Service Manual

MVD VR4+
3 Pipes

R410A

10/14
English

MUNDOCLIMA®
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MCAC-VTSM-2014-03

Catalogue

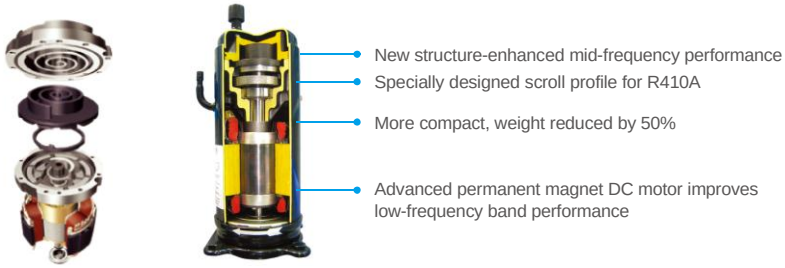
Part 1 General Information

1. Features

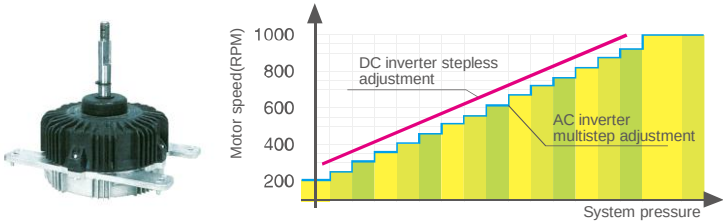
1.1 Energy saving

1.1.1 All DC inverter compressors

All DC inverter compressors make the capacity output better distributed, and always work at 60-140Hz which is the most efficient range. It makes the efficiency more than 30% higher than the normal.

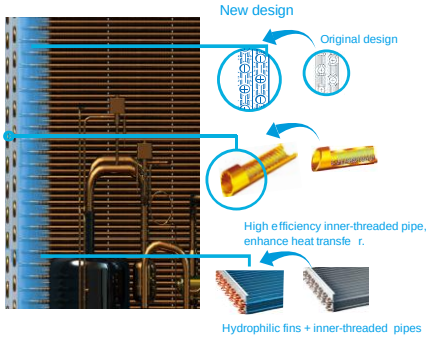


1.1.2 All DC fan motors



According to the running load and system pressure, the system controls the speed of DC fan to achieve the minimum energy consumption and best performance.

1.1.3 High efficiency heat exchanger

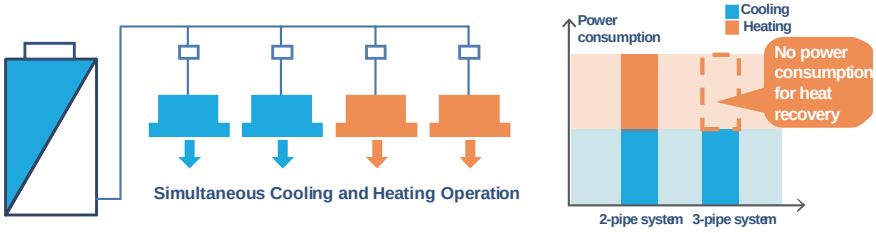


The new designed window fins enlarge the heat-exchanging area, decrease the air resistance, save more power and enhance heat exchange performance.

Hydrophilic film fins and inner-threaded copper pipes optimize heat exchange efficiency.

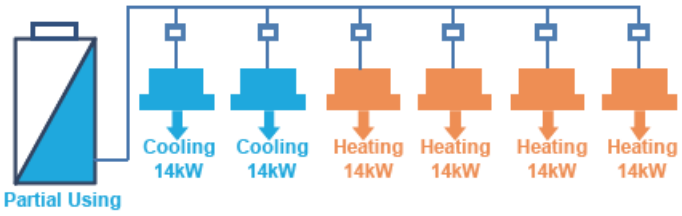
1.1.4 Heat recovery, more efficiency

Simultaneous heating and cooling in different zones, more energy saving by heat recovery from one space to another which saves up to 50% in costs compared with a conventional heat pump system.



1.1.5 Heating capacity automatic adjustment

Two parts condenser individual design, the unit can distribute a part of evaporator to be as condensing area according to the heating load requirement to improve the utilization rate of the condenser.



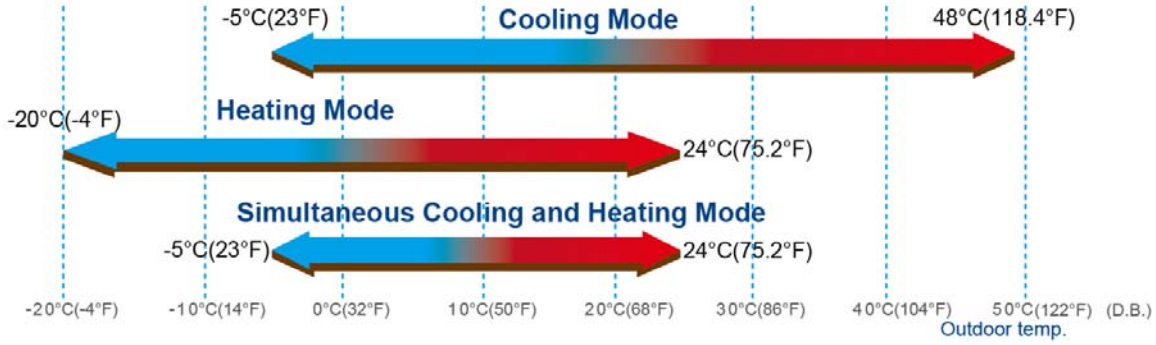
1.2 Flexible design

1.2.1 Wide capacity range

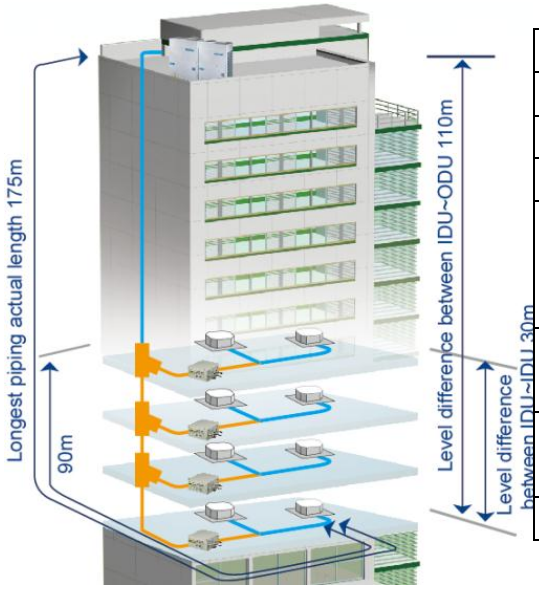
The outdoor units capacity range from 8HP to 64HP in 2HP increment. Maximum 64 indoor units with capacity up to 130% of total outdoor units can be connected in one refrigeration system.

1.2.2 Wide operation range

The V4 Plus R series system operates stably at extreme temperatures ranging from -20°C(-4°F) to 48°C(118.4. °F)



1.2.3 Flexible piping design



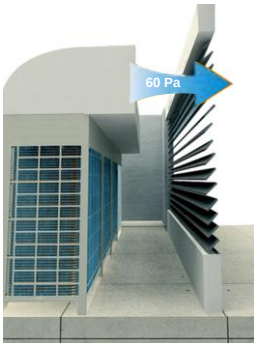
Piping length	Permitted value
Total pipe length	3280ft(1000m)
Max. actual pipe length	574ft(175m)
Max. equivalent pipe length	656ft(200m)
Equivalent piping length from the farthest IDU to the first indoor branch joint	131/295*ft(40/90*m)
Equivalent piping length from MS to its farthest downstream indoor unit	131ft(40m)
Level difference between outdoor unit and indoor unit	Outdoor unit is down: 361ft(110m) Outdoor unit is up: 230ft(70m)
Level difference between indoor units	98ft(30m)

* When the length is more than 40m, it needs to meet the specific conditions according to the installation technical manual.

1.2.4 High external static pressure

High static pressure propeller and optimized fan guard can adapt to various installation environments.

Midea now offers up to 60Pa*(0.24in.WG) external static pressure for customized applications (60Pa(0.24in.WG) is available customized for the 8-12HP model; 40Pa(0.16in.WG) is available customized for 14-16HP). A standard 0-20Pa(0-0.08in.WG) function is equipped by default.



1.3 High reliability

1.3.1 Cycle duty operation

In one combination, any of the outdoor unit can run as the master unit and master unit can cycle in a period, to realize the equal lifespan among the outdoor units. As a result extend the system lifespan significantly.

Cycle duty between modules

1.3.2 Backup operation

In a multiple system, if one module is failed, other modules can be backup instead of the failed one for continuing operation.

1.3.3 Precise oil control technology

5 stage oil control technology ensures every outdoor unit & compressor's oil always keep in the safe level, completely solve the compressor oil lack problem.

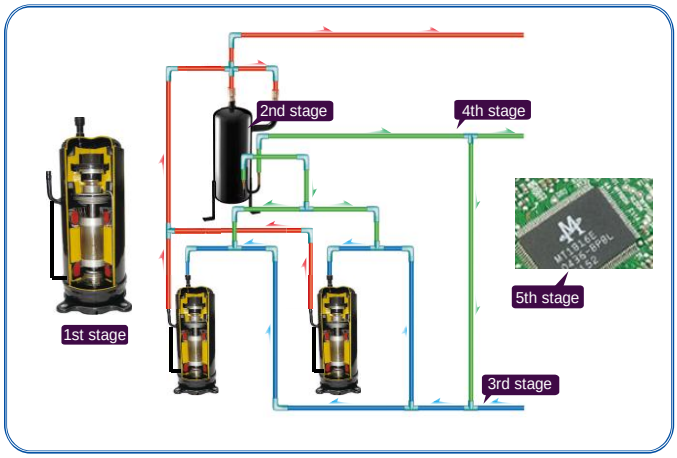
1st stage: compressor internal oil separate

2nd stage: high efficiency oil separator (separation efficiency up to 99%)

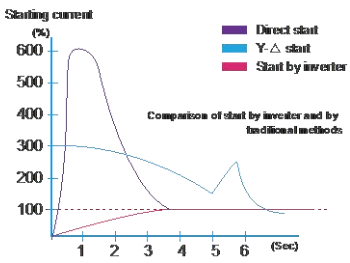
3rd stage: oil balance technology between compressors

4th stage: oil balance technology between modules

5th stage: intelligent system oil return program



1.3.4 Intelligent soft start technology



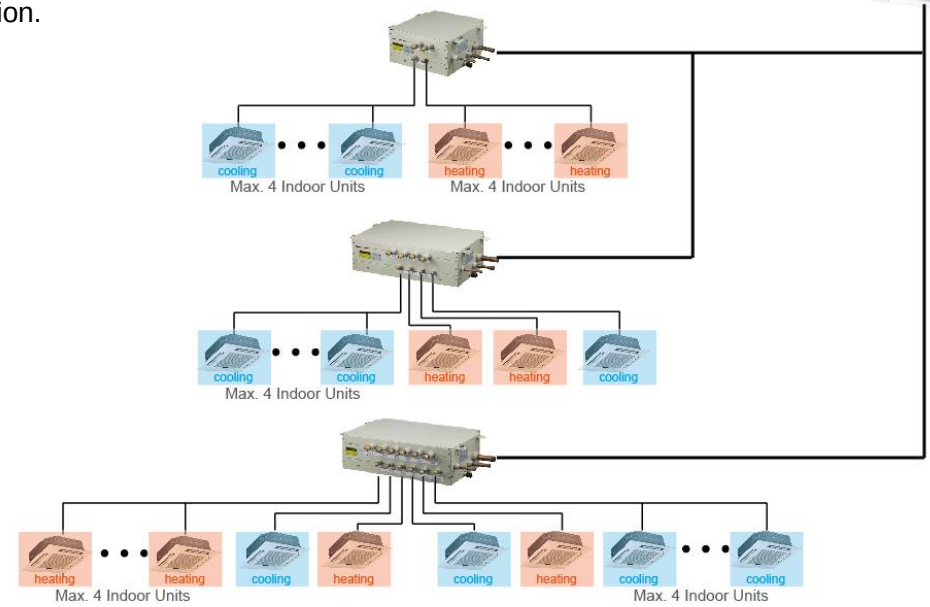
All the DC inverter compressors start with a very low current which will obviously reduce the strike to the electric network and make the system more reliable and stable.

1.4 Enhanced comfort

1.4.1 Cooling and heating simultaneous for new designed MS (Mode Switch) equipment

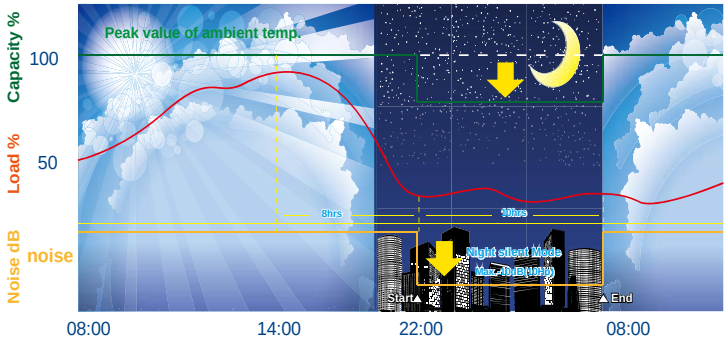
The outdoor unit individual controls the operation mode of each group indoor unit to achieve simultaneous heating and cooling in one system under the MS unit which adopts solenoid valve to precise control refrigerant flow rate.

The indoor units connect to the same MS can realize simultaneous cooling and heating operation.



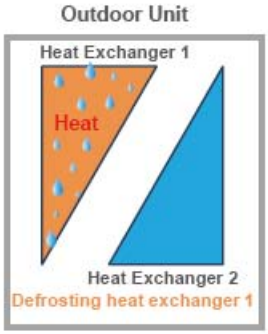
1.4.2 Night silent operation mode

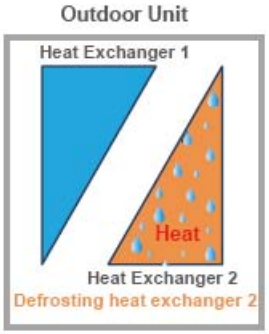
Night Silent Mode feature which is easily set on the PCB board allows the unit to be set to vary time options during Non-Peak and Peak operation time optimizing the units noise output.



1.4.3 Continuous heating during defrost operation

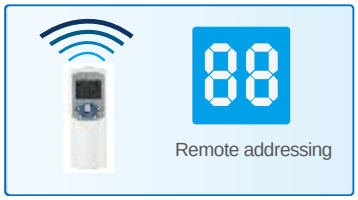
Each heat exchanger is defrosted by using heat transferred from one heat exchanger to the other in the outdoor unit.





1.5 Convenient installation & maintenance

1.5.1 Remote addressing

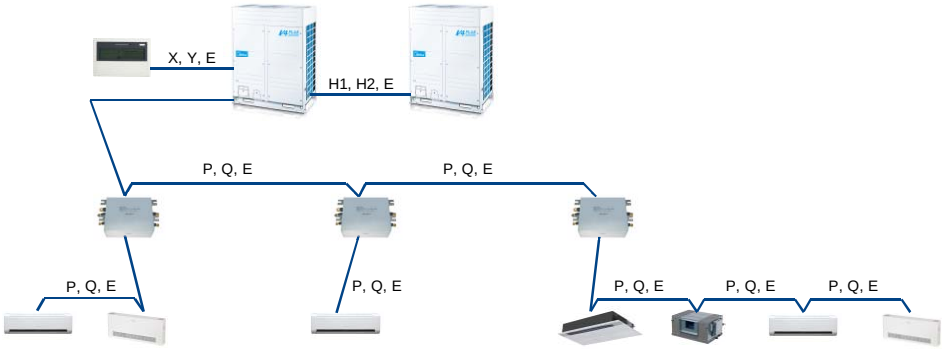


Addressing indoor units are able to be done just by pressing the button of the controller.

No need to set the address by the DIP switch one by one.

1.5.2 Simple communication wiring

Centralized controller (CCM03) can connect from indoor side or outdoor side (XYE terminals) at will. Only one group of communication wire of PQE, achieved both of communication for indoor & outdoor unit and network. It's more convenient for communication wiring.



1.5.3 Convenient inspection window & 4 bits LED digital tube display

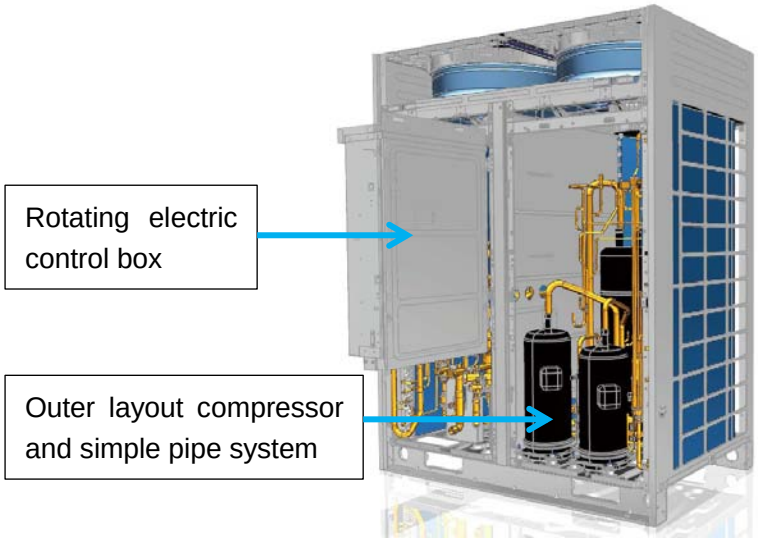
The check window reserved on electric control box provides a convenient spot checking and status enquiry. With the 4 bits digital tube LED display, it is very convenient to show the data of the system, such as pressure, compressor frequency, error code, discharge temperature etc., which can make the maintenance, installation and commissioning easier.

1.5.4 Professional structure design

Compressor is near the outside, and there is simple pipe system for convenient maintenance.

The newly designed rotating control box is so excellent that it can rotate in a wide angle.

It is convenient for the inspection and maintenance of the pipeline system and greatly reduced the time of dismount the electric control box.



2. Outdoor units lineup

● **Outdoor units lineup**

The capacity range of outdoor units is from 8HP up to 64HP in 2HP increment. Maximum 64 indoor units with capacity up to 130% of total outdoor units can be connected as one refrigeration system.

8, 10 , 12, 14, 16HP

18-32HP

34-48HP

50-64HP

Combination table

Capacity (HP)	Standard combination		High efficiency combination		Max. N° of connectable indoor units
	Model	Combination type	Model	Combination type	
8	MVD-252(8)W/D2RN1T(C)	8HP×1	MVD-252(8)W/D2RN1T(C)	8HP×1	13
10	MVD-280(10)W/D2RN1T(C)	10HP×1	MVD-280(10)W/D2RN1T(C)	10HP×1	16
12	MVD-335(12)W/ D2RN1T(C)	12HP×1	MVD-335(12)W/ D2RN1T(C)	12HP×1	20
14	MVD-400(14)W/ D2RN1T(C)	14HP×1	MVD-400(14)W/ D2RN1T(C)	14HP×1	23
16	MVD-450(16)W/ D2RN1T(C)	16HP×1	MVD-504(16)W/ D2RN1T(C)	8HP+8HP	26
18	MVD-532(18)W/D2RN1T(C)	8HP+10HP	MVD-532(18)W/D2RN1T(C)	8HP+10HP	29
20	MVD-560(20)W/D2RN1T(C)	10HP+10HP	MVD-587(20)W/D2RN1T(C)	8HP+12HP	33
22	MVD-615(22)W/D2RN1T(C)	10HP+12HP	MVD-615(22)W/D2RN1T(C)	10HP+12HP	36
24	MVD-680(24)W/D2RN1T(C)	10HP+14HP	MVD-756(24)W/D2RN1T(C)	8HP×3	39
26	MVD-730(26)W/D2RN1T(C)	10HP+16HP	MVD-784(26)W/D2RN1T(C)	8HP×2+10HP	43
28	MVD-800(28)W/D2RN1T(C)	14HP×2	MVD-839(28)W/D2RN1T(C)	8HP×2+12HP	46
30	MVD-850(30)W/D2RN1T(C)	14HP+16HP	MVD-867(30)W/D2RN1T(C)	8HP+10HP+12HP	50
32	MVD-900(32)W/D2RN1T(C)	16HP×2	MVD-1008(32)W/D2RN1T(C)	8HP×4	53
34	MVD-960(34)W/D2RN1T(C)	10HP×2+14HP	MVD-1036(34)W/D2RN1T(C)	8HP×3+10HP	56
36	MVD-1010(36)W/D2RN1T(C)	10HP×2+16HP	MVD-1091(36)W/D2RN1T(C)	8HP×3+12HP	59
38	MVD-1065(38)W/D2RN1T(C)	10HP+12HP+16HP	MVD-1119(38)W/D2RN1T(C)	8HP×2+10HP+12HP	63
40	MVD-1130(40)W/D2RN1T(C)	10HP+14HP+16HP	MVD-1174(40)W/D2RN1T(C)	8HP×2+12HP×2	64
42	MVD-1200(42)W/D2RN1T(C)	14HP×3	MVD-1202(42)W/D2RN1T(C)	8HP+10HP+12HP×2	64
44	MVD-1250(44)W/D2RN1T(C)	14HP×2+16HP	MVD-1257(44)W/D2RN1T(C)	8HP+12HP×3	64
46	MVD-1300(46)W/D2RN1T(C)	14HP+16HP×2	MVD-1285(46)W/D2RN1T(C)	10HP+12HP×3	64
48	MVD-1350(48)W/D2RN1T(C)	16HP×3	MVD-1340(48)W/D2RN1T(C)	12HP×4	64
50	MVD-1432(50)W/D2RN1T(C)	8HP+10HP+16HP×2	MVD-1405(50)W/D2RN1T(C)	12HP×3+14HP	64
52	MVD-1460(52)W/D2RN1T(C)	10HP×2+16HP×2	MVD-1455(52)W/D2RN1T(C)	12HP×3+16HP	64
54	MVD-1515(54)W/D2RN1T(C)	10HP+12HP+16HP×2	MVD-1520(54)W/D2RN1T(C)	12HP×2+14HP+16HP	64
56	MVD-1580(56)W/D2RN1T(C)	10HP+14HP+16HP×2	MVD-1570(56)W/D2RN1T(C)	12HP×2+16HP×2	64
58	MVD-1650(58)W/D2RN1T(C)	14HP×3+16HP	MVD-1635(58)W/D2RN1T(C)	12HP+14HP+16HP×2	64
60	MVD-1700(60)W/D2RN1T(C)	14HP×2+16HP×2	MVD-1685(60)W/D2RN1T(C)	12HP+16HP×3	64
62	MVD-1750(62)W/D2RN1T(C)	14HP+16HP×3	MVD-1750(62)W/D2RN1T(C)	14HP+16HP×3	64
64	MVD-1800(64)W/D2RN1T(C)	16HP×4	MVD-1800(64)W/D2RN1T(C)	16HP×4	64

3. MS units lineup

3.1 MS units which can be connected multiple indoor units

Model name	External appearance
MS01/N1-C	
MS02/N1-C	
MS04/N1-C	
MS06/N1-C	

Specifications

MS Model	Max. number of all downstream indoor units
MS01/N1-C	4
MS02/N1-C	8
MS04/N1-C	16
MS06/N1-C	24

3.2 MS units which can be connected only one indoor unit

Model name	External appearance
MS02E/N1-C	
MS04E/N1-C	

Specifications

MS Model	Max. number of all downstream indoor units
MS02E/N1-C	1
MS04E/N1-C	1

4. Indoor units lineup

Capacity (×100W)	Cassette type				
	One-way cassette		Two-way cassette	Compact four-way cassette	Four-way cassette
					
18	•				
22	•		•	•	
28	•		•	•	•
36	•		•	•	•
45		•	•	•	•
56		•	•		•
71		•	•		•
80					•
90					•
100					•
112					•
140					•

Capacity (×100W)	Duct type				
	Low static pressure duct	Medium static pressure duct	High static pressure duct		
					
18	•				
22	•	•			
28	•	•			
36	•	•			
45	•	•			
56	•	•			
71		•			
80		•			
90		•			
100					
112		•			
140		•	•		
160			•		
200				•	
250				•	
280				•	
400					•
450					•
560					•

Indoor units lineup

Capacity (×100W)	Floor-standing/Ceiling & Floor/Console			
	Cased floor-standing	Uncased floor-standing	Ceiling & floor	console
				
22	•	•		•
28	•	•		•
36	•	•	•	•
45	•	•	•	•
56	•	•	•	
71	•	•	•	
80	•	•	•	
90			•	
112			•	
140			•	
160			•	

Capacity (×100W)	Wall mounted	
	Wall mounted (Low capacity)	Wall mounted (Hight capacity)
		
22	•	
28	•	
36	•	
45	•	
56	•	
71		•
80		•
90		•

Note:

Due to continuous improvement, specifications are subject to change without prior notice.

5. Nomenclature

5.1 Outdoor unit

MVD – 252 (8) W / D2 R N1 T (C)

- **Series code**
- **T: 3-pipe type**
- **Omit: 2-Pipe type**
- **Refrigerant type**
  - N1: R410A
- **Power supply**
  - R: 380-415V, 3Ph, 50Hz
- **Inverter type**
  - D2: All DC inverter type
  - Omit: AC inverter
- **Outdoor unit**
- **Cooling capacity (HP), (only for combinable type)**
- **Cooling capacity (×100W)**
- **Mundo Clima Variable Digital**

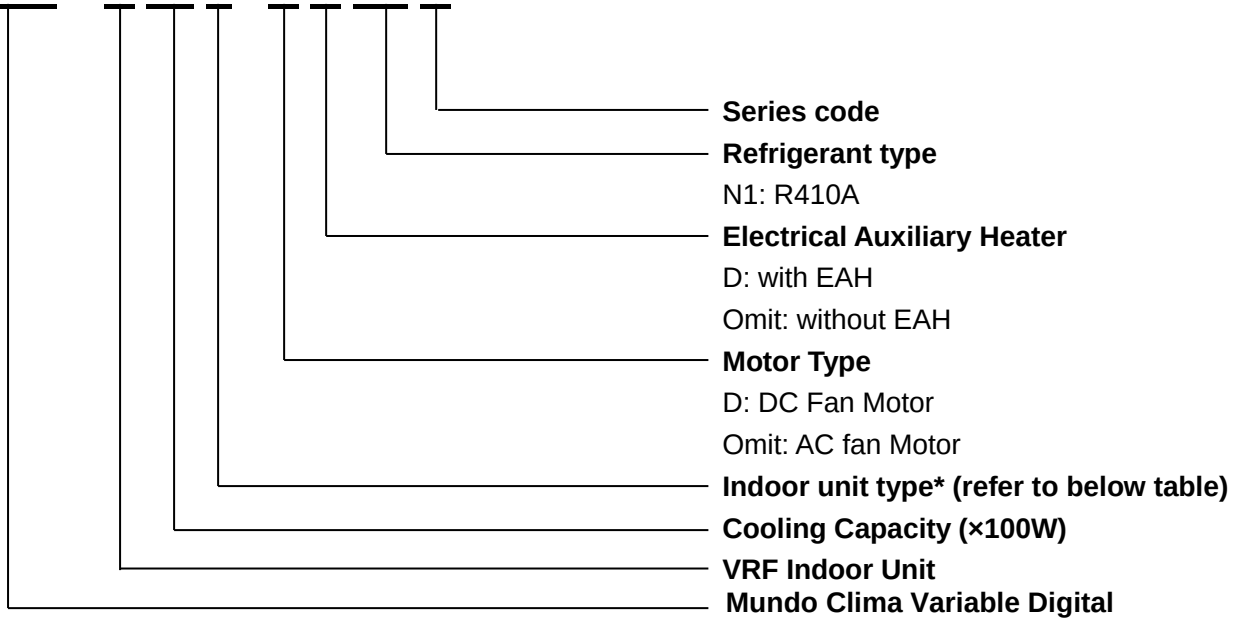
5.2 MS unit

MS 02 E / N1 - C

- **Series code**
- **Refrigerant type**
  - N1: R410A
- **E: The MS can connect only one indoor unit**
- **Omit: The MS can connect multiple indoor units**
- **MS type**
  - 01: One group refrigerant pipe
  - 02: Two groups refrigerant pipe
  - 04: Four groups refrigerant pipe
  - 06: Six groups refrigerant pipe
- **MS unit**

5.3 Indoor unit

MDV – D 28 Z / D D N1 A



Meaning of the code*

Type code	Meanings
Q1	1-waycassette
Q2	2-waycassette
Q4	4-waycassette
Q4-A	4-waycassette (compact)
T1	Low static pressure duct
T2	Medium static Pressure duct
T3	High static pressure duct
G	Wall mounted
DL	Ceiling & floor
Z-F	Floor standing (F4/F5: Cased ; F3: Uncased)
Z	Console

Part 2 Selection Procedure

1. Introduction

1.1 Model selection procedure

Select the model and calculate the capacity for each refrigerant system according to the procedure shown below.

- Calculation of the indoor air-conditioning load, Calculate the maximum air-conditioning load for each room or zone.

Selection of an air conditioning system

- Select the ideal air conditioning system for air conditioning of each room or zone

Design of the control system

- Design a suitable control system for the selected air conditioning system

Preliminary selection of indoor and outdoor units

- Make preliminary selections that are within the allowable range for the system

Check of the tubing length and elevation difference

- Check that the length of refrigerant tubing and the elevation difference are within the allowable ranges

Calculation of the corrected outdoor unit capacity

- Capacity correction coefficient for model, outdoor temperature conditions, tubing length and elevation difference.

Calculation of the actual capacity for each indoor unit

- Calculate the corrected indoor/outdoor capacity ratio, based on the corrected outdoor unit capacity and the total corrected capacity of all indoor units in the same system.

Recheck of the actual capacity for each indoor unit

- If the capacity is inadequate, reexamine the unit combinations.

1.2 Indoor unit selection

Enter INDOOR UNIT CAPACITY TABLES at given indoor and outdoor temperature. Select the unit that the capacity is the nearest to and greater than given load.

Note:

Individual indoor unit capacity is subject to change by the combination. Actual capacity has to be calculated according to the combination by using outdoor unit capacity table.

Calculation of actual capacity of indoor unit

Because the capacity of a multi air-conditioner changes according to the temperature conditions, tubing length, elevation difference and other factors, select the correct model after taking into account the various correction values. When selecting the model, calculate the corrected capacities of the outdoor unit and each indoor unit. Use the corrected outdoor unit capacity and the total corrected capacity of all the indoor units to calculate the actual final capacity of each indoor unit.

Find the indoor unit capacity correction coefficient for the following items:

- Capacity correction for the indoor unit temperature conditions

From the graph of capacity characteristics, use the indoor temperature to find the capacity correction coefficient.

- Capacity distribution ratio based on the indoor unit tubing length and elevation difference.

First, in the same way as for the outdoor unit, use the tubing length and elevation difference for each indoor unit to find the correction coefficient from the graph of capacity change characteristics

Capacity distribution ratio for each indoor unit=Correction coefficient for that indoor unit / Correction coefficient for the outdoor unit

1.3 Outdoor unit selection

Allowable combinations are indicated in INDOOR UNIT COMBINATION TOTAL CAPACITY INDEX TABLE.

In general, outdoor unit can be selected as follows though the location of the unit, zoning and usage of the rooms may be considered.

The indoor and outdoor unit combination is determined that the sum of indoor unit capacity index is nearest to and smaller than the capacity index at 100% combination ratio of each outdoor unit. Up to 8~16 indoor units can be connected to one outdoor unit. It is recommended to choose a larger outdoor unit if the installation space is large enough.

If the combination ratio is greater than 100%, the indoor unit selection shall be reviewed by using actual capacity of each indoor unit.

INDOOR UNIT COMBINATION TOTAL CAPACITY INDEX TABLE

Outdoor Unit HP(Btu/h)	Indoor Unit Combination Ratio kW(Btu/h)								
	130%	120%	110%	100%	90%	80%	70%	60%	50%
8(86000)	32.8 (111900)	30.2 (103000)	27.7 (94500)	25.2 (86000)	22.7 (77500)	20.1 (68600)	17.6 (60100)	15.1 (51500)	12.6 (43000)
10(95500)	36.4 (124200)	33.6 (114600)	30.8 (105100)	28.0 (95500)	25.2 (86000)	22.4 (76400)	19.6 (66900)	16.8 (57300)	14.0 (47800)
12(114300)	43.6 (148800)	40.2 (137200)	36.9 (125900)	33.5 (114300)	30.2 (103000)	26.8 (91400)	23.5 (80200)	20.2 (68900)	16.8 (57300)
14(136500)	52.0 (177400)	48.0 (163800)	44.0 (150100)	40.0 (136500)	36.0 (122800)	32.0 (109200)	28.0 (95500)	24.0 (81900)	20.0 (68200)
16(153500)	58.5 (199600)	54.0 (184200)	49.5 (168900)	45.0 (153500)	40.5 (138200)	36.0 (122800)	31.5 (107500)	27.0 (92100)	22.5 (76800)
18(181500)	69.2 (236100)	63.8 (217700)	58.5 (199600)	53.2 (181500)	47.9 (163400)	42.6 (145400)	37.2 (126900)	31.9 (108800)	26.6 (90800)
20(191000)	72.8 (248400)	67.2 (229300)	61.6 (210200)	56.0 (191100)	50.4 (172000)	44.8 (152900)	39.2 (133800)	33.6 (114600)	28.0 (95500)
22(209800)	80.0 (273000)	73.8 (251800)	67.7 (231000)	61.5 (209800)	55.4 (189000)	49.2 (167900)	43.1 (147100)	36.9 (125900)	30.8 (105100)
24(232000)	88.4 (301600)	81.6 (278400)	74.8 (255200)	68.0 (232000)	61.2 (208800)	54.4 (185600)	47.6 (162400)	40.8 (139200)	34.0 (116000)
26(249100)	94.9 (323800)	87.6 (298900)	80.3 (274000)	73.0 (249100)	65.7 (224200)	58.4 (199300	51.1 (174400)	43.8 (149400)	36.5 (124500)
28(273000)	104.0 (354900)	96.0 (327600)	88.0 (300300)	80.0 (273000)	72.0 (245700)	64.0 (218400	56.0 (191100)	48.0 (163800)	40.0 (136500)
30(290000)	110.5 (377000)	102.0 (348000)	93.5 (319000)	85.0 (290000)	76.5 (261000)	68.0 (232000	59.5 (203000)	51.0 (174000)	42.5 (145000)
32(307000)	117.0 (399200)	108.0 (368500)	99.0 (337800)	90.0 (307100)	81.0 (276400)	72.0 (245700	63.0 (215000)	54.0 (184200)	45.0 (153500)
34(327500)	124.8 (425800)	115.2 (393100)	105.6 (360300)	96.0 (327600)	86.4 (294800)	76.8 (262000	67.2 (229300)	57.6 (196500)	48.0 (163800)
36(344600)	131.3 (448000)	121.2 (413500)	111.1 (379100)	101.0 (344600)	90.9 (310200)	80.8 (275700	70.7 (241200)	60.6 (206800)	50.5 (172300)
38(363300)	138.5 (472600)	127.8 (436100)	117.2 (399900)	106.5 (363400)	95.9 (327200)	85.2 (290700	74.6 (254500)	63.9 (218000)	53.3 (181900)

INDOOR UNIT COMBINATION TOTAL CAPACITY INDEX TABLE

Outdoor Unit	Indoor Unit Combination Ratio kW(Btu/h)								
	130%	120%	110%	100%	90%	80%	70%	60%	50%
40(385600)	146.9 (501200)	135.6 (462700)	124.3 (424100)	113.0 (385600)	101.7 (347000)	90.4 (308400)	79.1 (269900)	67.8 (231300)	56.5 (192800)
42(409500)	156.0 (532350)	144.0 (491400)	132.0 (450450)	120.0 (409500)	108.0 (368550)	96.0 (327600)	84.0 (286650)	72.0 (245700)	60.0 (204750)
44(426500)	162.5 (554450)	150.0 (511800)	137.5 (469150)	125.0 (426500)	112.5 (383850)	100.0 (341200)	87.5 (298550)	75.0 (255900)	62.5 (213250)
46(443600)	169.0 (576600)	156.0 (532300)	143.0 (487900)	130.0 (443600)	117.0 (399200)	104.0 (354800)	91.0 (310500)	78.0 (266100)	65.0 (221800)
48(460600)	175.5 (598800)	162.0 (552700)	148.5 (506700)	135.0 (460600)	121.5 (414600)	108.0 (368500)	94.5 (322400)	81.0 (276400)	67.5 (230300)
50(488600)	186.2 (635300)	171.8 (586200)	157.5 (537400)	143.2 (488600)	128.9 (439800)	114.6 (391000)	100.2 (341900)	85.9 (293100)	71.6 (244300)
52(498100)	189.8 (647600)	175.2 (597800)	160.6 (548000)	146.0 (498200)	131.4 (448300)	116.8 (398500)	102.2 (348700)	87.6 (298900)	73.0 (249100)
54(516900)	197.0 (672200)	181.8 (620300)	166.7 (568800)	151.5 (516900)	136.4 (465400)	121.2 (413500)	106.1 (362000)	90.9 (310200)	75.8 (258600)
56(539100)	205.4 (700800)	189.6 (646900)	173.8 (593000)	158.0 (539100)	142.2 (485200)	126.4 (431300)	110.6 (377400)	94.8 (323500)	79.0 (269500)
58(563000)	214.5 (731900)	198.0 (675600)	181.5 (619300)	165.0 (563000)	148.5 (506700)	132.0 (450400)	115.5 (394100)	99.0 (337800)	82.5 (281500)
60(580000)	221.0 (754000)	204.0 (696000)	187.0 (638000)	170.0 (580000)	153.0 (522000)	136.0 (464000)	119.0 (406000)	102.0 (348000)	85.0 (290000)
62(597100)	227.5 (776200)	210.0 (716500)	192.5 (656800)	175.0 (597100)	157.5 (537400)	140.0 (477700)	122.5 (418000)	105.0 (358300)	87.5 (298600)
64(614000)	234.0 (798200)	216.0 (736800)	198.0 (675400)	180.0 (614000)	162.0 (552600)	144.0 (491200)	126.0 (429800)	108.0 (368400)	90.0 (307000)

INDOOR UNIT CAPACITY INDEX

Unit Size	Model 18	Model 22	Model 28	Model 36	Model 45	Model 56	Model 71	Model 80	Model 90	Model 112
Capacity Index kW(Btu/h)	1.8 (6140)	2.2 (7500)	2.8 (9550)	3.6 (12280)	4.5 (15350)	5.6 (19110)	7.1 (24230)	8.0 (27300)	9.0 (30710)	11.2 (38220)
Unit Size	Model 125	Model 140	Model 160	Model 200	Model 250	Model 280	Model 400	Model 450	Model 560	
Capacity Index kW(Btu/h)	12.5 (42650)	14.0 (47770)	16 (54590)	20 (68240)	25 (85300)	28 (95540)	40 (136500)	45 (153500)	56 (191070)	

1.4 Actual performance date

Use OUTDOOR UNIT CAPACITY TABLES.

Determine correct table according to the outdoor unit model and combination ratio.

Enter the table at given indoor and outdoor temperature and find the outdoor unit capacity and power input. The individual indoor unit capacity (power input) can by calculated as follows.

IUC=OUC × INX/TNX

Where,

IUC: Each indoor unit capacity

OUC: Outdoors unit capacity

INX: Each indoor unit capacity index

TNX: Total capacity index

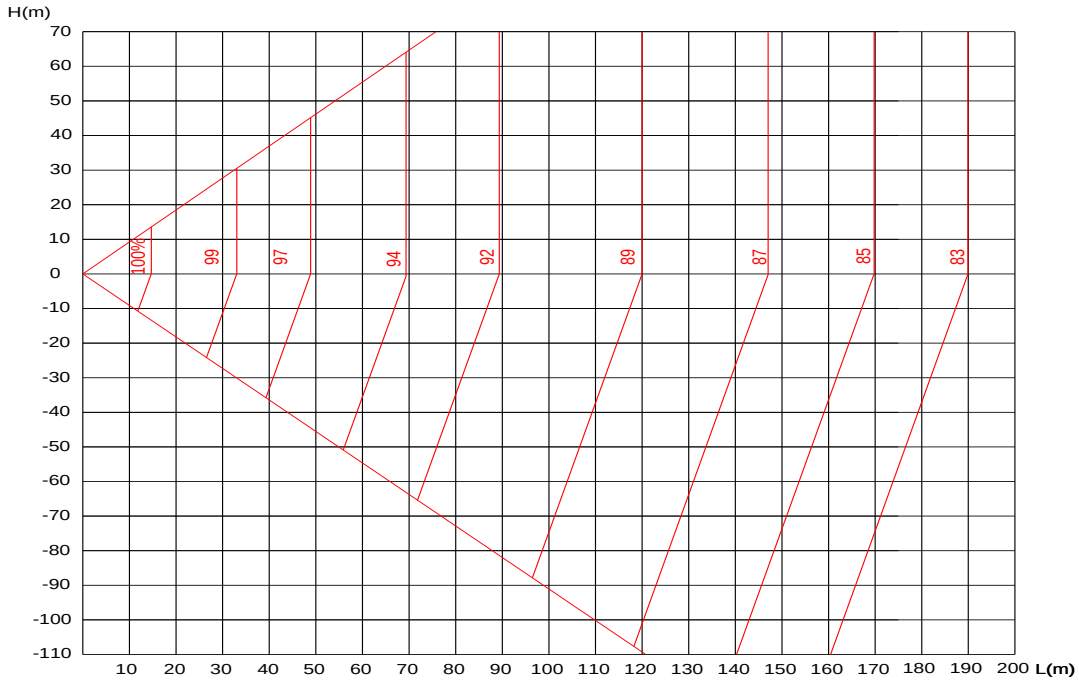
Then, correct the indoor unit capacity according to the piping length.

If the corrected capacity is smaller than the load, the size of indoor unit has to be increased and repeat the same selection procedure.

1.5 Cooling capacity modification in accordance with the length of refrigerant pipe

Modification coefficient of the length and high difference of refrigerant pipe:

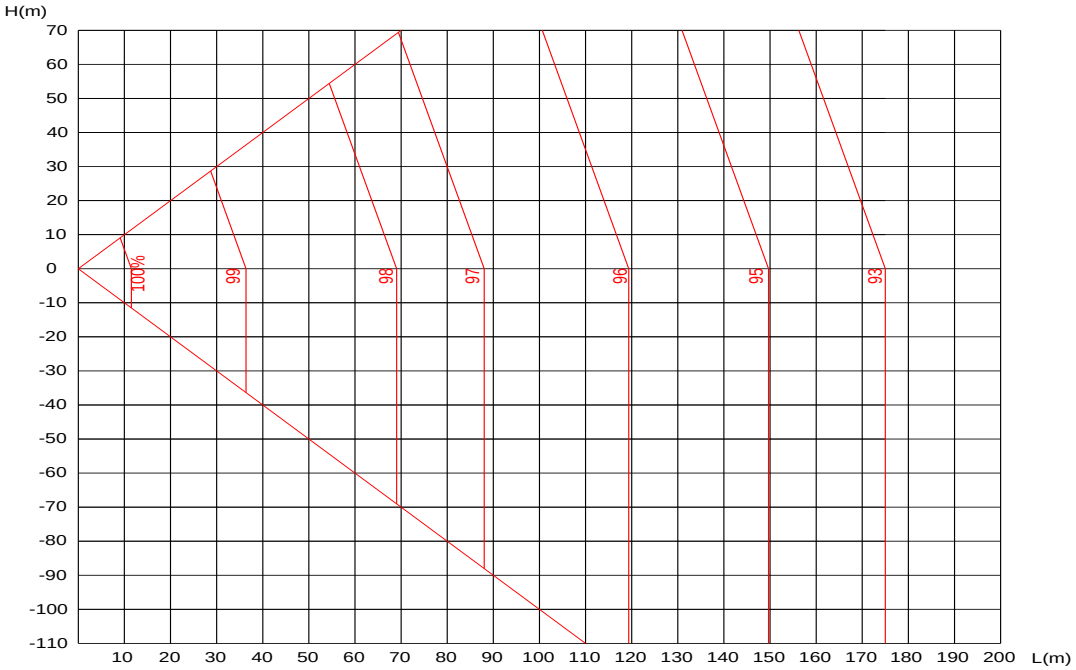
1.5.1 Cooling capacity modification



L: Refrigerant pipe equivalent length

H: Height difference between outdoor and indoor unit. Positive data means outdoor unit is top. Negative data means outdoor unit is down.

1.5.2 Heating capacity modification



2. Unit selection (based on cooling load)

2.1 Given condition

Condition:

Cooling: indoor temperature 20°CWB, outdoor temperature 35°CDB;

Cooling load

Location	Room A	Room B	Room C	Room D	Room E	Room F
Load kW(Btu/h)	2.1(7170)	2.8(9559)	3.5(11900)	4.6(15700)	5.8(19790)	7.2(24570)

Power supply: outdoor 380~415V-3Ph-50Hz, indoor 220~240V-1Ph-50Hz.

Piping length: 164ft (50m); Height difference between indoor unit and outdoor unit: 98.4ft(30m)

2.2 Indoor unit selection

Select the suitable capacity for condition of 'Indoor 20°C(68°F) WB, Outdoor 35°C(95°F) DB' using indoor unit capacity table. The selected result is as follows. (Assuming the indoor unit type is duct)

Location	Room A	Room B	Room C	Room D	Room E	Room F
Load kW(Btu/h)	2.1(7170)	2.8(9559)	3.5(11900)	4.6(15700)	5.8(19790)	7.2(24570)
Model	22	28	36	45	56	71
Capacity kW(Btu/h)	2.3(7850)	2.9(9900)	3.7(12600)	4.8(16400)	6.0(20500)	7.5(25600)

2.3 Outdoor unit selection

1) Assume the indoor unit and outdoor unit combination as follows

- Calculate the total nominal capacity of indoor units in the combination according to the above table: 2.2 × 1 +2.8 × 1+ 3.6 × 1 +4.5 × 1+ 5.6 × 1 + 7.1 × 1 = 25.8kW(88000Btu/h)
- Select outdoor unit: MVD-280(10)W/D2RN1T(C) which has nominal cooling capacity: 28kW (95500Btu/h).

  Calculate the proportion: 258/280= 92%

2) Result: Because the proportion is within 50～130%, it is a right selection.

Real function data with indoor unit combination

- For the 92% combination, calculate the cooling capacity of outdoor unit (MVD-280(10)W/D2RN1T(C)).
  26.8kW(91440Btu/h) ← 90% (Indoor temperature: WB 20°C(68°F), Outdoor temperature: DB 35°C(95°F))
  28.3kW(96560Btu/h) ← 100% (Indoor temperature: WB 20°C(68°F), Outdoor temperature: DB 35°C(95°F))
  Then calculate the outdoor capacity in 92% combination index:
  Therefore: 26.8+{(28.3-26.8)/ 10}×2=27.1kW(92470Btu/h);
- Outdoor unit (MVD-280(10)W/D2RN1T(C)) cooling temperature: DB 35°C(95°F)
- Capacity modification coefficient with pipe length 50m(164ft) and height difference 30m(98.4ft): 0.958
- Each indoor unit cooling capacity
  Room A: MVD-D22T2 (27.1×22/258×0.958=2.21kW) (92470×7510/88000×0.958=7540Btu/h)
  Room B: MVD-D28T2 (27.1×28/258×0.958=2.82kW) (92470×9550/88000×0.958=9620Btu/h)
  Room C: MVD-D36T2 (27.1×36/258×0.958=3.62kW) (92470×12300/88000×0.958=12350Btu/h)
  Room D: MVD-D45T2 (27.1×45/258×0.958=4.53kW) (92470×15400/88000×0.958 =15460Btu/h)
  Room E: MVD-D56T2 (27.1×56/258×0.958=5.64kW) (92470×19110/88000×0.958=19250Btu/h)
  Room F: MVD-D71T2 (27.1×71/258×0.958=7.14kW) (92470×24200/88000×0.958=24360Btu/h)

Location	Room A	Room B	Room C	Room D	Room E	Room F
Load kW(Btu/h)	2.1(7170)	2.8(9559)	3.5(11900)	4.6(15700)	5.8(19790)	7.2(24570)
Model	22	28	36	45	56	71
Capacity kW(Btu/h)	2.21(7540)	2.82(9620)	3.62(12350)	4.53(15460)	5.64(19250)	7.14(24360)

2.4 Conclusion

Generally, we think this result is acceptable, so we can think we have accomplished the calculation. But if you think this result is not acceptable, you can repeat the above process.

Remark: In this sample, the other capacity modification indexes don't be considered and are assumed as 1.0. For more details about the effect factor such as outside ambient/inside ambient DB/WD, please refer to the performance table of indoor and outdoor units.

Part 3 Specifications & Performances

1. Specifications

1.1 Outdoor unit specifications

Independent unit specifications

Model			MVD-252(8)W/ D2RN1T(C)	MVD-280(10)W /D2RN1T(C)	MVD-335(12)W/ D2RN1T(C)
Power supply		V/Ph/Hz	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60
Cooling	Capacity	kW	25.2	28.0	33.5
		Btu/h	86,000	95,500	114,300
	Power input	kW	5.73	6.67	8.07
	EER	kW/kW	4.40	4.20	4.15
Heating	Capacity	kW	27.0	31.5	37.5
		Btu/h	92,100	107,500	128,000
	Power input	kW	6.00	7.33	8.72
	COP	kW/kW	4.50	4.30	4.30
DC inverter compressor	Model		E655DHD-65D2YG	E655DHD-65D2YG	E655DHD-65D2YG
	Type		DC inverter	DC inverter	DC inverter
	Brand		Hitachi	Hitachi	Hitachi
	Quantity		1	1	1
	Capacity	kW	31.59	31.59	31.59
		Btu/h	107,800	107,800	107,800
	Crankcase heater	W	30×2	30×2	30×2
	Refrigerant oil type		FVC68D	FVC68D	FVC68D
	Refrigerant oil charge	gal.(ml)	0.132(500)	0.132(500)	0.132(500)
Outdoor fan motor	Model		WZDK750-38G-4	WZDK750-38G-4	WZDK750-38G-4
	Type		DC motor	DC motor	DC motor
	Quantity		2	2	2
	Brand		Panasonic/Nidec	Panasonic/Nidec	Panasonic/Nidec
	Insulation class		E	E	E
	Safe class		IP23	IP23	IP23
	Input	W	520	520	520
	Output	W	420	420	420
Outdoor fan	Material		Plastic	Plastic	Plastic
	Type		Axial	Axial	Axial
	Quantity		2	2	2
	External static pressure	in.WG (Pa)	0~0.08(0~20) (default)		
		in.WG (Pa)	(0.08~0.24)(20~60) (need to customize)		
Outdoor coil	Number of rows		2	2	2
	Tube pitch(a)×row pitch(b)	in.(mm)	7/8×3/4(22×19)	7/8×3/4(22×19)	7/8×3/4(22×19)
	Fin spacing	in.(mm)	1/16(1.6)	1/16(1.6)	1/16(1.6)
	Fin type		Hydrophilic aluminium	Hydrophilic aluminium	Hydrophilic aluminium
	Tube outside diameter	in.(mm)	Φ5/16(7.94)	Φ5/16(7.94)	Φ5/16(7.94)

	Tube type		inner-groove tube	inner-groove tube	inner-groove tube
	Coil dimension (W×D×H)	in.(mm)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)
	Condenser quantity		2	2	2
	Number of circuits		12	12	12
Outdoor air flow		m^3/h	12,000	12,000	13,000
		CFM	7,060	7,060	7,650
Sound pressure level		dB(A)	57	57	58
Connectable indoor unit	Total capacity	%	50-130	50-130	50-130
	Max. quantity		13	16	20
Outdoor unit	Net dimension (W×H×D)	inch	49-7/32×63-9/16×30-1/8		
		mm	1250×1615×765		
	Packing (W×H×D)	inch	51-9/16×70-1/2×32-1/2		
		mm	1305×1790×820		
	Net weight	lbs.(kg)	561(255)	561(255)	561(255)
	Gross weight	lbs.(kg)	600.6(273)	600.6(273)	600.6(273)
Refrigerant	Type		R410A	R410A	R410A
	Factory charged	lbs.(kg)	22(10)	22(10)	22(10)
Additional refrigerant oil	Oil type		FVC68D	FVC68D	FVC68D
	Oil charge	$L(ft^3)$	5(0.18)	5(0.18)	5(0.18)
Throttle type			EXV	EXV	EXV
Design pressure (Hi/Lo)		MPa	4.4/2.6	4.4/2.6	4.4/2.6
		PSI	640/380	640/380	640/380
Refrigerant piping	Liquid Pipe	in.(mm)	Φ3/8(9.53)	Φ1/2(12.7)	Φ1/2(12.7)
	Low Pressure Gas Pipe	in.(mm)	Φ7/8(22.2)	Φ7/8(22.2)	Φ1(25.4)
	High Pressure Gas Pipe	in.(mm)	Φ3/4(19.1)	Φ3/4(19.1)	Φ3/4(19.1)
	High Pressure Gas Balance Pipe	in.(mm)	Φ3/4(19.1)	Φ3/4(19.1)	Φ3/4(19.1)
	Oil Balance Pipe	in.(mm)	Φ1/4(6)	Φ1/4(6)	Φ1/4(6)
Ambient temp. range	Cooling	°F(°C)	23~118.4(-5~48)	23~118.4(-5~48)	23~118.4(-5~48)
	Heating	°F(°C)	-4~75.2(-20~24)	-4~75.2(-20~24)	-4~75.2(-20~24)
	Simultaneous Cooling and Heating	°F(°C)	23~75.2(-5~24)	23~75.2(-5~24)	23~75.2(-5~24)

Notes:

Capacities are based on the following conditions:

Cooling: Indoor temperature 27℃(80.6℉) DB/19℃(66.2℉) WB; Outdoor temperature 35℃(95℉) DB/24℃(75.2℉) WB.

Heating: Indoor temperature 20℃(68℉) DB/15℃(59℉) WB; Outdoor temperature 7℃(44.6℉) DB/6℃(42.8℉) WB.

Piping length: Interconnecting piping length is 7.5m(24.6ft), level difference is zero.

Connection piping diameter is based on the condition that the total equivalent liquid length is less than 90m(295.2ft). When the total equivalent liquid length is more than 90m(295.2ft), please refer to technical manual to choose the connection piping diameter.

Sound values are measured in a semi-anechoic room, at a position 1m(3.28ft) in front of the unit and 1.3m(4.26ft) above the floor.

Independent unit specifications

Model			MVD-400(14)W/D2RN1T(C)	MVD-450(16)W/D2RN1T(C)
Power supply		V/Ph/Hz	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60
Cooling	Capacity	kW	40.0	45.0
		Btu/h	136,500	153,500
	Power input	kW	11.30	13.24
	EER	kW/kW	3.54	3.40
Heating	Capacity	kW	45.0	50.0
		Btu/h	153,500	170,600
	Power input	kW	11.19	12.79
	COP	kW/kW	4.02	3.91
DC inverter compressor	Model		E655DHD-65D2YG+ E405DHD-36D2YG	E655DHD-65D2YG+ E405DHD-36D2YG
	Type		DC inverter	DC inverter
	Brand		Hitachi	Hitachi
	Quantity		2	2
	Capacity	kW	31.59+11.8	31.59+11.8
		Btu/h	107,800+40,300	107,800+40,300
	Crankcase heater	W	30×4	30×4
	Refrigerant oil type		FVC68D	FVC68D
	Refrigerant oil charge	gal.(ml)	0.132+0.132(500+500)	0.132+0.132(500+500)
Outdoor fan motor	Model		WZDK750-38G-4	WZDK750-38G-4
	Type		DC motor	DC motor
	Quantity		2	2
	Brand		Panasonic/Nidec	Panasonic/Nidec
	Insulation class		E	E
	Safe class		IP23	IP23
	Input	W	890	890
	Output	W	710	710
Outdoor fan	Material		Plastic	Plastic
	Type		Axial	Axial
	Quantity		2	2
	External static pressure	in.WG(Pa)	0~0.08(0~20) (default)	
		in.WG(Pa)	(0.08~0.16)(20~40) (need to customize)	
Outdoor coil	Number of rows		2	2
	Tube pitch(a)×row pitch(b)	in.(mm)	7/8×3/4(22×19)	7/8×3/4(22×19)
	Fin spacing	in.(mm)	1/16(1.6)	1/16(1.6)
	Fin type		Hydrophilic aluminium	Hydrophilic aluminium
	Tube outside diameter	in.(mm)	Φ5/16(7.94)	Φ5/16(7.94)
	Tube type		inner-groove tube	inner-groove tube
	Coil dimension (W×D×H)	in.(mm)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)
	Condenser quantity		2	2
	Number of circuits		12	12

Outdoor air flow		m^3/h	15,000	15,000
		CFM	8,830	8,830
Sound pressure level		dB(A)	60	60
Connectable indoor unit	Total capacity	%	50-130	50-130
	Max. quantity		23	26
Outdoor unit	Net dimension (W×H×D)	inch	49-7/32×63-9/16×30-1/8	49-7/32×63-9/16×30-1/8
		mm	1250×1615×765	1250×1615×765
	Packing (W×H×D)	inch	51-9/16×70-1/2×32-1/2	51-9/16×70-1/2×32-1/2
		mm	1305×1790×820	1305×1790×820
	Net weight	lbs.(kg)	666.6(303)	666.6(303)
	Gross weight	lbs.(kg)	708.4(322)	708.4(322)
Refrigerant	Type		R410A	R410A
	Factory charged	lbs.(kg)	28.6(13)	28.6(13)
Additional refrigerant oil	Oil type		FVC68D	FVC68D
	Oil charge	L(ft^3)	7(0.25)	7(0.25)
Throttle type			EXV	EXV
Design pressure (Hi/Lo)		MPa	4.4/2.6	4.4/2.6
		PSI	640/380	640/380
Refrigerant piping	Liquid Pipe	in.(mm)	Φ5/8(15.9)	Φ5/8(15.9)
	Low Pressure Gas Pipe	in.(mm)	Φ1-1/8(28.6)	Φ1-1/8(28.6)
	High Pressure Gas Pipe	in.(mm)	Φ7/8(22.2)	Φ7/8(22.2)
	High Pressure Gas Balance Pipe	in.(mm)	Φ3/4(19.1)	Φ3/4(19.1)
	Oil Balance Pipe	in.(mm)	Φ1/4(6)	Φ1/4(6)
Ambient temp. range	Cooling	°F(°C)	23~118.4(-5~48)	23~118.4(-5~48)
	Heating	°F(°C)	-4~75.2(-20~24)	-4~75.2(-20~24)
	Simultaneous Cooling and Heating	°F(°C)	23~75.2(-5~24)	23~75.2(-5~24)

Notes:

Capacities are based on the following conditions:

Cooling: Indoor temperature 27℃(80.6℉) DB/19℃(66.2℉) WB; Outdoor temperature 35℃(95℉) DB/24℃(75.2℉) WB.

Heating: Indoor temperature 20℃(68℉) DB/15℃(59℉) WB; Outdoor temperature 7℃(44.6℉) DB/6℃(42.8℉) WB.

Piping length: Interconnecting piping length is 7.5m(24.6ft), level difference is zero.

Connection piping diameter is based on the condition that the total equivalent liquid length is less than 90m(295.2ft). When the total equivalent liquid length is more than 90m(295.2ft), please refer to technical manual to choose the connection piping diameter.

Sound values are measured in a semi-anechoic room, at a position 1m(3.28ft) in front of the unit and 1.3m(4.26ft) above the floor.

Combination unit specifications

Model	**Combination unit**		**MVD-532(18)W/ D2RN1T(C)**	**MVD-560(20)W/ D2RN1T(C)**	**MVD-615(22)W/ D2RN1T(C)**
	Independent unit		MVD-252(8)W/ D2RN1T(C)	MVD-280(10)W /D2RN1T(C)	MVD-280(10)W /D2RN1T(C)
			MVD-280(10)W/ D2RN1T(C)	MVD-280(10)W /D2RN1T(C)	MVD-335(12)W/ D2RN1T(C)
Power supply		V/Ph/Hz	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60
Cooling	Capacity	kW	53.2	56.0	61.5
		Btu/h	181,500	191,000	209,800
	Power input	kW	12.40	13.34	14.74
	EER	kW/kW	4.29	4.20	4.17
Heating	Capacity	kW	58.5	63.0	69.0
		Btu/h	199,600	215,000	235,500
	Power input	kW	13.33	14.66	16.05
	COP	kW/kW	4.39	4.30	4.30
DC inverter compressor	Model		E655DHD-65D2YG	E655DHD-65D2YG	E655DHD-65D2YG
	Type		DC inverter	DC inverter	DC inverter
	Brand		Hitachi	Hitachi	Hitachi
	Quantity		2	2	2
	Capacity	kW	31.59×2	31.59×2	31.59×2
		Btu/h	107800×2	107800×2	107800×2
	Crankcase heater	W	30×4	30×4	30×4
	Refrigerant oil type		FVC68D	FVC68D	FVC68D
	Refrigerant oil charge	gal.(ml)	0.132×2(500×2)	0.132×2(500×2)	0.132×2(500×2)
Outdoor fan motor	Model		WZDK750-38G-4	WZDK750-38G-4	WZDK750-38G-4
	Type		DC motor	DC motor	DC motor
	Quantity		2×2	2×2	2×2
	Brand		Panasonic/Nidec	Panasonic/Nidec	Panasonic/Nidec
	Insulation class		E	E	E
	Safe class		IP23	IP23	IP23
	Input	W	520×2	520×2	520×2
	Output	W	420×2	420×2	420×2
Outdoor fan	Material		Plastic	Plastic	Plastic
	Type		Axial	Axial	Axial
	Quantity		2×2	2×2	2×2
Outdoor coil	Tube pitch(a)×row pitch(b)	in.(mm)	7/8×3/4(22×19)	7/8×3/4(22×19)	7/8×3/4(22×19)
	Fin spacing	in.(mm)	1/16(1.6)	1/16(1.6)	1/16(1.6)
	Fin type		Hydrophilic aluminium		
	Tube outside diameter	in.(mm)	Φ5/16(7.94)	Φ5/16(7.94)	Φ5/16(7.94)
	Tube type		inner-groove tube	inner-groove tube	inner-groove tube
	Coil dimension (W×D×H)	in.(mm)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)
Outdoor air flow		m^3/h	24,000	24,000	25,000

		CFM	14,120	14,120	14,710
Sound pressure level		dB(A)	61	61	62
Connectable indoor unit	Total capacity	%	50-130	50-130	50-130
	Max. quantity		29	33	36
Outdoor unit	Net dimension (W×H×D)	inch	(49-7/32×63-9/16×30-1/8)×2		
		mm	(1250×1615×765)×2		
	Packing (W×H×D)	inch	(51-9/16×70-1/2×32-1/2)×2		
		mm	(1305×1790×820)×2		
	Net weight	lbs.(kg)	561×2(255×2)	561×2(255×2)	561×2(255×2)
	Gross weight	lbs.(kg)	600.6×2(273×2)	600.6×2(273×2)	600.6×2(273×2)
Refrigerant	Type		R410A	R410A	R410A
	Factory charged	lbs.(kg)	22×2(10×2)	22×2(10×2)	22×2(10×2)
Additional refrigerant oil	Oil type		FVC68D	FVC68D	FVC68D
	Oil charge	L(ft^3)	10(0.35)	10(0.35)	10(0.35)
Throttle type			EXV	EXV	EXV
Design pressure (Hi/Lo)		MPa	4.4/2.6	4.4/2.6	4.4/2.6
		PSI	640/380	640/380	640/380
Refrigerant piping	Liquid Pipe	in.(mm)	Φ5/8(15.9)	Φ5/8(15.9)	Φ5/8(15.9)
	Low Pressure Gas Pipe	in.(mm)	Φ1-1/4(31.8)	Φ1-1/4(31.8)	Φ1-1/4(31.8)
	High Pressure Gas Pipe	in.(mm)	Φ1-1/8(28.6)	Φ1-1/8(28.6)	Φ1-1/8(28.6)
	High Pressure Gas Balance Pipe	in.(mm)	Φ3/4(19.1)	Φ3/4(19.1)	Φ3/4(19.1)
	Oil Balance Pipe	in.(mm)	Φ1/4(6)	Φ1/4(6)	Φ1/4(6)
Ambient temp. range	Cooling	°F(°C)	23~118.4(-5~48)	23~118.4(-5~48)	23~118.4(-5~48)
	Heating	°F(°C)	-4~75.2(-20~24)	-4~75.2(-20~24)	-4~75.2(-20~24)
	Simultaneous Cooling and Heating	°F(°C)	23~75.2(-5~24)	23~75.2(-5~24)	23~75.2(-5~24)

Notes:

Capacities are based on the following conditions:

Cooling: Indoor temperature 27℃(80.6℉) DB/19℃(66.2℉) WB; Outdoor temperature 35℃(95℉) DB/24℃(75.2℉) WB.

Heating: Indoor temperature 20℃(68℉) DB/15℃(59℉) WB; Outdoor temperature 7℃(44.6℉) DB/6℃(42.8℉) WB.

Piping length: Interconnecting piping length is 7.5m(24.6ft), level difference is zero.

Connection piping diameter is based on the condition that the total equivalent liquid length is less than 90m(295.2ft). When the total equivalent liquid length is more than 90m(295.2ft), please refer to technical manual to choose the connection piping diameter.

Sound values are measured in a semi-anechoic room, at a position 1m(3.28ft) in front of the unit and 1.3m(4.26ft) above the floor.

Combination unit specifications

Model	**Combination unit**		**MVD-680(24)W/ D2RN1T(C)**	**MVD-730(26)W/ D2RN1T(C)**	**MVD-800(28)W/ D2RN1T(C)**
	Independent unit		MVD-280(10)W/ D2RN1T(C)	MVD-280(10)W/ D2RN1T(C)	MVD-400(14)W/ D2RN1T(C)
			MVD-400(14)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)	MVD-400(14)W/ D2RN1T(C)
Power supply		V/Ph/Hz	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60
Cooling	Capacity	kW	68.0	73.0	80.0
		Btu/h	232,000	249,000	273,000
	Power input	kW	17.97	19.9	22.6
	EER	kW/kW	3.78	3.67	3.54
Heating	Capacity	kW	76.5	81.5	90.0
		Btu/h	261,000	278,100	307,000
	Power input	kW	18.52	20.1	22.4
	COP	kW/kW	4.13	4.05	4.02
DC inverter compressor	Model		E655DHD-65D2YG×2+ E405DHD-36D2YG	E655DHD-65D2YG×2+ E405DHD-36D2YG	(E655DHD-65D2YG+ E405DHD-36D2YG)×2
	Type		DC inverter	DC inverter	DC inverter
	Brand		Hitachi	Hitachi	Hitachi
	Quantity		3	3	4
	Capacity	kW	31.59+(31.59+11.8)	31.59+(31.59+11.8)	(31.59+11.8)×2
		Btu/h	107800+(107800+40300)		(107800+40300)×2
	Crankcase heater	W	30×4	30×6	30×8
	Refrigerant oil type		FVC68D	FVC68D	FVC68D
	Refrigerant oil charge	gal.(ml)	0.132×3(500×3)	0.132×3(500×3)	0.132×4(500×4)
Outdoor fan motor	Model		WZDK750-38G-4	WZDK750-38G-4	WZDK750-38G-4
	Type		DC motor	DC motor	DC motor
	Quantity		2×2	2×2	2×2
	Brand		Panasonic/Nidec	Panasonic/Nidec	Panasonic/Nidec
	Insulation class		E	E	E
	Safe class		IP23	IP23	IP23
	Input	W	520+890	520+890	890×2
	Output	W	420+710	420+710	710×2
Outdoor fan	Material		Plastic	Plastic	Plastic
	Type		Axial	Axial	Axial
	Quantity		2×2	2×2	2×2
Outdoor coil	Tube pitch(a)×row pitch(b)	in.(mm)	7/8×3/4(22×19)	7/8×3/4(22×19)	7/8×3/4(22×19)
	Fin spacing	in.(mm)	1/16(1.6)	1/16(1.6)	1/16(1.6)
	Fin type		Hydrophilic aluminium		
	Tube outside diameter	in.(mm)	Φ5/16(7.94)	Φ5/16(7.94)	Φ5/16(7.94)
	Tube type		inner-groove tube	inner-groove tube	inner-groove tube
	Coil dimension (W×D×H)	in.(mm)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)

Outdoor air flow		m^3/h	27,000	27,000	30,000
		CFM	15,890	15,890	17,660
Sound pressure level		dB(A)	63	63	64
Connectable indoor unit	Total capacity	%	50-130	50-130	50-130
	Max. quantity		39	43	46
Outdoor unit	Net dimension (W×H×D)	inch	(49-7/32×63-9/16×30-1/8)×2		
		mm	(1250×1615×765)×2		
	Packing (W×H×D)	inch	(51-9/16×70-1/2×32-1/2)×2		
		mm	(1305×1790×820)×2		
	Net weight	lbs.(kg)	561+666.6(255+303)	561+666.6(255+303)	666.6×2(303×2)
	Gross weight	lbs.(kg)	600.6+708.4(273+322)	600.6+708.4(273+322)	708.4×2(322×2)
Refrigerant	Type		R410A	R410A	R410A
	Factory charged	lbs.(kg)	22+28.6(10+13)	22+28.6(10+13)	28.6×2(13×2)
Additional refrigerant oil	Oil type		FVC68D	FVC68D	FVC68D
	Oil charge	L(ft3)	12(0.42)	12(0.42)	14(0.49)
Throttle type			EXV	EXV	EXV
Design pressure (Hi/Lo)		MPa	4.4/2.6	4.4/2.6	4.4/2.6
		PSI	640/380	640/380	640/380
Refrigerant piping	Liquid Pipe	in.(mm)	Φ5/8(15.9)	Φ3/4(19.1)	Φ3/4(19.1)
	Low Pressure Gas Pipe	in.(mm)	Φ1-3/8(34.9)	Φ1-3/8(34.9)	Φ1-3/8(34.9)
	High Pressure Gas Pipe	in.(mm)	Φ1-1/8(28.6)	Φ1-1/8(28.6)	Φ1-1/8(28.6)
	High Pressure Gas Balance Pipe	in.(mm)	Φ3/4(19.1)	Φ3/4(19.1)	Φ3/4(19.1)
	Oil Balance Pipe	in.(mm)	Φ1/4(6)	Φ1/4(6)	Φ1/4(6)
Ambient temp. range	Cooling	°F(°C)	23~118.4(-5~48)	23~118.4(-5~48)	23~118.4(-5~48)
	Heating	°F(°C)	-4~75.2(-20~24)	-4~75.2(-20~24)	-4~75.2(-20~24)
	Simultaneous Cooling and Heating	°F(°C)	23~75.2(-5~24)	23~75.2(-5~24)	23~75.2(-5~24)

Notes:

Capacities are based on the following conditions:

Cooling: Indoor temperature 27℃(80.6℉) DB/19℃(66.2℉) WB; Outdoor temperature 35℃(95℉) DB/24℃(75.2℉) WB.

Heating: Indoor temperature 20℃(68℉) DB/15℃(59℉) WB; Outdoor temperature 7℃(44.6℉) DB/6℃(42.8℉) WB.

Piping length: Interconnecting piping length is 7.5m(24.6ft), level difference is zero.

Connection piping diameter is based on the condition that the total equivalent liquid length is less than 90m(295.2ft). When the total equivalent liquid length is more than 90m(295.2ft), please refer to technical manual to choose the connection piping diameter.

Sound values are measured in a semi-anechoic room, at a position 1m(3.28ft) in front of the unit and 1.3m(4.26ft) above the floor.

Combination unit specifications

Model	**Combination unit**		**MVD-850(30)W/ D2RN1T(C)**	**MVD-900(32)W/ D2RN1T(C)**	**MVD-960(34)W/ D2RN1T(C)**
	Independent unit		MVD-400(14)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)	MVD-280(10)W/ D2RN1T(C)
			MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)	MVD-280(10)W/ D2RN1T(C)
			-	-	MVD-400(14)W/ D2RN1T(C)
Power supply		V/Ph/Hz	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60
Cooling	Capacity	kW	85.0	90.0	96.0
		Btu/h	290,000	307,000	327,500
	Power input	kW	24.54	26.48	24.64
	EER	kW/kW	3.46	3.40	3.90
Heating	Capacity	kW	95	100.0	108.0
		Btu/h	324,100	341,200	368,500
	Power input	kW	23.98	25.58	25.85
	COP	kW/kW	3.96	3.91	4.18
DC inverter compressor	Model		(E655DHD-65D2YG+ E405DHD-36D2YG)×2		E655DHD-65D2YG×3+ E405DHD-36D2YG
	Type		DC inverter	DC inverter	DC inverter
	Brand		Hitachi	Hitachi	Hitachi
	Quantity		4	4	4
	Capacity	kW	(31.59+11.8)×2	(31.59+11.8)×2	31.59×2+(31.59+11.8)
		Btu/h	(107800+40300)×2	(107800+40300)×2	107800×2+ (107800+40300)
	Crankcase heater	W	30×8	30×8	30×8
	Refrigerant oil type		FVC68D	FVC68D	FVC68D
	Refrigerant oil charge	gal.(ml)	0.132×4(500×4)	0.132×4(500×4)	0.132×4(500×4)
Outdoor fan motor	Model		WZDK750-38G-4	WZDK750-38G-4	WZDK750-38G-4
	Type		DC motor	DC motor	DC motor
	Quantity		2×2	2×2	2×3
	Brand		Panasonic/Nidec	Panasonic/Nidec	Panasonic/Nidec
	Insulation class		E	E	E
	Safe class		IP23	IP23	IP23
	Input	W	890×2	890×2	520×2+890
	Output	W	710×2	710×2	420×2+710
Outdoor fan	Material		Plastic	Plastic	Plastic
	Type		Axial	Axial	Axial
	Quantity		2×2	2×2	2×3
Outdoor coil	Tube pitch(a)×row pitch(b)	in.(mm)	7/8×3/4(22×19)	7/8×3/4(22×19)	7/8×3/4(22×19)
	Fin spacing	in.(mm)	1/16(1.6)	1/16(1.6)	1/16(1.6)
	Fin type		Hydrophilic aluminium		
	Tube outside diameter	in.(mm)	Φ5/16(7.94)	Φ5/16(7.94)	Φ5/16(7.94)

	Tube type		inner-groove tube	inner-groove tube	inner-groove tube
	Coil dimension (W×D×H)	in.(mm)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)
Outdoor air flow		m^3/h	30,000	30,000	39,000
		CFM	17,660	17,660	22,950
Sound pressure level		dB(A)	64	64	65
Connectable indoor unit	Total capacity	%	50-130	50-130	50-130
	Max. quantity		50	53	56
Outdoor unit	Net dimension (W×H×D)	inch	(49-7/32×63-9/16×30-1/8)×2		(49-7/32×63-9/16×30-1/8)×3
		mm	(1250×1615×765)×2		(1250×1615×765)×3
	Packing (W×H×D)	inch	(51-9/16×70-1/2×32-1/2)×2		(51-9/16×70-1/2×32-1/2)×3
		mm	(1305×1790×820)×2		(1305×1790×820)×3
	Net weight	lbs.(kg)	666.6×2(303×2)	666.6×2(303×2)	561×2+666.6(255×2+303)
	Gross weight	lbs.(kg)	708.4×2(322×2)	708.4×2(322×2)	600.6×2+708.4 (273×2+322)
Refrigerant	Type		R410A	R410A	R410A
	Factory charged	lbs.(kg)	28.6×2(13×2)	28.6×2(13×2)	22×2+28.6(10×2+13)
Additional refrigerant oil	Oil type		FVC68D	FVC68D	FVC68D
	Oil charge	L(ft3)	14(0.49)	14(0.49)	17(0.6)
Throttle type			EXV	EXV	EXV
Design pressure (Hi/Lo)		MPa	4.4/2.6	4.4/2.6	4.4/2.6
		PSI	640/380	640/380	640/380
Refrigerant piping	Liquid Pipe	in.(mm)	Φ3/4(19.1)	Φ3/4(19.1)	Φ3/4(19.1)
	Low Pressure Gas Pipe	in.(mm)	Φ1-3/8(34.9)	Φ1-3/8(34.9)	Φ1-5/8(41.3)
	High Pressure Gas Pipe	in.(mm)	Φ1-1/8(28.6)	Φ1-1/8(28.6)	Φ1-3/8(34.9)
	High Pressure Gas Balance Pipe	in.(mm)	Φ3/4(19.1)	Φ3/4(19.1)	Φ3/4(19.1)
	Oil Balance Pipe	in.(mm)	Φ1/4(6)	Φ1/4(6)	Φ1/4(6)
Ambient temp. range	Cooling	°F(°C)	23~118.4(-5~48)	23~118.4(-5~48)	23~118.4(-5~48)
	Heating	°F(°C)	-4~75.2(-20~24)	-4~75.2(-20~24)	-4~75.2(-20~24)
	Simultaneous Cooling and Heating	°F(°C)	23~75.2(-5~24)	23~75.2(-5~24)	23~75.2(-5~24)

Notes:

Capacities are based on the following conditions:

Cooling: Indoor temperature 27℃(80.6℉) DB/19℃(66.2℉) WB; Outdoor temperature 35℃(95℉) DB/24℃(75.2℉) WB.

Heating: Indoor temperature 20℃(68℉) DB/15℃(59℉) WB; Outdoor temperature 7℃(44.6℉) DB/6℃(42.8℉) WB.

Piping length: Interconnecting piping length is 7.5m(24.6ft), level difference is zero.

Connection piping diameter is based on the condition that the total equivalent liquid length is less than 90m(295.2ft). When the total equivalent liquid length is more than 90m(295.2ft), please refer to technical manual to choose the connection piping diameter.

Sound values are measured in a semi-anechoic room, at a position 1m(3.28ft) in front of the unit and 1.3m(4.26ft) above the floor.

Combination unit specifications

Model	**Combination unit**		**MVD-1010(36)W/ D2RN1T(C)**	**MDV-1065(38)W/ D2RN1T(C)**	**MVD-1130(40)W/ D2RN1T(C)**
	Independent unit		MVD-280(10)W/ D2RN1T(C)	MVD-280(10)W/ D2RN1T(C)	MVD-280(10)W/ D2RN1T(C)
			MVD-280(10)W/ D2RN1T(C)	MVD-335(12)W/ D2RN1T(C)	MVD-400(14)W/ D2RN1T(C)
			MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)
Power supply		V/Ph/Hz	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60
Cooling	Capacity	kW	101.0	106.5	113.0
		Btu/h	344,500	363,300	385,500
	Power input	kW	26.58	27.98	31.21
	EER	kW/kW	3.80	3.81	3.62
Heating	Capacity	kW	113	119	126.5
		Btu/h	385,600	406,100	431,600
	Power input	kW	27.45	28.84	31.31
	COP	kW/kW	4.12	4.13	4.04
DC inverter compressor	Model		E655DHD-65D2YG×3+ E405DHD-36D2YG		E655DHD-65D2YG×3+ E405DHD-36D2YG×2
	Type		DC inverter	DC inverter	DC inverter
	Brand		Hitachi	Hitachi	Hitachi
	Quantity		4	4	5
	Capacity	kW	31.59×2+(31.59+11.8)		31.59+(31.59+11.8)×2
		Btu/h	107800×2+(107800+40300)		107800+ (107800+40300)×2
	Crankcase heater	W	30×8	30×8	30×10
	Refrigerant oil type		FVC68D	FVC68D	FVC68D
	Refrigerant oil charge	gal.(ml)	0.132×4(500×4)	0.132×4(500×4)	0.132×5(500×5)
Outdoor fan motor	Model		WZDK750-38G-4	WZDK750-38G-4	WZDK750-38G-4
	Type		DC motor	DC motor	DC motor
	Quantity		2×3	2×3	2×3
	Brand		Panasonic/Nidec	Panasonic/Nidec	Panasonic/Nidec
	Insulation class		E	E	E
	Safe class		IP23	IP23	IP23
	Input	W	520×2+890	520×2+890	520+890×2
	Output	W	420×2+710	420×2+710	420+710×2
Outdoor fan	Material		Plastic	Plastic	Plastic
	Type		Axial	Axial	Axial
	Quantity		2×3	2×3	2×3
Outdoor coil	Tube pitch(a)×row pitch(b)	in.(mm)	7/8×3/4(22×19)	7/8×3/4(22×19)	7/8×3/4(22×19)
	Fin spacing	in.(mm)	1/16(1.6)	1/16(1.6)	1/16(1.6)
	Fin type		Hydrophilic aluminium		

	Tube outside diameter	in.(mm)	Φ5/16(7.94)	Φ5/16(7.94)	Φ5/16(7.94)
	Tube type		inner-groove tube	inner-groove tube	inner-groove tube
	Coil dimension (W×D×H)	in.(mm)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)
Outdoor air flow		m^3/h	39,000	40,000	42,000
		CFM	22,950	23,540	24,720
Sound pressure level		dB(A)	65	65	66
Connectable indoor unit	Total capacity	%	50-130	50-130	50-130
	Max. quantity		59	63	64
Outdoor unit	Net dimension (W×H×D)	inch	(49-7/32×63-9/16×30-1/8)×3		
		mm	(1250×1615×765)×3		
	Packing (W×H×D)	inch	(51-9/16×70-1/2×32-1/2)×3		
		mm	(1305×1790×820)×3		
	Net weight	lbs.(kg)	561×2+666.6(255×2+303)		561+666.6×2(255+303×2)
	Gross weight	lbs.(kg)	600.6×2+708.4(273×2+322)		600.6+708.4×2 (273+322×2)
Refrigerant	Type		R410A	R410A	R410A
	Factory charged	lbs.(kg)	22×2+28.6(10×2+13)	22×2+28.6(10×2+13)	22+28.6×2(10+13×2)
Additional refrigerant oil	Oil type		FVC68D	FVC68D	FVC68D
	Oil charge	L(ft3)	17(0.6)	17(0.6)	19(0.67)
Throttle type			EXV	EXV	EXV
Design pressure (Hi/Lo)		MPa	4.4/2.6	4.4/2.6	4.4/2.6
		PSI	640/380	640/380	640/380
Refrigerant piping	Liquid Pipe	in.(mm)	Φ3/4(19.1)	Φ3/4(19.1)	Φ3/4(19.1)
	Low Pressure Gas Pipe	in.(mm)	Φ1-5/8(41.3)	Φ1-5/8(41.3)	Φ1-5/8(41.3)
	High Pressure Gas Pipe	in.(mm)	Φ1-3/8(34.9)	Φ1-3/8(34.9)	Φ1-3/8(34.9)
	High Pressure Gas Balance Pipe	in.(mm)	Φ3/4(19.1)	Φ3/4(19.1)	Φ3/4(19.1)
	Oil Balance Pipe	in.(mm)	Φ1/4(6)	Φ1/4(6)	Φ1/4(6)
Ambient temp. range	Cooling	°F(°C)	23~118.4(-5~48)	23~118.4(-5~48)	23~118.4(-5~48)
	Heating	°F(°C)	-4~75.2(-20~24)	-4~75.2(-20~24)	-4~75.2(-20~24)
	Simultaneous Cooling and Heating	°F(°C)	23~75.2(-5~24)	23~75.2(-5~24)	23~75.2(-5~24)

Notes:

Capacities are based on the following conditions:

Cooling: Indoor temperature 27℃(80.6℉) DB/19℃(66.2℉) WB; Outdoor temperature 35℃(95℉) DB/24℃(75.2℉) WB.

Heating: Indoor temperature 20℃(68℉) DB/15℃(59℉) WB; Outdoor temperature 7℃(44.6℉) DB/6℃(42.8℉) WB.

Piping length: Interconnecting piping length is 7.5m(24.6ft), level difference is zero.

Connection piping diameter is based on the condition that the total equivalent liquid length is less than 90m(295.2ft). When the total equivalent liquid length is more than 90m(295.2ft), please refer to technical manual to choose the connection piping diameter.

Sound values are measured in a semi-anechoic room, at a position 1m(3.28ft) in front of the unit and 1.3m(4.26ft) above the floor.

Combination unit specifications

Model	**Combination unit**		**MVD-1200(42)W/ D2RN1T(C)**	**MVD-1250(44)W/ D2RN1T(C)**	**MVD-1300(46)W/ D2RN1T(C)**
	Independent unit		MVD-400(14)W/ D2RN1T(C)	MVD-400(14)W/ D2RN1T(C)	MVD-400(14)W/ D2RN1T(C)
			MVD-400(14)W/ D2RN1T(C)	MVD-400(14)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)
			MVD-400(14)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)
Power supply		V/Ph/Hz	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60
Cooling	Capacity	kW	120.0	125.0	130.0
		Btu/h	409,500	426,500	443,500
	Power input	kW	33.90	35.84	37.78
	EER	kW/kW	3.54	3.49	3.44
Heating	Capacity	kW	135.0	140.0	145.0
		Btu/h	460,500	477,600	494,700
	Power input	kW	33.57	35.17	36.77
	COP	kW/kW	4.02	3.98	3.94
DC inverter compressor	Model		E655DHD-65D2YG×3+ E405DHD-36D2YG×3	E655DHD-65D2YG×3+ E405DHD-36D2YG×3	E655DHD-65D2YG×3+ E405DHD-36D2YG×3
	Type		DC inverter	DC inverter	DC inverter
	Brand		Hitachi	Hitachi	Hitachi
	Quantity		6	6	6
	Capacity	kW	(31.59+11.8)×3	(31.59+11.8)×3	(31.59+11.8)×3
		Btu/h	(107800+40300)×3	(107800+40300)×3	(107800+40300)×3
	Crankcase heater	W	30×12	30×12	30×12
	Refrigerant oil type		FVC68D	FVC68D	FVC68D
	Refrigerant oil charge	gal.(ml)	0.132×6(500×6)	0.132×6(500×6)	0.132×6(500×6)
Outdoor fan motor	Model		WZDK750-38G-4	WZDK750-38G-4	WZDK750-38G-4
	Type		DC motor	DC motor	DC motor
	Quantity		2×3	2×3	2×3
	Brand		Panasonic/Nidec	Panasonic/Nidec	Panasonic/Nidec
	Insulation class		E	E	E
	Safe class		IP23	IP23	IP23
	Input	W	890×3	890×3	890×3
	Output	W	710×3	710×3	710×3
Outdoor fan	Material		Plastic	Plastic	Plastic
	Type		Axial	Axial	Axial
	Quantity		2×3	2×3	2×3
Outdoor coil	Tube pitch(a)×row pitch(b)	in.(mm)	7/8×3/4(22×19)	7/8×3/4(22×19)	7/8×3/4(22×19)
	Fin spacing	in.(mm)	1/16(1.6)	1/16(1.6)	1/16(1.6)
	Fin type		Hydrophilic aluminium	Hydrophilic aluminium	Hydrophilic aluminium
	Tube outside diameter	in.(mm)	Φ5/16(7.94)	Φ5/16(7.94)	Φ5/16(7.94)
	Tube type		inner-groove tube	inner-groove tube	inner-groove tube

	Coil dimension (W×D×H)	in.(mm)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)
Outdoor air flow		m^3/h	45,000	45,000	45,000
		CFM	26,490	26,490	26,490
Sound pressure level		dB(A)	67	67	67
Connectable indoor unit	Total capacity	%	50-130	50-130	50-130
	Max. quantity		64	64	64
Outdoor unit	Net dimension (W×H×D)	inch	(49-7/32×63-9/16×30-1/8)×3		
		mm	(1250×1615×765)×3		
	Packing (W×H×D)	inch	(51-9/16×70-1/2×32-1/2)×3		
		mm	(1305×1790×820)×3		
	Net weight	lbs.(kg)	666.6×3(303×3)	666.6×3(303×3)	666.6×3(303×3)
	Gross weight	lbs.(kg)	708.4×3(322×3)	708.4×3(322×3)	708.4×3(322×3)
Refrigerant	Type		R410A	R410A	R410A
	Factory charged	lbs.(kg)	28.6×3(13×3)	28.6×3(13×3)	28.6×3(13×3)
Additional refrigerant oil	Oil type		FVC68D	FVC68D	FVC68D
	Oil charge	L(ft3)	21(0.74)	21(0.74)	21(0.74)
Throttle type			EXV	EXV	EXV
Design pressure (Hi/Lo)		MPa	4.4/2.6	4.4/2.6	4.4/2.6
		PSI	640/380	640/380	640/380
Refrigerant piping	Liquid Pipe	in.(mm)	Φ3/4(19.1)	Φ3/4(19.1)	Φ3/4(19.1)
	Low Pressure Gas Pipe	in.(mm)	Φ1-5/8(41.3)	Φ1-5/8(41.3)	Φ1-5/8(41.3)
	High Pressure Gas Pipe	in.(mm)	Φ1-3/8(34.9)	Φ1-3/8(34.9)	Φ1-3/8(34.9)
	High Pressure Gas Balance Pipe	in.(mm)	Φ3/4(19.1)	Φ3/4(19.1)	Φ3/4(19.1)
	Oil Balance Pipe	in.(mm)	Φ1/4(6)	Φ1/4(6)	Φ1/4(6)
Ambient temp. range	Cooling	°F(°C)	23~118.4(-5~48)	23~118.4(-5~48)	23~118.4(-5~48)
	Heating	°F(°C)	-4~75.2(-20~24)	-4~75.2(-20~24)	-4~75.2(-20~24)
	Simultaneous Cooling and Heating	°F(°C)	23~75.2(-5~24)	23~75.2(-5~24)	23~75.2(-5~24)

Notes:

Capacities are based on the following conditions:

Cooling: Indoor temperature 27℃(80.6℉) DB/19℃(66.2℉) WB; Outdoor temperature 35℃(95℉) DB/24℃(75.2℉) WB.

Heating: Indoor temperature 20℃(68℉) DB/15℃(59℉) WB; Outdoor temperature 7℃(44.6℉) DB/6℃(42.8℉) WB.

Piping length: Interconnecting piping length is 7.5m(24.6ft), level difference is zero.

Connection piping diameter is based on the condition that the total equivalent liquid length is less than 90m(295.2ft). When the total equivalent liquid length is more than 90m(295.2ft), please refer to technical manual to choose the connection piping diameter.

Sound values are measured in a semi-anechoic room, at a position 1m(3.28ft) in front of the unit and 1.3m(4.26ft) above the floor.

Combination unit specifications

Model	**Combination unit**		**MVD-1350(48)W/ D2RN1T(C)**	**MVD-1432(50)W/ D2RN1T(C)**	**MVD-1460(52)W/ D2RN1T(C)**
	Independent unit		MVD-450(16)W/ D2RN1T(C)	MVD-252(8)W/ D2RN1T(C)	MCD-280(10)W/ D2RN1T(C)
			MVD-450(16)W/ D2RN1T(C)	MVD-280(10)W/ D2RN1T(C)	MVD-280(10)W/ D2RN1T(C)
			MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)
			-	MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)
Power supply		V/Ph/Hz	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60
Cooling	Capacity	kW	135.0	143.2	146.0
		Btu/h	460,500	488,500	498,000
	Power input	kW	39.72	38.88	39.82
	EER	kW/kW	3.40	3.68	3.67
Heating	Capacity	kW	150	158.5	163.0
		Btu/h	511,800	540,800	556,200
	Power input	kW	38.37	38.91	40.24
	COP	kW/kW	3.91	4.07	4.05
DC inverter compressor	Model		E655DHD-65D2YG×3+ E405DHD-36D2YG×3	E655DHD-65D2YG×4+ E405DHD-36D2YG×2	
	Type		DC inverter	DC inverter	DC inverter
	Brand		Hitachi	Hitachi	Hitachi
	Quantity		6	6	6
	Capacity	kW	(31.59+11.8)×3	31.59×2+(31.59+11.8)×2	
		Btu/h	(107800+40300)×3	107800×2+(107800+40300)×2	
	Crankcase heater	W	30×12	30×12	30×12
	Refrigerant oil type		FVC68D	FVC68D	FVC68D
	Refrigerant oil charge	gal.(ml)	0.132×6(500×6)	0.132×6(500×6)	0.132×6(500×6)
Outdoor fan motor	Model		WZDK750-38G-4	WZDK750-38G-4	WZDK750-38G-4
	Type		DC motor	DC motor	DC motor
	Quantity		2×3	2×4	2×4
	Brand		Panasonic/Nidec	Panasonic/Nidec	Panasonic/Nidec
	Insulation class		E	E	E
	Safe class		IP23	IP23	IP23
	Input	W	890×3	520×2+890×2	520×2+890×2
	Output	W	710×3	420×2+710×2	420×2+710×2
Outdoor fan	Material		Plastic	Plastic	Plastic
	Type		Axial	Axial	Axial
	Quantity		2×3	2×4	2×4
Outdoor coil	Tube pitch(a)×row pitch(b)	in.(mm)	7/8×3/4(22×19)	7/8×3/4(22×19)	7/8×3/4(22×19)
	Fin spacing	in.(mm)	1/16(1.6)	1/16(1.6)	1/16(1.6)

	Fin type		Hydrophilic aluminium	Hydrophilic aluminium	Hydrophilic aluminium
	Tube outside diameter	in.(mm)	Φ5/16(7.94)	Φ5/16(7.94)	Φ5/16(7.94)
	Tube type		inner-groove tube	inner-groove tube	inner-groove tube
	Coil dimension (W×D×H)	in.(mm)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)
Outdoor air flow		m^3/h	45,000	54,000	54,000
		CFM	26,490	31,780	31,780
Sound pressure level		dB(A)	67	68	68
Connectable indoor unit	Total capacity	%	50-130	50-130	50-130
	Max. quantity		64	64	64
Outdoor unit	Net dimension (W×H×D)	inch	(49-7/32×63-9/16×30-1/8)×3	(49-7/32×63-9/16×30-1/8)×4	
		mm	(1250×1615×765)×3	(1250×1615×765)×4	
	Packing (W×H×D)	inch	(51-9/16×70-1/2×32-1/2)×3	(51-9/16×70-1/2×32-1/2)×4	
		mm	(1305×1790×820)×3	(1305×1790×820)×4	
	Net weight	lbs.(kg)	666.6×3(303×3)	561×2+666.6×2(255×2+303×2)	
	Gross weight	lbs.(kg)	708.4×3(322×3)	600.6×2+708.4×2(273×2+322×2)	
Refrigerant	Type		R410A	R410A	
	Factory charged	lbs.(kg)	28.6×3(13×3)	22×2+28.6×2(10×2+13×2)	
Additional refrigerant oil	Oil type		FVC68D	FVC68D	FVC68D
	Oil charge	L(ft3)	21(0.74)	24(0.85)	24(0.85)
Throttle type			EXV	EXV	EXV
Design pressure (Hi/Lo)		MPa	4.4/2.6	4.4/2.6	4.4/2.6
		PSI	640/380	640/380	640/380
Refrigerant piping	Liquid Pipe	in.(mm)	Φ3/4(19.1)	Φ7/8(22.2)	Φ7/8(22.2)
	Low Pressure Gas Pipe	in.(mm)	Φ1-5/8(41.3)	Φ1-3/4(44.5)	Φ1-3/4(44.5)
	High Pressure Gas Pipe	in.(mm)	Φ1-3/8(34.9)	Φ1-1/2(38.1)	Φ1-1/2(38.1)
	High Pressure Gas Balance Pipe	in.(mm)	Φ3/4(19.1)	Φ3/4(19.1)	Φ3/4(19.1)
	Oil Balance Pipe	in.(mm)	Φ1/4(6)	Φ1/4(6)	Φ1/4(6)
Ambient temp. range	Cooling	°F(°C)	23~118.4(-5~48)	23~118.4(-5~48)	23~118.4(-5~48)
	Heating	°F(°C)	-4~75.2(-20~24)	-4~75.2(-20~24)	-4~75.2(-20~24)
	Simultaneous Cooling and Heating	°F(°C)	23~75.2(-5~24)	23~75.2(-5~24)	23~75.2(-5~24)

Notes:

Capacities are based on the following conditions:

Cooling: Indoor temperature 27℃(80.6℉) DB/19℃(66.2℉) WB; Outdoor temperature 35℃(95℉) DB/24℃(75.2℉) WB.

Heating: Indoor temperature 20℃(68℉) DB/15℃(59℉) WB; Outdoor temperature 7℃(44.6℉) DB/6℃(42.8℉) WB.

Piping length: Interconnecting piping length is 7.5m(24.6ft), level difference is zero.

Connection piping diameter is based on the condition that the total equivalent liquid length is less than 90m(295.2ft). When the total equivalent liquid length is more than 90m(295.2ft), please refer to technical manual to choose the connection piping diameter.

Sound values are measured in a semi-anechoic room, at a position 1m(3.28ft) in front of the unit and 1.3m(4.26ft) above the floor.

Combination unit specifications

Model	**Combination unit**		**MVD-1515(54)W/ D2RN1T(C)**	**MVD-1580(56)W/ D2RN1T(C)**	**MVD-1650(58)W/ D2RN1T(C)**
	Independent unit		MVD-280(10)W/ D2RN1T(C)	MVD-280(10)W/ D2RN1T(C)	MVD-400(14)W/ D2RN1T(C)
			MVD-335(12)W/ D2RN1T(C)	MVD-400(14)W/ D2RN1T(C)	MVD-400(14)W/ D2RN1T(C)
			MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)	MVD-400(14)W/ D2RN1T(C)
			MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)
Power supply		V/Ph/Hz	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60
Cooling	Capacity	kW	151.5	158.0	165.0
		Btu/h	516,800	539,000	563,000
	Power input	kW	41.22	44.45	47.14
	EER	kW/kW	3.68	3.55	3.50
Heating	Capacity	kW	169	176.5	185.0
		Btu/h	576,700	602,200	631,100
	Power input	kW	41.63	44.10	46.36
	COP	kW/kW	4.06	4.00	3.99
DC inverter compressor	Model		E655DHD-65D2YG×4+ E405DHD-36D2YG×2	E655DHD-65D2YG×4+ E405DHD-36D2YG×3	E655DHD-65D2YG×4+ E405DHD-36D2YG×4
	Type		DC inverter	DC inverter	DC inverter
	Brand		Hitachi	Hitachi	Hitachi
	Quantity		6	7	8
	Capacity	kW	31.59×2+ (31.59+11.8)×2	31.59+(31.59+11.8)×3	(31.59+11.8)×4
		Btu/h	107800×2+ (107800+40300)×2	107800+ (107800+40300)×3	(107800+40300)×4
	Crankcase heater	W	30×12	30×14	30×16
	Refrigerant oil type		FVC68D	FVC68D	FVC68D
	Refrigerant oil charge	gal.(ml)	0.132×6(500×6)	0.132×7(500×7)	0.132×8(500×8)
Outdoor fan motor	Model		WZDK750-38G-4	WZDK750-38G-4	WZDK750-38G-4
	Type		DC motor	DC motor	DC motor
	Quantity		2×4	2×4	2×4
	Brand		Panasonic/Nidec	Panasonic/Nidec	Panasonic/Nidec
	Insulation class		E	E	E
	Safe class		IP23	IP23	IP23
	Input	W	520×2+890×2	520+890×3	890×4
	Output	W	420×2+710×2	420+710×3	710×4
Outdoor fan	Material		Plastic	Plastic	Plastic
	Type		Axial	Axial	Axial
	Quantity		2×4	2×4	2×4
Outdoor coil	Tube pitch(a)×row pitch(b)	in.(mm)	7/8×3/4(22×19)	7/8×3/4(22×19)	7/8×3/4(22×19)

	Fin spacing	in.(mm)	1/16(1.6)	1/16(1.6)	1/16(1.6)
	Fin type		Hydrophilic aluminium	Hydrophilic aluminium	Hydrophilic aluminium
	Tube outside diameter	in.(mm)	Φ5/16(7.94)	Φ5/16(7.94)	Φ5/16(7.94)
	Tube type		inner-groove tube	inner-groove tube	inner-groove tube
	Coil dimension (W×D×H)	in.(mm)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)
Outdoor air flow		m^3/h	55,000	57,000	60,000
		CFM	32,370	33,550	35,320
Sound pressure level		dB(A)	68	68	69
Connectable indoor unit	Total capacity	%	50-130	50-130	50-130
	Max. quantity		64	64	64
Outdoor unit	Net dimension (W×H×D)	inch	(49-7/32×63-9/16×30-1/8)×4		
		mm	(1250×1615×765)×4		
	Packing (W×H×D)	inch	(51-9/16×70-1/2×32-1/2)×4		
		mm	(1305×1790×820)×4		
	Net weight	lbs.(kg)	561×2+666.6×2 (255×2+303×3)	561+666.6×3 (255+303×3)	666.6×4 (303×4)
	Gross weight	lbs.(kg)	600.6×2+708.4×2 (273×2+322×2)	600.6+708.4×3 (273+322×3)	708.4×4 (322×4)
Refrigerant	Type		R410A	R410A	R410A
	Factory charged	lbs.(kg)	22×2+28.6×2 (10×2+13×2)	22+28.6×3(10+13×3)	28.6×4(13×4)
Additional refrigerant oil	Oil type		FVC68D	FVC68D	FVC68D
	Oil charge	L(ft3)	24(0.85)	26(0.92)	28(0.99)
Throttle type			EXV	EXV	EXV
Design pressure (Hi/Lo)		MPa	4.4/2.6	4.4/2.6	4.4/2.6
		PSI	640/380	640/380	640/380
Refrigerant piping	Liquid Pipe	in.(mm)	Φ7/8(22.2)	Φ7/8(22.2)	Φ7/8(22.2)
	Low Pressure Gas Pipe	in.(mm)	Φ1-3/4(44.5)	Φ1-3/4(44.5)	Φ1-3/4(44.5)
	High Pressure Gas Pipe	in.(mm)	Φ1-1/2(38.1)	Φ1-1/2(38.1)	Φ1-1/2(38.1)
	High Pressure Gas Balance Pipe	in.(mm)	Φ3/4(19.1)	Φ3/4(19.1)	Φ3/4(19.1)
	Oil Balance Pipe	in.(mm)	Φ1/4(6)	Φ1/4(6)	Φ1/4(6)
Ambient temp. range	Cooling	°F(°C)	23~118.4(-5~48)	23~118.4(-5~48)	23~118.4(-5~48)
	Heating	°F(°C)	-4~75.2(-20~24)	-4~75.2(-20~24)	-4~75.2(-20~24)
	Simultaneous Cooling and Heating	°F(°C)	23~75.2(-5~24)	23~75.2(-5~24)	23~75.2(-5~24)

Notes:

Capacities are based on the following conditions:

Cooling: Indoor temperature 27℃(80.6℉) DB/19℃(66.2℉) WB; Outdoor temperature 35℃(95℉) DB/24℃(75.2℉) WB.

Heating: Indoor temperature 20℃(68℉) DB/15℃(59℉) WB; Outdoor temperature 7℃(44.6℉) DB/6℃(42.8℉) WB.

Piping length: Interconnecting piping length is 7.5m(24.6ft), level difference is zero.

Connection piping diameter is based on the condition that the total equivalent liquid length is less than 90m(295.2ft). When the total equivalent liquid length is more than 90m(295.2ft), please refer to technical manual to choose the connection piping diameter.

Sound values are measured in a semi-anechoic room, at a position 1m(3.28ft) in front of the unit and 1.3m(4.26ft) above the floor.

Combination unit specifications

Model	**Combination unit**		**MVD-1700(60)W/ D2RN1T(C)**	**MVD-1750(62)W/ D2RN1T(C)**	**MVD-1800(64)W/ D2RN1T(C)**
	Independent unit		MVD-400(14)W/ D2RN1T(C)	MVD-400(14)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)
			MVD-400(14)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)
			MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)
			MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)	MVD-450(16)W/ D2RN1T(C)
Power supply		V/Ph/Hz	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60	380-415/3/50 380-415/3/60
Cooling	Capacity	kW	170.0	175.0	180.0
		Btu/h	580,000	597,000	614,000
	Power input	kW	49.08	51.02	52.96
	EER	kW/kW	3.46	3.43	3.40
Heating	Capacity	kW	190.0	195.0	200.0
		Btu/h	648,200	665,300	682,400
	Power input	kW	47.96	49.56	51.16
	COP	kW/kW	3.96	3.93	3.91
DC inverter compressor	Model		E655DHD-65D2YG×4+ E405DHD-36D2YG×4	E655DHD-65D2YG×4+ E405DHD-36D2YG×4	E655DHD-65D2YG×4+ E405DHD-36D2YG×4
	Type		DC inverter	DC inverter	DC inverter
	Brand		Hitachi	Hitachi	Hitachi
	Quantity		8	8	8
	Capacity	kW	(31.59+11.8)×4	(31.59+11.8)×4	(31.59+11.8)×4
		Btu/h	(107800+40300)×4	(107800+40300)×4	(107800+40300)×4
	Crankcase heater	W	30×16	30×16	30×16
	Refrigerant oil type		FVC68D	FVC68D	FVC68D
	Refrigerant oil charge	gal.(ml)	0.132×8(500×8)	0.132×8(500×8)	0.132×8(500×8)
Outdoor fan motor	Model		WZDK750-38G-4	WZDK750-38G-4	WZDK750-38G-4
	Type		DC motor	DC motor	DC motor
	Quantity		2×4	2×4	2×4
	Brand		Panasonic/Nidec	Panasonic/Nidec	Panasonic/Nidec
	Insulation class		E	E	E
	Safe class		IP23	IP23	IP23
	Input	W	890×4	890×4	890×4
	Output	W	710×4	710×4	710×4
Outdoor fan	Material		Plastic	Plastic	Plastic
	Type		Axial	Axial	Axial
	Quantity		2×4	2×4	2×4
Outdoor coil	Tube pitch(a)×row pitch(b)	in.(mm)	7/8×3/4(22×19)	7/8×3/4(22×19)	7/8×3/4(22×19)
	Fin spacing	in.(mm)	1/16(1.6)	1/16(1.6)	1/16(1.6)
	Fin type		Hydrophilic aluminium	Hydrophilic aluminium	Hydrophilic aluminium

	Tube outside diameter	in.(mm)	Φ5/16(7.94)	Φ5/16(7.94)	Φ5/16(7.94)
	Tube type		inner-groove tube	inner-groove tube	inner-groove tube
	Coil dimension (W×D×H)	in.(mm)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)	42×1-1/2×48-1/2 (1067×38×1232)
Outdoor air flow		m^3/h	60,000	60,000	60,000
		CFM	35,320	35,320	35,320
Sound pressure level		dB(A)	69	69	69
Connectable indoor unit	Total capacity	%	50-130	50-130	50-130
	Max. quantity		64	64	64
Outdoor unit	Net dimension (W×H×D)	inch	(49-7/32×63-9/16×30-1/8)×4		
		mm	(1250×1615×765)×4		
	Packing (W×H×D)	inch	(51-9/16×70-1/2×32-1/2)×4		
		mm	(1305×1790×820)×4		
	Net weight	lbs.(kg)	666.6×4(303×4)	666.6×4(303×4)	666.6×4(303×4)
	Gross weight	lbs.(kg)	708.4×4 (322×4)	708.4×4 (322×4)	708.4×4 (322×4)
Refrigerant	Type		R410A	R410A	R410A
	Factory charged	lbs.(kg)	28.6×4(13×4)	28.6×4(13×4)	28.6×4(13×4)
Additional refrigerant oil	Oil type		FVC68D	FVC68D	FVC68D
	Oil charge	L(ft3)	28(0.99)	28(0.99)	28(0.99)
Throttle type			EXV	EXV	EXV
Design pressure (Hi/Lo)		MPa	4.4/2.6	4.4/2.6	4.4/2.6
		PSI	640/380	640/380	640/380
Refrigerant piping	Liquid Pipe	in.(mm)	Φ7/8(22.2)	Φ7/8(22.2)	Φ7/8(22.2)
	Low Pressure Gas Pipe	in.(mm)	Φ1-3/4(44.5)	Φ1-3/4(44.5)	Φ1-3/4(44.5)
	High Pressure Gas Pipe	in.(mm)	Φ1-1/2(38.1)	Φ1-1/2(38.1)	Φ1-1/2(38.1)
	High Pressure Gas Balance Pipe	in.(mm)	Φ3/4(19.1)	Φ3/4(19.1)	Φ3/4(19.1)
	Oil Balance Pipe	in.(mm)	Φ1/4(6)	Φ1/4(6)	Φ1/4(6)
Ambient temp. range	Cooling	°F(°C)	23~118.4(-5~48)	23~118.4(-5~48)	23~118.4(-5~48)
	Heating	°F(°C)	-4~75.2(-20~24)	-4~75.2(-20~24)	-4~75.2(-20~24)
	Simultaneous Cooling and Heating	°F(°C)	23~75.2(-5~24)	23~75.2(-5~24)	23~75.2(-5~24)

Notes:

Capacities are based on the following conditions:

Cooling: Indoor temperature 27℃(80.6℉) DB/19℃(66.2℉) WB; Outdoor temperature 35℃(95℉) DB/24℃(75.2℉) WB.

Heating: Indoor temperature 20℃(68℉) DB/15℃(59℉) WB; Outdoor temperature 7℃(44.6℉) DB/6℃(42.8℉) WB.

Piping length: Interconnecting piping length is 7.5m(24.6ft), level difference is zero.

Connection piping diameter is based on the condition that the total equivalent liquid length is less than 90m(295.2ft). When the total equivalent liquid length is more than 90m(295.2ft), please refer to technical manual to choose the connection piping diameter.

Sound values are measured in a semi-anechoic room, at a position 1m(3.28ft) in front of the unit and 1.3m(4.26ft) above the floor.

1.2 MS units specifications

MS units which can be connected multiple indoor units

Mode				MS01/N1-C	MS02/N1-C	MS04/N1-C	MS06/N1-C
Max. indoor unit groups				1	2	4	6
Max. number of each group indoor units				4	4	4	4
Max. number of all downstream indoor units				4×1=4	4×2=8	4×4=16	4×6=24
Max. capacity of each group indoor units			kW	16			
			kBtu/h	54.6			
Total capacity of all downstream indoor units			kW	≤16	≤28	≤45	
			kBtu/h	≤54.6	≤95.5	≤153.5	
Piping connections	Connect to outdoor unit	Liquid pipe	In.(mm)	Φ3/8(9.53)	Φ1/2(12.7)	Φ5/8(15.9)	
		High pressure gas pipe	In.(mm)	Φ5/8(15.9)	Φ3/4(19.1)	Φ7/8(22.2)	
		Low pressure gas pipe	In.(mm)	Φ3/4(19.1)	Φ1(25.4)	Φ1-1/4(31.8)	
	Connect to indoor unit	Liquid pipe	In.(mm)	Φ3/8(9.53)			
		Gas pipe	In.(mm)	Φ5/8(15.9)			
Sound pressure level			dB(A)	33	33	33	40
Net dimension (W×H×D)			inch	24-3/4×8-7/8×23-5/8		37-13/16×8-7/8×23-5/8	
			mm	630×225×600		960×225×600	
Packing size (W×H×D)			inch	28-9/16×12-3/4×27		41-1/2×12-3/4×27	
			mm	725×325×685		1055×325×685	
Net weight			lbs.(kg)	39.6(18)	42.9(19.5)	68.2(31)	77(35)
Gross weight			lbs.(kg)	55(25)	59.4(27)	88(40)	97.9(44.5)

MS units which can be connected only one indoor unit

Mode				MS02E/N1-C	MS04E/N1-C
Max. number of all downstream indoor units				1	1
Capacity of indoor unit			kW	20~28	40~56
			kBtu/h	68.2~95.5	136.5~191.1
Piping connections	Connect to outdoor unit	Liquid pipe	In.(mm)	Φ1/2(12.7)	Φ5/8(15.9)
		High pressure gas pipe	In.(mm)	Φ3/4(19.1)	Φ7/8(22.2)
		Low pressure gas pipe	In.(mm)	Φ1(25.4)	Φ1-1/4(31.8)
	Connect to indoor unit	Liquid pipe	In.(mm)	Φ3/8(9.53)	Φ3/8(9.53)
		Gas pipe	In.(mm)	Φ5/8(15.9)	Φ5/8(15.9)
Sound pressure level			dB(A)	33	33
Net dimension (W×H×D)			inch	24-3/4×8-7/8×23-5/8	37-13/16×8-7/8×23-5/8
			mm	630×225×600	960×225×600
Packing size (W×H×D)			inch	28-9/16×12-3/4×27	41-1/2×12-3/4×27
			mm	725×325×685	1055×325×685
Net weight			lbs.(kg)	42.9(19.5)	68.2(31)
Gross weight			lbs.(kg)	59.4(27)	88(40)

Note:

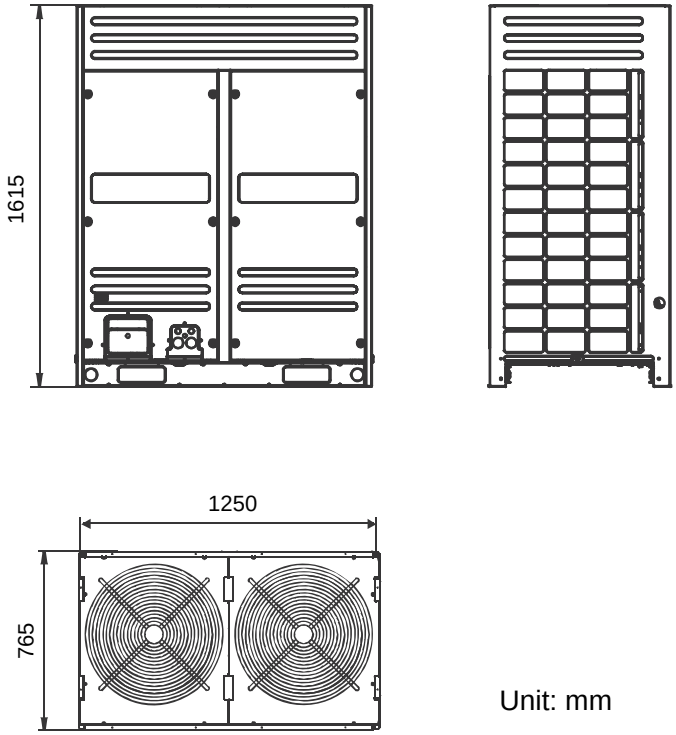
Sound values are measured in a semi-anechoic room, at a position 1m below the MS equipment in mode switch condition.

It is not recommended to install in the place where high noise performance is required.

2. Dimensions

2.1 Overall dimensions

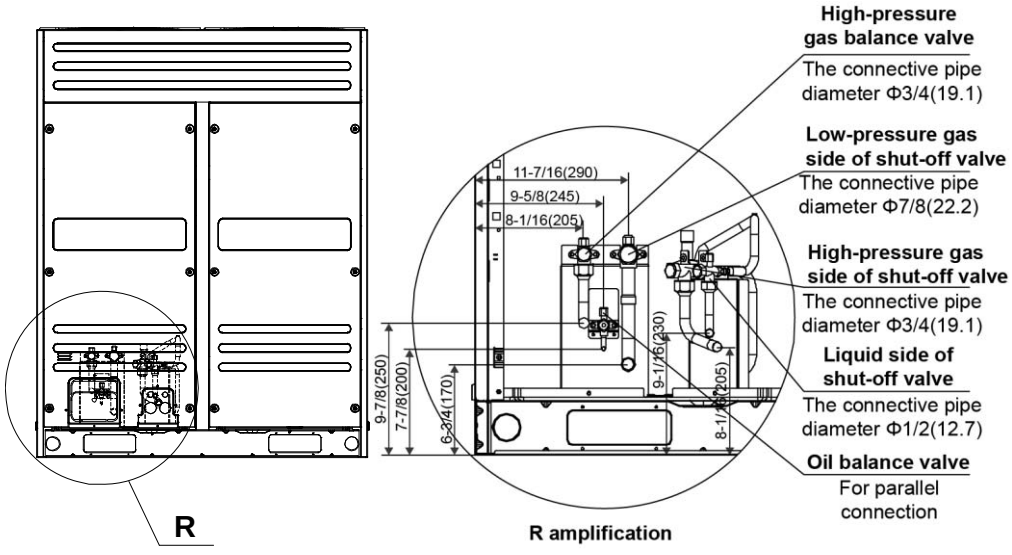
MVD- 252(8)W/D2RN1T(C)
MVD-280(10)W/D2RN1T(C)
MVD-335(12)W/D2RN1T(C)
MVD-400(14)W/D2RN1T(C)
MVD-450(16)W/D2RN1T(C)



Unit: mm

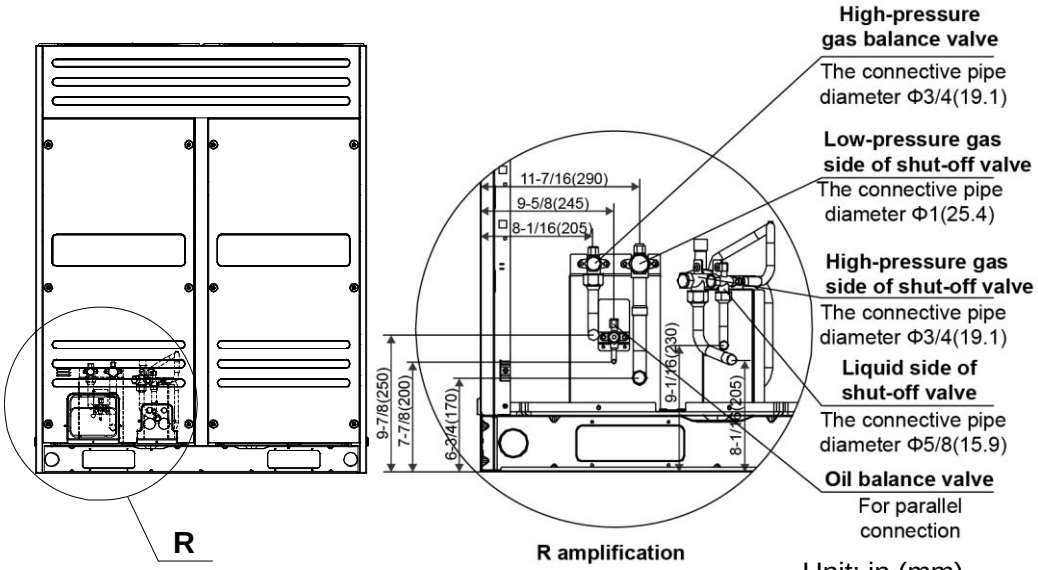
2.2 Section dimensions

MVD- 252(8)W/D2RN1T(C)
MVD-280(10)W/D2RN1T(C)



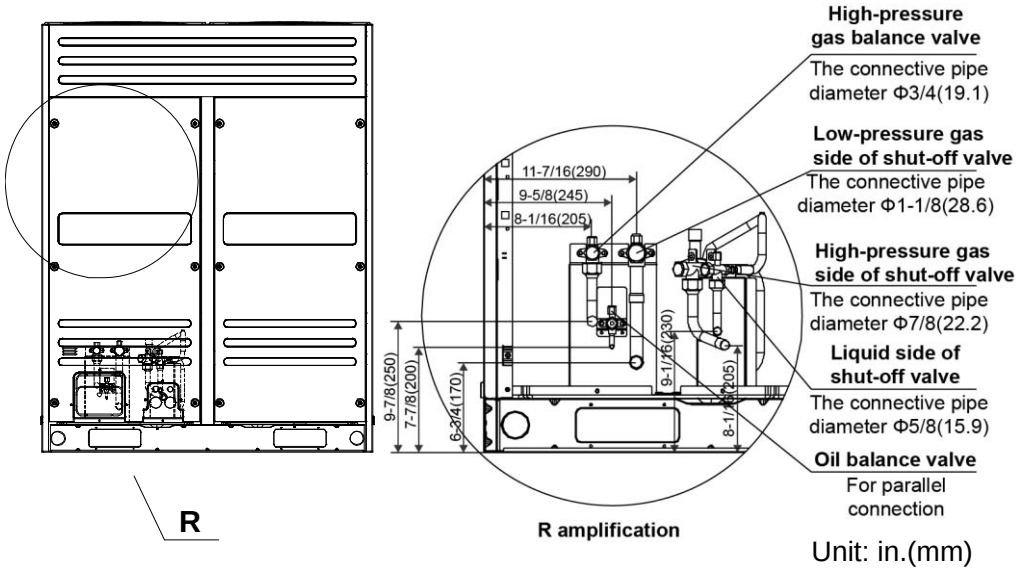
Unit: in.(mm)

MVD-335(12)W/D2RN1T(C)



Unit: in.(mm)

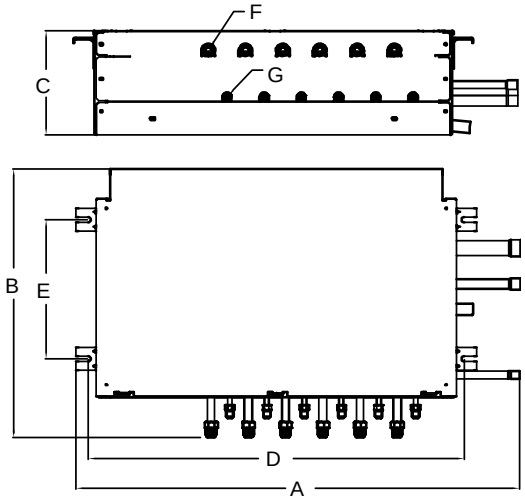
MVD-400(14)W/D2RN1T(C)
MVD-450(16)W/D2RN1T(C)



Unit: in.(mm)

2.3 MS dimensions

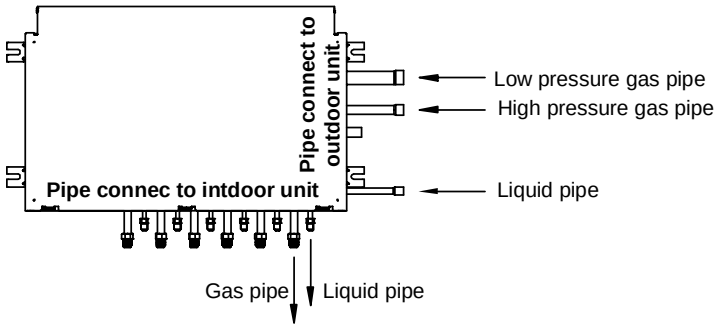
2.3.1 MS body dimensions



Unit in.(mm)

Model	A	B	C	D	E	F	G
MS01/N1-C	630	600	225	490	300	7/8"14UNF-2A	5/8"18UNF-3A
MS02/N1-C							
MS02E/N1-C							
MS04/N1-C	37-13/16 (960)	23-5/8 (600)	8-7/8 (225)	32-1/4 (820)	11-3/4 (300)		
MS06/N1-C							
MS04E/N1-C							

2.3.2 MS pipe dimensions



Unit in.(mm)

Model	Connect to outdoor unit			Connect to indoor unit	
	Low pressure gas pipe	High pressure pipe	Liquid pipe	Liquid pipe	Gas pipe
MS01/N1-C	Φ3/4(19.1)	Φ5/8(15.9)	Φ3/8(9.53)	Φ3/8(9.53)	Φ5/8(15.9)
MS02/N1-C	Φ1(25.4)	Φ3/4(19.1)	Φ1/2(12.7)	Φ3/8(9.53)	Φ5/8(15.9)
MS02E/N1-C					
MS04/N1-C	Φ1-1/4(31.8)	Φ7/8(22.2)	Φ5/8(15.9)	Φ3/8(9.53)	Φ5/8(15.9)
MS06/N1-C					
MS04E/N1-C					

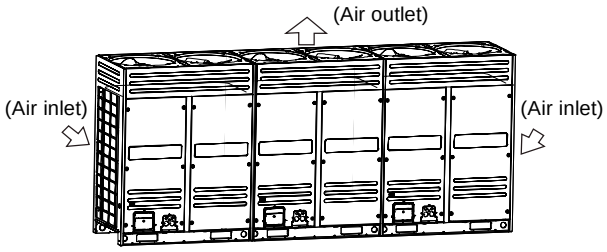
3. Service space

3.1 Service space for outdoor unit

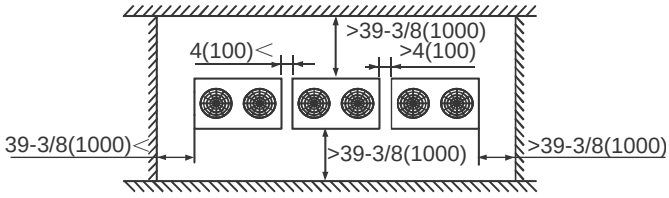
- Ensure enough space for maintenance. The modules in the same system must be on the same height.

When installing the unit, leave enough space for maintenance.

Unit: in.(mm)



Installation and maintenance surface

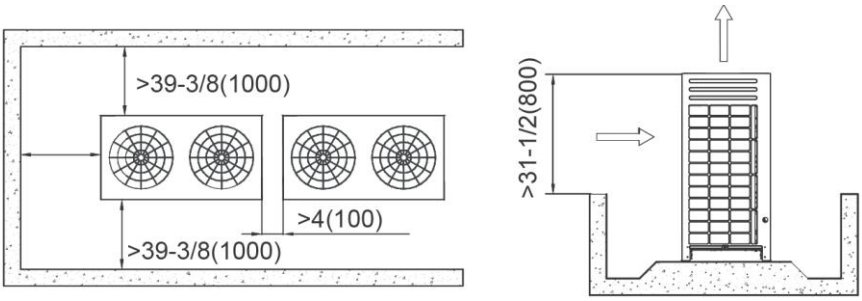


Top view of the outdoor unit

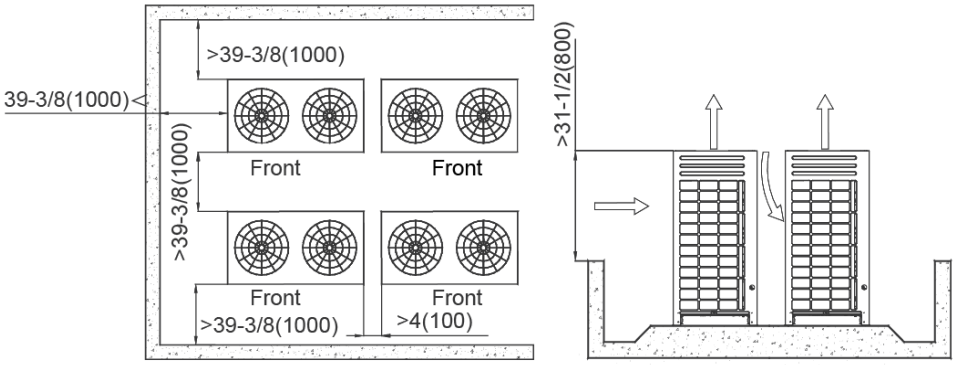
- When the outdoor unit is higher than the surrounding obstacle

Unit: in.(mm)

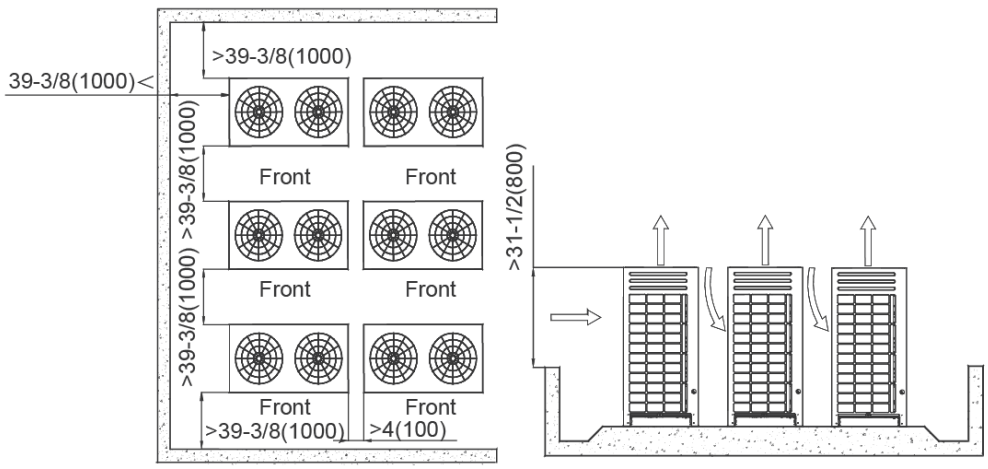
One row



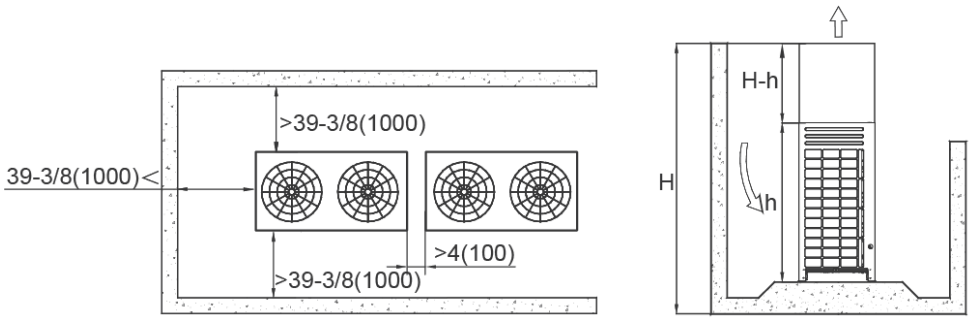
Two rows



More than two rows

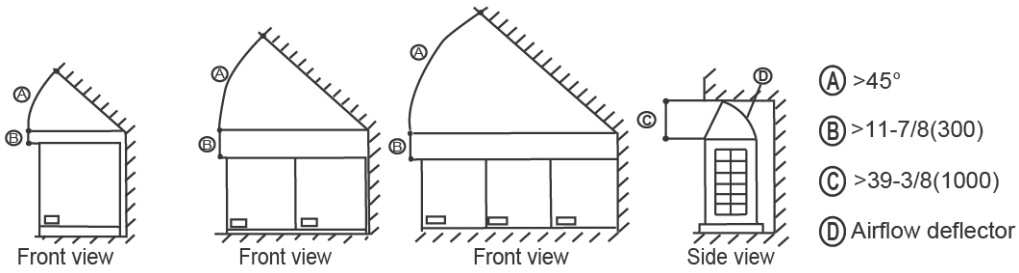


- When the outdoor unit is lower than the surrounding obstacle, to avoid cross connection of the outdoor hot air from affecting the heat exchange effect, please add an air director onto the exhaust hood of the outdoor unit to facilitate heat dissipation. See the figure below. The height of the air director is HD (namely H-h). Please make the air director on site.



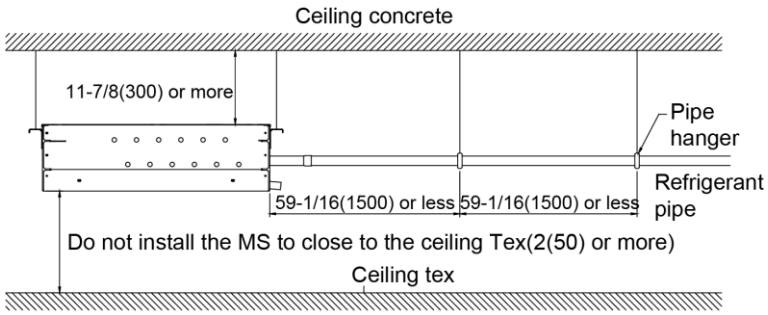
Unit: in.(mm)

- If miscellaneous articles are piled around the outdoor unit, such articles must be 31-1/2inch(800mm) below the top of the outdoor unit. The articles must be 31-1/2inch(800mm) below the top of the outdoor unit. Otherwise, a mechanic exhaust device must be added.

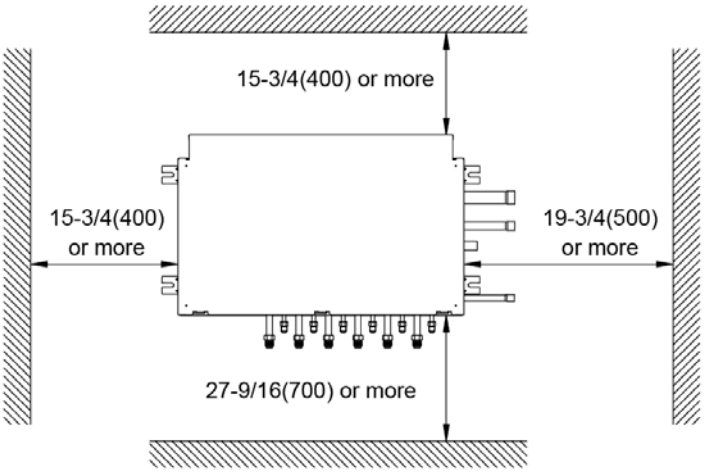


Unit: in.(mm)

3.2 Service space for MS unit



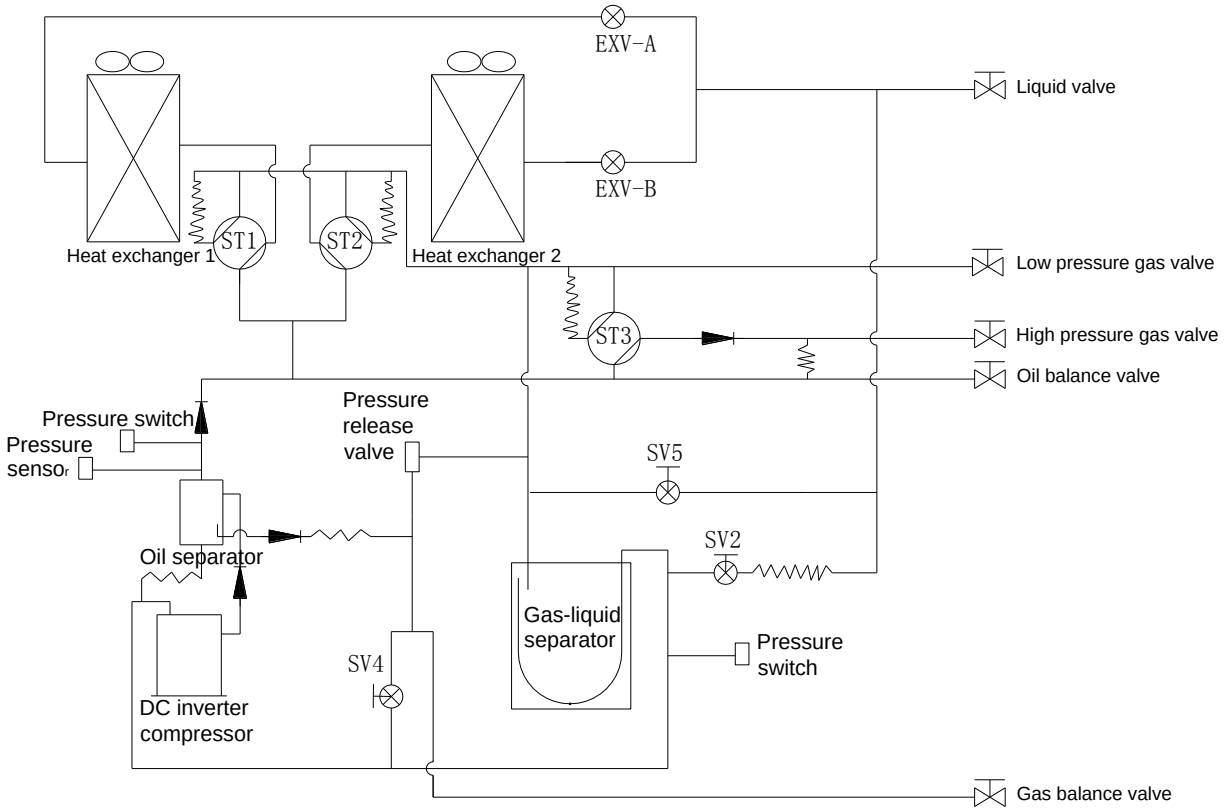
Unit: in.(mm)



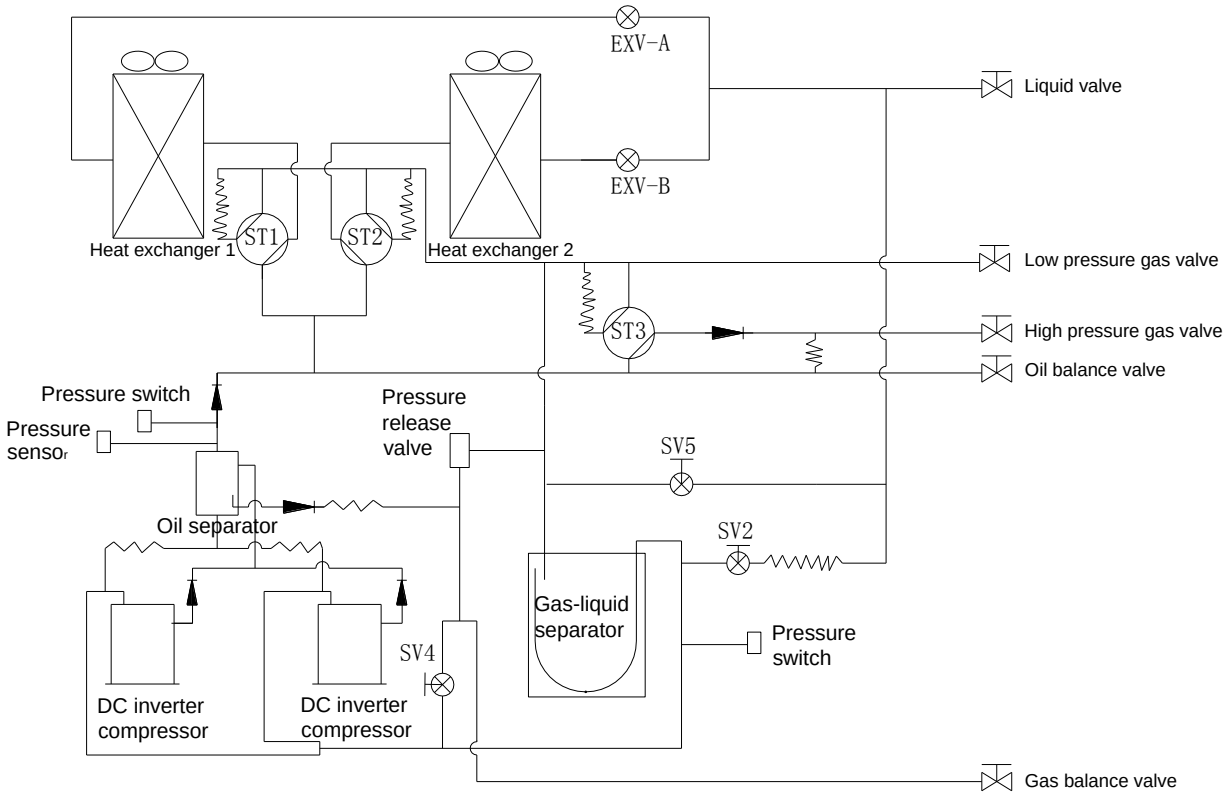
Unit: in.(mm)

4. Piping diagrams

8/10/12HP



14/16HP



Key components:

Oil separator: It is used to separate oil from high pressure and high temperature gas refrigerant, which is pumped out from compressor. The separation efficiency is up to 99%, it makes the oil return back to each compressor very soon.

Gas-liquid separator: It is used to store the liquid refrigerant and oil; it can protect the compressor from liquid hammer.

EXV (Electromagnetic Expansion Valve): It is used to adjust refrigerant volume.

Four-way valve ST1: It is used to control the refrigerant flow of the left heat-exchanger. When the ST1 is OFF, the left heat-exchanger is condenser. When the ST1 is ON, the left heat-exchanger is evaporator.

Four-way valve ST2: It is used to control the refrigerant flow of the right heat-exchanger. When the ST2 is OFF, the left heat-exchanger is condenser. When the ST1 is ON, the left heat-exchanger is evaporator or closed.

Four-way valve ST3: When the system is in total cooling mode, the ST3 is ON. When the system is in total heating mode or mixed mode, the ST3 is OFF.

SV2: It is used to protect compressor. When any compressor discharge temperature is higher than 100^{o}C, SV2 will be open to spray a little liquid refrigerant to cooling compressor, and it will be closed when the discharge temperature is lower than 90^{o}C.

SV4: It is used to balance the oil between modules.

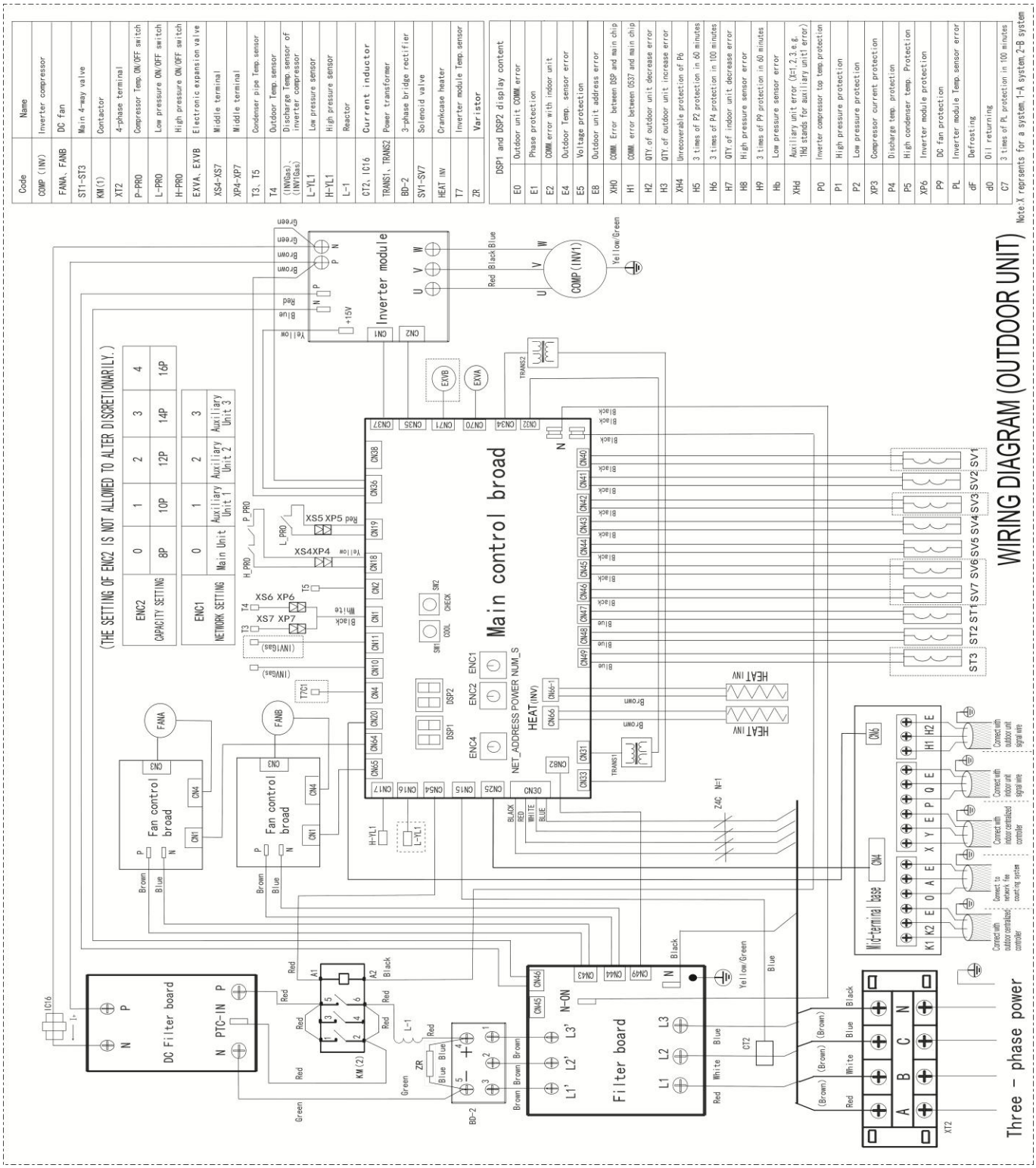
SV5: It is used for quick defrosting. In defrosting mode, the opening of SV5 can cut the refrigerant flowing circle, so the defrosting process will takes less time. In cooling mode, it is always off.

Pressure switch: It is used to protect the system pressure. When the system pressure is too high or too low, the pressure switch will open. Once the pressure switch is open, the compressor will stop, and the compressor will restart after ten minutes.

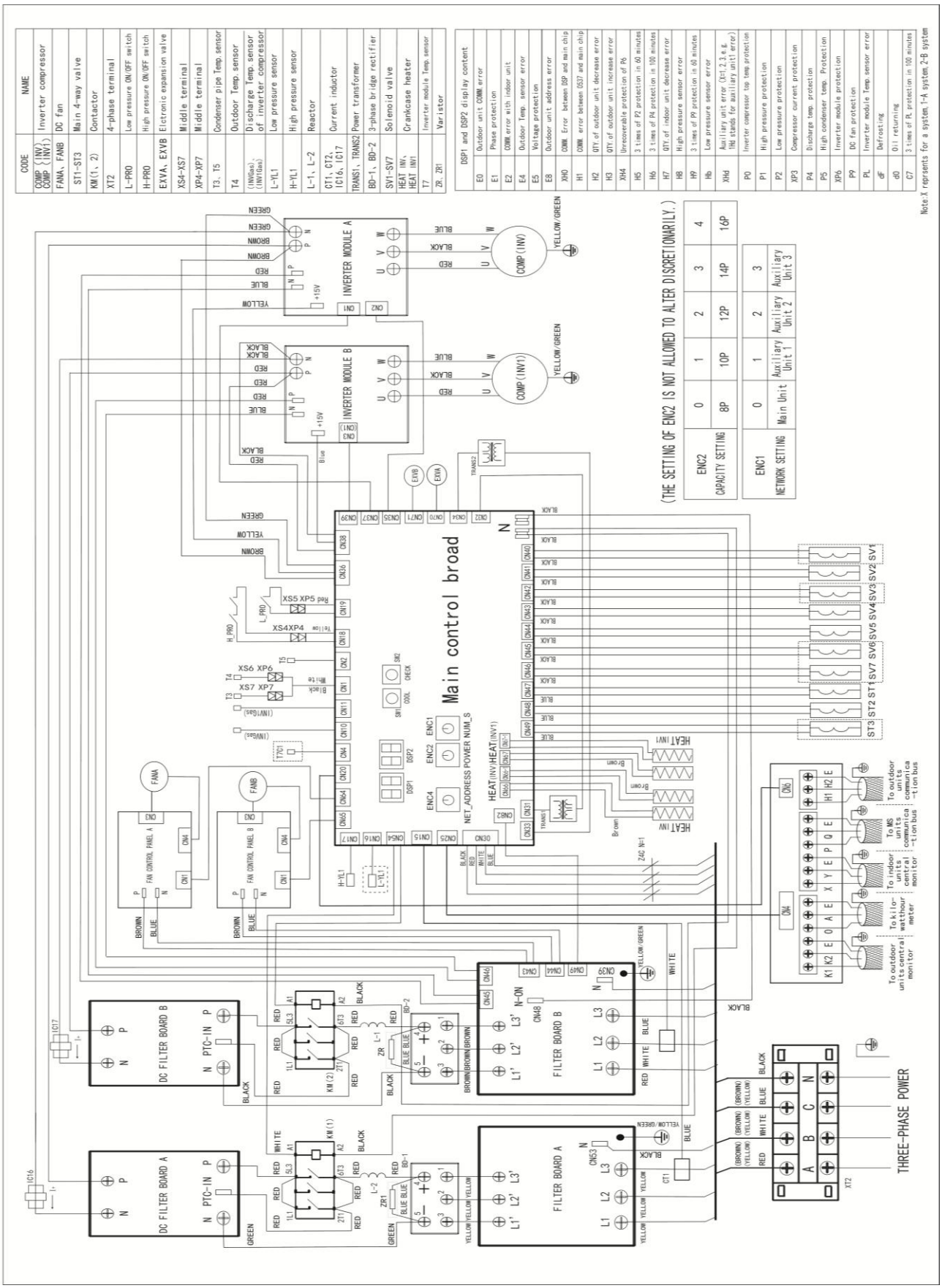
5. Wiring diagram and field wiring

5.1 Wiring diagram

8/10/12HP



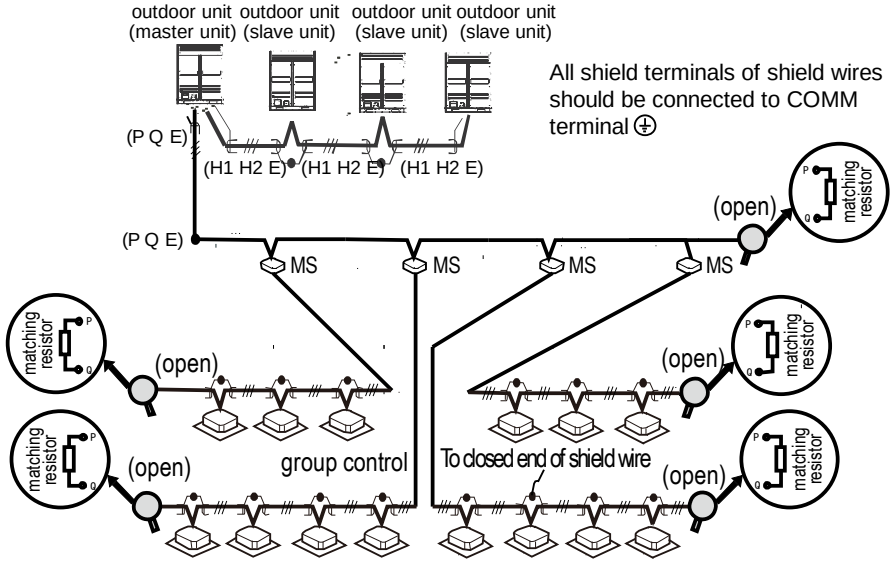
14/16HP


Main control broad
INVERTER MODULE A
INVERTER MODULE B
COMP(INV)
COMP(INV1)
FILTER BOARD A
FILTER BOARD B
DC FILTER BOARD A
DC FILTER BOARD B
THREE-PHASE POWER
HEAT INV
HEAT INV1
FAN CONTROL PANEL A
FAN CONTROL PANEL B
NET_ADDRESS POWER NUM_S
(THE SETTING OF ENC2 IS NOT ALLOWED TO ALTER DISCRETIONARILY.)
Note:X represents for a system.1-A system,2-B system

5.2 Field wiring

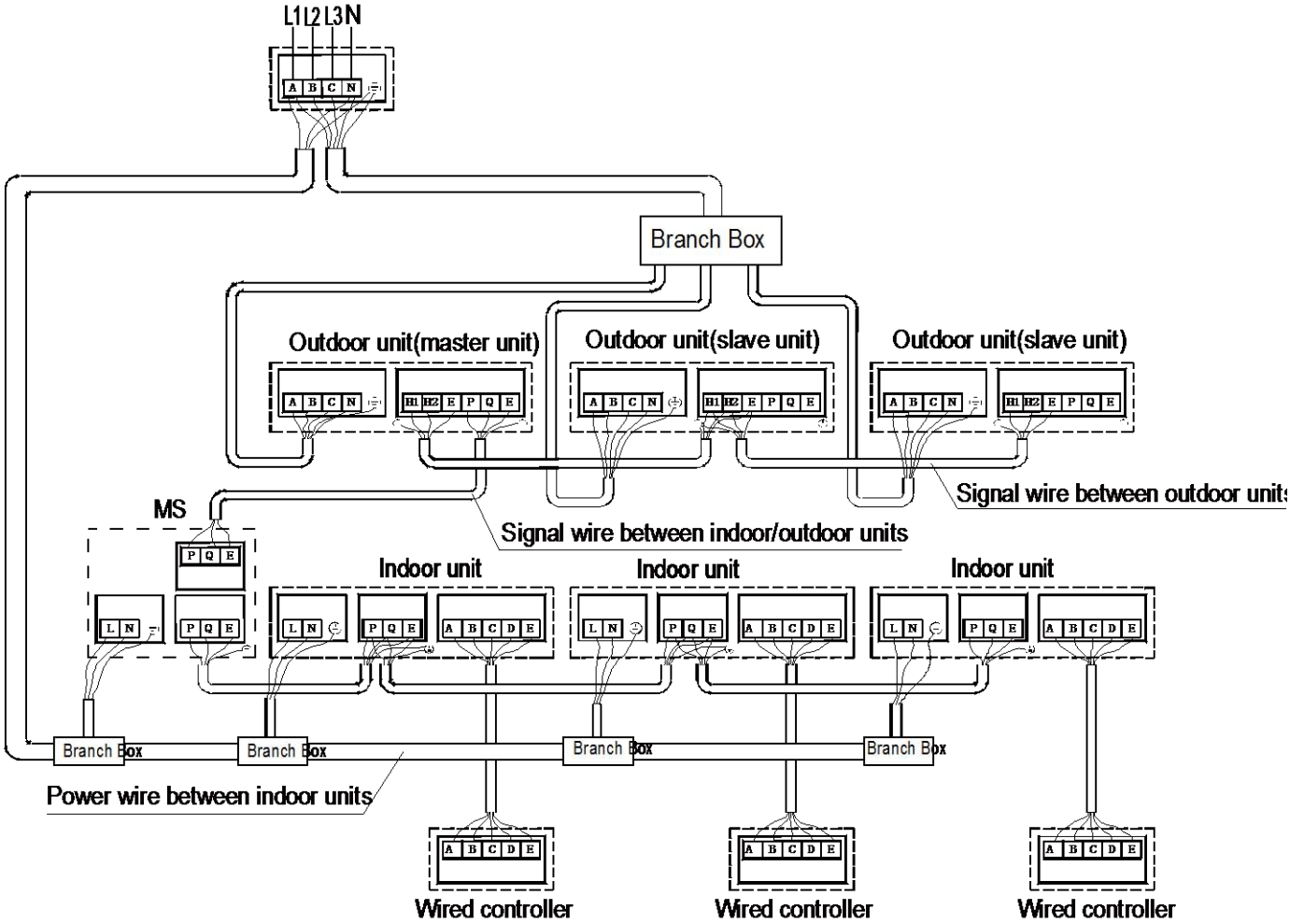
5.2.1 Signal wire between outdoor unit and indoor unit

Signal wire of indoor/outdoor unit adopts 3-core shielded wire (≥0.0012in.^{2}(0.75mm^2) which has polarity, please connect it correctly.



The indoor unit at the end of communication wire shoud be connected a impedance between port P and port Q

5.2.2 Example wiring connection



6. Electric characteristics

Model	Units				Power supply			Compressor		OFM	
	Hz	Voltage (V)	Min. (V)	Max. (V)	MCA (A)	TOCA (A)	MFA (A)	MSC (A)	RLA (A)	kW	FLA (A)
MVD-252(8)W/ D2RN1T(C)	50/ 60	380~415	342	440	18.4	20.8	25	-	17.4	0.42	3.6
MVD-280(10)W/ D2RN1T(C)	50/ 60	380~415	342	440	20.6	22.1	25	-	17.4	0.42	3.6
MVD-335(12)W/ D2RN1T(C)	50/ 60	380~415	342	440	21.8	22.8	25	-	17.4	0.42	3.6
MVD-400(14)W/ D2RN1T(C)	50/ 60	380~415	342	440	27.9	31.8	35	-	17.4+ 10.5	0.71	5.9
MVD-450(16)W/ D2RN1T(C)	50/ 60	380~415	342	440	33.4	32.8	35	-	17.4+ 10.5	0.71	5.9

The current value of combination unit is the total value of each basic model (refer to Units Combination Table in Part1)

For example: 46HP=16HP+16HP+14HP

Power current: MCA=33.4+33.4+27.9=94.7

TOCA=32.8+32.8+31.8=97.4

MFA=35+35+35=105

Compressor: RLA=(17.4+10.5)+ (17.4+10.5)+ (17.4+10.5)=83.7

OFM: FLA=5.9+5.9+5.9=17.7

Notes:

1. RLA is based on the following conditions, Indoor temp. 27°C DB/19°C WB, Outdoor temp. 35°C DB
2. TOCA means the total value of each OC set.
3. MSC means the Max. current during the starting of compressor.
4. Voltage range.

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

5. Maximum allowable voltage variation between phases is 2%
6. Selection wire size based on the larger value of MCA or TOCA
7. MFA is used to select the circuit breaker and the ground fault circuit interrupter (earth circuit breaker).

MCA: Min. Circuit Amps. (A)

TOCA: Total Over-current Amps. (A)

MFA: Max. Fuse Amps. (A)

MSC: Max. Starting Amps. (A)

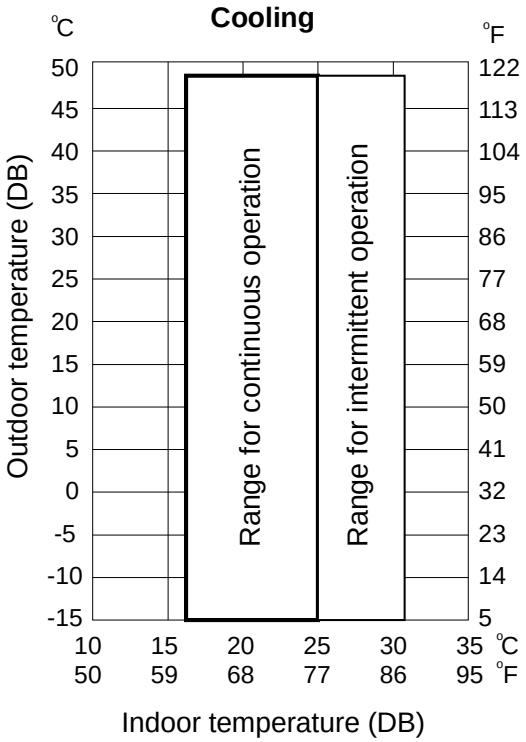
RLA: Rated Load Amps. (A)

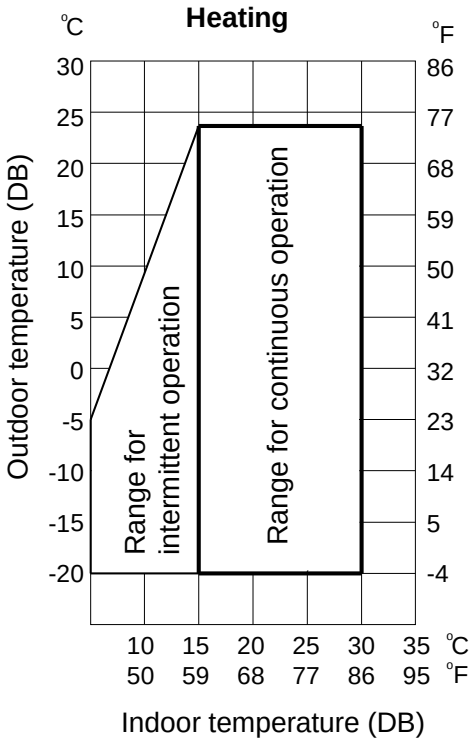
OFM: Outdoor Fan Motor.

FLA: Full Load Amps. (A)

KW: Rated Motor Output (KW)

7. Operation limits

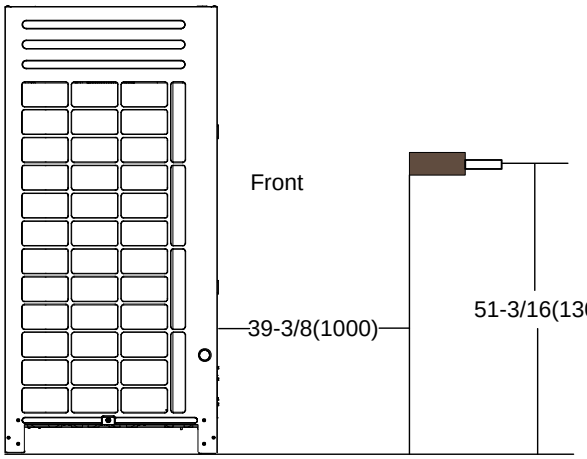




Note:

1. These figures assume the following operating conditions:
   Equivalent piping length: 295-1/4inch (7.5m)
   Level difference: 0
2. If the system is running in cooling mode, when the ambient temperature is lower than -5°C (23°F) or higher than 48 °C(118.4 °F), the unit will stop for protection control.

8. Sound levels



Notes:

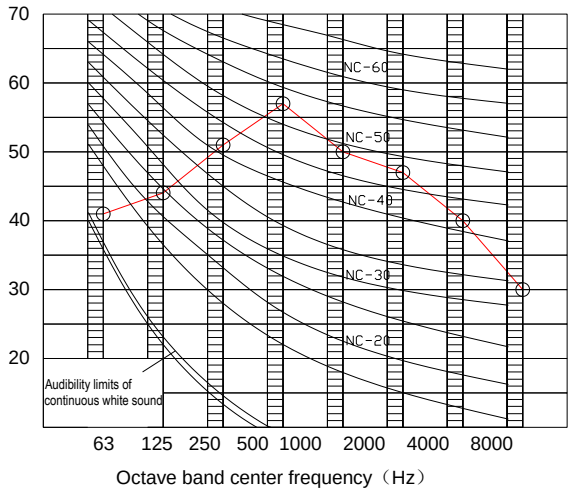
- Data is valid at free field condition
- Data is valid at nominal operating condition
- Sound level will vary depending on a range of factors such as the construction (acoustic absorption coefficient) of particular room in which the equipment is installed
- Sound level can be increased in static pressure mode or used air guide.

unit: in.(mm)

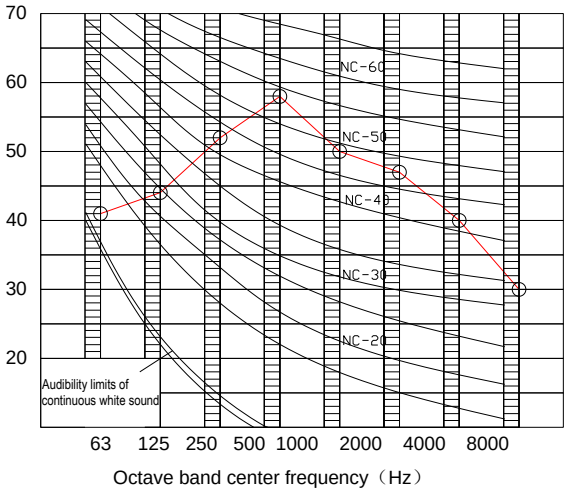
Model	Sound pressure level d(B)A
MVD-252(8)W/D2RN1T(C)	57
MVD-280(10)W/D2RN1T(C)	57
MVD-335(12)W/D2RN1T(C)	58
MVD-400(14)W/D2RN1T(C)	60
MVD-450(16)W/D2RN1T(C)	60

Sound pressure spectrum

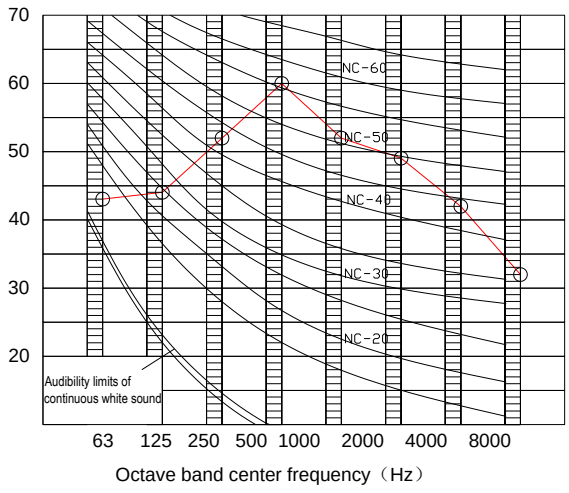
8,10HP



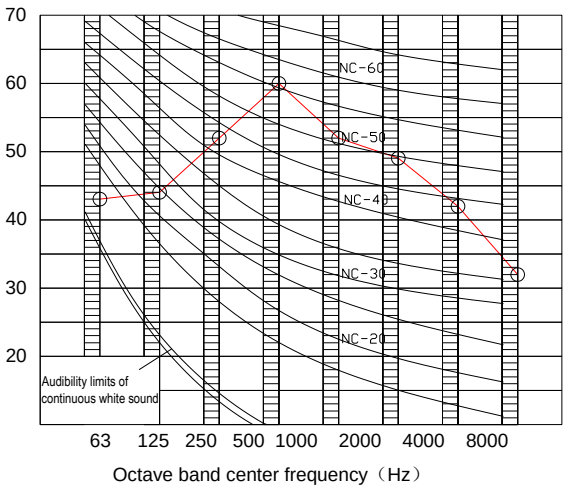
12HP



14HP



16HP



9. Accessories

9.1 Standard accessories

Name	Shape	Quantity	Function
Installation manual of outdoor unit		1	/
Operation manual of outdoor unit		1	/
Operation manual of indoor unit		1	/
Toggling flathead screw	-	1	For toggling of indoor and outdoor units
90° mouthing elbow		1 (8HP,10HP) 2 (12HP～16HP)	For connecting pipes
Seal plug		8	Be used in cleaning pipe
Connection pipe		1	Connect to the high pressure gas balance pipe side (be used in 8-16HP)
		1	Connect to the liquid pipe side (be used in 8-16HP)
		1	Connect to the high pressure gas pipe side (be used in 8-12HP)
		1	Connect to the high pressure gas pipe side (be used in 14-16HP)
		2	Connect to the low pressure gas pipe or liquid pipe side (be used in 12HP)
Accessory bag	-	1	/

9.2 Optional accessories

Branch joint of outdoor & indoor unit

Optional accessories	Model name	Packing Size in.(mm)	Net/gross Weight (lbs.(kg))	Function
Branch Joint of outdoor unit	FQZHW-02SB	10-3/4×6-5/8×9-1/8(272×167×232)	3.5/4.8(1.6/2.2)	Distribute the refrigerant to indoor units and balance the resistance between each outdoor unit.
	FQZHW-03SB	18-5/8×6-3/16×12-1/4(472×157×312)	8.6/11(3.9/5.0)	
	FQZHW-04SB	29-5/16×6-5/16×13-3/16(745×160×335)	11.4/16.5(6.2/7.5)	
Branch Joint between MS and outdoor unit	FQZHN-01D	11-7/16×4-1/8×4(290×105×100)	0.7/0.9(0.3/0.4)	
Branch Joint between MS and indoor unit	FQZHN-01SB	10-1/8×5×4-1/4(257×127×107)	1.3/1.8(0.6/0.8)	
	FQZHN-02SB	11-5/16×5-3/8×4-1/4 (287×137×107)	1.5/2(0.7/0.9)	
	FQZHN-03SB	11-3/4×6-9/16×7(297×167×177)	2.4/3.1(1.1/1.4)	
	FQZHN-04SB	14-5/8×7-3/4×7-3/8(372×197×187)	3.5/5.1(1.6/2.3)	
	FQZHN-05SB	17×8-3/4×9(432×222×227)	4.8/7.3(2.2/3.3)	

Other optional accessories

Optional accessories	Model name	Function
Outdoor controller	MD-CCM02/E	Monitor the outdoor operating parameter
Three phase electricity power protector	DPA51CM44 or HWUA/DPB71CM48	To stop the air-conditioner running in case of bad power supply such as Phase Error, Over-voltage, Under-voltage lose, phase lost and phase sequence inverse. Thus to protect the equipment.
Digital ammeter (WHM)	DTS634/DT636	Electricity Charge monitor

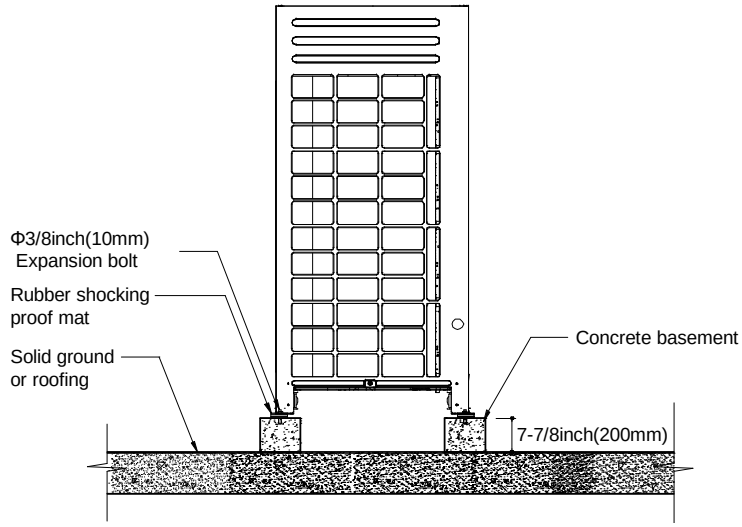
Part 4 Outdoor Unit Installation

1. Select installation position

- Ensure that the outdoor unit is installed in a dry, well-ventilated place.
- Ensure that the noise and exhaust ventilation of the outdoor unit do not affect the neighbors of the property owner or the surrounding ventilation.
- Ensure that the outdoor unit is installed in a well-ventilated place that is possibly closest to the indoor unit.
- Ensure that the outdoor unit is installed in a cool place without direct sunshine exposure or direct radiation of high-temp heat source.
- Do not install the outdoor unit in a dirty or severely polluted place, so as to avoid blockage of the heat exchanger in the outdoor unit.
- Do not install the outdoor unit in a place with oil pollution or full of harmful gas such as sulfurous gas.
- Do not install the outdoor unit in a place surrounded by salty air. (Except for the models with corrosion-resistant function)

2. Foundation for installation

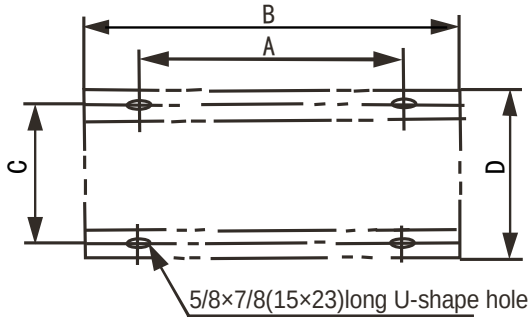
- A solid, correct base can: Avoid the outdoor unit from sinking and avoid the abnormal noise generated due to base.
- Base types: Steel structure base or concrete base (See the figure below for the general making method)



Note: The key points to make basement:

- The master unit's basement must be made on the solid concrete ground . Refer to the structure diagram to make concrete basement in detail, or make after field measurements.
- In order to ensure every point can contact equality, the basement should be on completely level.
- If the basement is placed on the roofing, the detritus layer isn't needed, but the concrete surface must be flat. The standard concrete mixture ratio is cement 1/ sand 2/ carpolite 4, and adds Φ3/8inch(10mm) strengthen reinforcing steel bar, the surface of the cement and sand plasm must be flat, border of the basement must be chamfer angle.
- Before construct the unit base, please ensure the base is directly supporting the rear and front folding edges of the bottom panel vertically, for the reason of these edges are the actual supported sites to the unit.
- In order to drain off the seeper around the equipment, a discharge ditch must be setup around the basement.
- Please check the affordability of the roofing to ensure the load capacity.
- When piping from the bottom of the unit, the base height should be no less than 7-7/8inch(200mm).

- Position illustration of screw bolt (Unit: in.(mm))



Size (in.(mm))	8-16HP
A	44-1/8(1120)
B	49-1/4(1250)
C	29(736)
D	30-1/8(765)

3. Master and slave unit setting

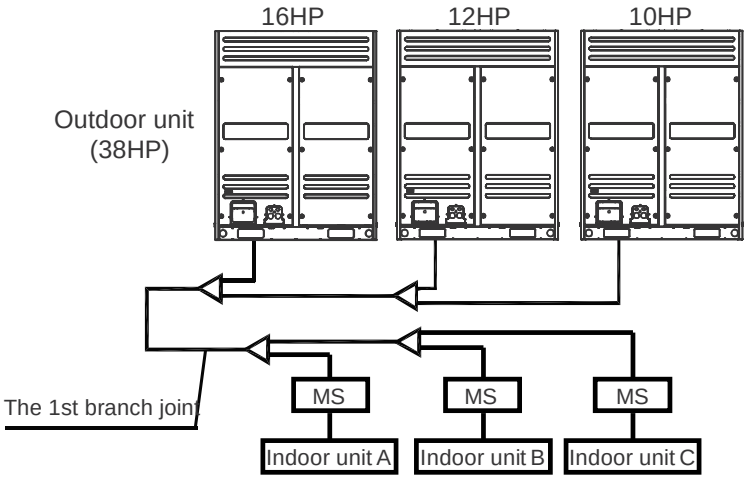
When the quantity of outdoor unit is more than two in one system, the outdoor unit should be placed form large capacity unit to small capacity unit. The largest capacity unit must be placed at the first branch site, and be set as master unit, while the other are set as slave units.

Take 38HP (composed by 10HP, 12HP and 16HP) as an example:

1) Place the 16HP at a side of the first branch site.

2) Place the unit from the large capacity to small (See the detail placement illustration)

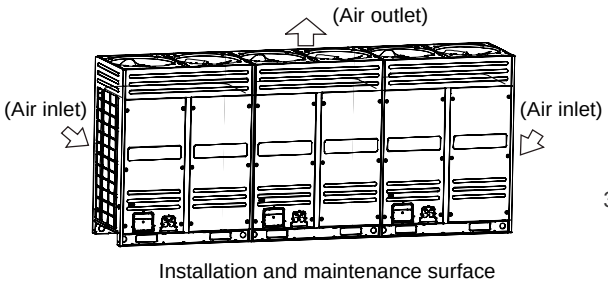
3) Set 16HP as the master unit, while the 12HP and the 10HP as slave units.

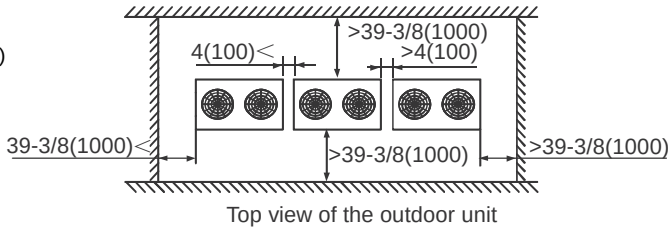


4. Installation space

- Ensure enough space for maintenance. The modules in the same system must be on the same height.
- When installing the unit, leave enough space for maintenance.

Unit: in.(mm)

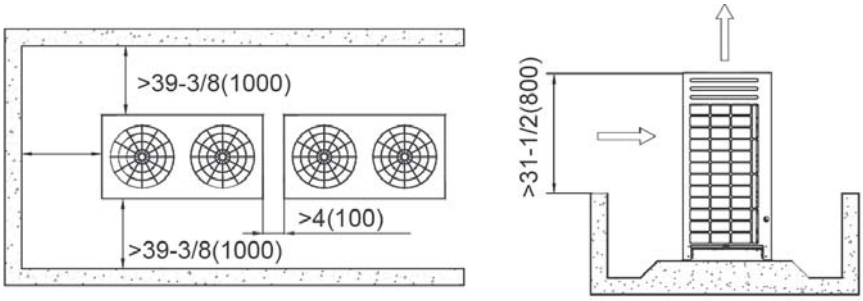




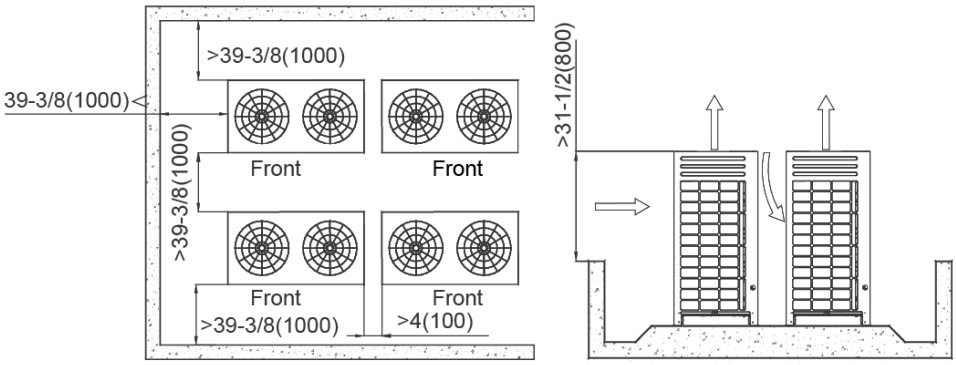
- When the outdoor unit is higher than the surrounding obstacle

Unit: in.(mm)

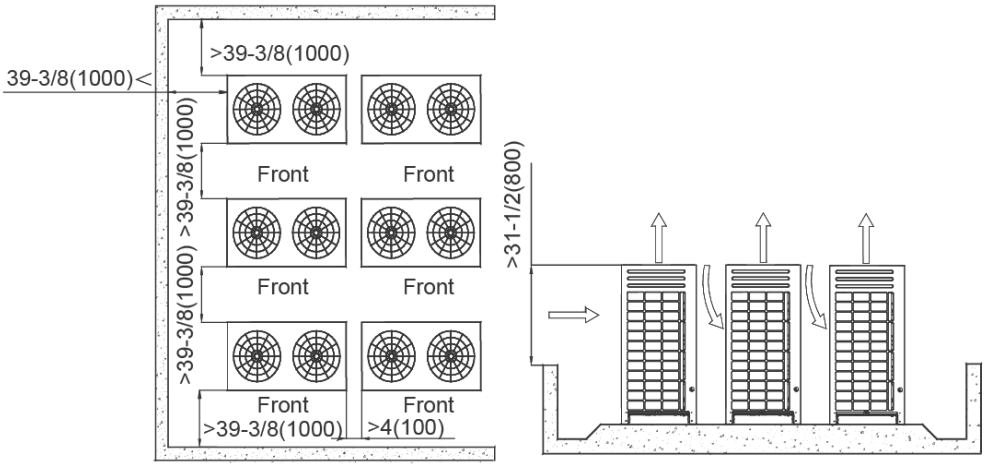
One row



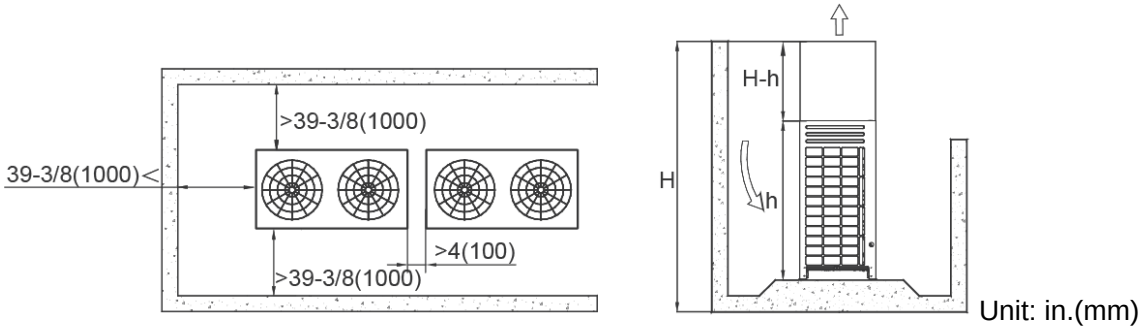
Two rows



More than two rows

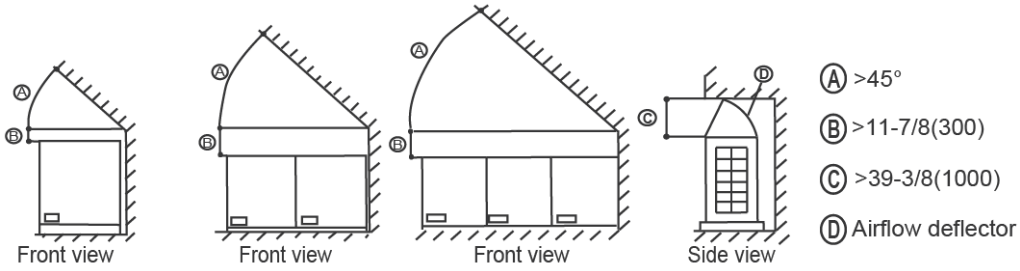


- When the outdoor unit is lower than the surrounding obstacle, to avoid cross connection of the outdoor hot air from affecting the heat exchange effect, please add an air director onto the exhaust hood of the outdoor unit to facilitate heat dissipation. See the figure below. The height of the air director is HD (namely H-h). Please make the air director on site.



Unit: in.(mm)

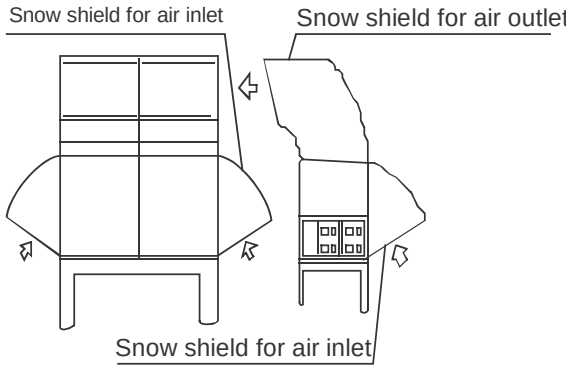
- If miscellaneous articles are piled around the outdoor unit, such articles must be 31-1/2inch(800mm) below the top of the outdoor unit. The articles must be 31-1/2inch(800mm) below the top of the outdoor unit. Otherwise, a mechanic exhaust device must be added.



Unit: in.(mm)

- Set the snow-proof facility

In snowy areas, facilities should be installed to prevent snow. (See the figure below) (Defective facilities may cause malfunction.) Please lift the bracket higher and install snow shield at the air inlet and air outlet.

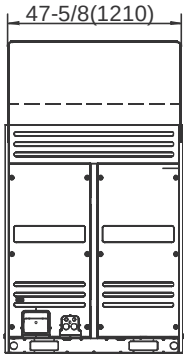


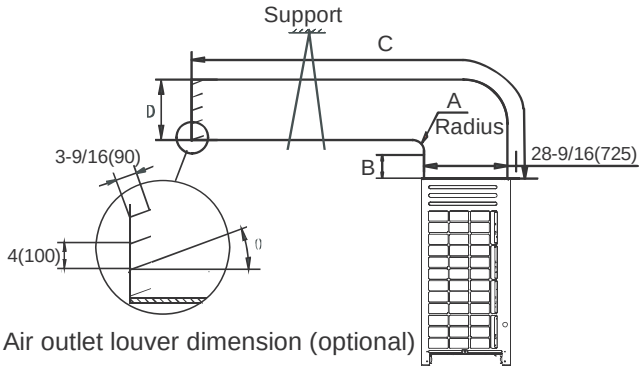
5. Air ventilation assembly installation

The ventilation assembly is provided at the field installation. When installing, please take off the mesh cover firstly, and then install the unit as the following method.

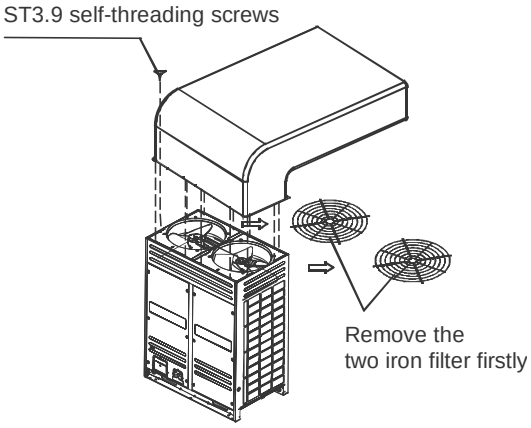
Example A

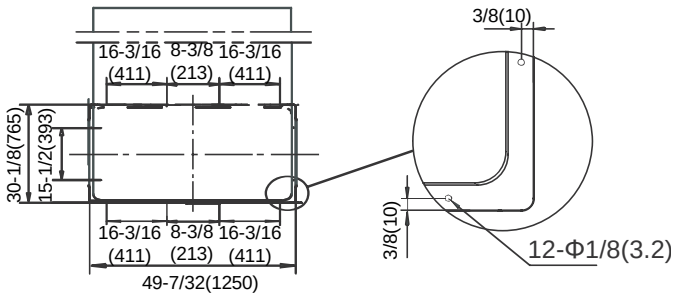
Unit: in.(mm)





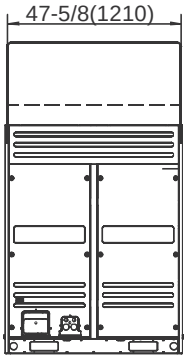
Air outlet louver dimension (optional)

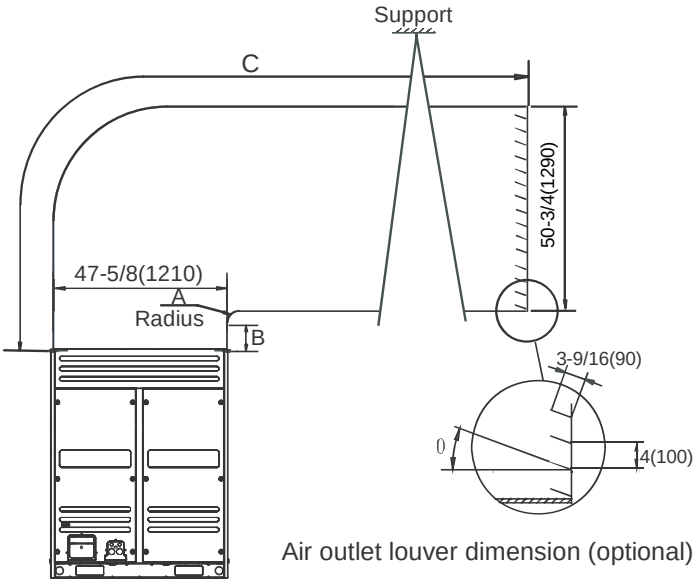




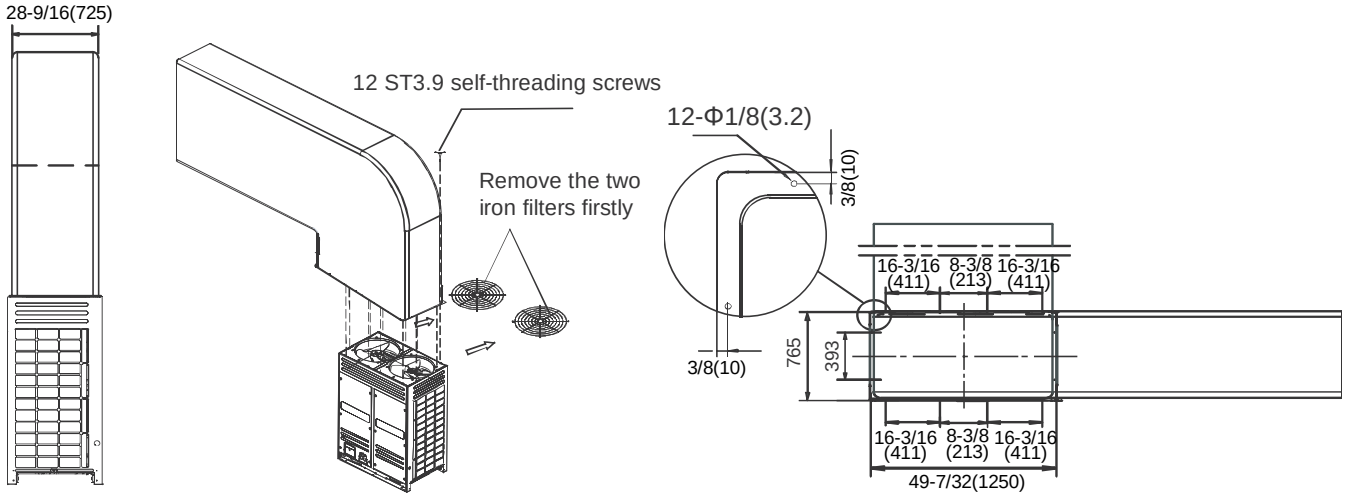
Example B

Unit: in.(mm)





Air outlet louver dimension (optional)



Unit: in.(mm)

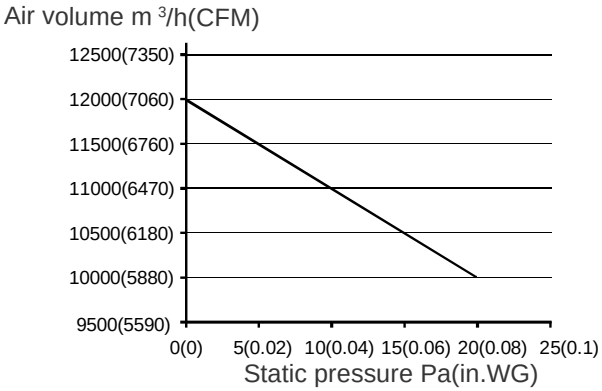
Example A	
A	A≥11-3/4(300)
B	B≥9-7/8(250)
C	C≤118-1/8(3000)
D	28-9/16(725)≤D≤29-15/16(760)
θ	θ≤15°

Example B	
A	A≥11-3/4(300)
B	B≥9-7/8(250)
C	C≤118-1/8(3000)
θ	θ≤15°

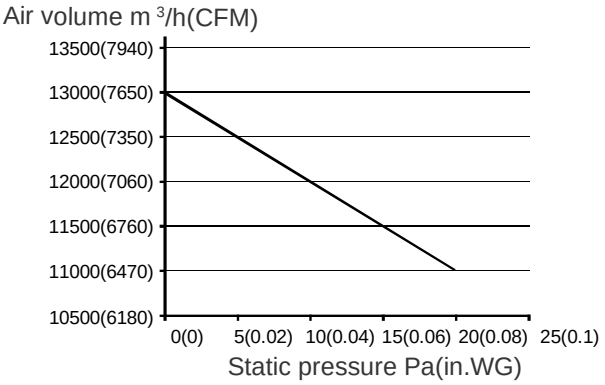
Outdoor fan performance

The default static pressure of outdoor unit is 0 Pa, and 20Pa can be achieved when the steel mesh is removed.

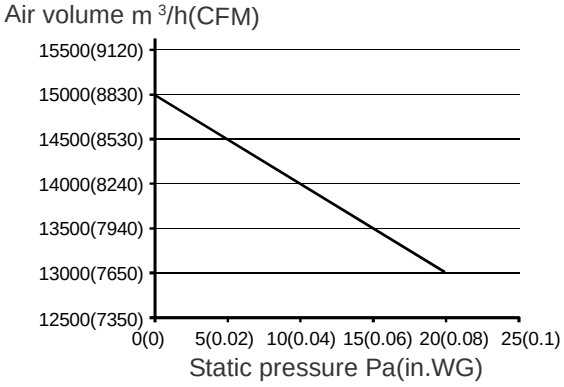
8/10HP



12HP



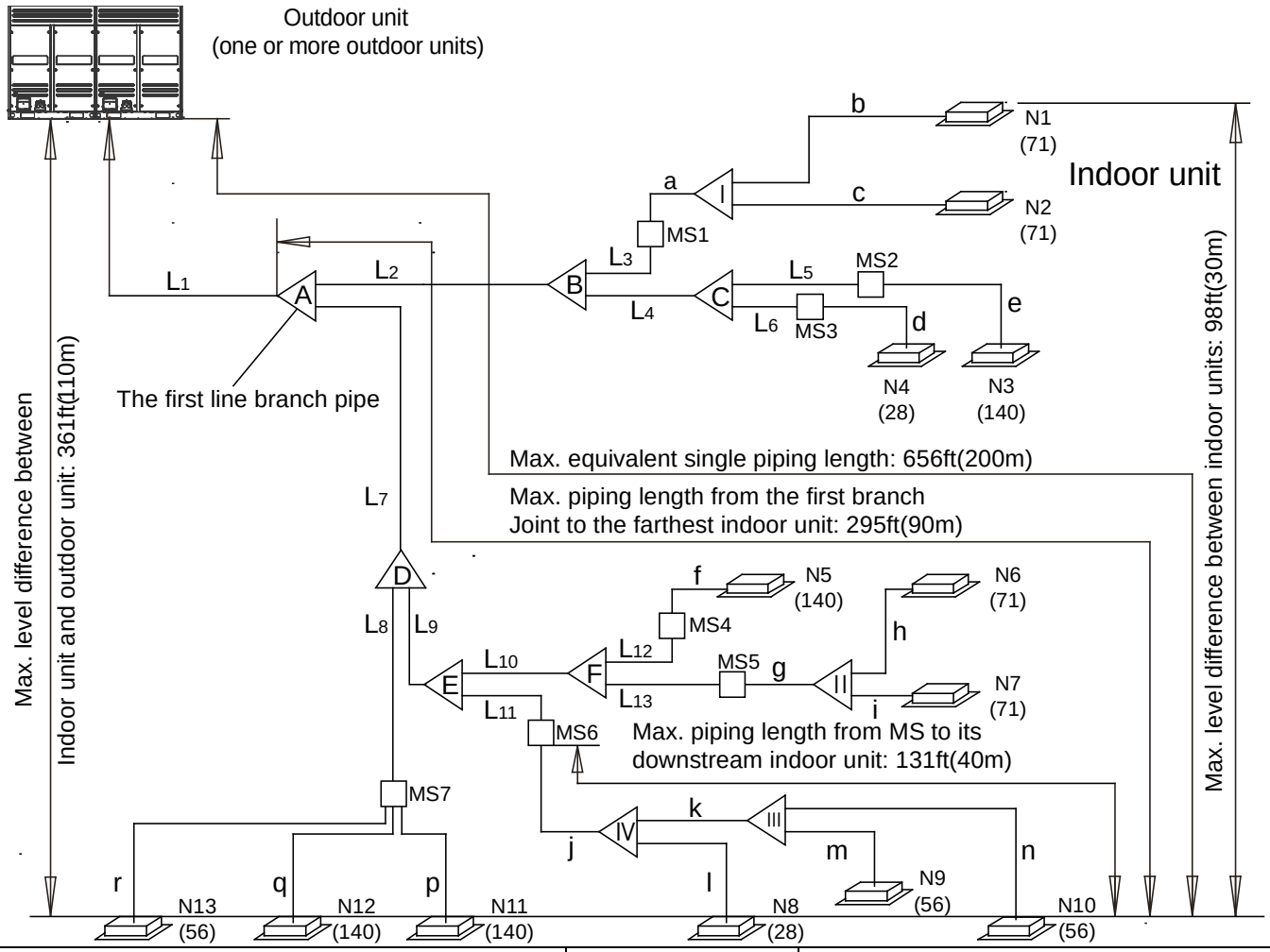
14/16HP



Note:
Before install the ventilation assembly, please remove the steel meshes firstly, otherwise, they would decrease the air supply volume.
1. Increase shutters would decreases the air supply volume, as well as cooling (heating) capacity and energy efficiency would be decreased, the larger angle of the shutter, the more effect to the unit. So we don't recommend applying shutter, if necessary to apply shutter, please ensuring the angle should not over than 15°.
2. The bending place at ventilated duct should be not more than 1(show in above figure), otherwise, operation malfunction would be caused.
3. Install the flexible connector between the unit and the air deflector pipe to avoid vibration noise.

6. Refrigerant piping installation

6.1 Refrigerant piping length permitted value



Piping length			Permitted value	Piping
Piping length	Total piping length		≤3280ft(1000m) (refer to note 1)	L1+(L2+L3+L4+L5+L6+L7+L8+L9+L10+L11+L12+L13)×2+a+b+c+d+e+f+g+h+i+j+k+l+m+n
	Single piping length	Actual length	≤574ft(175m)	L1+L7+L9+L11+j+k+n
		Equivalent length	≤656ft(200m) (refer to note 2)	
	Piping length from the first branch joint to the farthest indoor unit		≤131/295ft(40/90m) (refer to note 3)	L7+L9+L11+j+k+n
	Piping length from MS to the downstream indoor unit of itself		≤131ft(40m)	j+k+n
Level difference	Level difference between indoor unit and outdoor unit	Outdoor unit up	≤ 230ft(70m) (refer to note 4)	/
		Outdoor unit down	≤361ft(110m) (refer to note 5)	/
	Level difference between indoor units		≤98ft(30m)	/

Note:

The indoor units should be installed as possible as equal in the both sides of the U-shape branch joint.

1. When counting the total piping length, the actual length of the distribution pipes which between the first branch joint and MS should be double:

Total piping length= L1+(L2+L3+L4+L5+L6+L7+L8+L9+L10+L11+L12+L13)×2+a+b+c+d+e+f+g+h+i+j+k+l+m+n≤3280ft(1000m)

2. The equivalent length of each branch pipe is 1.64ft(0.5m).

3. The allowable piping length from the first branch joint to the farthest indoor unit should be equal to or less than 131ft(40m), but when the following conditions are all met, the allowable length can be extended to 295ft (90m).

- The piping length from each indoor unit to the nearest branch joint or direct connected MS should be less than 131ft(40m). (b, c, d, e, f, h, i, l, m, n, p, q, r≤131ft(40m))
- The length difference between (the outdoor unit to the farthest indoor unit) and (the outdoor unit to the nearest indoor unit) ≤131ft(40m).

  The farthest indoor unit: N10

  The nearest indoor unit: N11

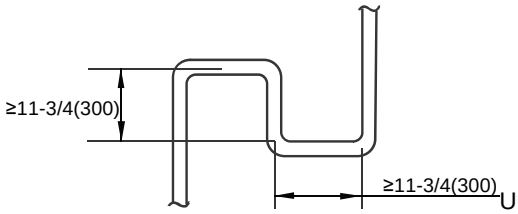
  (L1+L7+L9+L11+j+k+n)-(L1+L7+L8+p) ≤131ft(40m)
- It needs to increase distribution pipes which between the first branch and MS (L2~L13). (Please change the pipe diameter at field) If the pipe diameter of the main slave pipe is the same as the main pipe, then it is no need to be increased.

When: 131ft(40m)＜L7+L9+L11+j+k+n≤295ft (90m) L2~L13 need to increase the pipe diameter.

Increasing size as the following: unit in.(mm)

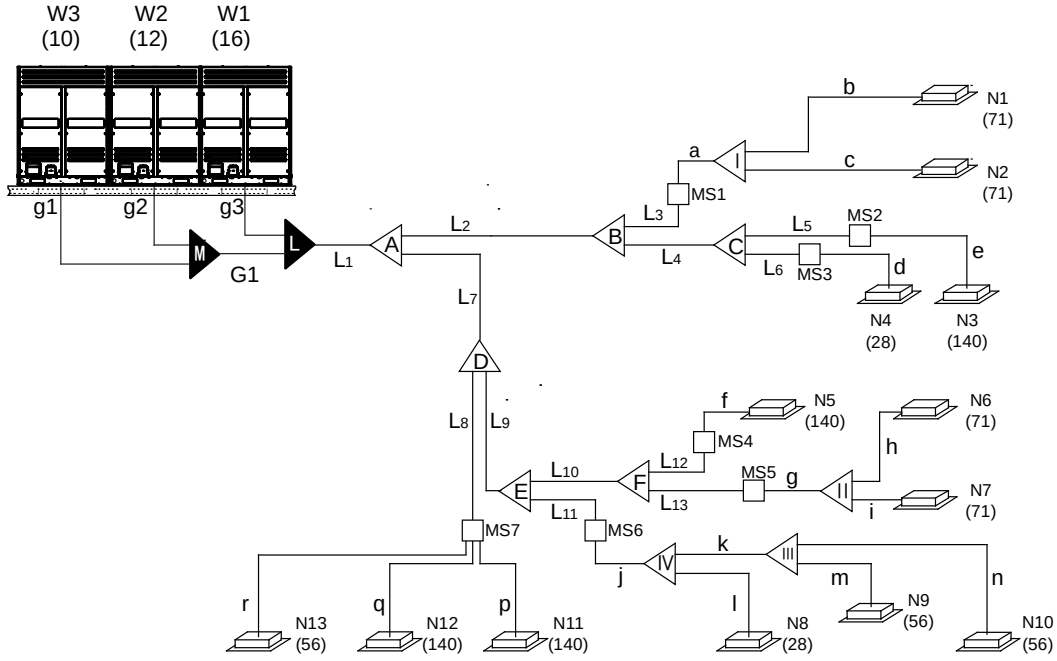
Φ3/8(9.53)→ Φ1/2(12.7)	Φ1/2(12.7)→ Φ5/8(15.9)	Φ5/8(15.9)→ Φ3/4(19.1)	Φ3/4(19.1)→ Φ7/8(22.2)	Φ7/8(22.2)→ Φ1(25.4)	Φ1(25.4)→ Φ1-1/8(28.6)
Φ1-1/8(28.6)→ Φ1-1/4(31.8)	Φ1-1/4(31.8)→ Φ1-1/2(38.1)	Φ1-1/2(38.1)→ Φ1-5/8(41.3)	Φ1-5/8(41.3)→ Φ1-3/4(44.5)	Φ1-3/4(44.5)→ Φ2-1/8(54.0)	

4. When the outdoor unit is higher than indoor units and the level difference is over 65.6ft(20m), it is recommended to set an oil return bend every 32.8ft(10m) in the gas pipe of the main pipe, the specification of the oil return bend refers to below figure.



5. When the outdoor unit is lower than indoor units and the level difference is more than 131ft(40m), the liquid pipe of the main pipe need to increase one size.

6.2 Refrigerant piping selection



- Pipe name

Main pipe	L1
Indoor unit main pipe	L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L12, L13
Indoor unit auxiliary pipe between MS and downstream branch joint	a, g, j, k
Indoor unit auxiliary pipe from indoor unit to the nearest branch joint or direct connected MS	b, c, d, e, f, h, i, l, m, n, p, q, r
Branch pipe assembly between main pipe and MS	A, B, C, D, E
Branch pipe assembly between MS and indoor unit	Ⅰ, Ⅱ, Ⅲ, Ⅳ
Outdoor unit branch pipe assembly	L, M
Outdoor connection pipe	g1, g2, g3, G1
MS equipment	MS1,...MS7

➢ Table 1: Indoor unit main pipe selection (L1~L13) Unit: in.(mm)

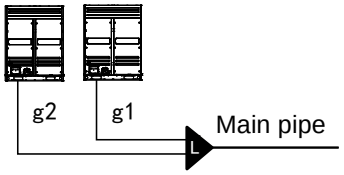
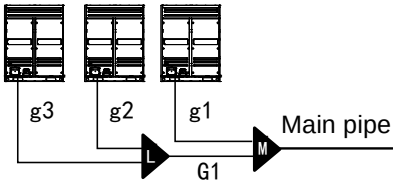
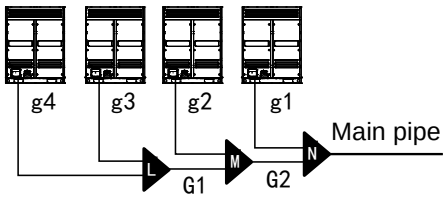
Capacity of indoor unit kW(kBtu/h)	Indoor unit main pipe in.(mm)			
	Low pressure gas pipe	High pressure gas pipe	Liquid pipe	Available branching pipe assembly
A<5.6(19.1)	Φ1/2(12.7)	Φ3/8(9.53)	Φ1/4(6.35)	FQZHN-01SB
(19.1)5.6≤A<16.6(56.6)	Φ3/4(19.1)	Φ5/8(15.9)	Φ3/8(9.53)	FQZHN-01SB
(56.6)16.6≤A<23(78.5)	Φ7/8(22.2)	Φ3/4(19.1)	Φ3/8(9.53)	FQZHN-02SB
(78.5)23≤A<33(112.6)	Φ7/8(22.2)	Φ3/4(19.1)	Φ1/2(12.7)	FQZHN-02SB
(112.6)33≤A<46(157)	Φ1-1/8(28.6)	Φ7/8(22.2)	Φ1/2(12.7)	FQZHN-03SB
(157)46≤A<66(225.2)	Φ1-1/8(28.6)	Φ7/8(22.2)	Φ5/8(15.9)	FQZHN-03SB
(225.2)66≤A<92(313.9)	Φ1-3/8(34.9)	Φ1-1/8(28.6)	Φ3/4(19.1)	FQZHN-04SB
(313.9)92≤A<135(460.6)	Φ1-5/8(41.3)	Φ1-3/8(34.9)	Φ3/4(19.1)	FQZHN-05SB
(460.6)135≤A	Φ1-3/4(44.5)	Φ1-1/2(38.1)	Φ7/8(22.2)	FQZHN-05SB

➢ Table 2: Main pipe selection (L1) Unit: in.(mm)

Model	Main pipe in.(mm)							
	When the equivalent length of all liquid pipes<90m				When the equivalent length of all liquid pipes≥90m			
	Low pressure gas pipe	High pressure gas pipe	Liquid pipe	The 1st branching pipe	Low pressure gas pipe	High pressure gas pipe	Liquid pipe	The 1st branching pipe
8HP	Φ7/8(22.2)	Φ3/4(19.1)	Φ3/8(9.53)	FQZHN-02SB	Φ7/8(22.2)	Φ3/4(19.1)	Φ1/2(12.7)	FQZHN-02SB
10HP	Φ7/8(22.2)	Φ3/4(19.1)	Φ1/2(12.7)	FQZHN-02SB	Φ7/8(22.2)	Φ3/4(19.1)	Φ1/2(12.7)	FQZHN-02SB
12HP	Φ1(25.4)	Φ3/4(19.1)	Φ1/2(12.7)	FQZHN-03SB	Φ1(25.4)	Φ3/4(19.1)	Φ5/8(15.9)	FQZHN-03SB
14-16HP	Φ1-1/8(28.6)	Φ7/8(22.2)	Φ5/8(15.9)	FQZHN-03SB	Φ1-1/8(28.6)	Φ7/8(22.2)	Φ5/8(15.9)	FQZHN-03SB
18-22HP	Φ1-1/4(31.8)	Φ1-1/8(28.6)	Φ5/8(15.9)	FQZHN-03SB	Φ1-1/4(31.8)	Φ1-1/8(28.6)	Φ3/4(19.1)	FQZHN-03SB
24HP	Φ1-3/8(34.9)	Φ1-1/8(28.6)	Φ5/8(15.9)	FQZHN-04SB	Φ1-3/8(34.9)	Φ1-1/8(28.6)	Φ3/4(19.1)	FQZHN-04SB
26-32HP	Φ1-3/8(34.9)	Φ1-1/8(28.6)	Φ3/4(19.1)	FQZHN-04SB	Φ1-3/8(34.9)	Φ1-1/8(28.6)	Φ7/8(22.2)	FQZHN-04SB
34-48HP	Φ1-5/8(41.3)	Φ1-3/8(34.9)	Φ3/4(19.1)	FQZHN-05SB	Φ1-5/8(41.3)	Φ1-3/8(34.9)	Φ7/8(22.2)	FQZHN-05SB
50-64HP	Φ1-3/4(44.5)	Φ1-1/2(38.1)	Φ7/8(22.2)	FQZHN-05SB	Φ1-3/4(44.5)	Φ1-1/2(38.1)	Φ1(25.4)	FQZHN-05SB

Note: the main pipe L1 can be selected form table1 or table2, the larger size should be finally selected.

- Outdoor unit branch pipe assembly

Outdoor unit Qty.	Illustration
2 units	
3 units	
4 units	

➢ Table 3: Outdoor unit connection pipe selection (g1, g2, g3, g4, G1, G2) Unit: in.(mm)

Pipe		Low pressure gas pipe	High pressure gas pipe	Liquid pipe
g1,g2,,g3,g4	8/10/12HP	Φ7/8(22.2)	Φ3/4(19.1)	Φ1/2(12.7)
	14/16HP	Φ1-1/8(28.6)	Φ7/8(22.2)	Φ5/8(15.9)
G1		Φ1-3/8(34.9)	Φ1-1/8(28.6)	Φ3/4(19.1)
G2		Φ1-5/8(41.3)	Φ1-3/8(34.9)	Φ7/8(22.2)

➢ Table 4: Outdoor unit branching pipe assembly selection (L, M, N)

Outdoor unit quantity	Parallel connect with the branch pipes
2 units	L: FQZHW-02SB
3 units	L+M: FQZHW-03SB
4 units	L+M+N: FQZHW-04SB

- Indoor unit auxiliary pipe selection

➢ Table 5: Indoor unit auxiliary pipe between MS and downstream branch joint selection (a, g, j, k)

Capacity of indoor unit kW(kBtu/h)	Gas pipe (in.(mm))	Liquid pipe (in.(mm))	Available branching pipe
A<16.6(56.6)	Φ5/8(15.9)	Φ3/8(9.53)	FQZHN-01D

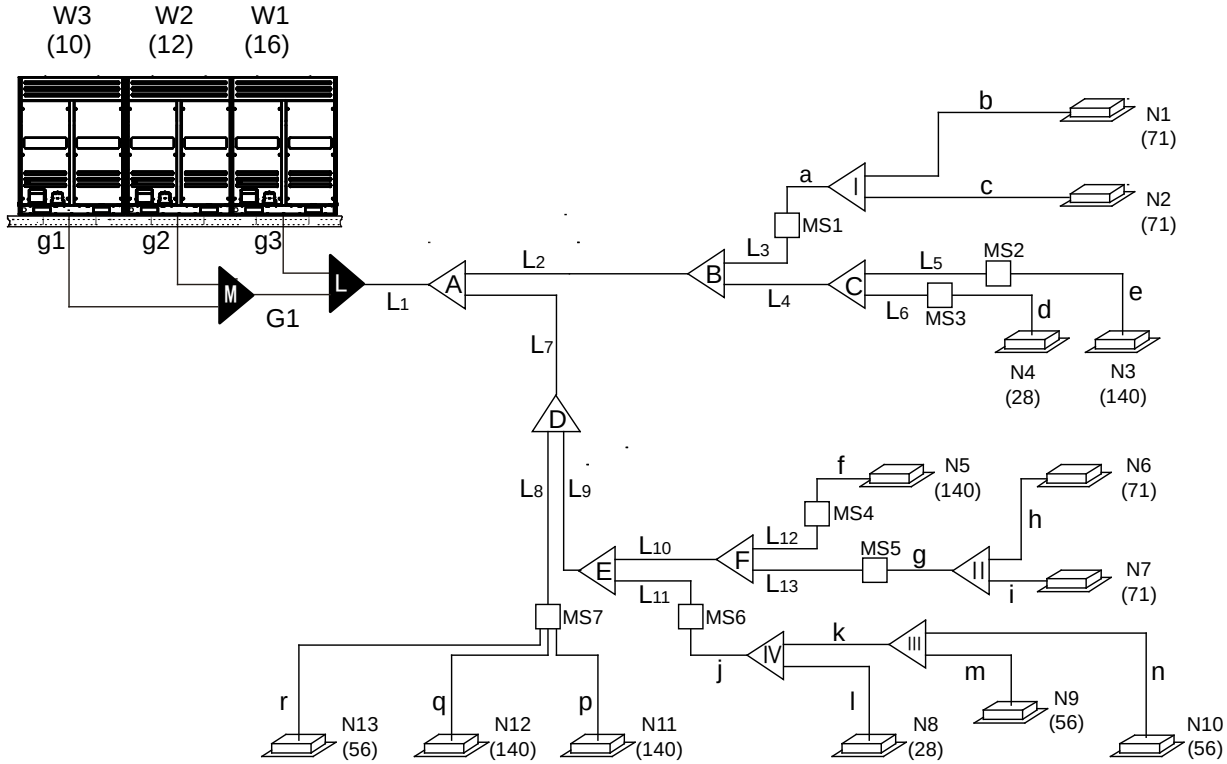
➢ Table 6: Indoor unit auxiliary pipe from indoor unit to the nearest branch joint or direct connected MS selection (b, c, d, e, f, h, i, l, m, n, p, q, r) Unit: in.(mm)

Capacity of indoor unit kW(kBtu/h))	The pipe length from indoor unit to the nearest branch joint or direct connected MS≤32.8ft(10m)		The pipe length from indoor unit to the nearest branch joint or direct connected MS＞32.8ft(10m)	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
A<5.6(19.1)	Φ1/2(12.7)	Φ1/4(6.35)	Φ5/8(15.9)	Φ3/8(9.53)
(19.1)5.6≤A<16(54.6)	Φ5/8(15.9)	Φ3/8(9.53)	Φ3/4(19.1)	Φ1/2(12.7)

6.3 Example

The example is as blow:

(Provided that the capacity of outdoor unit is (16+12+10) HP, the equivalent length of all pipes in this system is larger than 90m, the pipe length from the 1st branch joint to the farthest indoor unit is less than 40m, and the pipe from indoor unit to the nearest branch joint or direct connected MS is less than 10m.



1. Select indoor unit auxiliary pipes from indoor unit to the nearest branch joint or direct connected MS: b, c, d, e, f, h, i, l, m, n, p, q, r.

Refer to table 6, the pipes of b, c, e, f, h, i, m, n, p, q and r are Φ5/8(15.9)/ Φ3/8(9.53), and the pipes of d and l are Φ1/2(12.7)/Φ1/4(6.35).

2. Select indoor unit auxiliary pipes between MS and downstream branch joint: a, g, j, k.

Refer to table 5, the pipes of a, g, j and k are Φ5/8(15.9)/ Φ3/8(9.53), the brand pipe assembly Ⅰ, Ⅱ, Ⅲ and Ⅳ are FQZHN-01D.

3. Select indoor unit main pipes: L1~L13

- The downstream indoor units of L3 are N1 and N2, which capacity is 7.1×2=14.2kW(48.5kBtu/h). Refer to table 1, the indoor unit main pipe L3 is Φ3/4(19.1) /Φ5/8(15.9)/ Φ3/8(9.53), select MDV-MS02/N1-C for MS1.
- The downstream indoor unit of L5 is N3, which capacity is 14 kW(47.8kBtu/h). Refer to table 1, the indoor unit main pipe L5 isΦ3/4(19.1) /Φ5/8(15.9)/ Φ3/8(9.53), select MDV-MS02/N1-C for MS2.
- The downstream indoor unit of L6 is N4, which capacity is 2.8 kW(9.6kBtu/h). Refer to table 1, the indoor unit main pipe L6 is Φ1/2(12.7)/ Φ3/8(9.53)/ Φ1/4(6.35), select MDV-MS02/N1-C for MS3.
- The downstream indoor units of L4 are N3 and N4, which capacity is 14+2.8=16.8 kW(57.3kBtu/h). Refer to table 1, the indoor unit main pipe L4 is Φ7/8(22.2)/ Φ3/4(19.1)/ Φ3/8(9.53), the branch pipe assembly C is FQZHN-02SB.
- The downstream indoor units of L2 are N1, N2, N3 and N4, which capacity is 7.1×2+14+2.8=31 kW (105.8kBtu/h). Refer to table 1, the indoor unit main pipe L2 is Φ7/8(22.2)/ Φ3/4(19.1)/ Φ1/2(12.7), the branch pipe assembly B is FQZHN-02SB.
- The downstream indoor unit of L12 is N5, which capacity is 14 kW(47.8kBtu/h). Refer to table 1, the indoor unit main pipe L12 is Φ3/4(19.1)/ Φ5/8(15.9) /Φ3/8(9.53), select MDV-MS02/N1-C for MS4.

- The downstream indoor units of L13 are N6 and N7, which capacity is 7.1×2=14.2 kW(48.5kBtu/h). Refer to table 1, the indoor unit main pipe L13 is Φ3/4(19.1)/ Φ5/8(15.9) /Φ3/8(9.53), select MDV-MS02/N1-C for MS5.
- The downstream indoor units of L10 are N5, N6 and N7, which capacity is 14+7.1×2=28.2 kW(96.2kBtu/h). Refer to table 1, the indoor unit main pipe L10 is Φ7/8(22.2)/ Φ3/4(19.1)/ Φ1/2(12.7), the branch pipe assembly F is FQZHN-02SB.
- The downstream indoor units of L11 are N8, N9 and N10, which capacity is 2.8+5.6×2=14 kW(47.8kBtu/h). Refer to table 1, the indoor unit main pipe L11 is Φ3/4(19.1)/ Φ5/8(15.9) /Φ3/8(9.53), select MDV-MS02/N1-C for MS6.
- The downstream indoor units of L9 are N5~N10, which capacity is 14+5.6×2+7.1×2+2.8=42.2 kW (144kBtu/h). Refer to table 1, the indoor unit main pipe L9 is Φ1-1/8(28.6)/ Φ7/8(22.2)/ Φ1/2(12.7), the branch pipe assembly E is FQZHN-03SB.
- The downstream indoor units of L8 are N11~N13, which capacity is 14×2+5.6=33.6 kW(114.6kBtu/h). Refer to table 1, the indoor unit main pipe L8 isΦ1-1/8(28.6)/ Φ7/8(22.2)/ Φ1/2(12.7), select MDV-MS04/N1-C for MS7.
- The downstream indoor units of L7 are N5~N13, which capacity is 14×3+7.1×2+5.6×3+2.8=75.8 kW (258.6kBtu/h). Refer to table 1, the indoor unit main pipe L7 is Φ1-3/8(34.9)/ Φ1-1/8(28.6)/ Φ3/4(19.1), the branch pipe assembly D is FQZHN-04SB.
- The downstream indoor units of L1 are N1~N13, which capacity is 14×4+7.1×4+5.6×3+2.8×2=106.8 kW (364.4kBtu/h). Refer to table 1, the indoor unit main pipe L1 is Φ1-5/8(41.3)/ Φ1-3/8(34.9)/ Φ3/4(19.1), the branch pipe assembly A is FQZHN-05SB.

4. Select main pipe: L1

For the capacity of outdoor unit is 38HP, the equivalent length of all pipes in this system is larger than 295ft(90m), refer to table 2, the main pipe L1 is Φ1-5/8(41.3)/ Φ1-3/8(34.9)/ Φ7/8(22.2), the branch pipe assembly A is FQZHN-05SB.

As the main pipe L1 is selected as Φ1-5/8(41.3)/ Φ1-3/8(34.9)/ Φ3/4(19.1) from step 3, and Φ1-5/8(41.3)/ Φ1-3/8(34.9)/ Φ7/8(22.2) from step 4, we finally select the larger pipe Φ1-5/8(41.3)/ Φ1-3/8(34.9)/ Φ7/8(22.2) as main pipe L1.

5. Outdoor unit connection pipe (g1, g2, g3, G1,L+M) selection (refer to table3, table 4)

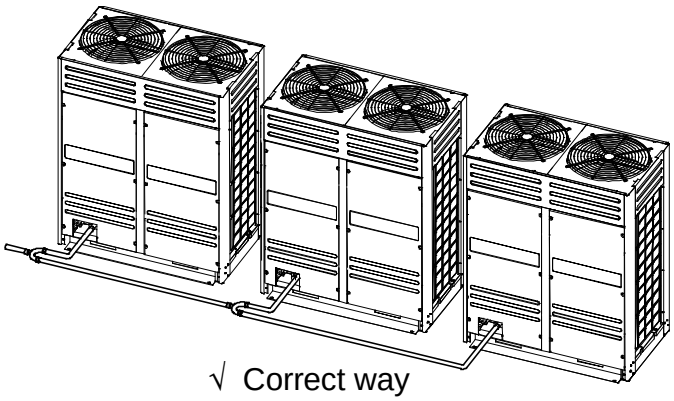
- The pipe g1 is connected to 10HP outdoor unit. Refer to table3, the diameter of g1 is Φ7/8(22.2) /Φ3/4(19.1) /Φ1/2(12.7)
- The pipe g2 is connected to 12HP outdoor unit. Refer to table3, the diameter of g2 is Φ7/8(22.2) /Φ3/4(19.1) /Φ1/2(12.7)
- The pipe g3 is connected to 16HP outdoor unit. Refer to table3, the diameter of g3 is Φ1-1/8(28.6)/ Φ7/8(22.2) /Φ5/8(15.9)
- The upstream outdoor unit quantity of G1 is two. Refer to table3, the diameter of G1 is Φ1-3/8(34.9)/ Φ1-1/8(28.6)/ Φ3/4(19.1)
- The quantity of combined outdoor units is three. Refer to table4, the outdoor branch assembly is L+M: FQZHW-03SB

Note: For the detail dimension and installation information pipe, please read the branch pipe installation manual carefully.

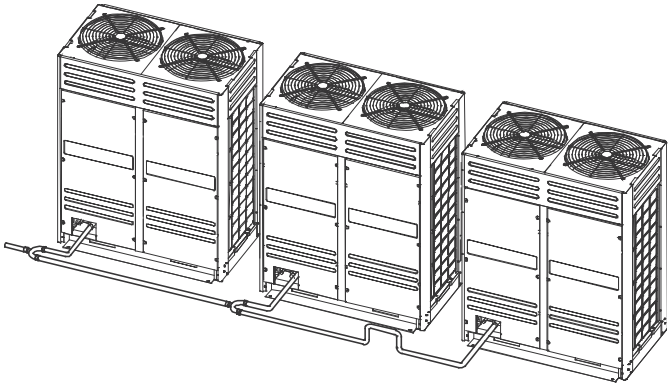
6.4 Piping connection between outdoor units

All connection pipes between outdoor units should be horizontally, it is not allowed the concave at junction site.

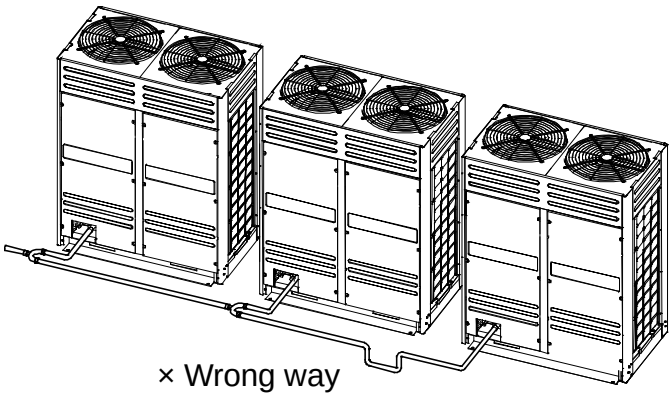
The height of each connection pipe between outdoor units is not allowed to over the height of refrigerant outlet pipe.



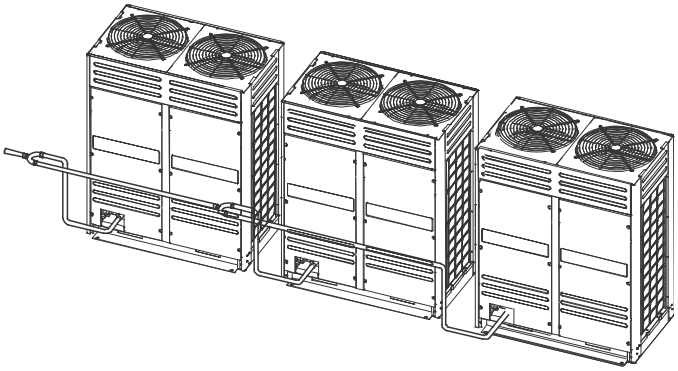
√ Correct way



√ Correct way



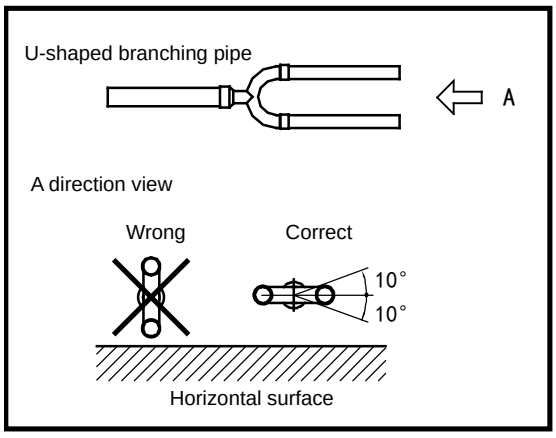
× Wrong way



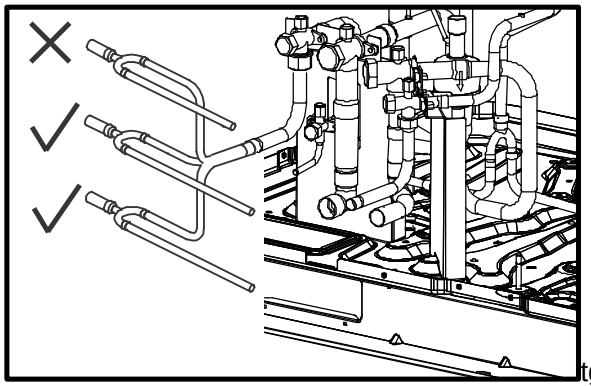
× Wrong way

6.5 Branch pipe installation

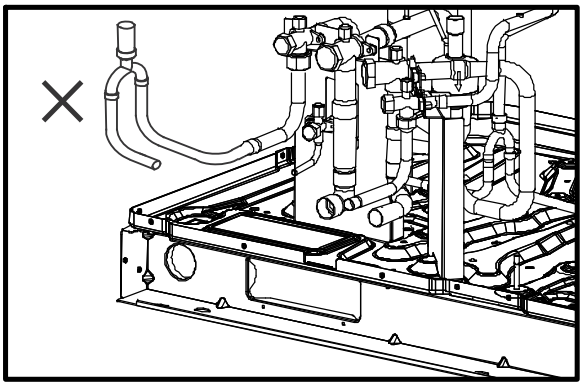
The branching pipe must be installed horizontally and error angle of it should not be larger than 10°. Otherwise, refrigerant assignment will be uneven and malfunction will be caused.



For avoiding oil accumulate at the outdoor unit, please install the branching pipes properly.

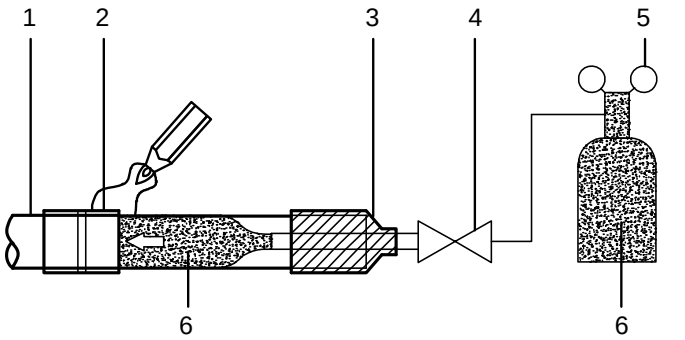


tg



7. Caution for brazing

- Make sure to blow through with nitrogen when brazing. Blowing through with nitrogen prevents the creation of large quantities of oxidized film on the side of the pipe. An oxidized film adversely affects valves and compressors in the refrigerating system and prevents proper operation.
- The nitrogen pressure should be set to 0.02MPa (just enough so it can be felt on the skin) with a pressure-reducing valve.



1 Refrigerant pipe
2 Part to be brazed
3 Taping
4 Hands valve
5 Pressure-reducing valve
6 Nitrogen

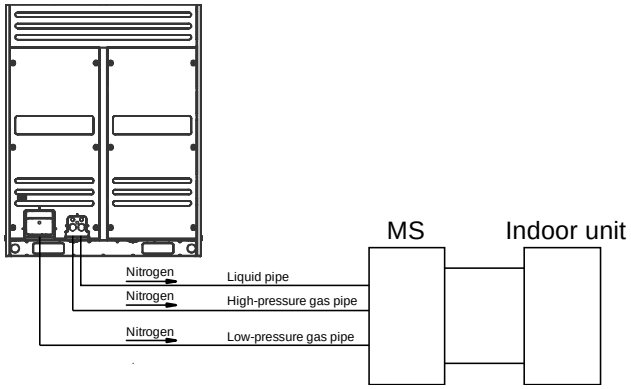
- Do not use anti-oxidants when brazing the pipe joints. Residue can clog pipes and break equipment.
- Do not use flux when brazing copper-to-copper refrigerant piping. Use phosphor copper brazing filler alloy (BCuP) which does not require flux.
- Flux has an extremely harmfully influence on refrigerant pipe systems. For instance, if chlorine based flux is used, it will cause pipe corrosion in particular, if the flux contains fluorine, it will deteriorate the refrigerant oil.

8. Remove dirt or water in the piping

- Make sure there is no any dirt or water in the pipe before connecting the piping to the outdoor units.
- Wash the piping with high pressure nitrogen, never use refrigerant of the outdoor unit to do that.

9. Gas tightness test

Charge 40kgf/cm^2 nitrogen gas from the high-pressure gas valve from the meter connector. Pressure inside should be maintained no less than 24 hrs.

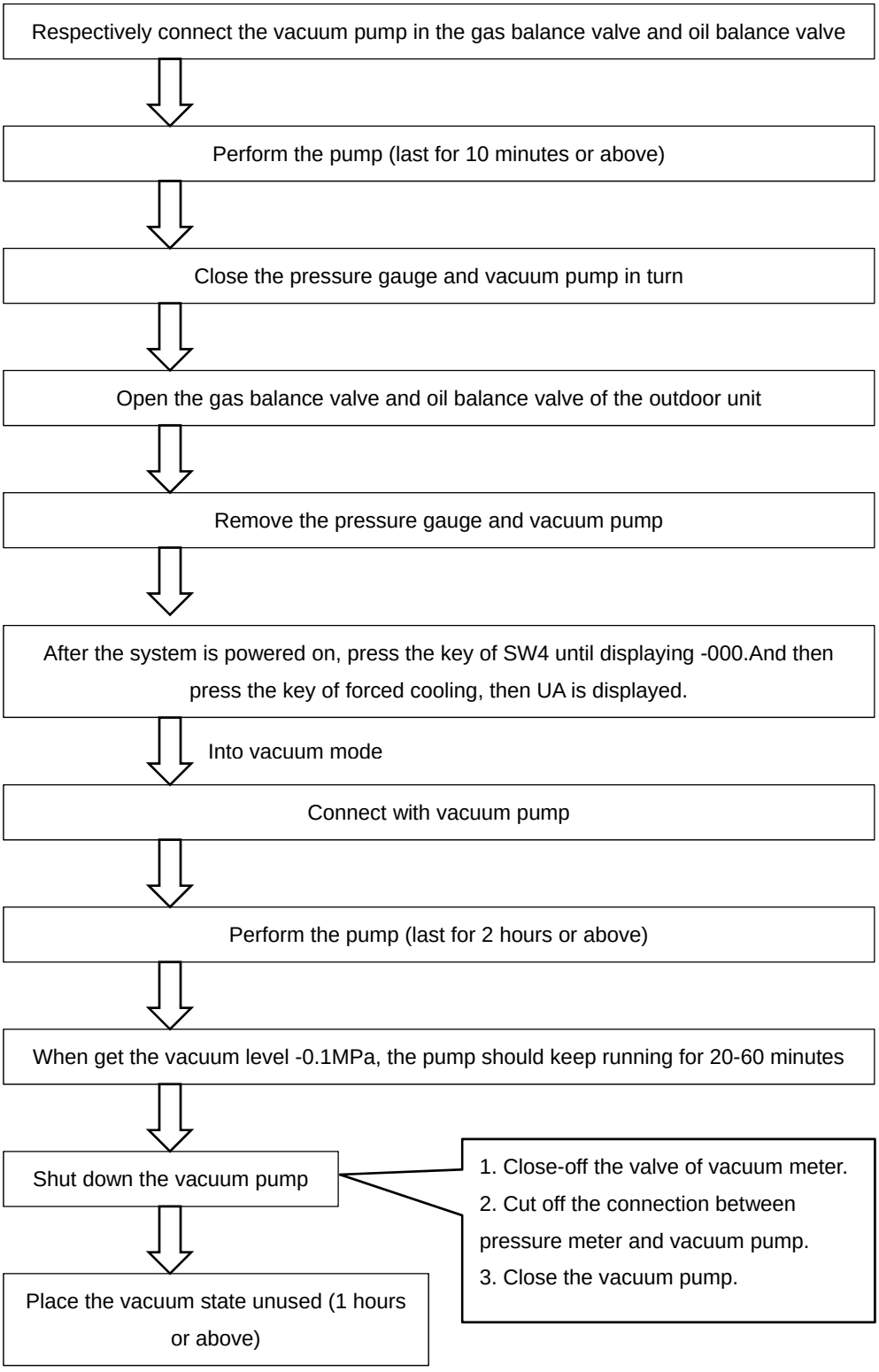


Note:

- Pressurized nitrogen (3.9MPa; 40kgf/cm^2) is used for airtightness test.
- It is not allowed to use oxygen, combustible gas or toxic gas to conduct the airtightness test.
- When welding, please use wet cloth insulating the low pressure valve for protection.
- To avoid the equipment be damaged, the pressure maintained time should not last too long.

10. Vacuum

- Use the vacuum pump which vacuum level lower than -0.1MPa(-14.5PSI) and the air discharge capacity above 40L/min(1.41ft^3/min).
- The outdoor unit is not necessary to vacuum, don't open the outdoor unit gas and liquid pipe shut-off valves.
- Make sure the vacuum pump could result as -0.1MPa(-14.5PSI) or below after 2 hours or above operation. If the pump operated 3 hours or above could not achieve to -0.1MPa(-14.5PSI) or below, please check whether water mix or gas leak inside of the pipe.
- Pressure gauge with the switch is installed between vacuum pump and system pipes.



Caution:

- Don’t mix up the different refrigerants or abuse the tools and measurements which directly contact with refrigerants.
- Don’t adopt refrigerant gas for air vacuuming.

- If vacuum level could not get to -0.1MPa, please check whether resulted by leakage and confirm the leakage site. If no leakage, please operate the vacuum pump again 1 or 2 hrs.

11. Additional refrigerant charge

- Calculate the additional refrigerant charge according to the diameter and the length of the liquid side pipe of the outdoor/indoor unit connection. The refrigerant is R410A.

Note: Assume equivalent pipe length of the branch joint is 0.5m, and MS is 1m (for calculation purposes).

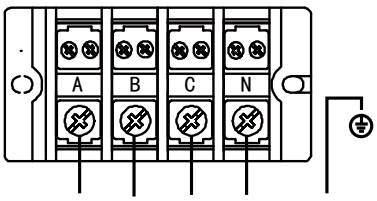
The refrigerant charge of MS02 is 0.3kg/per, MS04/MS06 is 0.5kg/per.

Pipe size of liquid side (in.(mm))	Additional refrigerant charge per meter (kg)
Φ1/4(6.35)	0.023
Φ3/8(9.53)	0.060
Φ1/2(12.7)	0.120
Φ5/8(15.9)	0.180
Φ3/4(19.1)	0.270
Φ7/8(22.2)	0.380
Φ1(25.4)	0.550
Φ1-1/8(28.6)	0.710

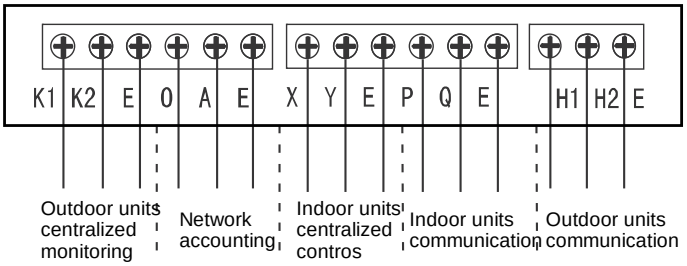
- Charge the additional refrigerant from the low-pressure pipe and liquid pipe.
- The system will quit from vacuum mode and go to normal running after power on.

12. Electric wiring installation

12.1 Wiring terminals instruction



Three-phase power supply



12.2 Electric characteristics

Model	Units				Power supply			Compressor		OFM	
	Hz	Voltage (V)	Min. (V)	Max. (V)	MCA (A)	TOCA (A)	MFA (A)	MSC (A)	RLA (A)	kW	FLA (A)
MDV-252(8)W/ D2RN1T(C)	50/ 60	380~415	342	440	18.4	20.8	25	-	17.4	0.42	3.6
MDV-280(10)W/ D2RN1T(C)	50/ 60	380~415	342	440	20.6	22.1	25	-	17.4	0.42	3.6
MDV-335(12)W/ D2RN1T(C)	50/ 60	380~415	342	440	21.8	22.8	25	-	17.4	0.42	3.6
MDV-400(14)W/ D2RN1T(C)	50/ 60	380~415	342	440	27.9	31.8	35	-	17.4+ 10.5	0.71	5.9
MDV-450(16)W/ D2RN1T(C)	50/ 60	380~415	342	440	33.4	32.8	35	-	17.4+ 10.5	0.71	5.9

The current value of combination unit is the total value of each basic model (refer to Units Combination Table in Part1)

For example: 46HP=16HP+16HP+14HP

Power current: MCA=33.4+33.4+27.9=94.7A

TOCA=32.8+32.8+31.8=97.4A

MFA=35+35+35=105A

Compressor: RLA=(17.4+10.5)+ (17.4+10.5)+ (17.4+10.5)=83.7A

OFM: FLA=5.9+5.9+5.9=17.7A

Notes:

1. RLA is based on the following conditions, Indoor temp. 27°C(80.6°F) DB/19°C(66.2°F) WB, Outdoor temp. 35°C(95°F) DB
2. TOCA means the total value of each OC set.
3. MSC means the Max. current during the starting of compressor.
4. Voltage range.

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

5. Maximum allowable voltage variation between phases is 2%
6. Selection wire size based on the larger value of MCA or TOCA
7. MFA is used to select the circuit breaker and the ground fault circuit interrupter (earth circuit breaker).

MCA: Min. Circuit Amps. (A)

TOCA: Total Over-current Amps. (A)

MFA: Max. Fuse Amps. (A)

MSC: Max. Starting Amps. (A)

RLA: Rated Load Amps. (A)

OFM: Outdoor Fan Motor.

FLA: Full Load Amps. (A)

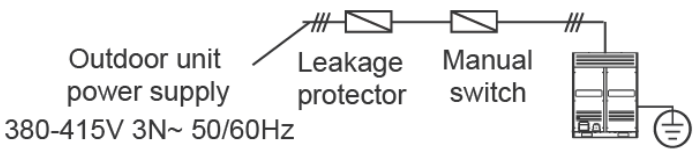
KW: Rated Motor Output (KW)

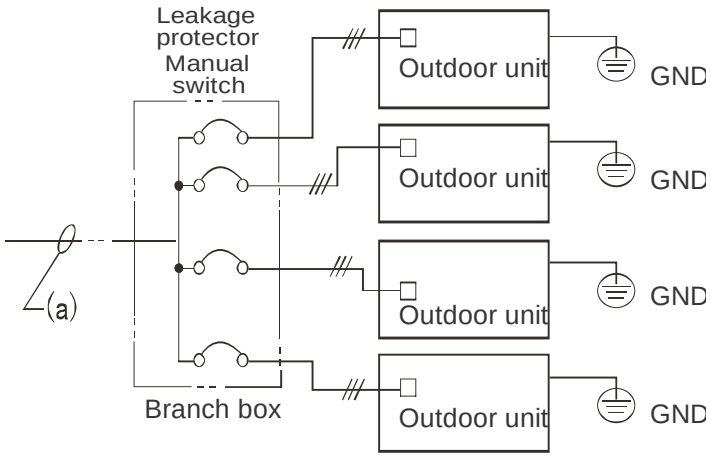
12.3 Electric wiring installation

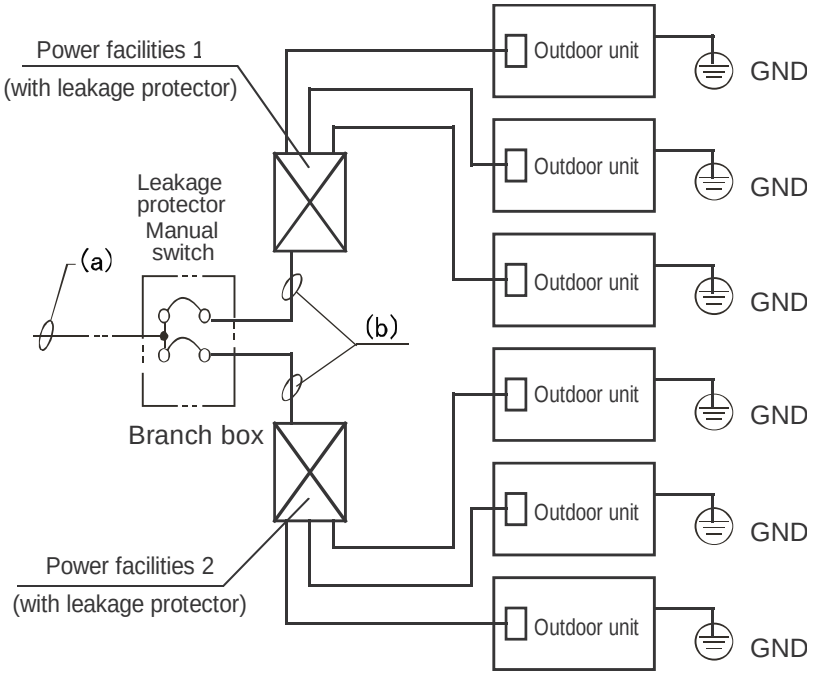
Note:

- Please select power supply for indoor unit and outdoor unit separately.
- The power supply should have specified branch circuit with leakage protector and manual switch.
- The power supply, leakage protector and manual of all the indoor units connecting to the same outdoor unit should be universal. (Please set all the indoor unit power supply of one system into the same circuit. It should turn on or shut down the unit at the same time, otherwise, the service life would affect seriously, even the unit may not turn on.)
- Please put the connective wiring system between indoor unit and outdoor unit with refrigerant piping system together.
- It is suggested to use 3-core shielded wire as signal wire between indoor and outdoor units, multi-core wire is unavailable.
- Please comply with relevant National Electric Standard.
- Power wiring should be done by professional electrician.

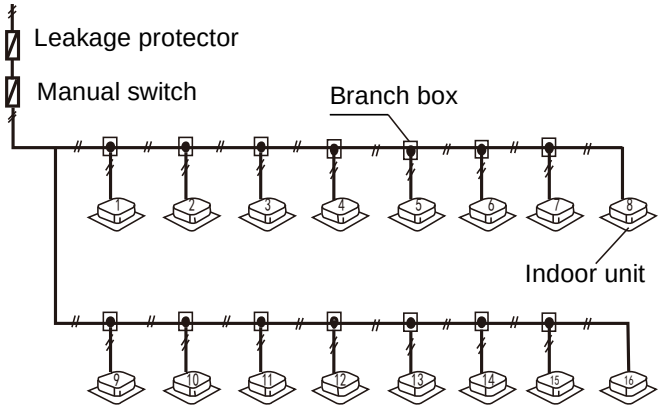
12.3.1 Outdoor unit powering supply wiring







12.3.2 Indoor unit powering supply wiring



Note:

- Set refrigerant piping system, signal wires between indoor units and signal wires between outdoor units into one system.
- Power must unified supply to all indoor units in the one system.
- Please do not put the signal wires and power wires in the same wire tube; keep distance between the two tubes. (Keep distance above 11-13/16inch(300mm), when current capacity of power supply less than 10A, and Keep distance above 19-11/16inch(500mm), when current capacity of power supply less than 50A).
- Make sure to address the outdoor unit which is in combination type.

12.4 Control system installation

The control line should be shielded wire. Using other wiring shall create signal interference, thus leading to error operation.

The shielded nets at the two sides of shielded wires are either grounded to the earth, or connected with each other and jointed to the sheet metal along to the earth.

Control wire could not be bound together with refrigerant pipeline and power wire. When power wire and control wire is distributed in parallel form, keep gap between them above 11-13/16inch(300mm) so as to preventing signal interference.

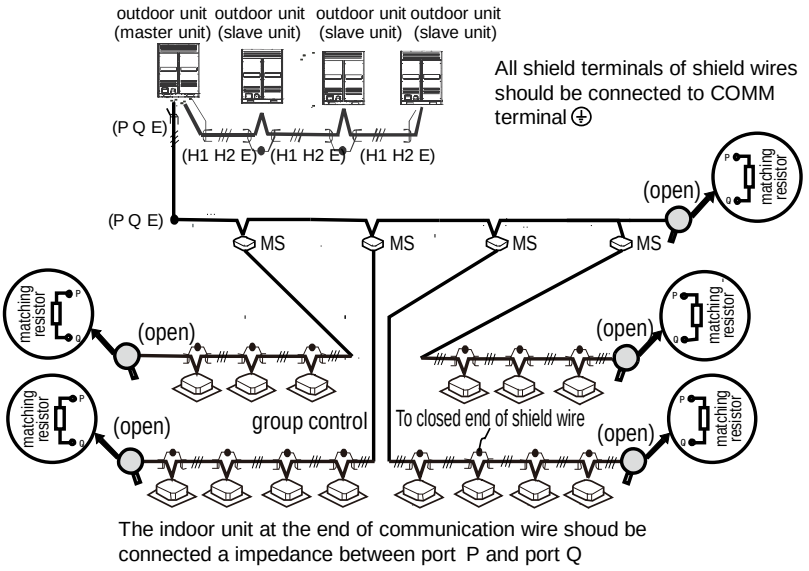
Control wire could not form closed loop.

Control wire has polarity, so be careful when connecting.

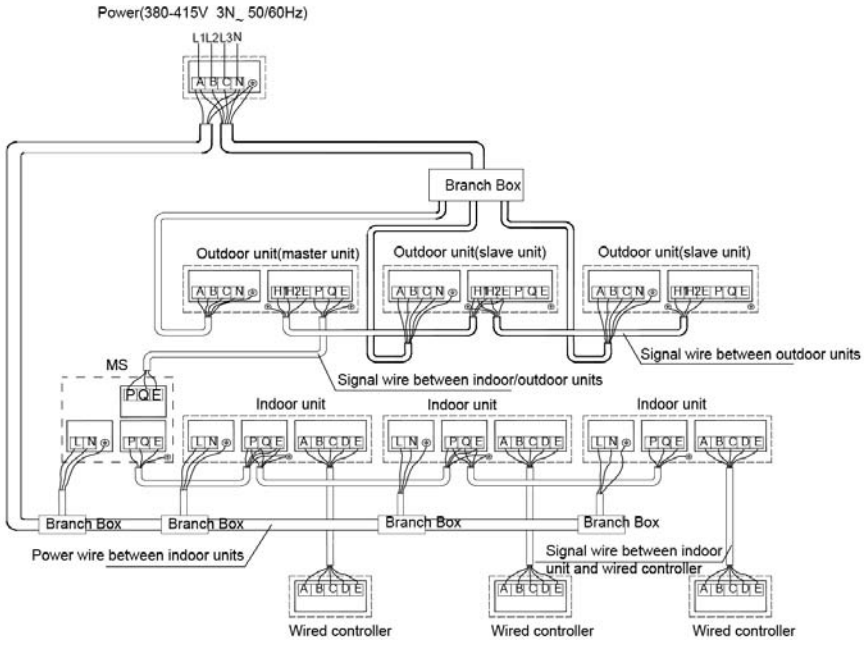
The shield net should be grounded at the wiring terminal of outdoor unit. The inlet and outlet wire net of indoor communication wire should be connected directly and could not be grounded, and form open circuit at the shield net of final indoor unit.

12.4.1 Signal wire between outdoor unit and indoor unit

Signal wire of indoor/outdoor unit adopts 3-core shielded wire (≥0.0012in.^{2}(0.75mm^2) which has polarity, please connect it correctly.



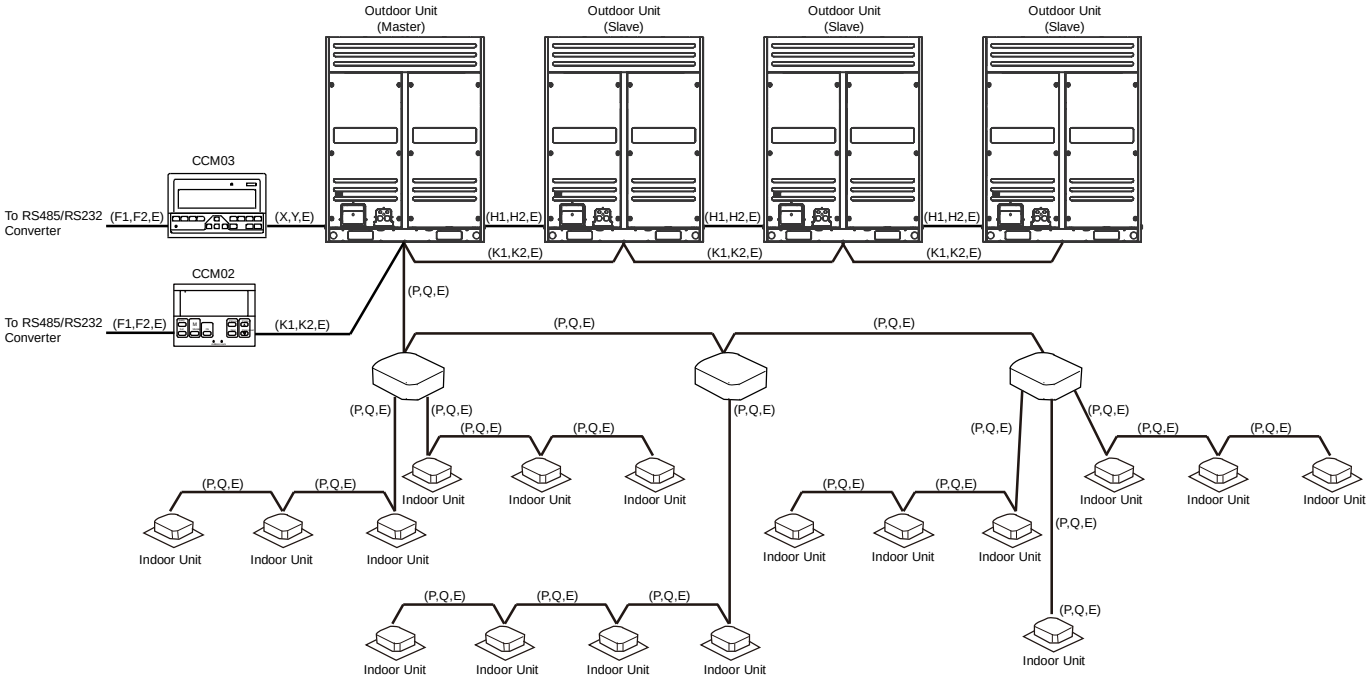
12.4.2 Example connection of wiring



12.4.3 Signal wire of centralized control

When centralized control is needed, one CCM03 (central controller of indoor unit) can only control the indoor units which are in the same refrigerant system **via the port X Y E of outdoor unit.**

The diagram below shows the connection of signal wire in this case:



12.5 Dial switch setting

S1: Starting time setting	
	Starting time is 10 minutes
	Starting time is 12 minutes (default)
S2: Night silent time setting	
	Night silent time is 6h/10h (default)
	Night silent time is 6h/12h
	Night silent time is 8h/10h
	Night silent time is 8h/12h
S3: Silent mode selection	
	Night silent mode (default)
	Silent mode
	Super silent mode.
	None silent mode.
S4: Static pressure mode selection	
	None static pressure(default)
	Low static pressure mode (reserved, can be customized)
	Medium static pressure mode (reserved, can be customized)
	High static pressure mode (reserved, can be customized)
ENC3+S12: Indoor unit quantity setting	
 	The quantity of indoor unit is 0-15 0~9 on ENC3 refer to 0~9 indoor units; A~F on ENC3 refer to 10~15 indoor units.
 	The quantity of indoor unit is 16-31 0~9 on ENC3 refer to 16~25 indoor units; A~F on ENC3 refer to 26~31 indoor units.
 	The quantity of indoor unit is 32-47 0~9 on ENC3 refer to 32~41 indoor units; A~F on ENC3 refer to 42~47 indoor units.
 	The quantity of indoor unit is 48-63 0~9 on ENC3 refer to 48~57 indoor units; A~F on ENC3 refer to 58~63 indoor units.
ENC1: Outdoor unit address setting	
	Only 0, 1, 2, 3 are available. 0 is for main unit; 1, 2, 3 are for slave units

ENC2: Outdoor unit capacity setting	
ENC2	Only 0, 1, 2, 3, 4 are available. 0: 8HP; 1: 10HP; 2: 12HP; 3: 14HP; 4: 16HP
ENC4: Network address setting	
ENC4	Only 0, 1, 2, 3, 4, 5, 6, 7 are available.

13. Running test

13.1 Inspection and confirmation before commissioning

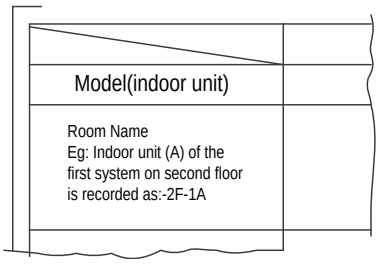
- Check and confirm that refrigeration pipe line and communication wire of indoor and outdoor units have been connected to the same refrigeration system. Otherwise, operation troubles shall happen.
- Power voltage is within ±10% rated voltage.
- Check and confirm that the power wire and control wire are correctly connected.
- Check whether wire controller is properly connected.
- Before powering on, confirm there is no short circuit to each line.
- Check whether all units have passed nitrogen pressure-keeping test for 24 hours with R410A: 40kg/cm^2 (580PSI).
- Confirm whether the system to debugging has been carried out vacuum drying and packed with refrigeration as required.

13.2 Preparation before debugging

- Calculate the additional refrigerant quantity for each set of unit according to the actual length of liquid pipe.
- Keep required refrigerant ready.
- Keep system scheme, system piping diagram and control wiring diagram ready.
- Record the setting address code on the system scheme.
- Turn on power switches of outdoor unit in advance, and keep connected for above 12 hours so that heater heating up refrigerant oil in compressor.
- Turn on all valves. If the above valves do not be turned on totally, the unit should be damaged.
- Check whether the power phase sequence of outdoor unit is correct.
- All dial switch of indoor and outdoor units have been set according to the Technical Requirement of Product.

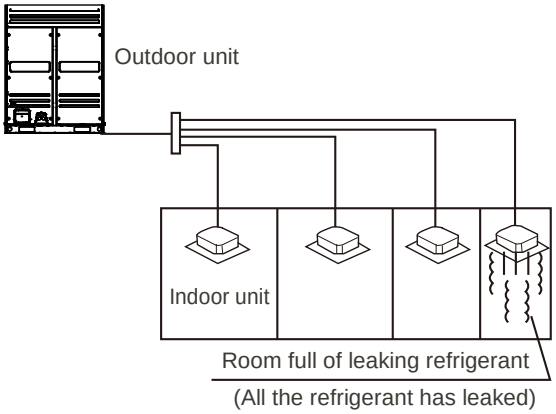
13.3 Fill the name of connected system

To clearly identify the connected systems among two or more indoor units and outdoor units, select names for every system and record them on the nameplate on the outdoor electric control box cover.



13.4 Caution on refrigerant leakage

- This air conditioner adopts R410A as refrigerant, which is safe and noncombustible.
- The room for air conditioner should be big enough that refrigerant leakage cannot reach the critical thickness. Besides this, you can take some action on time.
- R410A critical thickness: 0.3 kg/m^3(0.02Ibs./ft^3), (Critical thickness: the max thickness of Freon without any harm to person)



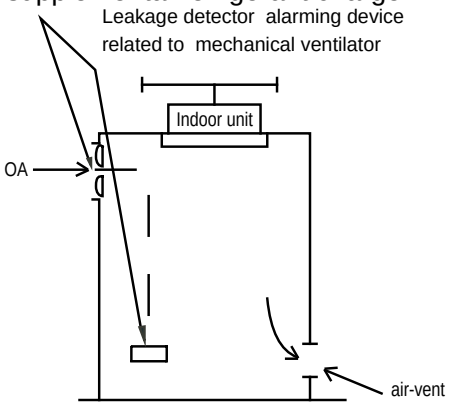
- Calculate the critical thickness through following steps, and take necessary actions.

1. Calculate the refrigerant charge A
2. Total refrigerant charge = delivered refrigerant charge (nameplate) + supplemental refrigerant charge
3. Calculate the indoor volume (B) (as the minimum volume)
4. Calculate the refrigerant thickness.

   A/B ≤ critical thickness 0.3kg/m3(0.02Ibs./ft3)

- Countermeasure to over-high refrigerant thickness

1. Install mechanical ventilator to reduce the refrigerant thickness under critical level. (Ventilate regularly)
2. Install leakage detector alarming device related to mechanical ventilator if you cannot regularly ventilate.



Part 5 MS Unit Installation

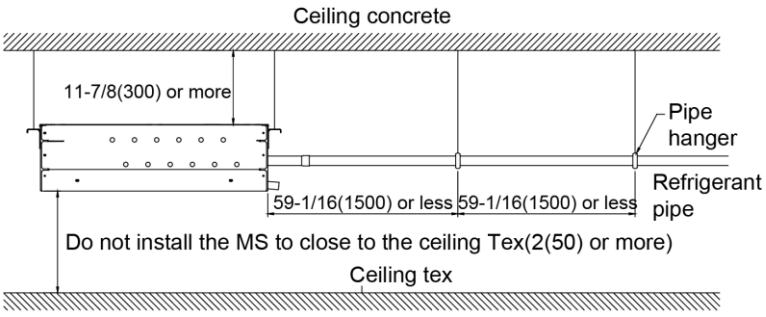
1. Select installation position

1. A place can provide enough installation and maintenance space.
2. Horizontal ceiling and its building construction is able to withstand the set's weight.
3. A place where the connecting pipes and drain pipes can be connected easily.
4. The installation location should consider the length of the refrigerant pipe connected with the outdoor and indoor units; it cannot exceed the limited length range.

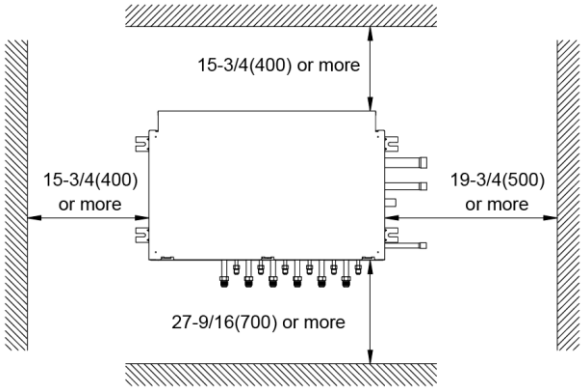
Note:

- Do not install the MS near the strong electromagnetic interference environment, otherwise will cause the MS communication error.
- For the MS may produce refrigerant noise, please do not install it at the silent places, such as sleeping room, hospital sickroom, dedicated silent room etc., recommend installing it at the corridor or washing room etc.
- Be sure to install drain piping in order to ensure proper drainage.
- Improper drain piping may result in water leakage and bedewing furniture etc.
- Be sure to install an earth leakage breaker. Failure to install an earth leakage breaker may result in electric shocks.
- Do not install the MS at any place where flammable gas may leak out.
- If the gas leaks out and stays around the MS, a fire may break out.
- Be sure to install at a strong and firm foundation or ceiling base. If the foundation or ceiling base is not strong and firm enough, the set will drop to cause injury.
- Connect the electric cable correctly. If wrong connecting the electric cable, then it will damage the electrical components.
- Expose the unit to the water or other moisture before installation will lead to the short circuit of the electrical components.
- Don't store the unit in the humid basement or expose to the rain or water. If refrigerant leaks happen during installation, then ventilate the room immediately.
- After finishing the installation work, be sure to check whether the refrigerant leak or not. If refrigerant leak and is exposed to the fire source such as heater, fire pot or electric cooker etc., then will produce toxic gas.

2. Installation space



Unit: in.(mm)



Unit: in.(mm)

3. Body installation

3.1 Install the Φ25/64inch(Φ10mm) hoisting screw

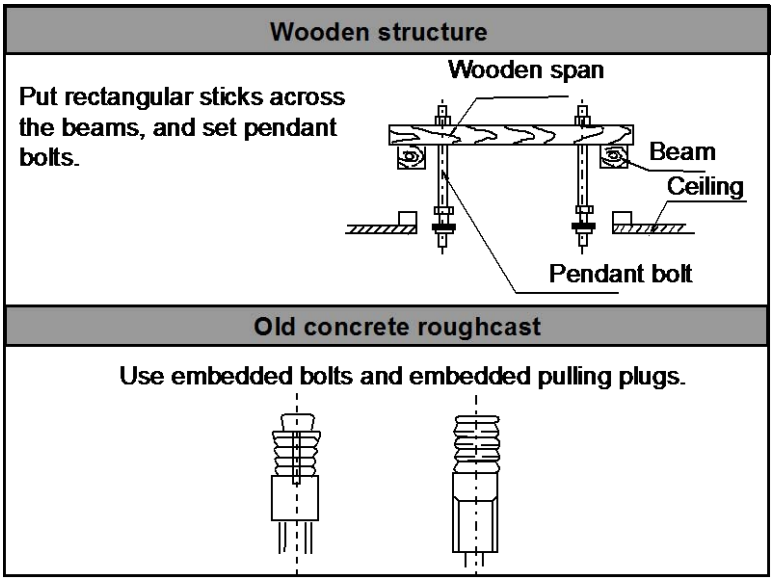
1. Please use Φ25/64inch(Φ10mm) hoisting screw.
2. Remove the ceiling: For different architectural structure, details please contact with indoor decoration personnel.

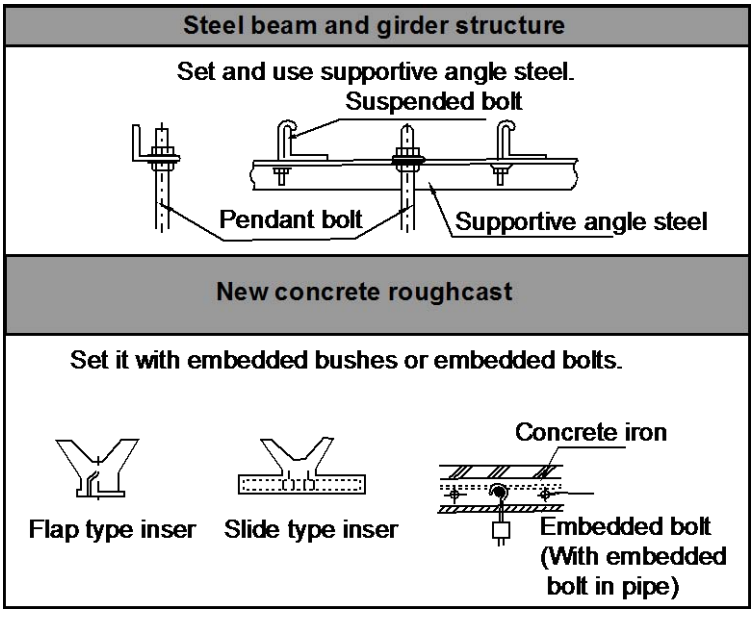
- Ceiling: For make sure the ceiling level and for avoiding to the ceiling vibration, it must be strengthened the ceilingplate base frame.
- Do not cut off the ceiling plate base frame.
- Strengthen the base frame on the both sides of the fixed ceiling.
- After hoisting install the main body, it should do the piping and wiring work in the ceiling, decide the outlet directionsof the pipes after selected the installation location. Especially for the position already has ceiling, please install pipe, drainage pipe, indoor and outdoor units connecting wires and wire controlling wire to the connecting positionsbefore hoisting the unit.

3.2 Install the MS

1. Please use the pulley to hoisting install the MS unit on the hoisting bolt.
2. Please use the gradienter to adjust the MS to be horizontal, if not, it may cause water leakage.

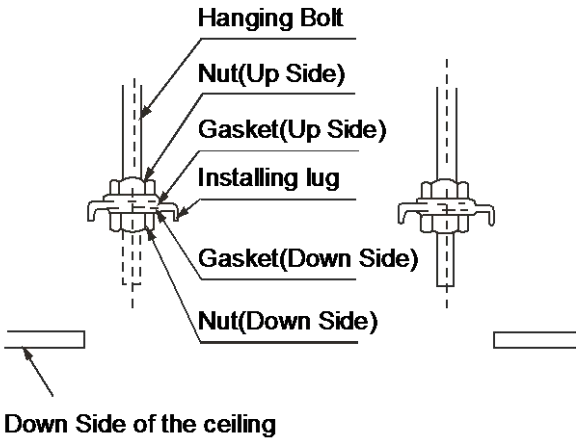
3.3 Install the hanging screw bolts



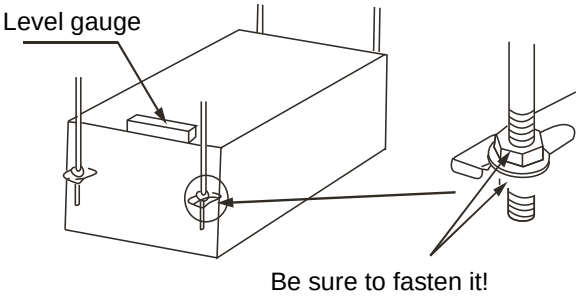


3.4 Hanging the MS

1. Adjust the nut's site, the interval between gasket (Down Side) and the ceiling should according to actual construction.



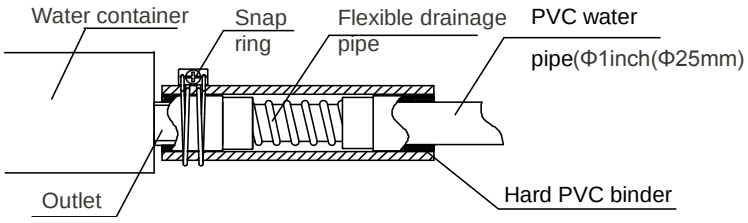
2. Hang the nut of hanging screw bolt into the slotted hole of the installing ear.
3. Use the level gauge to confirm the horizontality of the unit. (Prohibitfalling toward non-drainage side, better to fall a little toward the drainage side)



4. Drain pipe installation

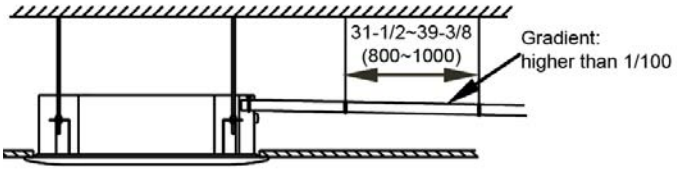
4.1 Install the drain pipe

1. Please use the flexible drainage pipe to connect the MS drainage port and the PVC pipes, and use the snap ring for fastening.
2. While connecting other drain pipes please use hard PVC binder and check whether leak or not.
3. The waterspout joints and drain pipes (especially the indoor parts) of the main unit have to wrap up evenly by insulated casing pipes, and tighten up with lacing belt, in order to prevent air admission and cause condensation.



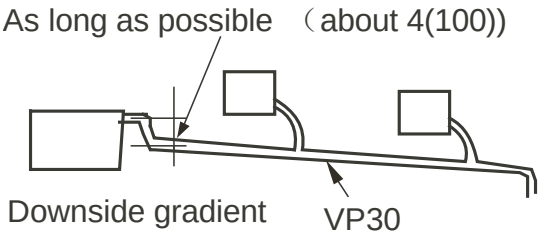
4. For avoiding to the condensate water reflow to the air-conditioner inner, the drain pipes should incline toward the outdoor side (drainage side), the gradient should be over 1/100, and do not turn up defect as prominence and water absorb etc.
5. While connecting the drain pipes, do not pull so hard for avoiding the main unit effect by force. The transverse pull-out of the drain pipes should be within 20m, meanwhile, set a supporting point every 31-1/2~39-3/8inch(0.8~1.0m,) for avoiding the flexure of drain pipes; use hard polyethylene (PE)PE pipes

to connect the drain pipes and the connecting pipes, and use the connecting pipes to fasten the drain pipes.



Unit: in.(mm)

6. Central install the drain pipes please follow below diagram to match pipes.



Unit: in.(mm)

7. The end of the drain pipe should leave the ground or the bottom of the drain tank more than 2inch (50mm), and should not put into the water. While directly pour the condensate water into foul sewer, must make the sparge pipe bend up to a U-shape water seal, in order to avoid the fetor come into the indoor through the drain pipe.

Note: For avoiding water leakage, every joint of the drainage system must be sealed up.

4.2 Drain test

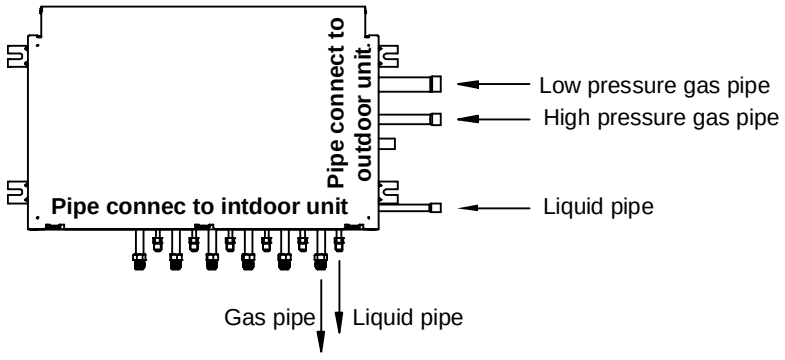
1. It should keep the drainage piping smooth, and check every joint whether sealed up or not before doing drain test.
2. For newly built room, do the drain test before paving the ceiling.

- Use a water main to fill the water tank with 500~1000ml(30.5~61in^3) water.
- Check whether drained water normally and whether has leakage on the connectors.

Refrigerant piping installation

5. Refrigerant piping installation

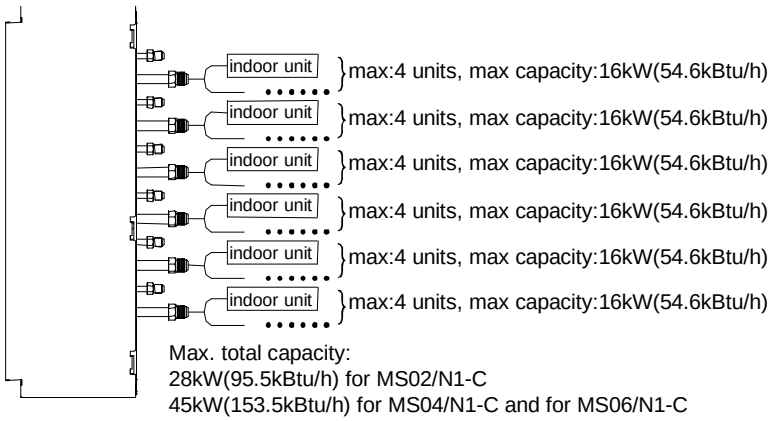
5.1 Connection piping instruction



5.2 Connecting diagram of MS and indoor unit

Connecting diagram 1

MS01/N1-C, MS02/N1-C, MS04/N1-C, MS06/N1-C which can be connected multiple indoor units.

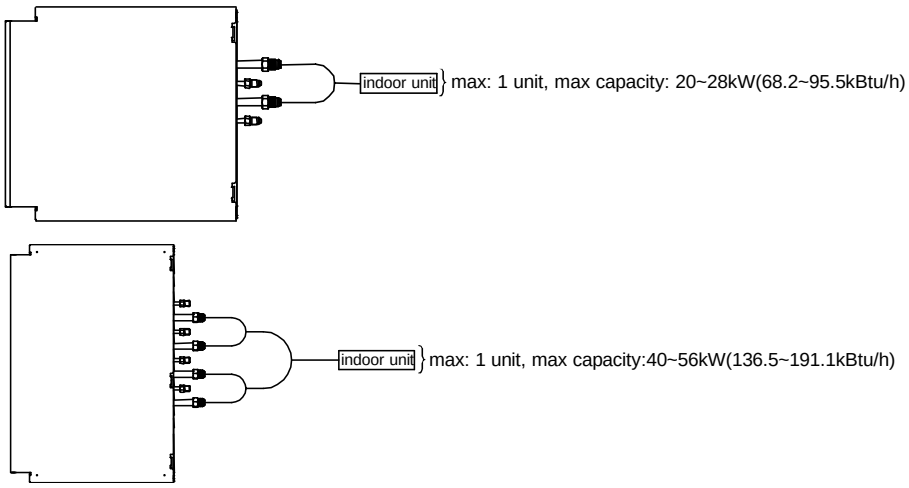


Note:

- The maximum number of each group indoor units should be less than 4, and the maximum capacity of each group indoor units should be less than 16kW (54.6kBtu/h).
- If the indoor units do not have auto mode function, then each group of MS can be connected with four indoor units at most for one time; otherwise, it can be connected with only one indoor unit at most.
- Indoor units in the same group of MS cannot be operated in cooling or heating mode at the same time, or operated in heating and air supplying mode at the same time; otherwise it will be mode conflict.

Connecting diagram 2

MS02E/N1-C and MS04E/N1-C which can be connected only one indoor unit.



Caution:

Do not let air, dust, or other impurities fall in the pipe system during the time of installation.

The connecting pipe should not be installed until the indoor and outdoor units have been fixed already.

Keep the connecting pipe dry, and do not let moisture in during installation.

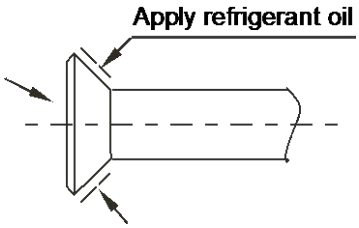
The connecting copper pipes should be wrapped up by insulated materials (more than 3/8inch(10mm) thick).

5.3 The procedure of connecting pipes

1. Connect the indoor unit first, and then connect the outdoor unit.

a) The pipe bend should be handled carefully, without damaging the pipe and insulation layer.

b) Before screwing up the flared nut, apply refrigerant oil at the outer surface of the pipeline flare and the taper surface of the connection nut. Screw up the nut for 3~4 circles beforehand.



c) When connecting or disconnecting the pipe, be sure to use two spanners concurrently.

d) Do not rest the weight of the connective pipe on the adapter of the indoor unit. Too heavy load on the adapter of the indoor unit may deform the pipe and thus affect the cooling/heating effect.

2. The valve of the outdoor unit should be closed completely (as in the factory status). Every time when connecting the pipe, screw off the nut at the valve, and connect the flared pipe (within 5 minutes). If the nut is put away for a long time after being screwed off the valve, dust and other foreign substance may intrude into the pipeline system and lead to fault.

3. After the refrigerant pipe is connected to the indoor and outdoor units, expel air as instructed in the “Expel air” section. After expelling the air, screw up the nut at the maintenance orifice.

a) Precautions for the flexible part of the pipeline

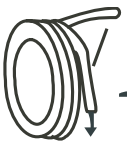
- The bend angle shall not exceed 90°.

Use a thumb to bend the pipe

Minimum radius 100mm

- The bend shall be preferably in the middle of the pipe length, and higher bend radiuses are preferred.
- Do not bend the flexible pipe for over 3 times.

b) Bend the thin-wall connective pipe



Method of unleashing the spooled pipe
Straighten the pipe end

- When bending the pipe, cut out a notch of the desired size at the bend of the adiabatic pipe, and then expose the pipe (wrap the pipe with the wrapping tape after bending it).
- The radio of the elbow pipe should be as large as possible to prevent flattening or crush.
- Use the pipe bender to make close elbow pipe.

4. Deploy the pipelines

- Drill a porthole on the wall, and put the hole sheath and hole cover through the wall.
- Place the connective pipe together with the indoor & outdoor connection wires. Use wrapping tape to tie them tight. Do not let air penetrate into it lest condensation and drips of moist.
- Pull the connective wrapped connective pipe from outdoor through the sheath, which gets through the wall, and lead it into the room.

5. Make a vacuum of connective pipeline.

6. After the above steps are completed, the spool of the valve of the outdoor unit should be completely open, and the refrigerant pipeline of the indoor unit and the outdoor unit should be smooth.

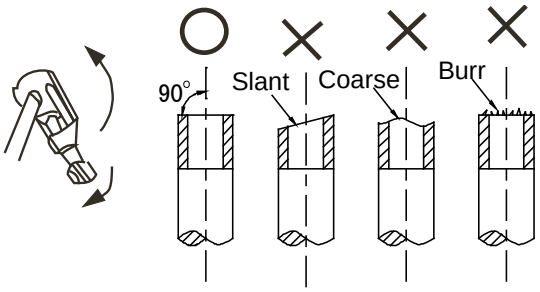
7. Use leak detector or soap water detect leak carefully to prevent leakage.

8. Put on an adiabatic envelope (accessory) at connective pipe adapter of the indoor unit, and wrap it tight with the wrapping tape lest condensate and leakage.

5.4 Pipe connection

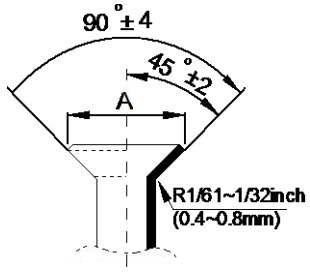
1. Flare

- Use a pipe cutter to cut off the pipe.



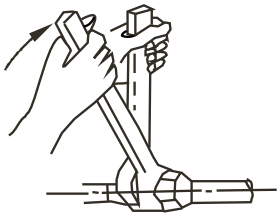
- Pull the pipe into the rear flare of the connective nut.

Outer diameter in.(mm)	A in.(mm)	
	Max.	Min.
Φ1/4(6.35)	11/32(8.7)	5/16(8.3)
Φ3/8(9.53)	1/2(12.4)	15/32(12.0)
Φ1/2(12.7)	5/8(15.8)	39/64(15.4)
Φ5/8(15.9)	3/4(19.0)	47/64(18.6)
Φ3/4(19.1)	15/16(23.3)	29/32(22.9)



2. Tighten the nut

Align with the connective pipe, screw up the connection pipe nut manually, and use a spanner to tighten it.



According to the installation conditions, too large torque will damage the flaring, and too small torque will lead to looseness and leakage. Determine the tightening torque by reference to below table.

Liquid and gas pipes without connecting must be tightened with copper tube sealing piece.

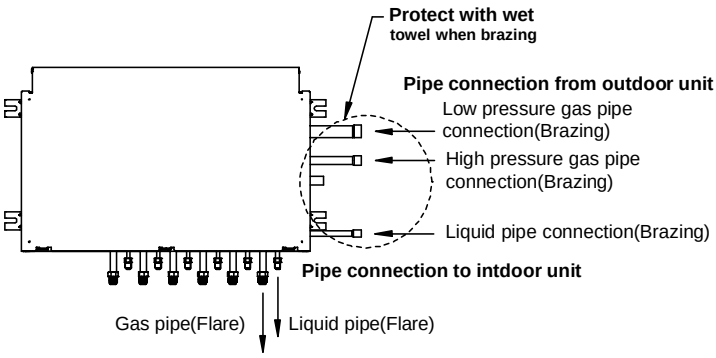
Pipe size in.(mm)	Tightening torque N.M
Φ1/4(6.35)	14.2～17.2
Φ3/8(9.53)	32.7～39.9
Φ1/2(12.7)	49.5～60.3
Φ5/8(15.9)	61.8～75.4
Φ3/4(19.1)	97.2～118.6

5.5 Welding the copper pipe

Use braze-welding for the low pressure gas pipe, high pressure gas pipe, liquid pipe which connected with MS and the outdoor unit.

During welding, use wet cloth to pack the copper pipe which near the MS.

During welding, use nitrogen gas to protect welding.



5.6 Airtight test

The refrigerant pipe after installation and before connect to the outdoor unit, it must undergo the airtight test with 3.92 MPa (568.5PSI)nitrogen for 24 hours from the low pressure gas pipe, high pressure gas pipe and liquid pipe.

5.7 Air purging

Connect the refrigerant pipe with the low pressure gas pipe, high pressure gas pipe, and liquid pipe of the outdoor unit. Use a vacuum pump, to vacuum from the low pressure gas pipe, high pressure gas pipe, and liquid pipe of the outdoor unit.

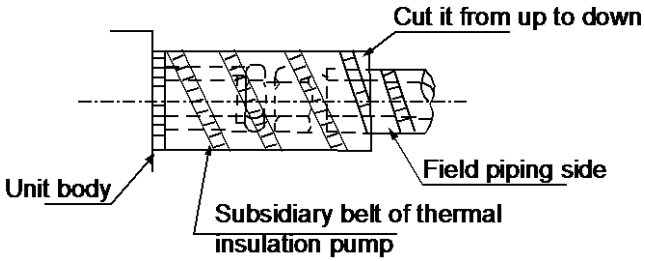
5.8 Open/close the valves

Open/Close the spools or the valves of outdoor unit with a hexagon spanner.

5.9 Thermal insulation

To process the thermal insulation for air side and liquid side piping. Please insulted the air side and liquid side piping completely, in the reason of during operate cooling mode the ambient temperature is very low.

- Thermal insulation at least 120°C(248°F) material shall be applied for air side piping.
- Apply attached thermal insulation material to wrap the connective part of indoor piping tightly without gap.



6. Electric wiring installation

Note:

- Special power shall be applied within rated voltage range. External circuit of this air conditioner must be grounded that means power cable of outdoor unit shall be jointed with external grounding wire reliable.
- Electric wiring must be done by professionals, and wiring according to the wiring label.
- Fixing circuit must be wired with an a11-poledisconnection device at least 1-8inch(3mm) switching distance of contact.
- Setting the electrical leakage device according to national regulation.
- Power cables and signal wires shall be arranged orderly and be wired rational without mutual interfere, and connective pipes and body of valves without mutual contact among them.
- The attached connective wire is 10m, provided that the length were not long enough, you must replace it by an appropriate length connective wire in the same specification. In a normal circumstance, it is not allowed to overlapping the two wires, but welded fix and wrapped by insulation adhesive band is except.
- All electric wiring is finished, you could input power as long as confirm that all wires connect are correct and fix tightly.

6.1 Power supply specifications

The power supply cable specifications are as follows. In case power capacity is too low may result in over-heating of piping that would be burned out the unit.

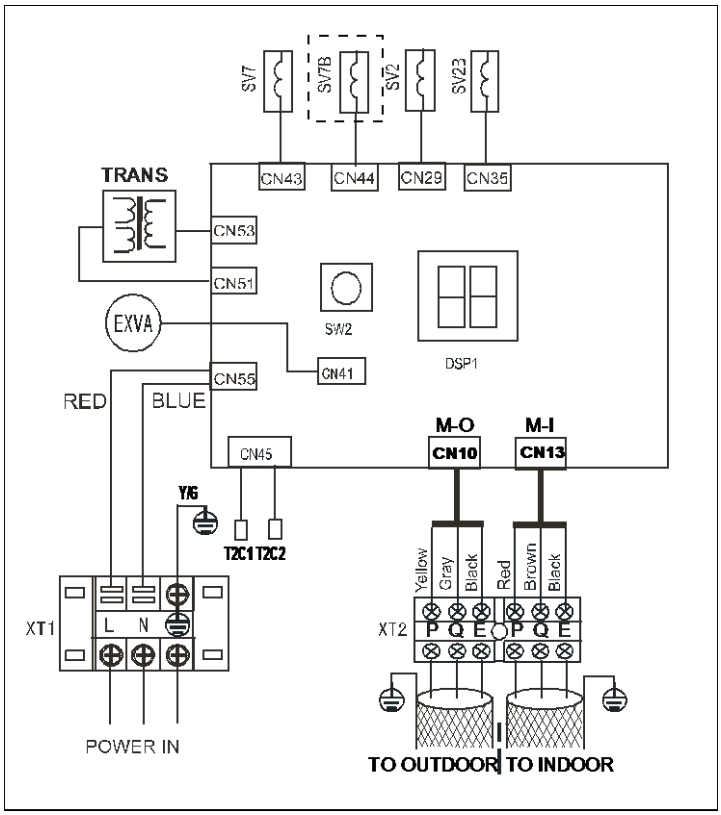
Item / Model	Power supply (V/Ph/Hz)	Power switch		Power supply cable		Signal wire
		Capacity (A)	Safety fuse (A)	Power wire	Ground wire	
MS01/N1-C	220-240/1/50~60	5	5	2×14AWG	1×14AWG	3-core shielded wire 20AWG
MS02/N1-C						
MS04/N1-C						
MS06/N1-C						
MS02E/N1-C						
MS04E/N1-C						

6.2 Wiring for the MS power wire and signal wire

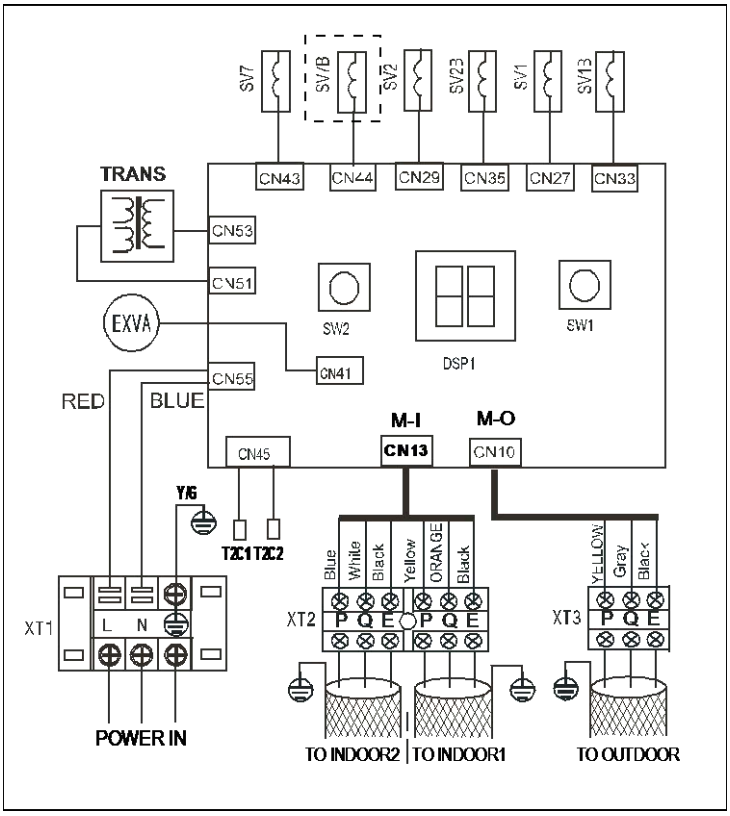
1. Please use dedicated power supply different from the outdoor unit for the MS power.
2. The power, electrical leakage protectors and operation switches for each indoor unit connected to the same outdoor unit and the MS should be in common use.
3. The MS power wire should be connected to the terminals with the label “L, N”, and the MS signal wire should be connected to the terminals with the label “P, Q, E” and correspond to the “P, Q, E” wiring terminals for the outdoor and indoor units, which cannot be wrong connected. Please refer to the following figures.

Wiring diagrams

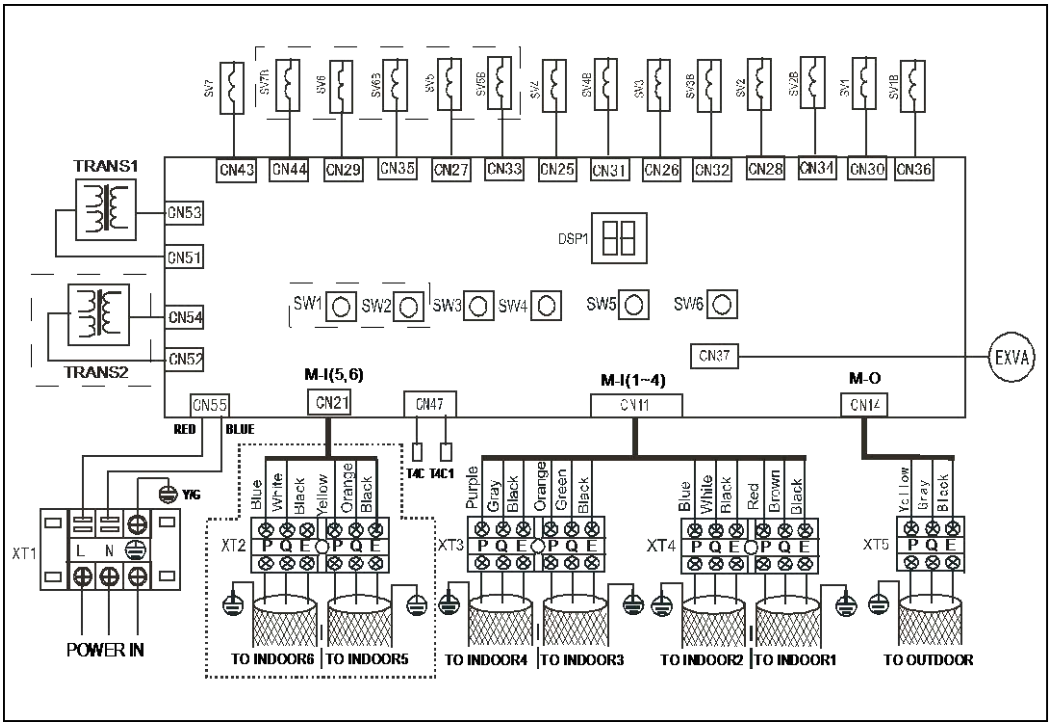
MS01/N1-C



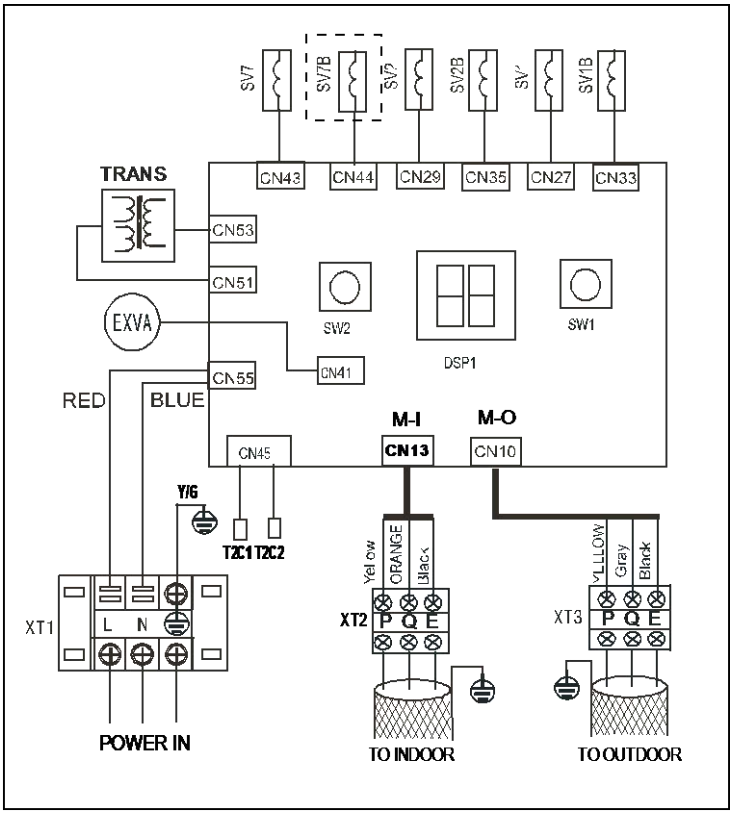
MS02/N1-C



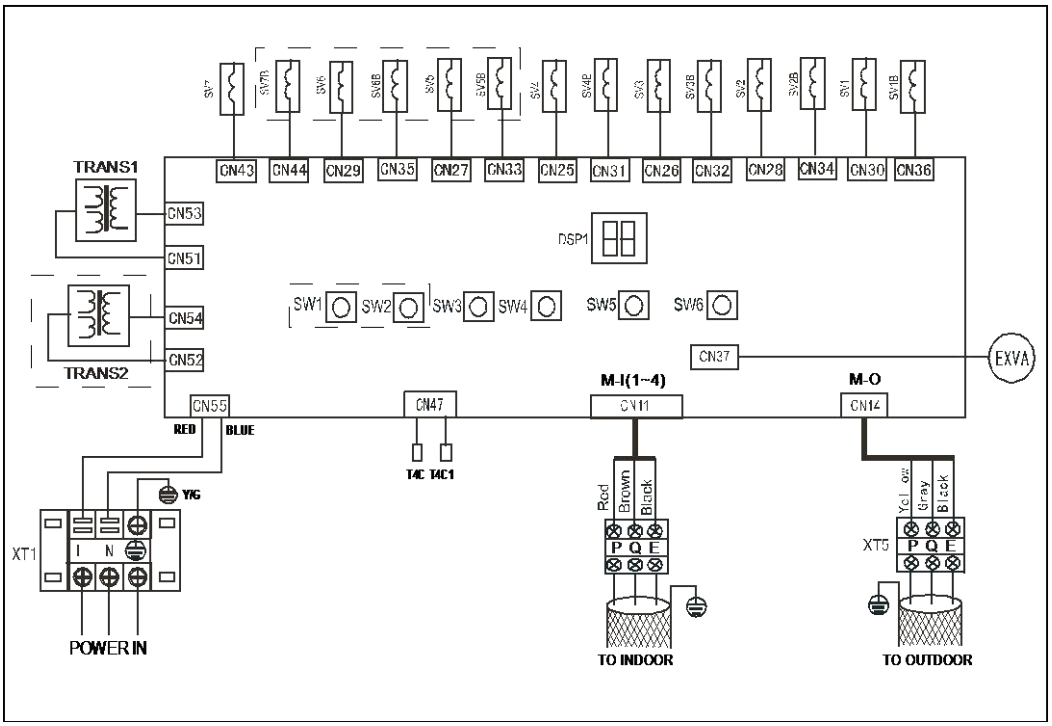
MS04/N1-C, MS06/N1-C



MS02E/N1-C

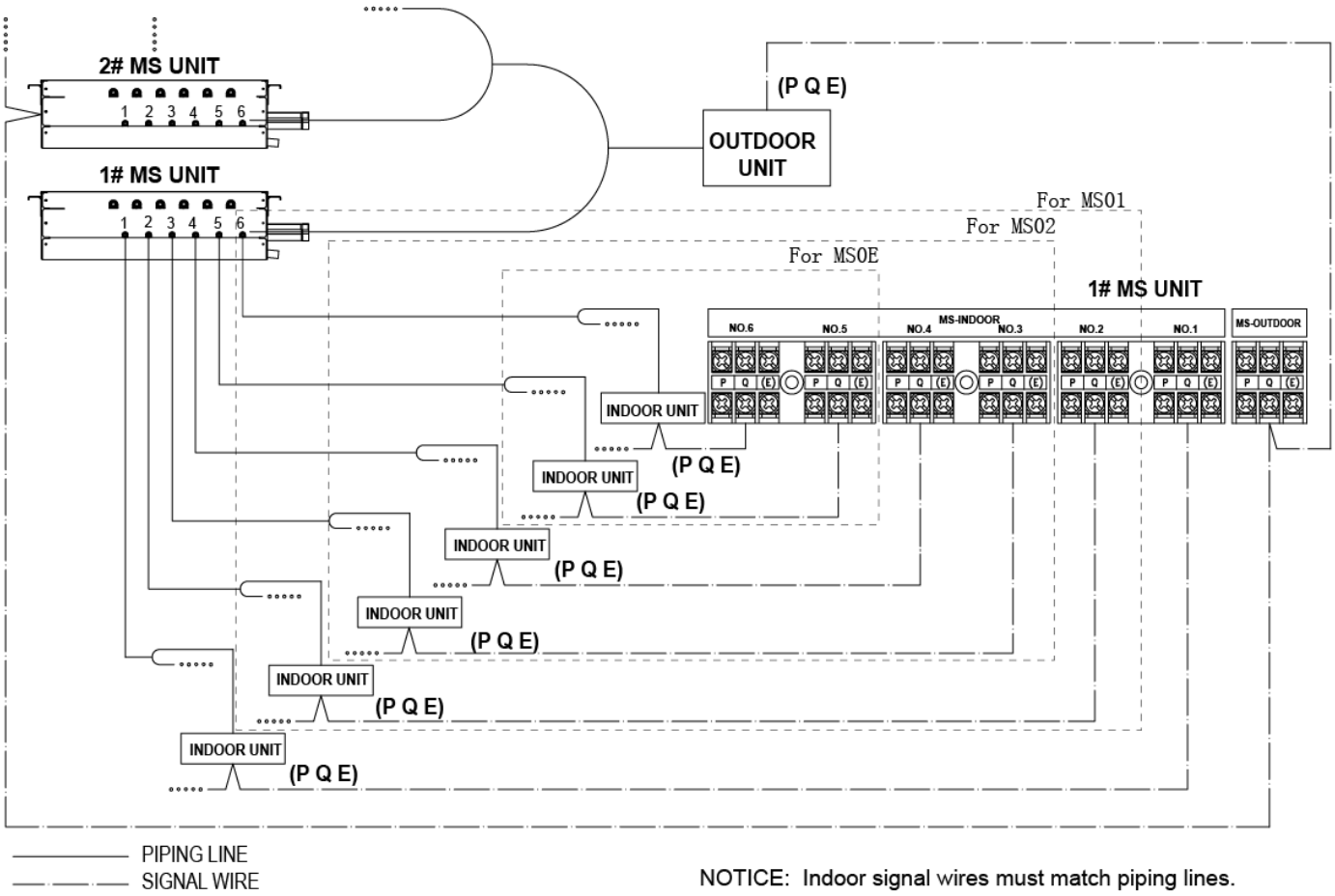


MS04E/N1-C



System wiring diagrams

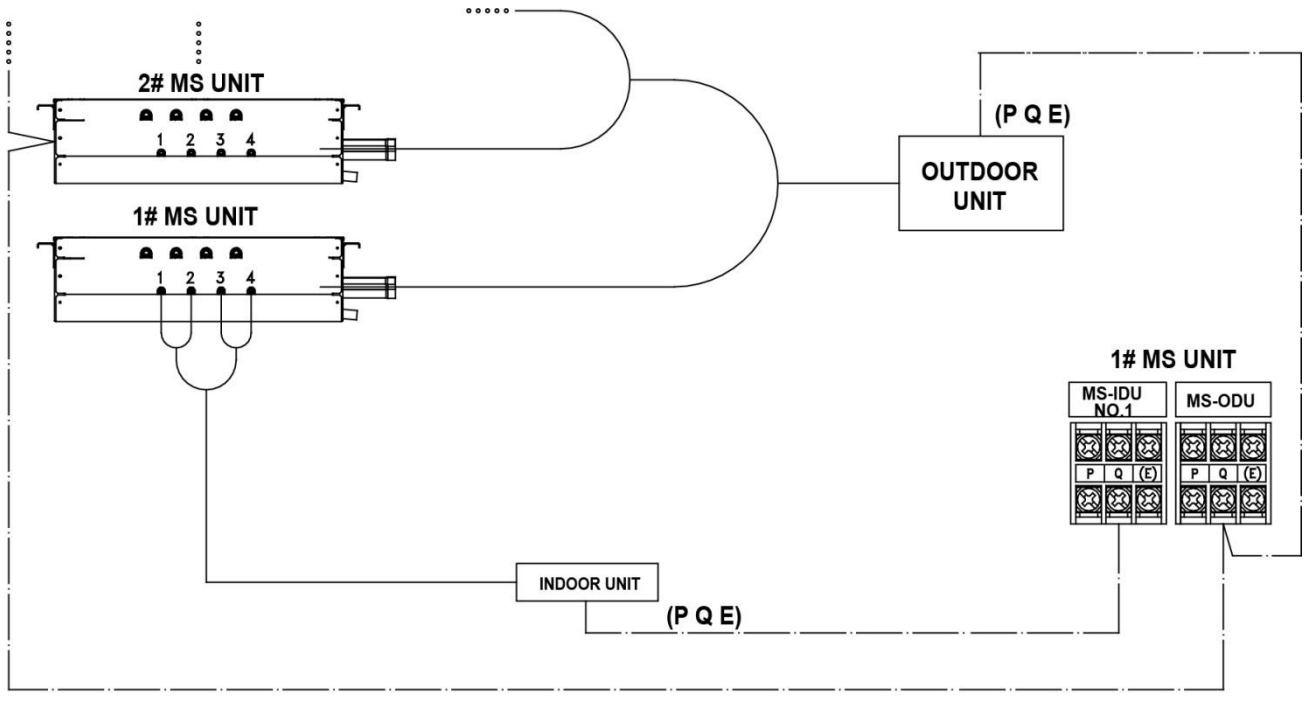
MS01/N1-C, MS02/N1-C, MS04/N1-C, MS06/N1-C



PIPING LINE
SIGNAL WIRE

NOTICE: Indoor signal wires must match piping lines.

MS02E/N1-C, MS04E/N1-C



PIPING LINE
SIGNAL WIRE

NOTICE: Indoor signal wires must match piping lines.

Note:

1. The signal wire must use shielding wire. User other wires might cause signal interference and lead to malfunction.
2. All the shielding wires network should be interconnected, and finally connected together to the metal plate grounding.
3. Do not tie up the signal wire together with the refrigerant pipes and power wires etc. When parallel layout the power wire and signal wire, the distance should be over 11-13/16inch (300mm).
4. The signal wire cannot be a close loop.
5. The signal wire has polarity, please be careful during wiring.
6. Please use 3-core shielding wire for MS, indoor unit and outdoor unit signal wires (greater than or equal to 0.0012in^2 (0.75mm$^{2)}$). The signal wire has polarity, it needs correct connection. The MS and outdoor signal wires only can be led out from the outdoor main unit.

6.3 Check whether the MS and indoor unit signal wire is wired correctly or not.

Spot check:

1. Only power on the MS and indoor units which belong to No. n system;
2. Long press the MS spot check key which is correspond to No. n system for 6s, then No. n system will enter to spot check mode (MS02, MS04, MS06 has 2, 4, 6 spot check keys separately);
3. After enter spot check mode, the display panel will display “CH”, when No. n system of MS detects the indoor unit communication signal, the No. n system will immediately operate the solenoid valve under this system as the following sequence: “SV(n)” ON 10s → “SV(n)-B” ON 10s→repeat the above steps for 3 times → “SV(n)” and “SV(n)-B” OFF;
4. If the valve didn’t follow step 3 operation then means the No. n system communication has error, please check the signal wire connection between No. n system and indoor unit, and then repeat the step 1~3 to check the No. n system; if the valve followed step 3 operation then means the No. n system communication is normal, and then can repeat the step 1~3 to check other systems;

Exit spot check:

1. No indoor unit signal is detected in 10 minutes;
2. MS power off;
3. Finish spot check operation.

6.4 Spot check instruction

MS Spot check keys SW1-SW6 are separately corresponded to No.1-6 system

No.	Content
1	The quantity of downstream indoor units of this MS
2	The operation mode of this MS
3	Subcooling inlet temperature (T1C2)
4	Subcooling outlet temperature (T1C1)
5	Total T2(B) average value back from outdoor unit
6	Indoor unit T2(B) value under this MS
7	The quantity of opened outdoor unit
8	The operation mode* of outdoor unit
9	Subcooling PMV opening degree
10	The quantity of opened indoor units of this MS
11	Chip version number
12	--

Operation mode:

0: OFF; 2: Cooling mode; 3: Heating mode; 4: Force cooling mode; 5:Main cooling mode; 6: Main heating mode.

6.5 LED lamp instruction

Phenomenon / LED lamp	Normally ON	Slow flash	Flash
LED 1	Outdoor unit ON	Outdoor unit standby	Outdoor unit communication error
LED 2	Indoor unit ON of this MS	Indoor unit OFF of this MS	Indoor unit communication error

7. Running test

7.1 Confirm the following insure before operation

1) Whether the MS, indoor unit and outdoor unit are installed correctly;
2) Whether the tubing and wiring are correctly completed;
3) Whether check the leakage of refrigeration piping system;
4) Whether the drainage is unimpeded;
5) Whether the heating insulation works well;
6) Whether the ground wiring is connected correctly;
7) Whether recorded the pipe length and the refrigerant added amount;
8) Whether the power voltage fits the rated voltage of the unit;
9) Whether there is no obstacle at the air outlet and inlet;
10) Open the stop valves of low pressure gas pipe, high pressure gas pipe, and liquid pipe, air balance pipe and oil balance pipe;
11) Power on, pre-heat the unit;
12) Whether the connected indoor unit quantity is the same with the actual quantity under the spot check MS situation;
13) Whether the connected outdoor unit quantity is the same with the actual quantity.

8. Trial running

Use the wired controller to control the operation of the unit, check the following items according to the instruction. If there is error, check the error according to the instruction and solve them.

8.1 Indoor unit

1) Check whether the switch of the wired/remote controller is normal;
2) Check whether the functional keys of the wired/remote controller are normal;
3) Check whether the indoor temperature adjusts normally;
4) Check whether the indication lamp is normal;
5) Check whether the manual operation button is normal.
6) Check whether water draining normally;
7) Check whether has excessively noise and vibration during operation;

8.2 MS unit

1) Check whether water draining normally;
2) Check whether has excessively noise and vibration during operation and mode shifting;

8.3 Outdoor unit

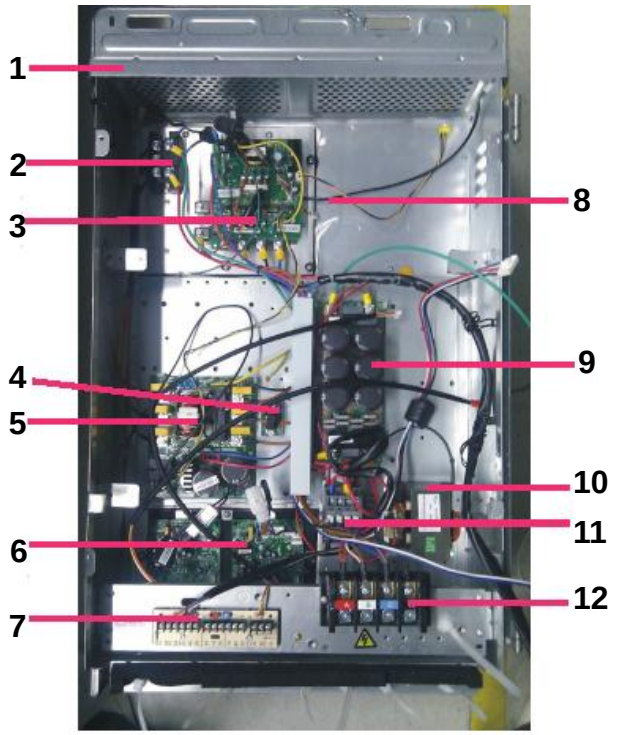
1) Check whether has excessively noise and vibration during operation;
2) Check whether the wind, noise and condensed water affect neighbors;
3) Check whether refrigerant leakage.

Part 6 Troubleshooting

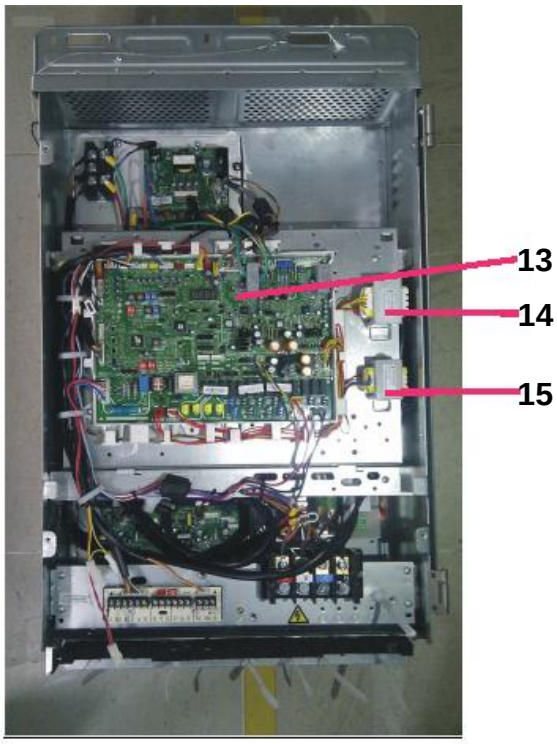
1. Outdoor electric control box assembly instructions

8/10/12HP

Bottom layer of electric control box



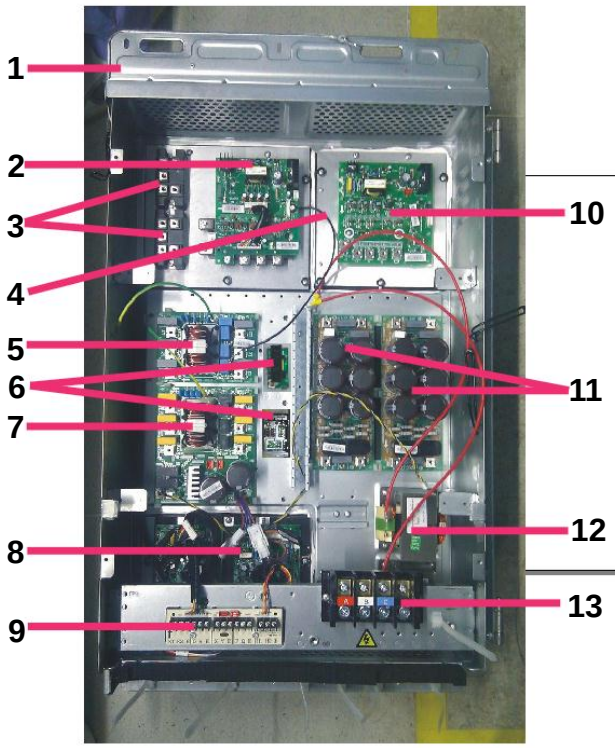
Top layer of electric control box



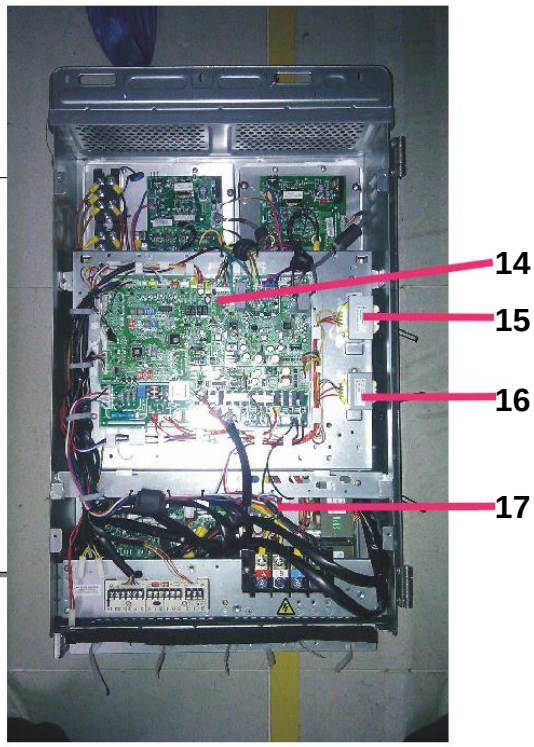
No.	Content
1	Electric control box assembly
2	Three phase bridge
3	Inverter module
4	Outdoor current detection board
5	Outdoor power supply board
6	DC fan module
7	Intermediate adapter board
8	Temperature sensor
9	Filter board
10	Reactor
11	Contactor
12	Terminal block, 4P
13	Main PCB
14	Power transformer
15	Power transformer

14/16HP

Bottom layer of electric control box



Top layer of electric control box



No.	Content
1	Electric control box assembly
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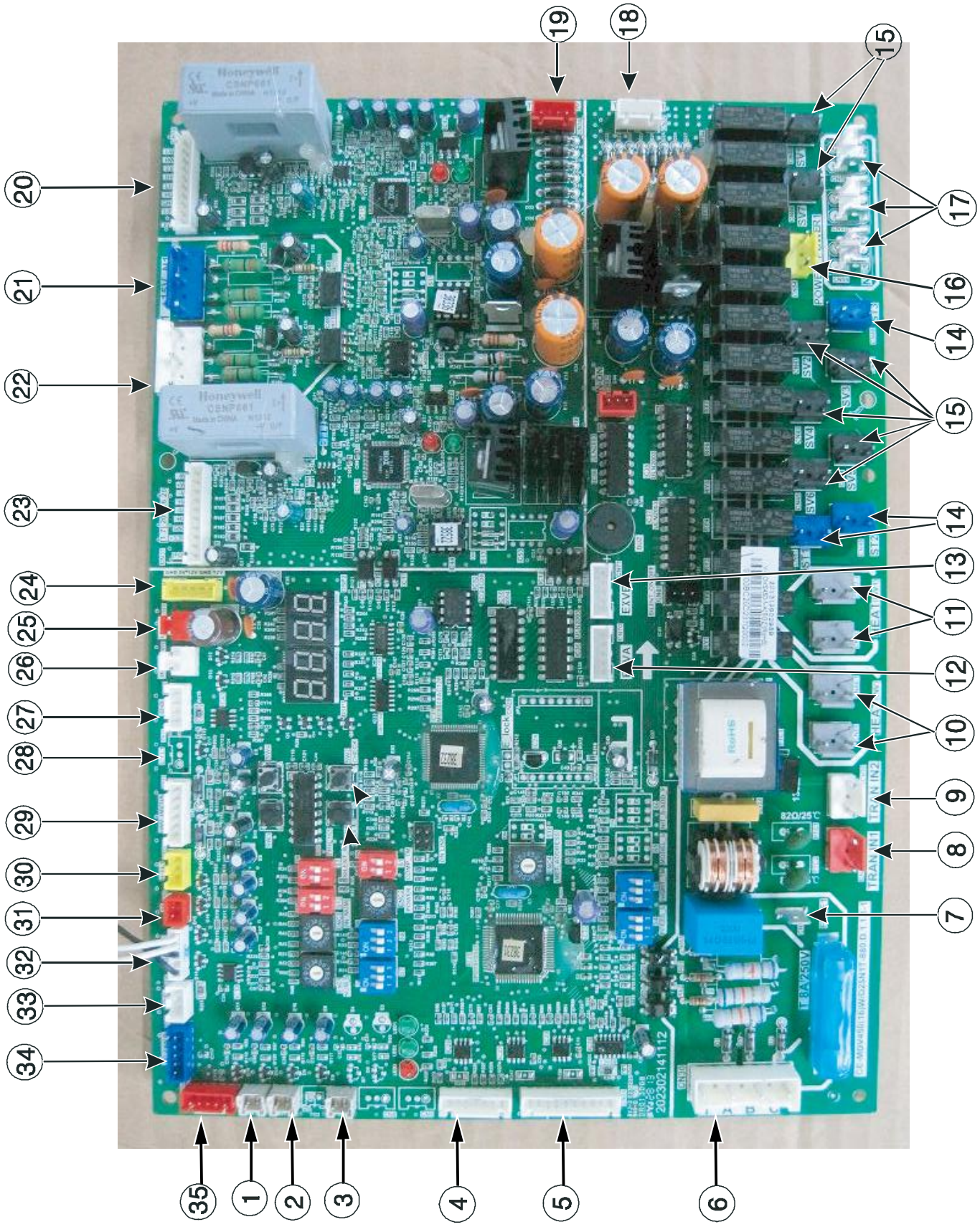
4	Temperature sensor
5	Outdoor power supply board
6	Outdoor current detection board
7	Outdoor power supply board
8	DC fan module
9	Intermediate adapter board
10	Inverter module
11	Filter board
12	Reactor
13	Terminal block, 4P
14	Main PCB
15	Power transformer
16	Power transformer
17	Contactor

2. Outdoor main control board instructions

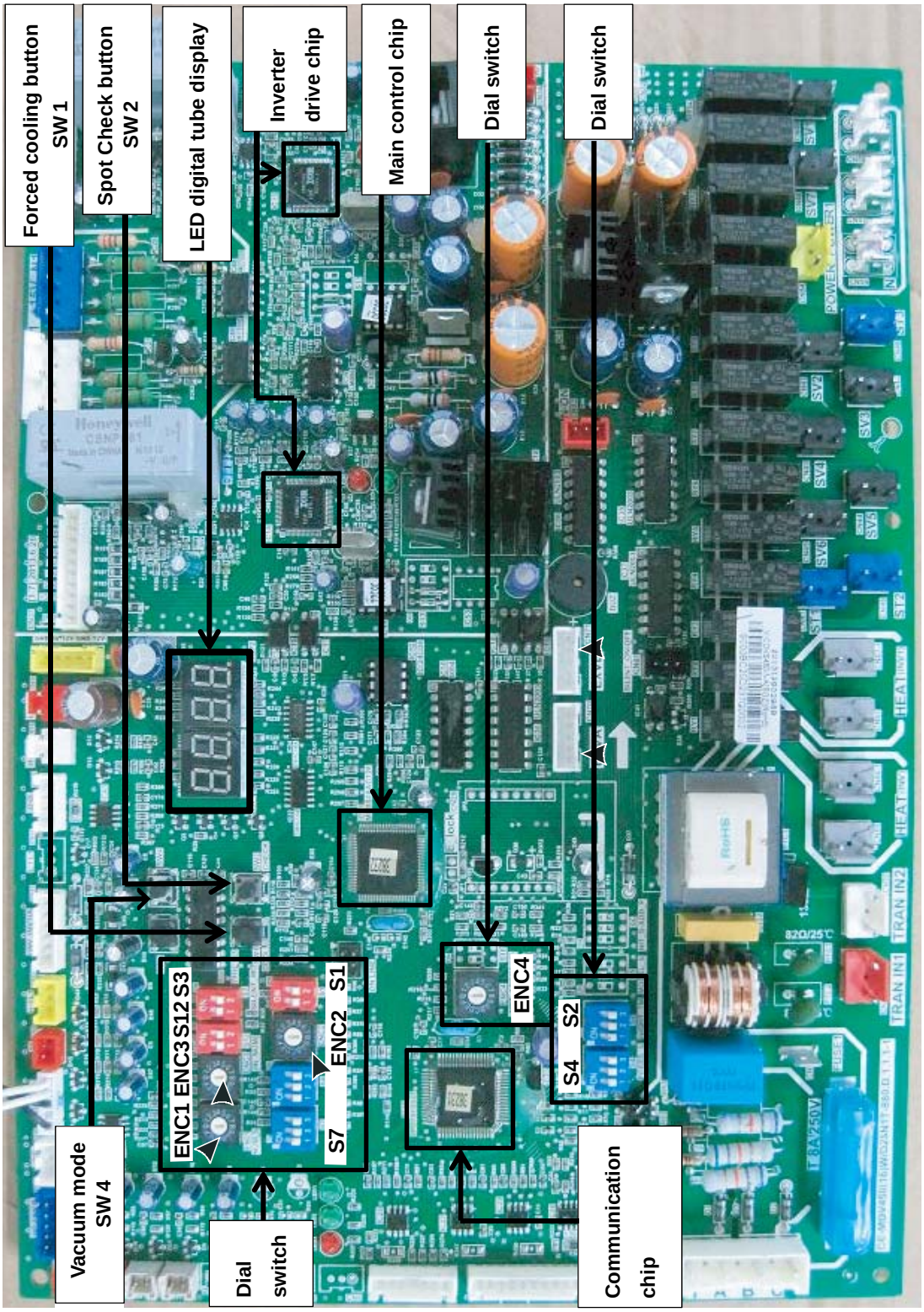
2.1 Main PCB ports instructions



Outdoor main PCB ports instructions

No.	Port code	Content	Port voltage
1	CN10	Discharge temperature detection port of inverter compressor A	DC 0~5V (in dynamic change)
2	CN11	Discharge temperature detection port of inverter compressor B	DC 0~5V (in dynamic change)
3	CN4	Inverter module temperature detection port	DC 0~5V (in dynamic change)
4	CN26	Reserved	/
5	CN25	Wiring port for communication between indoor and outdoor units, indoor unit network, outdoor unit network and network accounting	DC 2.5~2.7V
6	CN30	Three-phase detection port	380V
7	CN80	Reserved	/
8	CN31	Power input of No.1 transformer	220V
9	CN33	Power input of No.2 transformer	220V
10	CN66	Heat output of inverter compressor A electrical heater	220V
11	CN67	Heat output of inverter compressor B electrical heater	220V
12	CN70	Driver port of EXV A	The first pin on left: DC 12V The other four pins: in dynamic change
13	CN71	Driver port of EXV B	
14	CN47-CN49	Four-way valve output port	220V
15	CN41-CN45	One-way valve output port	220V
16	CN54	Power output port	220V
17	CN57-CN59	Null line terminal	0
18	CN32	Power output of No.1 transformer	The voltage between upper tow pins: AC 13.5V; The voltage between under tow pins: AC 9V
19	CN34	Power output of No.2 transformer	The voltage between upper tow pins: AC 14.5V; The voltage between under tow pins: AC 14.5V
20	CN39	Activation port of inverter module B	The third pin on the left: DC3.3V
21	CN38	Voltage detection port of inverter module B	DC 540V, +15V, N
22	CN36	Voltage detection port of inverter module A	DC 540V, +15V, N
23	CN37	Activation port of inverter module A	The third pin on the left: DC3.3V
24	CN35	Power supply port of main PCB	GND, +5V, +12V, GND, 12V
25	CN19	ON/OFF signal input port for system low pressure detection	0 or 5V
26	CN18	ON/OFF signal input port for system high pressure detection	0 or 5V
27	CN28	Reserved	/
28	CN16	Reserved	/
29	CN15	Current detection port of inverter compressor A and B	AC 0~7.8V (in dynamic change)
30	CN17	Input port for system high pressure detection	DC 0~5V (in dynamic change)
31	CN2	Right condenser temperature detection port	DC 0~5V (in dynamic change)
32	CN1	Outdoor ambient temperature and left condenser temperature detection port	DC 0~5V (in dynamic change)
33	CN20	Outdoor units communication port	DC 2.5~2.7V
34	CN65	Control port of DC fan B	The first pin on left: DC 12V The other four pins: in dynamic change
35	CN64	Control port of DC fan A	

2.2 Main PCB parts instructions



2.2.1 Spot check content instructions

No.	Normal display	Content (present frequency)	Note
1	0 - -	Outdoor unit address	0, 1, 2, 3
2	1 - -	Outdoor unit capacity setting	Refer to note 1
3	2 - -	Outdoor unit quantity	Available for main outdoor unit
4	3 - -	Running mode	Refer to note 2
5	4 - -	Total capacity of outdoor units	Capacity requirement
6	5 - -	Cooling capacity	Slave unit only display capacity of main mode
7	6 - -	Heating capacity	Slave unit only display capacity of main mode
8	7 - -	Ambient temperature revision of cooling capacity	Capacity requirements
9	8 - -	Ambient temperature revision of heating capacity	Capacity requirements
10	9 - -	Actual running capacity of this outdoor unit	Capacity requirement
11	10 - -	Fan A speed	Refer to note 3
12	11 - -	Fan B speed	Refer to note 3
13	12 - -	T2 average temperature	Actual value=display value
14	13 - -	T2B average temperature	Actual value=display value
15	14 - -	T3 left pipe temperature	Actual value=display value
16	15 - -	T5 right pipe temperature	Actual value=display value
17	16 - -	T4 ambient temperature	Actual value=display value
18	17 - -	Discharge temperature of inverter compressor A	Actual value=display value
19	18 - -	Discharge temperature of inverter compressor B	Actual value=display value
20	19 - -	Inverter module temperature	Actual value=display value
21	20 - -	Discharge pressure corresponding to the saturation temperature	Actual value=display value-30
22	21 - -	The minimum overheating temperature of discharge	Actual value=display value
23	22 - -	Current of inverter compressor A	Actual value=display value
24	23 - -	Current of inverter compressor B	Actual value=display value
25	24 - -	State of the outdoor heat exchanger	Refer to note 4
26	25 - -	EXVA opening degree	Pulsed value=display value×8
27	26 - -	EXVB opening degree	Pulsed value=display value×8
28	27 - -	Discharge pressure value	Actual value=display value×0.1MPa
29	28 - -	Indoor units quantity	Actual value=display value
30	29 - -	Cooling indoor units quantity	Cooling indoor units quantity
31	30 - -	Heating indoor units quantity	Cooling indoor units quantity
32	31 - -	Reserved	/
33	32 - -	Silent mode	Refer to note 5
34	33 - -	Static pressure mode	Refer to note 6
35	34 - -	DC voltage A	Actual value=display value×10
36	35 - -	DC voltage B	Actual value=display value×10
37	36 - -	Reserved	/
38	37 - -	Reserved	/
39	38 - -	The last error or protection code	Display 000 if it has no error or protection
40	39 - -	- -	Over

Note:

When the outdoor unit is in standby, the first two numbers on LED digital tube will display the address of the outdoor unit, and the last two numbers display the indoor unit's quantity which can communicate with outdoor unit. When the outdoor unit is operating, it will display the rotation frequency of the compressor.

1. Outdoor unit capacity setting: 0: 8HP; 1: 10HP; 2: 12HP; 3: 14HP; 4: 16HP
2. Running mode: 0—closed; 2—cooling mode; 3—heating mode; 4—forced cooling mode.
3. Fan speed: 0—closed; 1~15—fan speed increase in sequence.
4. State of the outdoor heat exchanger: 0-close/condenser; 1-All evaporator; 2-Left evaporator/right condenser; 3-Left evaporator/close.
5. Silent mode: 0—nighttime silent mode; 1—silent mode; 2—super silent mode; 3—no silent mode.
6. Static pressure mode: 0—no static pressure; 1—low static pressure; 2—medium static pressure; 3—high static pressure.

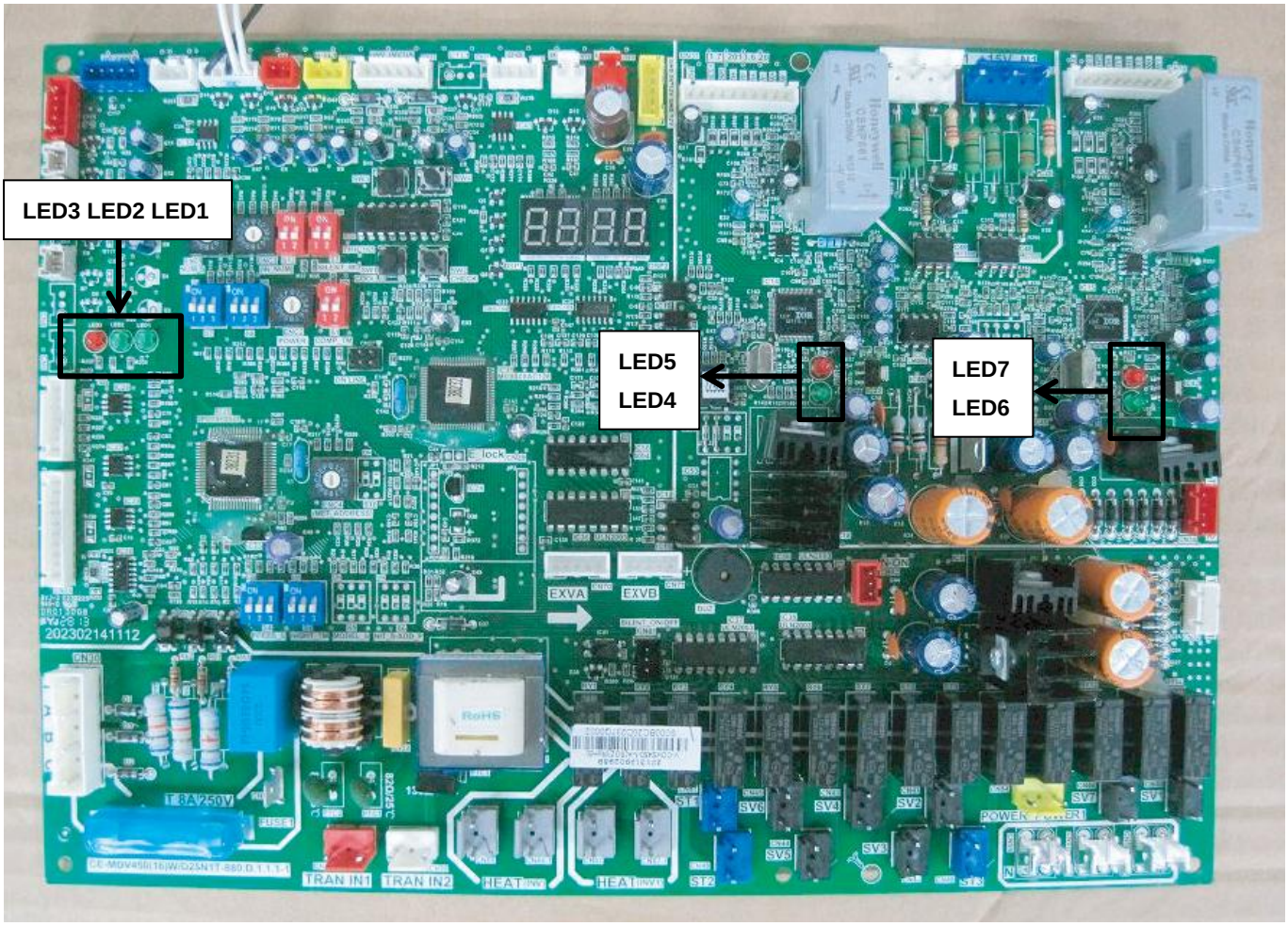
2.2.2 Dial switch setting

S1: Starting time setting	
	Starting time is 10 minutes
	Starting time is 12 minutes (default)
S2: Night silent time setting	
	Night silent time is 6h/10h (default)
	Night silent time is 6h/12h
	Night silent time is 8h/10h
	Night silent time is 8h/12h
S3: Silent mode selection	
	Night silent mode (default)
	Silent mode
	Super silent mode.
	None silent mode.
S4: Static pressure mode selection	
	None static pressure(default)
	Low static pressure mode (reserved, can be customized)
	Medium static pressure mode (reserved, can be customized)
	High static pressure mode (reserved, can be customized)

Dial switch setting

ENC3+S12: Indoor unit quantity setting		
		The quantity of indoor unit is 0-15 0~9 on ENC3 refer to 0~9 indoor units; A~F on ENC3 refer to 10~15 indoor units.
		The quantity of indoor unit is 16-31 0~9 on ENC3 refer to 16~25 indoor units; A~F on ENC3 refer to 26~31 indoor units.
		The quantity of indoor unit is 32-47 0~9 on ENC3 refer to 32~41 indoor units; A~F on ENC3 refer to 42~47 indoor units.
		The quantity of indoor unit is 48-63 0~9 on ENC3 refer to 48~57 indoor units; A~F on ENC3 refer to 58~63 indoor units.
ENC1: Outdoor unit address setting		
		Only 0, 1, 2, 3 are available. 0 is for main unit; 1, 2, 3 are for slave units
ENC2: Outdoor unit capacity setting		
		Only 0, 1, 2, 3, 4 are available. 0: 8HP; 1: 10HP; 2: 12HP; 3: 14HP; 4: 16HP
ENC4: Network address setting		
		Only 0, 1, 2, 3, 4, 5, 6, 7 are available.

2.3 LED on main control board instructions



LED1: Power supply indicator lamp. The lamp will be on if the power supply is normal.

LED2: Running indicator lamp. The lamp will be on if the system running is normal.

LED3: Malfunction indicator lamp of network centralized control chip. The lamp will flash in three-phase phase sequence protection.

LED4: Running indicator lamp of inverter module. The lamp will be on if the compressor is running.

LED5: Malfunction indicator lamp of inverter module. The lamp will flash if the inverter module is faulty and the error code will display on digital tube.

LED6: Running indicator lamp of inverter module. The lamp will be on if the compressor is running.

LED7: Malfunction indicator lamp of inverter module. The lamp will flash if the inverter module is faulty and the error code will display on digital tube.

3. Error code table

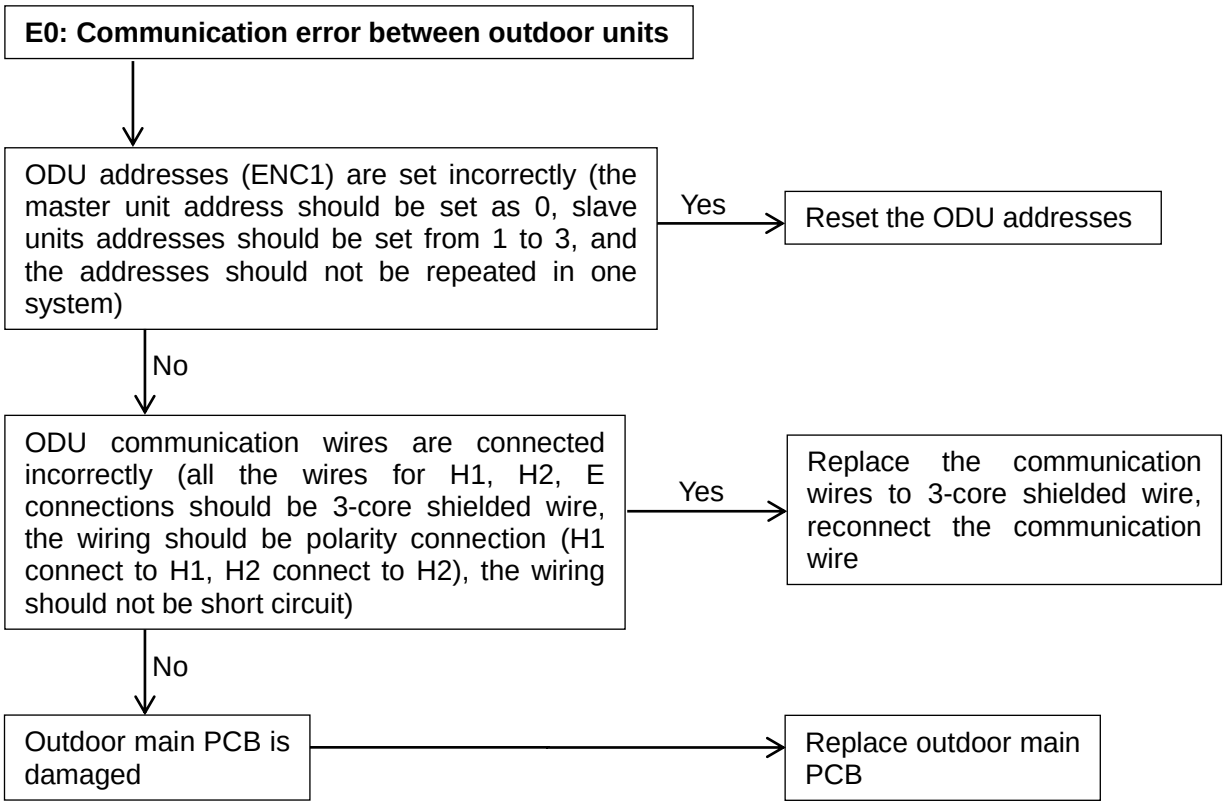
Error code	Content	Note
E0	Communication error between outdoor units	Only display on the faulty slave unit, all the ODUs are in standby.
E1	Phase sequence error	Display on the faulty unit, all the ODUs are in standby.
E2	Communication error between indoors and the master unit.	Only display on the master unit, all the ODUs are in standby.
E4	Outdoor ambient temperature sensor (T4) and condenser pipe temperature sensor (T3/T5) error	Display on the faulty unit, all the ODUs are in standby.
E5	Power voltage error	Display on the faulty unit, all the ODUs are in standby.
E7	Discharge temp sensor error	Display on the faulty unit, all the ODUs are in standby.
E8	Outdoor unit address is wrong	Only display on the faulty slave unit, all the ODUs are in standby.
XE9	Driver model is mismatching	When X is 1, it means A system; 2 means B system
H0	Communication error between main control chip and inverter driver chip	Display on the faulty unit, all the ODUs are in standby.
H1	Communication error between main control chip and communication chip	Display on the faulty unit, all the ODUs are in standby.
H2	Quantity of outdoor unit decreased	Only display on the master unit, all the ODUs are in standby.
H3	Quantity of outdoor unit increased	Only display on the master unit, all the ODUs are in standby.
H4	P6 protection appears three times in 60 minutes	Display on the faulty unit, all the ODUs are in standby. Cannot be recovered until re-power on.
H5	P2 protection appears three times in 60 minutes	Display on the faulty unit, all the ODUs are in standby. Cannot be recovered until re-power on.
H6	P4 protection appears three times in 100 minutes	Display on the faulty unit, all the ODUs are in standby. Cannot be recovered until re-power on.
H7	Quantity of indoor unit decreased	Only display on the master unit, all the ODUs are in standby.
H8	High pressure sensor error	The discharge pressure Pc≤0.3MPa(43.5PSI)
H9	P9 protection appears three times in 60 minutes	Display on the faulty unit, all the ODUs are in standby. Cannot be recovered until being power on again.
xHd	Slave units malfunction	X stands for corresponding slave unit
C7	PL protection appears three times in 100 minutes	Display on the faulty unit, all the ODUs are in standby. Cannot be recovered until re-power on.
P1	High pressure protection	Display on the faulty unit, all the ODUs are in standby.
P2	Low pressure protection	Display on the faulty unit, all the ODUs are in standby.
XP3	Over current protection of inverter compressor	Display on the faulty unit, all the ODUs are in standby.
P4	Compressor discharge temp protection	Display on the faulty unit, all the ODUs are in standby.
P5	Condenser high temperature protection	Display on the faulty unit, all the ODUs are in standby.
XP6	Inverter module protection	When X is 1, it means A inverter module; 2 means B inverter module
P9	Fan module protection	Display on the faulty unit, all the ODUs are in standby.
PL	Temperature protection of main inverter module	

L0	Inverter module error	Display after P6 displaying for one minute
L1	DC generatrix low voltage error	Display after P6 displaying for one minute
L2	DC generatrix high voltage error	Display after P6 displaying for one minute
L3	Reserved	-
L4	MCE error/ synchronization/ closed loop	Display after P6 displaying for one minute
L5	Zero speed protection	Display after P6 displaying for one minute
L6	Reserved	-
L7	Phase sequence error	Display after P6 displaying for one minute
L8	Frequency difference in one second more than 15Hz protection	Display after P6 displaying for one minute
L9	Frequency difference between the real and the setting frequency more than 15Hz protection	Display after P6 displaying for one minute

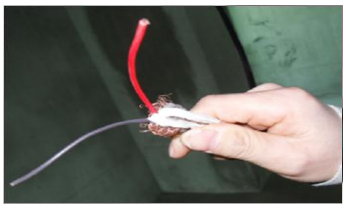
4. Troubleshooting

4.1 E0: Communication error between outdoor units

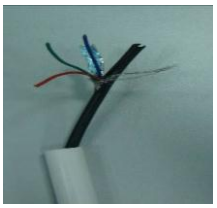
The error only display on faulty slave unit, all the ODU will be standby.



2-core shielded wire (×)

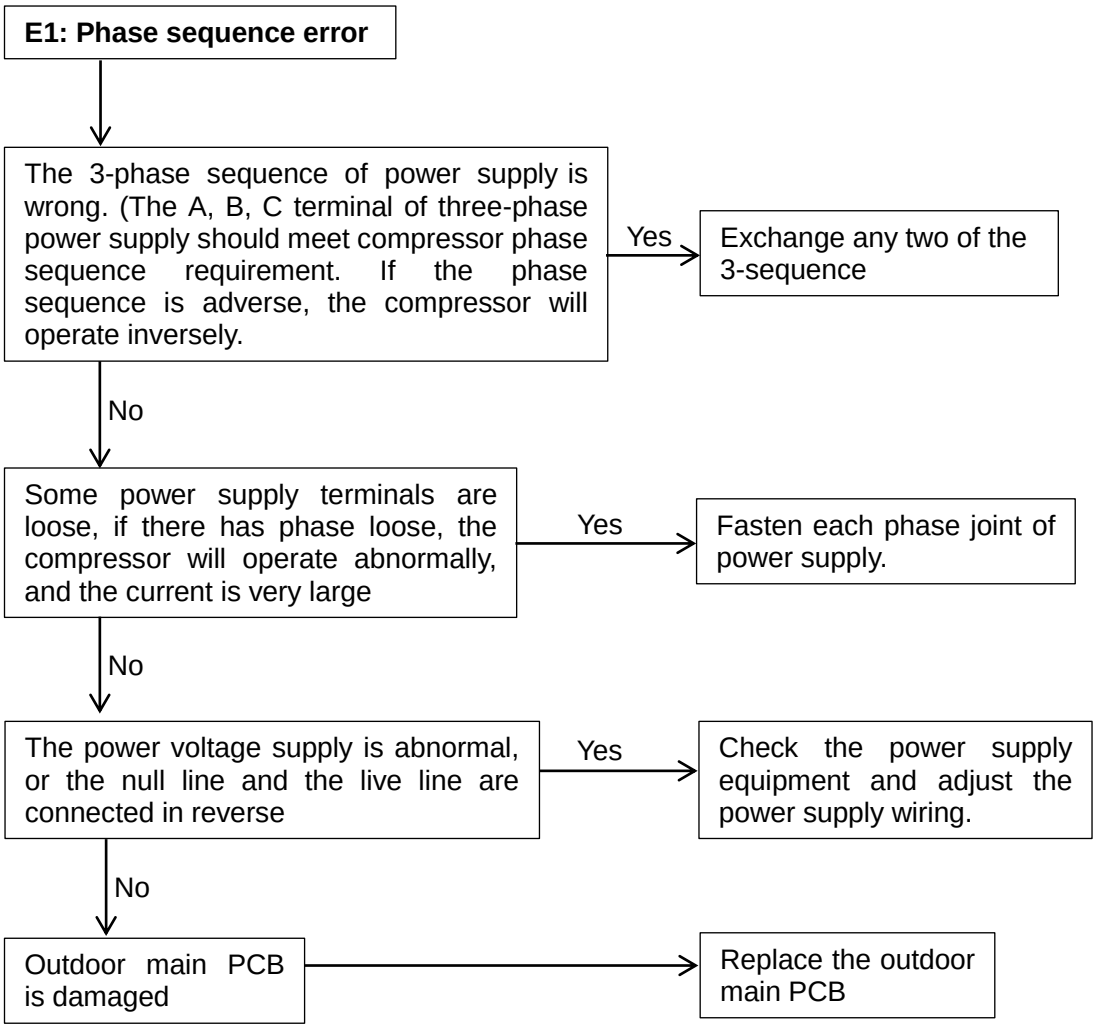


3-core shielded wire (√)



4.2 E1: Phase sequence error

The error only display on faulty unit, all the ODU will be standby.

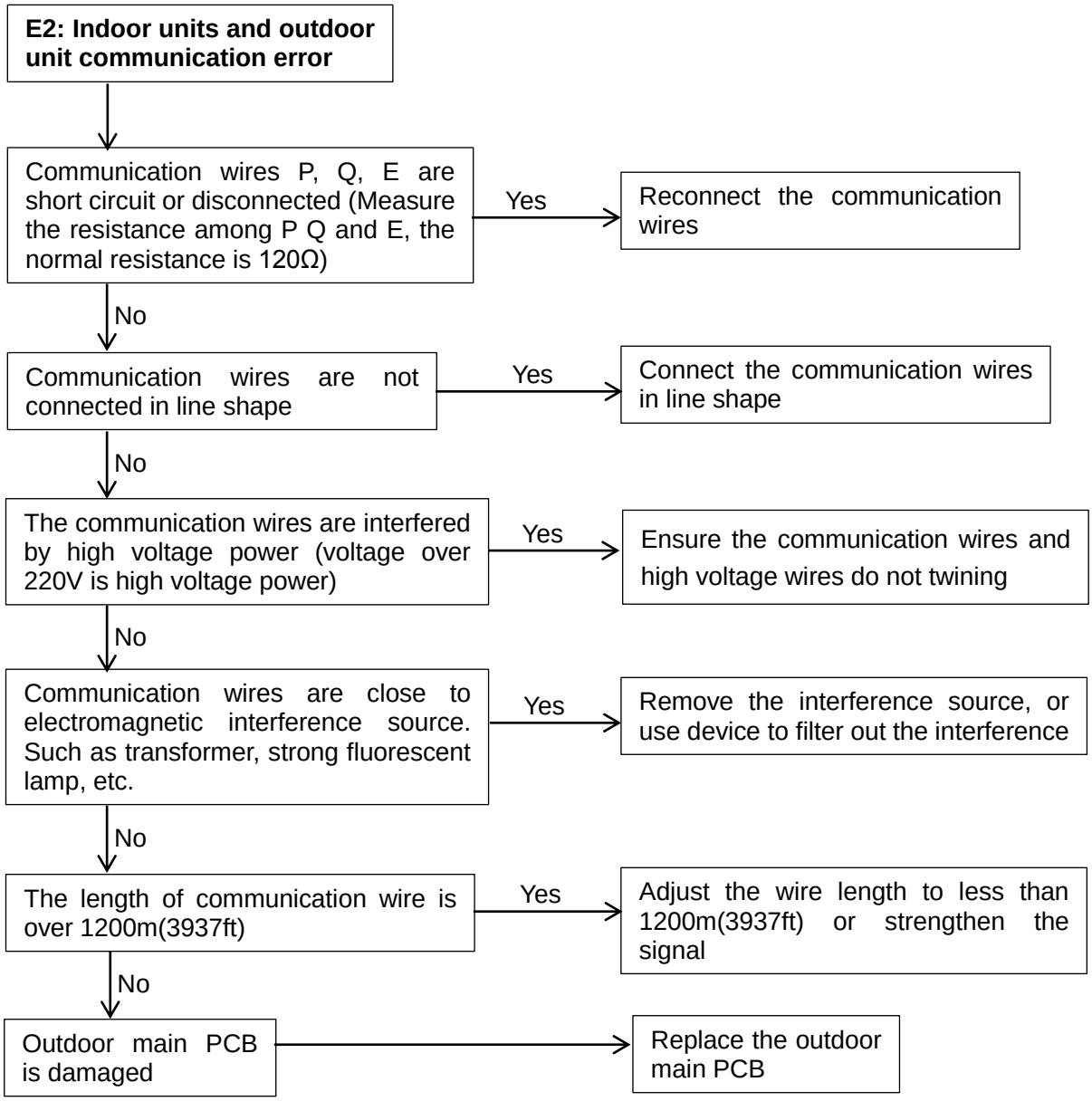


Note:

If the wiring connection of each outdoor unit is according to A, B, C phase sequence, when the quantity of outdoor units is large, the current difference between C phase and A, B phase will be very large for the power supply load of each outdoor unit is on C phase, it is very easy to lead to air switch break and wiring terminal burnout. So when the quantity of outdoor units is large, the phase sequence should be staggered, then the current can be distributed to the three phases equally.

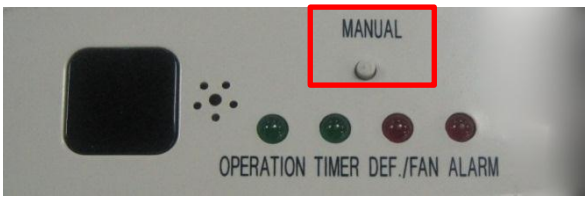
4.3 E2: Communication error between indoors and the master unit

The error only display on faulty slave unit, all the ODU will be standby.



Note:

1. Press the manual button on display board of indoor unit for 5 seconds, the communication address code of indoor unit will display;



Codes are as follows:

Indicator light	Running	Timer	Fan/defend cold fan	Warning
Code	8	4	2	1

Buzzer	Communication address	Four LED display
Not warning	00---15	Normally on
Not warning	16---31	Flash
Warning	32---47	Normally on
Warning	48---63	Flash

For example:

Press the manual button for 5 seconds:

- If the “Operation”, “Timer” and “DEF./FAN” lights are normally on and the buzzer is not warning, that means the address code is 14=(8+4+2)
- If the four LED lights are flash and the buzzer isn’t warning, the address code should plus 16, that means the address code is 30=16+ (8+4+2)
- If the “Operation”, “Timer” and “DEF./FAN” lights are normally on and the buzzer is warning, that means the address code is 46=32+(8+4+2)
- If the four LED lights are flash and the buzzer is warning, that means the address code is 62=48+ (8+4+2)

2. Press the manual button on display board of indoor unit for 10 seconds, the capacity code of indoor unit will display;

Dial code	Capacity (×100W)	Capacity (Btu/h)	Capacity (HP)
0	22	7510	0.8
1	28	9550	1.0
2	36	12280	1.2
3	45	15350	1.6
4	56	19110	2.0
5	71	24230	2.5
6	80	27300	3.0
7	90	30710	3.2
8	112	38210	4.0
9	140	47770	5.0
A	160	54590	6.0
B	160	54590	6.0
C	160	54590	6.0
D	160	54590	6.0
E	160	54590	6.0
F	160	54590	6.0

For example

Pressing continued the manual button for 10 seconds:

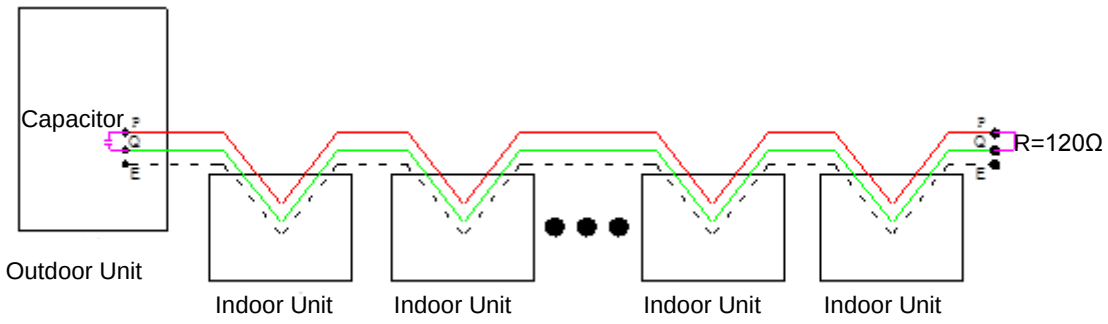
- If all the LED lights turn off, that means the capacity code is 0 and the capacity of indoor units is 22×100W(7510Btu/h);
- If the “Timer” and “Alarm” lights are normally on, that means the capacity code is 5=(4＋1) and the capacity of indoor unit is 71×100W(24230Btu/h);
- If the “Operation” and “Alarm” lights are normally on, that means the capacity code is 9=(8+1) and the capacity of indoor unit is 140×100W(47770Btu/h);
- If all the LED lights turn on, that means the capacity code is F=(8+4+2+1) and the capacity of indoor unit is 160×100W(54590Btu/h).

The above basic principle just applies to single PCB, if the indoor unit has more than one PCB, or one PCB can achieve a virtual multi blocks function, you must use the basic principle to Calculate the achievable capacity of single PCB at first, then add all the value as the capacity of the indoor unit .

For example

- The high static pressure duct have capacity of 20kW(68240Btu/h), 25kW(85300Btu/h), 28kW(95540Btu/h) and larger capacity of 40kW(136480Btu/h), 45kW(153540Btu/h), 56kW(191070Btu/h).
- The “Operation” light is normally on, that means the capacity code is 8 and the achievable capacity of single PCB is 112×100W(38210Btu/h), then add the value of two PCB, so the capacity of indoor unit is 200×100W(68240Btu/h);
- The “Operation” and “Alarm” lights are normally on, that means the capacity code is 9=(8+1) and the achievable capacity of single PCB is 140×100W(47770Btu/h), then add the value of two PCB, so the capacity of indoor unit is 280×100W(95540Btu/h);
- The “Operation” light is normally on, that means the capacity code is 8 and the achievable capacity of single PCB is 112×100W(38210Btu/h), then add the value of four PCB, so the capacity of indoor unit is 450×100W(153540Btu/h);
- The “Operation” and “Alarm” lights are normally on, that means the capacity code is 9=(8+1) and the achievable capacity of single PCB is 140×100W(47770Btu/h), then add the value of four PCB, so the capacity of indoor unit is 560×100W(191070Btu/h).

3. If the signal is weak, connect a 120Ω resistor between P and Q of the farthest indoor unit, or connect a 0.5-1.5uF capacitor between P and Q of outdoor unit. Installation refers to the following picture:

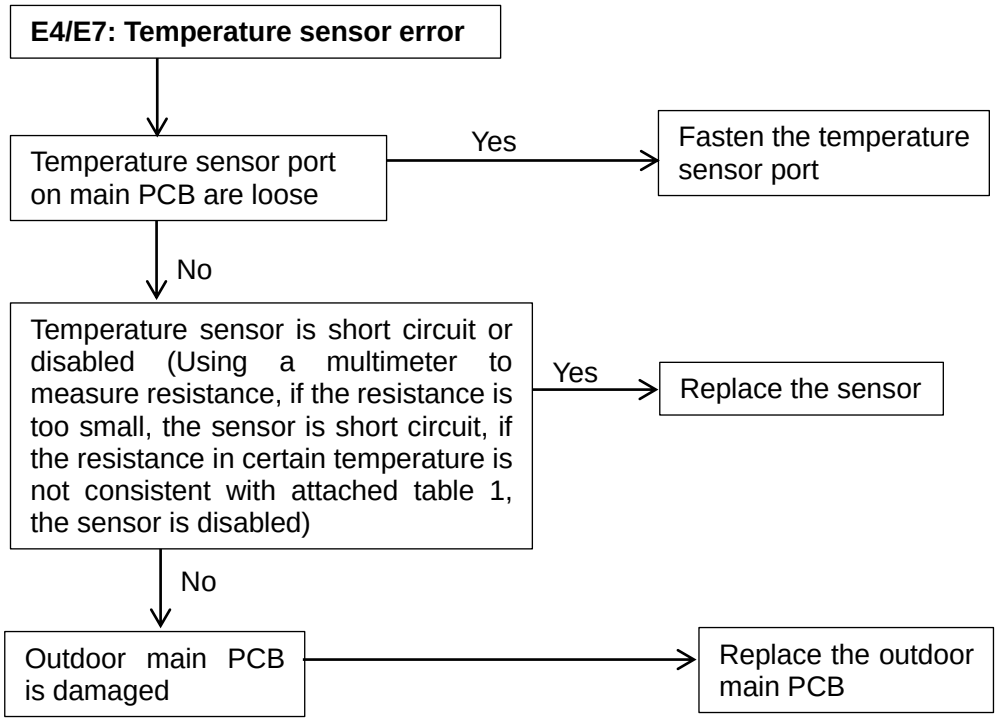


Note:

Communication wires should be shield wire and indoor units should be connected in series.

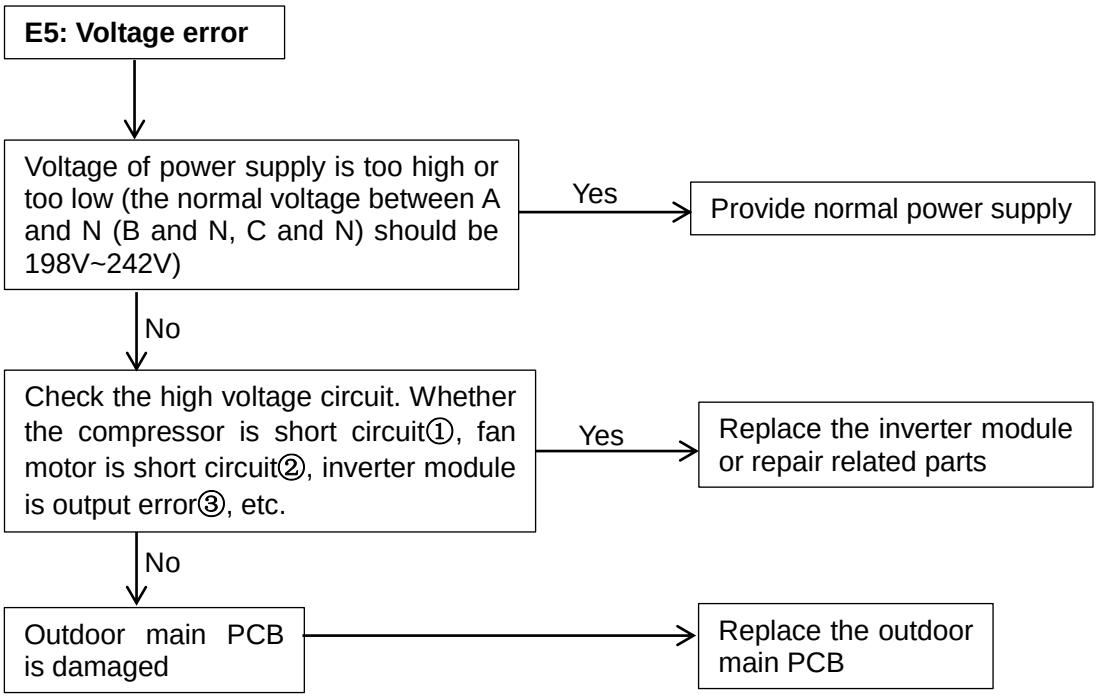
4.4 E4: Temperature senor (ambient temperature sensor T4, pipe temperature sensor T3/T5)
E7: Discharge temperature sensor error

The error only display on faulty unit, all the ODU will be standby.



4.5 E5: Voltage error

The error only display on faulty unit, all the ODU will be standby.



Note:

1. How to check whether the compressor is short circuit①:

The normal resistance value of inverter compressor among U V W is 0.7~1.5Ω, and infinity to earth. If the resistance value is out of the range, the compressor is abnormal.

2. How to check whether the fan motor is short circuit②:

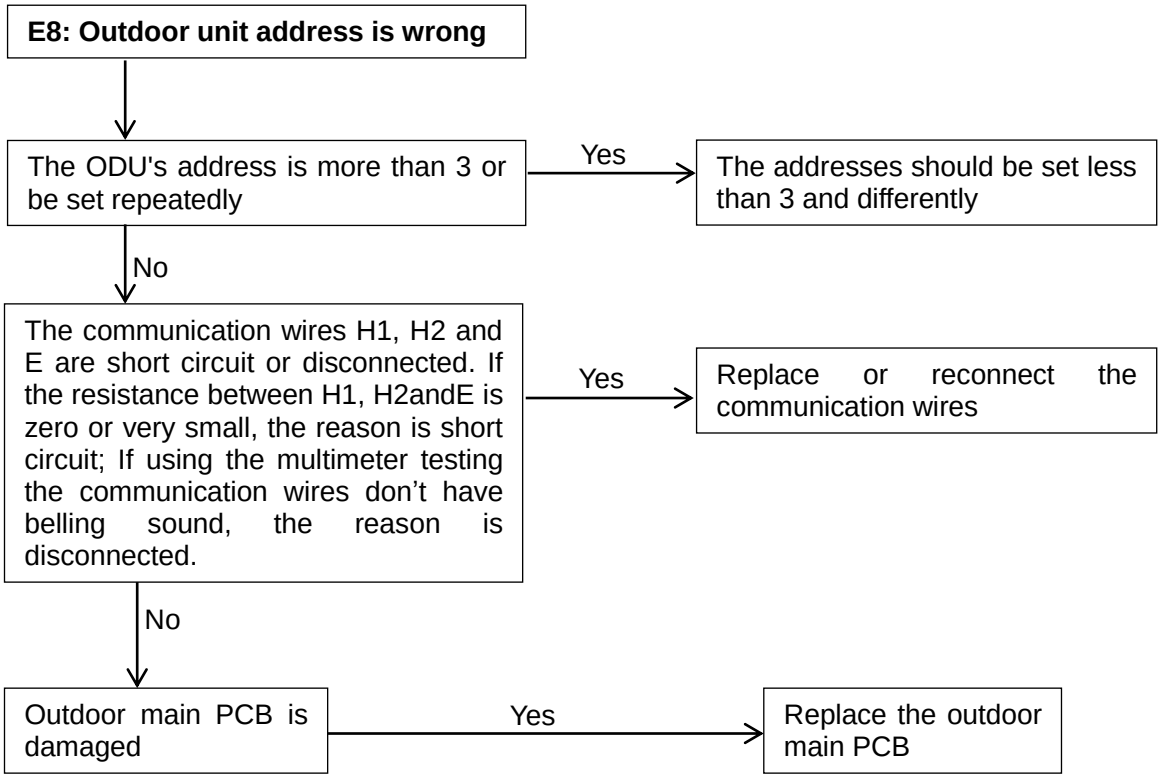
The normal value of DC fan motor coil among U V W is less than 10Ω, and the value of AC fan motor coil is from a few ohm to hundreds of ohm for different fan motor model. If the measured value is 0Ω, the fan motor is short circuit.

3. How to check whether the inverter module is output error③:

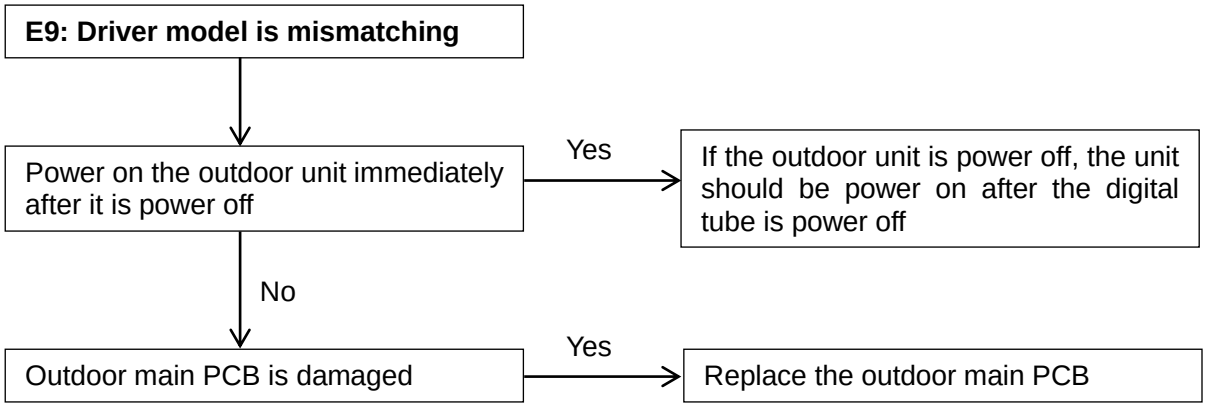
Let PN and U V W of inverter module short circuit, then dial multimeter to buzzer file, if the multimeter is ring, the inverter module is output error.

4.6 E8: Outdoor unit address is wrong

The error only display on faulty slave unit, all the ODU will be standby.

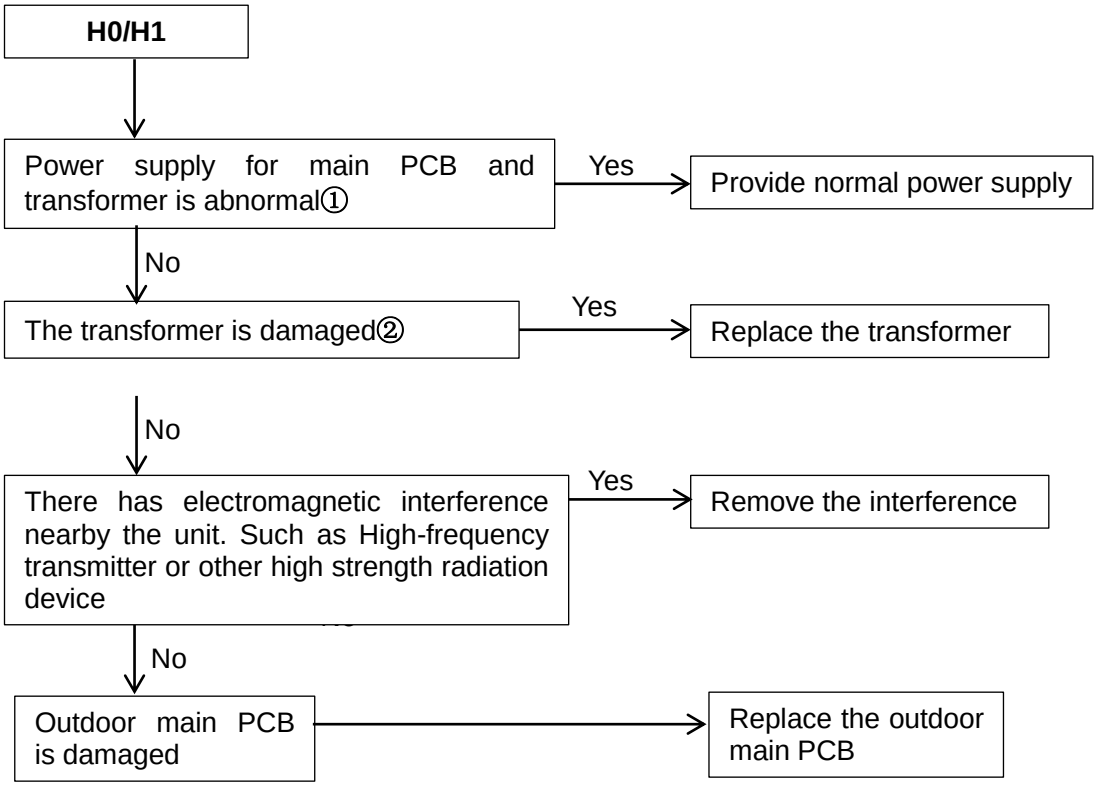


4.7 XE9: Driver model is mismatching (When X is 1, it means A system; 2 means B system)



4.8 H0: Communication error between main control chip and inverter driver chip
H1: Communication error between main control chip and communication chip

The error only display on faulty unit, all the ODU will be standby.



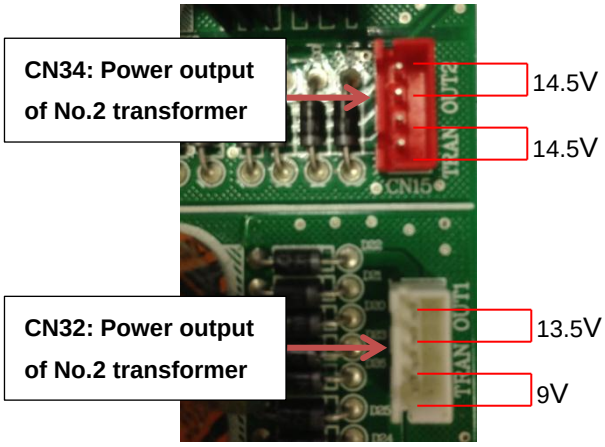
Note:

1. How to check whether power supply for transformer is abnormal①

Check the voltage of 8(CN31), 9(CN33) and 24(CN35) terminals. The normal voltage of 8(CN31) and 9(CN33) terminals should be 220V, the voltage between “GND” and “5V” of 24(CN35) terminal should be 5V, the voltage between “GND” and “12 of 24(CN35) terminal should be 12. If the voltage is out of the range, the power supply for main PCB and transformer is abnormal.

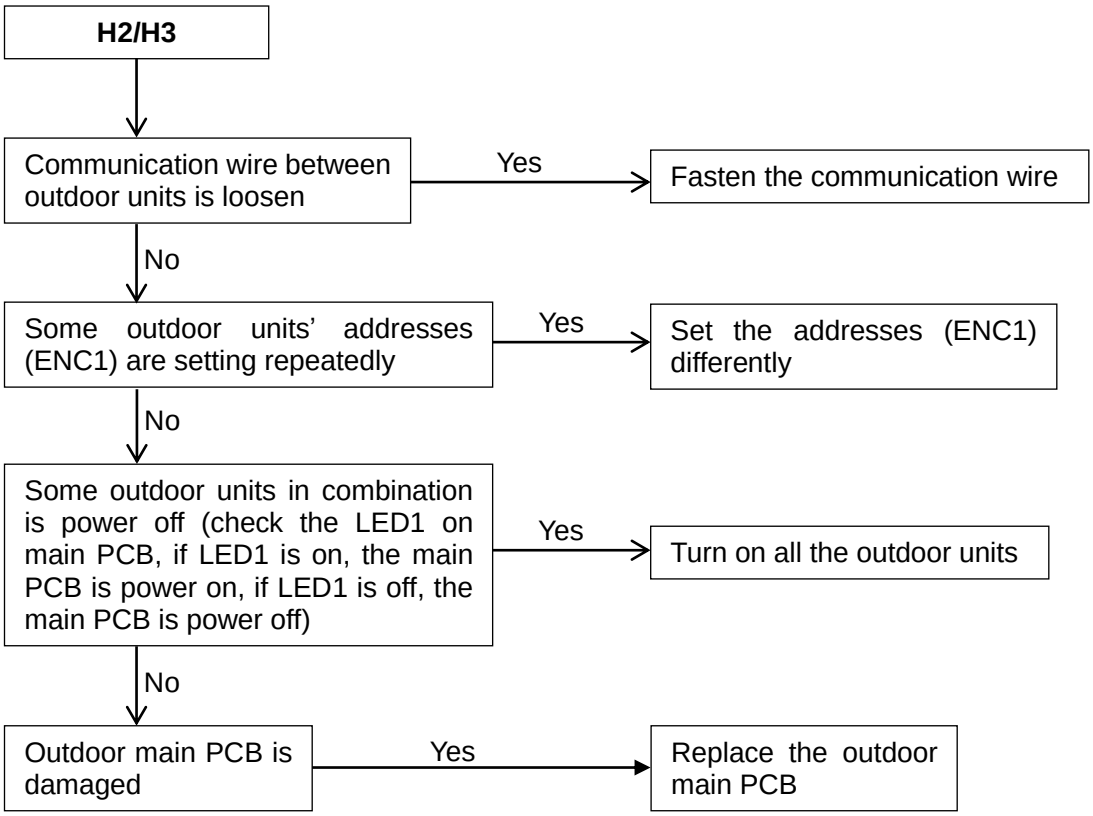
2. How to check whether the transformer is disabled②

The voltage between upper tow pins of 18(CN32) terminal is AC 13.5V; the voltage between under tow pins of 18(CN32) terminal is AC 9V. The voltage between upper tow pins of 19(CN34) terminal is AC 14.5V; the voltage between under tow pins of 19(CN34) terminal is AC 14.5V



4.9 H2: Quantity of outdoor unit decreased; H3: Quantity of outdoor unit increased

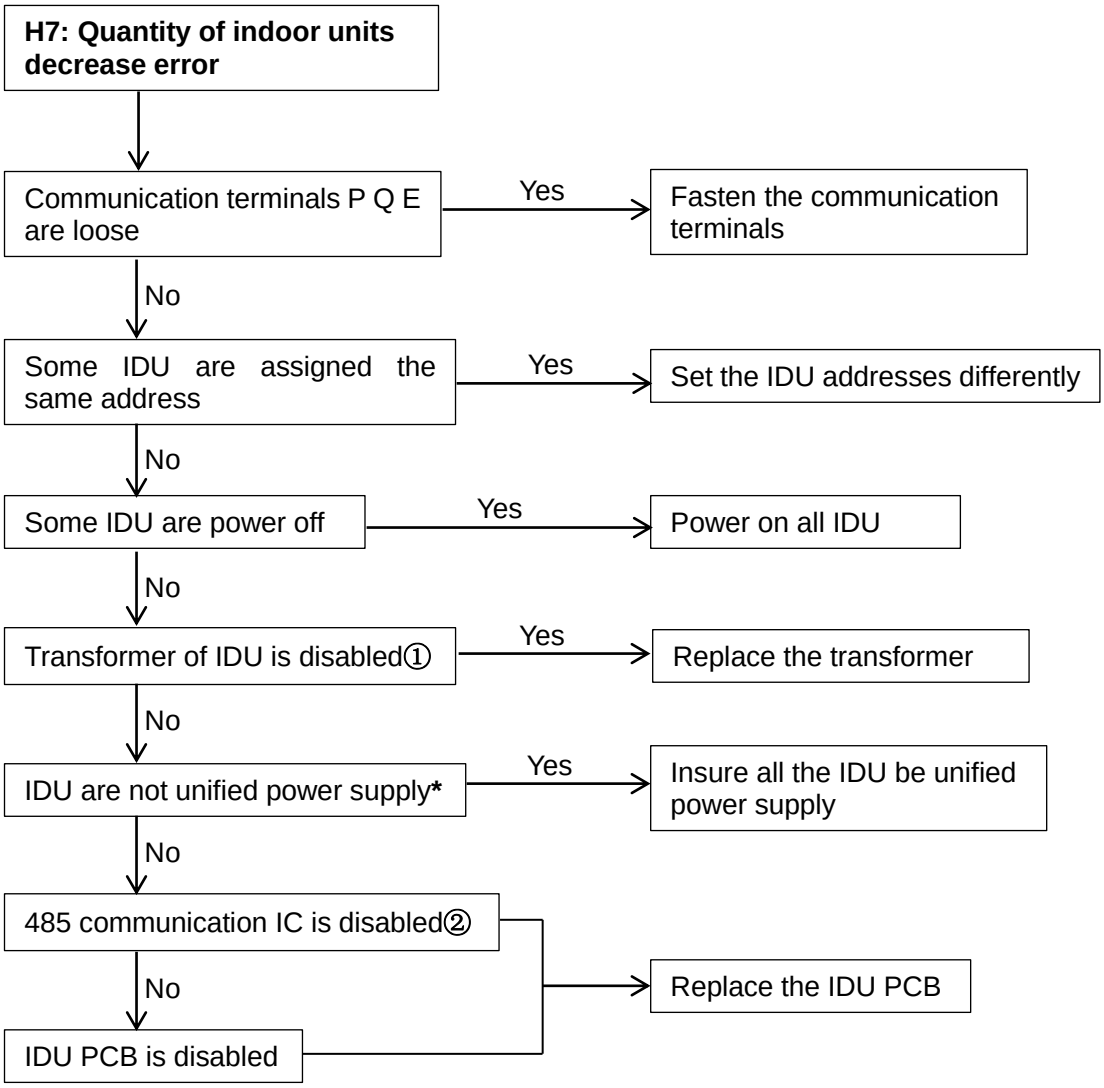
The error only display on master unit, all the ODU will be standby.



Note: All the outdoor units should be unified power supply. If the outdoor units are not unified power supply, once some outdoor unit is power off, other outdoor units are still running, it may cause system unbalance and damage devices.

4.10 H7: Quantity of indoor units decrease error

The error only display on master unit, all the ODU will be standby. It will display when the quantity of indoor units decrease above 3 minutes.



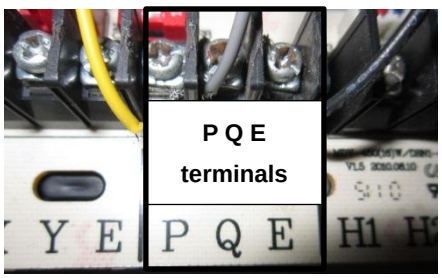
Note:

1. How to check whether the transformer of IDU is disabled①

The voltage input for IDU transformer is 220V, the voltage output of is AC9V (yellow-yellow) and AC13.5V (brown-brown)

2. How to check whether the 485 communication IC is disabled②

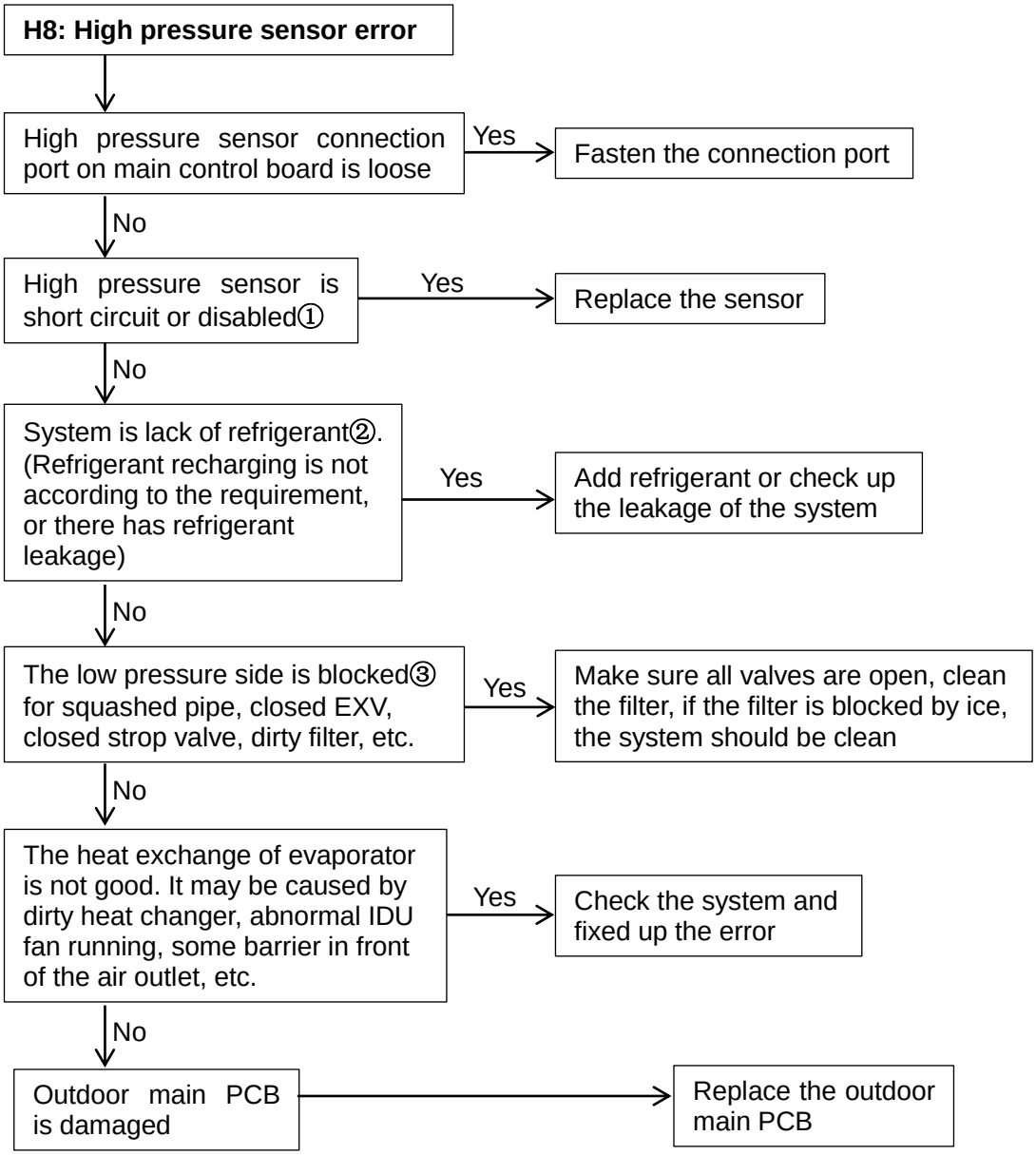
The normal voltage between “P” and “GND” is DC2.5~2.7V, between “Q” and “GND” is DC2.5~2.7V. If the voltage is out of the normal range, the 485 communication IC is disabled.



* Indoor units should be unified power supply, which can prevent compressor from liquid hammer caused by dropped indoor units with EXV unclosed.

4.11 H8: High pressure sensor error

When the discharge pressure is lower than 0.3MPa(43.5PSI), the system will display H8 error, the ODU in standby. When the discharge pressure is back to normal, H8 disappears and normal operation resumes.



Note:

1. How to check whether the high pressure sensor is short circuit or disabled①

Measure the resistance among the three terminals of the pressure sensor, if the resistance value is megohm or infinite, the pressure sensor is disabled, otherwise, it may be normal.

2. The phenomenon of lack of refrigerant②:

Top temperature and discharge temperature of all compressors are higher than normal value, discharge pressure and suction pressure are both lower than normal value, current is lower than normal value, suction pipe may be frosting. All the phenomenon will disappear after recharging refrigerant.

3. The phenomenon of the low pressure side is blocked③:

The discharge temperature is higher than normal value*, low pressure is lower than normal value*, current is lower than normal value* and suction pipe may be frosting.

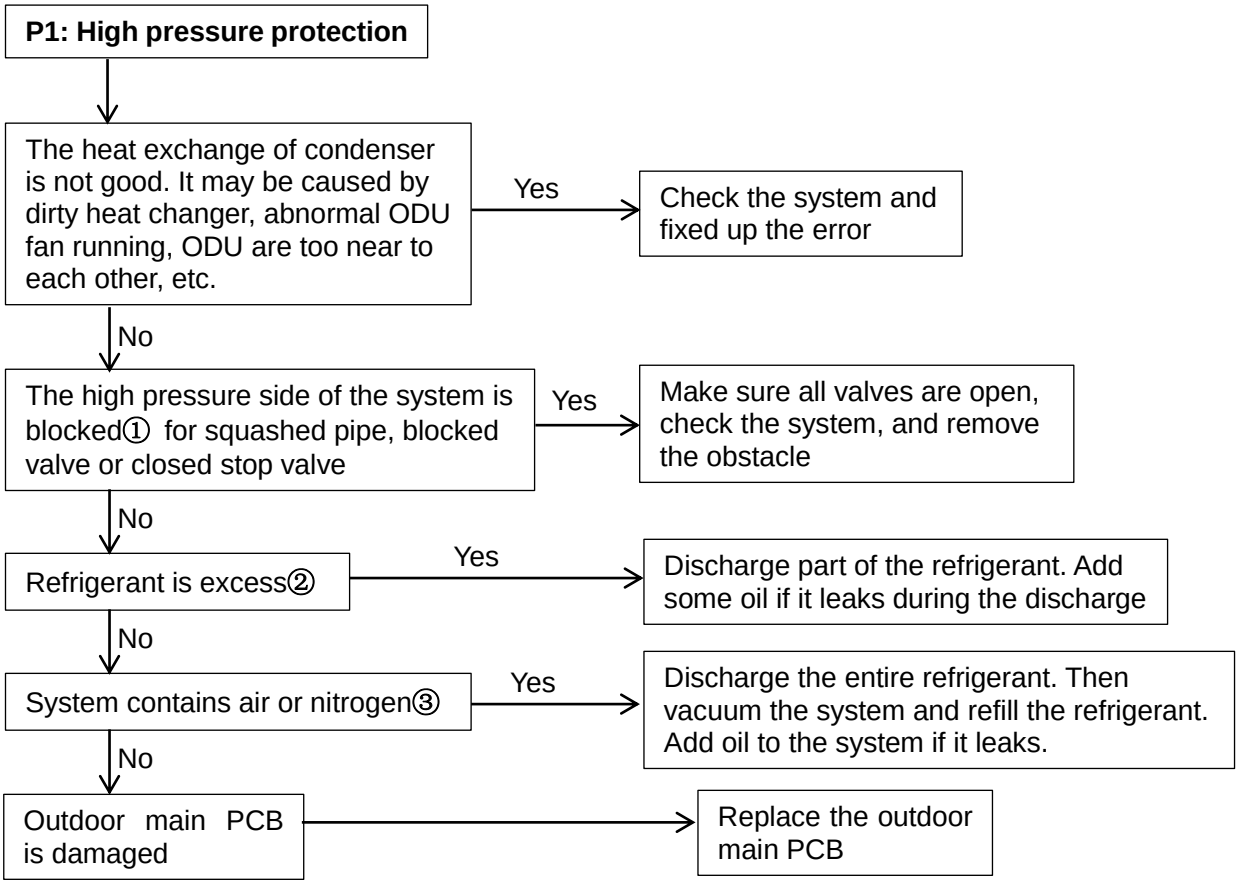
*The normal system running parameters please refer to attached table 3.

4.12 XHd: Slave units malfunction (X stands for corresponding slave unit)

XHD is only displayed on master unit. X stands for corresponding slave unit. If X is 1, it means no.1 slave unit has problem, then you should check no.1 slave unit.

4.13 P1: High pressure protection

When the pressure is over 4.4MPa, the system will display P1 protection, the ODU in standby. When the pressure is lower than 3.2MPa, P1 disappears and normal operation resumes.



Note:

1. The phenomenon of The high pressure side of the system is blocked①:

The high pressure is higher than normal value, the low pressure is lower than normal value, and the discharge temperature is higher than normal value.

2. The phenomenon of the refrigerant is excess②:

The high pressure is higher than normal value, the low pressure is higher than normal value, and the discharge temperature is lower than normal value.

3. The phenomenon of the system contains air or nitrogen③:

The high pressure is higher than normal value, current is larger than normal value, discharge temperature is higher than normal value, compressor makes noise, pressure meter do not display steady.

*The normal system running parameters please refer to attached table 3.

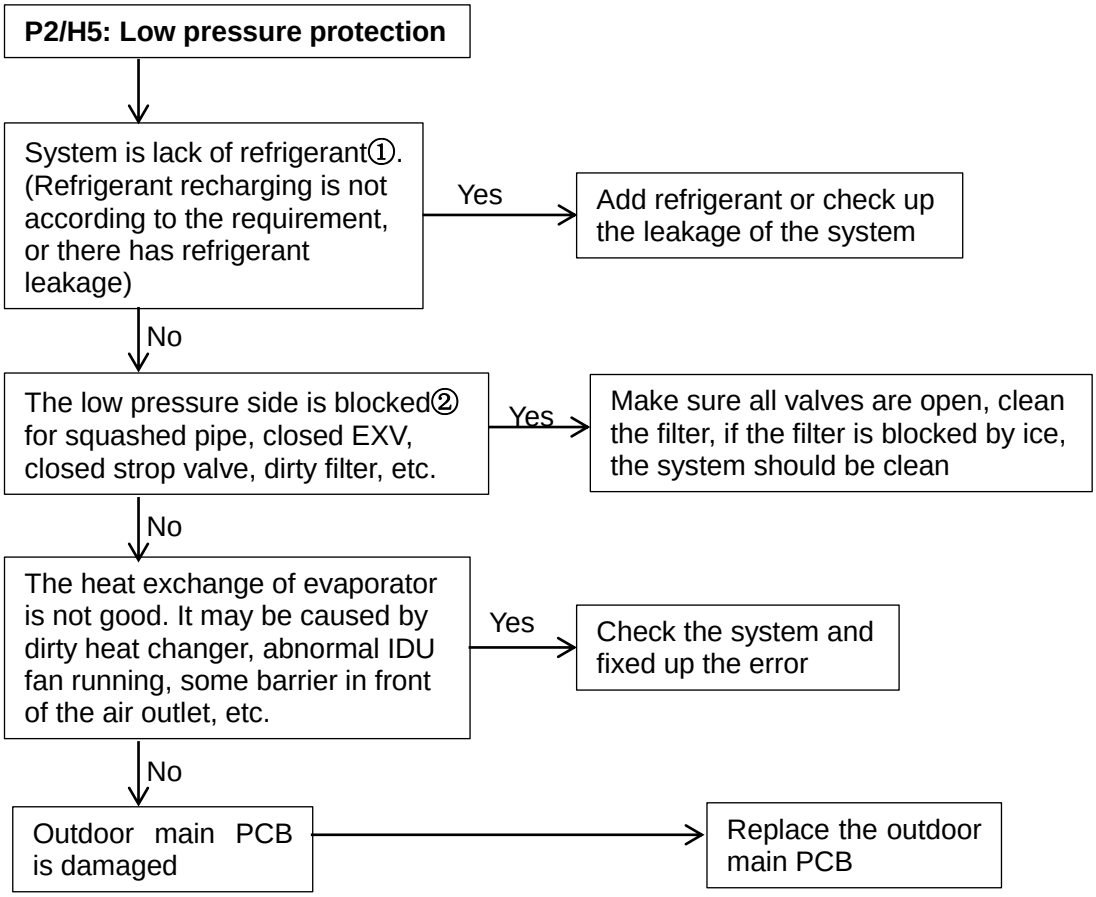
*If the system install three-phase protector, and the three-phase protector connect with high pressure switch in series connection, the system will display P1 protection when fist power on, and P1 protection will disappear after system is steady.

*If the system install three-phase protector, and the three-phase protector connect with low pressure switch in series connection, the system will display P2 protection when fist power on, and P2 protection will disappear after system is steady.

4.14 P2/H5: Low pressure protection

When the pressure is lower than 0.05MPa, the system will display P2 protection, the ODU in standby. When the pressure is higher than 0.15MPa, P2 disappears and resumes normal operation.

H5 error will display when system appear 3 times P2 protection in 60 minutes, it cannot resume automatically, and it can resume only by restarting the machine.



Note:

1. The phenomenon of lack of refrigerant①:

Top temperature and discharge temperature of all compressors are higher than normal value, discharge pressure and suction pressure are both lower than normal value, current is lower than normal value, suction pipe may be frosting. All the phenomenon will disappear after recharging refrigerant.

2. The phenomenon of the low pressure side is blocked②:

The discharge temperature is higher than normal value*, low pressure is lower than normal value*, current is lower than normal value* and suction pipe may be frosting.

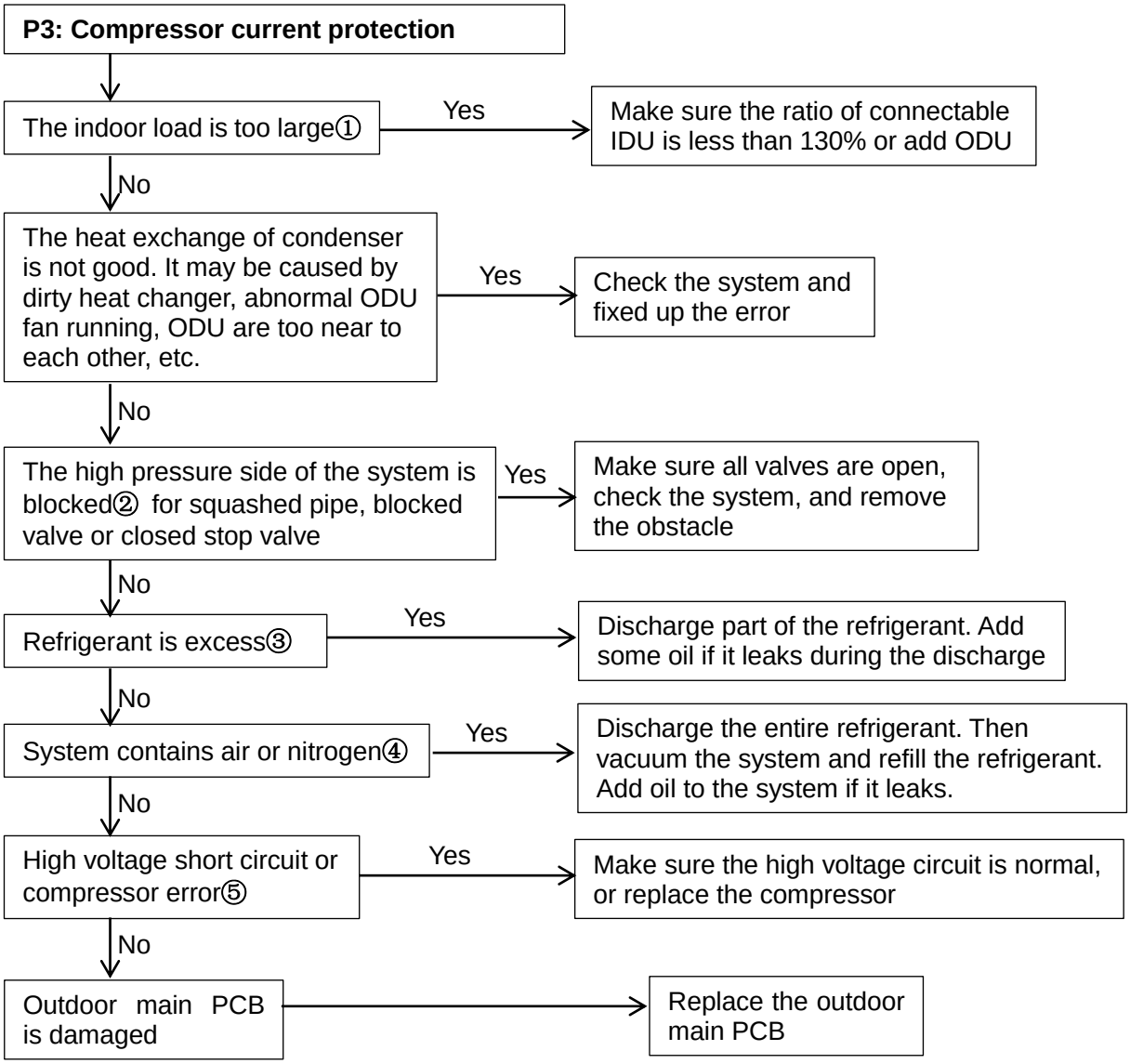
*The normal system running parameters please refer to attached table 3.

*If the system install three-phase protector, and the three-phase protector connect with high pressure switch in series connection, the system will display P1 protection when fist power on, and P1 protection will disappear after system is steady.

*If the system install three-phase protector, and the three-phase protector connect with low pressure switch in series connection, the system will display P2 protection when fist power on, and P2 protection will disappear after system is steady.

4.15 XP3: Current protection of inverter compressor (When X is 1, it means A compressor; 2 means B compressor)

P3: When the current of inverter compressor is over12A, the system will display P3 protection, the ODU in standby. When the current goes back to normal range, P3 disappears and normal operation resumes.



Note:

1. The phenomenon of the indoor load is too large①:

The suction temperature and discharge temperature are both higher than normal value.

2. The phenomenon of The high pressure side of the system is blocked②:

The high pressure is higher than normal value, the low pressure is lower than normal value, and the discharge temperature is higher than normal value.

3. The phenomenon of the refrigerant is excess③:

The high pressure is higher than normal value, the low pressure is higher than normal value, and the discharge temperature is lower than normal value.

4. The phenomenon of the system contains air or nitrogen④:

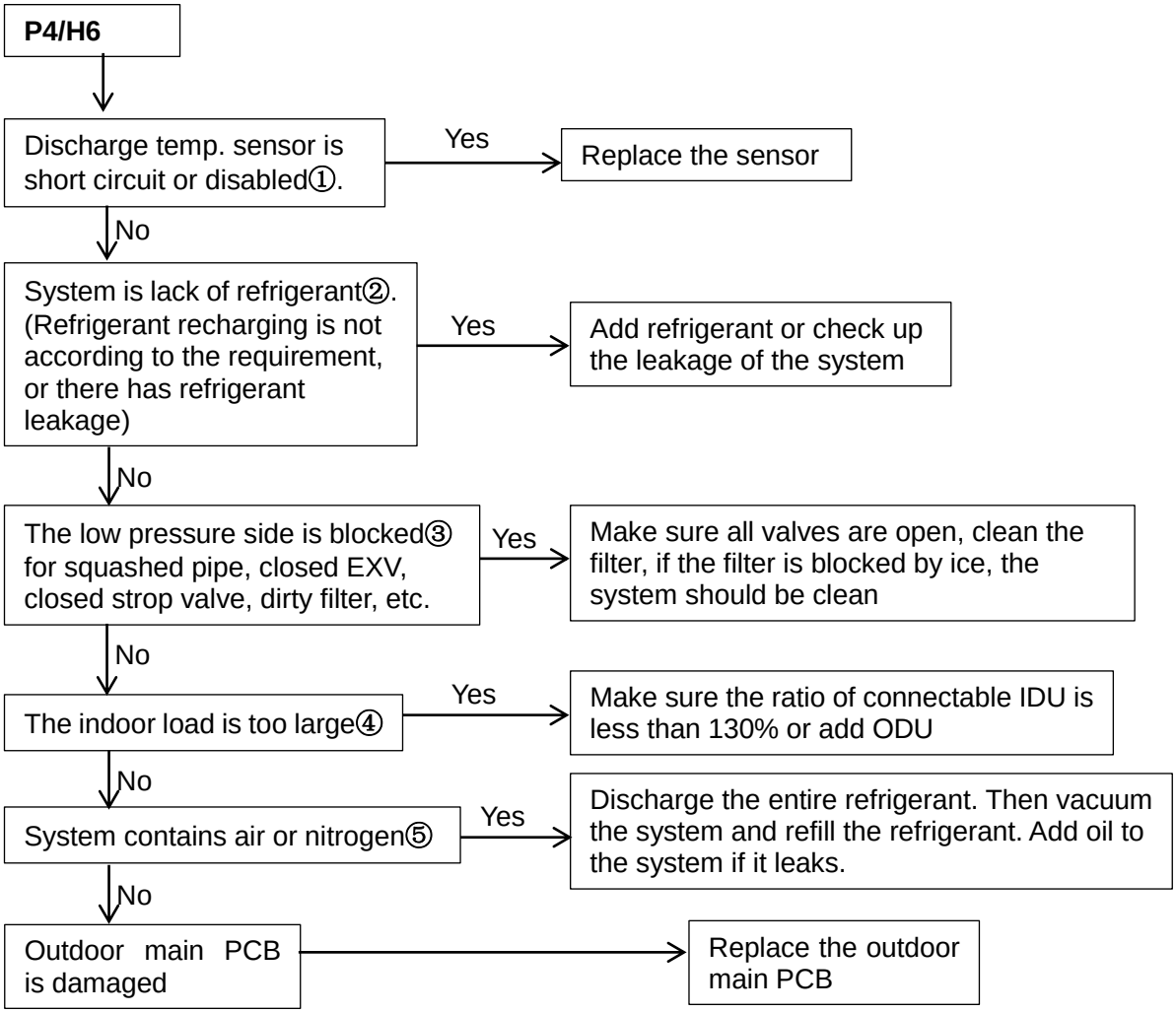
The high pressure is higher than normal value, current is larger than normal value, discharge temperature is higher than normal value, compressor makes noise, pressure meter do not display steady.

5. How to check whether compressor is error⑤:

Measure the resistance between two terminals among the three terminals of compressor. The resistance between two terminals is 2-5Ω, the resistance between each terminal and ground is infinity, if the resistance is out of the normal range, the compressor is error.

4.16 P4: Discharge temperature protection; H6: P4 protection appears three times in 100 minutes

The error only display on faulty unit, all the ODU will be standby. H6 error cannot resume automatically, and it can resume only by restarting the machine.



Note:

1. How to check whether the discharge temperature sensor is short circuit or disabled①:

Using a multimeter to measure resistance, if the resistance is too small, the sensor is short circuit, if the resistance in certain temperature is not consistent with attached table 2, the sensor is disabled

2. The phenomenon of lack of refrigerant②:

Top temperature and discharge temperature of all compressors are higher than normal value, discharge pressure and suction pressure are both lower than normal value, current is lower than normal value, suction pipe may be frosting. All the phenomenon will disappear after recharging refrigerant.

3. The phenomenon of the low pressure side is blocked③:

The discharge temperature is higher than normal value*, low pressure is lower than normal value*, current is lower than normal value* and suction pipe may be frosting.

4. The phenomenon of the indoor load is too large④:

The suction temperature and discharge temperature are both higher than normal value.

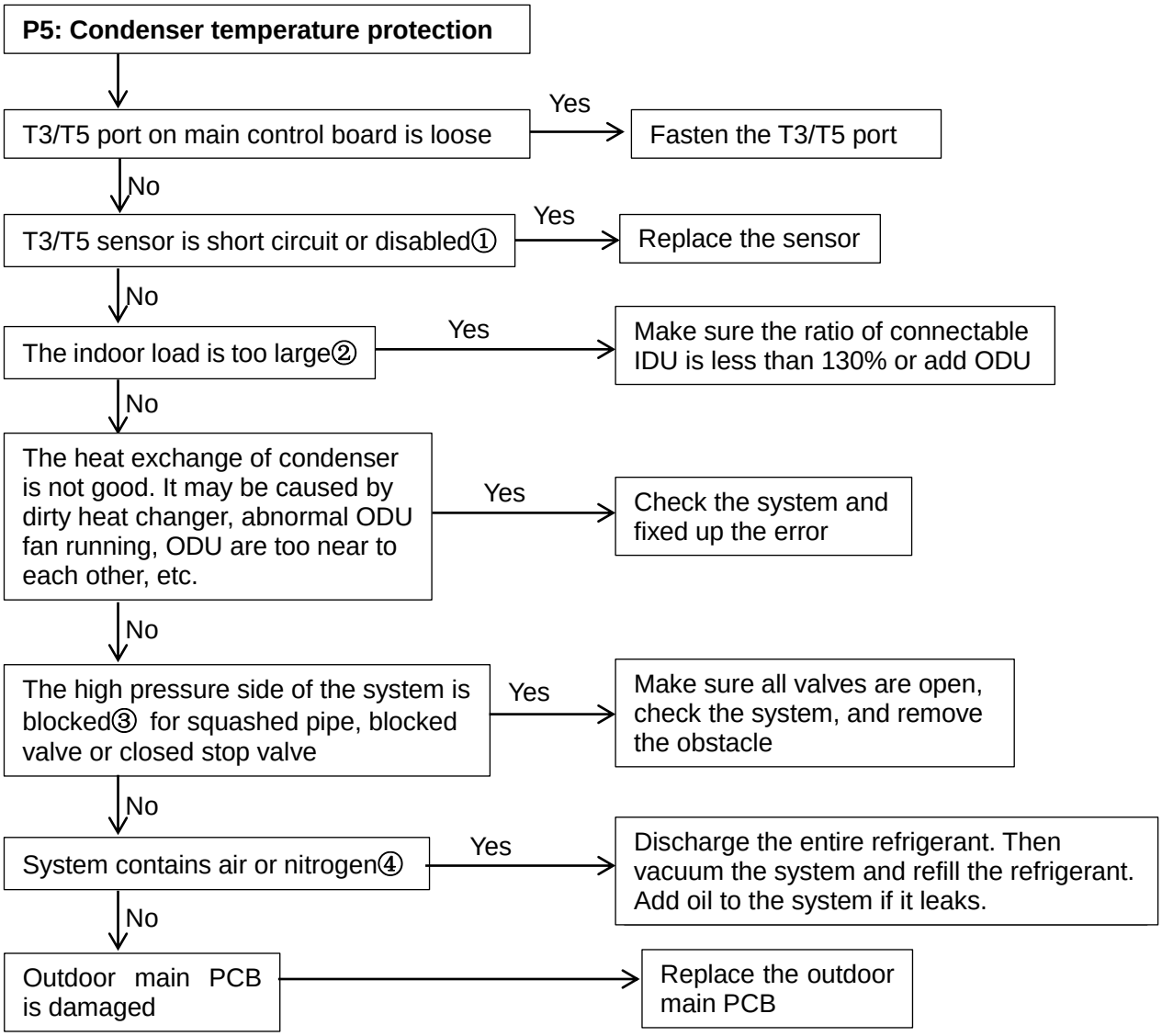
5. The phenomenon of the system contains air or nitrogen⑤:

The high pressure is higher than normal value, current is larger than normal value, discharge temperature is higher than normal value, compressor makes noise, pressure meter do not display steady.

*The normal system running parameters please refer to attached table 3.

4.17 P5: Condenser temperature protection

When condenser temperature is over 65°C(149°F), the system will display P5 protection, the ODU in standby. When the temperature goes back to normal range, P5 disappear and normal operation resumes.



Note:

1. How to check whether the T3/T5 sensor is circuit or disabled①:

Using a multimeter to measure resistance, if the resistance is too small, the sensor is short circuit, if the resistance in certain temperature is not consistent with attached table 1, the sensor is disabled

2. The phenomenon of the indoor load is too large②:

The suction temperature and discharge temperature are both higher than normal value.

3. The phenomenon of The high pressure side of the system is blocked③:

The high pressure is higher than normal value, the low pressure is lower than normal value, and the discharge temperature is higher than normal value.

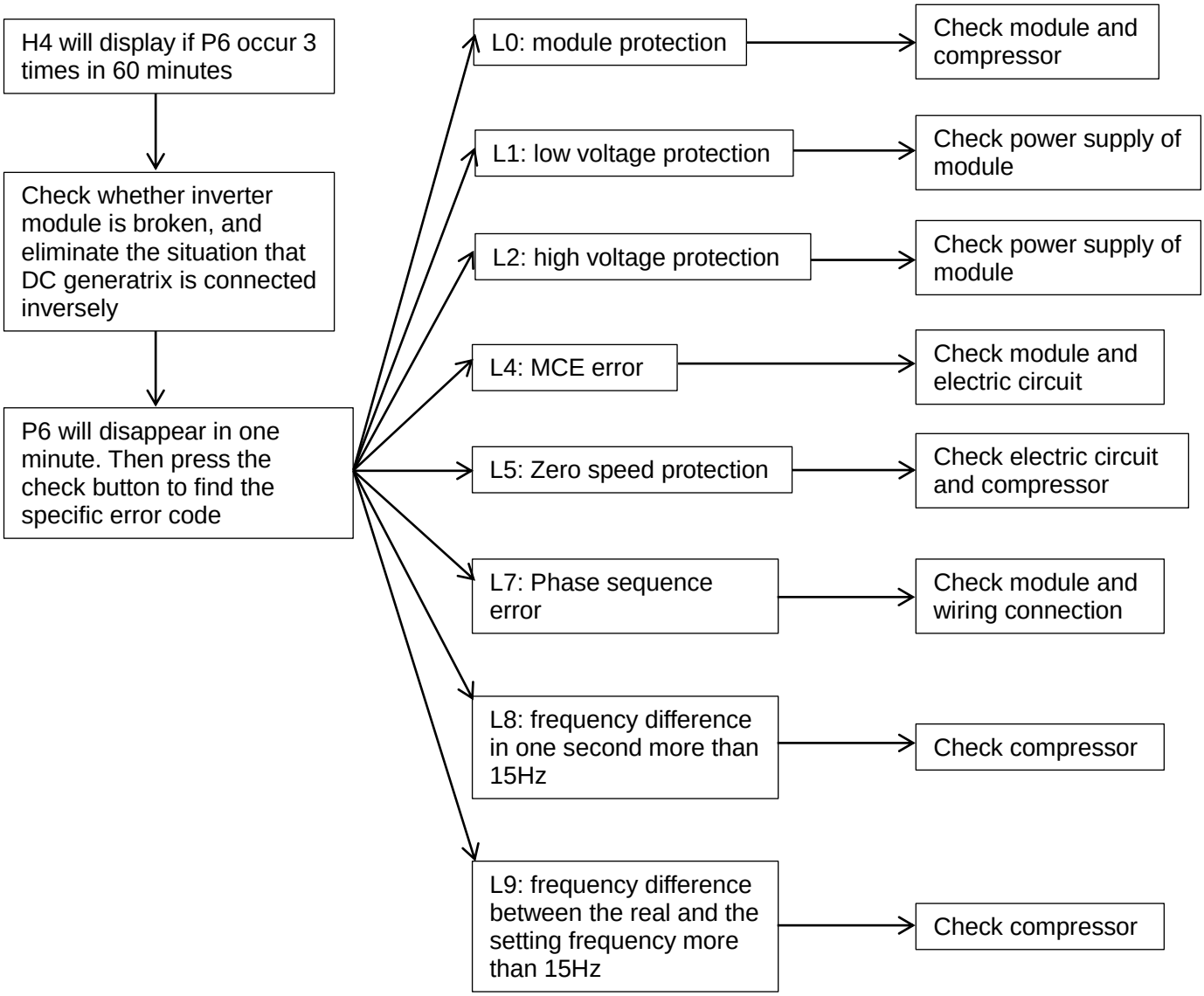
4. The phenomenon of the system contains air or nitrogen④:

The high pressure is higher than normal value, current is larger than normal value, discharge temperature is higher than normal value, compressor makes noise, pressure meter do not display steady.

4.18 XP6: Inverter module protection (When X is 1, it means A inverter module; 2 means B inverter module)

H4: P6 protection appears three times in 60 minutes

When the system displays H4 error code, the system can resume only by restarting the machine. At this time, malfunction should be disposed promptly to avoid further damage.



1) L0 troubleshooting

Step 1: Compressor check

Measure the resistance between each two of U, V, W terminals of the compressor, all the resistance should be the same and equal to 0.9~5 Ohms. (Fig. A and Fig. B)

Measure the resistance between each of U, V, W terminals of the compressor to ground (Fig. C), all the resistance should trend to infinity (Fig. D), otherwise the compressor has been malfunction, needs to be replaced.

Fig. A

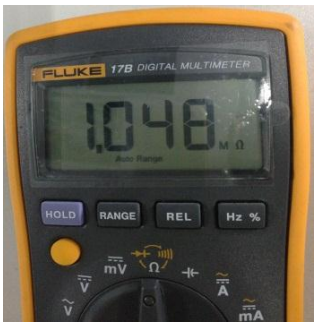


Fig.B

Fig.C

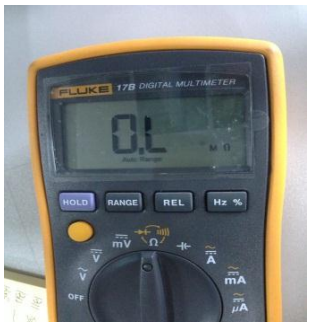
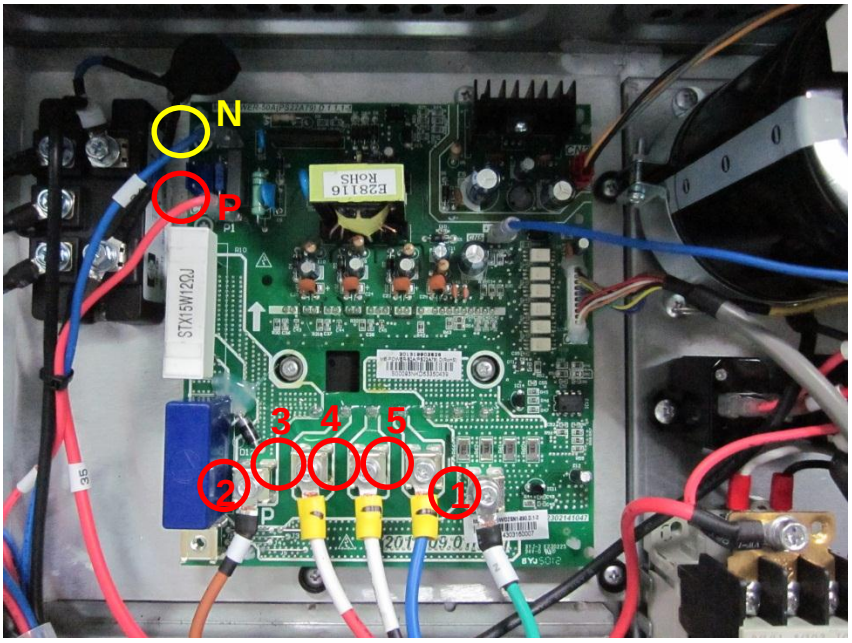


Fig.D

If the resistance value are normal, then go to step 2.

Step 2: Module check

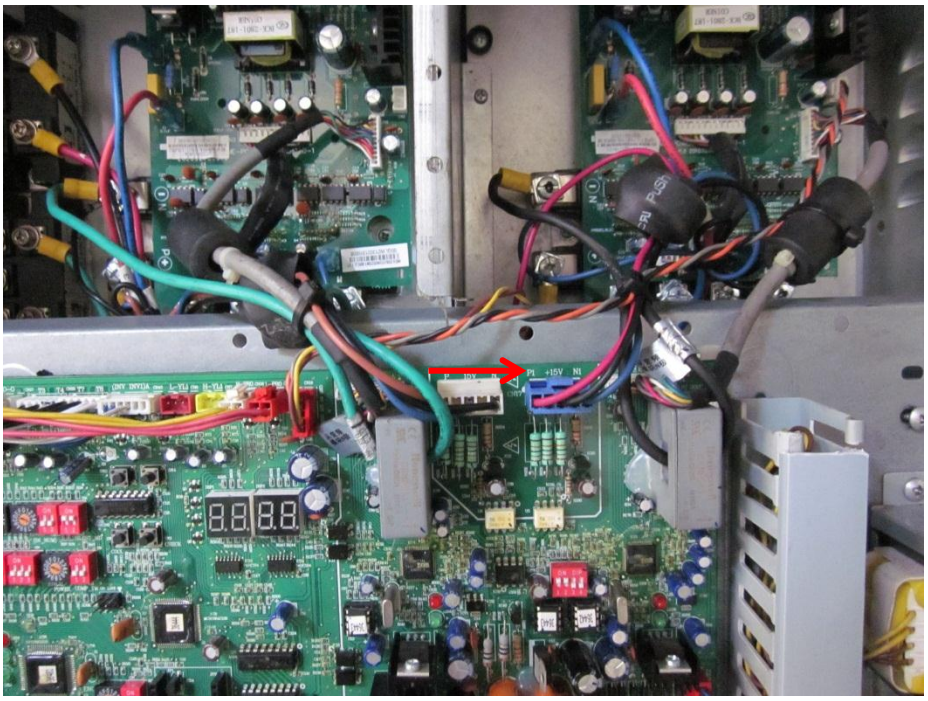


1) DC voltage between terminal P and terminal N should be 1.41 times of the local power supply voltage.
2) DC voltage between terminal 1 and 2 should be 510V～580V.
3) Discoonnect the terminal 3, 4, and 5 from inverter compressor. Measure the risistance between any two terminals among terminal 1, 2, 3, 4, 5. All the values should be infinity. If any of the value approximates to 0, the inverter module is damaged and should be replaced.

After replaced the inverter module, if the system is still abnormal, then go to step3.

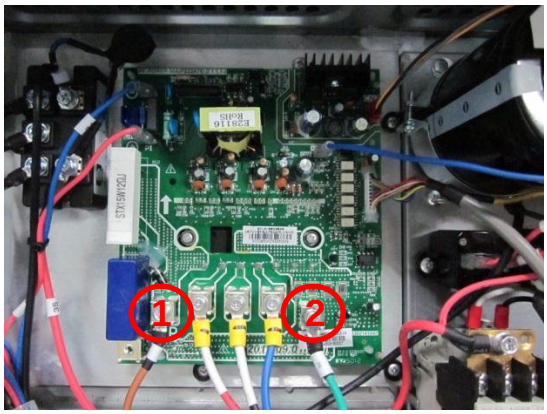
Step 3: DC generatrix check

Direction of the current in DC supply wire which is running through the inductor should be the same as the direction of arrow marked on the inductor.



2) L1/L4 troubleshooting

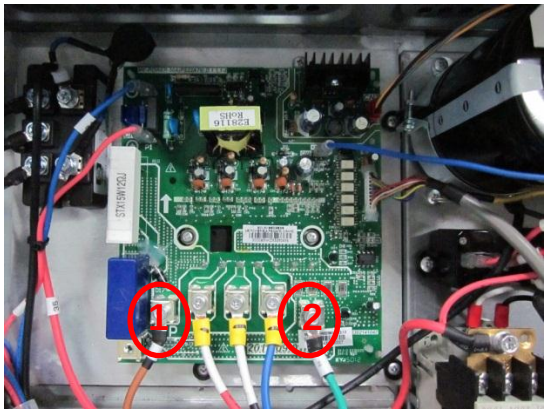
Step 1: Check the DC voltage between 1 and 2 terminal, the normal value should be 510V~580V, if the voltage is lower than 510V, go to step 2.



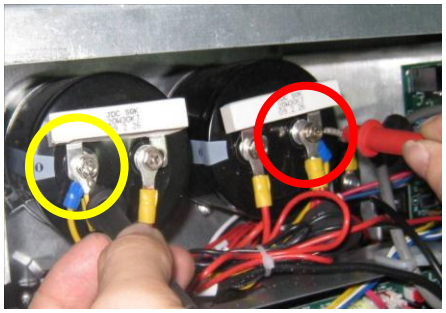
Step 2: Check whether the wires of rectifier circuit are loose or not. If wires are loosen, fasten the wires. If wires are OK, replace the main PCB.

3) L2 troubleshooting

Step 1: Check the DC voltage between 1 and 2 terminal, the normal value should be 510V~580V, if the voltage is higher than 580V, go to step 2.



Step 2: Check the voltage between the two electrolytic capacitors, the normal value should be 510V~580V.



Turn the measure range of the meter to 1kV, measure the voltage between two electrolytic capacitors

If the value is not in the range, that means the power supply for electrolytic capacitors has problem, you should check the power supply, whether the voltage is too high and whether the voltage is stable.

If the voltage value is normal, then the main PCB has malfunction, it needs to be replaced.

4) L8/L9 troubleshooting

Step 1: Compressor check

Measure the resistance between each two of U, V, W terminals of the compressor, all the resistance should be the same and equal to 0.9~5 Ohms. (Fig. A and Fig. B)

Measure the resistance between each of U, V, W terminals of the compressor to ground (Fig. C), all the resistance should trend to infinity (Fig. D), otherwise the compressor has been malfunction, needs to be replaced.

Fig. A

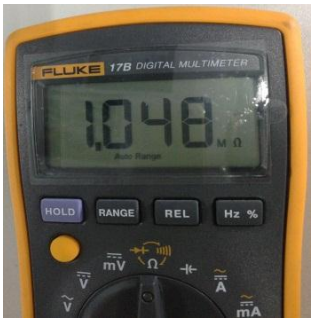


Fig. B

Fig. C

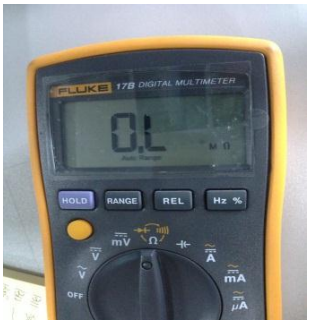


Fig. D

If the resistance value are normal, then go to step 2.

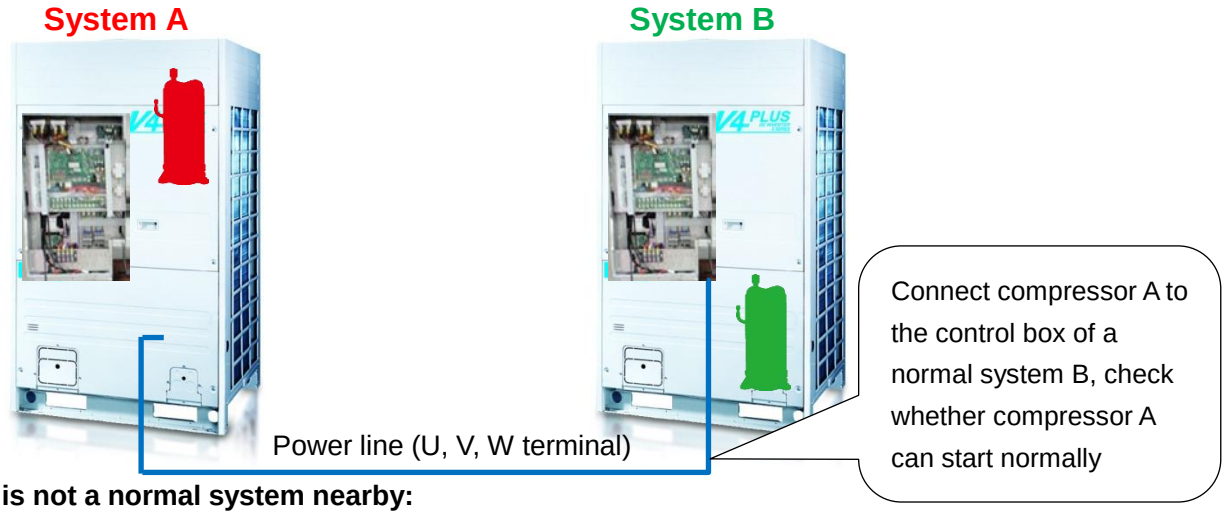
Step 2: Disconncet the power wiring from the compressor(named compressor A) of the faulted system(named system A).

If there is a system running normally nearby(named system B):

Extend the power line of the inverter compressor of system B, connect compressor A to the control box of system B, make sure that the U, V, W terminals are connected in right order, then start system B.

If compressor A can start normally, that means compressor is OK, the control box of system A is malfunction, then raplace the main PCB of system A with correct wire connection.

If compressor A can not start normally, that means compressor A is demaged, needs to be replaced.



If there is not a normal system nearby:

Replace the main PCB of system A with correct connection, if compressor A can start normally, it means the main PCB which is replaced is damaged. If compressor A still can't start normally, replace the compressor.

5) Guide for compressor replacement

Step 1: Take out the compressor from the faulted outdoor unit, pour out the oil from the compressor according to the method illustrated. Normally the oil will outflow from the discharge pipe of the compressor.

Step 2: check the oil of the system

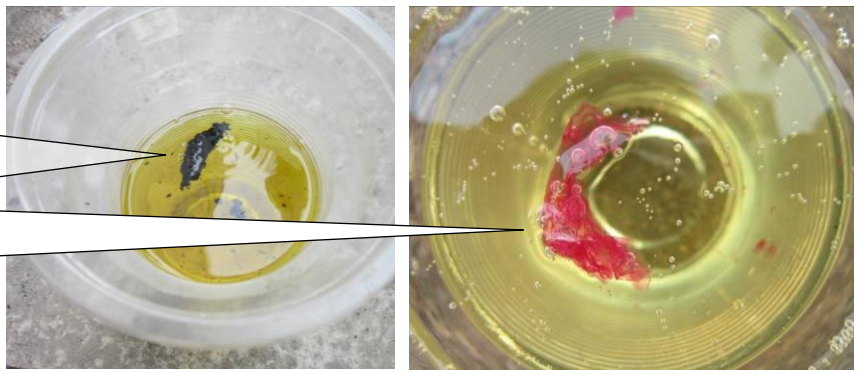
Normally the oil is clear and transparent, if it is a little yellowing, it is also OK. However, if the oil is become

black, feculent, or even there is impurity in the oil, that means the system has problems and the oil has gone bad, the oil need to be replaced.

The oil is black, it has been carbonized

The oil is a little yellowing, but it is clear and transparent, the quality is OK

The oil is still transparent, but there is impunity in the oil, the impunity may clog the filter



The oil becomes cloudy and gray

The oil contains a lot of copper scrap

If the oil has gone bad:

The compressor can't be lubricated effectively.

↓

The scroll plate, the crankshaft and the bearing of the compressor is worn

↓

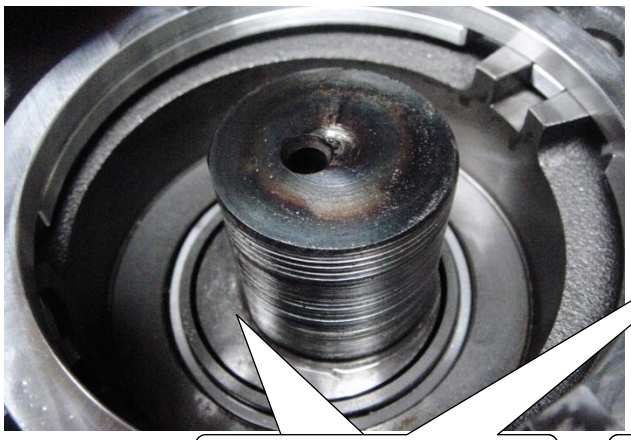
Abrasion leads to larger load, higher current

↓

The electric heat will rise and the temperature of the motor becomes increasingly high

↓

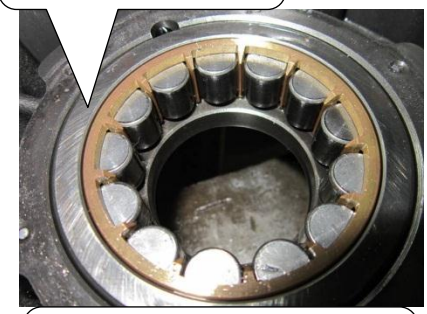
The motor is burned and the compressor is damaged at last



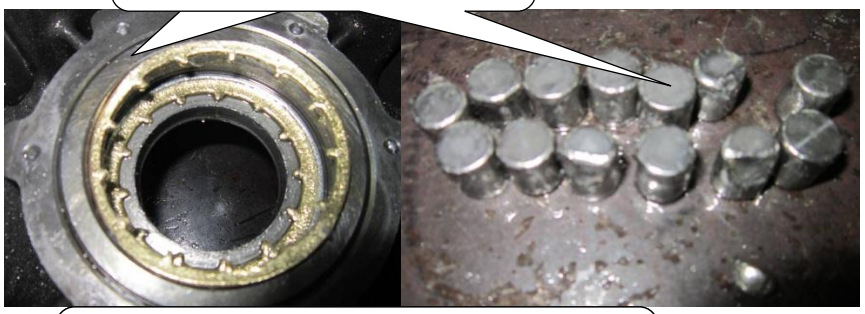
The crankshaft is worn.

The scroll plate is worn.

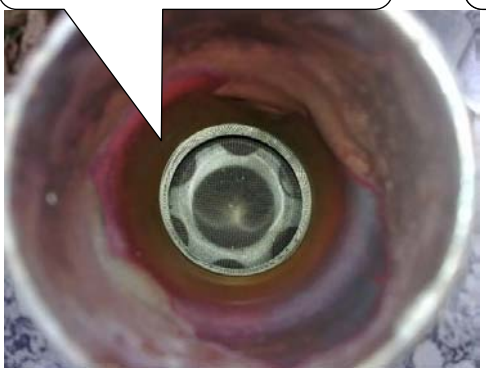
A normal bearing of the compressor



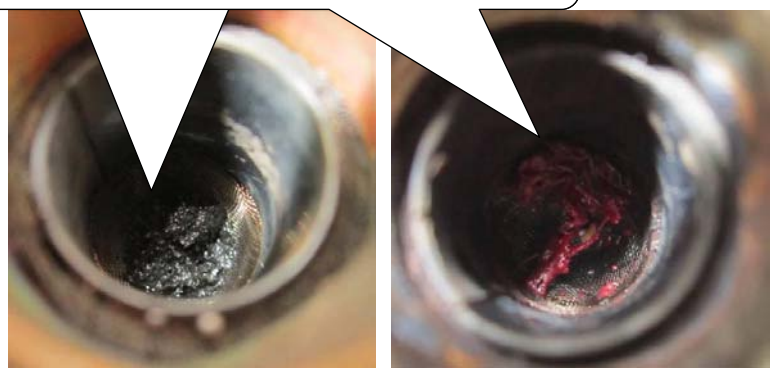
The bearing is worn seriously, it is damaged completely



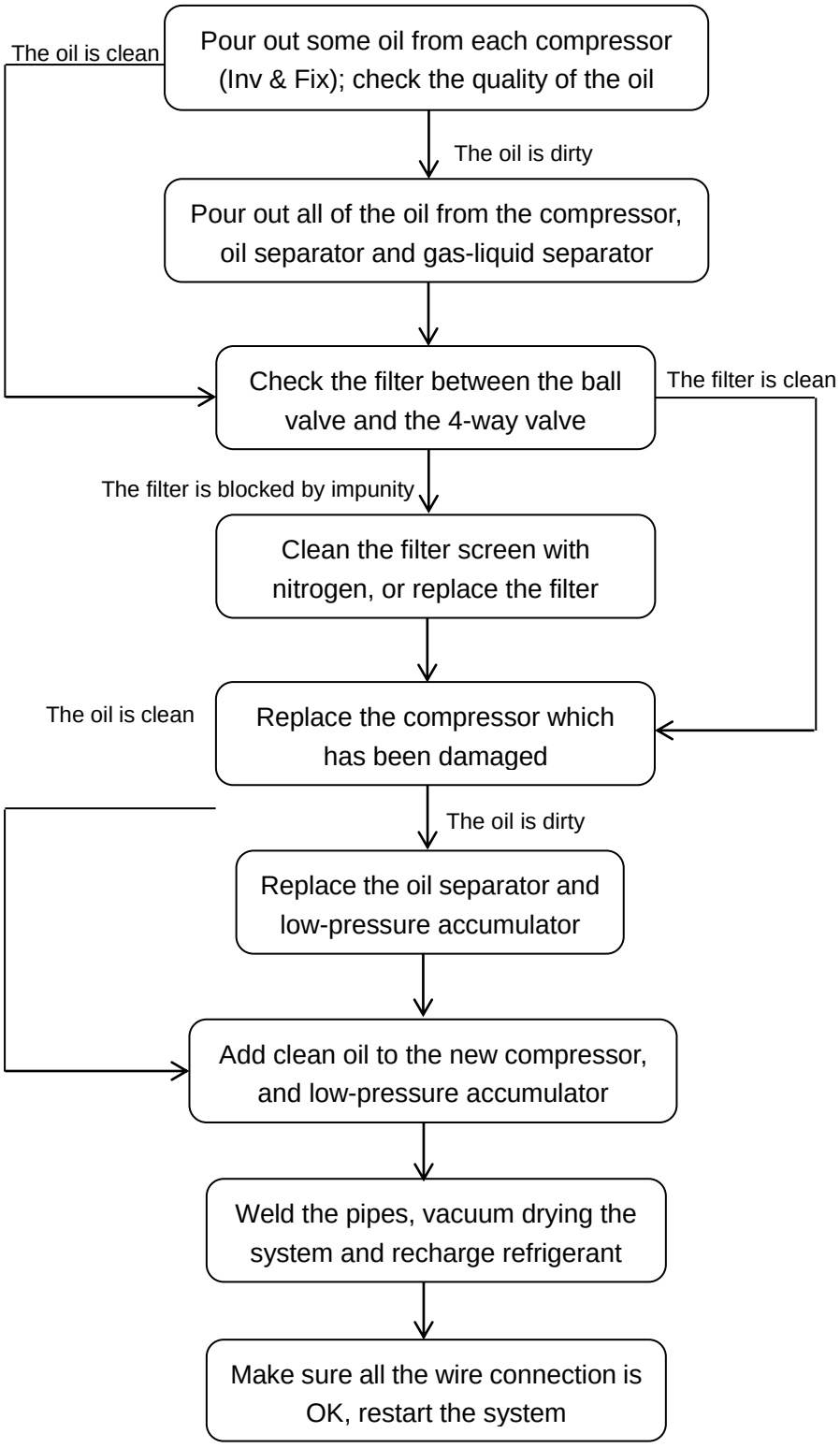
A clean filter (on the suction pipe of the system)



The filter is blocked by impunity, the suction of the compressor will be abnormal



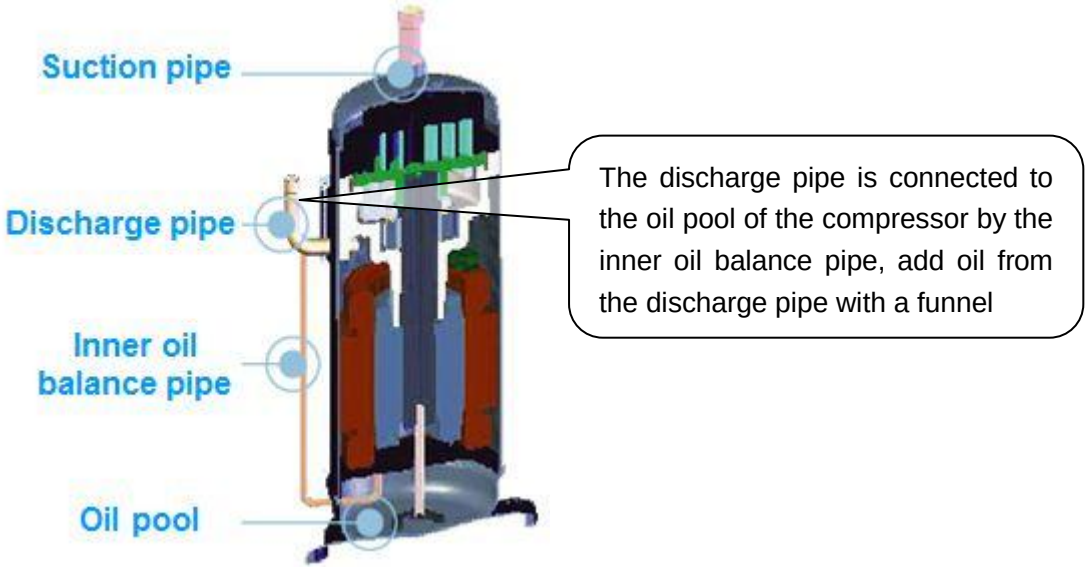
Step 3: Replace the compressor



Note:

1. Before dumping the oil, shake the compressor, oil separator and gas-liquid separator first, because impunity may deposit at the bottom of the tank.
2. If the oil of the inverter compressor is clean, there's no need to check the oil of fixed compressors. If the oil of the inverter compressor has gone bad, check the oil of fixed compressors is necessary. If all the oil of an outdoor unit needs to be replaced, after adding oil to the compressors, the rest oil should be charged to the low-pressure accumulator.

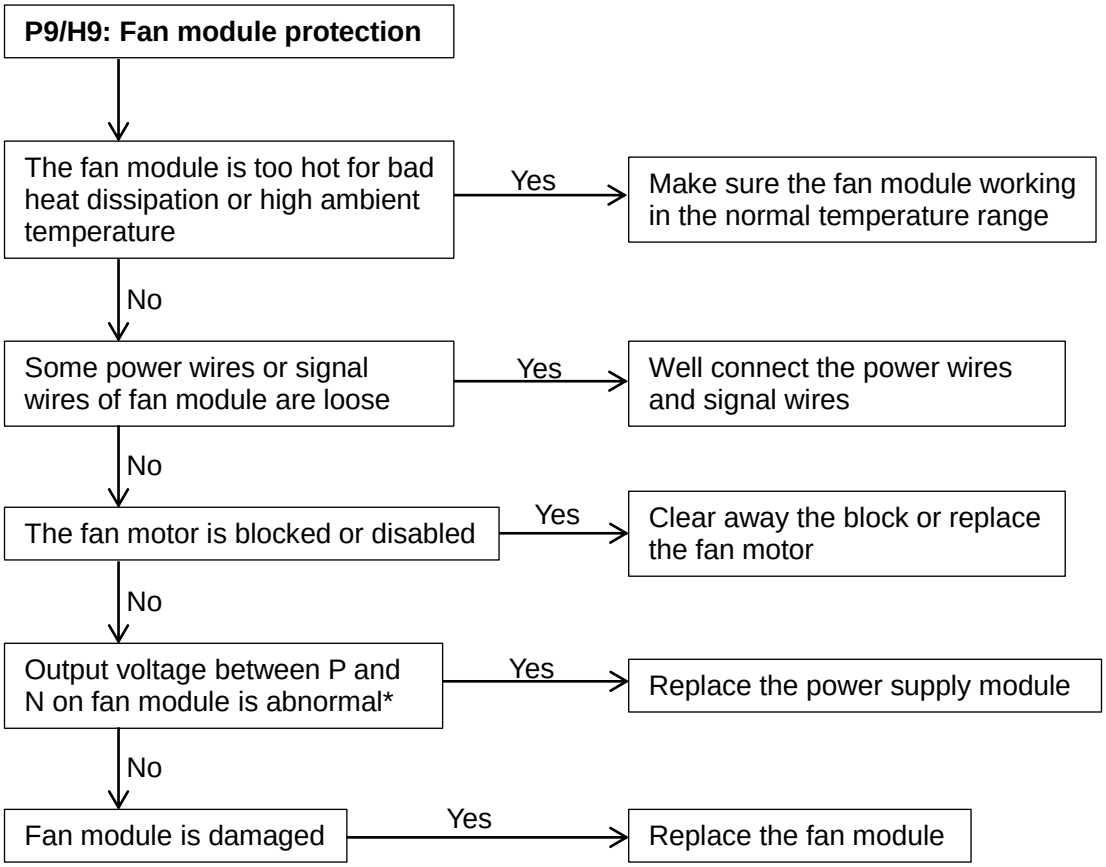
3. Add oil to the compressor from the **discharge pipe**.



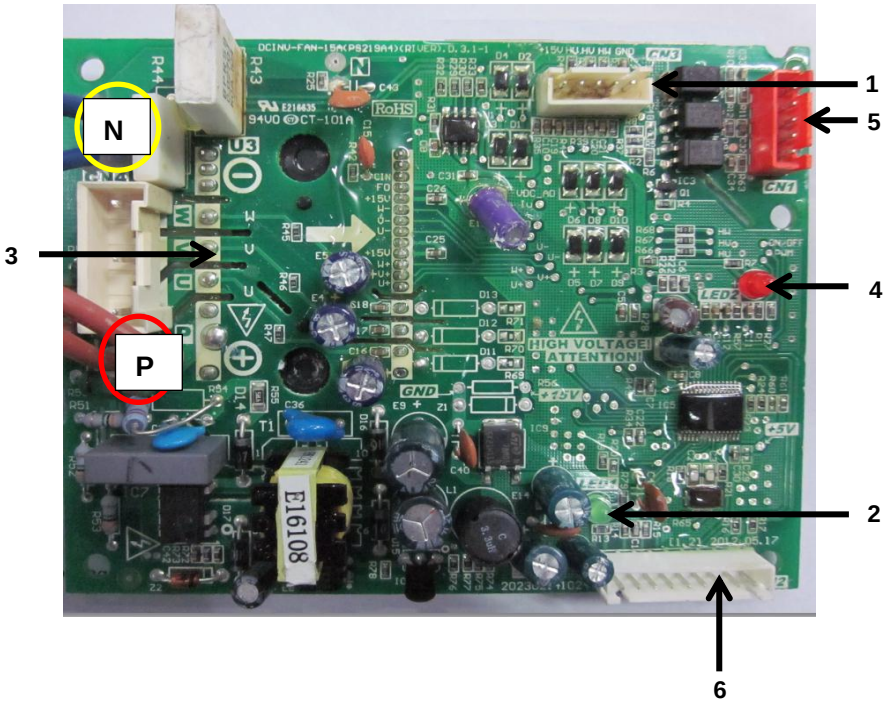
4. The type of the oil is FVC-68D, make sure the type of the oil is right because different compressor need different type of oil, if the type is wrong there will be various kinds of problems.

4.19 P9/H9: DC fan module protection

If the system display three times P9 protection in 60 minutes, the system will stop and display H9 error code. When the system displays H9 error code, the system can resume only by restarting the machine. At this time, malfunction should be disposed promptly to avoid further damage.



Fan module instruction



1 Program input port
2 Power supply indicator lamp
3 Fan motor U, V, W output port
4 Fault indicator lamp
5 PCB control signal input port
6 Signal feedback port

*** The normal value of output voltage between P and N on fan module is DC 310V**

P9 protection analysis

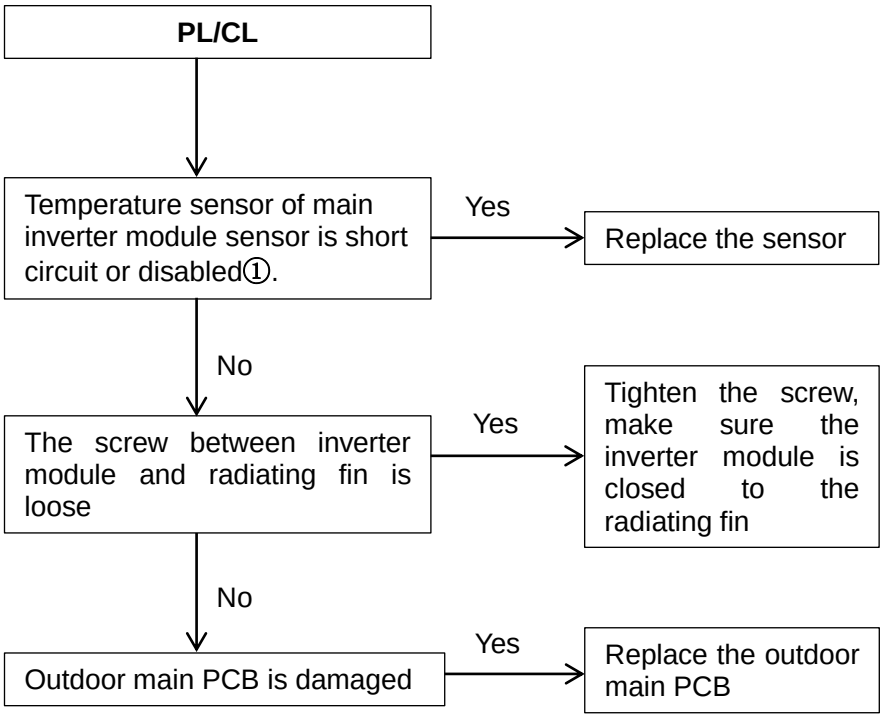
Conditions	Fault indicator lamp of fan module	Power supply indicator lamp of fan module	Digital tube display	Malfunction analysis
Power on	Off	Off	Quantity of IDU or “0”	Check the power supply circuit for fan module. Check whether there has power supply for lightning protection plate, whether the protective tube is broken, whether the voltage after rectification is normal, whether the bridge rectifier is broken.
Power on	Off	Flicker	Quantity of IDU or “0”	Power supply of fan module has problem, needs to replace the fan module.
When fan motor start	At first the lamp is on then the lamp is off	On	P9/H9	Check whether the drive port and signal feedback port is loose, whether the fan module and fan motor is installed firmly. If above conditions are all OK, it needs to replace the fan module.
When fan motor start	At first the lamp is on then the lamp flicker	On	P9/H9	Check whether the transformer in lightning protection plate Is open circuit, whether the relay is broken. If occurs above problem, it needs to replace the lightning protection plate.
Fan motor running several minutes	On	On	P9/H9	Check whether the capacity setting from dial switch is accordance with actual ODU capacity, whether the capacity from spot check is accordance with actual ODU capacity. If occurs above problem, it needs to adjust the capacity setting. If above conditions are both OK, it needs to replace the main control board.

4.20 PL/C7: Temperature protection of main inverter module

When the temperature of inverter module is over 80°C, it will display PL protection.

If the system display three times PL protection in 100 minutes, the system will stop and display C7 error code.

When the system displays C7 error code, the system can resume only by restarting the machine.



1. How to check whether the temperature sensor is short circuit or disabled①:

Using a multimeter to measure resistance, if the resistance is too small, the sensor is short circuit, if the resistance in certain temperature is not consistent with attached table 2, the sensor is disabled

Attached table 1: Resistance value of ambient temperature (T4) and pipe temperature sensors (T3 &T5)

Temperature °C(°F)	Resistance value (kΩ)	Temperature °C(°F)	Resistance value (kΩ)	Temperature °C(°F)	Resistance value (kΩ)	Temperature °C(°F)	Resistance value (kΩ)
-20(-4)	115.266	**20(68)**	12.6431	**60(140)**	2.35774	**100(212)**	0.62973
-19(-2.2)	108.146	**21(69.8)**	12.0561	**61(141.8)**	2.27249	**101(213.8)**	0.61148
-18(-0.4)	101.517	**22(71.6)**	11.5	**62(143.6)**	2.19073	**102(215.6)**	0.59386
-17(1.4)	96.3423	**23(73.4)**	10.9731	**63(145.4)**	2.11241	**103(217.4)**	0.57683
-16(3.2)	89.5865	**24(75.2)**	10.4736	**64(147.2)**	2.03732	**104(219.2)**	0.56038
-15(5)	84.219	**25(77)**	10	**65(149)**	1.96532	**105(221)**	0.54448
-14(6.8)	79.311	**26(78.8)**	9.55074	**66(150.8)**	1.89627	**106(222.8)**	0.52912
-13(8.6)	74.536	**27(80.6)**	9.12445	**67(152.6)**	1.83003	**107(224.6)**	0.51426
-12(10.4)	70.1698	**28(82.4)**	8.71983	**68(154.4)**	1.76647	**108(226.4)**	0.49989
-11(12.2)	66.0898	**29(84.2)**	8.33566	**69(156.2)**	1.70547	**109(228.2)**	0.486
-10(14)	62.2756	**30(86)**	7.97078	**70(158)**	1.64691	**110(230)**	0.47256
-9(15.8)	58.7079	**31(87.8)**	7.62411	**71(159.8)**	1.59068	**111(231.8)**	0.45957
-8(17.6)	56.3694	**32(89.6)**	7.29464	**72(161.6)**	1.53668	**112(233.6)**	0.44699
-7(19.4)	52.2438	**33(91.4)**	6.98142	**73(163.4)**	1.48481	**113(235.4)**	0.43482
-6(21.2)	49.3161	**34(93.2)**	6.68355	**74(165.2)**	1.43498	**114(237.2)**	0.42304
-5(23)	46.5725	**35(95)**	6.40021	**75(167)**	1.38703	**115(239)**	0.41164
-4(24.8)	44	**36(96.8)**	6.13059	**76(168.8)**	1.34105	**116(240.8)**	0.4006
-3(26.6)	41.5878	**37(98.6)**	5.87359	**77(170.6)**	1.29078	**117(242.6)**	0.38991
-2(28.4)	39.8239	**38(100.4)**	5.62961	**78(172.4)**	1.25423	**118(244.4)**	0.37956
-1(30.2)	37.1988	**39(102.2)**	5.39689	**79(174.2)**	1.2133	**119(246.2)**	0.36954
0(32)	35.2024	**40(104)**	5.17519	**80(176)**	1.17393	**120(248)**	0.35982
1(33.8)	33.3269	**41(105.8)**	4.96392	**81(177.8)**	1.13604	**121(249.8)**	0.35042
2(35.6)	31.5635	**42(107.6)**	4.76253	**82(179.6)**	1.09958	**122(251.6)**	0.3413
3(37.4)	29.9058	**43(109.4)**	4.5705	**83(181.4)**	1.06448	**123(253.4)**	0.33246
4(39.2)	28.3459	**44(111.2)**	4.38736	**84(183.2)**	1.03069	**124(255.2)**	0.3239
5(41)	26.8778	**45(113)**	4.21263	**85(185)**	0.99815	**125(257)**	0.31559
6(42.8)	25.4954	**46(114.8)**	4.04589	**86(186.8)**	0.96681	**126(258.8)**	0.30754
7(44.6)	24.1932	**47(116.6)**	3.88673	**87(188.6)**	0.93662	**127(260.6)**	0.29974
8(46.4)	22.5662	**48(118.4)**	3.73476	**88(190.4)**	0.90753	**128(262.4)**	0.29216
9(48.2)	21.8094	**49(120.2)**	3.58962	**89(192.2)**	0.8795	**129(264.2)**	0.28482
10(50)	20.7184	**50(122)**	3.45097	**90(194)**	0.85248	**130(266)**	0.2777
11(51.8)	19.6891	**51(123.8)**	3.31847	**91(195.8)**	0.82643	**131(267.8)**	0.27078
12(53.6)	18.7177	**52(125.6)**	3.19183	**92(197.6)**	0.80132	**132(269.6)**	0.26408
13(55.4)	17.8005	**53(127.4)**	3.07075	**93(199.4)**	0.77709	**133(271.4)**	0.25757
14(57.2)	16.9341	**54(129.2)**	2.95896	**94(201.2)**	0.75373	**134(273.2)**	0.25125
15(59)	16.1156	**55(131)**	2.84421	**95(203)**	0.73119	**135(275)**	0.24512
16(60.8)	15.3418	**56(132.8)**	2.73823	**96(204.8)**	0.70944	**136(276.8)**	0.23916
17(62.6)	14.6181	**57(134.6)**	2.63682	**97(206.6)**	0.68844	**137(278.6)**	0.23338
18(64.4)	13.918	**58(136.4)**	2.53973	**98(208.4)**	0.66818	**138(280.4)**	0.22776
19(66.2)	13.2631	**59(138.2)**	2.44677	**99(210.2)**	0.64862	**139(282.2)**	0.22231

Attached table 2: Resistance value of compressor discharge temperature sensor (INVgas & INV1gas)

Temperature °C(°F)	Resistance value (kΩ)	Temperature °C(°F)	Resistance value (kΩ)	Temperature °C(°F)	Resistance value (kΩ)	Temperature °C(°F)	Resistance value (kΩ)
-20(-4)	542.7	**20(68)**	68.66	**60(140)**	13.59	**100(212)**	3.702
-19(-2.2)	511.9	**21(69.8)**	65.62	**61(141.8)**	13.11	**101(213.8)**	3.595
-18(-0.4)	483	**22(71.6)**	62.73	**62(143.6)**	12.65	**102(215.6)**	3.492
-17(1.4)	455.9	**23(73.4)**	59.98	**63(145.4)**	12.21	**103(217.4)**	3.392
-16(3.2)	430.5	**24(75.2)**	57.37	**64(147.2)**	11.79	**104(219.2)**	3.296
-15(5)	406.7	**25(77)**	54.89	**65(149)**	11.38	**105(221)**	3.203
-14(6.8)	384.3	**26(78.8)**	52.53	**66(150.8)**	10.99	**106(222.8)**	3.113
-13(8.6)	363.3	**27(80.6)**	50.28	**67(152.6)**	10.61	**107(224.6)**	3.025
-12(10.4)	343.6	**28(82.4)**	48.14	**68(154.4)**	10.25	**108(226.4)**	2.941
-11(12.2)	325.1	**29(84.2)**	46.11	**69(156.2)**	9.902	**109(228.2)**	2.86
-10(14)	307.7	**30(86)**	44.17	**70(158)**	9.569	**110(230)**	2.781
-9(15.8)	291.3	**31(87.8)**	42.33	**71(159.8)**	9.248	**111(231.8)**	2.704
-8(17.6)	275.9	**32(89.6)**	40.57	**72(161.6)**	8.94	**112(233.6)**	2.63
-7(19.4)	261.4	**33(91.4)**	38.89	**73(163.4)**	8.643	**113(235.4)**	2.559
-6(21.2)	247.8	**34(93.2)**	37.3	**74(165.2)**	8.358	**114(237.2)**	2.489
-5(23)	234.9	**35(95)**	35.78	**75(167)**	8.084	**115(239)**	2.422
-4(24.8)	222.8	**36(96.8)**	34.32	**76(168.8)**	7.82	**116(240.8)**	2.357
-3(26.6)	211.4	**37(98.6)**	32.94	**77(170.6)**	7.566	**117(242.6)**	2.294
-2(28.4)	200.7	**38(100.4)**	31.62	**78(172.4)**	7.321	**118(244.4)**	2.233
-1(30.2)	190.5	**39(102.2)**	30.36	**79(174.2)**	7.086	**119(246.2)**	2.174
0(32)	180.9	**40(104)**	29.15	**80(176)**	6.859	**120(248)**	2.117
1(33.8)	171.9	**41(105.8)**	28	**81(177.8)**	6.641	**121(249.8)**	2.061
2(35.6)	163.3	**42(107.6)**	26.9	**82(179.6)**	6.43	**122(251.6)**	2.007
3(37.4)	155.2	**43(109.4)**	25.86	**83(181.4)**	6.228	**123(253.4)**	1.955
4(39.2)	147.6	**44(111.2)**	24.85	**84(183.2)**	6.033	**124(255.2)**	1.905
5(41)	140.4	**45(113)**	23.89	**85(185)**	5.844	**125(257)**	1.856
6(42.8)	133.5	**46(114.8)**	22.89	**86(186.8)**	5.663	**126(258.8)**	1.808
7(44.6)	127.1	**47(116.6)**	22.1	**87(188.6)**	5.488	**127(260.6)**	1.762
8(46.4)	121	**48(118.4)**	21.26	**88(190.4)**	5.32	**128(262.4)**	1.717
9(48.2)	115.2	**49(120.2)**	20.46	**89(192.2)**	5.157	**129(264.2)**	1.674
10(50)	109.8	**50(122)**	19.69	**90(194)**	5	**130(266)**	1.632
11(51.8)	104.6	**51(123.8)**	18.96	**91(195.8)**	4.849		
12(53.6)	99.69	**52(125.6)**	18.26	**92(197.6)**	4.703		
13(55.4)	95.05	**53(127.4)**	17.58	**93(199.4)**	4.562		
14(57.2)	90.66	**54(129.2)**	16.94	**94(201.2)**	4.426		
15(59)	86.49	**55(131)**	16.32	**95(203)**	4.294	B(25/50)=3950K	
16(60.8)	82.54	**56(132.8)**	15.73	**96(204.8)**	4.167		
17(62.6)	78.79	**57(134.6)**	15.16	**97(206.6)**	4.045	R(90℃)=5KΩ+-3%	
18(64.4)	75.24	**58(136.4)**	14.62	**98(208.4)**	3.927		
19(66.2)	71.86	**59(138.2)**	14.09	**99(210.2)**	3.812		

Attached table 3: Commissioning and operating parameters of refrigerant system

Conditions 1: Make sure outdoor unit can detect all the indoor units, the quantity of indoor units display steadily and be equal to actual quantity of installed indoor units.

Conditions 2: Make sure all the valves in outdoor unit are open, indoor units EXV have connected to indoor PCB.

Conditions 3: The ratio of connectable indoor units is 100%. When ambient temperature is high, operate the system in cooling mode and set the temperature 17°C(62.6°F). When ambient temperature is low, operate the system in heating mode and set the temperature 30 °C(86°F). Then get the parameters after system running normally more than 30 minutes.

Outdoor unit cooling parameters table

Ambient temperature (T4)	°C	20-27	27-33	33-38	38-45
	°F	68-80.6	80.6-91.4	91.4-100.4	100.4-113
Discharge pressure (spot check)	MPa	2.1-2.3	2.8-3.1	3.3-3.5	3.7-3.9
	PSI	305-334	406-450	479-508	537-566
Pressure of high pressure valve	MPa	1.8-2.0	2.4-2.7	2.8-3.0	3.2-3.5
	PSI	261-290	348-392	406-435	464-508
Pressure of low pressure valve	MPa	0.7-0.9	0.8-1.0	1.0-1.2	1.2-1.4
	PSI	102-131	116-145	145-174	174-203
Discharge temperature (spot check)	°C	50-65	70-85	70-90	80-90
	°F	122-149	158-185	158-194	176-194
DC inverter compressor current (spot check)	A	4-5	6-7	7~8	9-11
Average temperature of evaporator outlet T2B	°C	8-9	12-15	16-17	20
	°F	46.4-48.2	53.6-59	60.8-62.6	68

Outdoor unit heating parameters table

Ambient temperature (T4)	°C	-15--5	-5-5	5-12	12-18
	°F	5-41	23-41	41-53.6	53.6-64.4
Discharge pressure (spot check)	MPa	2.0-2.2	2.2-2.7	3.0-3.1	2.6-2.7
	PSI	290-319	319-392	435-450	377-392
Pressure of high pressure valve	MPa	1.7-1.8	1.8-2.4	2.6-2.8	2.1-2.4
	PSI	247-261	261-348	377-406	305-348
Pressure of low pressure valve	MPa	2.0-2.2	2.2-2.6	3.0-3.1	2.5-2.7
	PSI	290-319	319-377	435-450	363-392
Discharge temperature (spot check)	°C	50-70	60-70	60-85	60-70
	°F	122-158	140-158	140-185	140-158
DC inverter compressor current (spot check)	A	5	5-6	6-8	5-6
Average temperature of condenser outlet T2	°C	33	33-40	46-50	39-41
	°F	91.4	91.4-104	114.8-122	102.2-105.8

Part 7 Exploded view

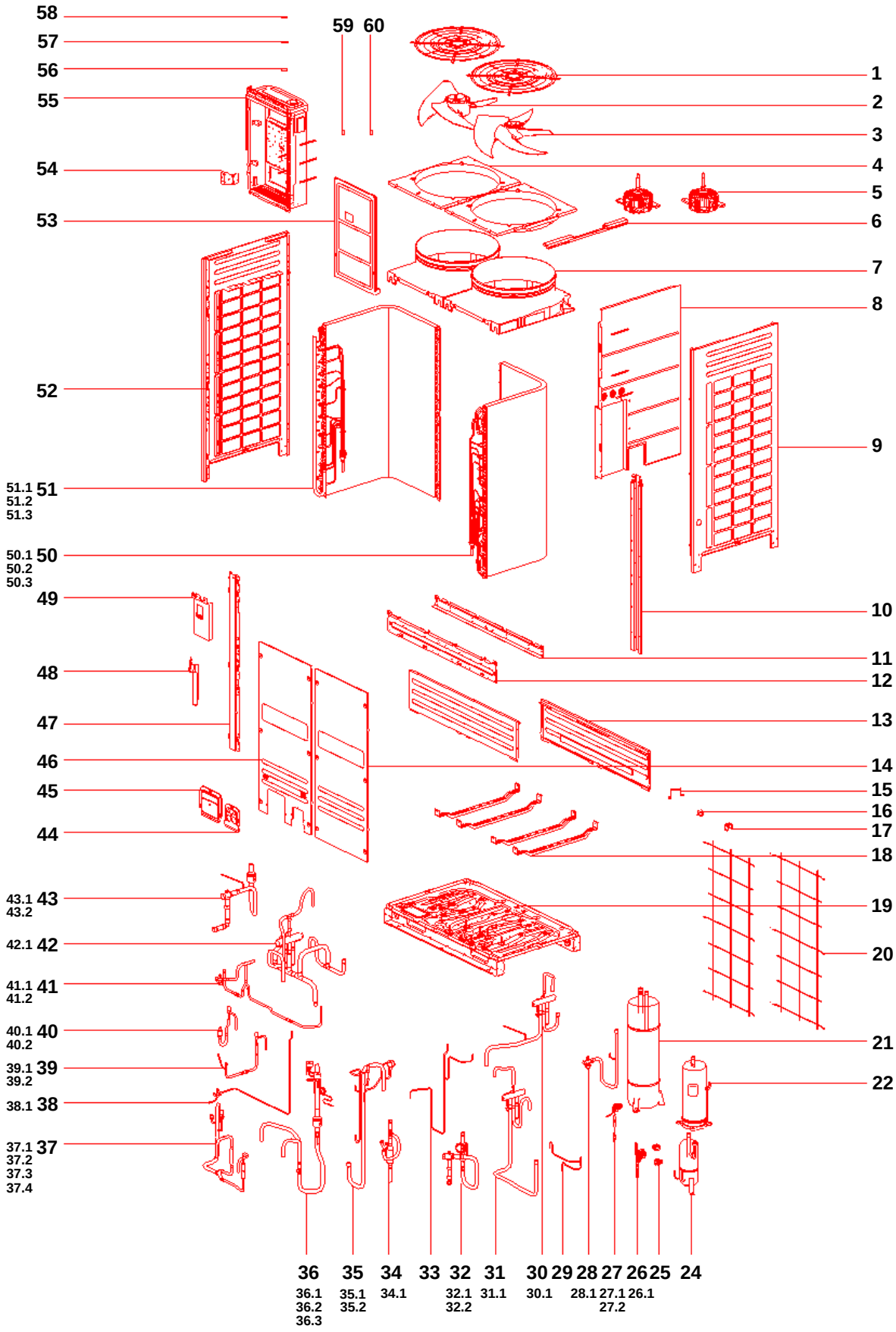
1. Outdoor unit exploded view

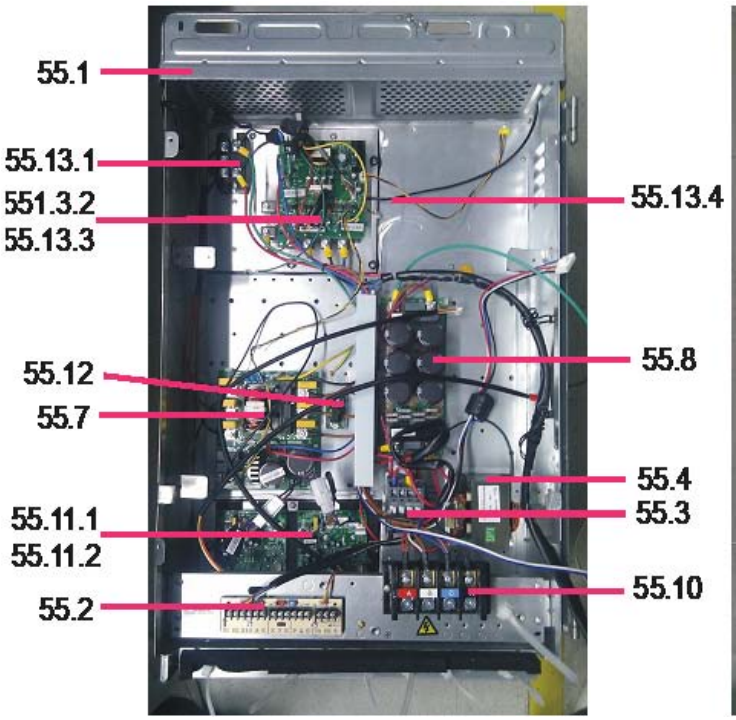
1.1. Exploded view units 8, 10 and 12 HP

MVD-252(8)W/D2RN1T(C)
CL23115

MVD-280(10)W/D2RN1T(C)
CL23116

MVD-335(12)W/D2RN1T(C)
CL23117

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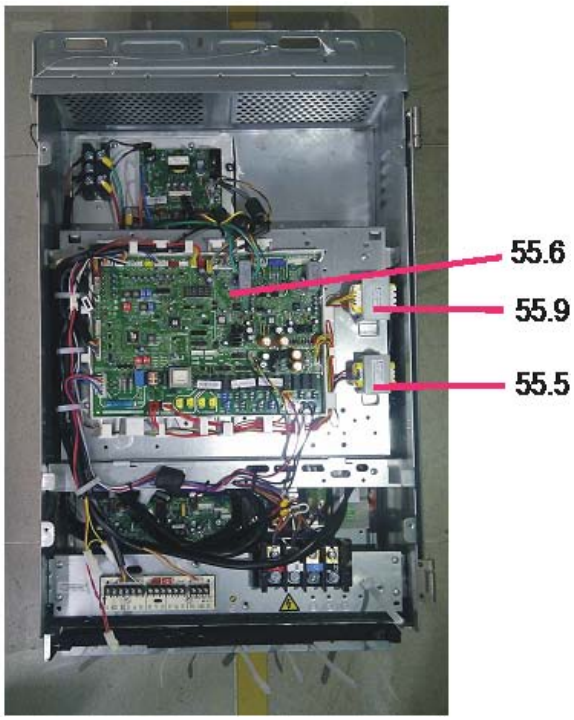
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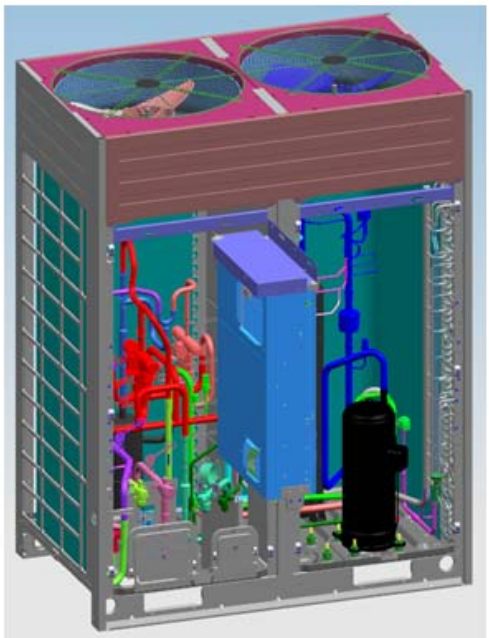


1.2. Spare parts list unit 8 HP

MVD-252(8)W/D2RN1T(C)

CL23115

Nº	Description	Qty.	Supplier code	Code
1	Grille	2	201295100244	
2	Axial flow fan	1	201100300518	CL92307
3	Axial fan	1	201100300522	CL92316
4	Top cover ass'y	2	201195100013	
5	Dc motor	2	202400300026	CL92297
6	Beam ass'y, top cover	1	201295100368	
7	Ventilation ass'y	2	201195100390	
8	Middle clapboard ass'y	1	201295190192	
9	Right panel ass'y	1	201295100359	
10	Middle upright ass'y	1	201295301011	
11	Motor beams	1	201295100369	
12	Support board，beam	1	201295100383	
13	Front cover ass'y, up	2	201295100372	
14	Right front plate	1	201295100377	
15	No. 3 piping support board	1	201295190197	
16	No. 2 piping mounting board	1	201295190198	
17	No. 1 piping mounting board	1	201295190199	
18	Motor bracket	4	201295100574	
19	Chassis ass'y	1	201295190200	
20	Back wire mesh	2	201295301013	
21	Separator	1	201601100201	
22	Compressor	1	201400400210	
24	Oil separator	1	201601100031	
25	Electronic expansion valve coil	2	201601300641	
26	Capillary ass'y	1	201695100839	
27	Oil balance pipe ass'y	1	201695100603	
28	High pressure gas balance pipe ass'y	1	201695190617	
28.1	Low pressure valve	1	201600720425	
29	Tee joint ass'y	1	201695190619	
30	No. 1 four-way valve ass'y	1	201695190622	
30.1	Four-way valve ass'y	1	201600630619	
31	No. 2 four-way valve ass'y	1	201695190627	
31.1	Four-way valve ass'y	1	201600630619	
32	High pressure valve ass'y	1	201695190578	
32.1	Low pressure valve	1	201600720425	
32.2	one-way valve	1	201600801467	
33	No. 1 Tee joint ass'y	1	201695190706	
34	One-way valve ass'y	1	201695190588	
34.1	One way valve	1	201600800833	
35	Unloading valve ass'y	1	201695190569	
35.1	One-way solenoid valve	1	201600610010	
35.2	Unloading valve	1	201601600057	
36	Compressor suction pipe ass'y	1	201695190599	
36.1	Strainer	1	201600900123	
36.2	Pressure controller	1	202301820018	
36.3	One-way solenoid valve coil	2	201600630561	
37	Compressor discharge pipe ass'y	1	201695190604	
37.1	Pressure sensor	1	202301300714	
37.2	Connecting pipe of pressure sensor	1	201695100740	
37.3	Pressure switch	1	202301820042	
37.4	One way valve	1	201600810001	
37.5	Pipe joint	1	201601200212	
38	Oil balance pipe ass'y	1	201695190631	
38.1	Low pressure valve	1	201600710613	
39	Right expansion valve ass'y	1	201695190607	
39.1	Filter	1	201600900856	
39.2	Electronic expansion valve	1	201601300532	CL94689
40	Left expansion valve ass'y	1	201695190612	

MVD-252(8)W/D2RN1T(C)

CL23115

Nº	Description	Qty.	Supplier code	Code
40.1	Filter	1	201600900854	
40.2	Electronic expansion valve	1	201601300532	CL94689
41	Liquid pipe ass'y	1	201695190581	
41.1	Low pressure valve	1	201600720193	
41.2	Filter	2	201600900856	
42	Four-way valve ass'y	1	201695190590	
42.1	Four-way valve ass'y	1	201600630579	
43	Low pressure valve ass'y	1	201695190586	
43.1	Strainer	1	201600900123	
43.2	Low pressure valve	1	201600700080	
44	Wire clip	1	201295100350	
45	Pipe clip	1	201295100351	
47	Stand column assy	1	201295100584	
48	No. 2 valve mounting board ass'y	1	201295190201	
49	No. 1 valve mounting board ass'y	1	201295190203	
50	Right condenser ass'y	1	201595190045	
50.1	Right condenser	1	201595190046	
50.2	Right condenser input pipe ass'y	1	201695190633	
50.3	Right condenser output pipe ass'y	1	201695190639	
51	Left condenser ass'y	1	201595190047	
51.1	Left condenser	1	201595190048	
51.2	Left condenser input pipe ass'y	1	201695190654	
51.3	Left condenser output pipe ass'y	1	201695190659	
52	Left panel ass'y	1	201295100357	
53	E-Part box cover ass'y	1	201295100502	
54	Left hanging plate of electronic control box	1	201295100869	
55	Outdoor electric control box ass'y	1	203395190244	
55.1	Electric control box	1	201295190194	
55.2	Intermediate adapter board ass'y	1	201395100269	
55.3	Contactor	1	202300850043	CL92289
55.4	Reactor	1	202301000953	
55.5	Power transformer (with the fuse)	1	202300930247	
55.6	Outdoor main control board ass'y	1	201319902959	
55.7	Outdoor power supply board ass'y	1	201319902960	
55.8	Filter board ass'y	1	201395100272	
55.9	Transformer	1	202300930264	
55.10	Terminal block, 4P	1	202301400420	
55.11	Fan module radiator ass'y	1	201395100282	
55.11.1	Inverter module	2	201319902795	
55.11.2	Electronic control module component-IPM module	2	202300702383	
55.12	Current detection plate ass'y	1	201319902859	
55.13	Inverter module radiator ass'y	1	201395190279	
55.13.1	Three phase bridge	1	202300500348	
55.13.2	50 A DC frequency converter module ass'y	1	201319900504	
55.13.3	50A 1200V frequency converter module	1	202300701005	
55.13.4	Module temperature sensor ass'y (T7)	1	202301300783	
56	Discharge temperature controller (P-PRO switch)	1	202301600646	
57	Pipe temp. sensor ass'y (T5 - right)	1	202301300743	
58	Pipe temp. sensor ass'y (T3 - left)	1	202301300733	
59	Discharge temp, sensor ass'y (INVgas)	1	202301300709	CL92295
60	Outdoor temp. sensor ass'y (T4)	1	202301300198	CL92294

1.3. Spare parts list unit 10 HP

MVD-280(10)W/D2RN1T(C)

CL23116

Nº	Description	Qty.	Supplier code	Code
1	Grille	2	201295100244	
2	Axial flow fan	1	201100300518	CL92307
3	Axial fan	1	201100300522	CL92316
4	Top cover ass'y	2	201195100013	
5	Dc motor	2	202400300026	CL92297
6	Beam ass'y, top cover	1	201295100368	
7	Ventilation ass'y	2	201195100390	
8	Middle clapboard ass'y	1	201295190192	
9	Right panel ass'y	1	201295100359	
10	Middle upright ass'y	1	201295301011	
11	Motor beams	1	201295100369	
12	Support board, beam	1	201295100383	
13	Front cover ass'y, up	2	201295100372	
14	Right front plate	1	201295100377	
15	No. 3 piping support board	1	201295190197	
16	No. 2 piping mounting board	2	201295190198	
17	No. 1 piping mounting board	1	201295190199	
18	Motor bracket	4	201295100574	
19	Chassis ass'y	1	201295190200	
20	Back wire mesh	2	201295301013	
21	Separator	1	201601100201	
22	Compressor	1	201400400210	
24	Oil separator	1	201601100031	
25	Electronic expansion valve coil	2	201601300641	
26	Capillary ass'y	1	201695100839	
27	Oil balance pipe ass'y	1	201695100603	
28	High pressure gas balance pipe ass'y	1	201695190617	
29	Tee joint ass'y	1	201695190619	
30	No. 1 four-way valve ass'y	1	201695190622	
31	No. 2 four-way valve ass'y	1	201695190627	
32	High pressure valve ass'y	1	201695190578	
33	No. 1 Tee joint ass'y	1	201695190706	
34	One-way valve ass'y	1	201695190588	
35	Unloading valve ass'y	1	201695190569	
36	Compressor suction pipe ass'y	1	201695190599	
37	Compressor discharge pipe ass'y	1	201695190604	
38	Oil balance pipe ass'y	1	201695190631	
39	Right expansion valve ass'y	1	201695190607	
39.1	Filter	1	201600900856	
39.2	Electronic expansion valve	1	201601300532	CL94689
40	Left expansion valve ass'y	1	201695190612	
40.1	Filter	1	201600900854	
40.2	Electronic expansion valve	1	201601300532	CL94689
41	Liquid pipe ass'y	1	201695190581	
42	Four-way valve ass'y	1	201695190590	
43	Low pressure valve ass'y	1	201695190586	
44	Wire clip	1	201295100350	
45	Pipe clip	1	201295100351	
46	Left panel	1	201295100376	
47	Stand column assy	1	201295100584	
48	No. 2 valve mounting board ass'y	1	201295190201	
49	No. 1 valve mounting board ass'y	1	201295190203	
50	Right condenser ass'y	1	201595190045	
51	Left condenser ass'y	1	201595190047	
52	Left panel ass'y	1	201295100357	
53	E-Part box cover ass'y	1	201295100502	
54	Left hanging plate of electronic control box	1	201295100869	
55	Outdoor electric control box ass'y	1	203395190244	

MVD-280(10)W/D2RN1T(C)

CL23116

Nº	Description	Qty.	Supplier code	Code
55.1	Electric control box	1	201295190194	
55.2	Intermediate adapter board ass'y	1	201395100269	
55.3	Contactor	1	202300850043	CL92289
55.4	Reactor	1	202301000953	
55.5	Power transformer (with the fuse)	1	202300930247	
55.6	Outdoor main control board ass'y	1	201319902959	
55.7	Outdoor power supply board ass'y	1	201319902960	
55.8	Filter board ass'y	1	201395100272	
55.9	Transformer	1	202300930264	
55.10	Terminal block, 4P	1	202301400420	
55.11	Fan module radiator ass'y	1	201395100282	
55.11.1	Inverter module	2	201319902795	
55.11.2	Electronic control module component-IPM module	2	202300702383	
55.12	Current detection plate ass'y	1	201319902859	
55.13	Inverter module radiator ass'y	1	201395190279	
55.13.1	Three phase bridge	1	202300500348	
55.13.2	50 A DC frequency converter module ass'y	1	201319900504	
55.13.3	50A 1200V frequency converter module	1	202300701005	
55.13.4	Module temperature sensor ass'y (T7)	1	202301300783	
56	Discharge temperature controller (P-PRO switch)	1	202301600646	
57	Pipe temp. sensor ass'y (T5 - right)	1	202301300743	
58	Pipe temp. sensor ass'y (T3 - left)	1	202301300733	
59	Discharge temp, sensor ass'y (INVgas)	1	202301300709	CL92295
60	Outdoor temp. sensor ass'y (T4)	1	202301300198	CL92294

1.4. Spare parts list unit 12 HP

MVD-335(12)W/D2RN1T(C)

CL23117

Nº	Description	Qty.	Supplier code	Code
1	Grille	2	201295100244	
2	Axial flow fan	1	201100300518	CL92307
3	Axial fan	1	201100300522	CL92316
4	Top cover ass'y	2	201195100013	
5	Dc motor	2	202400300026	CL92297
6	Beam ass'y, top cover	1	201295100368	
7	Ventilation ass'y	2	201195100390	
8	Middle clapboard ass'y	1	201295190192	
9	Right panel ass'y	1	201295100359	
10	Middle upright ass'y	1	201295301011	
11	Motor beams	1	201295100369	
12	Support board, beam	1	201295100383	
13	Front cover ass'y, up	2	201295100372	
14	Right front plate	1	201295100377	
15	No. 3 piping support board	1	201295190197	
16	No. 2 piping mounting board	1	201295190198	
17	No. 1 piping mounting board	1	201295190199	
18	Motor bracket	4	201295100574	
19	Chassis ass'y	1	201295190200	
20	Back wire mesh	2	201295301013	
21	Separator	1	201601100201	
22	Compressor	1	201400400210	
24	Oil separator	1	201601100031	
25	Electronic expansion valve coil	2	201601300641	
26	Capillary ass'y	1	201695100839	
26.1	Filter	1	201600900852	
27	Oil balance pipe ass'y	1	201695100603	
27.1	One way valve	1	201600800033	
27.2	Filter	1	201600900853	
28	High pressure gas balance pipe ass'y	1	201695190617	
28.1	Low pressure valve	1	201600720425	
29	Tee joint ass'y	1	201695190619	
30	No. 1 four-way valve ass'y	1	201695190622	
30.1	Four-way valve ass'y	1	201600630619	
31	No. 2 four-way valve ass'y	1	201695190627	
31.1	Four-way valve ass'y	1	201600630619	
32	High pressure valve ass'y	1	201695190578	
32.1	Low pressure valve	1	201600720425	
32.2	one-way valve	1	201600801467	
33	No. 1 Tee joint ass'y	1	201695190706	
34	One-way valve ass'y	1	201695190588	
34.1	One way valve	1	201600800833	
35	Unloading valve ass'y	1	201695190569	
35.1	One-way solenoid valve	1	201600610010	
35.2	Unloading valve	1	201601600057	
36	Compressor suction pipe ass'y	1	201695190599	
36.1	Strainer	1	201600900123	
36.2	Pressure controller	1	202301820018	
36.3	One-way solenoid valve coil	2	201600630561	
37	Compressor discharge pipe ass'y	1	201695190604	
37.1	Pressure sensor	1	202301300714	
37.2	Connecting pipe of pressure sensor	1	201695100740	
37.3	Pressure switch	1	202301820042	
37.4	One way valve	1	201600810001	
37.5	Pipe joint	1	201601200212	
38	Oil balance pipe ass'y	1	201695190631	
38.1	Low pressure valve	1	201600710613	
39	Right expansion valve ass'y	1	201695190607	

MVD-335(12)W/D2RN1T(C)

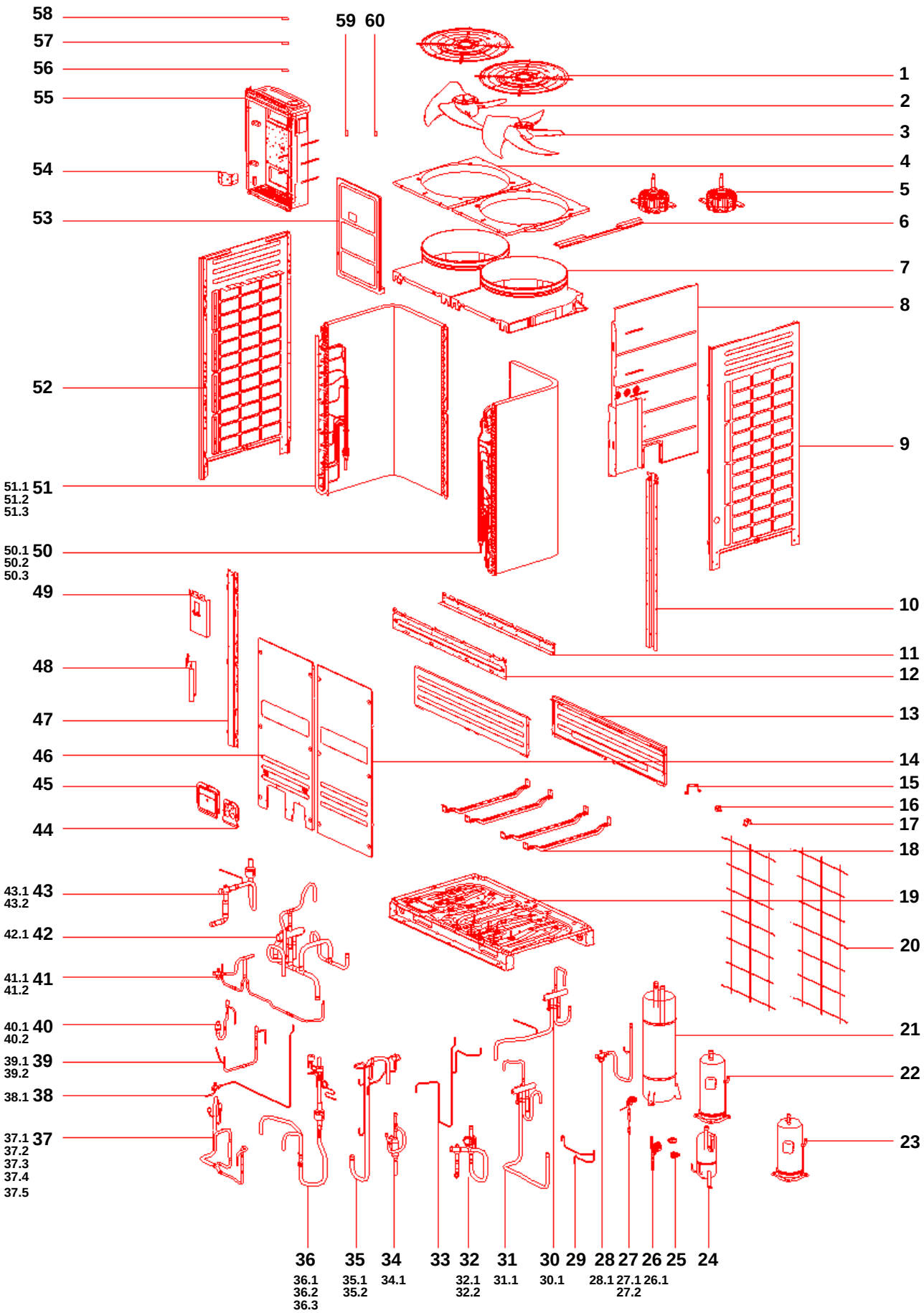
CL23117

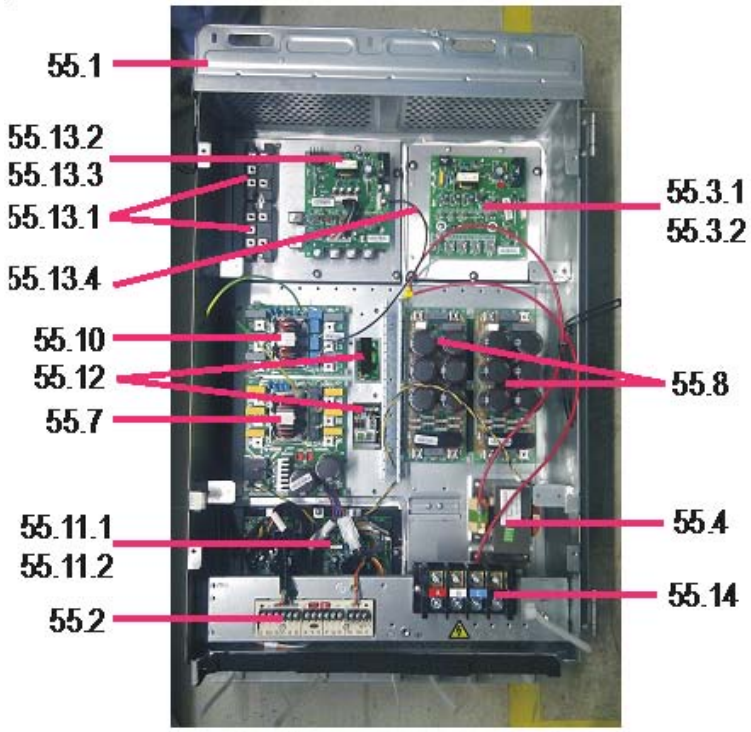
Nº	Description	Qty.	Supplier code	Code
39.1	Filter	1	201600900856	
39.2	Electronic expansion valve	1	201601300532	CL94689
40	Left expansion valve ass'y	1	201695190612	
40.1	Filter	1	201600900854	
40.2	Electronic expansion valve	1	201601300532	CL94689
41	No. 1 low pressure valve ass'y	1	201695190697	
41.1	Filter	2	201600900856	
41.2	Low pressure valve	1	201600710615	
42	Four-way valve ass'y	1	201695190590	
42.1	Four-way valve ass'y	1	201600630579	
43	Low pressure valve ass'y	1	201695190705	
43.1	Strainer	1	201600900123	
43.2	low pressure valve	1	201600700080	
44	Wire clip	1	201295100350	
45	Pipe clip	1	201295100351	
46	Left panel	1	201295100376	
47	Stand column assy	1	201295100584	
48	No. 2 valve mounting board ass'y	1	201295190201	
49	No. 1 valve mounting board ass'y	1	201295190203	
50	Right condenser ass'y	1	201595190045	
50.1	Right condenser	1	201595190046	
50.2	Right condenser input pipe ass'y	1	201695190633	
50.3	Right condenser output pipe ass'y	1	201695190639	
51	Left condenser ass'y	1	201595190047	
51.1	Left condenser	1	201595190048	
51.2	Left condenser input pipe ass'y	1	201695190654	
51.3	Left condenser output pipe ass'y	1	201695190659	
52	Left panel ass'y	1	201295100357	
53	E-Part box cover ass'y	1	201295100502	
54	Left hanging plate of electronic control box	1	201295100869	
55	Outdoor electric control box ass'y	1	203395190244	
55.1	Electric control box	1	201295190194	
55.2	Intermediate adapter board ass'y	1	201395100269	
55.3	Contactor	1	202300850043	CL92289
55.4	Reactor	1	202301000953	
55.5	Power transformer (with the fuse)	1	202300930247	
55.6	Outdoor main control board ass'y	1	201319902959	
55.7	Outdoor power supply board ass'y	1	201319902960	
55.8	Filter board ass'y	1	201395100272	
55.9	Transformer	1	202300930264	
55.10	Terminal block, 4P	1	202301400420	
55.11	Fan module radiator ass'y	1	201395100282	
55.11.1	Inverter module	2	201319902795	
55.11.2	Electronic control module component-IPM module	2	202300702383	
55.12	Current detection plate ass'y	1	201319902859	
55.13	Inverter module radiator ass'y	1	201395190279	
55.13.1	Three phase bridge	1	202300500348	
55.13.2	50 A DC frequency converter module ass'y	1	201319900504	
55.13.3	50A 1200V frequency converter module	1	202300701005	
55.13.4	Module temperature sensor ass'y (T7)	1	202301300783	
56	Discharge temperature controller (P-PRO switch)	1	202301600646	
57	Pipe temp. sensor ass'y (T5 - right)	1	202301300743	
58	Pipe temp. sensor ass'y (T3 - left)	1	202301300733	
59	Discharge temp, sensor ass'y (INVgas)	1	202301300709	CL92295
60	Outdoor temp. sensor ass'y (T4)	1	202301300198	CL92294

1.5. Exploded view units 14 and 16 HP

MVD-400(14)W/D2RN1T(C) CL23118

MVD-450(16)W/D2RN1T(C) CL23119

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55.13.3
55.13.1
55.13.4
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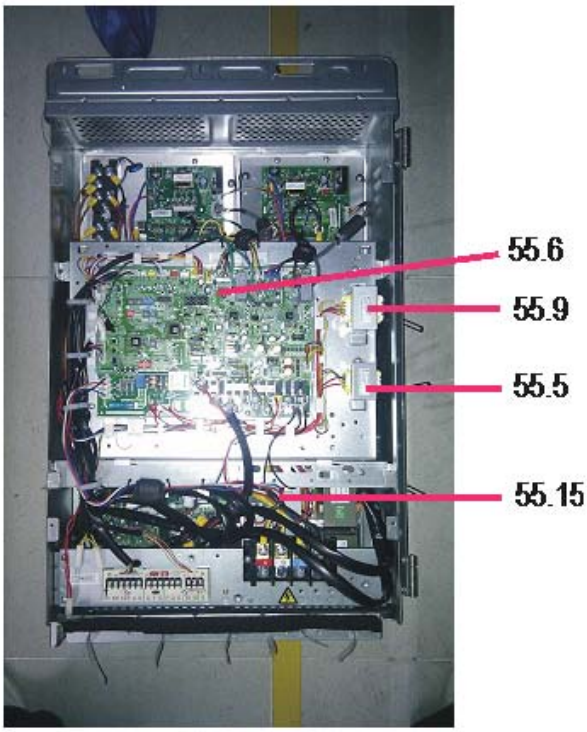
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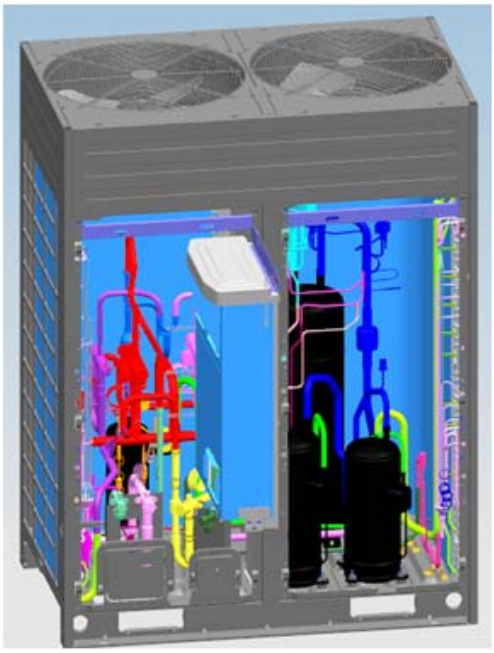


1.6. Spare parts list unit 14 HP

MVD-400(14)W/D2RN1T(C)

CL23118

N°	Description	Qty.	Supplier code	Code
1	Grille	2	201295100244	
2	Axial flow fan	1	201100300518	CL92307
3	Axial fan	1	201100300522	CL92316
4	Top cover ass'y	2	201195100013	
5	Dc motor	2	202400300026	CL92297
6	Beam ass'y, top cover	1	201295100368	
7	Ventilation ass'y	2	201195100390	
8	Middle clapboard ass'y	1	201295190192	
9	Right panel ass'y	1	201295100359	
10	Middle upright ass'y	1	201295301011	
11	Motor beams	1	201295100369	
12	Support board, beam	1	201295100383	
13	Front cover ass'y, up	2	201295100372	
14	Right front plate	1	201295100377	
15	No. 3 piping support board	1	201295190197	
16	No. 2 piping mounting board	1	201295190198	
17	No. 1 piping mounting board	1	201295190199	
18	Motor bracket	4	201295100574	
19	Chassis ass'y	1	201295190200	
20	Back wire mesh	2	201295301013	
21	Gas-liquid separator	1	201601100226	
22	Compressor	1	201400400210	
23	Compressor	1	201400400270	
24	Oil separator	1	201601100031	
25	Electronic expansion valves wire	2	201601300572	
26	Oil return capillary ass'y	1	201695190709	
26.1	Strainer	1	201600980000	
27	Oil balance pipe ass'y	1	201695100603	
27.1	One way valve	1	201600800033	
27.2	Filter	1	201600900853	
28	High pressure gas balance pipe ass'y	1	201695190617	
28.1	Low pressure valve	1	201600720425	
29	Tee joint ass'y	1	201695190619	
30	No. 1 four-way valve ass'y	1	201695190622	
30.1	Four-way valve ass'y	1	201600630619	
31	No. 2 four-way valve ass'y	1	201695190627	
31.1	Four-way valve ass'y	1	201600630619	
32	High pressure valve ass'y	1	201695190703	
32.1	low pressure valve	1	201600700080	
32.2	one-way valve	1	201600801467	
33	No. 1 Tee joint ass'y	1	201695190706	
34	One-way valve ass'y	1	201695190678	
34.1	One way valve	1	201600800835	
35	Unloading valve ass'y	1	201695190679	
35.1	Unloading valve	1	201601600057	
35.2	One-way solenoid valve	1	201600610010	
36	Compressor suction pipe ass'y	1	201695190681	
36.1	One-way solenoid valve coil	2	201600630561	
36.2	Filter	1	201600900868	
36.3	Pressure controller	1	202301820018	
37	Compressor discharge pipe ass'y	1	201695190686	
37.1	Pressure sensor	1	202301300714	
37.2	Pressure switch	1	202301820042	
37.3	Pipe joint	1	201601200212	
37.4	One way valve	1	201600800027	
37.5	One way valve	1	201600810001	
38	Oil balance pipe ass'y	1	201695190631	
38.1	Low pressure valve	1	201600710613	

MVD-400(14)W/D2RN1T(C)

CL23118

Nº	Description	Qty.	Supplier code	Code
39	Right expansion valve ass'y	1	201695190690	
39.1	Electronic expansion valve	1	201601300571	CL92282
39.2	Filter	1	201600900856	
40	Left expansion valve ass'y	1	201695190693	
40.1	Electronic expansion valve	1	201601300571	CL92282
40.2	Filter	1	201600900854	
41	No. 1 low pressure valve ass'y	1	201695190697	
41.1	Low pressure valve	1	201600710615	
41.2	Filter	2	201600900856	
42	No. 3 four-way valve ass'y	1	201695190699	
42.1	Four-way valve ass'y	1	201600630579	
43	No. 2 low pressure valve ass'y	1	201695190695	
43.1	Low pressure valve	1	201600700082	
43.2	Filter	1	201600900868	
44	Wire clip	1	201295100350	
45	Pipe clip	1	201295100351	
46	Left panel	1	201295100376	
47	Stand column assy	1	201295100584	
48	No. 2 valve mounting board ass'y	1	201295190201	
49	No. 1 valve mounting board ass'y	1	201295190203	
50	Right condenser ass'y	1	201595190045	
50.1	Right condenser	1	201595190046	
50.2	Right condenser input pipe ass'y	1	201695190633	
50.3	Right condenser output pipe ass'y	1	201695190639	
51	Left condenser ass'y	1	201595190047	
51.1	Left condenser	1	201595190048	
51.2	Left condenser input pipe ass'y	1	201695190654	
51.3	Left condenser output pipe ass'y	1	201695190659	
52	Left panel ass'y	1	201295100357	
53	E-Part box cover ass'y	1	201295100502	
54	Left hanging plate of electronic control box	1	201295100869	
55	Outdoor electric control box ass'y	1	203395190245	
55.1	Outdoor electric control box	1	201295100585	
55.2	Intermediate adapter board ass'y	1	201395100269	
55.3	Frequency converter module radiator ass'y	1	201395100281	
55.3.1	35A 1200V frequency converter module	1	202300701018	
55.3.2	Electronic Module ass'y	1	201319900996	
55.4	Reactor	2	202301000953	
55.5	Power transformer (with the fuse)	1	202300930247	
55.6	Outdoor main control board ass'y	1	201319902959	
55.7	Outdoor power supply board ass'y	1	201319902960	
55.8	Filter board ass'y	2	201395100272	
55.9	Transformer	1	202300930264	
55.10	Outdoor power board ass'y	1	201395100273	
55.11	Fan module radiator ass'y	1	201395100282	
55.11.1	Inverter module	2	201319902795	
55.11.2	Electronic control module component-IPM module	2	202300702383	
55.12	Current detection plate ass'y	2	201319902859	
55.13	Inverter module radiator ass'y	1	201395190280	
55.13.1	Three phase bridge	2	202300500348	
55.13.2	50 A DC frequency converter module ass'y	1	201319900504	
55.13.3	50A 1200V frequency converter module	1	202300701005	
55.13.4	Module temperature sensor ass'y (T7)	1	202301300783	
55.14	Terminal block, 4P	1	202301400420	
55.15	Contactor	2	202300850043	CL92289
56	Discharge temperature controller (P-PRO switch)	1	202301600646	
57	Pipe temp. sensor ass'y (T5 - right)	1	202301300743	
58	Pipe temp. sensor ass'y (T3 - left)	1	202301300733	
59	Discharge temp, sensor ass'y (INVgas / INV1gas)	2	202301300709	CL92295

1.7. Spare parts list unit 16 HP

MVD-450(16)W/D2RN1T(C)

CL23119

Nº	Description	Qty.	Supplier code	Code
1	Grille	2	201295100244	
2	Axial flow fan	1	201100300518	CL92307
3	Axial fan	1	201100300522	CL92316
4	Top cover ass'y	2	201195100013	
5	Dc motor	2	202400300026	CL92297
6	Beam ass'y, top cover	1	201295100368	
7	Ventilation ass'y	2	201195100390	
8	Middle clapboard ass'y	1	201295190192	
9	Right panel ass'y	1	201295100359	
10	Middle upright ass'y	1	201295301011	
11	Motor beams	1	201295100369	
12	Support board，beam	1	201295100383	
13	Front cover ass'y, up	2	201295100372	
14	Right front plate	1	201295100377	
15	No. 3 piping support board	1	201295190197	
16	No. 2 piping mounting board	2	201295190198	
17	No. 1 piping mounting board	1	201295190199	
18	Motor bracket	4	201295100574	
19	Chassis ass'y	1	201295190200	
20	Back wire mesh	2	201295301013	
21	Gas-liquid separator	1	201601100226	
22	Compressor	1	201400400210	
23	Compressor	1	201400400270	
24	Oil separator	1	201601100031	
25	Electronic expansion valves wire	2	201601300572	
26	Oil return capillary ass'y	1	201695190709	
26.1	Strainer	1	201600980000	
27	Oil balance pipe ass'y	1	201695100603	
27.1	One way valve	1	201600800033	
27.2	Filter	1	201600900853	
28	High pressure gas balance pipe ass'y	1	201695190617	
28.1	Liquid pipe valve	1	201600700074	
29	Tee joint ass'y	1	201695190619	
30	No. 1 four-way valve ass'y	1	201695190622	
30.1	4-way valve	1	201600630543	
31	No. 2 four-way valve ass'y	1	201695190627	
31.1	4-way valve	1	201600630543	
32	High pressure valve ass'y	1	201695190703	
32.1	low pressure valve	1	201600700080	
32.2	one-way valve	1	201600801467	
33	No. 1 Tee joint ass'y	1	201695190706	
34	One-way valve ass'y	1	201695190678	
34.1	One way valve	1	201600800835	
35	Unloading valve ass'y	1	201695190679	
35.1	Electromagnetic valve	1	201600600080	
35.2	Unloading valve	1	201601600057	
36	Compressor suction pipe ass'y	1	201695190681	
36.2	Filter	1	201600900868	
36.3	Pressure controller	1	202301820018	
37	Compressor discharge pipe ass'y	1	201695190686	
37.1	Pressure sensor	1	202301300714	
37.2	Pressure switch	1	202301820042	
37.3	Pipe joint	1	201601200212	
37.4	One way valve	1	201600810001	
37.5	One way valve	1	201600800027	
38	Oil balance pipe ass'y	1	201695190631	
38.1	Low pressure valve	1	201600710613	
39	Left expansion valve ass'y	1	201695190693	

MVD-450(16)W/D2RN1T(C)

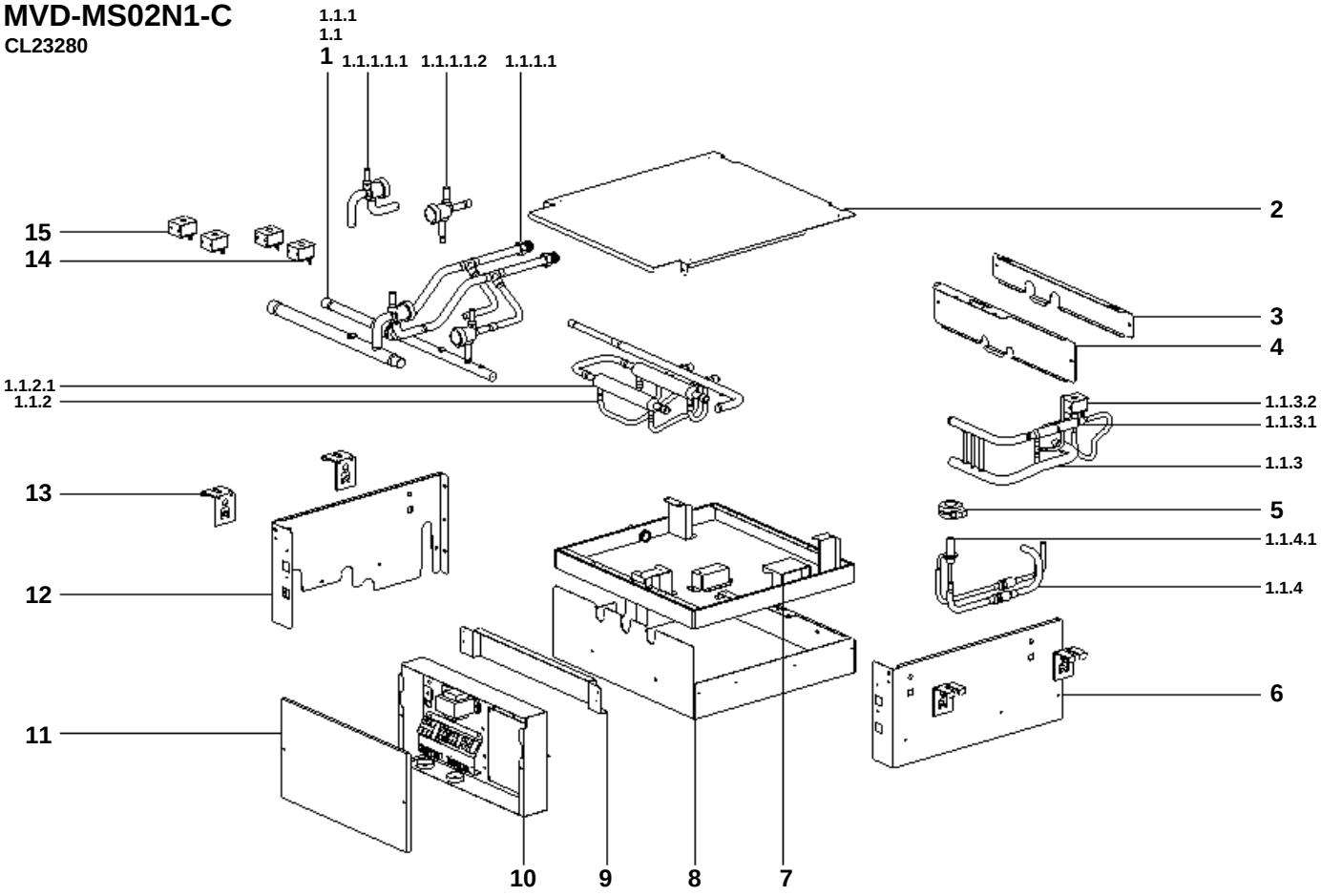
CL23119

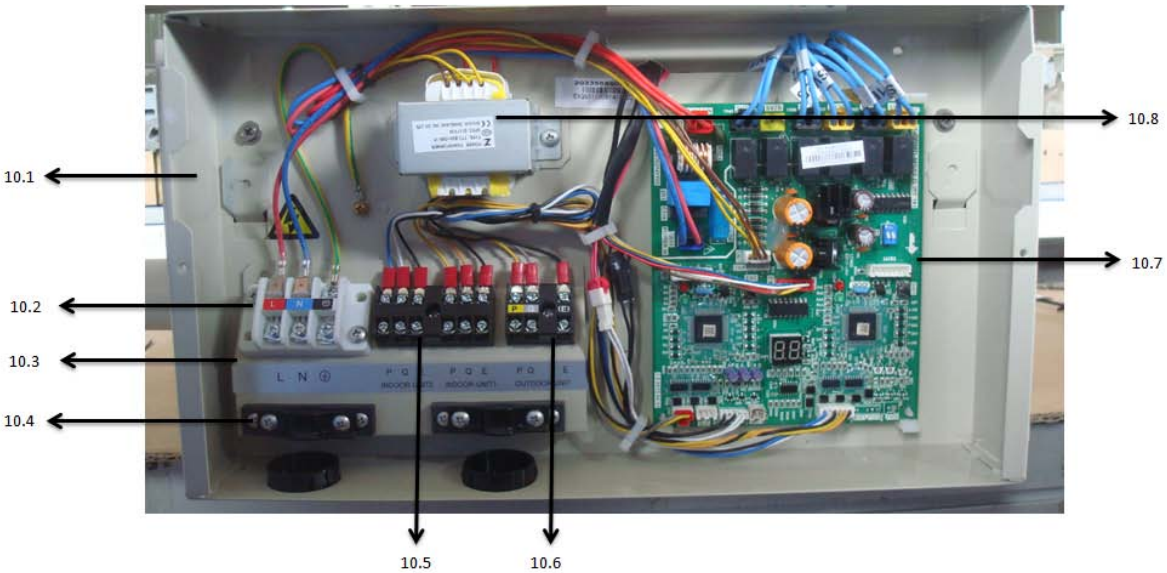
Nº	Description	Qty.	Supplier code	Code
39.1	Electronic expansion valve	1	201601300571	CL92282
39.2	Filter	1	201600900854	
40	Right expansion valve ass'y	1	201695190690	
40.1	Electronic expansion valve	1	201601300571	CL92282
40.2	Filter	1	201600900856	
41	No. 1 low pressure valve ass'y	1	201695190697	
41.1	Low pressure valve	1	201600710615	
41.2	Filter	2	201600900856	
42	No. 3 four-way valve ass'y	1	201695190699	
42.1	Four-way valve	1	201600600516	
43	No. 2 low pressure valve ass'y	1	201695190695	
43.1	Low pressure valve	1	201600700082	
43.2	Filter	1	201600900868	
44	Wire clip	1	201295100350	
45	Pipe clip	1	201295100351	
47	Stand column assy	1	201295100584	
48	No. 2 valve mounting board ass'y	1	201295190201	
49	No. 1 valve mounting board ass'y	1	201295190203	
50	Right condenser ass'y	1	201595190045	
50.1	Right condenser	1	201595190046	
50.2	Right condenser input pipe ass'y	1	201695190633	
50.3	Right condenser output pipe ass'y	1	201695190639	
51	Left condenser ass'y	1	201595190047	
51.1	Left condenser	1	201595190048	
51.2	Left condenser input pipe ass'y	1	201695190654	
51.3	Left condenser output pipe ass'y	1	201695190659	
52	Left panel ass'y	1	201295100357	
53	E-Part box cover ass'y	1	201295100502	
54	Left hanging plate of electronic control box	1	201295100869	
55	Outdoor electric control box ass'y	1	203395190245	
55.1	Outdoor electric control box	1	201295100585	
55.2	Intermediate adapter board ass'y	1	201395100269	
55.3	Frequency converter module radiator ass'y	1	201395100281	
55.3.1	35A 1200V frequency converter module	1	202300701018	
55.3.2	Electronic Module ass'y	1	201319900996	
55.4	Reactor	2	202301000953	
55.5	Power transformer (with the fuse)	1	202300930247	
55.6	Outdoor main control board ass'y	1	201319902959	
55.7	Outdoor power supply board ass'y	1	201319902960	
55.8	Filter board ass'y	2	201395100272	
55.9	Transformer	1	202300930264	
55.10	Outdoor power board ass'y	1	201395100273	
55.11	Fan module radiator ass'y	1	201395100282	
55.11.1	Inverter module	2	201319902795	
55.11.2	Electronic control module component-IPM module	2	202300702383	
55.12	Current detection plate ass'y	2	201319902859	
55.13	Inverter module radiator ass'y	1	201395190280	
55.13.1	Three phase bridge	2	202300500348	
55.13.2	50 A DC frequency converter module ass'y	1	201319900504	
55.13.3	50A 1200V frequency converter module	1	202300701005	
55.13.4	Module temperature sensor ass'y (T7)	1	202301300783	
55.14	Terminal block, 4P	1	202301400420	
55.15	Contactor	2	202300850043	CL92289
56	Discharge temperature controller (P-PRO switch)	1	202301600646	
57	Pipe temp. sensor ass'y (T5 - right)	1	202301300743	
58	Pipe temp. sensor ass'y (T3 - left)	1	202301300733	
59	Discharge temp, sensor ass'y (INVgas / INV1gas)	2	202301300709	CL92295
60	Outdoor temp. sensor ass'y (T4)	1	202301300198	CL92294

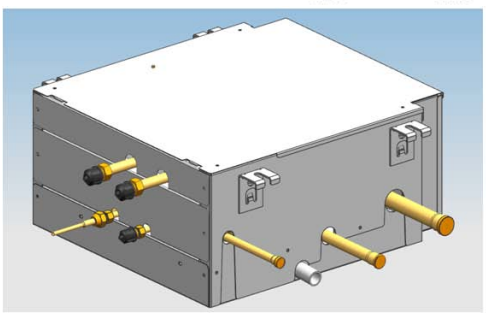
2. MS unit exploded view

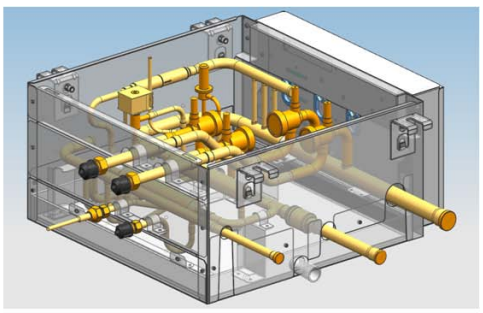
2.1. Exploded view unit MS02

MVD-MS02N1-C
CL23280









2.2. Spare parts list unit MS02

MVD-MS02N1-C

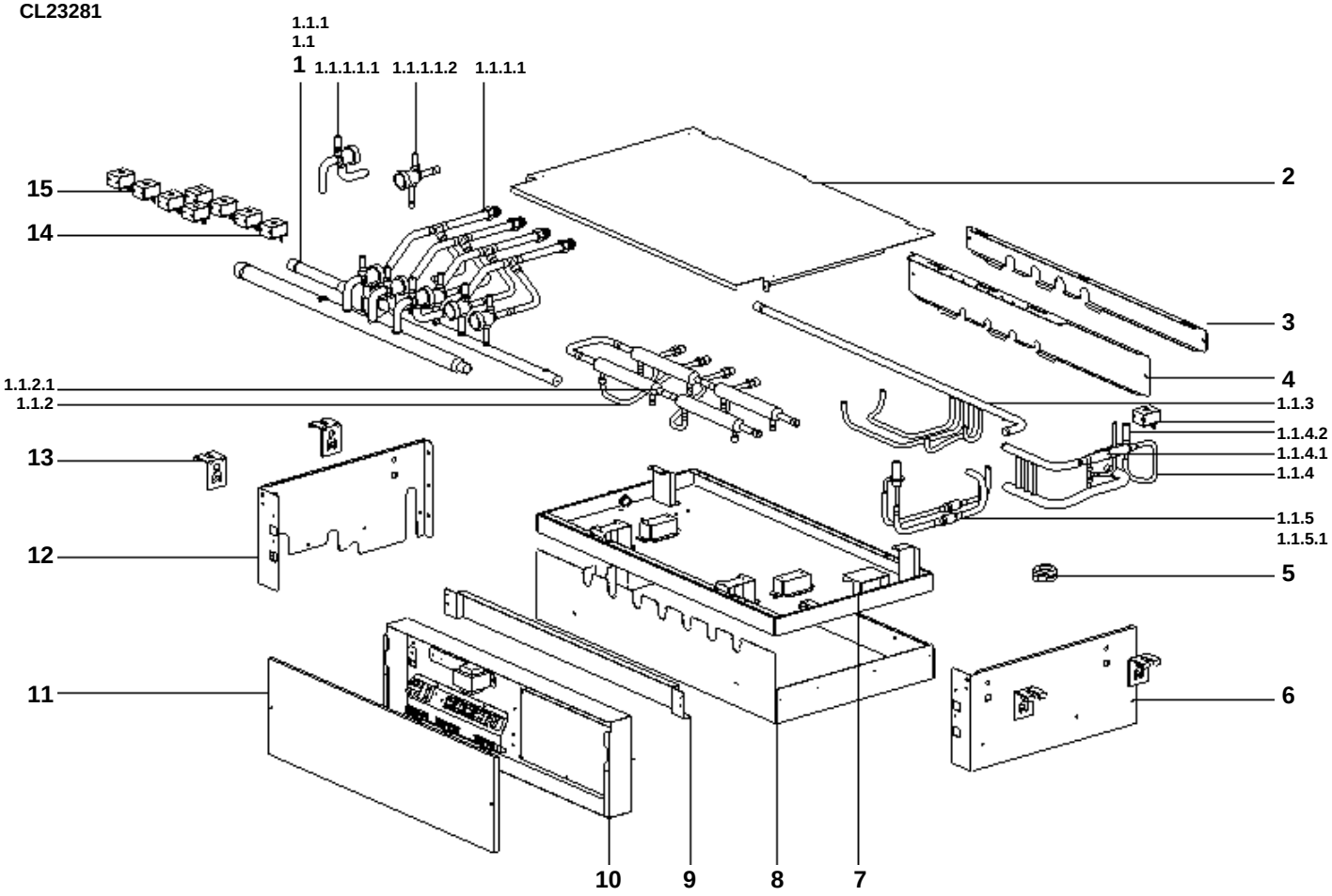
CL23280

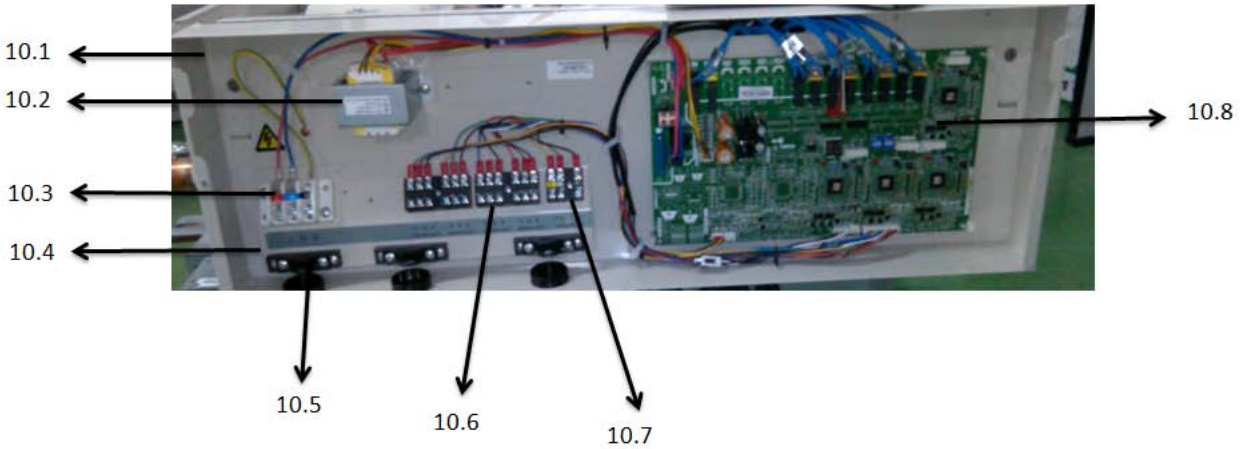
Nº	Description	Qty.	Supplier code	Code
1	Piping ass'y	1	201656890076	
1.1	Piping	1	201656890069	
1.1.1	Solenoid valve ass'y	1	201656890070	
1.1.1.1	Solenoid valve ass'y	2	201656890020	
1.1.1.1.1	Solenoid valve	1	201600630534	
1.1.1.1.2	Solenoid valve	1	201600630533	
1.1.2	Subcooling pipe ass'y	1	201656890071	
1.1.2.1	Subcooling pipe	2	201656890100	
1.1.3	Bypass valve ass'y	1	201656890045	
1.1.3.1	One way valve	1	201600800027	
1.1.3.2	One way solenoid valve ass'y	1	201600630566	
1.1.4	Subcooling expansion valve ass'y	1	201656890062	
1.1.4.1	Electronic expansion valve	1	201601300106	CL92856
2	Cover board ass'y	1	201256890050	
3	Board for gas pipe crossing	1	201256890075	
4	Board for liquid pipe crossing	1	201256890074	
5	Electronic expansion valve coil	1	201601300107	
6	Left side board ass'y	1	201256890066	
7	Drain pan ass'y	1	201256890056	
8	Chassis ass'y	1	201256890073	
9	Coil cover board ass'y	1	201256890076	
10	Electric control box ass'y	1	203356890004	
10.1	Electric control box	1	201256890060	
10.2	Wire joint	1	202301400464	
10.3	Insulation plate	2	201135000004	
10.4	Wire clamp	2	201219900001	
10.5	Terminal block 6P	1	202301400219	
10.6	Wire joint, 3p	1	202301400249	
10.7	Data conversion module ass'y	1	201310800007	
10.8	Transformer	1	202300900109	CL92290 / CL94601
11	Cover board of electric control board	1	201256890052	
12	Right side board ass'y	1	201256890067	
13	Lifting lug	4	201270890284	
14	Solenoid valve coil	2	201600630536	
15	Solenoid valve coil	2	201600630535	

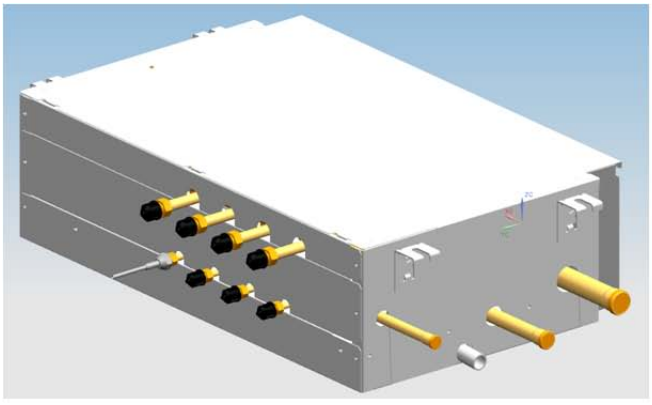
2.3. Exploded view unit MS04

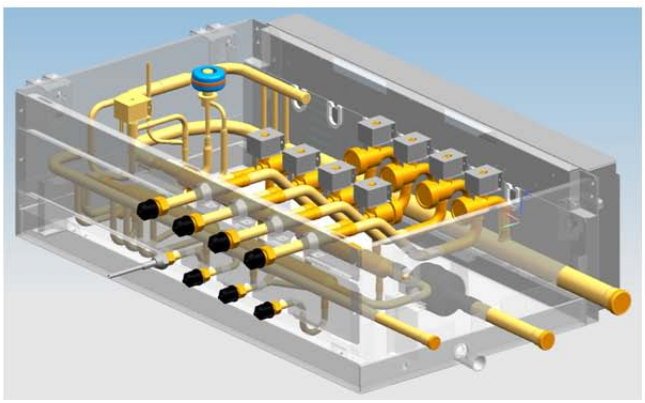
MVD-MS04N1-C

CL23281









2.4. Spare parts list unit MS04

MVD-MS04N1-C

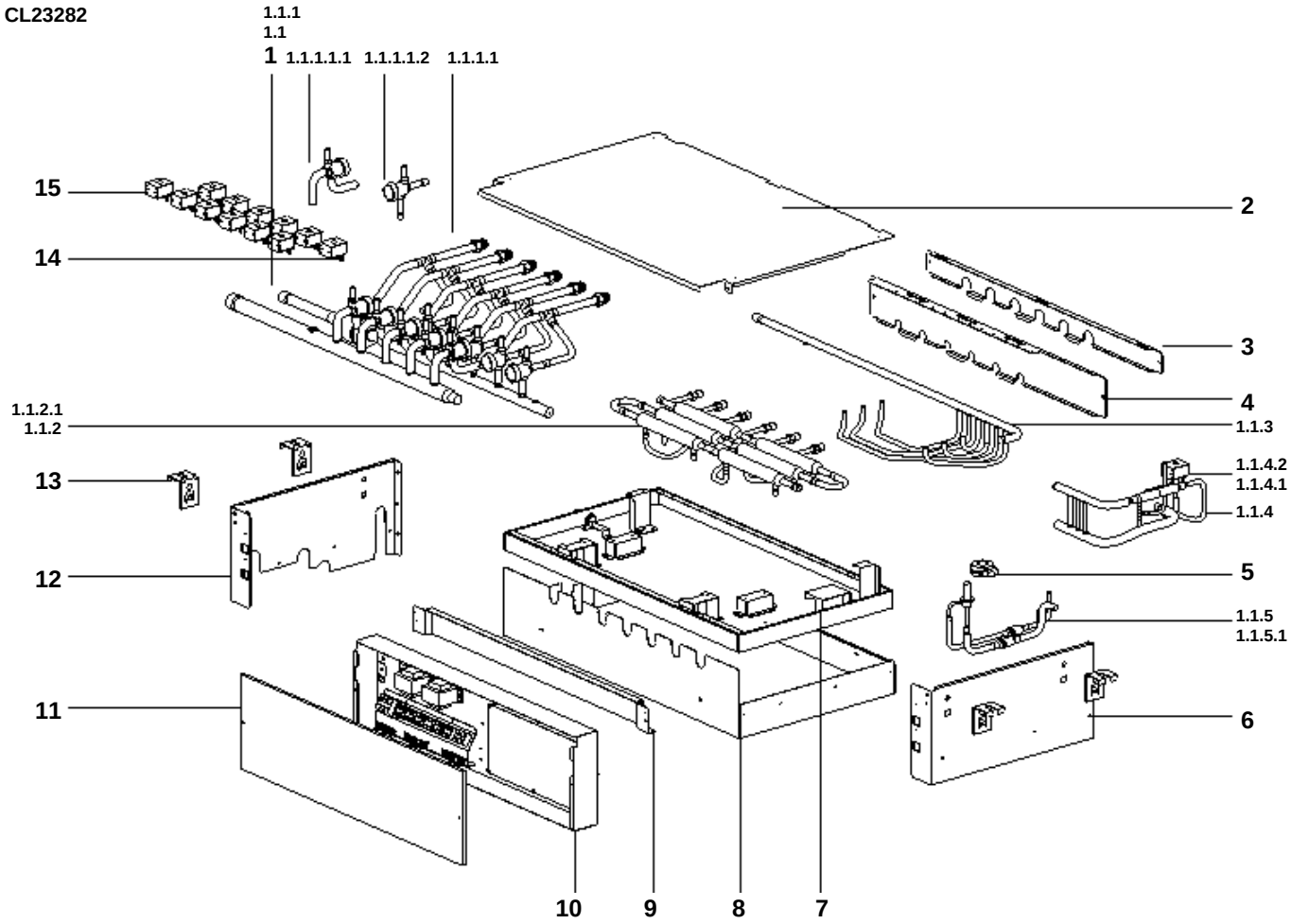
CL23281

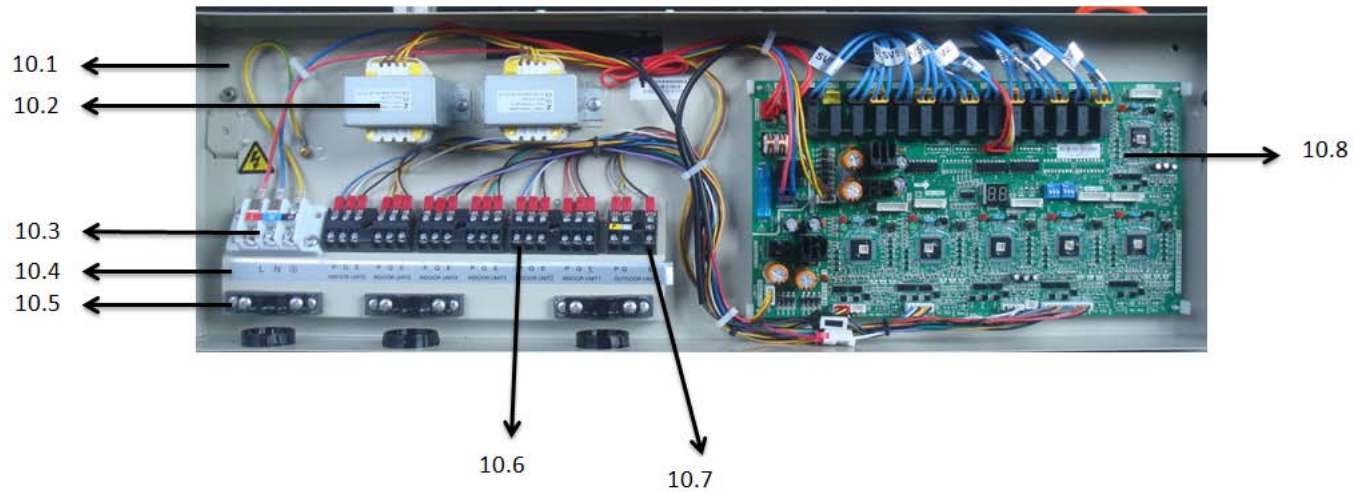
Nº	Description	Qty.	Supplier code	Code
1	Piping ass'y	1	2016568A0002	
1.1	Piping	1	201656890058	
1.1.1	Solenoid valve ass'y	1	201656890059	
1.1.1.1	Solenoid valve ass'y	4	201656890020	
1.1.1.1.1	Solenoid valve	1	201600630534	
1.1.1.1.2	Solenoid valve	1	201600630533	
1.1.2	Subcooling pipe ass'y	1	201656890060	
1.1.2.1	Subcooling pipe	4	201656890100	
1.1.3	Liquid pipe ass'y	1	201656890063	
1.1.4	Bypass valve ass'y	1	201656890045	
1.1.4.1	One way valve	1	201600800027	
1.1.4.2	One way solenoid valve ass'y	1	201600630566	
1.1.5	Subcooling expansion valve ass'y	1	201656890062	
1.1.5.1	Electronic expansion valve	1	201601300106	CL92856
2	Cover board ass'y	1	201256890038	
3	Board for gas pipe crossing	1	201256890072	
4	Board for liquid pipe crossing	1	201256890071	
5	Electronic expansion valve coil	1	201601300107	
6	Left side board ass'y	1	201256890066	
7	Drain pan ass'y	1	201256890046	
8	Chassis ass'y	1	201256890065	
9	Coil cover board ass'y	1	201256890070	
10	Electric control box ass'y	1	203356890003	
10.1	Electric control box	1	201256890040	
10.2	Transformer	1	202300900109	CL92290 / CL94601
10.3	Wire joint	1	202301400464	
10.4	Insulation plate	3	201135000004	
10.5	Wire clamp	3	201219900001	
10.6	Terminal block 6P	2	202301400219	
10.7	Wire joint, 3p	1	202301400249	
10.8	Data conversion module ass'y	1	201319900814	
11	Cover board of electric control box	1	201256890037	
12	Right side board ass'y	1	201256890067	
13	Lifting lug	4	201270890284	
14	Solenoid valve coil	4	201600630536	
15	Solenoid valve coil	4	201600630535	

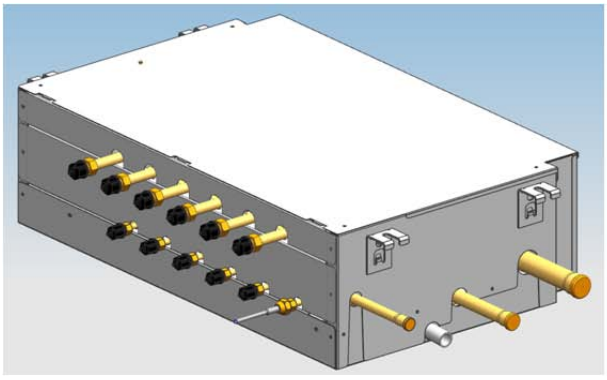
2.5. Exploded view unit MS06

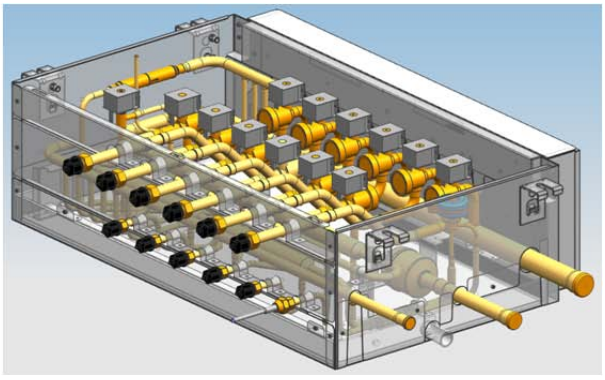
MVD-MS06N1-C

CL23282









2.6. Spare parts list unit MS06

MVD-MS06N1-C

CL23282

Nº	Description	Qty.	Supplier code	Code
1	Piping ass'y	1	2016568A0003	
1.1	Piping	1	201656890018	
1.1.1	Solenoid valve ass'y	1	201656890019	
1.1.1.1	Solenoid valve ass'y	6	201656890020	
1.1.1.1.1	Solenoid valve	1	201600630534	
1.1.1.1.2	Solenoid valve	1	201600630533	
1.1.2	Subcooling pipe ass'y	1	201656890026	
1.1.2.1	Subcooling pipe	6	201656890100	
1.1.3	Liquid pipe ass'y	1	201656890037	
1.1.4	Bypass valve ass'y	1	201656890045	
1.1.4.1	One way valve	1	201600800027	
1.1.4.2	One way solenoid valve ass'y	1	201600630566	
1.1.5	Subcooling expansion valve ass'y	1	201656890032	
1.1.5.1	Electronic expansion valve	1	201601300106	CL92856
2	Cover board ass'y	1	201256890038	
3	Gas pipe crossing board	1	201256890069	
4	Liquid pipe crossing board	1	201256890068	
5	Electronic expansion valve coil	1	201601300107	
6	Left side board ass'y	1	201256890066	
7	Drain pan ass'y	1	201256890029	
8	Chassis ass'y	1	201256890065	
9	Coil cover board ass'y	1	201256890070	
10	Electric control box ass'y	1	203356890002	
10.1	Electric control box	1	201256890040	
10.2	Transformer	2	202300900109	CL92290 / CL94601
10.3	Wire joint	1	202301400464	
10.4	Insulation plate	3	201135000004	
10.5	Wire clamp	3	201219900001	
10.6	Terminal block 6P	3	202301400219	
10.7	Wire joint, 3p	1	202301400249	
10.8	Data conversion module ass'y	1	201319900813	
11	Cover board ass'y of electric control box	1	201256890037	
12	Right side board ass'y	1	201256890067	
13	Lifting lug	4	201270890284	
14	Solenoid valve coil	6	201600630536	
15	Solenoid valve coil	6	201600630535	

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