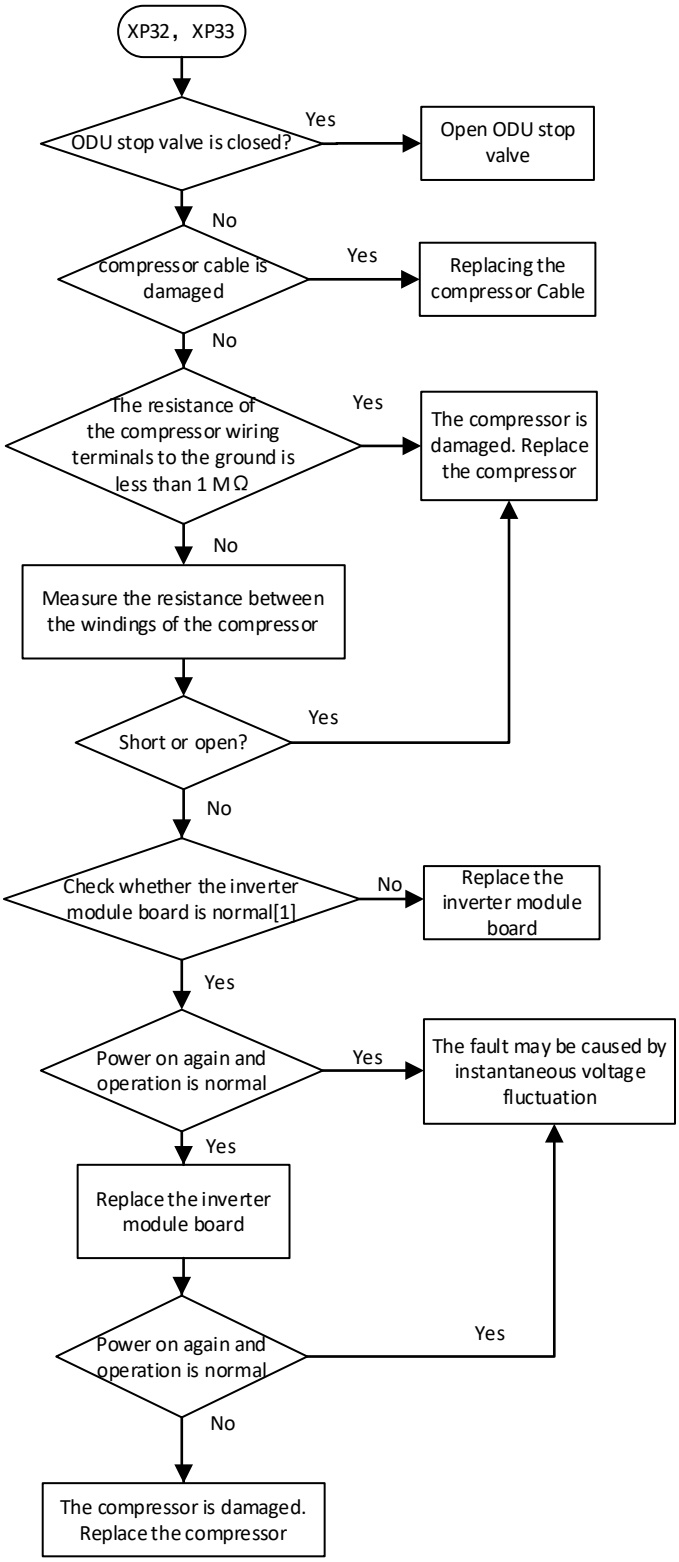
2.28.3 Trigger / recover condition

- Trigger condition:
  P32: During operation, the DC bus current of any compressor exceeds the upper limit
  P33: Within 100min, No.x compressor appears P32 for 3 times
- Recover condition:
  P32: The DC bus current of all compressors is lower than the recovery value
  P33: After the device is powered on again, release the lock
- Reset method:
  P32: Resume automatically
  P33: Resume manually

2.28.4 Possible causes

- The compressor is overloaded.
- The module board is damaged.
- The compressor cable is not connected.
- The compressor is damaged.

2.28.5 Procedure



Note:

1. Refer to the Appendix “Measurement Guide for inverter Module Board”.

2.29 P51: High AC voltage protection

2.29.1 Digital display output

2.29.2 Description

- The AC voltage of the system is too high, triggering the protection shutdown
- All units stop running
- Error code is displayed on the unit with the error.

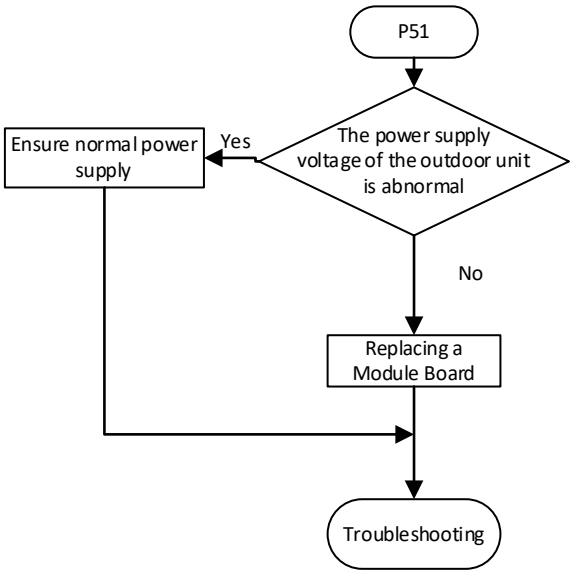
2.29.3 Trigger / recover condition

- Trigger condition:The AC voltage of Outdoor Unit over 265 V
- Recover condition: Wait 7/15/30min for each occurrence, and the AC voltage of Outdoor Unit drops below 250 V
- Reset method: Resume automatically.

2.29.4 Possible causes

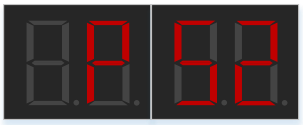
- The power supply voltage is too high
- The module is damaged.

2.29.5 Procedure



2.30 P52: Low voltage protection

2.30.1 Digital display output



2.30.2 Description

- The AC voltage of the system is too low, triggering the protection shutdown
- All units stop running.
- Error code is displayed on the unit with the error

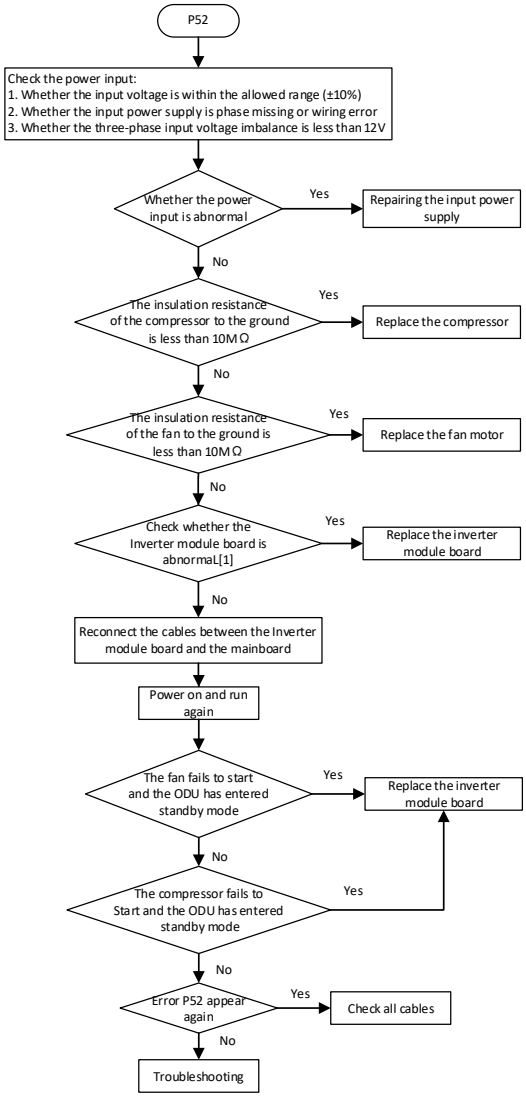
2.30.3 Trigger / recover condition

- Trigger condition:The Vac of Outdoor Unit less than 170 V
- Recover condition: Wait 7/15/30min for each occurrence, and the Vac of Outdoor Unit rises above 180 V
- Reset method: Resume automatically.

2.30.4 Possible causes

- The power supply voltage of the outdoor unit is abnormal or phase is missing
- Cables in the electric control box are loose
- Error in the high voltage circuit
- Inverter driver board is damaged

2.30.5 Procedure



Note:

1. Refer to the Appendix “Measurement Guide for inverter Module Board”.

2.31 P53: Phase B and N of the power cable are connected to the opposite protection

2.31.1 Digital display output

2.31.2 Description

- System phase and neutral wires are connected reversely and fail the inspection
- All units stop running
- Error code is displayed on the unit with the error

2.31.3 Trigger / recover condition

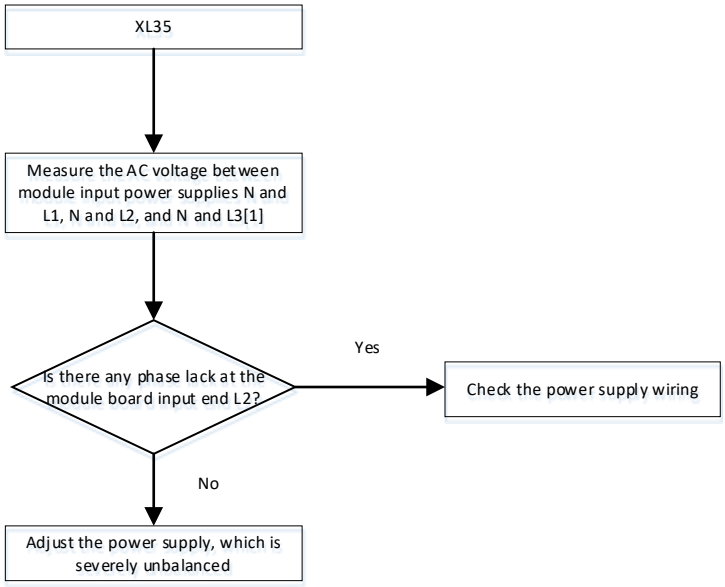
- Trigger condition: The drive board uploads L35 fault
- Recover condition: The drive board does not upload L35 fault
- Reset method: Resume automatically

2.31.4 Possible causes

- Outdoor Uint power supply B N is inversely connected
- Cables in the electric control box are loose
- The module board PCB is damaged

2.31.5 Procedure

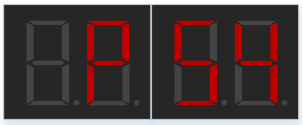
Perform troubleshooting based on the xL35



Notes:
[1]. When the system is powered on, use a multimeter to measure the voltages of the power input terminals L1,2, and L3 of the inverter dirve board. Compare the voltages of L1-L2, L2-L3, and L1-L3.If basically equal, the power supply voltage is fine;If there is a difference of more than 10V, consider the power phase imbalance;If there is a difference of tens or even hundreds of volts, consider the power supply or the filter board has a problem.

2.32 P54: DC bus low voltage protection

2.32.1 Digital display output



2.32.2 Description

- The DC bus voltage of the compressor is too low
- All units stop running.
- Error code is displayed on the unit with the error

2.32.3 Trigger / recover condition

- Trigger condition: The drive board uploads XL3E fault
- Recover condition: The drive board does not upload XL3E fault.
- Reset method: Resume automatically

2.32.4 Possible causes

- The input voltage is too low
- The power supply loose phase
- The model power supply information is incorrectly configured
- Compressor inverter driver board is damaged

2.32.5 Procedure

Troubleshoot according to xL3E

2.33 P55: DC bus ripple over protection

2.33.1 Digital display output

2.33.2 Description

- The ripple of the DC bus on the module is over the limits.
- All units stop running.
- Error code is displayed on the unit with the error

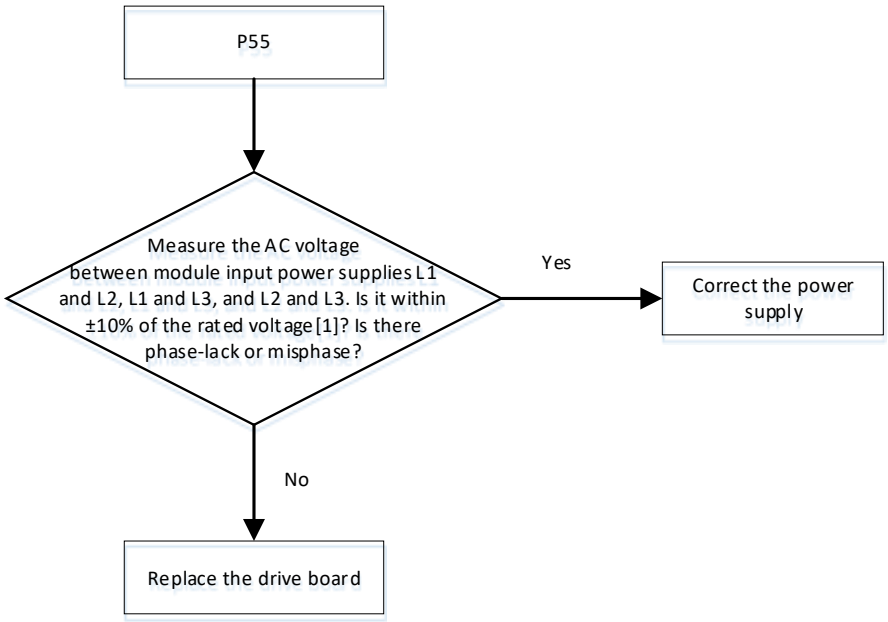
2.33.3 Trigger / recover condition

- Trigger condition: The DC bus ripple voltage uploaded by the drive board exceeds the threshold set by the main control board.
- Recover condition: The DC bus ripple voltage is lower than the threshold set by the main control board.
- Reset method: Resume automatically

2.33.4 Possible causes

- The Outdoor Unit power supply is out of phase or seriously unbalanced
- Cables in the electric control box are loose
- Module board PCB is damaged.

2.33.5 Procedure



Note:
[1] When the system is powered on, use a multimeter to measure the voltages of the power input terminals L1, L2 and L3 of the inverter dirve board.

2.34 xP56: No.x inverter driver board DC bus voltage is too low

2.34.1 Digital display output

2.34.2 Description

- No.x inverter driver board DC bus voltage is too low
- All units stop running.
- Error code is displayed on the unit with the error

2.34.3 Trigger / recover condition

- Trigger condition: The inverter driver board upload L3E/J3E fails
- Recover condition: The inverter driver board does not upload L3E/J3E fails
- Reset method: Resume automatically.

2.34.4 Possible causes

- The Outdoor Unit power supply is too low or phase is missing
- Cables in the electric control box are loose
- Inverter driver board is damaged

2.34.5 Procedure

Troubleshoot according to xJ3E/xL3E

2.35 xP57: No.x inverter driver board DC bus voltage is too high

2.35.1 Digital display output

2.35.2 Description

- No.x inverter driver board DC bus voltage is too high
- All units stop running.
- Error code is displayed on the unit with the error

2.35.3 Trigger / recover condition

- Trigger condition: The inverter driver board upload L31/J31 fails
- Recover condition: The inverter driver board does not upload L31/J31 fails
- Reset method: Resume automatically.

2.35.4 Possible causes

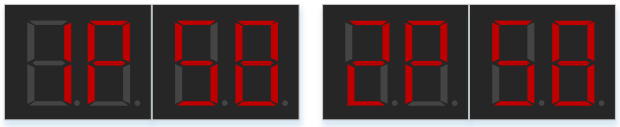
- The Outdoor Unit power supply is too high
- Inverter driver board is damaged

2.35.5 Procedure

Troubleshoot according to xJ31/xL31

2.36 xP58: No.x inverter driver board DC bus voltage is seriously too high

2.36.1 Digital display output



2.36.2 Description

- No.x inverter driver board DC bus voltage is seriously too high
- All units stop running
- Error code is displayed on the unit with the error

2.36.3 Trigger / recover condition

- Trigger condition: The inverter driver board upload L32/J32 fails
- Recover condition: The inverter driver board does not upload L32/J32 fails
- Reset method: Resume automatically.

2.36.4 Possible causes

- The input voltage is too high, resulting in the high DC bus voltage
- The power grid voltage is too high
- Inverter driver board is damaged

2.36.5 Procedure

Troubleshoot according to xJ32/xL32

2.37 xP5A: Phase B Misphase of Inverter Module P5A Input Power Supply

2.37.1 Digital display output

2.37.2 Description

- The phase and neutral wires are connected reversely and fail the inspection.
- All units stop running
- Error code is displayed on the unit with the error

2.37.3 Trigger / recover condition

- Trigger condition: phase and neutral wires are connected reversely
- Recover condition: phase and neutral wires are connected correctly
- Reset method: Resume automatically.

2.37.4 Possible causes

- The B and N phases of the ODU power supply are connected reversely.
- The internal wiring of the electrical control box is loose.
- The module board PCB is damaged.

2.37.5 Procedure

Troubleshoot according to xL35

2.38 P71: Error in EEPROM

2.38.1 Digital display output

2.38.2 Description

- The EEPROM parameter of the ODU main control board is incorrect
- All units stop running.
- Error code is displayed on the unit with the error

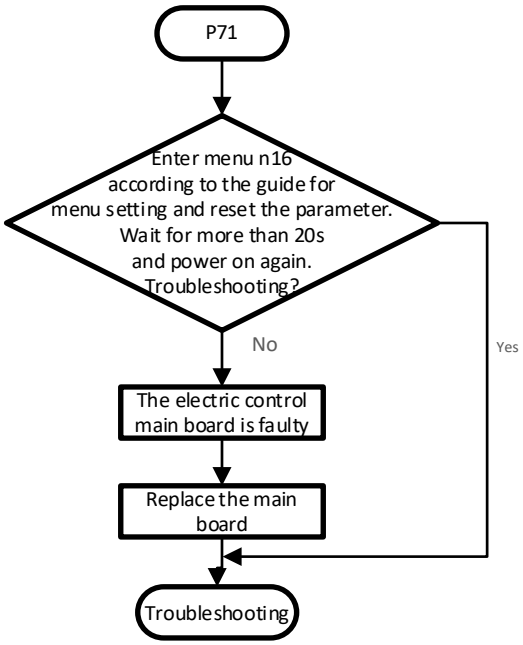
2.38.3 Trigger / recover condition

- Trigger condition:EEPROM parameter verification is incorrect
- Recover condition:EEPROM parameter verification is correct
- Reset method:Resume manually

2.38.4 Possible causes

- EEPROM units damaged:
- Main control board is damaged
- Menu settings are incorrect

2.38.5 Procedure



2.39 Pb1: HyperLink overcurrent error

2.39.1 Digital display output

2.39.2 Description

- HyperLink overcurrent error
- All units stop running.
- Error code is displayed on master ODU.

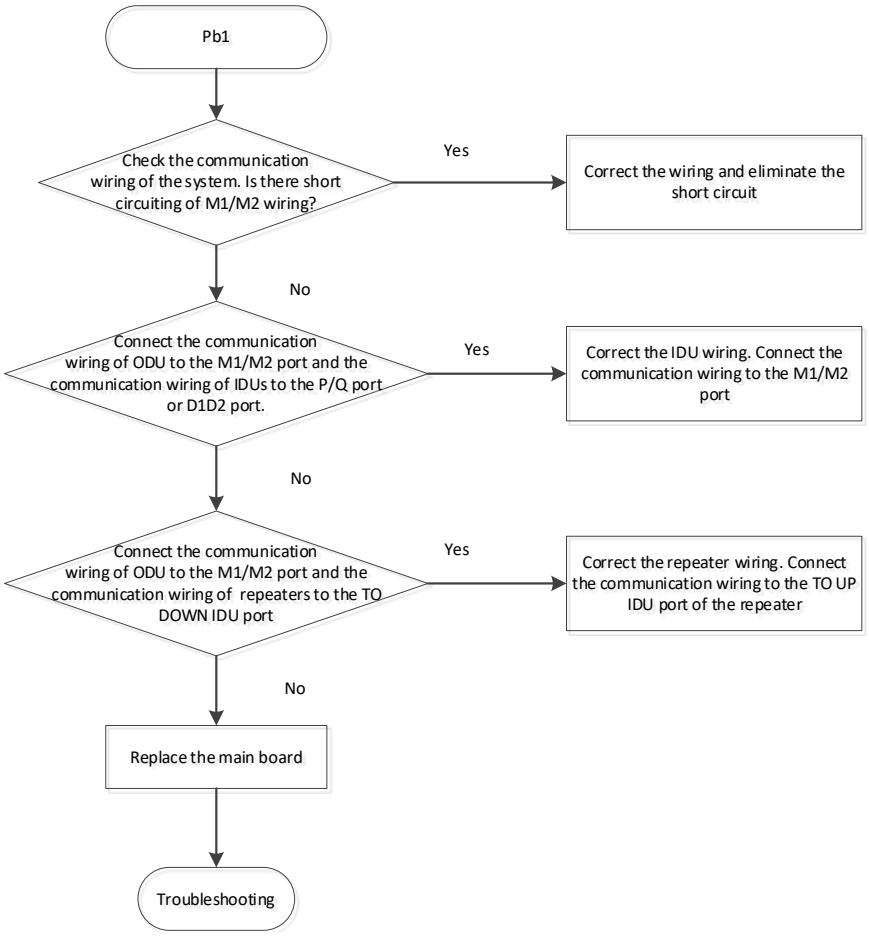
2.39.3 Trigger / recover condition

- Trigger condition: The M1M2 communication wiring is short-circuited, or M1M2 is connected to the 485 communication port by mistake
- Recover condition: Eliminate the short circuit/wrong connection
- Reset method: Automatic restoration if the error display time is less than 2h; power on again if the error display time is greater than 2h.

2.39.4 Possible causes

- The M1M2 communication wiring of the master ODU is short-circuited.
- The M1M2 communication wiring of the master ODU is connected to other communication wiring (not M1M2) of the IDU.
- The M1M2 communication wiring of the master ODU is connected to port “TO DOWN IDU” of the repeater.
- Main control board is damaged

2.39.5 Procedure



2.40 Pd1, Pd2: Anti-condensation protection

2.40.1 Digital display output

2.40.2 Description

- Anti-condensation protection
- All units stop running.
- Error code is displayed on the unit with the error

2.40.3 Trigger / recover condition

- Trigger condition:

  Pd1: Liquid pipe inlet temperature (T5) remains lower than the anti-condensation setting temperature for more than 10 min

  Pd2: Pd1 protection occurs 2 times in 60 minutes
- Recover condition: Liquid pipe inlet temperature (T5) is higher than the anti-condensation setting temperature
- Reset method:

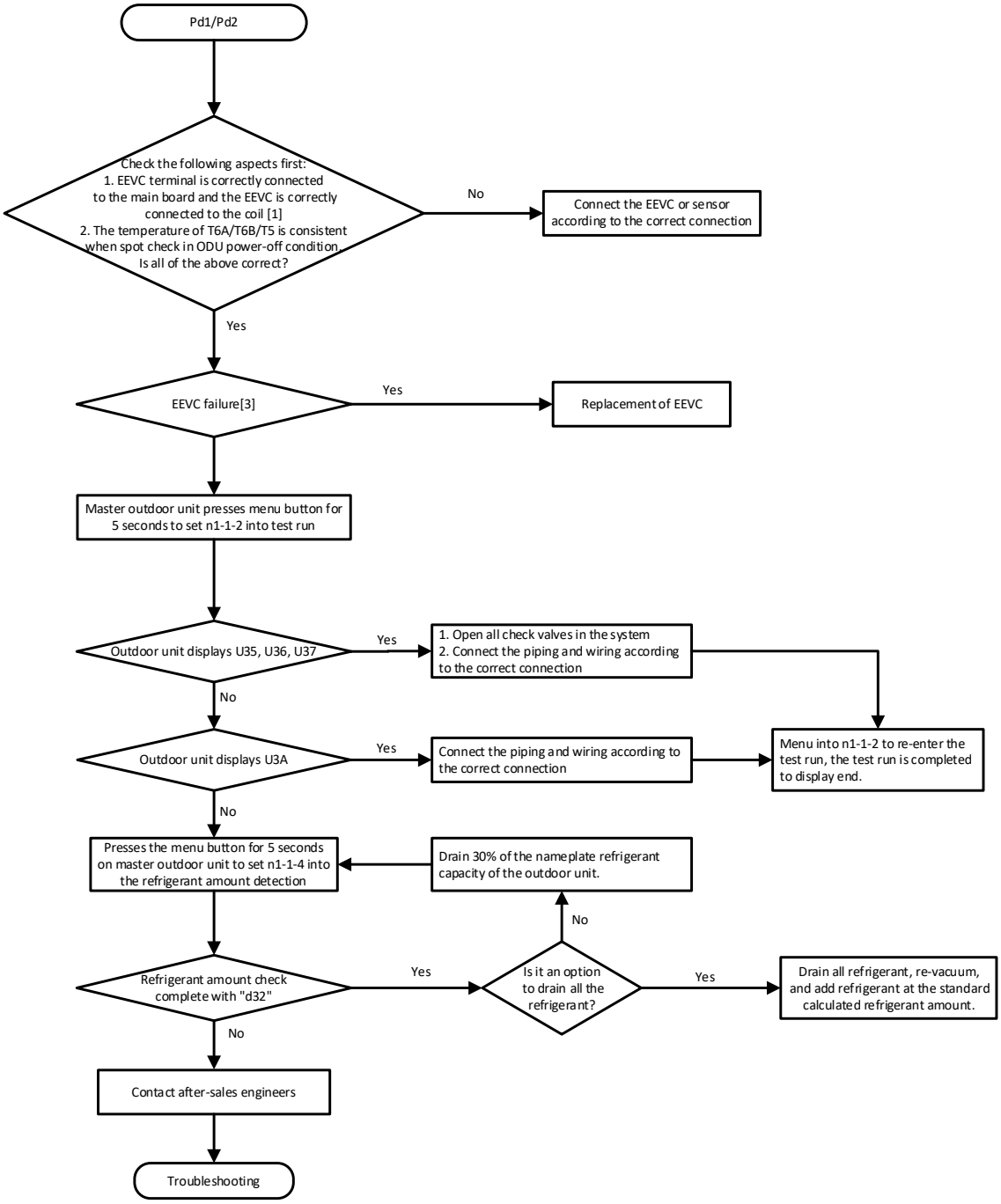
  Pd1: Resume automatically

  Pd2: Resume manually

2.40.4 Possible causes

- The ODU check valve is not opened.
- Piping and wiring are inconsistent. For example, the piping for system A is connected to system A and the communication wiring is connected to system B.
- EEVC fails and cannot be closed normally.
- Excessive refrigerant
- Temperature sensors T6A, T6B, and T5 are not installed in designated positions.
- Temperature sensors T6A, T6B, and T5 are damaged.
- The main board is damaged.

2.40.5 Procedure



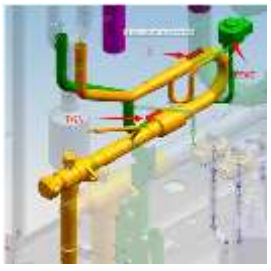
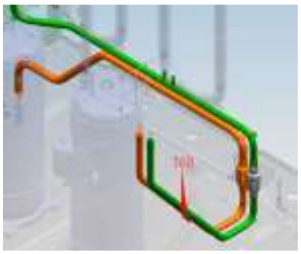
Notes:

[1] EEVC port of the main board is CN72. Both the port and terminal are green. The location of the EEVC as shown in Figure 1.

[2] The location of temperature sensor T6A/T5 as shown in Figure 1. The location of temperature sensor T6B (auxiliary out) as shown in Figure 2.

[3] In the shutdown state of the Bluetooth tool shows that the EEVC open degree of 0 after unplugging the EEVC coil (that is, the EEVC has been in a closed state). Power on the unit again, after the compressor starts to touch the T6A, observe whether there is a refrigerant flow through, if there is a refrigerant flow through the judgment of EEVC failure; otherwise, EEVC normal.

Note: After checking, the EEVC coil should be restored and then re-powered.

Figure 1: Location of the EEVC, T6A, T5	Figure 2: Location of the T6B
	

2.41 U11: Outdoor unit model is not set

2.41.1 Digital display output

2.41.2 Description

- The outdoor unit model is not set into the main board.
- All units stop running
- Error code is displayed on the unit with the error

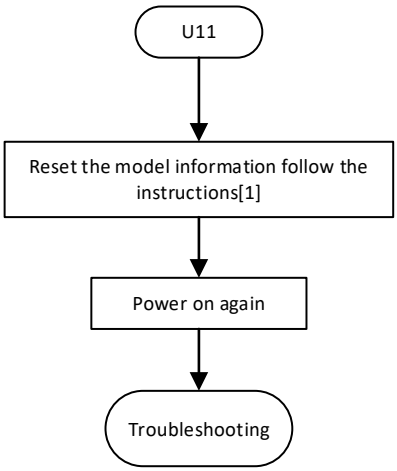
2.41.3 Trigger / recover condition

- Trigger condition: The model information is not set.
- Recover condition: The model information of the unit is set correctly
- Reset method: Resume manually

2.41.4 Possible causes

- Outdoor unit model is not set or setting fails after replacing the main board.

2.41.5 Procedure



Note:
[1] Use the Bluetooth module or Bluetooth after-sales kit

2.42 U12: Outdoor unit Capacity setting error

2.42.1 Digital display output

2.42.2 Description

- The capability information of outdoor unit is not set
- All units stop running
- Error code is displayed on the unit with the Error

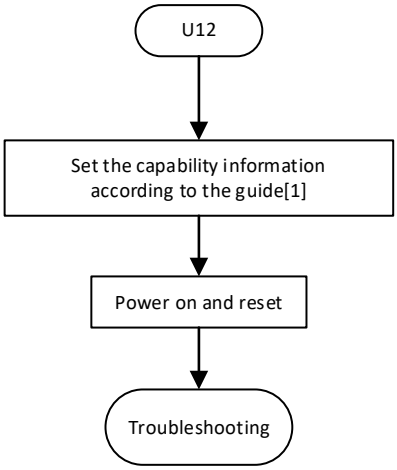
2.42.3 Trigger / recover condition

- Trigger condition: The capability information of outdoor unit is not set
- Recover condition: Reset the capability information of outdoor unit
- Reset method: Resume manually

2.42.4 Possible causes

- The capability information of outdoor unit is not set

2.42.5 Procedure



Note:
[1] Use the Bluetooth module or Bluetooth after-sales kit set the capability information according to the nameplate

2.43 U21: The indoor unit connection is incorrect

2.43.1 Digital display output

2.43.2 Description

- Connected to the 1st generation indoor unit or indoor unit address repeated in system
- All Outdoor units stop running
- Error code is displayed on the master unit

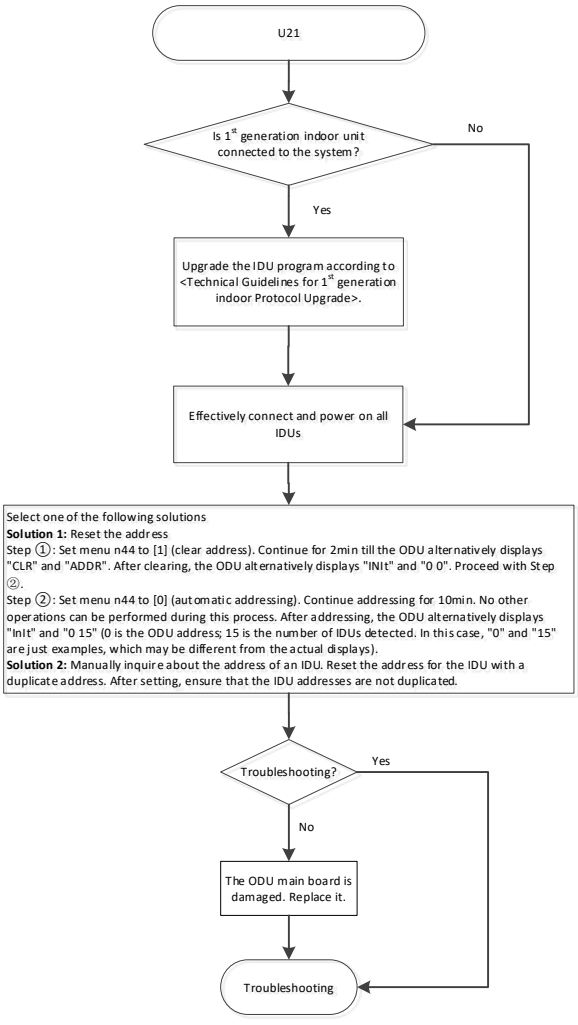
2.43.3 Trigger / recover condition

- Trigger condition:
  - 1st generation indoor units are connected to the system.
  - The indoor units address is repeated.
- Recover condition: No 1st generation indoor units are connected to the system and the indoor units address is not repeated.
- Reset method: Resume manually

2.43.4 Possible causes

- 1st generation indoor unit are connected in system
- The indoor unit address is repeated.

2.43.5 Procedure



2.44 U31: The test run was never successful

2.44.1 Digital display output

2.44.2 Description

- The system is not in the test run or the test run is unsuccessful
- All units stop running
- Error code is only displayed on the master unit.

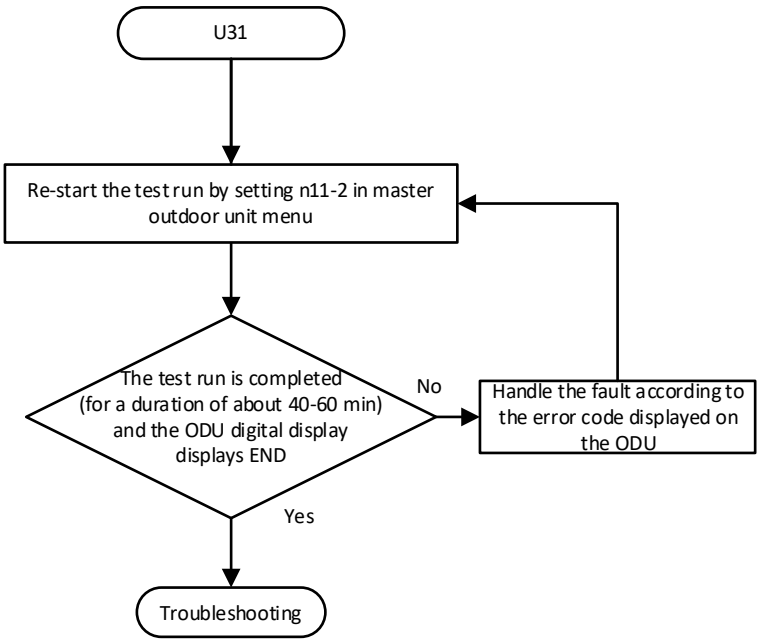
2.44.3 Trigger / Recover condition

- Trigger condition:
  - The system is not in the test run mode within 30 min of power-on
  - The test run is unsuccessful
- Recover condition: The test run complete successfully.
- Reset method: Resume manually

2.44.4 Possible causes

- The system is not in the test run or the test run is unsuccessful

2.44.5 Procedure



2.45 U32, U33, U34: The temperature is not suitable for test run

2.45.1 Digital display output

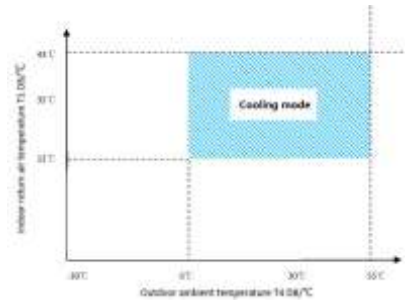
2.45.2 Description

- During the test run, the indoor or outdoor temperature exceeds the operating range
- All units stop running
- Error code is only displayed on outdoor unit

2.45.3 Trigger /Recover condition

- Trigger condition:

  After entering into test run, the master unit estimates whether it is suitable for test run according to the indoor average return air temperature T1 and outdoor average ambient temperature T4(Refer to the following figure and table). If it is not suitable for test run, the outdoor unit displays an error code like “U32, U33, U34”

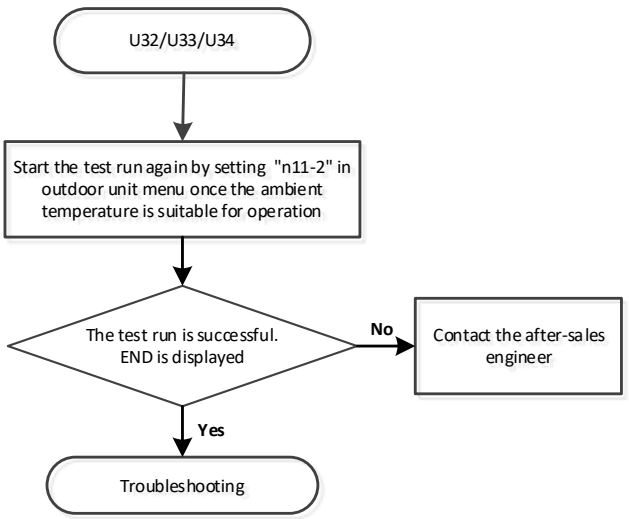
Temperature range	Error code	Description	
	U32	The outdoor temperature is not suitable	T4min≤-5 ºC or T4min>55 ºC
	U33	The indoor temperature is not suitable	Cooling mode: Average T1≥43 ºC
	U34	The indoor and outdoor temperature is not suitable	Average T1≥12 ºC : T4min>55 ºC or T4min<-5 ºC

- Recover condition: Maintain indoor and outdoor temperature within a suitable range. Set "n11-2" in the MENU for test run, and the test run succeeds.
- Reset method: Resume manually

2.45.4 Possible causes

- The Temperature out of test run range

2.45.5 Procedure



2.46 U35, U36, U37: Stop valve is not open

2.46.1 Digital display output

2.46.2 Description

- The outdoor unit stop valve is not opened during the test run.
- All units stop running
- Error code is only displayed on the master unit.

2.46.3 Trigger/ Recover condition

- Trigger condition:

Error code	Description	
U35	The liquid side stop valve of the system is not opened	Discharge pressure of cooling mode≥ 3.9MPa Suction pressure of heating mode < 0.15MPa
U36	The gas side stop valve of the system is not opened	Discharge pressure of heating mode≥ 3.8MPa
U37	The gas side stop valve of the system is not opened	Suction pressure of cooling mode<0.3MPa The indoor unit is faulty.

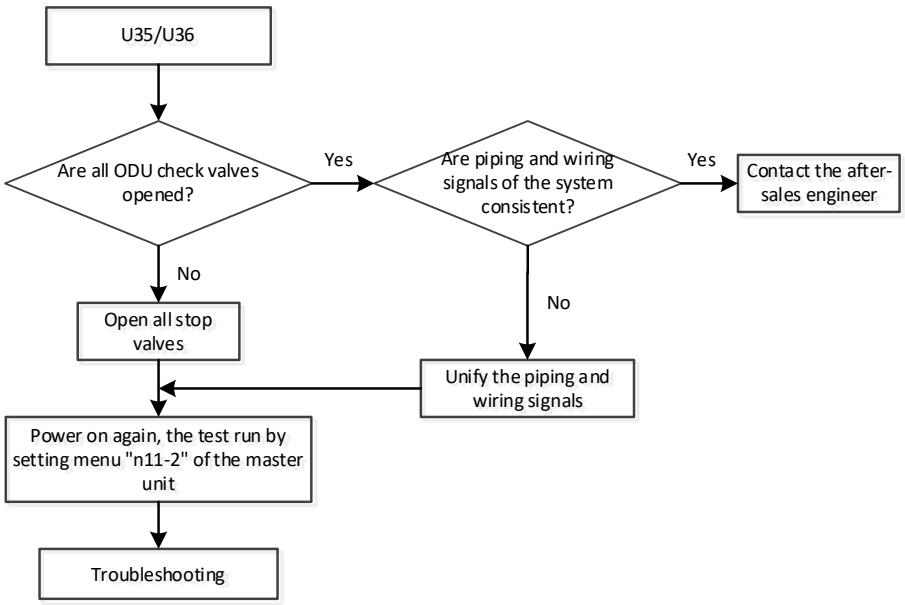
- Recover condition: Set "n11-2" in the MENU for test run, and the test run succeeds.
- Reset method: Resume automatically after the test run succeeds

2.46.4 Possible causes

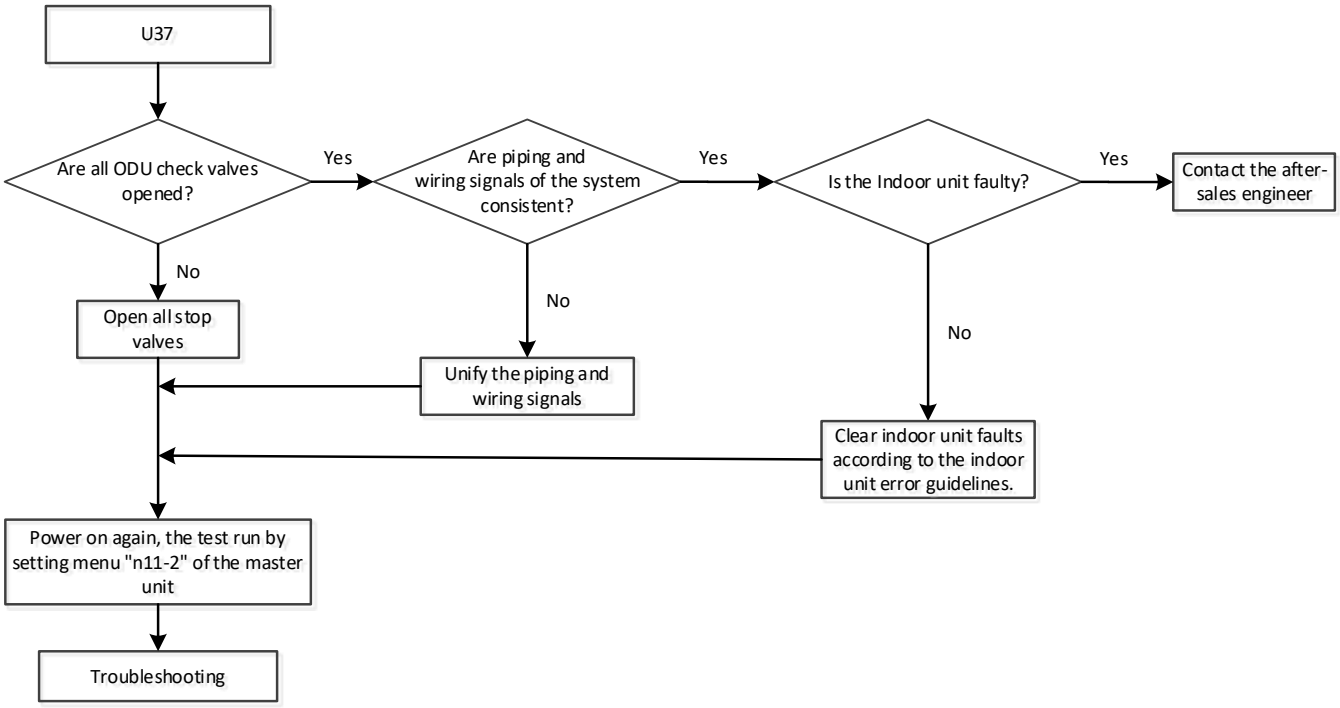
- Stop valve is not open
- Piping and wiring are inconsistent. For example, the piping for system A is connected to system A and the communication wiring is connected to system B.
- Indoor unit report “U37”

2.46.5 Procedure

1. U35/U36



2. U37


U37
Are all ODU check valves opened?
Yes
Are piping and wiring signals of the system consistent?
Yes
Is the Indoor unit faulty?
Yes
Contact the after-sales engineer
No
Open all stop valves
No
Unify the piping and wiring signals
No
Clear indoor unit faults according to the indoor unit error guidelines.
Power on again, the test run by setting menu "n11-2" of the master unit
Troubleshooting

2.47 U38: Outdoor Unit has no address.

2.47.1 Digital display output

2.47.2 Description

- Outdoor Unit has no address.
- Outdoor Unit with error can not run.
- Outdoor Unit with error cannot communicate with indoor units.

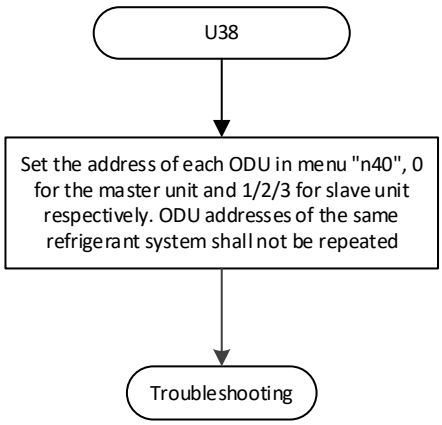
2.47.3 Trigger / recover condition

- Trigger condition: Outdoor unit address is not set
- Recover condition: Outdoor unit address detection is normal
- Reset method: Resume automatically

2.47.4 Possible causes

- The ODU's address is not set

2.47.5 Procedure



Notes:
[1]After setting the outdoor unit address, waiting for 30 seconds then, powering off the ODU, next waiting another 30 seconds, and then powering on the ODU again.

2.48 U3A: The communication wiring is connected incorrectly

2.48.1 Digital display output

2.48.2 Description

- Indoor unit piping and communication wiring are not connected in the same system.
- All units stop running
- Error code only displayed on the master unit.

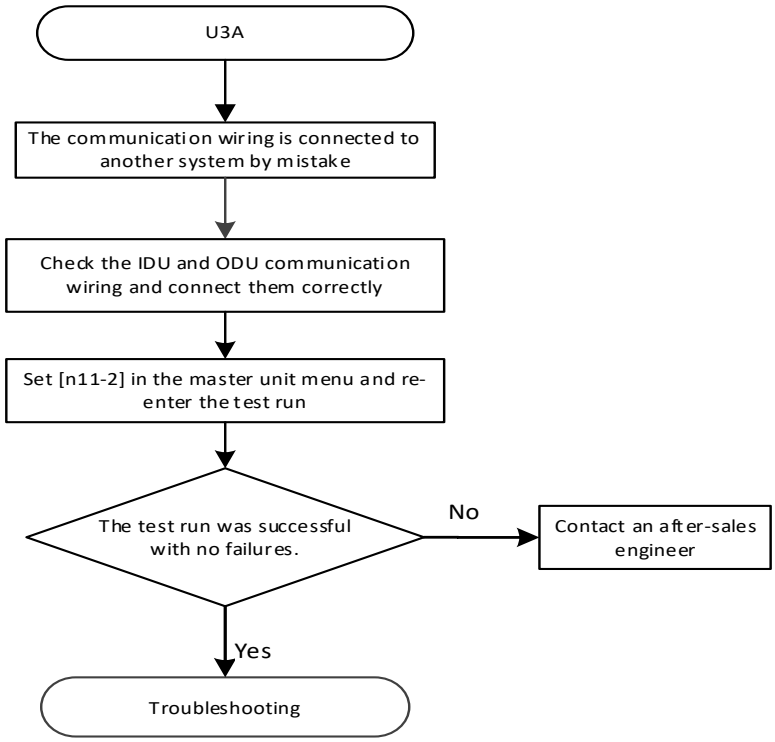
2.48.3 Trigger / Recover condition

- Trigger condition: Indoor unit piping and communication wiring are not connected in the same system. The communication wiring of the indoor unit is connected to another system.
- Recover condition: Set "n11-2" in the MENU for test run, and the test run succeeds.
- Reset method: Resume automatically after the test run succeeds

2.48.4 Possible causes

- Indoor unit piping and communication wiring are not connected in the same system. The communication wiring of the indoor unit is connected to another system.

2.48.5 Procedure



2.49 U3b: The installation environment is abnormal

2.49.1 Digital display output

2.49.2 Description

- Ambient temperature of the test environment exceeds the allowed range during the test run
- All units stop running
- Error code only displayed on the master unit.

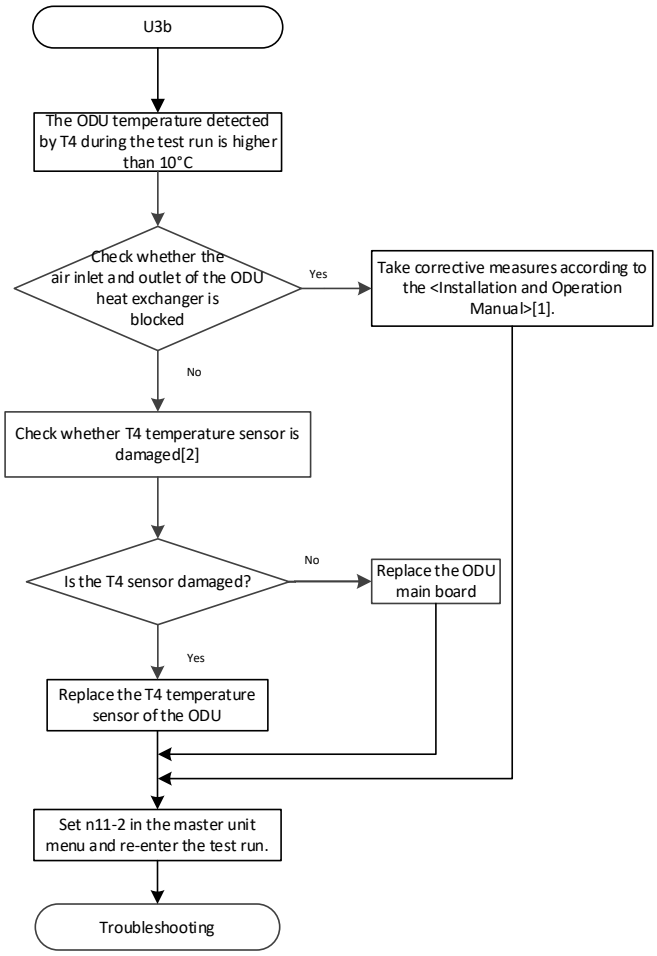
2.49.3 Trigger / Recover condition

- Trigger condition: Return air temperature is detected to increase more than 10℃ during test run.
- Recover condition: Set "n11-2" in the MENU for test run, and the test run succeeds.
- Reset method: Resume automatically after the test run succeeds

2.49.4 Possible causes

- The installation environment of the IDU has poor ventilation and heat dissipation, and the outlet air and return air form short circuit
- Return air of the IDU is affected by other heat sources
- The return air temperature sensor of the IDU is improperly installed or damaged

2.49.5 Procedure



Note:
[1]. Clear the obstructions beside the ODU. Ensure smooth air inlet and outlet of the ODU without a short circuit. In spaces that have limited area for heat dissipation, install a louver for air discharge or relocate the ODU
[2]. Refer to "E41: T4 Temperature Sensor Fault". Check whether T4 temperature sensor is damaged

2.50 U3C: Changeover mode error

2.50.1 Digital display output

2.50.2 Description

- ODU in changeover mode doesn’t set the VIP IDU address.
- ODUs stop running
- Error code only displayed on the master unit.

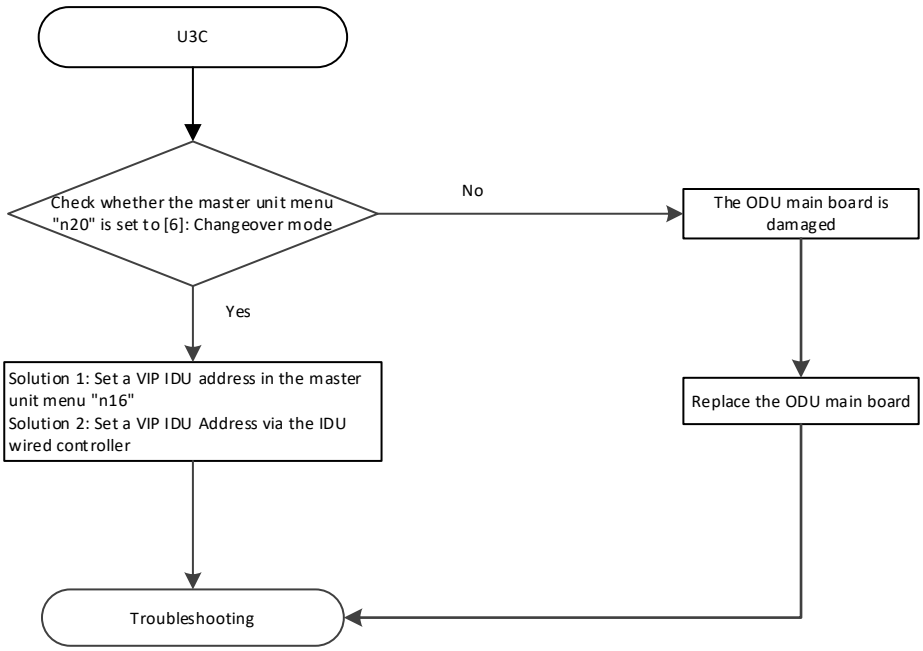
2.50.3 Trigger / Recover condition

- Trigger condition: Outdoor unit in changeover mode, but the VIP address has not been set.
- Recover condition: Outdoor unit in changeover mode detect the VIP IDU address.
- Reset method: Resume automatically

2.50.4 Possible causes

- VIP address has not been set
- Mainboard of ODU is damaged.

2.50.5 Procedure



2.51 U4x: Overconnection ratio

2.51.1 Digital display output





2.51.2 Description

- Combination ratio of indoor unit and outdoor unit is out of range
- All units stop running
- Error code only displayed on the master unit

2.51.3 Trigger / Recover condition

- Trigger condition:

Error code	Description
U41	The combination ratio of Standard VRF Indoor Unit is out of range.
U42	The combination ratio of Fresh Air Processing Uint is out of range.
U43	The combination ratio of AHU Kit (air discharge control) is out of range
U44	The combination ratio of AHU Kit (air return control) is out of range
U48	The combination ratios of all Indoor Units are out of range.

1) Code and type of Indoor Unit

Indoor unit code	**A**	**B**	**C**	**D**
Indoor unit type	Standard VRF Indoor Unit	Fresh Air Processing Unit(FAPU)	AHU Kit (air discharge control)	AHU Kit (air return control)

2) Connection type and combination ratio limit

	Connection type				Combination ratio (%)				
Indoor unit code	A	B	C	D	A	B	C	D	Total capacity combination ratio of all indoor units
Only one type of IDU is connected to the system	●				50%-130%				50%—130%
		●				50%-100%			50%—100%
			●				50%-100%		50%—100%
				●				50%-110%	50%—110%
Combination 1	●	●			50%-130%	≤30%			50%—130%
Combination 2	●		●		50%-130%		≤30%		50%—130%
Combination 3	●			●	50%-130%			≤60%	50%—110%
Combination 4	●	●	●	●	50%-130%	≤30%		50%-130%	50%—130%

3) Calculation of combination ratio: Combination ratio = Total capacity (HP) of online IDUs/Total capacity (HP) of ODUs

- Recover condition:

  Indoor/Outdoor Unit connection rate within allowable range

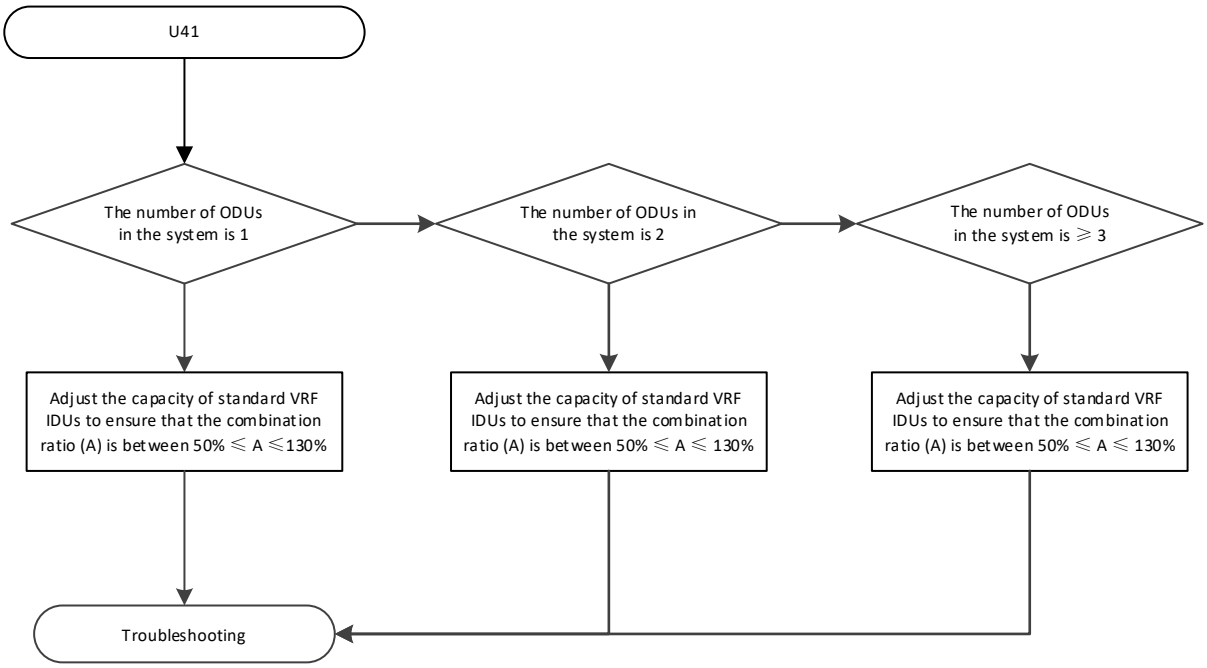
- Reset method: Resume manually

2.51.4 Possible causes

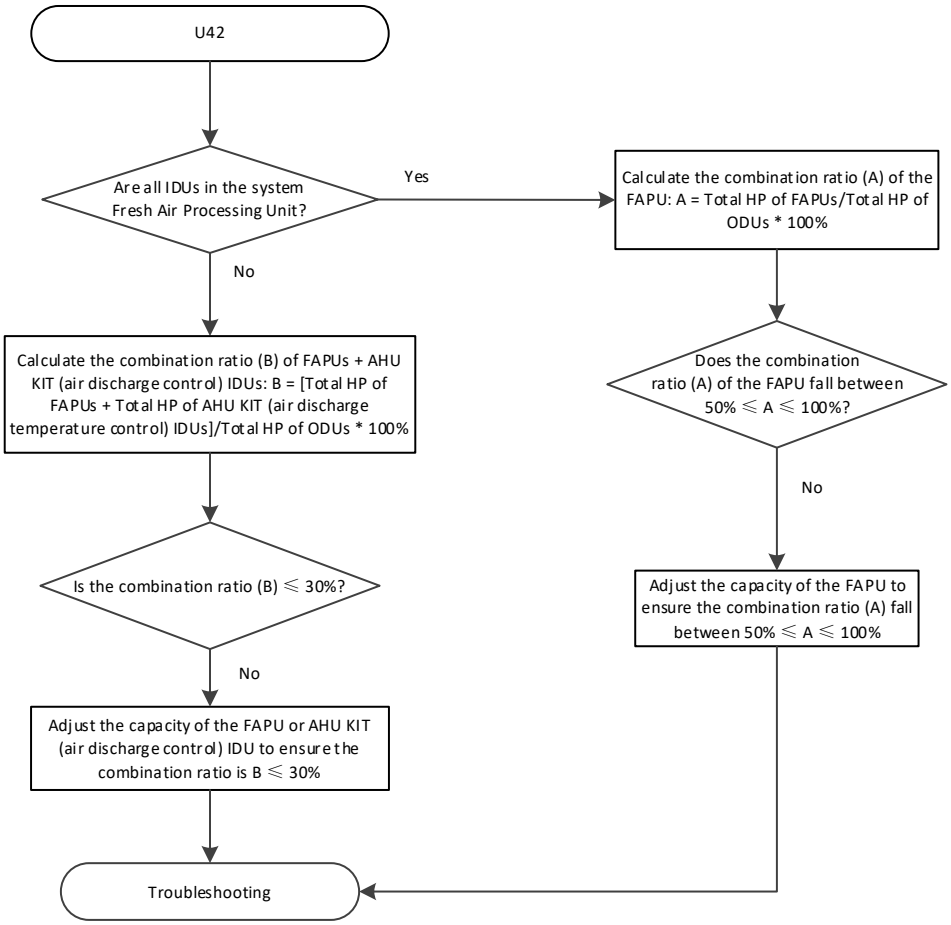
- Indoor units and outdoor units combination ratio is out of range.
- Outdoor unit address is repeated or the slave outdoor unit does not have an address.
- Individual series indoor unit is installed in combination with a combinable series.

2.51.5 Procedure

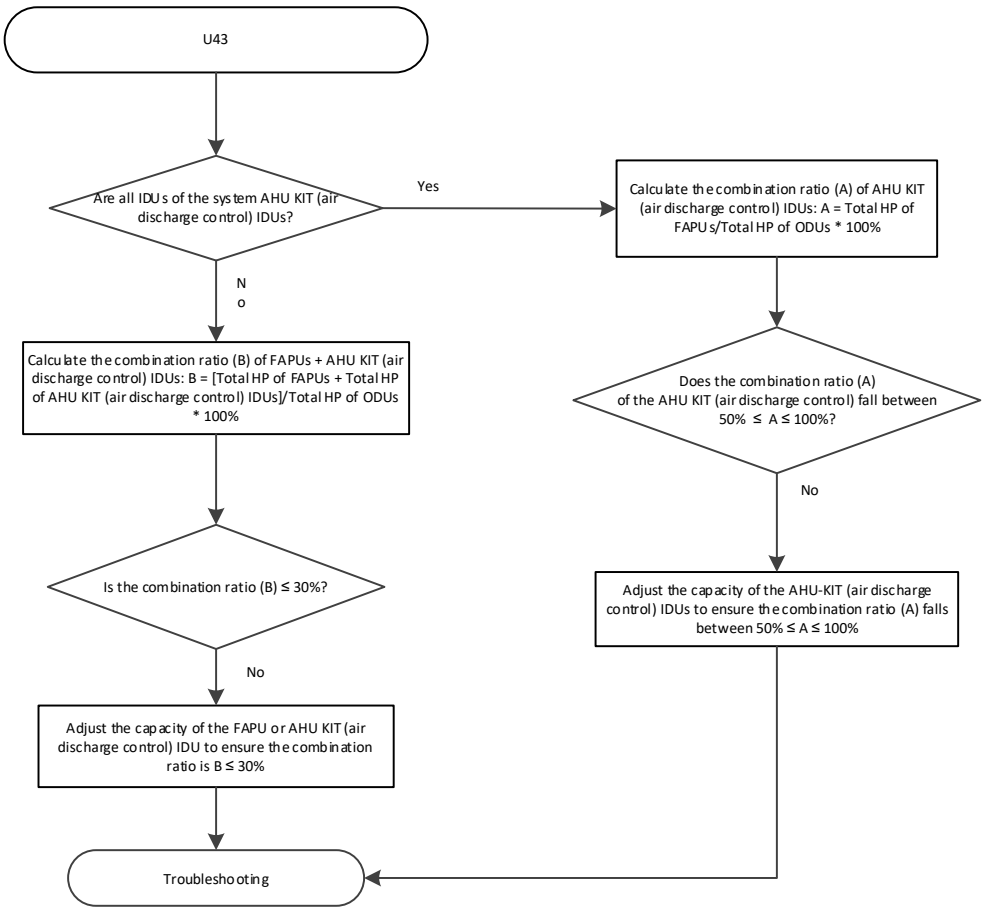
1. U41



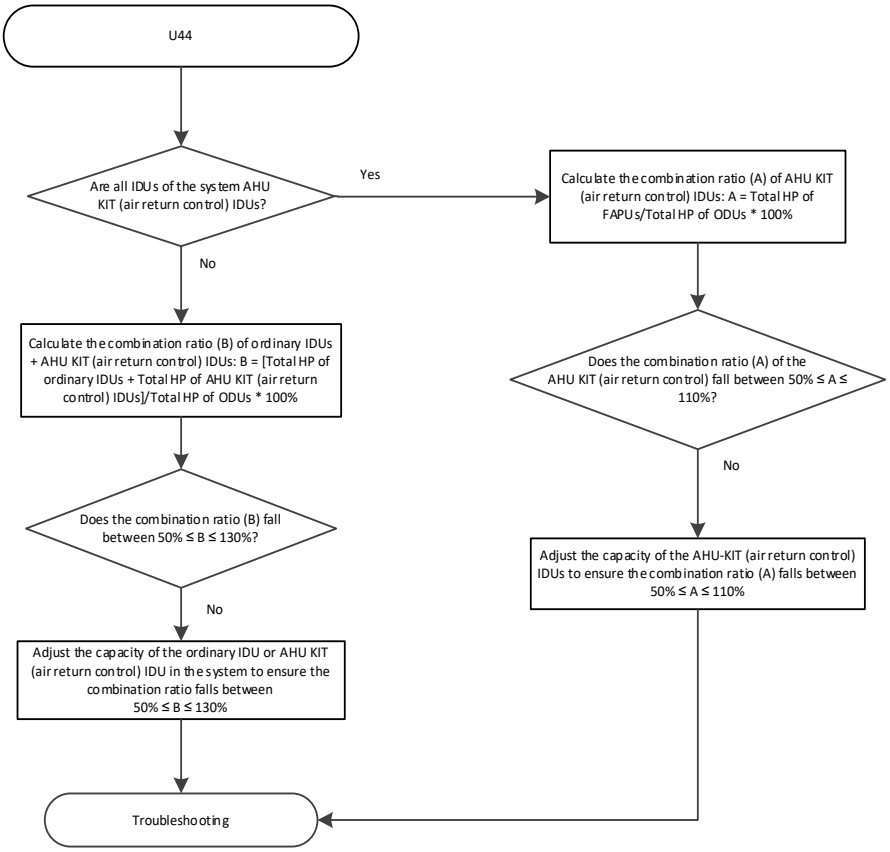
2. U42



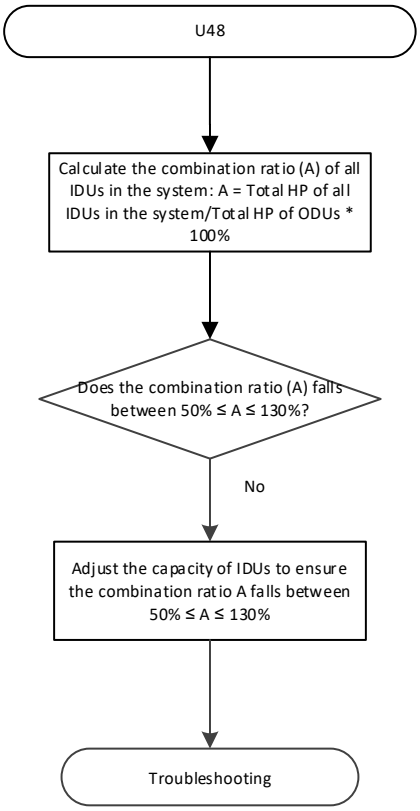
3. U43


U43
Are all IDUs of the system AHU KIT (air discharge control) IDUs?
Yes
No
Calculate the combination ratio (A) of AHU KIT (air discharge control) IDUs: A = Total HP of FAPUs/Total HP of ODUs * 100%
Does the combination ratio (A) of the AHU KIT (air discharge control) fall between 50% ≤ A ≤ 100%?
No
Adjust the capacity of the AHU-KIT (air discharge control) IDUs to ensure the combination ratio (A) falls between 50% ≤ A ≤ 100%
Calculate the combination ratio (B) of FAPUs + AHU KIT (air discharge control) IDUs: B = [Total HP of FAPUs + Total HP of AHU KIT (air discharge control) IDUs]/Total HP of ODUs * 100%
Is the combination ratio (B) ≤ 30%?
No
Adjust the capacity of the FAPU or AHU KIT (air discharge control) IDU to ensure the combination ratio is B ≤ 30%
Troubleshooting

4. U44


U44
Are all IDUs of the system AHU KIT (air return control) IDUs?
Yes
No
Calculate the combination ratio (A) of AHU KIT (air return control) IDUs: A = Total HP of FAPUs/Total HP of ODUs * 100%
Does the combination ratio (A) of the AHU KIT (air return control) fall between 50% ≤ A ≤ 110%?
No
Adjust the capacity of the AHU-KIT (air return control) IDUs to ensure the combination ratio (A) falls between 50% ≤ A ≤ 110%
Calculate the combination ratio (B) of ordinary IDUs + AHU KIT (air return control) IDUs: B = [Total HP of ordinary IDUs + Total HP of AHU KIT (air return control) IDUs]/Total HP of ODUs * 100%
Does the combination ratio (B) fall between 50% ≤ B ≤ 130%?
No
Adjust the capacity of the ordinary IDU or AHU KIT (air return control) IDU in the system to ensure the combination ratio falls between 50% ≤ B ≤ 130%
Troubleshooting

5. U48


U48
Calculate the combination ratio (A) of all IDUs in the system: A = Total HP of all IDUs in the system/Total HP of ODUs * 100%
Does the combination ratio (A) falls between 50% ≤ A ≤ 130%?
No
Adjust the capacity of IDUs to ensure the combination ratio A falls between 50% ≤ A ≤ 130%
Troubleshooting

2.52 U51: More than One Outdoor Unit Models in the Individual Series System

2.52.1 Digital display output

2.52.2 Description

- Outdoor unit of Individual Series is installed in combine system, and the number of ODUs detected is greater than 1.
- All units stop running
- Error code is only displayed on master unit.

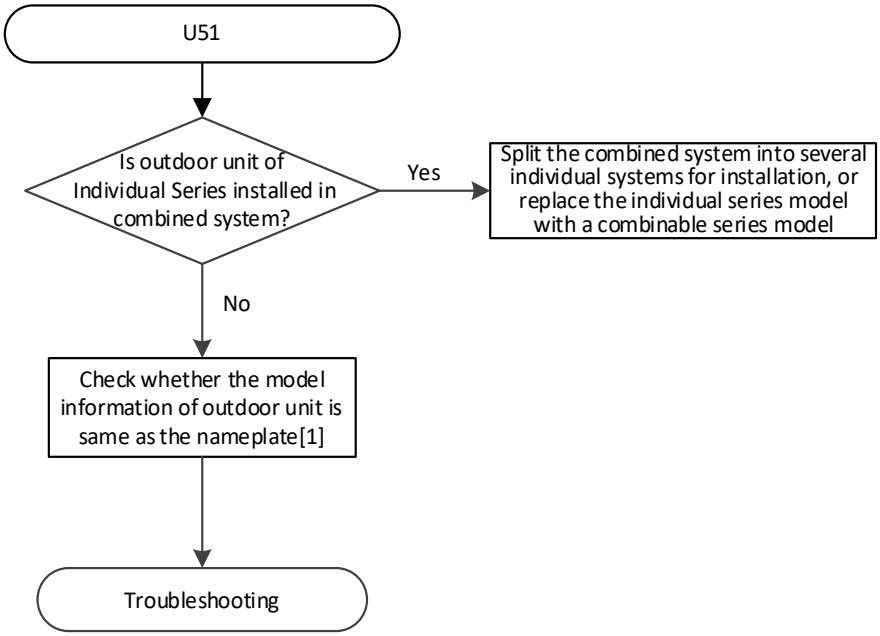
2.52.3 Trigger / Recover condition

- Trigger condition: The number of ODUs connected to the system detected by individual series is greater than 1
- Recover condition: The number of ODUs connected to the system detected by individual series is equal to 1
- Reset method: Resume manually (Power on again)

2.52.4 Possible causes

- Outdoor unit of Individual Series is installed in combine system, and the number of ODUs detected is greater than 1
- Outdoor unit model is incorrectly set

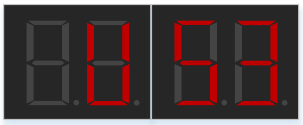
2.52.5 Procedure



Note:
[1]Use Bluetooth module or bluetooth after-sales kit to check and reset the model parameter.

2.53 U53: Two or More Outdoor Unit Models in the Combined System

2.53.1 Digital display output



2.53.2 Description

- Detected different series outdoor units in the combined system
- All units stop running
- Error code is only displayed master unit

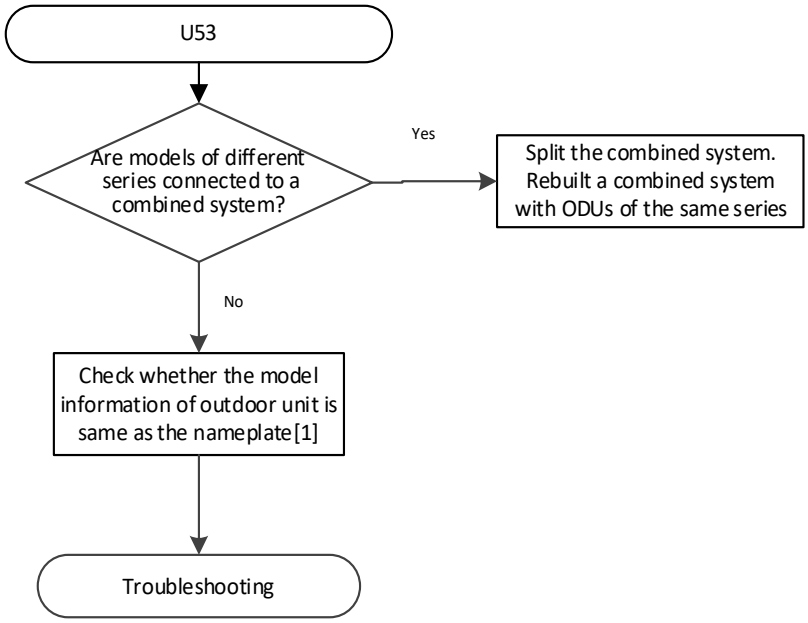
2.53.3 Trigger / Recover condition

- Trigger condition: Detected different series outdoor units in the combined system
- Recover condition: There is only one series of Outdoor Unit in the combined system
- Reset method: Resume manually (Power on again)

2.53.4 Possible causes

- Detected different series outdoor units in the combined system
- Outdoor unit model is incorrectly set

2.53.5 Procedure



Note:
[1]Use Bluetooth module or bluetooth after-sales kit to check and reset the model parameter.

3 Error in Compressor Driver

3.1 xL1E: Hardware overcurrent

3.1.1 Digital display output

3.1.2 Description

- The compressor current exceeds the protection value set for the hardware.
- The compressor stops running after the error occurs. If the error disappears one minute later, the compressor starts again

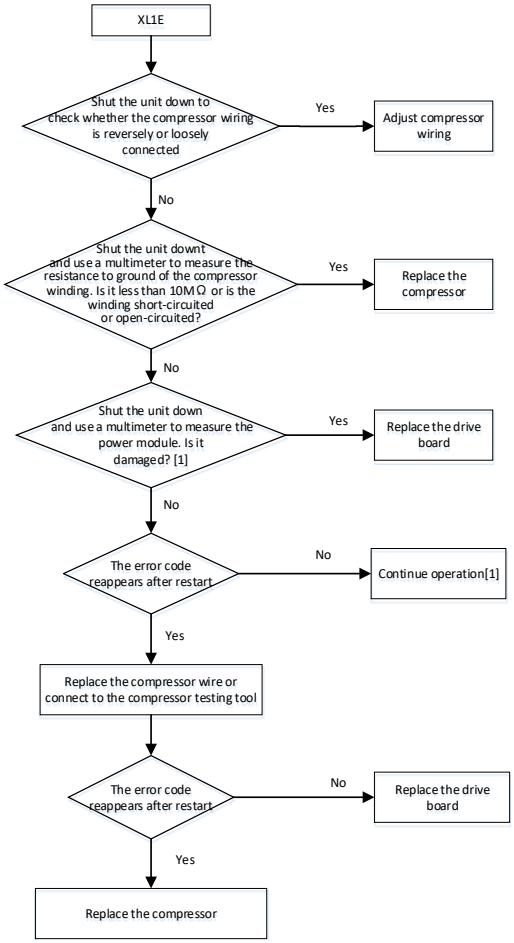
3.1.3 Trigger / recover condition

- Trigger condition: The current exceeds the protection value set for the hardware
- Recover condition: The compressor will stop after failure, and recover after one minute, if the condition for fault elimination is satisfied in 1 min, compressor operation resumes
- Reset method:The system automatically recovers one minute after the error exit condition is reached

3.1.4 Possible causes

- Compressor wiring is wrong. Compressor winding is open-circuited or short-circuited.
- System power supply is faulty.
- The system is faulty, due to reasons such as liquid return and impurities.
- The compressor is worn or locked upon startup.
- The compressor drive board is faulty.

3.1.5 Procedure



Notes:
[1]Voltage fluctuation occurs when high-power equipment is started

3.2 xL11, xL12 : Software overcurrent

3.2.1 Digital display output

3.2.2 Description

- The compressor current exceeds the protection value set by the software.
- The compressor will shutdowm when the error occurs. If the error disappears one minute later, the compressor will start again.

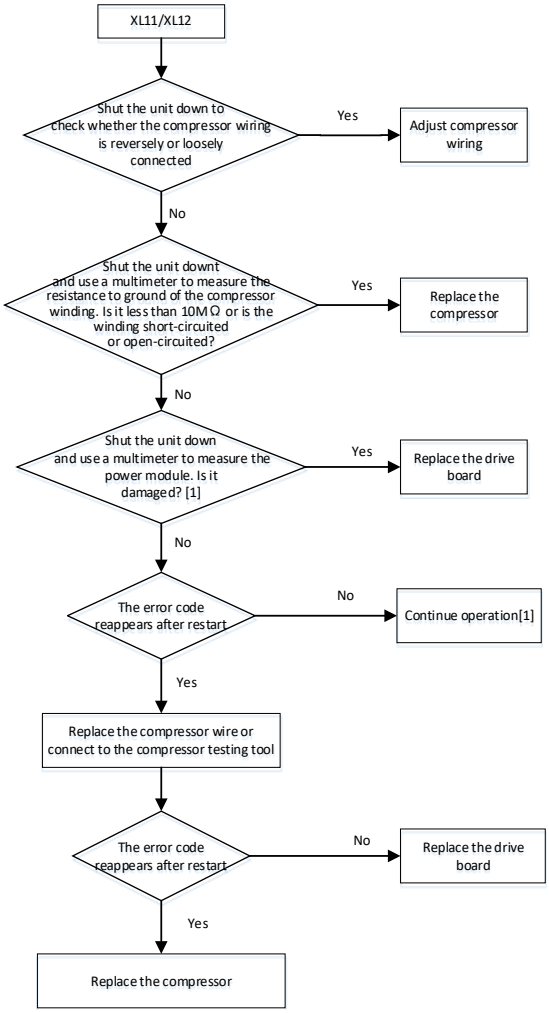
3.2.3 Trigger / recover condition

- Trigger condition:
  xL11: The compressor current is detected to have exceeded the protection value set for the software 3 times in a row.
  xL12: Software overcurrent protection last 30s
- Recover condition: The compressor will stop when the error occurs. If the error disappears one minute later, the compressor will start again
- Reset method:Resume automatically after reaching exit condition of Error

3.2.4 Possible causes

- There are impurities in the refrigerant system or the compressor is instantaneously locked.
- The compressor drive board is faulty.
- The system is faulty, due to reasons such as liquid return and impurities.

3.2.5 Procedure



Notes:
[1]Voltage fluctuation occurs when high-power equipment is started

3.3 xL2E: Module overtemperature protection

3.3.1 Digital display output

3.3.2 Description

- The temperature of the compressor or fan drive board (IPM) exceeds the set value (100°C).
- The compressor will stop when the error occurs. If the error disappears one minute later, the compressor will start again

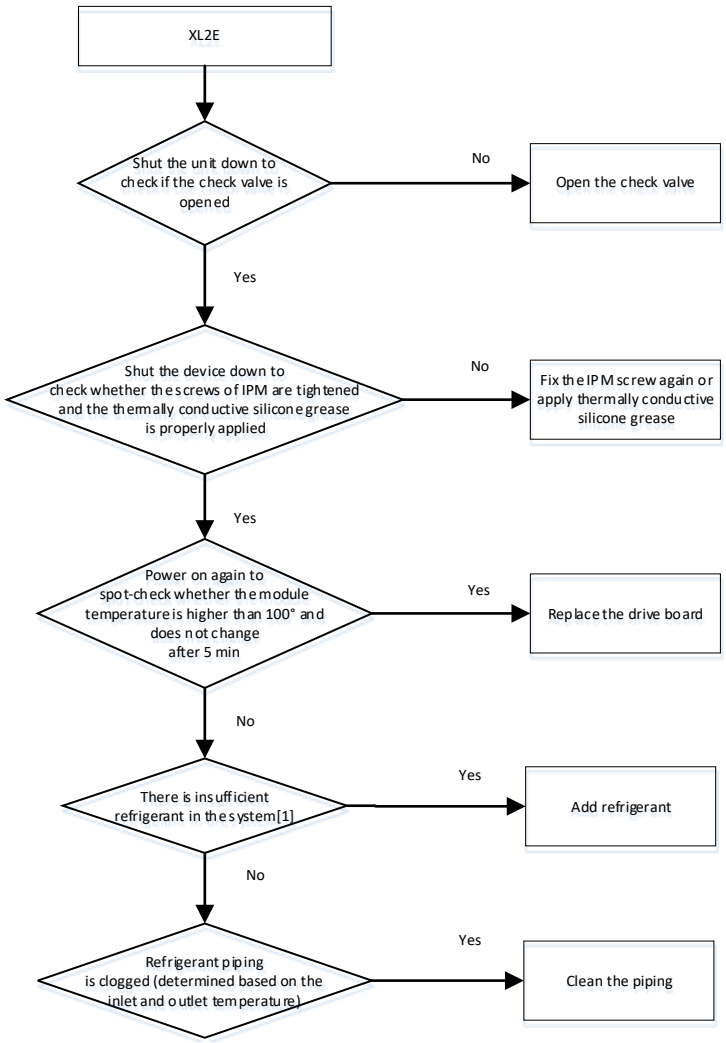
3.3.3 Trigger / recover condition

- Trigger condition:The temperature of the IPM exceeds the set value
- Recover condition: The compressor will stop when the error occurs. If the error disappears one minute later, the compressor will start again (when module temperature is lower than the set value).
- Reset method:Resume automatically

3.3.4 Possible causes

- The set screws of the compressor or fan drive board (IPM) are not tightened, resulting in poor heat dissipation:
- The heat dissipation silicone for the IPM module is not evenly applied, resulting in poor heat dissipation:
- There is insufficient refrigerant in the system or the piping is clogged, resulting in poor cooling effect.
- The drive board is faulty.

3.3.5 Procedure



Notes:
[1] Less refrigerant system results in higher Discharge temperature of the compressor, lower Discharge and suction pressure, lower current, and frost on the gas return pipe. Refer to Table 5.2.1 and 5.2.2 "Normal Refrigerant System parameters" in Chapter 5 for normal system parameters.

3.4 XL01: L1*/L2* Fault Occurs 10 Times in 1 h

3.4.1 Digital display output

3.4.2 Description

- xL1*/xL2* fault occurs 10 times in 1 h.

3.4.3 Possible Cause

- Spot check to inquire about the code. Find out the cause by the error code.

3.4.4 Procedure

- Spot check to inquire about the error code. Refer to the process for the error code.

3.5 xL3E: The bus voltage is too low

3.5.1 Digital display output

3.5.2 Description

- The DC bus voltage of the drive board is lower than 350VDC.
- The compressor stops running after the error occurs. If the error disappears one minute later, the compressor starts again.

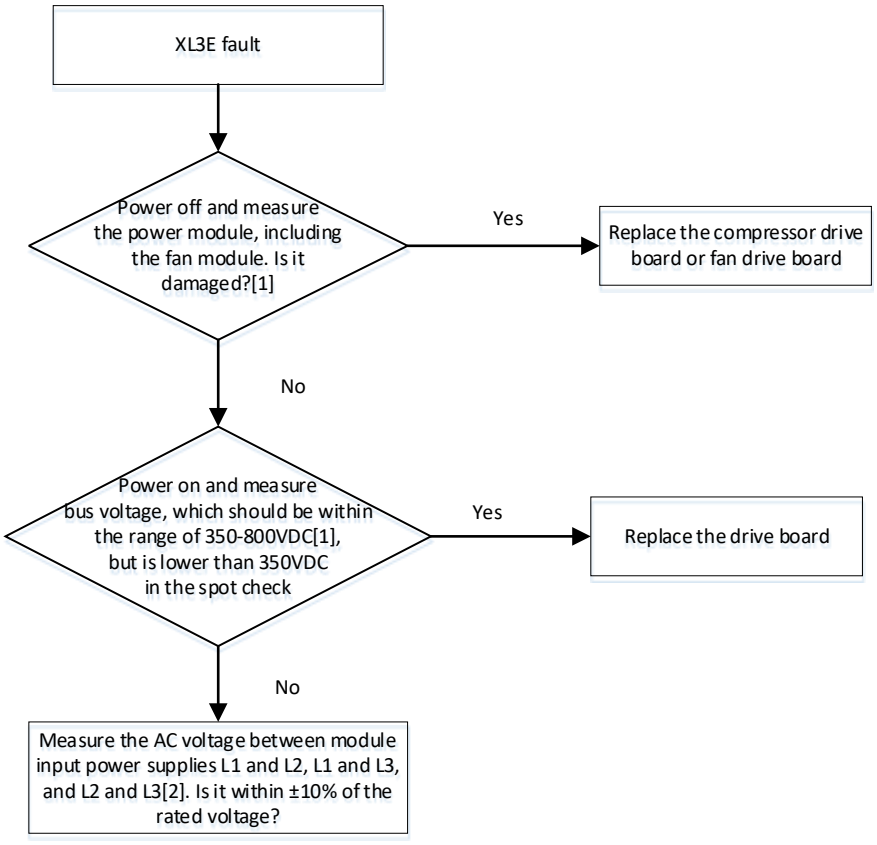
3.5.3 Trigger / recover condition

- Trigger condition: The bus voltage is lower than the bus voltage protection threshold set by the software.
- Recover condition: The compressor will stop when the error occurs. If the error disappears one minute later, the compressor will start again (bus voltage is higher than 350VDC).
- Reset method: Resume automatically after the error exit condition is reached.

3.5.4 Possible causes

- The input voltage is too low, resulting in the low bus voltage:
- The power grid suffers short-time power outage or the voltage is too low within a short time.
- The compressor drive board is faulty.

3.5.5 Procedure



Note:

[1] Refer to *5.5 Compressor & Fan drive board ports detection*

[2] When the system is powered on, use a multimeter to measure the voltages of the power input terminals L1, L2 and L3 of the inverter dirve board.

3.6 xL31: The bus voltage is too high

3.6.1 Digital display output

3.6.2 Description

- Bus voltage is higher than the high bus voltage protection threshold set by the software (800VDC).
- The compressor stops running after the error occurs. If the error disappears one minute later, the compressor starts again.

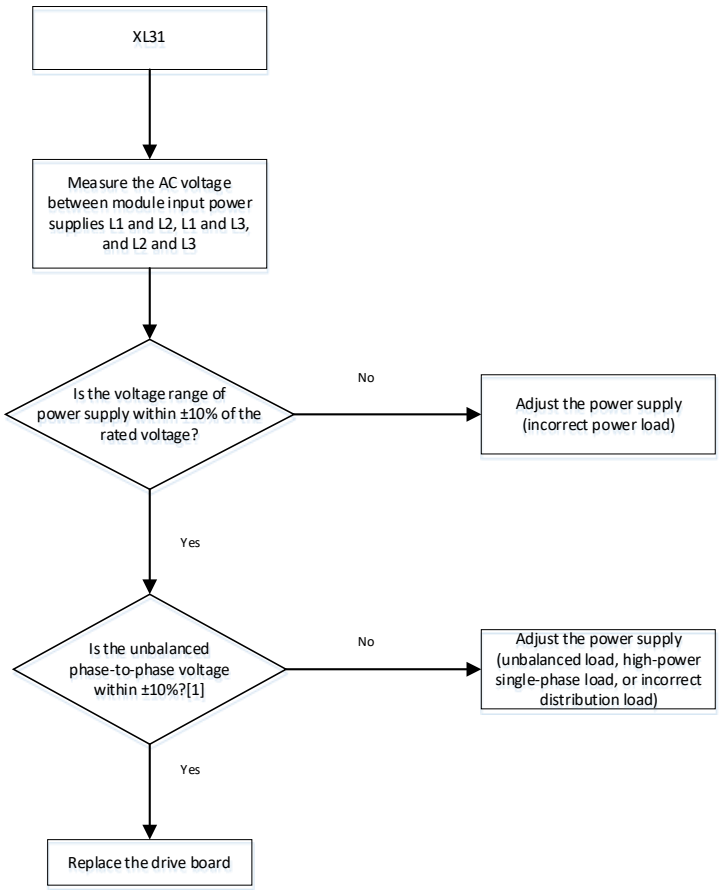
3.6.3 Trigger / recover condition

- Trigger condition: The bus voltage is higher than the software overvoltage protection threshold.
- Recover condition: The compressor will stop when the error occurs. If the error disappears one minute later, the compressor will start again (bus voltage is lower than 800VDC).
- Reset method: Resume automatically after the error exit condition is reached.

3.6.4 Possible causes

- The input voltage is too high, resulting in the high bus voltage;
- The power grid voltage is too high:
- The drive board is faulty.

3.6.5 Procedure



Notes:

[1] When the system is powered on, use the AC voltage function of a multimeter to measure the voltage of input terminals CN16 (L1), CN7 (L2) and CN15 (L3) of the power supply of the drive board. Compare the L1-L2, L2-L3, and L1-L3 voltages and check whether they are equal. If the voltages are almost equal, there is no problem with the power supply voltage. If the difference is greater than 10V, there may be phase unbalance of the power supply. If the difference is as great as dozens of or more than a hundred volts, the power supply or filter board may be faulty.

3.7 xL32: The bus voltage is excessively high

3.7.1 Digital display output

3.7.2 Description

- Bus voltage is higher than the high bus voltage protection threshold set by the software (820VDC).
- The compressor stops running after the error occurs. If the error disappears one minute later, the compressor starts again.

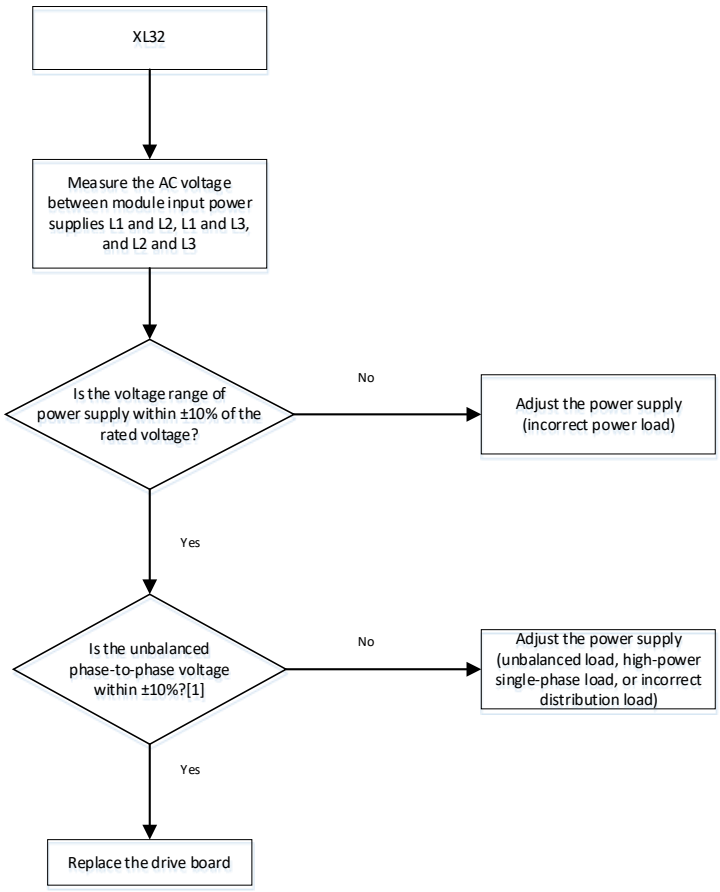
3.7.3 Trigger / recover condition

- Trigger condition: The bus voltage is too high, higher than the high bus voltage protection threshold set by the software (820VDC)
- Recover condition: The compressor will stop when the error occurs. If the error disappears one minute later, the compressor will start again
- Reset method: Resume automatically after the error exit condition is reached.

3.7.4 Possible causes

- The input voltage is too high, resulting in the high bus voltage;
- The power grid voltage is too high:
- The drive board is faulty.

3.7.5 Procedure



Notes:

[1] When the system is powered on, use the AC voltage function of a multimeter to measure the voltage of input terminals CN16 (L1), CN7 (L2) and CN15 (L3) of the power supply of the drive board. Compare the L1-L2, L2-L3, and L1-L3 voltages and check whether they are equal. If the voltages are almost equal, there is no problem with the power supply voltage. If the difference is greater than 10V, there may be phase unbalance of the power supply. If the difference is as great as dozens of or more than a hundred volts, the power supply or filter board may be faulty.

3.8 xL43: The current sampling bias is abnormal.

3.8.1 Digital display output

3.8.2 Description

- The drive board is faulty upon the power-on self test.
- Once this fault occurs, the compressor cannot be started up, and the drive board must be checked.

3.8.3 Trigger / recover condition

- Trigger condition: The drive board fails the power-on self test.

3.8.4 Possible causes

- The compressor and fan drive board is faulty.

3.8.5 Procedure

- Replace the compressor and fan drive board.

3.9 XL45: Motor Code Mismatch

3.9.1 Digital display output

3.9.2 Description

- The compressor parameters set by the main control board do not match the compressor parameters of the drive board.
- Once this fault occurs, the compressor cannot be started up, and the drive board must be checked.

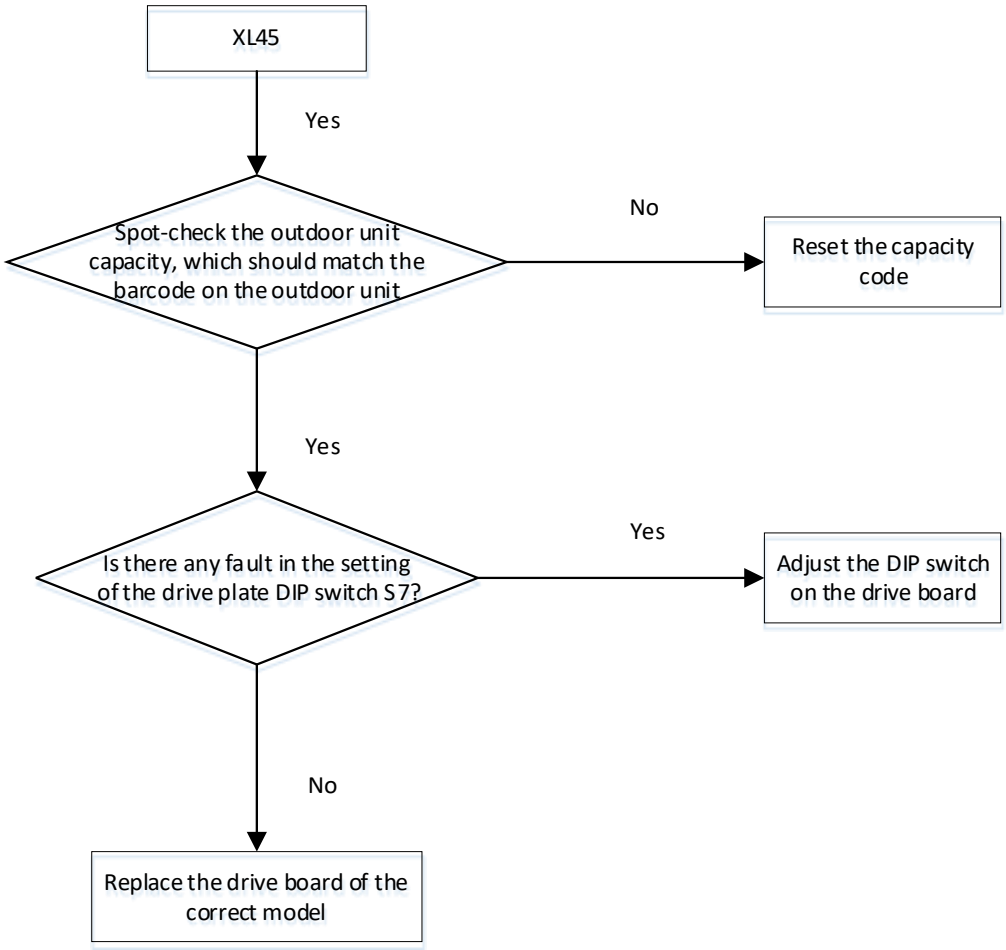
3.9.3 Trigger / recover condition

- Trigger condition: The compressor model selected through communication for the main control board does not match the compressor model in the drive.
- Restoration condition: Check whether the DIP switch of the model is wrong. Select a correct DIP switch for the model.
- Reset method: Resume manually (Select the correct DIP switch for the model, power the unit off, and power on again)

3.9.4 Possible causes

- The capacity DIP switch or model DIP switch of the main control board is incorrectly set.
- The model selected does not match the drive board.
- The main board or compressor drive board is faulty.

3.9.5 Procedure



3.10 XL46: IPM protection (FO)

3.10.1 Digital display output

3.10.2 Description

- IPM has overcurrent or IPM has drive undervoltage.
- The compressor stops running after the error occurs. If the error disappears one minute later, the compressor starts again.

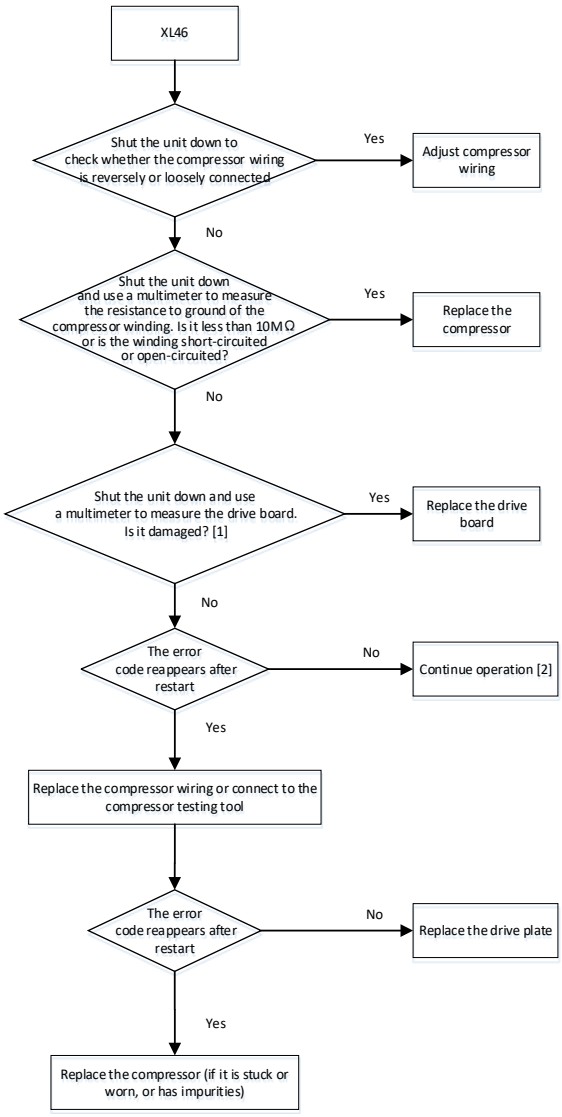
3.10.3 Trigger / recover condition

- Trigger condition: IPM has overcurrent or IPM has drive undervoltage.
- Restoration condition:
- Reset method: Resume manually

3.10.4 Possible causes

- The compressor wiring is reversely connected, in poor contact, or short-circuited.
- There is impurity in the refrigerant system or the compressor is instantaneously locked.
- The compressor drive board is faulty.

3.10.5 Procedure



Notes:
[1] Refer to *5.5 Compressor & Fan drive board ports detection*
[2] Voltage fluctuation occurs when high-power equipment is started

3.11 XL47: Module type mismatch

3.11.1 Digital display output

3.11.2 Description

- The compressor parameters set by the main control board do not match the compressor parameters, the driver board specifications set by the main control board do not match the compressor specifications of the drive board.

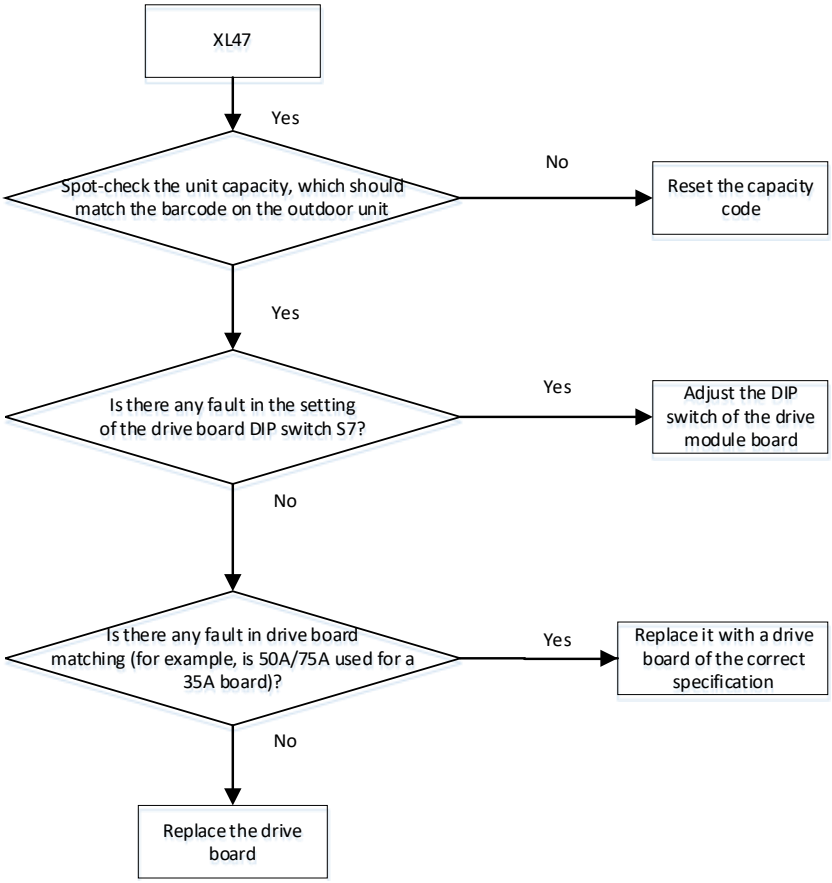
3.11.3 Trigger / recover condition

- Trigger condition: The compressor parameters set by the main control board do not match the compressor parameters, the driver board specifications set by the main control board do not match the compressor specifications of the drive board.
- Restoration condition: Select the correct drive board for the model, power the unit off, and start it up again.
- Reset method: Resume manually

3.11.4 Possible causes

- Model configuration parameters are incorrect.
- The drive board used does not match the model.
- The compressor drive board is faulty.

3.11.5 Procedure



3.12 xL5E: Startup failed

3.12.1 Digital display output

3.12.2 Description

- The compressor fails to start
- The compressor stops running after the error occurs. If the error disappears one minute later, the compressor starts again.

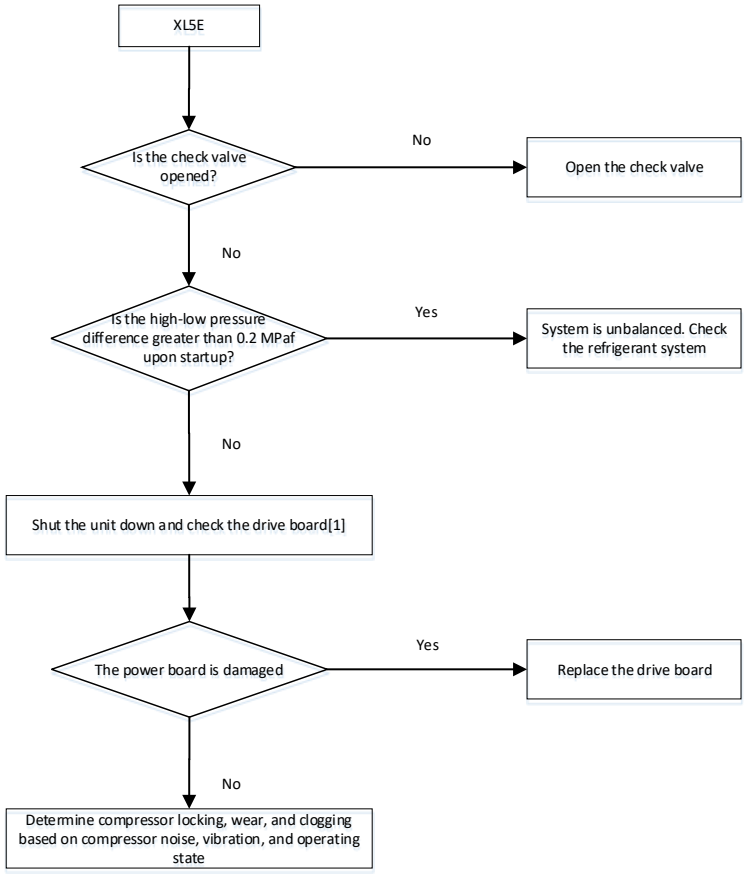
3.12.3 Trigger / recover condition

- Trigger condition:The compressor fails to start
- Recover condition: If the compressor fails to start and starts again successfully, the error will be rectified.
- Reset method: Resume automatically.

3.12.4 Possible causes

- The check valve is not opened.
- Differential pressure occurs upon system startup.
- The compressor is locked, worn, or blocked.
- The compressor drive board is faulty.

3.12.5 Procedure



Notes:
[1] Refer to *5.5 Compressor & Fan drive board ports detection*

3.13 xL52: Locked-rotor protection

3.13.1 Digital display output

3.13.2 Description

- The compressor is blocked.
- The compressor stops running after the error occurs. If the error disappears one minute later, the compressor starts again.

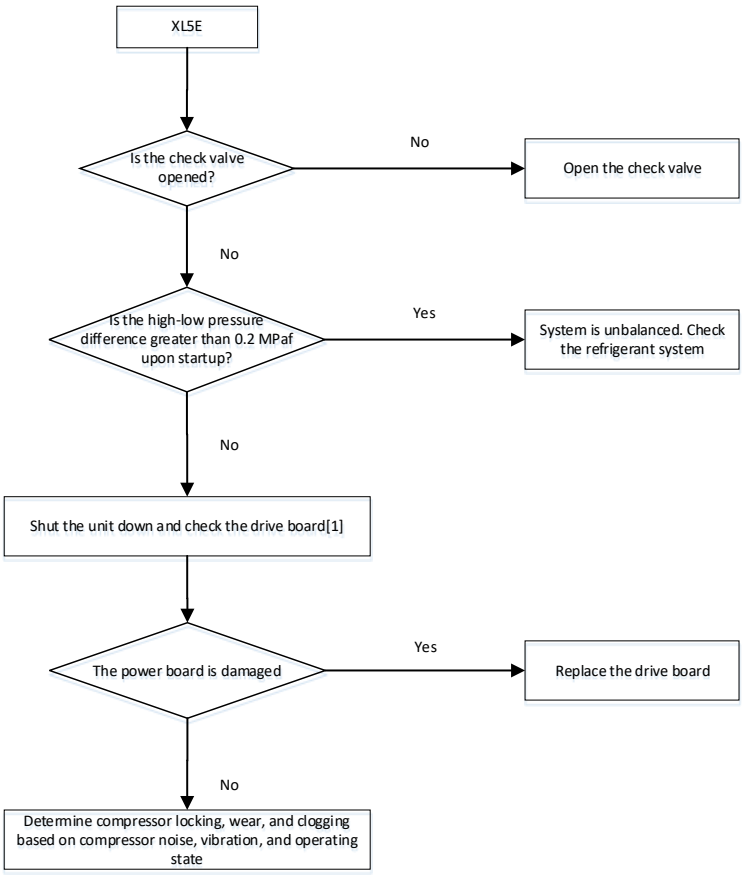
3.13.3 Trigger / recover condition

- Trigger condition: The compressor is blocked.
- Recover condition: The blocking error is removed.
- Reset method: Resume automatically after the error exit condition is reached.

3.13.4 Possible causes

- The compressor is blocked due to impurities or lack of oil in the system.

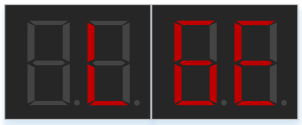
3.13.5 Procedure



Notes:
[1] Refer to *5.5 Compressor & Fan drive board ports detection*

3.14 xL6E: Compressor motor lack of phase protection

3.14.1 Digital display output



3.14.2 Description

- The high pressure switch (CN21) connected to the drive board acts.
- When the fault occurs, the compressor stops operation. If the fault disappears in 1 min, the compressor is started up again.

3.14.3 Trigger / recover condition

- Trigger condition: High-voltage open circuit is detected.
- Reset method: Resume automatically after the error exit condition is reached.

3.14.4 Possible causes

- System pressure is too high.
- The high pressure switch is faulty.
- The drive board is faulty.

3.14.5 Procedure

- Refer to P13 Troubleshooting.

4 Error in Fan Drive

4.1 xJ1E: Hardware overcurrent

4.1.1 Digital display output

4.1.2 Description

- The fan current exceeds the protection value set for the hardware.
- The fan stops running after the error occurs. If the error disappears five seconds, the fan starts again

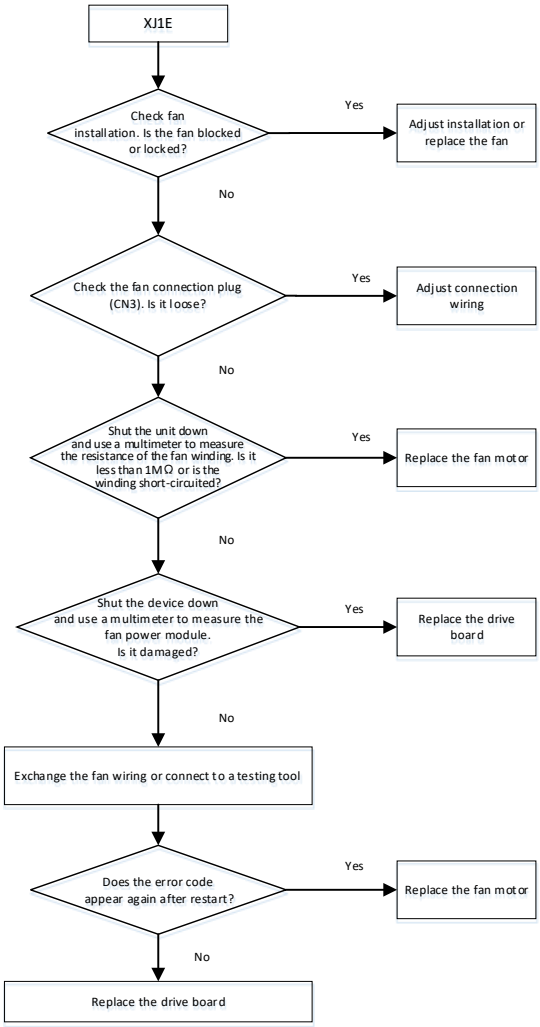
4.1.3 Trigger / recover condition

- Trigger condition: The instantaneous current of the fan exceeds the protection value.
- Recover condition:The fan will stop after failure, and recover after five seconds when the condition of failure exit is reached
- Reset method:The system automatically recovers five seconds after the error exit condition is reached

4.1.4 Possible causes

- The fan is blocked or the internal coil is short-circuited or damaged
- The fan drive board is damaged
- The circuits of Inverter drive board(fan section) are abnormal

4.1.5 Procedure



4.2 xJ11, xJ12: Software overcurrent

4.2.1 Digital display output

4.2.2 Description

- The fan current exceeds the protection value set for the software.
- The fan will stop when the error occurs. If the error disappears five seconds later, the fan will start again.

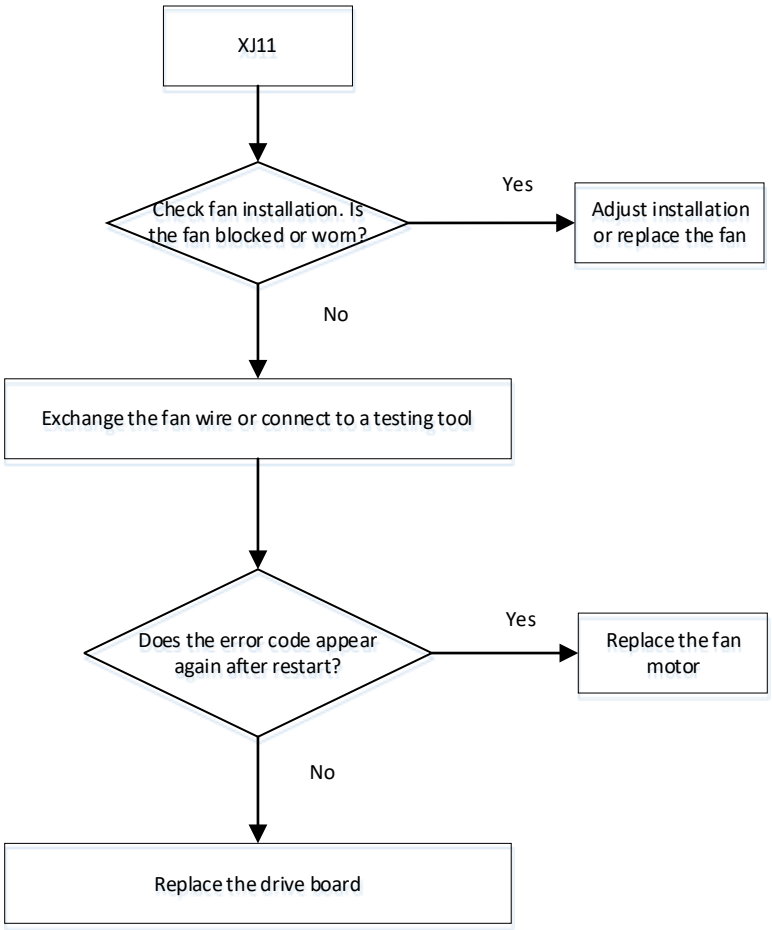
4.2.3 Trigger / recover condition

- Trigger condition:
  xJ11: The compressor current is detected to have exceeded the protection value set for the software 3 times
  xJ12: Software overcurrent protection last 30s
- Recover condition: The fan will stop when the error occurs. If the error disappears five seconds later, the fan will start again
- Reset method:Resume automatically after reaching exit condition of Error

4.2.4 Possible causes

- Severe fan wear.
- The fan drive board is faulty.

4.2.5 Procedure



4.3 xJ2E: Module overtemperature protection

4.3.1 Digital display output

4.3.2 Description

- The internal temperature of the fan drive module (IPM) is higher than 100℃.

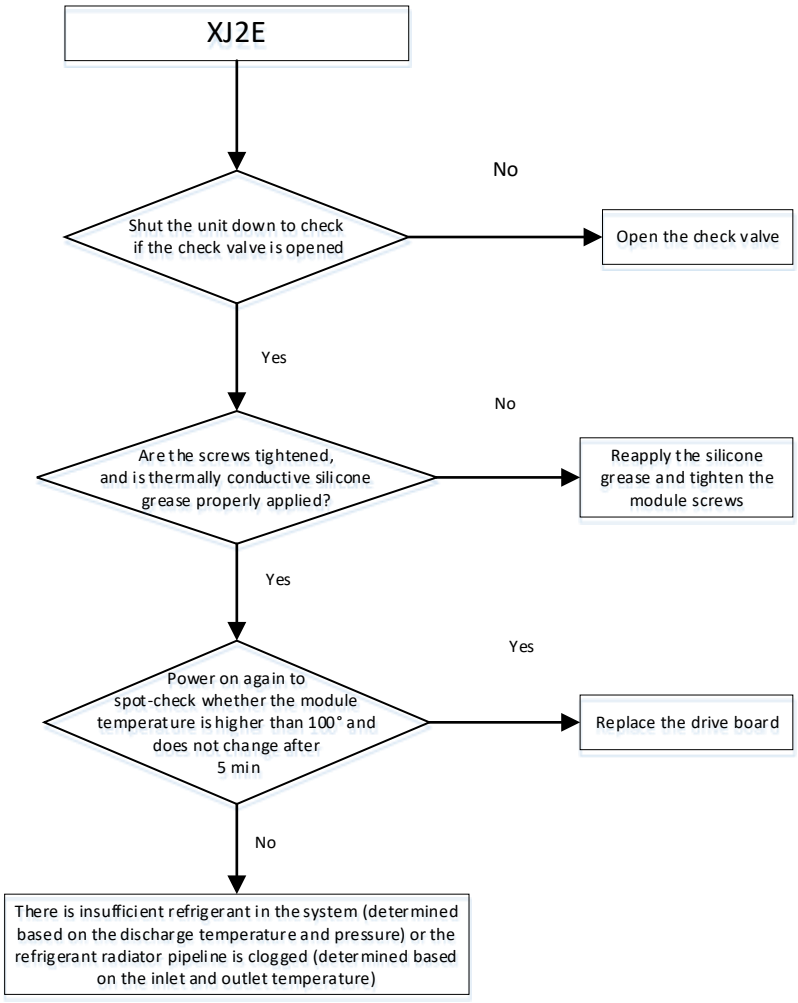
4.3.3 Trigger / recover condition

- Trigger condition:The temperature of the IPM exceeds 100℃
- Recover condition: After an error occurs, the fan is shut down. The fan will recover five seconds later when the error exit condition is reached (the module temperature is lower than 100℃).
- Reset method: Resume automatically after the error exit condition is reached.

4.3.4 Possible causes

- The IPM screws are not tightened, resulting in poor heat dissipation:
- The heat dissipation silicone for the IPM module is not evenly applied, resulting in poor heat dissipation:
- The fan drive board is faulty.

4.3.5 Procedure



4.4 XJ01: J1*/J2* Fault Occurs 10 Times in 1 h

4.4.1 Digital display output

4.4.2 Description

- xJ1*/xJ2* fault occurs 10 times in 1 h.

4.4.3 Possible Cause

- Spot check to inquire about the code. Find out the cause by the error code.

4.4.4 Procedure

- Spot check to inquire about the error code. Refer to the process for the error code.

4.5 xJ3E: The bus voltage is too low

4.5.1 Digital display output

4.5.2 Description

- Bus voltage is lower than the low bus voltage protection threshold set by the software (350VDC).
- The fan stops running after the error occurs. If the error disappears five seconds later, the fan starts again.

4.5.3 Trigger / recover condition

- Trigger condition: The bus voltage is lower than the bus voltage protection threshold set by the software.
- Recover condition: The bus voltage is higher than the low bus voltage protection threshold set by the software
- Reset method: Resume automatically after the error exit condition is reached.

4.5.4 Possible causes

- The input voltage is too low, resulting in the low bus voltage:
- Voltage sag or interruption, resulting in transient bus voltage is too low:
- The bus voltage detection circuit of the module is abnormal:

4.5.5 Procedure

Troubleshoot according to xL3E

4.6 xJ31: The bus voltage is too high

4.6.1 Digital display output

4.6.2 Description

- Bus voltage is higher than the high bus voltage protection threshold set by the software (750VDC).
- The fan stops running after the error occurs. If the error disappears five seconds later, the fan starts again.

4.6.3 Trigger / recover condition

- Trigger condition: The bus voltage is higher than the software overvoltage protection threshold.
- Recover condition: The bus voltage is lower than the overvoltage protection threshold set by the software.
- Reset method: Resume automatically after the error exit condition is reached.

4.6.4 Possible causes

- The input voltage is too high, resulting in the high bus voltage;
- The power grid voltage is too high:
- The bus voltage detection circuit of the module is abnormal:

4.6.5 Procedure

Troubleshooting according to xL31

4.7 xJ32: The bus voltage is excessively high

4.7.1 Digital display output

4.7.2 Description

- Bus voltage is higher than the high bus voltage protection threshold set by the software (770VDC).
- The fan stops running after the error occurs. If the error disappears five seconds later, the fan starts again.

4.7.3 Trigger / recover condition

- Trigger condition: The bus voltage is too high, higher than the high bus voltage protection threshold set by the software (770VDC)
- Recover condition: The bus voltage is lower than the high bus voltage protection threshold.
- Reset method: Resume automatically after the error exit condition is reached.

4.7.4 Possible causes

- The input voltage is too high, resulting in the high bus voltage;
- The power grid voltage is too high:
- The bus voltage detection circuit of the module is abnormal:

4.7.5 Procedure

Troubleshooting according to xL32

4.8 xJ43: The current sampling bias is abnormal

4.8.1 Digital display output

4.8.2 Description

- The detection circuit of the drive board fails the power-on self test.
- After this error occurs, the fan cannot start. Check whether the inverter driver board is in error.

4.8.3 Trigger / recover condition

- Trigger condition: The drive board fails the power-on self test.
- Reset method: Restoration after passing the self test.

4.8.4 Possible causes

- The fan drive board is abnormal

4.8.5 Procedure

- Replace the inverter drive board

4.9 xJ45: Motor Code Mismatch

4.9.1 Digital display output

4.9.2 Description

- The compressor parameters set by the main control board do not match the compressor parameters of the drive board.
- Once this fault occurs, the fan cannot be started up, and the drive board must be checked.

4.9.3 Trigger / recover condition

- Trigger condition: The fan model selected through communication for the main control board does not match the fan model in the drive.
- Restoration condition: Check whether the DIP switch of the model is wrong. Select a correct DIP switch for the model.
- Reset method: Resume manually (Select the correct DIP switch for the model, power the unit off, and power on again)

4.9.4 Possible causes

- The capacity DIP switch or model DIP switch of the main control board is incorrectly set.
- The model selected does not match the drive board.
- The fan drive board is faulty.

4.9.5 Procedure

Troubleshooting according to xL45

4.10 XL47: Module Type Mismatch

4.10.1 Digital display output

4.10.2 Description

- The fan parameters set by the main control board do not match the fan parameters, the driver board specifications set by the main control board do not match the fan specifications of the drive board.

4.10.3 Trigger / recover condition

- Trigger condition: The fan parameters set by the main control board do not match the fan parameters, the driver board specifications set by the main control board do not match the fan specifications of the drive board.
- Restoration condition: Select the correct drive board for the model, power the unit off, and start it up again.
- Reset method: Resume manually

4.10.4 Possible causes

- Model configuration parameters are incorrect.
- The drive board used does not match the model.
- The drive board is faulty.

4.10.5 Procedure

Troubleshooting according to xL47

4.11 xJ5E: Startup failed

4.11.1 Digital display output

4.11.2 Description

- The fan fails to be started.
- The fan stops running after the error. If the error disappears after five seconds, the fan starts again.

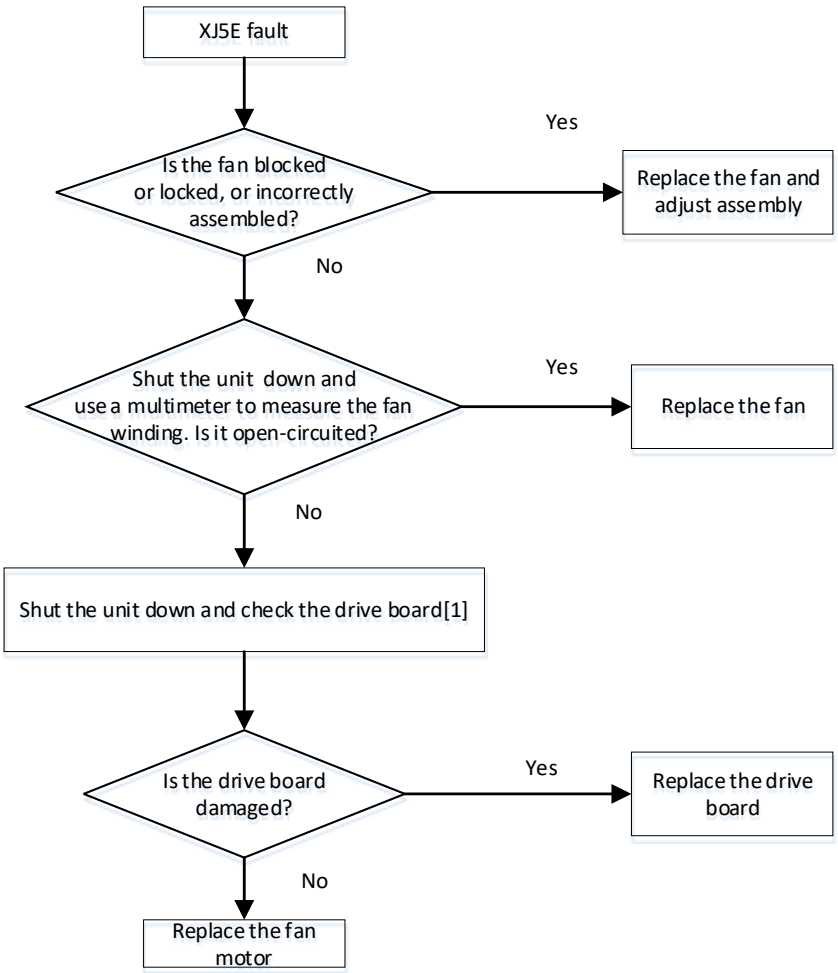
4.11.3 Trigger / recover condition

- Trigger condition: Fan startup failure.
- Recover condition: If the fan fails to start, the fan restarts again and the error is rectified after the fan starts successfully.
- Reset method: Resume automatically after the fan starts successfully.

4.11.4 Possible causes

- Fan motor stuck:
- Fan is started against the wind:
- Fan drive board is abnormal:

4.11.5 Procedure



4.12 xJ52: Locked-rotor protection

4.12.1 Digital display output

4.12.2 Description

- The fan is blocked.
- The fan stops running after the error. If the error disappears after five seconds, the fan starts again.

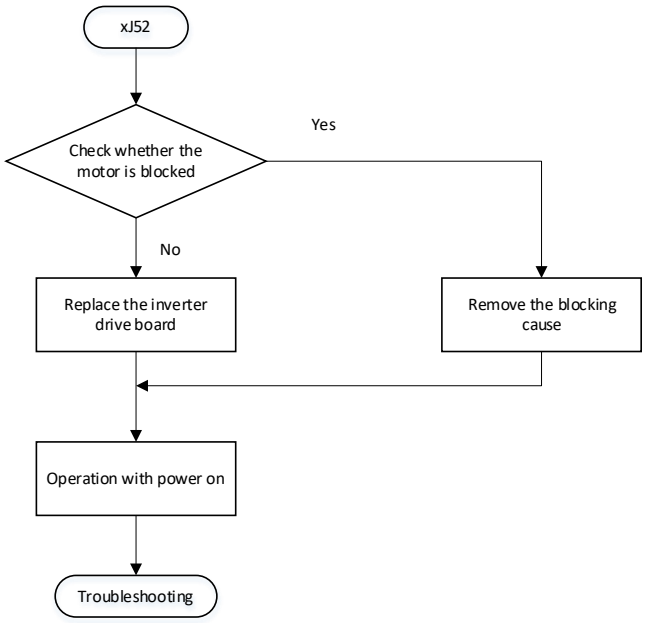
4.12.3 Trigger / recover condition

- Trigger condition: The fan is blocked.
- Recover condition: The blocking error is removed.
- Reset method: Resume automatically after the error exit condition is reached.

4.12.4 Possible causes

- The fan shaft is stuck.

4.12.5 Procedure



4.13 xJ6E: Motor lack of phase protection

4.13.1 Digital display output

4.13.2 Description

- The fan has phase loss protection.
- The fan stops running after the error. If the error disappears after five seconds, the fan starts again

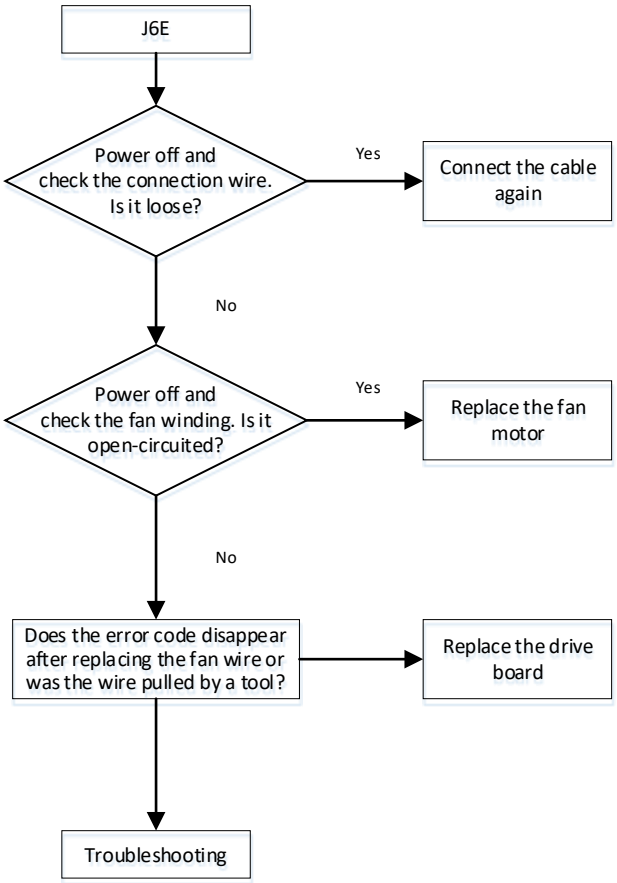
4.13.3 Trigger / recover condition

- Trigger condition: The fan has phase loss protection.
- Recover condition: Check the fan wiring, after the wiring is good, the error of missing phase protection is removed.
- Reset method:Resume Automatically after the error exit condition is reached

4.13.4 Possible causes

- The compressor cable is in poor contact or the terminal screw is not tightened.
- The IPM of inverter drive board is damaged:

4.13.5 Procedure



4.14 xJ65: Fan IPM Short Circuit Protection

4.14.1 Digital display output

4.14.2 Description

- The fan is in IPM short circuit protection.
- The fan stops running after the error. If the error disappears after five seconds, the fan starts again

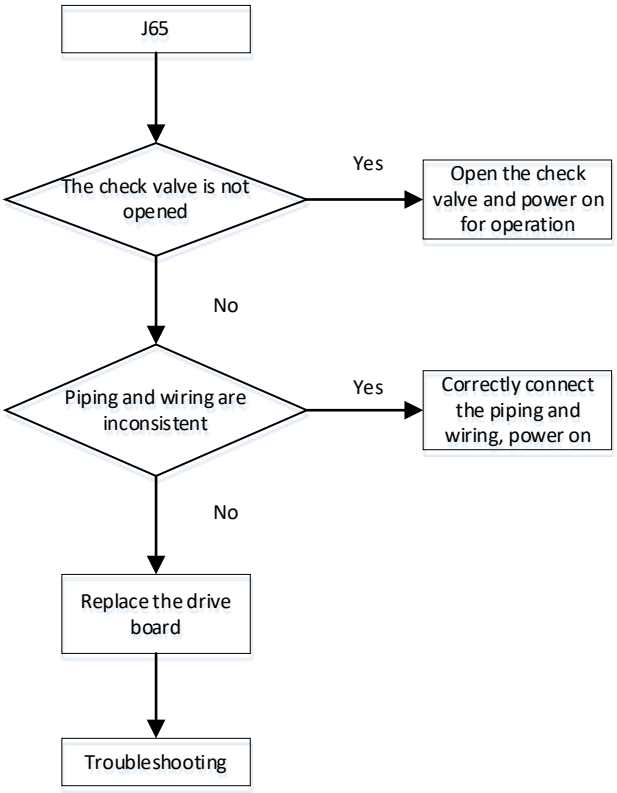
4.14.3 Trigger / recover condition

- Trigger condition: The fan is in IPM short circuit protection.
- Recover condition: IPM short circuit protection is disabled.
- Reset method:Resume Automatically after the error exit condition is reached

4.14.4 Possible causes

- The check valve is not opened.
- Piping and wiring are inconsistent. For example, the piping for system A is connected to system A and the communication wiring is connected to system B.
- Coils of EEVA and EEVC are reversely connected.
- The fan drive board is short-circuited or damaged.

4.14.5 Procedure



5 Appendix

5.1 Resistance characteristics of temperature sensor

Table 6-5.1: Temperature probe symbol and position

Temperature probe symbol and position		The probe type
T3	Bottom of heat exchanger	Type A
T4	Outdoor ambient temperature	Type A
T5	Liquid pipe stop valve	Type A
T6A	Microchannel heat exchanger inlet pipe	Type A
T6B	Microchannel heat exchanger outlet pipe	Type A
T71/T72	Inverter compressor A/B suction	Type A
T7C1/T7C2	Inverter compressor A discharge	Type B
T8	Outdoor Heat exchanger gas pipe	Type A
TL	Outdoor Heat exchanger liquid pipe	Type A
Tg	Gas pipe stop valve	Type A
Tb	Electric control box cavity	Type A
Tr	Sampling resistance of inverter drive board	Type C
NTC	inverter drive board	Type C

Notes: Type A is mainly used for general pipe temperature and ambient temperature detection

Type B is mainly used for compressor discharge temperature detection

Type C is mainly used for internal temperature detection of electronic control board

Table 6-5.2: Temperature sensor temperature resistance characteristic table

temperature	resistance (kΩ)		
(°C)	Type A	Type B	Type C
-20	115.3	542.7	532.2
-19	108.1	511.9	502.2
-18	101.5	483	474.1
-17	96.34	455.9	447.7
-16	89.59	430.5	423
-15	84.22	406.7	399.8
-14	79.31	384.3	378
-13	74.54	363.3	357.5
-12	70.17	343.6	338.2
-11	66.09	325.1	320.1
-10	62.28	307.7	303.1
-9	58.71	291.3	287.1
-8	56.37	275.9	272
-7	52.24	261.4	257.8
-6	49.32	247.8	244.4
-5	46.57	234.9	231.9
-4	44	222.8	220
-3	41.59	211.4	208.7
-2	39.82	200.7	198.2
-1	37.2	190.5	188.2
0	35.2	180.9	178.8

Table 6-5.2: Temperature sensor temperature resistance characteristic table (continues)

temperature	resistance (kΩ)		
(°C)	Type A	Type B	Type C
1	33.33	171.9	169.9
2	31.56	163.3	161.5
3	29.91	155.2	153.6
4	28.35	147.6	146.1
5	26.88	140.4	139.1
6	25.5	133.5	132.3
7	24.19	127.1	126
8	22.57	121	120
9	21.81	115.2	114.3
10	20.72	109.8	109
11	19.69	104.6	103.9
12	18.72	99.69	99.02
13	17.8	95.05	94.44
14	16.93	90.66	90.11
15	16.12	86.49	86
16	15.34	82.54	82.09
17	14.62	78.79	78.38
18	13.92	75.24	74.87
19	13.26	71.86	71.53
20	12.64	68.66	68.36
21	12.06	65.62	65.34
22	11.5	62.73	62.47
23	10.97	59.98	59.75
24	10.47	57.37	57.17
25	10	54.89	54.71
26	9.551	52.53	52.36
27	9.124	50.28	50.13
28	8.72	48.14	48.01
29	8.336	46.11	45.99
30	7.971	44.17	44.07
31	7.624	42.33	42.23
32	7.295	40.57	40.48
33	6.981	38.89	38.81
34	6.684	37.3	37.23
35	6.4	35.78	35.71
36	6.131	34.32	34.27
37	5.874	32.94	32.89
38	5.63	31.62	31.58
39	5.397	30.36	30.33
40	5.175	29.15	29.13
41	4.964	28	27.98
42	4.763	26.9	26.89
43	4.571	25.86	25.85

Table 6-5.2: Temperature sensor temperature resistance characteristic table (continues)

temperature	resistance (kΩ)		
(°C)	Type A	Type B	Type C
44	4.387	24.85	24.85
45	4.213	23.89	23.9
46	4.046	22.89	22.98
47	3.887	22.1	22.1
48	3.735	21.26	21.26
49	3.59	20.46	20.47
50	3.451	19.69	19.7
51	3.318	18.96	18.97
52	3.192	18.26	18.26
53	3.071	17.58	17.59
54	2.959	16.94	16.94
55	2.844	16.32	16.32
56	2.738	15.73	15.73
57	2.637	15.16	15.16
58	2.54	14.62	14.62
59	2.447	14.09	14.1
60	2.358	13.59	13.6
61	2.272	13.11	13.12
62	2.191	12.65	12.65
63	2.112	12.21	12.22
64	2.037	11.79	11.79
65	1.965	11.38	11.39
66	1.896	10.99	10.99
67	1.83	10.61	10.62
68	1.766	10.25	10.25
69	1.705	9.902	9.909
70	1.647	9.569	9.576
71	1.591	9.248	9.253
72	1.537	8.94	8.947
73	1.485	8.643	8.646
74	1.435	8.358	8.362
75	1.387	8.084	8.089
76	1.341	7.82	7.821
77	1.291	7.566	7.569
78	1.254	7.321	7.323
79	1.2133	7.086	7.088
80	1.174	6.859	6.858
81	1.136	6.641	6.64
82	1.1	6.43	6.432
83	1.064	6.228	6.23
84	1.031	6.033	6.033
85	0.9982	5.844	5.847
86	0.9668	5.663	5.667

Table 6-5.2: Temperature sensor temperature resistance characteristic table (continues)

temperature	resistance (kΩ)		
(°C)	Type A	Type B	Type C
87	0.9366	5.488	5.492
88	0.9075	5.32	5.322
89	0.8795	5.157	5.159
90	0.8525	5	5
91	0.8264	4.849	4.855
92	0.8013	4.703	4.705
93	0.7771	4.562	4.566
94	0.7537	4.426	4.431
95	0.7312	4.294	4.301
96	0.7094	4.167	4.176
97	0.6884	4.045	4.055
98	0.6682	3.927	3.938
99	0.6486	3.812	3.825
100	0.6297	3.702	3.716
101	0.6115	3.595	3.613
102	0.5939	3.492	3.514
103	0.5768	3.392	3.418
104	0.5604	3.296	3.326
105	0.5445	3.203	3.235
106	0.5291	3.113	3.148
107	0.5143	3.025	3.063
108	0.4999	2.941	2.982
109	0.486	2.86	2.902
110	0.4726	2.781	2.826
111	0.4596	2.704	2.747
112	0.447	2.63	2.672
113	0.4348	2.559	2.599
114	0.423	2.489	2.528
115	0.4116	2.422	2.46
116	0.4006	2.357	2.39
117	0.3899	2.294	2.322
118	0.3796	2.233	2.256
119	0.3695	2.174	2.193
120	0.3598	2.117	2.132
121	0.3504	2.061	2.073
122	0.3413	2.007	2.017
123	0.3325	1.955	1.962
124	0.3239	1.905	1.91
125	0.3156	1.856	1.859
126	0.3075	1.808	
127	0.2997	1.762	
128	0.2922	1.717	
129	0.2848	1.674	

Table 6-5.2: Temperature sensor temperature resistance characteristic table (continues)

temperature	resistance (kΩ)		
(°C)	Type A	Type B	Type C
130	0.2777	1.632	
131	0.2708		
132	0.2641		
133	0.2576		
134	0.2513		
135	0.2451		

5.2 Normal status parameter of refrigerant system

The parameters listed in Tables 6.5.3 and 6.5.4 need to be noted when the following conditions are met:

- The master can detect all indoor machines:
- The number of indoor units displayed for outdoor units is consistent with the actual installation.
- All stop valves have been opened and all indoor units' electronic expansion valve have been connected to their main control board:
- If the indoor unit connection rate is less than 100% and all indoor units are running.If the connection rate of the indoor unit is greater than 100%, the operating capacity of the indoor units is equal to the total capacity of the outdoor units.
- If the outdoor ambient temperature is high, and the system is in cooling mode and set the temperature to 17 ° C with high wind speed;
- If the outdoor ambient temperature is low, and the system is in heating mode and set to 30 ° C, high wind speed:
- The system runs properly for more than 30 minutes

Table 6-5.3: Outdoor unit cooling mode parameters

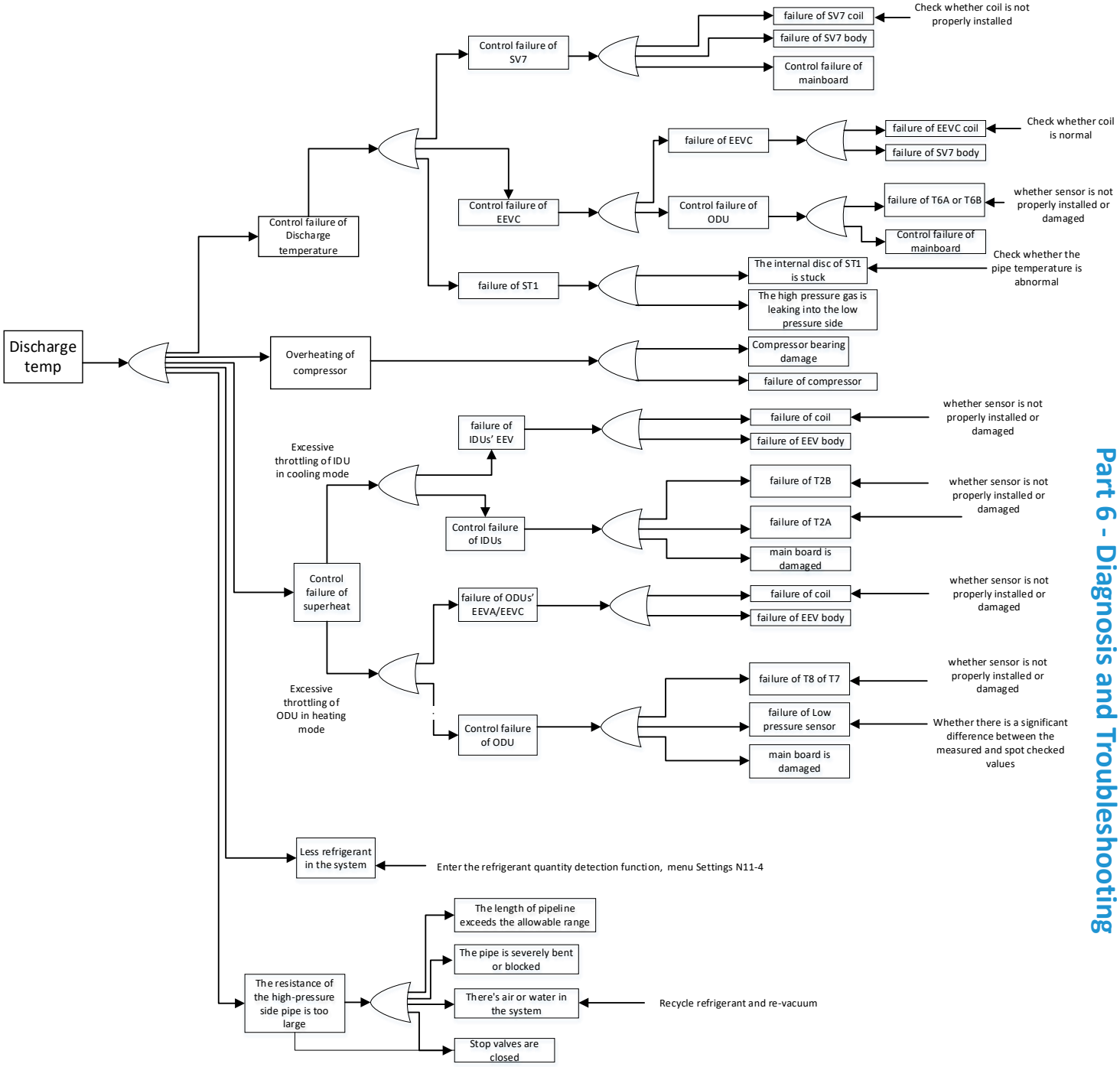
Outdoor ambient temperature	**°C**	< 10	10 to 26	26 to 31	31 to 41	> 41
Discharge temperature	**°C**	60-76	62-78	65-82	67-92	69-92
Discharge superheat	**°C**	17-30	17-33	17-34	17-36	10-32
discharge pressure	**MPa**	2.3-2.8	2.3-2.8	2.4-3.6	2.6-3.8	3.1-4.1
suction pressure	**MPa**	0.6-0.7	0.7-0.9	0.8-1.0	1.0-1.2	1.2-1.4

Table 6-5.4: Outdoor unit heating mode parameters

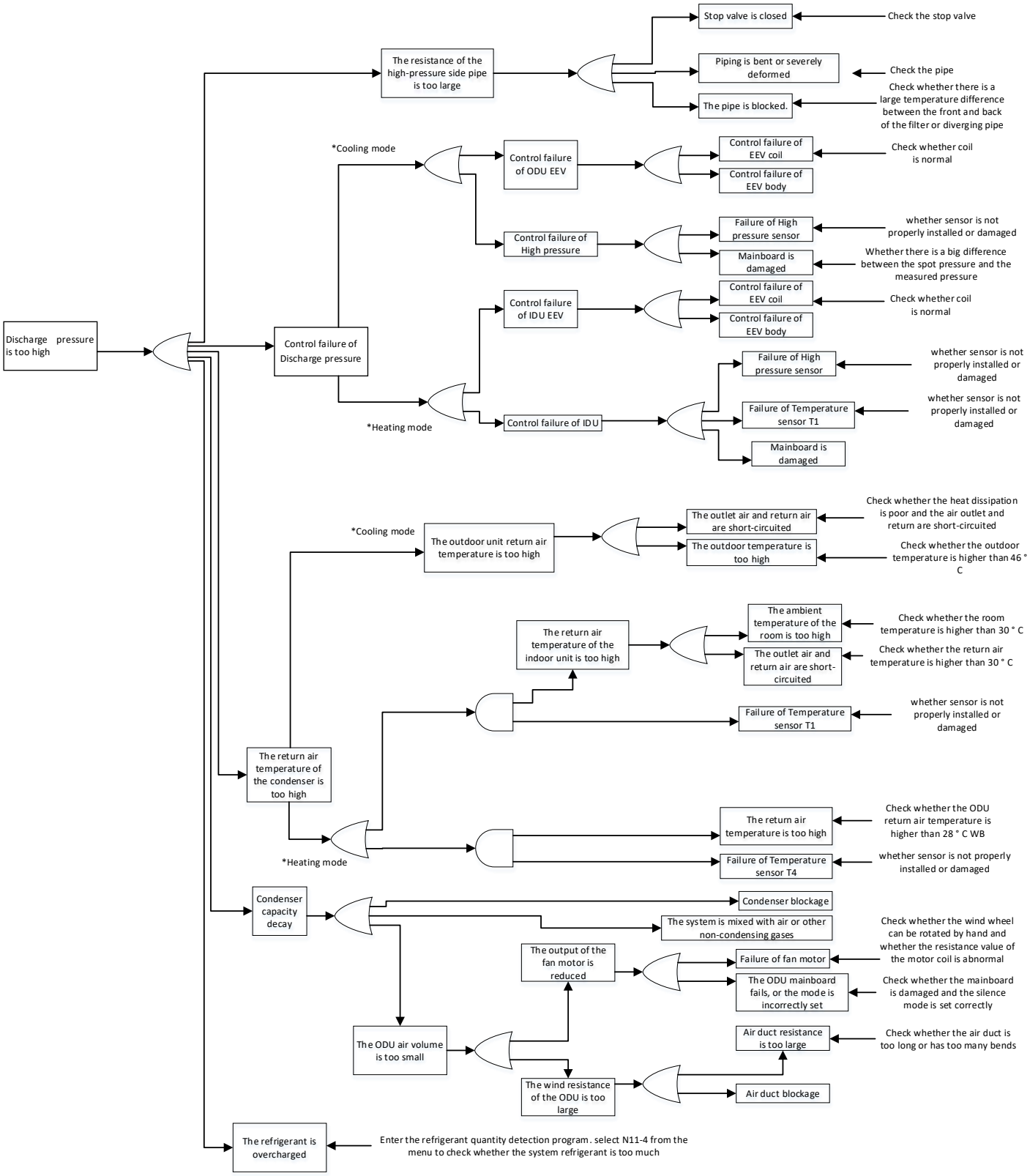
Outdoor temperature	**°C**	< -10	-10 to 10	0 to 5	5 to 10	10 to 17	> 17
Discharge temperature	**°C**	56-74	57-76	58-78	61-82	63-82	63-82
Discharge superheat	**°C**	17-35	17-35	17-35	17-33	14-33	14-33
discharge pressure	**MPa**	1.7-2.4	1.8-2.5	1.9-3.0	2.2-3.2	2.3-3.2	2.3-3.2
Back to the gas pressure	**MPa**	0.4-1.0	0.5-1.2	0.5-1.2	0.5-1.3	0.5-1.3	0.6-1.4

5.3 Analysis of the cause of system anomalies

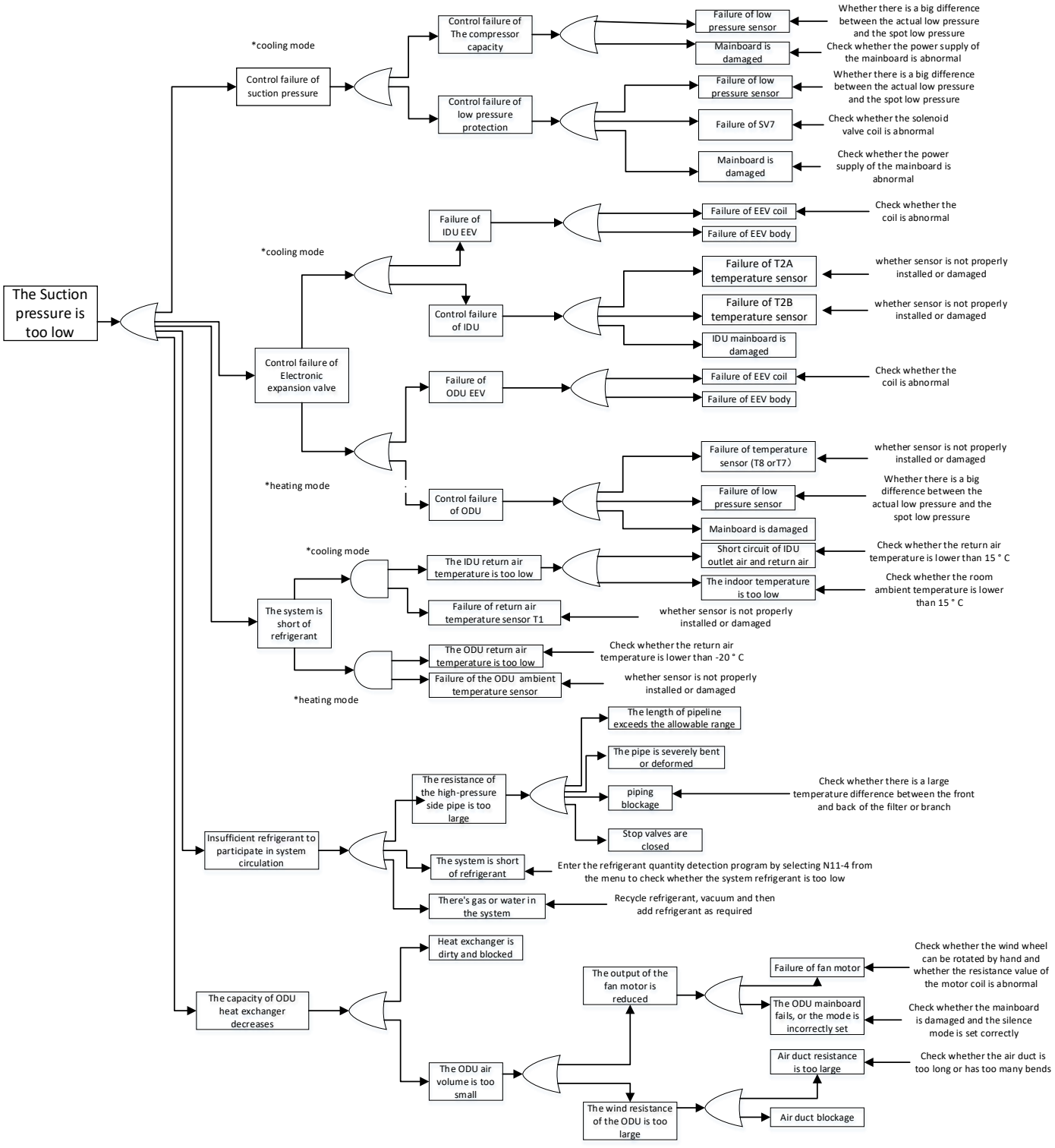
5.3.1 Cause Analysis of Excessive discharge Temperature



5.3.2 Cause Analysis of too high Pressure



5.3.3 Cause Analysis of too Low Pressure

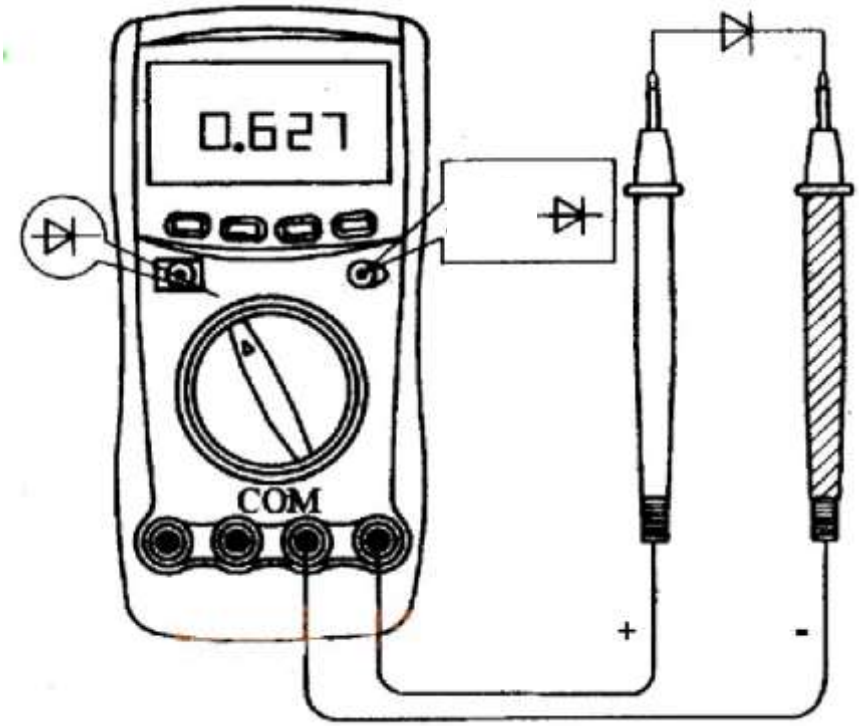


5.4 Inverter drive board measurement guidelines

Please give priority to the following things before testing Inverter drive board:

1) Cut off the power supply:
2) To avoid electric shock from capacitor discharge, power off for 10 minutes and wait for capacitor discharge before operation:
3) Remove all wiring on the Inverter drive board.

Tools: multimeter (measurable secondary pipe)



The following measurements are for reference:

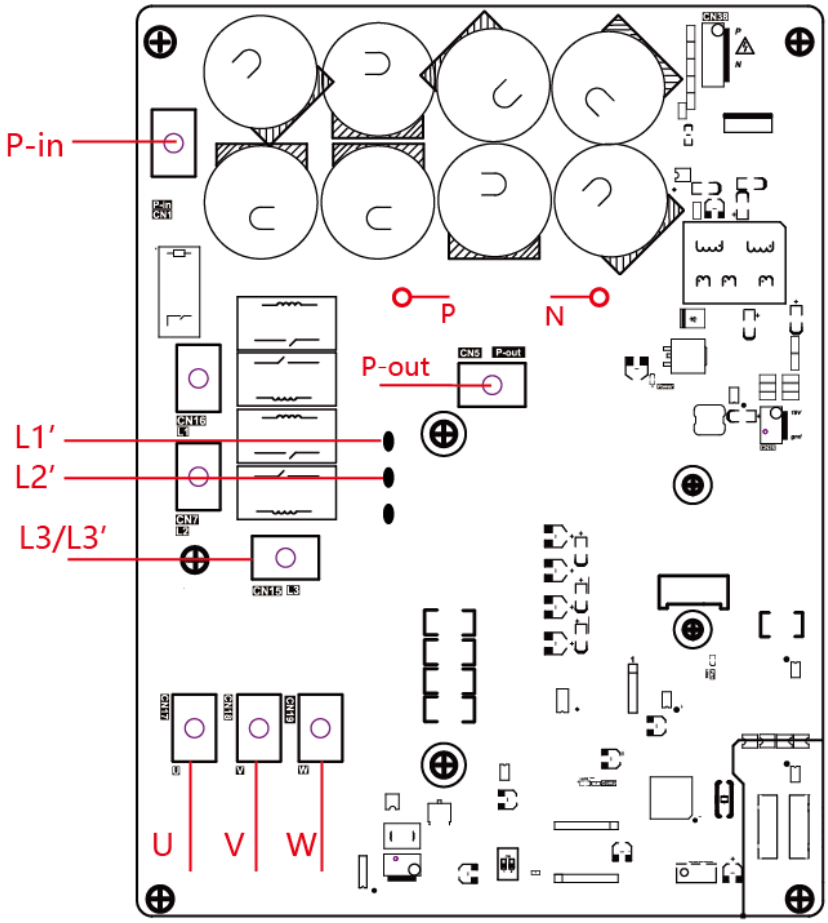
Inverter circuit measurement

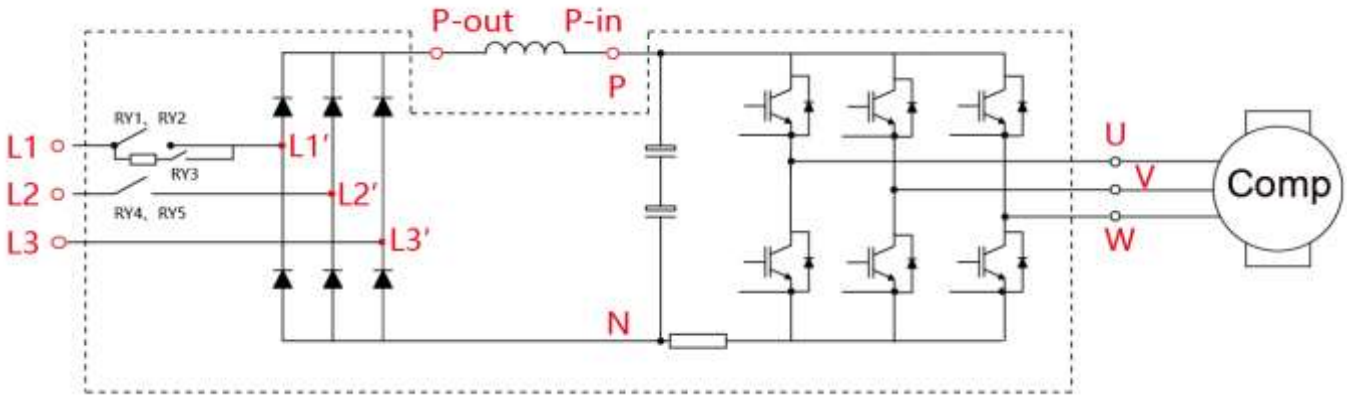
Number	Test point		Normal decision value	Notes
	+(Red)	-(Black)		
1	U	P-in	0.3-0.7V	0 or→+ ∞ is abnormal
2	V	P-in		
3	W	P-in		
4	N	U		
5	N	V		
6	N	W		

Rectifier bridge stack measurement

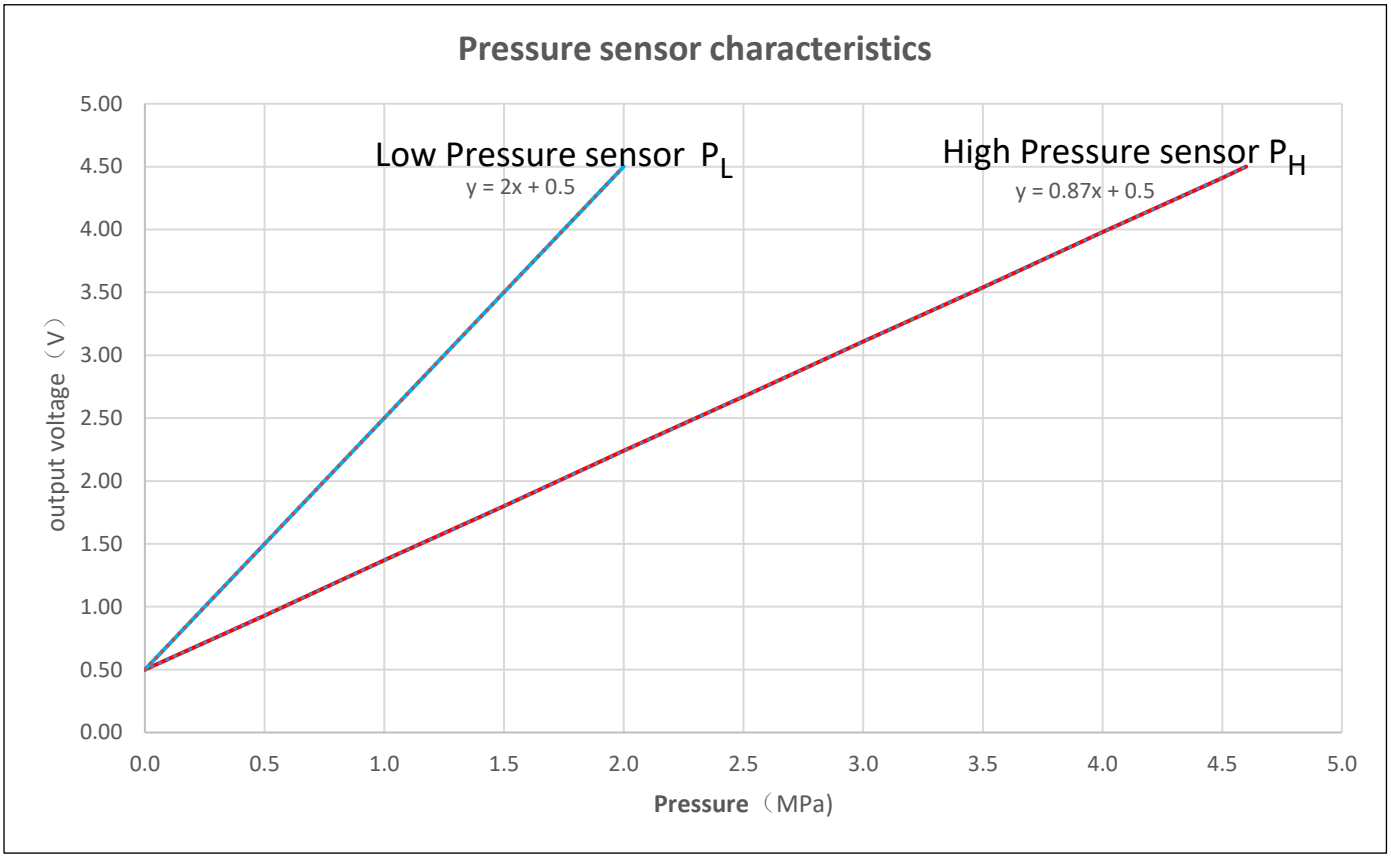
Number	Test point		Normal decision value	Notes
	+(Red)	-(Black)		
1	L1’	P-out	0.3-0.7V	0 or→+ ∞ is abnormal
2	L2’	P-out		
3	L3’	P-out		
4	N	L1’		
5	N	L2’		
6	N	L3’		

Schematic diagram of measuring points of Inverter drive board:



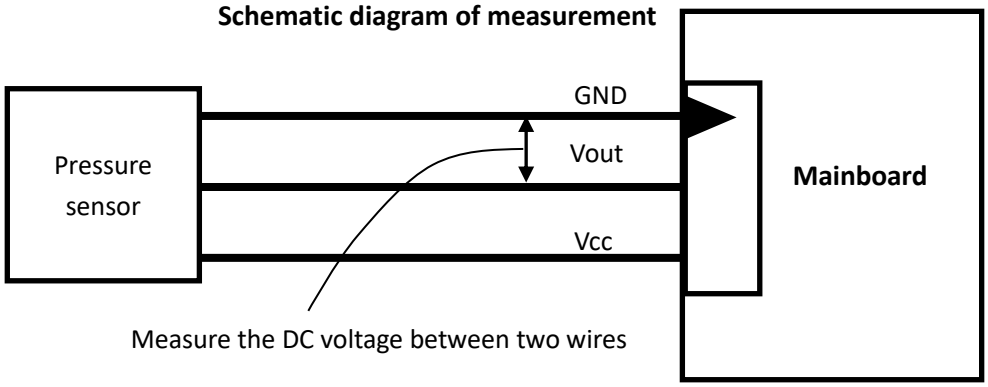


5.5 Appendix of Pressure Sensor Detection



P_H :Vout(H)=0.87×P_H+0.5

P_L:Vout(L)=2×P_L+0.5

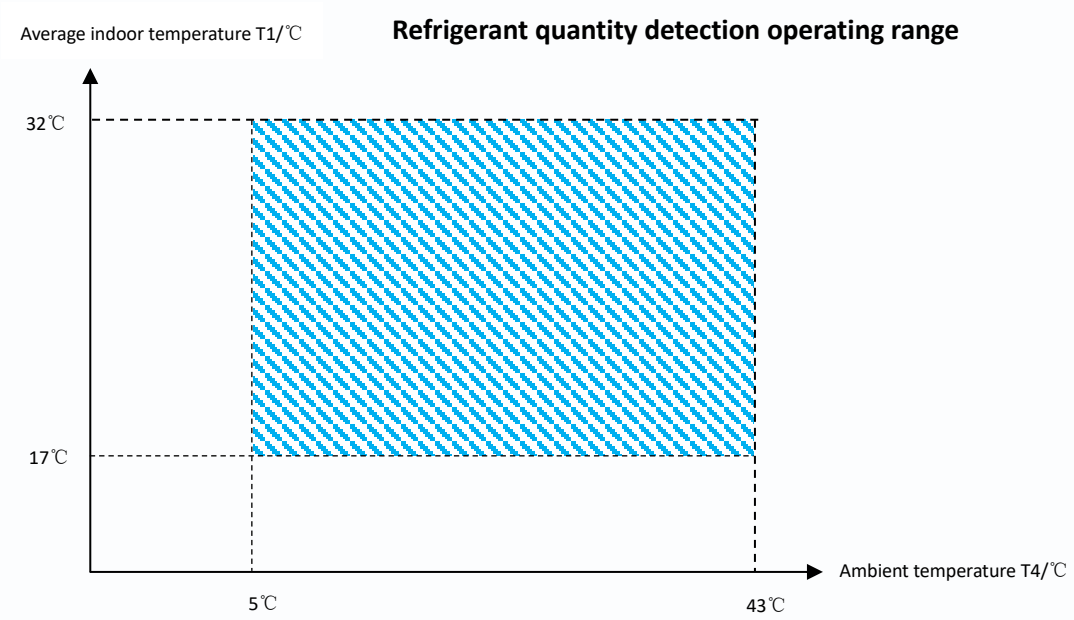


5.6 Refrigerant volume diagnosis

When running the refrigerant quantity detection program, the machine calculates the system refrigerant quantity according to the ambient temperature, condensing temperature and evaporation temperature, heat exchanger inlet and outlet temperature and other parameters, and give hints according to the results

The detection results of the system have V6 IDUs may have a large deviation. It is recommended to perform the refrigerant quantity diagnostic test when the system is all V8 IDUs and the communication protocol is V8 communication.

The following operating ranges must be met



Refrigerant quantity warning value setting:

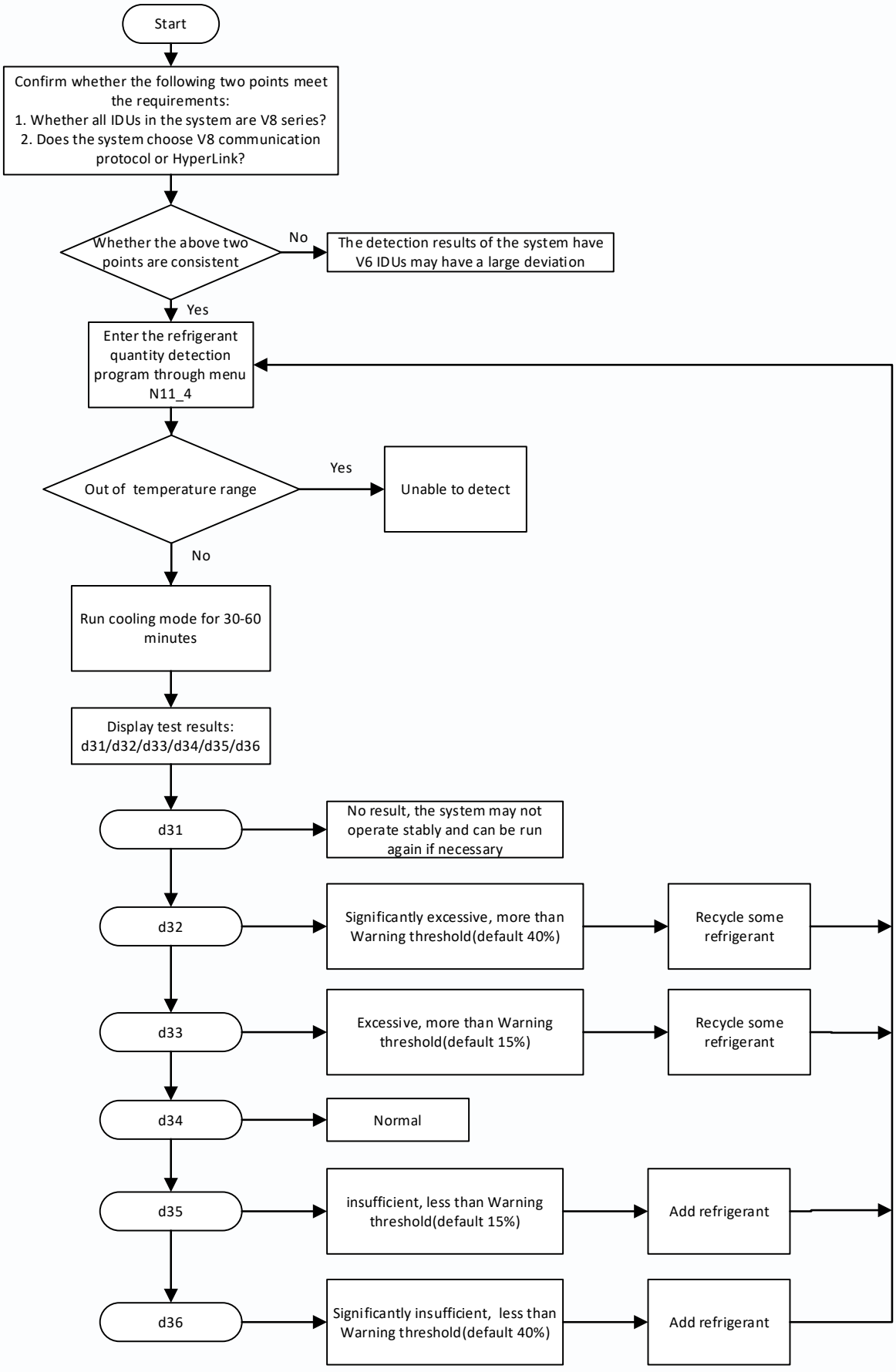
Menu NB1 sets the warning threshold X of excessive or insufficient,

menu NB2 sets the warning threshold X of Significantly excessive or Significantly insufficient refrigerant.

The setting parameters are shown in the following table:

		warning threshold	excessive	insufficient
【nb】	【1】	【0】10%	d33	d35
		【1】15%(default ）		
		【2】20%		
		【3】25%		
		【4】30%		
		【5】35%		
		【6】40%		
	【2】	【0】30%	d32	d36
		【1】35%		
		【2】40%(default ）		
		【3】45%		
		【4】50%		
		【5】55%		
		【6】60%		

5.6.1 Procedure



5.7 Oil volume table

Table 6-5.6: Oil volume table:

HP	Oil model	Compressor A (Y1)	Compressor B (Y2)	Total compressors oil	additional adding oil Volume	TOTAL OIL	TOTAL OIL
8HP	FV68H	1.1L		1.1L	5L	5L+1.1L	6.1L
10HP	FV68H	1.1L		1.1L	5L	5L+1.1L	6.1L
12HP	FV68H	1.1L		1.1L	5L	5L+1.1L	6.1L
14HP	FV68H	1.1L		1.1L	5L	5L+1.1L	6.1L
16HP	FV68H	1.1L		1.1L	5L	5L+1.1L	6.1L
18HP	FV68H	1.1L		1.1L	6L	6L+1.1L	7.1L
20HP	FV68H	1.1L		1.1L	7L	7L+1.1L	8.1L
22HP	FV68H	1.1L		1.1L	7L	7L+1.1L	8.1L
24HP	FV68H	1.1L		1.1L	7L	7L+1.1L	8.1L
26HP	FV68H	1.1L	1.1L	1.1L+1.1L	7L	7L+1.1L+1.1L	9.2L
28HP	FV68H	1.1L	1.1L	1.1L+1.1L	7L	7L+1.1L+1.1L	9.2L
30HP	FV68H	1.1L	1.1L	1.1L+1.1L	7L	7L+1.1L+1.1L	9.2L

1. If we only need to replace the compressor, do not need to replace the Gas-liquid separator and the pipe, then how much oil you pulled out (for example you pulled out X), then you need to add X-Y1-Y2(for 30HP, Y1 is 1.1L, Y2 is 1.1L)

2. If we need to replace all the compressors and we need to replace the Gas-liquid separator, then we need to add the additional adding oil Volume as above show.

3 Please add the additional oil to the innlet of Gas-liquid separator, not directly to the compressor.

S-V8S
Ver. 2024-3

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