DM13-01.01.01en

Service manual

MIV V5 HEAT PUMP

DC INVERTER R410A

MVUH252B-VA3

MVUH280B-VA3

MVUH335B-VA3

MVUH400B-VA3

MVUH450B-VA3

MVUH500B-VA3

Contents

Part 1 General Information

1. Midea Product Development History

In 1999, Midea cooperated with Toshiba, produced the No.1 AC Inverter VRF MDV.

In 2001, Midea produced the No1. MDV in Air-conditioning industry.

In 2002, Midea developed the No.1 AC Inverter VRF MDV, and the No1. D series MDV in China.

In 2003, Midea completed the 2nd D series and 2nd V series MDV.

In 2005, Midea cooperated with Hitachi, produced the No.1 module's AC Inverter V3 and digital scroll D3.

In 2008, Midea launched out the MDV4, which is the R410A DC Inverter VRF and Modular design also.

In 2011, the new MIV V4+ was on sale, which owns the entirely DC Inverter technology and new low noise, technology (full systems line up: Heat Pump, mini, Heat Recovery, Individual).

In 2013, Midea launched the DC Inverter MIV V5 Series outdoor unit.

2. DC Inverter MIV V5 Introduction

2.1. Free combination, the World's Largest Capacity 72HP

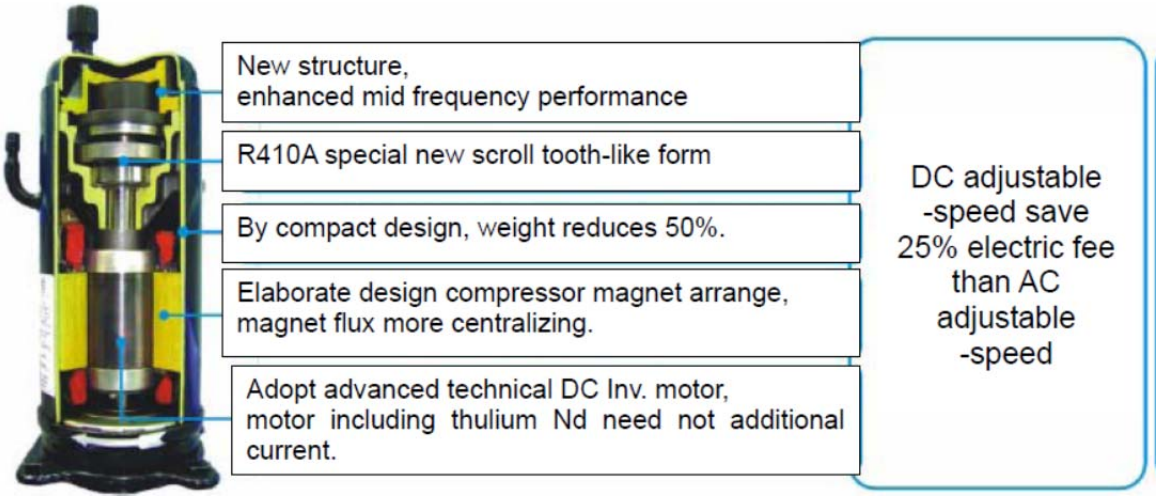
MIV V5 Series achieves world's largest capacity of 72HP by combining maximum 4 outdoor units with 6 different capacities (8, 10, 12, 14, 16 and 18 HP), and 64 indoor units can be connected max.

2.2 High efficiency and Energy saving:

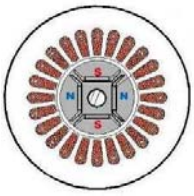
MIV V5 Series achieves the industry's top class energy efficiency of cooling and heating by utilizing **all DC inverter compressors, DC fan motors and high performance heat exchanger**. All DC inverter compressors contribute to higher IPLV greatly. The highest IPLV is up to 5.8.

2.2.1 High efficiency DC inverter compressor, saving power 25%

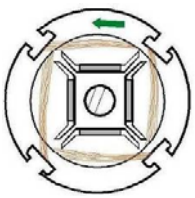
8HP&10HP units adopt one DC inverter compressor only. 12, 14, 16, 18HP adopt two DC inverter compressors. With all DC inverter compressors, MIV V5 Series offers a wide operation range from 20Hz to 200Hz.



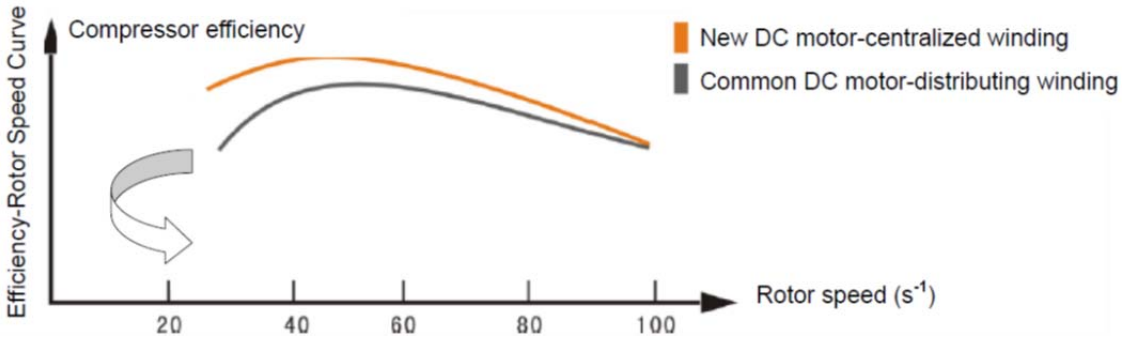
The A/C load ratio of building is 30%-75%, the area use ratio is 55%, most of the A/C runs in the mid load, so the mid load operation ratio control the whole year AC running charge.



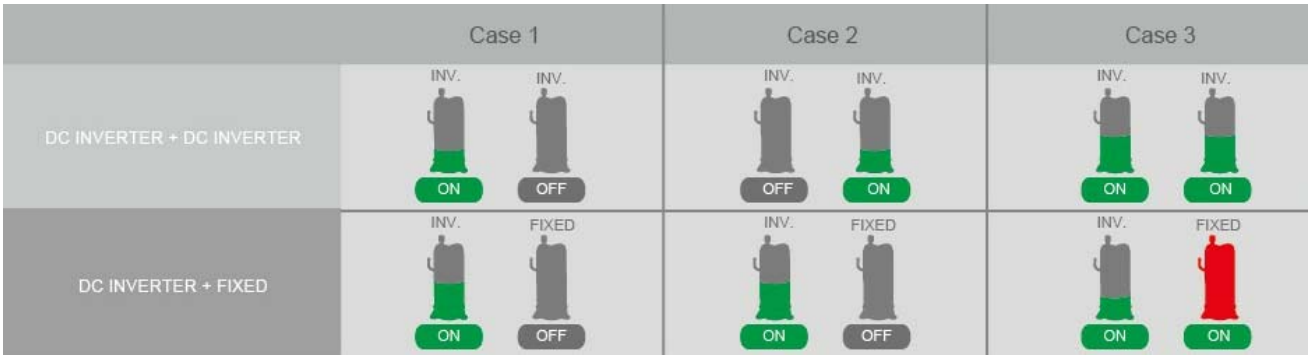
Centralizing winding



Distributing winding

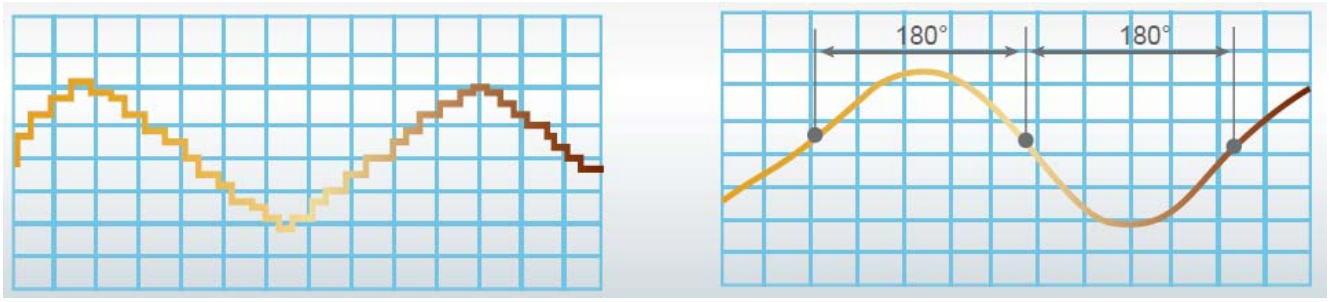


All DC inverter compressors make the capacity output better distributed, and always work at 30-70Hz which is the most efficient range. It makes the efficiency more than 30% higher than the normal.



Smooth Sine Wave DC Inverter

Motor uses 180° sine wave vector drive technology to ensure transducer to output smooth curve, which shows motor rotor speed to run smooth. While, common frequency motor outputs sawtooth wave not precisely to show motor speed, so its efficiency is low.



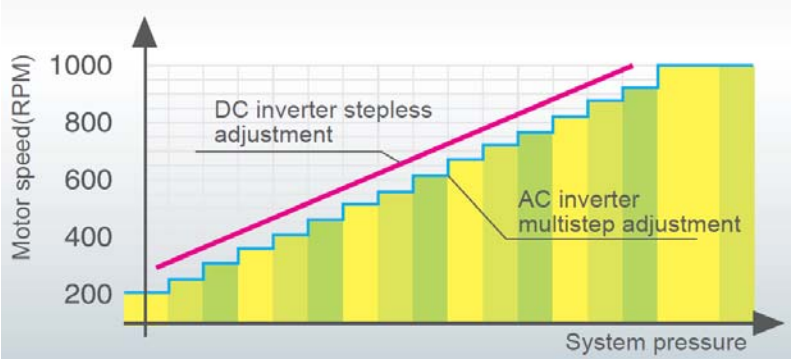
Common Sawtooth Wave Sine Wave DC Inverter

2.2.2 High efficiency DC Fan motor, saving power 50%

According to the running load and pressure, it controls the speed of DC fan to achieve the min. energy consumption, to reach the best effect. All DC fan motors saves much power consumption.

- Used across entire range of models (from 8 to 72 HP)
- Efficiency improved by up to 45% especially at low speed

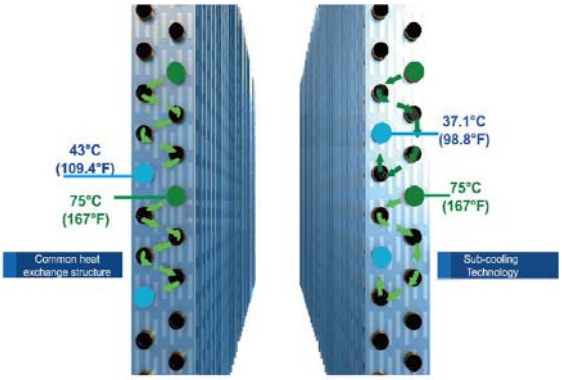
Pressure sensor DC Fan motor



Motor rotor speed waves among ±5r, and can rapidly match DC Inverter Compressor to output, and enhance efficiency in part load.

2.2.3 Newly designed sub-cooling heat exchanger

12°C sub-cooling degree makes the cooling capacity increased efficiently. Thus, the total piping length becomes longer, reach up to 1000m. Meanwhile, the innovative designed high efficiency heat exchanger also simplified the pipeline of outdoor unit and realized compact design and low weight. By adoption of Pressure Sensor, EXV, all DC fan motors and all DC compressors, MIV V5 has an obvious improvement on efficiency than previous products.



2.3 More flexible design

2.3.1 External static pressure enhanced up to 60Pa and air volume increases

Applied high static pressure propeller fan and the optimum fan guard for high external static pressure, to respond to a range of various installation environments.

Midea now offers up to 60Pa* (6.12 mm H_2O) external static pressure for customized applications (60 Pa is available for the 12HP model; 40Pa is available for other models). A standard 0-20Pa function is equipped by default.

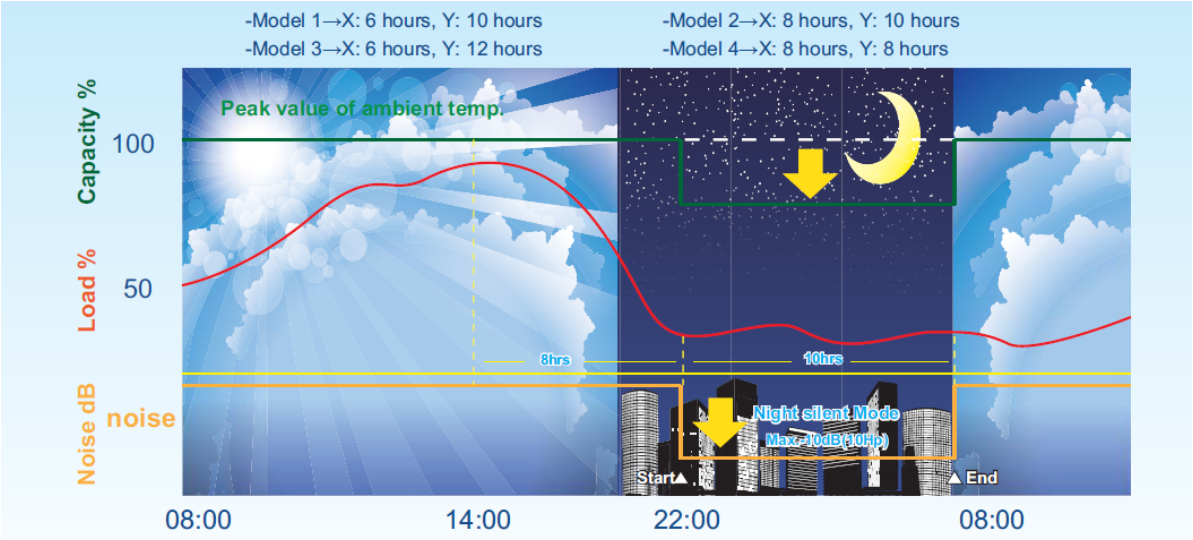
2.3.2 More options of indoor units and high capacity connection

Lineup of heat pump types is 8 to 72 HP. Indoor units consist of 14 types with 115 models, capacity ranges from 1.8kW to 56kW. A maximum 130% indoor unit's connective ratio is allowed for all outdoor unit capacities. This wide selection of models makes it possible to build a system that suits the customer's requirements.

2.4 High Comfort

2.4.1 Optional outdoor units Silent Mode control

Night silent operation will be activated X (6, 8) hours after the peak temperature during daytime, and it will get back to normal operation after Y (8, 10, 12) hours. Super silent operation mode can reduce sound level further, minimum 45dB (A). This function can be activated by setting at site. Temperature (load) curve shown in the graph is just an example.



2.4.2 More options for outdoor units

Night silent mode, silence mode, super silence mode.

2.4.3 Optimized fan design, strengthen heat exchanger

By CFD software, the newly designed fan and grille enhance fan performance greatly and decrease the running noise as well.

New designed fan outlet grille

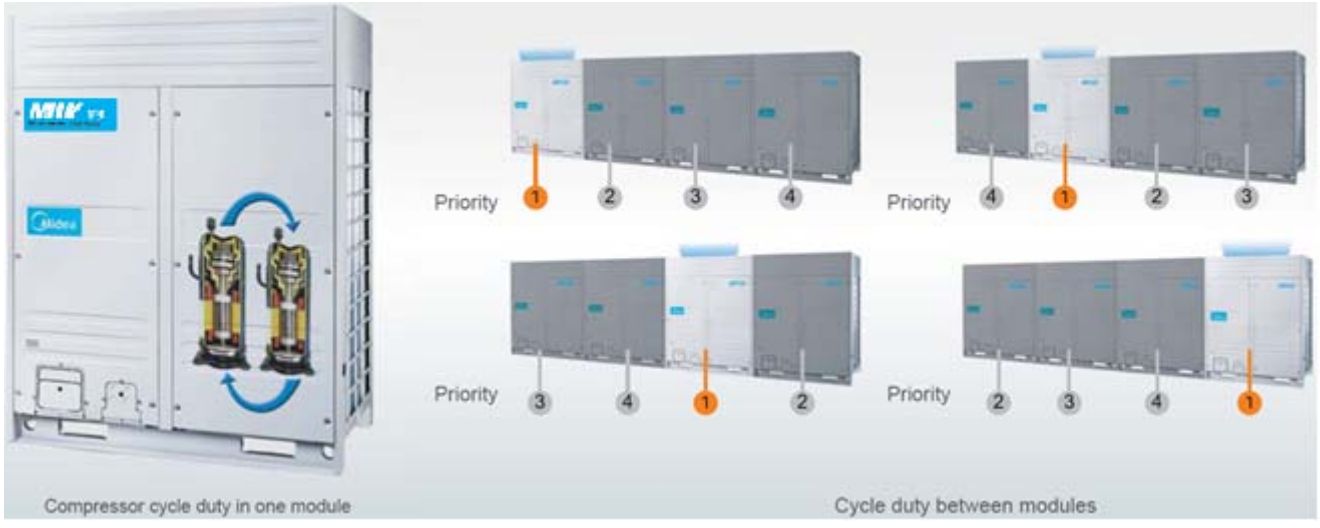
New designed fan impeller

Conventional fan impeller

2.5 High Reliability

2.5.1 Double Cycle Duty operation

Cycle duty operation: both between the modules in one system and the compressors in one module, which extend the system lifespan significantly. The outdoor unit cycle duty operation happens once when running max. 125 minutes.

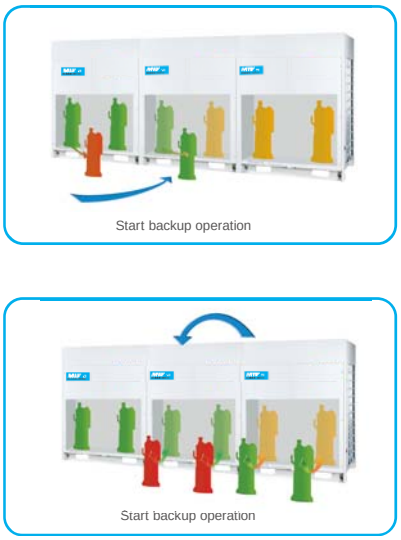


2.5.2 Double Backup operation

Outdoor unit adopts double backup function. If one module failed, other modules can be backup instead of the failed one, or if one of the compressors in one module failed, the other one can backup for continuing operation.

Compressor backup in one module

Compressor backup among modules



2.5.3 Dynamic gas balance technology

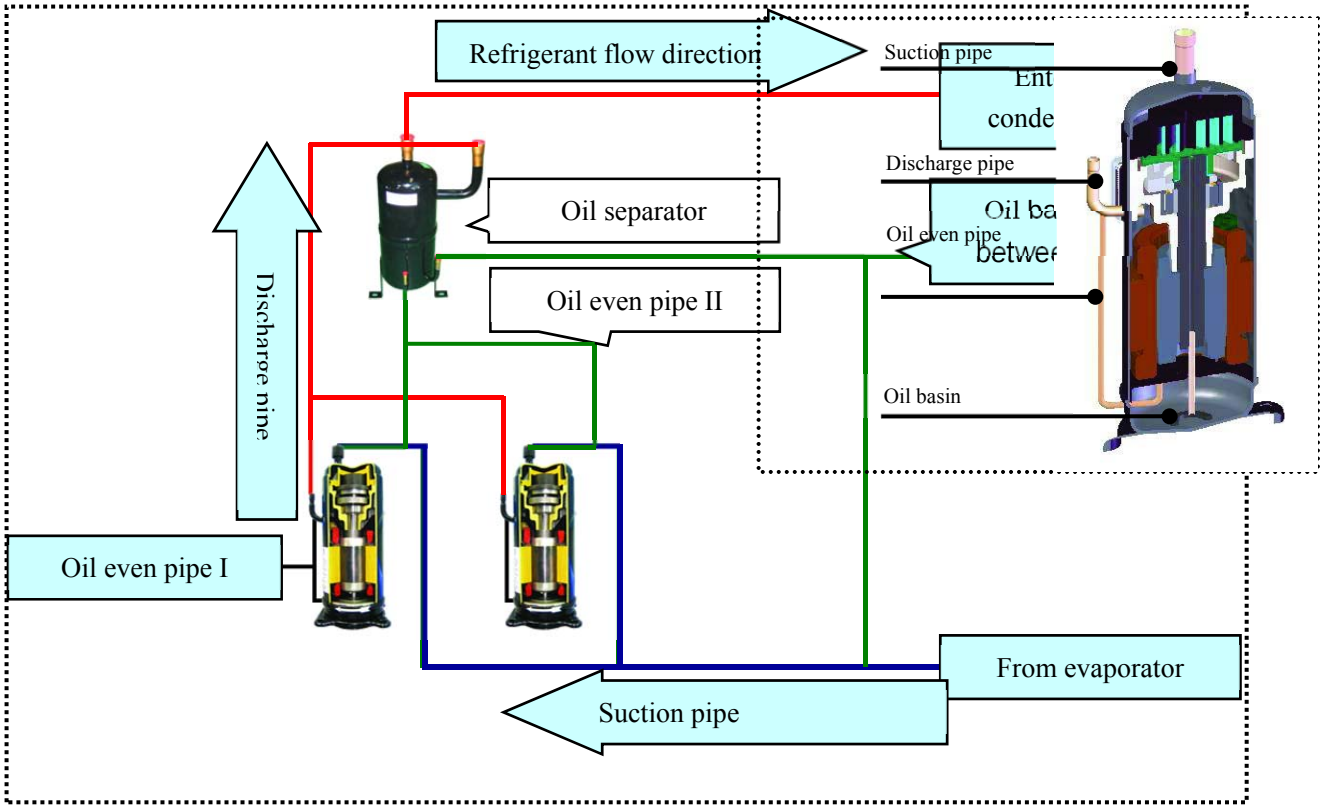
Dynamic vector balance technology, no need to install gas balance pipe:

- High-precision pressure sensor monitors the system pressure on time and transfers the data to master unit
- Master unit sends the pressure data to every unit and make sure each outdoor unit in balance situation.

2.5.4 High efficiency oil balance technology

Oil balance pipes set among the modules, and individual oil balance vector control ensures oil distribution among the modules to compressor smoothly and running reliably. When one compressor's oil is overfull, oil balance pipes and outlet pipes both send the oil to the system, and then the system distributes the oil to other compressors in average.

Oil balance diagram：



It adopts high efficient centrifugal type oil separator, which separates the oil from the discharged refrigerant with the efficiency up to 99% and makes all the lubricant discharged from the compressor can be returned in time.

· New designed low pressure liquid receiver with high efficiency of oil return effect.

· Oil balance ensures sufficient refrigerant lubricant supply. Elaborately designed oil return hole, which ensures reliable oil return for every compressor.

2.5.5 Oil return technology

Centrifugal oil separator can be up to over 99% separating efficiency, which in time and efficiently send the oil to compressors to ensure compressor oil volume.

System auto back oil design can complete through PC core to send oil back instruction by system running time and state.

The accumulator is large volume design, which can save more refrigerant to avoid liquid strike.

Multi back oil holes can ensure the oil back of the compressor smoothly.

2.5.6 Intelligent soft start technology, rapidly enhance refrigerant cycle volume

Compressor soft start complete low frequency and low current start by DC Inverter compressor, and to reduce strike to electric network. When start DC Inverter Compressor, the system runs in large volume and offers more heating capacity.

· Compressor soft start

Compressor soft start complete low frequency and low current start by DC Inverter compressor, and to induce strike to electric network.

· Lubrication system soft start

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2.6 Convenient for installation and service

2.6.1 Auto addressing

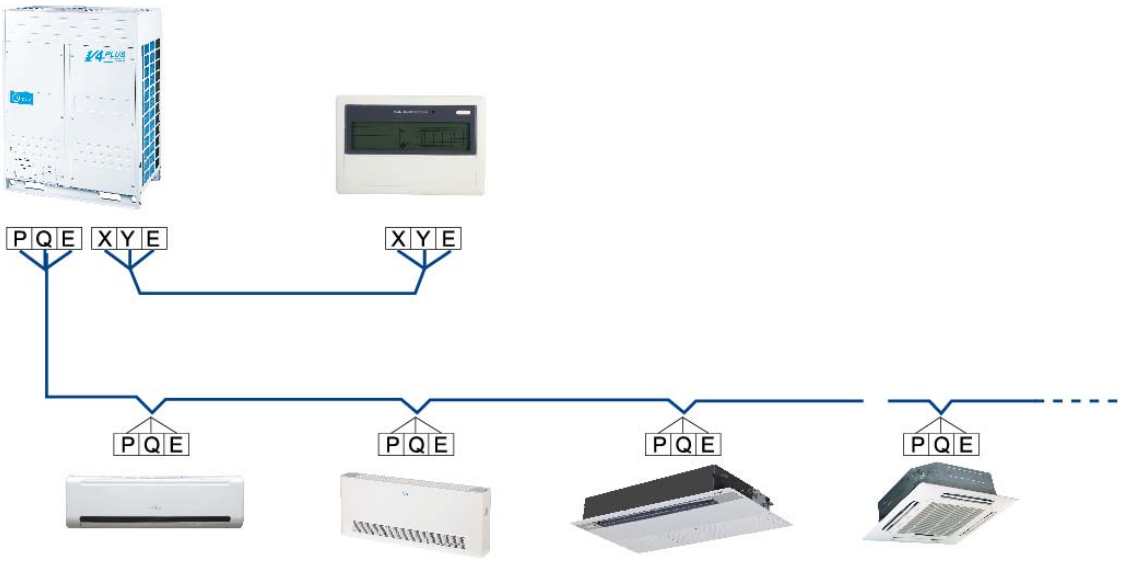
Addressing outdoor units and indoor units are automatically done just by pressing the button of the controller.

- The outdoor unit can automatically distribute the address to indoor units without any manual settings.
- Wireless and wired controller can enquiry and modify every indoor units address.
- Up to 64 indoor units can be connected to one system and identified automatically.

2.6.2 Super Wiring

It is possible to enable the shared use of the wiring between indoor & outdoor units, as well the centralized control. Hence make it easy for the user to retrofit the existing system with a centralized control, by simply connecting it to the outdoor units.

- PQE & XYE, just only one group of communication wire of PQE, achieved both of communication for indoor & outdoor unit and network.
- Reversible communication , central controller can connect from indoor side or outdoor side at will.



2.6.3 Convenient for maintenance

Convenient electronic control check window. Can directly observe the operation status from the LED display, and directly press the FORCE COOLING / CHECK button.

The high/low pressure valves adopt the Stop Valves, which have screwed thread nipple joint, can be connected to the meter connector directly in air tight test. And also make it more efficient and easy for installation.

Self diagnosis function and four-digit Digital display, help service engineer to find out the fault fast and easily.

3. Model Line up

Outdoor units (Combination Unit):

8, 10 HP	12 ,14 ,16 HP
	
18 HP	**18, 20, 22, 24, 26, 28, 30, 32 HP**
	
34, 36, 38, 40, 42, 44, 46, 48 HP	**50, 52, 54, 56, 58, 60, 62, 64 HP**
	
66, 68, 70, 72 HP	
	

*The recommended combinations larger than 64HP adopt 5 basic models since 18HP model can be customized.

4. Outdoor Unit Combinations

Without 18HP model:

Capacity (HP)	Model	Recommend combination					Max. indoor units nos.
		8(HP)	10(HP)	12(HP)	14(HP)	16(HP)	
8	MVUH252B-VA3	●					13
10	MVUH280B-VA3		●				16
12	MVUH335B-VA3			●			20
14	MVUH400B-VA3				●		23
16	MVUH450B-VA3					●	26
18	MVUH500B-VA3	●	●				29
20	MVUH560B-VA3		●●				33
22	MVUH615B-VA3		●	●			36
24	MVUH680B-VA3		●		●		39
26	MVUH730B-VA3		●			●	43
28	MVUH780B-VA3				●●		46
30	MVUH850B-VA3				●	●	50
32	MVUH900B-VA3					●●	53
34	MVUH950B-VA3		●●		●		56
36	MVUH1000B-VA3		●●			●	59
38	MVUH1060B-VA3		●	●		●	63
40	MVUH1130B-VA3		●		●	●	64
42	MVUH1180B-VA3				●●●		64
44	MVUH1230B-VA3				●●	●	64
46	MVUH1280B-VA3				●	●●	64
48	MVUH1350B-VA3					●●●	64
50	MVUH1400B-VA3	●	●			●●	64
52	MVUH1450B-VA3		●●			●●	64
54	MVUH1500B-VA3		●	●		●●	64
56	MVUH1560B-VA3		●		●	●●	64
58	MVUH1630B-VA3				●●●	●	64
60	MVUH1680B-VA3				●●	●●	64
62	MVUH1730B-VA3				●	●●●	64
64	MVUH1780B-VA3					●●●●	64

With 18HP model:

Capacity (HP)	Model	Recommend combination						Max. indoor units nos.
		8(HP)	10(HP)	12(HP)	14(HP)	16(HP)	18(HP)	
8	MVUH252B-VA3	●						13
10	MVUH280B-VA3		●					16
12	MVUH335B-VA3			●				20
14	MVUH400B-VA3				●			23
16	MVUH450B-VA3					●		26
18	MVUH500B-VA3						●	29
20	MVUH560B-VA3		●●					33
22	MVUH615B-VA3		●	●				36
24	MVUH680B-VA3		●		●			39
26	MVUH730B-VA3		●			●		43
28	MVUH780B-VA3		●				●	46
30	MVUH850B-VA3				●	●		50
32	MVUH900B-VA3				●		●	53
34	MVUH950B-VA3					●	●	56
36	MVUH1000B-VA3						●●	59
38	MVUH1060B-VA3		●●				●	63
40	MVUH1130B-VA3		●		●	●		64
42	MVUH1180B-VA3		●			●●		64
44	MVUH1230B-VA3		●			●	●	64
46	MVUH1280B-VA3		●				●●	64
48	MVUH1350B-VA3				●	●	●	64
50	MVUH1400B-VA3				●		●●	64
52	MVUH1450B-VA3					●	●●	64
54	MVUH1500B-VA3						●●●	64
56	MVUH1560B-VA3		●●				●●	64
58	MVUH1630B-VA3		●		●	●	●	64
60	MVUH1680B-VA3			●	●		●●	64
62	MVUH1730B-VA3		●			●	●●	64
64	MVUH1780B-VA3		●				●●●	64
66	MVUH1850B-VA3)				●	●	●●	64
68	MVUH1900B-VA3				●		●●●	64
70	MVUH1950B-VA3					●	●●●	64
72	MVUH2000B-VA3						●●●●	64

5. Capacity Range of Indoor Units

Capacity (kW)	1.8	2.2	2.8	3.6	4.5	5.6	7.1	8	9	10	11.2	12.5	14	16	20	25	28	40	45	56
HP	0.6	0.8	1	1.25	1.6	2	2.5	2.8	3.2	3.6	4	4.4	5	6	8	9	10	14	15.7	19.6
INDEX	18	22	28	36	45	56	71	80	90	100	112	123	140	160	200	250	280	400	450	560
One-way Cassette			√	√	√	√	√													
Two- way Cassette		√	√	√	√	√	√													
Compact Four- way Cassette		√	√	√	√	√														
Four-way Cassette Type			√	√	√	√	√	√	√	√	√		√							
Low Static Pressure Duct	√	√	√	√	√	√														
Middle Static Pressure Duct		√	√	√	√	√	√	√	√		√		√							
High Static Pressure Duct							√	√	√		√		√	√	√	√	√	√	√	√
Ceiling & Floor				√	√	√	√	√	√		√		√							
Wall-mounted Type		√	√	√	√	√	√													
Console		√	√	√	√															
Exposed Floor-standing		√	√	√	√	√	√	√												

6. External Appearance and Model Names of Indoor Units

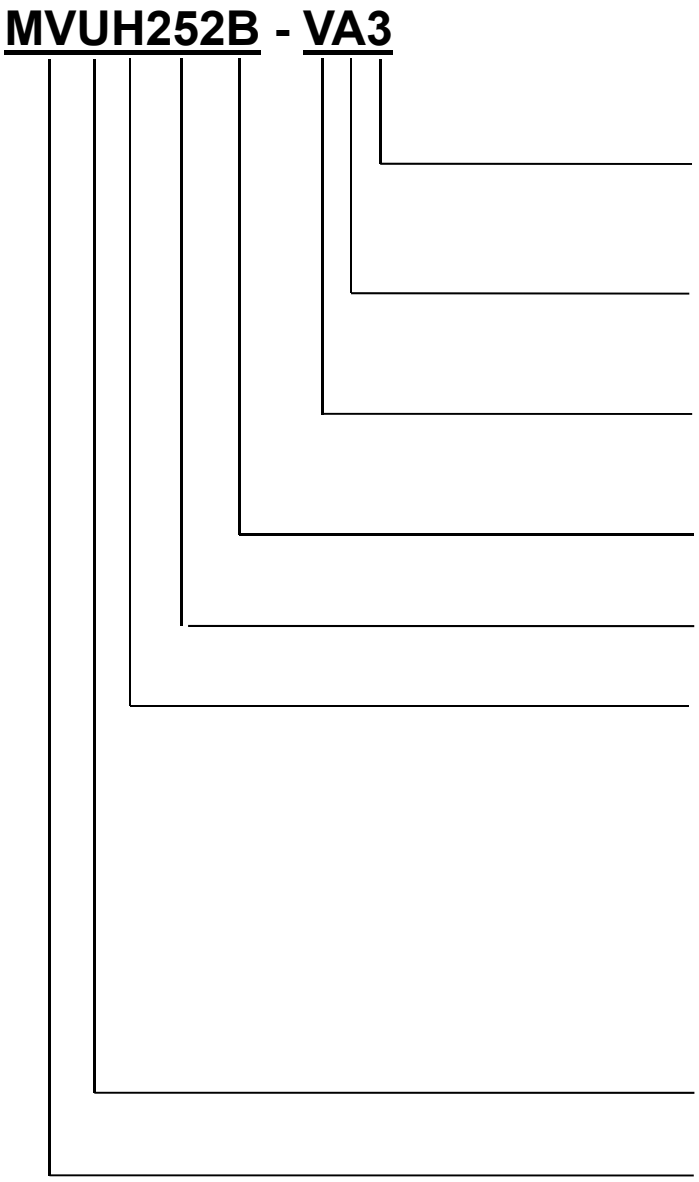
External Appearance	Model Name	External Appearance	Model Name
 One-way cassette	MVN28A-VA1 MVN36A-VA1 MVN45A-VA1 MVN56A-VA1 MVN71A-VA1	 Two-way cassette	MVT22A-VA1 MVT28A-VA1 MVT36A-VA1 MVT45A-VA1 MVT56A-VA1 MVT71A-VA1
 Compact four-way cassette	MVS22A-VA1 MVS28A-VA1 MVS36A-VA1 MVS45A-VA1 MVS56A-VA1	 Four-way Cassette Type	MVC28A-VA1 MVC36A-VA1 MVC45A-VA1 MVC56A-VA1 MVC71A-VA1 MVC80A-VA1 MVC90A-VA1 MVC100A-VA1 MVC112A-VA1 MVC140A-VA1
 Low Static Pressure Duct	MVL18A-VA1 MVL22A-VA1 MVL28A-VA1 MVL36A-VA1 MVL45A-VA1 MVL56A-VA1	 Middle Static Pressure Duct	MVM22A-VA1 MVM28A-VA1 MVM36A-VA1 MVM45A-VA1 MVM56A-VA1 MVM71A-VA1 MVM80A-VA1 MVM90A-VA1 MVM112A-VA1 MVM140A-VA1
 71~112 Model  140~160 Model High Static Pressure Duct	MVH71A-VA1 MVH80A-VA1 MVH90A-VA1 MVH112A-VA1 MVH140A-VA1 MVH160A-VA1	 High Static Pressure Duct	MVH200A-VA1 MVH250A-VA1 MVH280A-VA1
 High Static Pressure Duct	MVH400A-VA1 MVH450A-VA1 MVH560A-VA1	 Ceiling & Floor	MVX36A-VA1 MVX45A-VA1 MVX56A-VA1 MVX71A-VA1 MVX80A-VA1 MVX90A-VA1 MVX112A-VA1 MVX140A-VA1

 Wall-mounted S Type	MVW22A-VA1 MVW28A-VA1 MVW36A-VA1 MVW45A-VA1 MVW56A-VA1 MVW71A-VA1	 Exposed floor standing Type	MVE22A-VA1 MVE28A-VA1 MVE36A-VA1 MVE45A-VA1 MVE56A-VA1 MVE71A-VA1 MVE80A-VA1
 Console	MVD22A-VA1 MVD28A-VA1 MVD36A-VA1 MVD45A-VA1		

※The specifications, designs, and information in this book are subject to change without notice for product improvement.

7. Nomenclature

7.1 Outdoor unit:



Power
1 - 1 phase, 50 Hz
3 - 3 phases, 50 Hz
Refrigerant
A - R410A
B - R22
Inverter
(in)**V**(erter) - inverter
S(tandard) – on/off
Model, Modification
A…**Z, AA…ZZ**
Capacity index
kW*10
The main feature of the system
air cooled:
C(ooling) – cooling only
H(eat pump) – cooling and heating
R(ecovery) – heat recovery, 3-pipe
water cooled:
Q(ooling) – cooling only
W(ater) – cooling and heating
(reco)**V**(ery) – heat recovery, 3-pipe
Identifier of the outdoor unit
(o)**U**(tdoor)
Manufacturer's brand and class of the system
M(idea) **V**(RF)

7.2 Indoor unit:

MVC28A – VA1

Design features (may be absent)
For example: **G**(rey), **W** (hite) - color

Power
1 - 1 phase, 50 Hz
3 - 3 phases, 50 Hz

Refrigerant
A - R410A
B - R22

Inverter
(in)**V**(erter) - inverter
S(tandard) - on/off

Model, Modification
A…**Z, AA…ZZ**

Capacity index
kW*10

Type of the indoor unit
W(all) - wall
(ca)**S**(sette) – cassette 600x600
C(assette) - cassette
(o)**N**(e way) – 1-way cassette
T(wo way) – 2-way cassette
L(ow) – low static pressure duct
M(edium) – medium static pressure duct
H(igh) - high static pressure duct
(fle)**X** – ceiling & floor
F(loor standing) – floor standing (колонный)
E(floor-standing exposed) – floor standing exposed
D – console

Manufacturer's brand and class of the system
M(idea) **V**(RF)

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.

1.2.1 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	Indoor Unit Combination Ratio (kW)								
	130%	120%	110%	100%	90%	80%	70%	60%	50%
8HP	32.8	30.2	27.7	25.2	22.7	20.1	17.6	15.1	12.6
10HP	36.4	33.6	30.8	28.0	25.2	22.4	19.6	16.8	14.0
12HP	43.6	40.2	36.9	33.5	30.2	26.8	23.5	20.2	16.8
14HP	52.0	48.0	44.0	40.0	36.0	32.0	28.0	24.0	20.0
16HP	58.5	54.0	49.5	45.0	40.5	36.0	31.5	27.0	22.5
18HP	69.2	63.8	58.5	53.2	47.9	42.6	37.2	31.9	26.6
20HP	72.8	67.2	61.6	56.0	50.4	44.8	39.2	33.6	28.0
22HP	80.0	73.8	67.7	61.5	55.4	49.2	43.1	36.9	30.8
24HP	88.4	81.6	74.8	68.0	61.2	54.4	47.6	40.8	34.0
26HP	94.9	87.6	80.3	73.0	65.7	58.4	51.1	43.8	36.5
28HP	102.1	94.2	86.4	78.5	70.7	62.8	55.0	47.1	39.3
30HP	110.5	102.0	93.5	85.0	76.5	68.0	59.5	51.0	42.5
32HP	117.0	108.0	99.0	90.0	81.0	72.0	63.0	54.0	45.0
34HP	124.8	115.2	105.6	96.0	86.4	76.8	67.2	57.6	48.0
36HP	131.3	121.2	111.1	101.0	90.9	80.8	70.7	60.6	50.5
38HP	138.5	127.8	117.2	106.5	95.9	85.2	74.6	63.9	53.3
40HP	146.9	135.6	124.3	113.0	101.7	90.4	79.1	67.8	56.5
42HP	153.4	141.6	129.8	118.0	106.2	94.4	82.6	70.8	59.0
44HP	160.6	148.2	135.9	123.5	111.2	98.8	86.5	74.1	61.8
46HP	169.0	156.0	143.0	130.0	117.0	104.0	91.0	78.0	65.0
48HP	175.5	162.0	148.5	135.0	121.5	108.0	94.5	81.0	67.5
50HP	186.2	171.8	157.5	143.2	128.9	114.6	100.2	85.9	71.6
52HP	189.8	175.2	160.6	146.0	131.4	116.8	102.2	87.6	73.0
54HP	197.0	181.8	166.7	151.5	136.4	121.2	106.1	90.9	75.8
56HP	205.4	189.6	173.8	158.0	142.2	126.4	110.6	94.8	79.0
58HP	211.9	195.6	179.3	163.0	146.7	130.4	114.1	97.8	81.5
60HP	219.1	202.2	185.4	168.5	151.7	134.8	118.0	101.1	84.3
62HP	227.5	210.0	192.5	175.0	157.5	140.0	122.5	105.0	87.5
64HP	234.0	216.0	198.0	180.0	162.0	144.0	126.0	108.0	90.0

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	Model 140
Capacity Index (kW)	1.8	2.2	2.8	3.6	4.5	5.6	7.1	8.0	9.0	11.2	14.0
Unit Size	Model 160	Model 200	Model 250	Model 280							
Capacity Index (kW)	16	20	25	28							

1.3 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

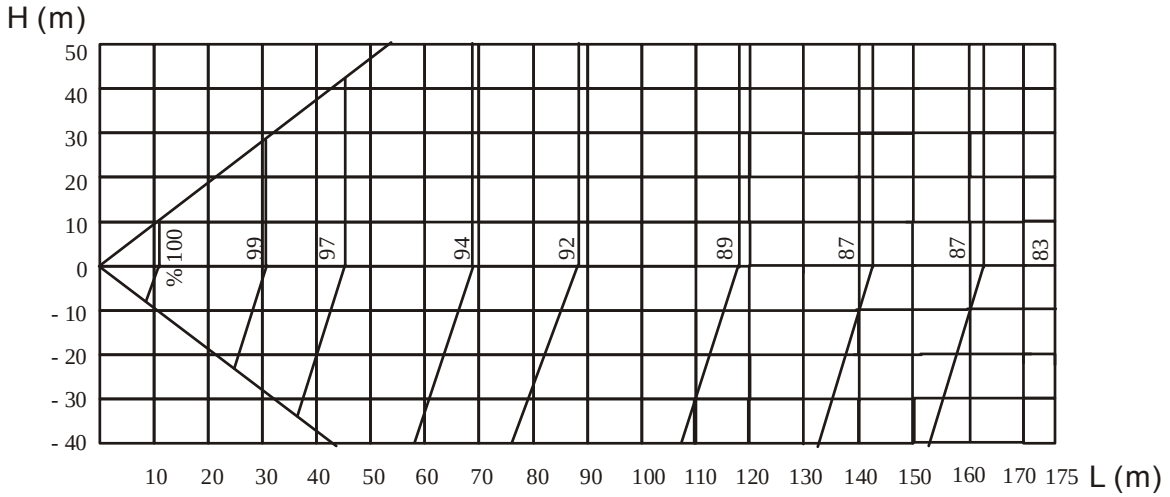
Then, correct the indoor unit capacity according to the piping length.

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

1.4 Variation in capacity in accordance with the length of refrigerant pipe

1.4.1 Cooling capacity modification

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

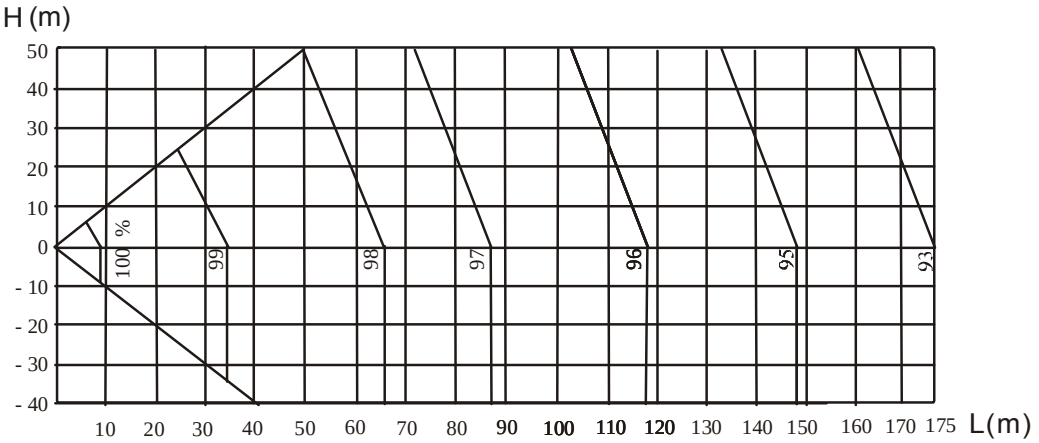


L: Refrigerant pipe equivalent length

H: Height difference between outdoor and indoor

1.4.2 Heating capacity modification

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



L: Refrigerant pipe equivalent length
H: Height difference between outdoor and indoor

2 Unit selection (Based on cooling load)

2.1 Given condition

2.1.1 Design condition (Cooling: Indoor 20°C (WB), Outdoor 35°C (DB))

2.1.2 Cooling load

Location	Room A	Room B	Room C	Room D	Room E	Room F
Load (kW)	2.1	2.8	3.5	4.6	5.8	7.2

2.1.3 Power supply unit: Outdoor 380~415V-3Ph-50Hz, Indoor 220~240V-1Ph-50Hz.
2.1.4 Pipe length: 50m
2.1.5 Height difference: 30m

2.2 Indoor unit selection

Select the suitable capacity for condition of 'Indoor 20°C (WB), Outdoor 35°C (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)	2.1	2.8	3.5	4.6	5.8	7.2
Unit size	22	28	36	45	56	71
Capacity (kW)	2.3	2.9	3.7	4.8	6.0	7.5

2.3 Outdoor unit selection

2.3.1 Assume the indoor unit and outdoor unit combination as follows

2.3.1.1 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

2.3.1.2 Select outdoor unit: MVUH280A-VA3 which has nominal cooling capacity: 28kW.

Calculate the proportion between ① and ②: 258/280= 92%

2.3.2 Result: Because the proportion is within 50～130%, it is a «Right» selection.

2.3.3 Real function data with indoor unit combination

● For the 92% combination, calculate the cooling capacity of outdoor unit (MVUH280A-VA3).

26.65KW ←90% (Indoor temperature: **WB 20°C,** Outdoor temperature: **DB 35°C**)

29.61KW ←100% (Indoor temperature: **WB 20°C**, Outdoor temperature: **DB 35°C**)

Then calculated the outdoor capacity in 92% combination index:

Therefore: 26.65+ {(29.61-26.65)/ 10} ×2= 27.24;

● Outdoor unit (MVUH280A-VA3) cooling temperature: DB 35°C

● Capacity modification coefficient with pipe length (50m) and height difference (30m): 0.958

● Each indoor unit cooling capacity

MVM22A-VA1: 27.24 × 22/258 × 0.958 = 2.22 (kW)

MVM28A-VA1: 27.24 × 28/258 × 0.958 = 2.83 (kW)

MVM36A-VA1: 27.24 × 36/258 × 0.958 = 3.64 (kW)

MVM45A-VA1: 27.24 × 45/258 × 0.958 = 4.55 (kW)

MVM56A-VA1: 27.24 × 56/258 × 0.958 = 5.66 (kW)

MVM71A-VA1: 27.24 × 71/258 × 0.958 = 7.18 (kW)

Location	Room A	Room B	Room C	Room D	Room E	Room F
Load (kW)	2.1	2.8	3.5	4.6	5.8	7.2
Unit size	22	28	36	45	56	71
Capacity (kW)	2.22	2.83	3.64	4.55	5.66	7.18

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, we don't consider the other capacity modification index and assume them are 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 Specification & Performance

1. Specifications

Model			MVUH252B-VA3	MVUH280B-VA3	MVUH335B-VA3
Power supply		V-Ph-Hz	380~415V 3Ph ~ 50Hz	380~415V 3Ph ~ 50Hz	380~415V 3Ph ~ 50Hz
Cooling (*1)	Capacity	W	25200	28000	33500
	Input	W	5875	7053	8793
	EER	W/W	4.29	3.97	3.81
Heating (*2)	Capacity	W	27000	31500	37500
	Input	W	6150	7554	8993
	COP	W/W	4.39	4.17	4.17
Max. input consumption		W	11270	11270	16953
Max. current		A	20.8	22.1	30.8
DC Inverter compressor	Model		E655DHD-65D2YG	E655DHD-65D2YG	E655DHD-65D2YG+ E405DHD-36D2YG
	Quantities		1	1	1+1
	Type		DC Inverter	DC Inverter	DC Inverter
	Brand		Hitachi	Hitachi	Hitachi
	Capacity	W	31590（90Hz）	31590（90Hz）	31590（90Hz）+11800(60Hz）
	Input	W	10340（90Hz）	10340（90Hz）	10340（90Hz）+3665（60Hz）
	Power supply	V-Ph-Hz	380-415V~3Ph, 50Hz	380-415V~3Ph, 50Hz	380-415V~3Ph, 50Hz
	Operating frequency	Hz	40~200	40~200	40~200
	Crankcase	W	27.6	27.6	27.6*2
	Refrigerant oil	ml	FVC68D / 500	FVC68D / 500	FVC68D / 500+ FVC68D / 500
Outdoor fan motor	Model		WZDK750-38G-4	WZDK750-38G-4	WZDK750-38G-4
	Type		DC Inverter	DC Inverter	DC Inverter
	Brand		Panasonic&Nidec	Panasonic&Nidec	Panasonic&Nidec
	Quantities		1	1	2
	Insulation class		E	E	E
	Safe class		IPX4	IPX4	IPX4
	Input	W	534(RATED)	534(RATED)	272×2(RATED)
	Output	W	454	454	232×2
	Rated current	A	4.4	4.4	2.3×2
	Speed	r/min	850(RATED)	850(RATED)	930(RATED)
Outdoor fan	Material		Plastic	Plastic	Plastic
	Type		Axial	Axial	Axial
	Fan Quantities		1	1	2
	Dimension(Dia.×H)	mm	700×202	700×202	560×189
	Vane Quantities		3	3	3+4
Outdoor coil	Number of rows		2	2	2
	Tube pitch(a)x row pitch(b)	mm	22×19	22×19	22×19
	Fin spacing	mm	1.6	1.6	1.6
	Fin type (code)		Hydrophilic aluminum	Hydrophilic aluminum	Hydrophilic aluminum
	Tube outside dia.	mm	Φ7.94	Φ7.94	Φ7.94
	Tube type		Inner-grooved	Inner-grooved	Inner-grooved
	Coil length x height	mm	1985×1232	1985×1232	2270×1232
	Number of circuits		22	22	22
Outdoor air flow		m^3/h	11242	11242	15620
External static pressure		Pa	0~20 (default) 20~40 (optional)	0~20 (default) 20~40(optional)	0~20 (default) 20~60 (optional)
Outdoor sound level(*3)		dB(A)	57	57	59

Outdoor unit	Dimension(W×H×D)	mm	960×1615×765	960×1615×765	1250×1615×765
	Packing (W×H×D)	mm	1025×1790×830	1025×1790×830	1305×1790×820
	Net/Gross weight	Kg	212/220	212/220	288/300
Charged refrigerant type and volume		kg	R410A 10kg	R410A 10kg	R410A 12kg
Throttle type			EXV	EXV	EXV
Excessive operating pressure		MPa	4.4/2.6	4.4/2.6	4.4/2.6
Refrigerant piping	Liquid side/ Gas side(*4)	mm	Φ12.7/Φ25.4	Φ12.7/Φ25.4	Φ15.9/Φ31.8
	Oil balance pipe	mm	Φ6.4	Φ6.4	Φ6.4
	Total pipe length	m	1000	1000	1000
	The farthest pipe length(actual)	m	175	175	175
	The farthest pipe length (equivalent)	m	200	200	200
	The farthest equivalent pipe length from the first distributor (*5)	m	40(90)	40(90)	40(90)
	Max. Vertical pipe length (When outdoor units is above)	m	70	70	70
	Max. Vertical pipe length (When outdoor units is below)	m	110	110	110
	Max. drop between indoor units	m	30	30	30
Connection wiring	Power wiring	mm^2	4×10+10(L≤20m); 4×16+10(L≤50m)	4×10+10(L≤20m); 4×16+10(L≤50m)	4×10+10(L≤20m); 4×16+10(L≤50m)
	Signal wiring	mm^2	3 core shielded wiring; wiring dia.≥0.75	3 core shielded wiring; wiring dia.≥0.75	3 core shielded wiring; wiring dia.≥0.75
Ambient temp. range - Cooling		℃	-5℃－48℃	-5℃－48℃	-5℃－48℃
Ambient temp. range - Heating		℃	-20℃－27℃	-20℃－27℃	-20℃－27℃

Notes:

1. The cooling conditions: indoor temp.: 27℃ DB(80.6℉), 19℃WB(60℉), outdoor temp.: 35℃DB(95℉), equivalent pipe length: 5m, drop length: 0m.
2. The heating conditions: indoor temp.: 20℃ DB(68℉), 15℃WB(44.6℉) outdoor temp.: 7℃DB(42.8℉) equivalent pipe length: 5m drop length: 0m.
3. Sound level: Anechoic chamber conversion value, measured at a point 1 m in front of the unit at a height of 1.5 m. During actual operation, these values are normally somewhat higher as a result of ambient conditions.
4. It's the dimension of connecting pipes between outdoor and first branch joint when the Max. Equivalent length of tubing is less than 90m.
5. The farthest equivalent pipe length should be equal to or shorter than 40m, but it can be up to 90m if meet the required conditions following part 4 installation sections.
6. The above data may be changed without notice for future improvement on quality and performance.

Model			MVUH400B-VA3	MVUH450B-VA3	MVUH500B-VA3
Power supply		V-Ph-Hz	380~415V 3Ph ~ 50Hz	380~415V 3Ph ~ 50Hz	380~415V 3Ph ~ 50Hz
Cooling	Capacity	W	40000	45000	50000
	Input	W	11299	13235	14793
	EER	W/W	3.54	3.4	3.38
Heating	Capacity	W	45000	50000	56000
	Input	W	11194	12788	14396
	COP	W/W	4.02	3.91	3.89
Max. input consumption		W	16953	17402	27250
Max. current		A	31.8	32.8	46
DC Inverter compressor	Model		E655DHD-65D2YG+E405D HD-36D2YG	E655DHD-65D2YG+E405D HD-36D2YG	E655DHD-65D2YG
	Quantities		1+1	1+1	2
	Type		DC Inverter	DC Inverter	DC Inverter
	Brand		Hitachi	Hitachi	Hitachi
	Capacity	W	31590（90Hz）+11800（60Hz）	31590（90Hz）+11800（60Hz）	31590（90Hz）+31590（90Hz）
	Input	W	10340（90Hz）+3665（60Hz）	10340（90Hz）+3665（60Hz）	10340（90Hz）+10340（90Hz）
	Power supply	V-Ph-Hz	380-415V~3Ph, 50Hz	380-415V~3Ph, 50Hz	380-415V~3Ph, 50Hz
	Operating frequency	Hz	40~200/48~230	40~200/48~230	40~200
	Crankcase	W	27.6×2	27.6×2	27.6×2
	Refrigerant oil	ml	FVC68D / 500+ FVC68D / 500	FVC68D / 500+ FVC68D / 500	FVC68D / 500+ FVC68D / 500
Outdoor fan motor	Model		WZDK750-38G-4	WZDK750-38G-4	WZDK560-38G(A)
	Type		DC MOTOR	DC MOTOR	DC MOTOR
	Brand		Panasonic&Nidec	Panasonic&Nidec	Panasonic
	Quantities		2	2	2
	Insulation class		E	E	E
	Safe class		IPX4	IPX4	IPX4
	Input	W	450×2(RATED)	450×2(RATED)	465×2
	Output	W	383×2	383×2	560×2
	Rated current	A	3.5×2	3.5×2	3.6×2
	Speed	r/min	1100×2	1100×2	800×2
Outdoor fan	material		Plastic	Plastic	Plastic
	Type		Axial	Axial	Axial
	Fan Quantities		2	2	2
	Dimension(Dia.×H)	mm	560×189	560×189	560×189
	Vane Quantities		3+4	3+4	3+4
Outdoor coil	Number of rows		2	2	2
	Tube pitch(a)x row pitch(b)	mm	22×19	22×19	22×19
	Fin spacing	mm	1.6	1.6	1.6
	Fin type (code)		Hydrophilic aluminum	Hydrophilic aluminum	Hydrophilic aluminum
	Tube outside dia.	mm	Φ7.94	Φ7.94	Φ7.94
	Tube type		Inner-grooved	Inner-grooved	Inner-grooved
	Coil length × height	mm	2270×1232	2270×1232	2867×1232
	Number of circuits		22	22	22
Outdoor air flow		m^3/h	15620	15620	14000
External static pressure		Pa	0~20 (default) 20~40 (optional)	0~20 (default) 20~40 (optional)	0~20 (default) 20~40 (optional)
Outdoor sound level(*4)		dB(A)	61	62	62
Outdoor unit	Dimension(W×H×D)	mm	1250×1615×765	1250×1615×765	1250×1615×765

	Packing (W×H×D)	mm	1305×1790×820	1305×1790×820	1305×1790×820
	Net/Gross weight	Kg	288/308	288/308	310/330
Charged refrigerant type		kg	R410A 15kg	R410A 15kg	R410A 16kg
Throttle type			EXV	EXV	EXV
Excessive operating pressure		MPa	4.4/2.6	4.4/2.6	4.4/2.6
Refrigerant piping	Liquid side/ Gas side	mm	Φ15.9/Φ31.8	Φ15.9/Φ31.8	Φ19.1/Φ31.8
	Oil balance pipe	mm	Φ6.4	Φ6.4	Φ6.4
	Total pipe length	m	1000	1000	1000
	The farthest pipe length(actual)	m	175	175	175
	The farthest pipe length (equivalent)	m	200	200	200
	The farthest equivalent pipe length from the 1st distributor tube(*5)	m	40(90)	40(90)	40(90)
	Max. Vertical pipe length (When outdoor units is above)	m	70	70	70
	Max. Vertical pipe length (When outdoor units is below)	m	110	110	110
	Max. drop between indoor units	m	30	30	30
Connection wiring	Power wiring	mm^2	4×16+16(L≤20m); 4×25+16(L≤50m)	4×16+16(L≤20m); 4×25+16(L≤50m)	4×16+16(L≤20m); 4×25+16(L≤50m)
	Signal wiring	mm^2	3 core shielded wiring; wiring dia.≥0.75	3 core shielded wiring; wiring dia.≥0.75	3 core shielded wiring; wiring dia.≥0.75
Ambient temp. range - Cooling		℃	-5℃－48℃	-5℃－48℃	-5℃－48℃
Ambient temp. range - Heating		℃	-20℃－27℃	-20℃－27℃	-20℃－27℃

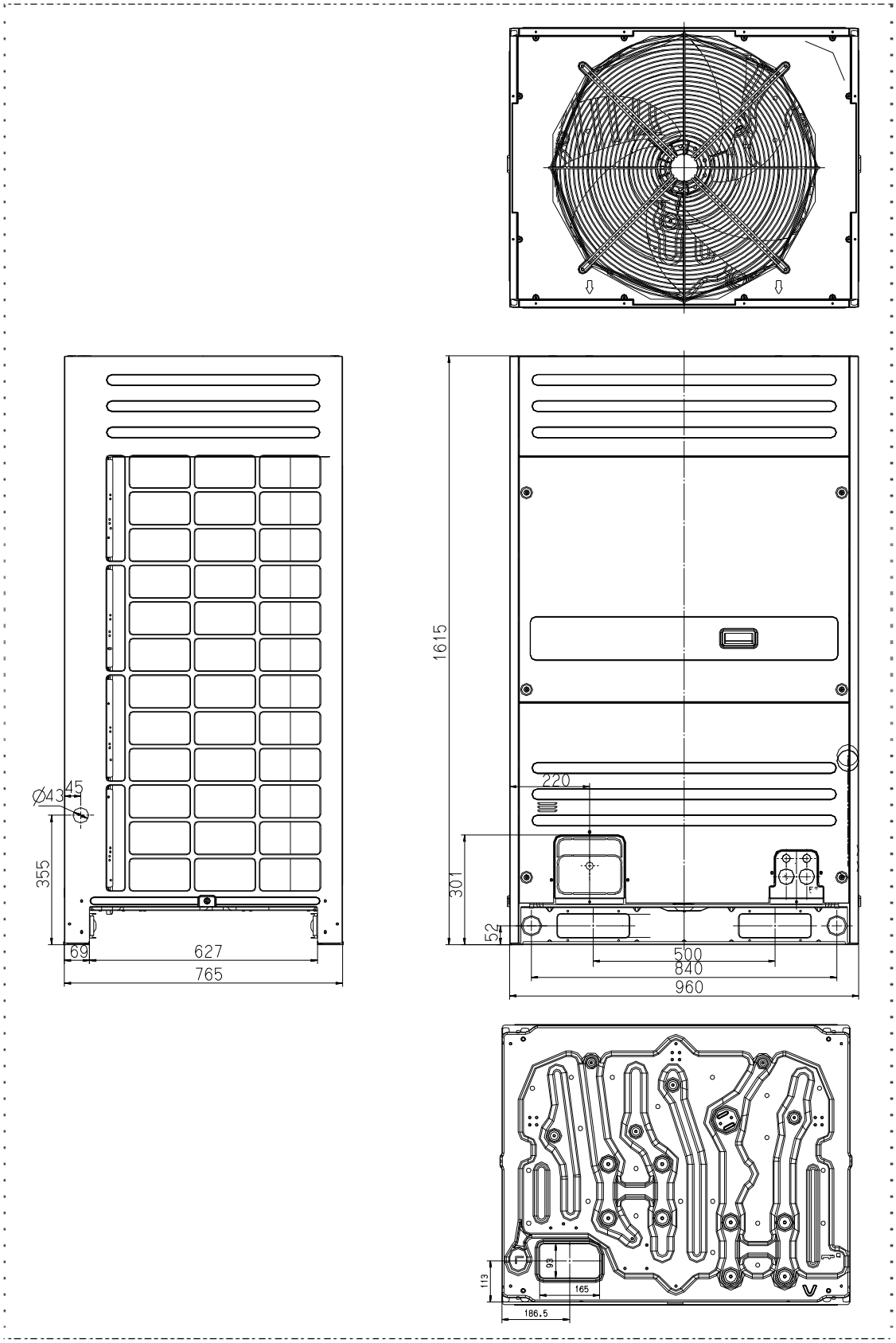
Notes:

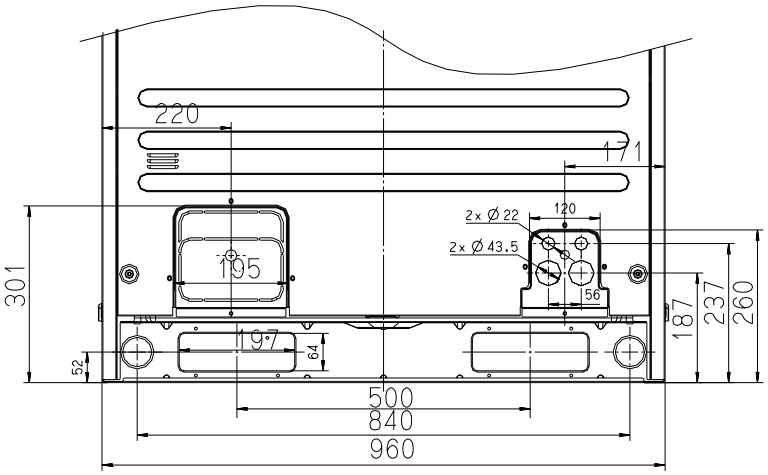
1. The cooling conditions: indoor temp.: 27℃DB(80.6℉), 19℃WB(60℉), outdoor temp.: 35℃DB(95℉), equivalent pipe length: 5m, drop length: 0m.
2. The heating conditions: indoor temp.: 20℃DB(68℉), 15℃WB(44.6℉), outdoor temp.: 7℃DB(42.8℉), equivalent pipe length: 5m, drop length: 0m.
3. Sound level: Anechoic chamber conversion value, measured at a point 1 m in front of the unit at a height of 1.5 m. During actual operation, these values are normally somewhat higher as a result of ambient conditions.
4. It's the dimension of connecting pipes between outdoor and first branch joint when the Max. Equivalent length of tubing is less than 90m.
5. The farthest equivalent pipe length should be equal to or shorter than 40m, but it can be up to 90m if meet the required conditions following part 4 installation sections.
6. The above data may be changed without notice for future improvement on quality and performance.

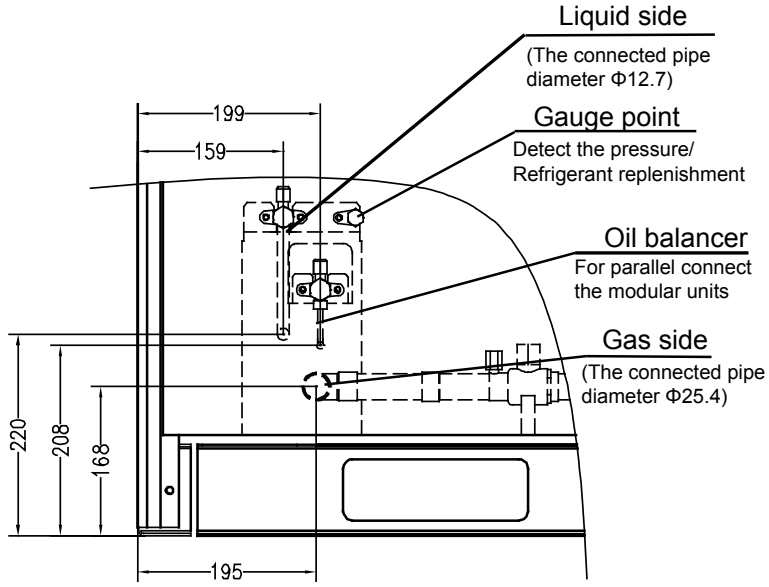
2. Dimensions

2.1 Units Dimension

8HP/10HP Dimensions (Combinable):

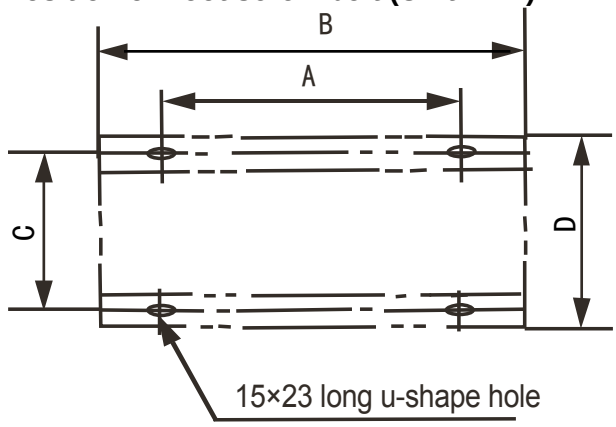






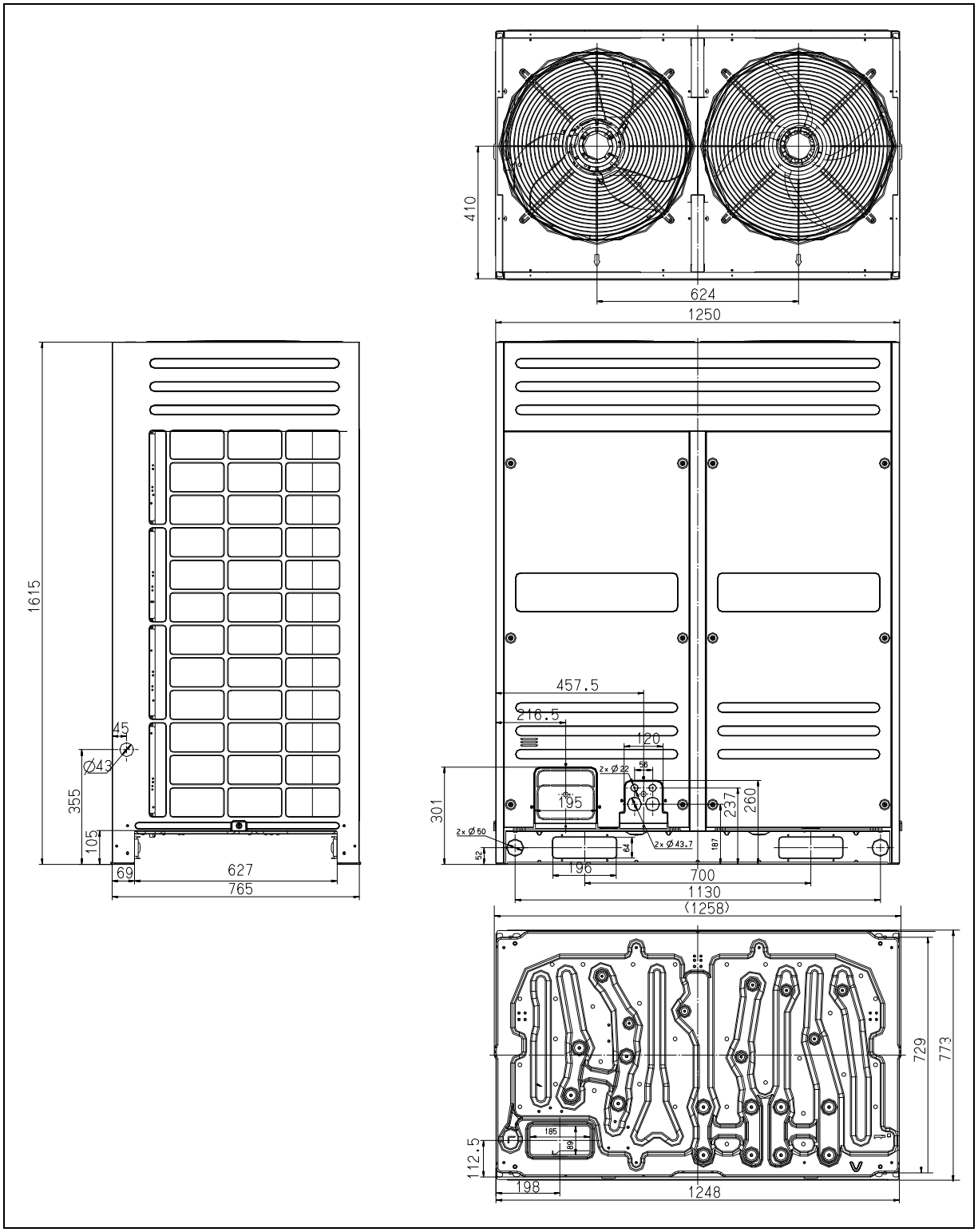
Enlarged view for 8HP/10HP

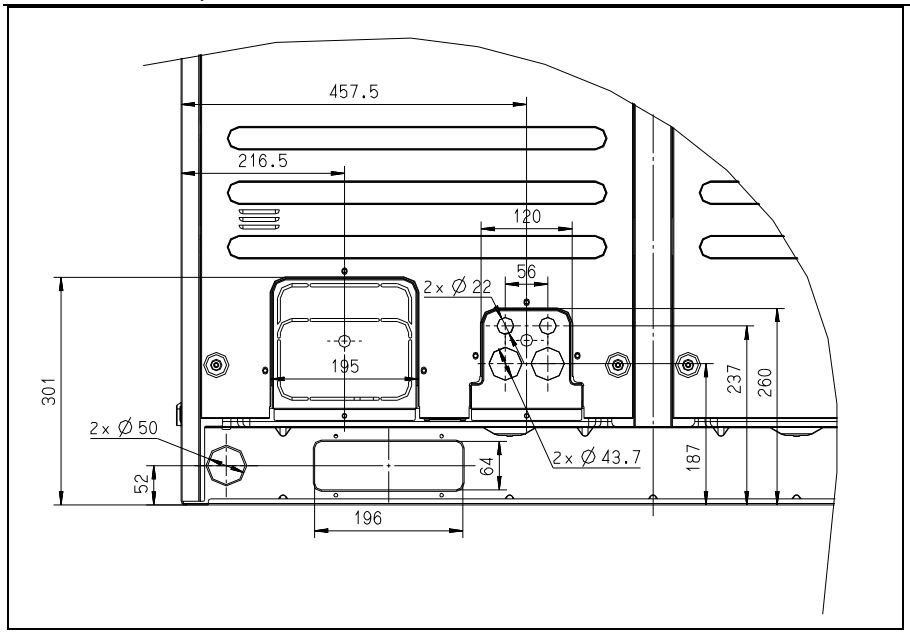
Position of Foot screw bolt (Unit: mm)

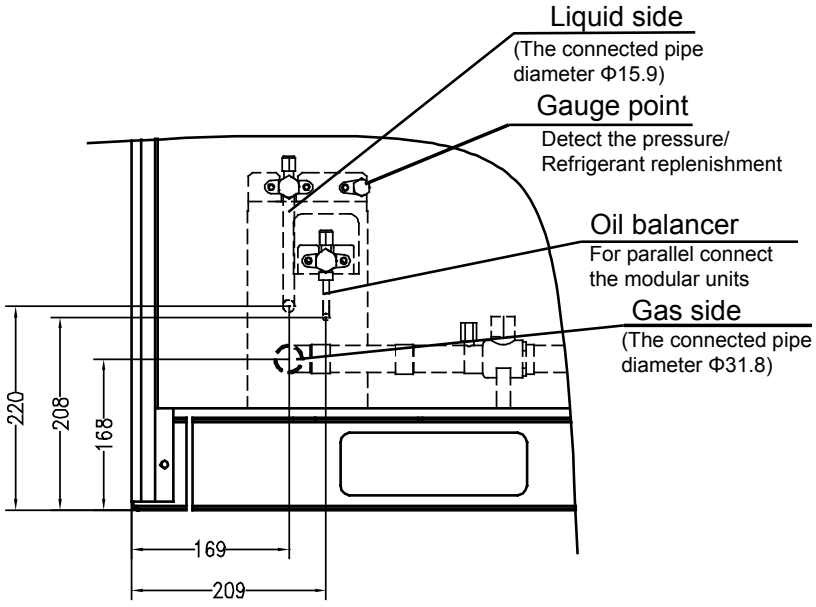


	For 8,10HP	For 12,14,16,18HP
A	830	1120
B	960	1250
C	736	736
D	765	765

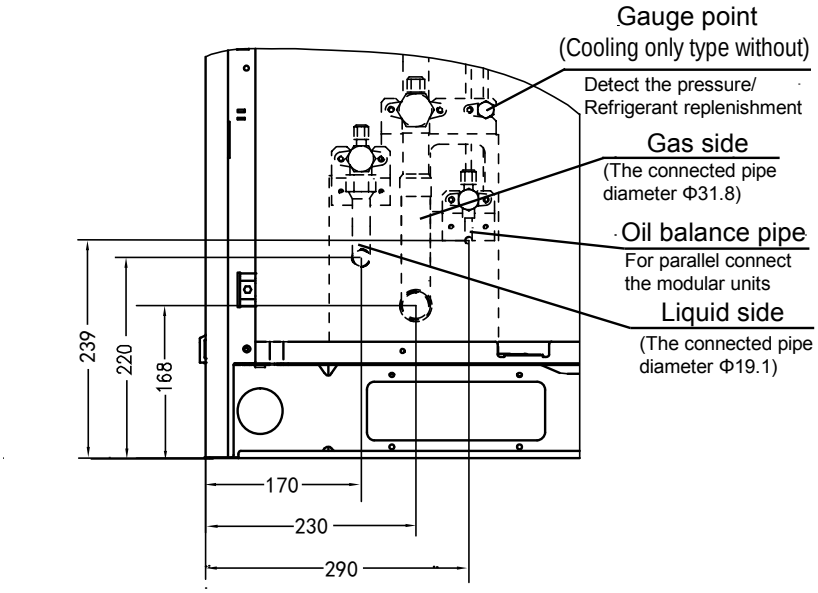
12HP/14HP/16HP/18HP （Combinable）Dimensions:





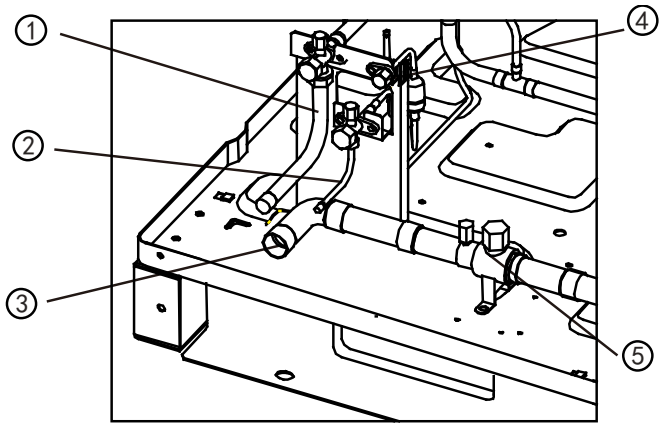


Enlarged view for 12HP/14/16HP



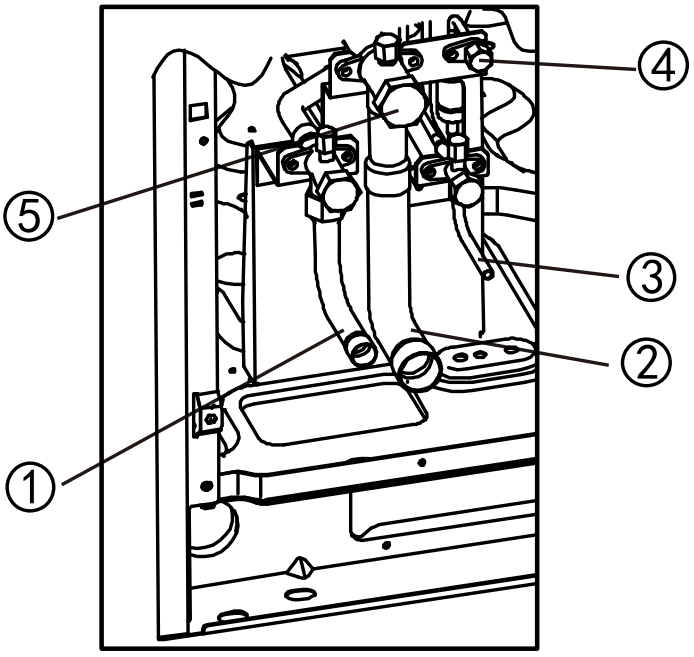
Enlarged view for 18HP

2.2 Valve explanation



12HP, 14HP, 16HP

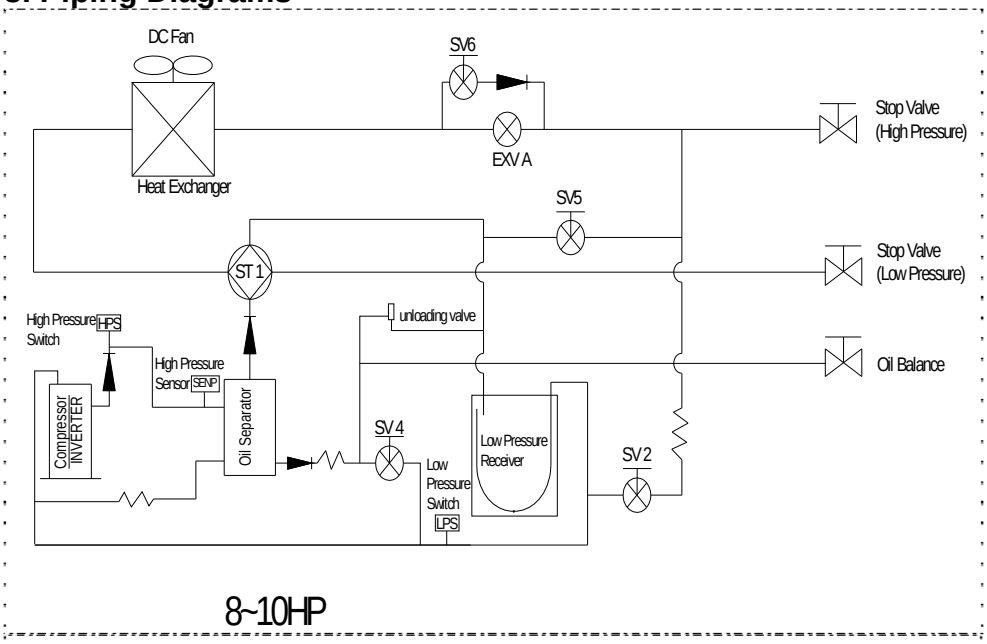
①Connect the liquid pipe (accessory, field installation) ② Oil balance pipe (only for combination)
③Connect the gas pipe ④Gauge point(Cooling only type without)
⑤Low pressure float valve



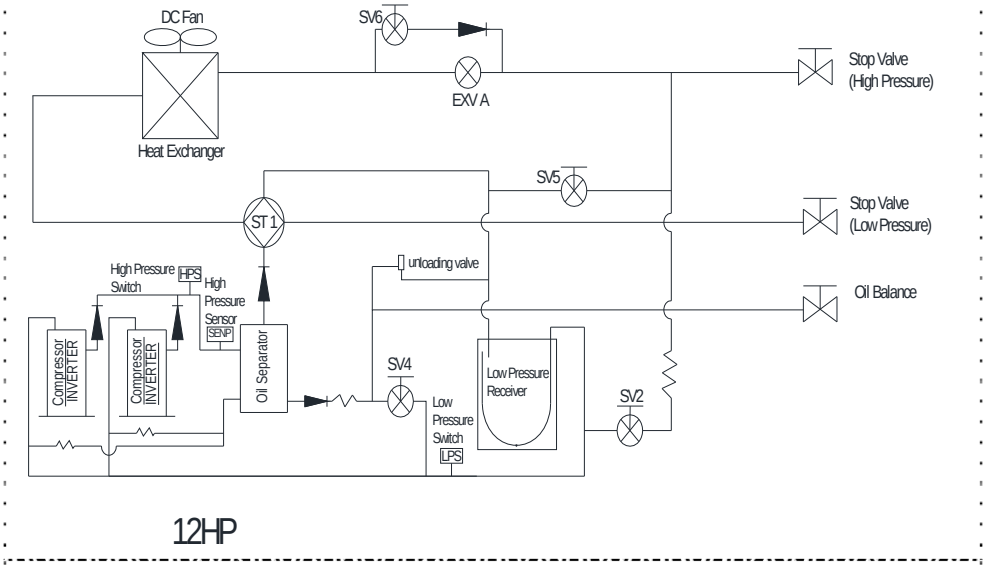
18HP

①Connect the liquid pipe (accessory, field installation) ② Connect the gas pipe
③Oil balance pipe (only for combination) ④ Gauge point(Cooling only type without)
⑤Stop valve

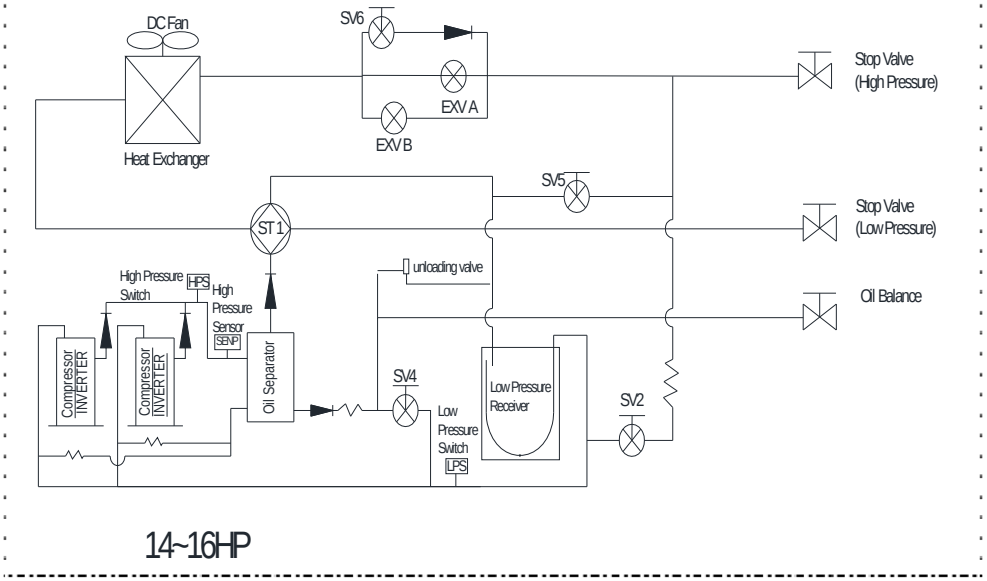
3. Piping Diagrams



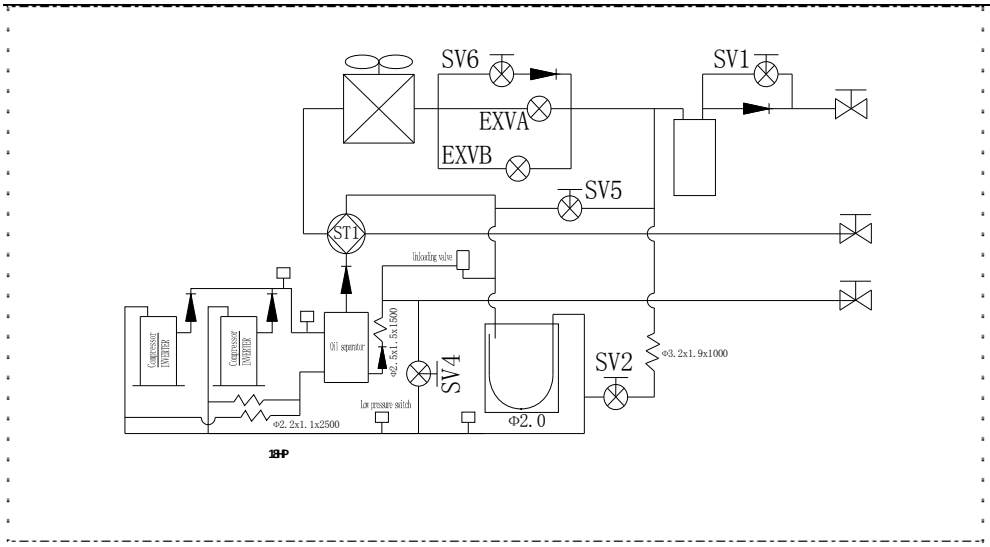
8~10HP



12HP



14~16HP



Remark:
1.8~10 HP models only have one inverter compressor.
2.12~18HP have two DC inverter compressors.
3.14~18HP models have two EXV parts at the high-pressure pipe side, different with 12HP model.
Key Components:
Oil Separator: used to separate oil from high pressure & 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.

Low pressure receiver: It is used to store the liquid refrigerant and oil, it can protect the compressor from liquid hammer.

Four-way valve control (ST1): Closed in cooling mode and open in heating mode

EXV (electromagnetic expansion valve) control:
1) Max. Open degree is 480 pulses.
2) Generally, when system is plug in the EXV closes 700pulse first, then opens to 350 pulse and stand by. When then the unit started, it opens to the right pulse.
3) When the running outdoor unit receives OFF signal, the EXV of slave unit will stop, while master unit is running and slave unit stopped at the same time. If all outdoor units stopped, the EXV will close first, and then open to the pulse of stand-by.
4) 8HP~12HP models have one EXV; 14~18HP models have double EXVs.

SV2: spray a little liquid refrigerant to cooling compressor. Open when any compressor discharge temperature is higher than 100□.

SV4: oil returning valve. Opens after the DC inverter compressor has been run for 5 minutes and then closes 15 minutes later. (For the system has only one outdoor unit).
Every 20 minutes, SV4 of each outdoor unit opens for 3 minutes. (For the system has more than one outdoor unit)

SV5: for 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.

SV6: for by-pass. Closed when the unit stands by and system is running at heating mode. Open when the discharge temperature is over-high in cooling mode, and close when the unit is standby or system is in heating mode.
High pressure sensor: to supervisor the discharge pressure of the compressor and to control the DC fan speed.

For example:

Cooling mode launch sequence (The unit has accomplish commissioning):
Plug in and unit start----------SV4, SV5 open —60s later— SV5 closed —60s later— SV4 closed —40s later— Inverter compressor start at 40 Hz —50s later— Inverter compressor start at 30hz —20s later— Fix scroll compressor start (This step is omitted for 8HP&10HP models) —40s later— Inverter compressor running frequency will adjust according the capacity requirement.

4. Electric Characteristics

Model	Outdoor Unit				Power Supply			Compressor		OFM	
	Hz	Voltage	Min.	Max.	MCA	TOCA	MFA	MSC	RLA	KW	FLA
MVUH252B-VA3	50	380~415	342	440	32	25	32	-	-	0.454	4.4
MVUH280B-VA3	50	380~415	342	440	38	30	40	-	-	0.454	4.4
MVUH335B-VA3	50	380~415	342	440	50	40	50	-	-	0.234×2	2.2×2
MVUH400B-VA3	50	380~415	342	440	50	40	50	-	-	0.391×2	3.4×2
MVUH450B-VA3	50	380~415	342	440	50	50	63	-	-	0.391×2	3.4×2
MVUH500B-VA3	50	380~415	342	440	50	50	63	-	-	0.391×2	3.4×2

Remark:

MCA: Min. Current Amps. (A)

TOCA: Total Over-current Amps. (A)

MFA: Max. Fuse Amps. (A)

MSC: Max. Starting Amps. (A)

RLA: Rated Locked Amps. (A)

OFM: Outdoor Fan Motor.

FLA: Full Load Amps. (A)

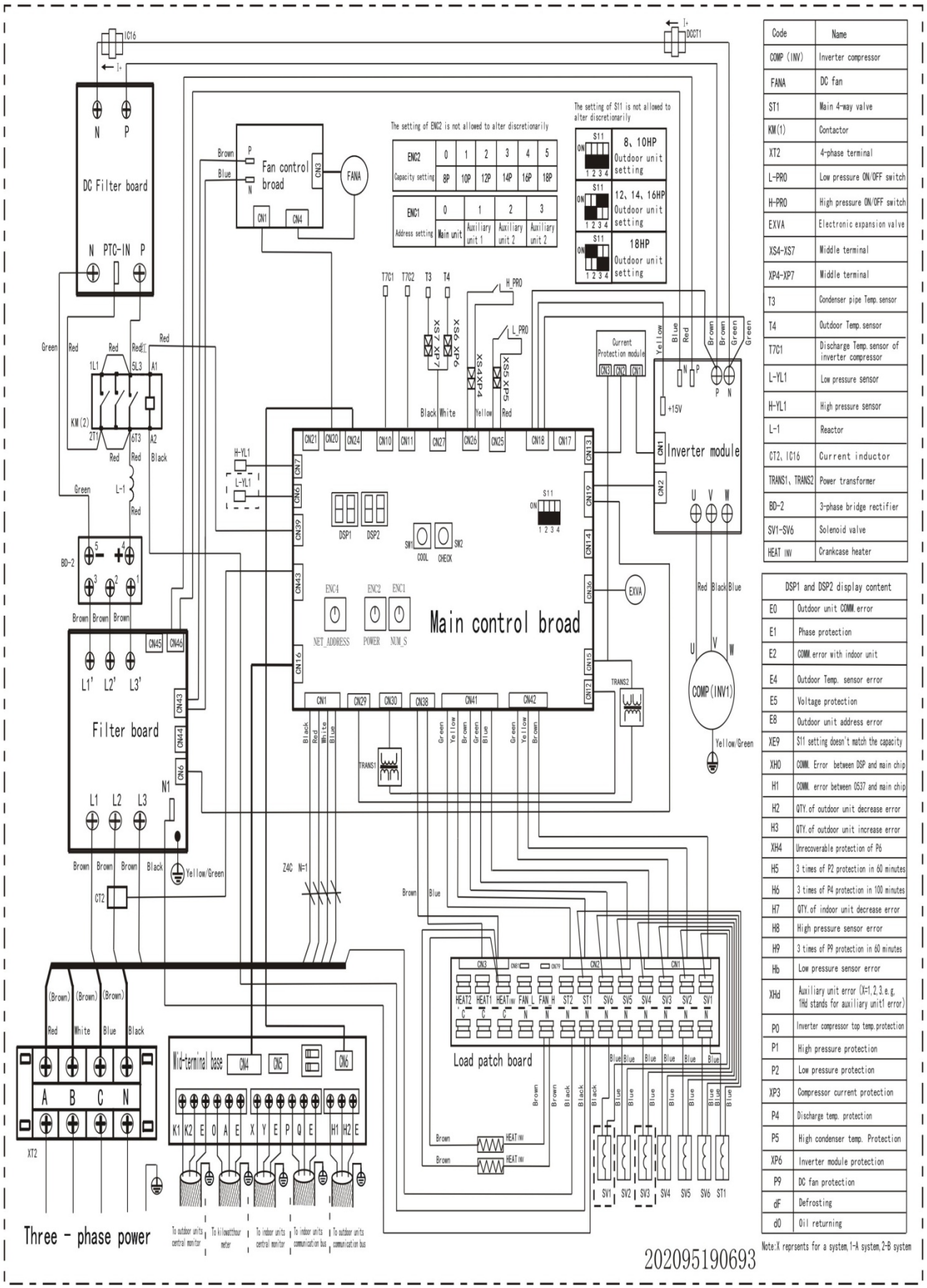
KW: Rated Motor Output (KW)

Notes:

1. RLA is based on the following conditions, Indoor temp. 27℃ DB/19℃ WB,Outdoor temp. 35℃ 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).

5. Wiring Diagrams and Field Wiring

5.1 Wiring Diagram For 8~10HP

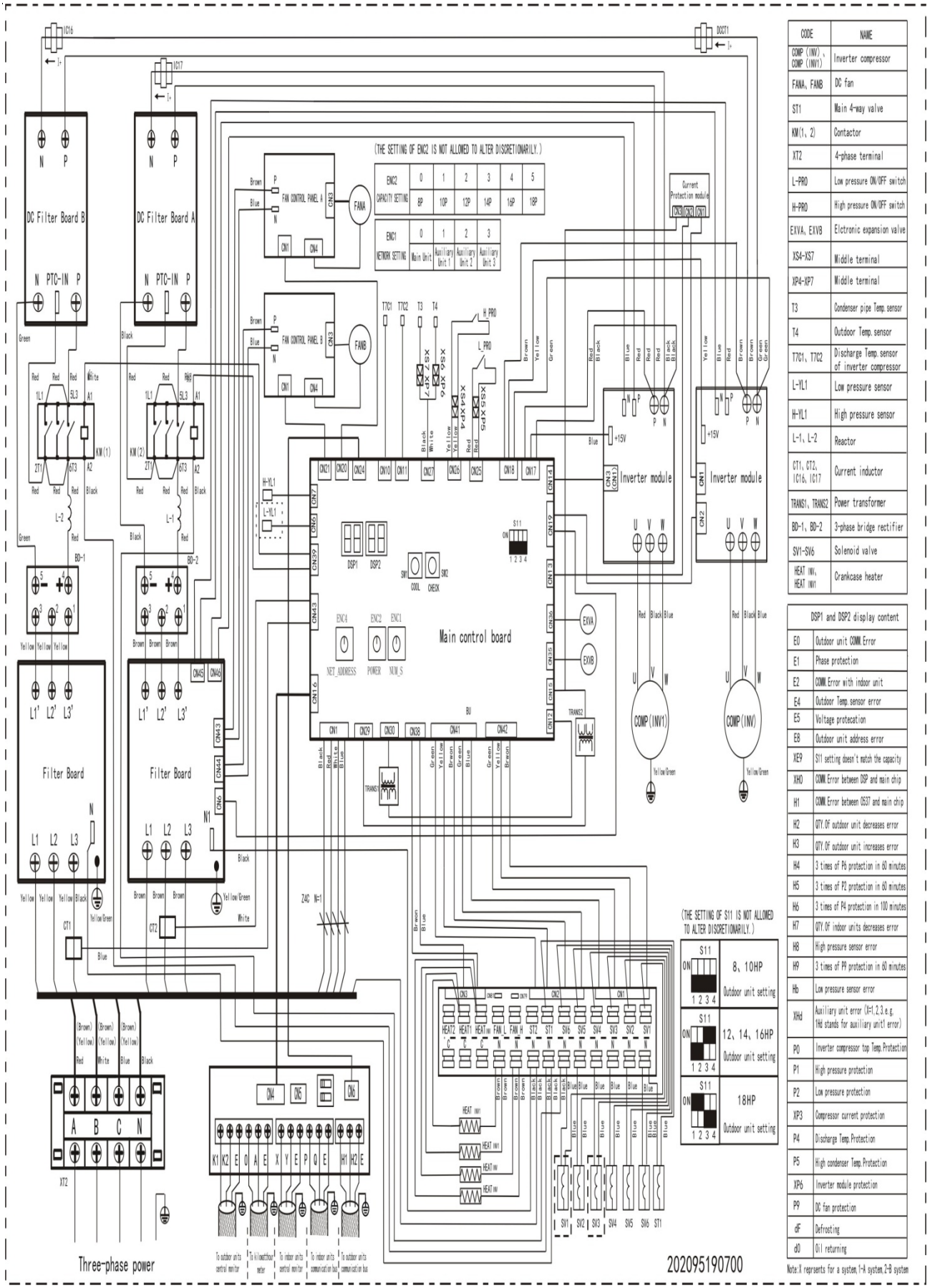


Code	Name
COMP (INV)	Inverter compressor
FANA	DC fan
ST1	Main 4-way valve
KM(1)	Contactor
XT2	4-phase terminal
L-PRO	Low pressure ON/OFF switch
H-PRO	High pressure ON/OFF switch
EXVA	Electronic expansion valve
XS4-XS7	Middle terminal
XP4-XP7	Middle terminal
T3	Condenser pipe Temp. sensor
T4	Outdoor Temp. sensor
T7C1	Discharge Temp. sensor of inverter compressor
L-YL1	Low pressure sensor
H-YL1	High pressure sensor
L-1	Reactor
CT2、IC16	Current inductor
TRANS1、TRANS2	Power transformer
BD-2	3-phase bridge rectifier
SV1-SV6	Solenoid valve
HEAT INV	Crankcase heater

DSP1 and DSP2 display content	
E0	Outdoor unit COMM.error
E1	Phase protection
E2	COMM.error with indoor unit
E4	Outdoor Temp. sensor error
E5	Voltage protection
E8	Outdoor unit address error
XE9	S11 setting doesn't match the capacity
XH0	COMM. Error between DSP and main chip
H1	COMM. error between 0537 and main chip
H2	QTY.of outdoor unit decrease error
H3	QTY.of outdoor unit increase error
XH4	Unrecoverable protection of P6
H5	3 times of P2 protection in 60 minutes
H6	3 times of P4 protection in 100 minutes
H7	QTY.of indoor unit decrease error
H8	High pressure sensor error
H9	3 times of P9 protection in 60 minutes
Hb	Low pressure sensor error
XHd	Auxiliary unit error (X=1,2,3.e.g, 1Hd stands for auxiliary unit1 error)
P0	Inverter compressor top temp.protection
P1	High pressure protection
P2	Low pressure protection
XP3	Compressor current protection
P4	Discharge temp. protection
P5	High condenser temp. Protection
XP6	Inverter module protection
P9	DC fan protection
dF	Defrosting
dO	Oil returning

Note:X reprsents for a system,1-A system,2-B system

Wiring Diagram For 12~18HP



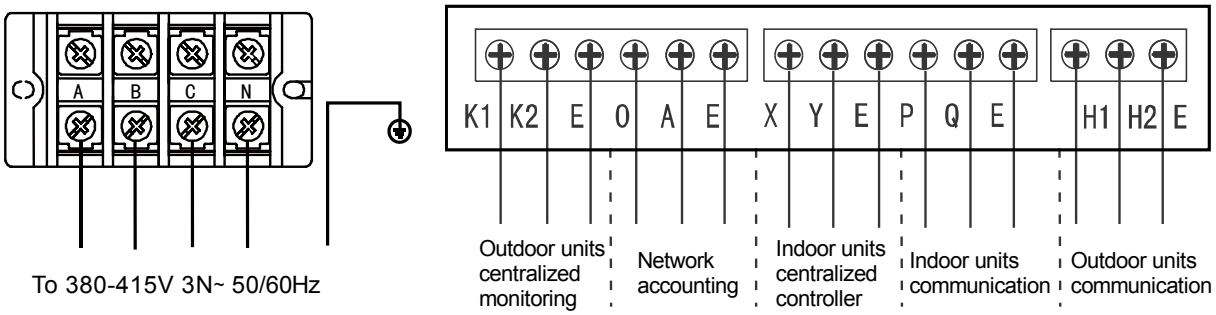
CODE	NAME
COMP (INV), COMP (INV1)	Inverter compressor
FANA, FANB	DC fan
ST1	Main 4-way valve
KM(1, 2)	Contactor
XT2	4-phase terminal
L-PRO	Low pressure ON/OFF switch
H-PRO	High pressure ON/OFF switch
EXVA, EXVB	Electronic expansion valve
XS4-XS7	Middle terminal
XP4-XP7	Middle terminal
T3	Condenser pipe Temp.sensor
T4	Outdoor Temp.sensor
T7C1, T7C2	Discharge Temp.sensor of inverter compressor
L-YL1	Low pressure sensor
H-YL1	High pressure sensor
L-1, L-2	Reactor
CT1, CT2, IC16, IC17	Current inductor
TRANS1, TRANS2	Power transformer
BD-1, BD-2	3-phase bridge rectifier
SV1-SV6	Solenoid valve
HEAT INV, HEAT INV1	Crankcase heater

DSP1 and DSP2 display content	
E0	Outdoor unit COMM.Error
E1	Phase protection
E2	COMM.Error with indoor unit
E4	Outdoor Temp.sensor error
E5	Voltage protecation
E8	Outdoor unit address error
XE9	S11 setting doesn't match the capacity
XH0	COMM.Error between DSP and main chip
H1	COMM.Error between IC37 and main chip
H2	QTY.Of outdoor unit decreases error
H3	QTY.Of outdoor unit increases error
H4	3 times of P6 protection in 60 minutes
H5	3 times of P2 protection in 60 minutes
H6	3 times of P4 protection in 100 minutes
H7	QTY.Of indoor units decreases error
H8	High pressure sensor error
H9	3 times of P9 protection in 60 minutes
Hb	Low pressure sensor error
XHd	Auxiliary unit error (X=1,2,3 e.g. 1Hd stands for auxiliary unit1 error)
P0	Inverter compressor top Temp.Protection
P1	High pressure protection
P2	Low pressure protection
XP3	Compressor current protection
P4	Discharge Temp.Protection
P5	High condenser Temp.Protection
XP6	Inverter module protection
P9	DC fan protection
dF	Defrosting
dO	Oil returning

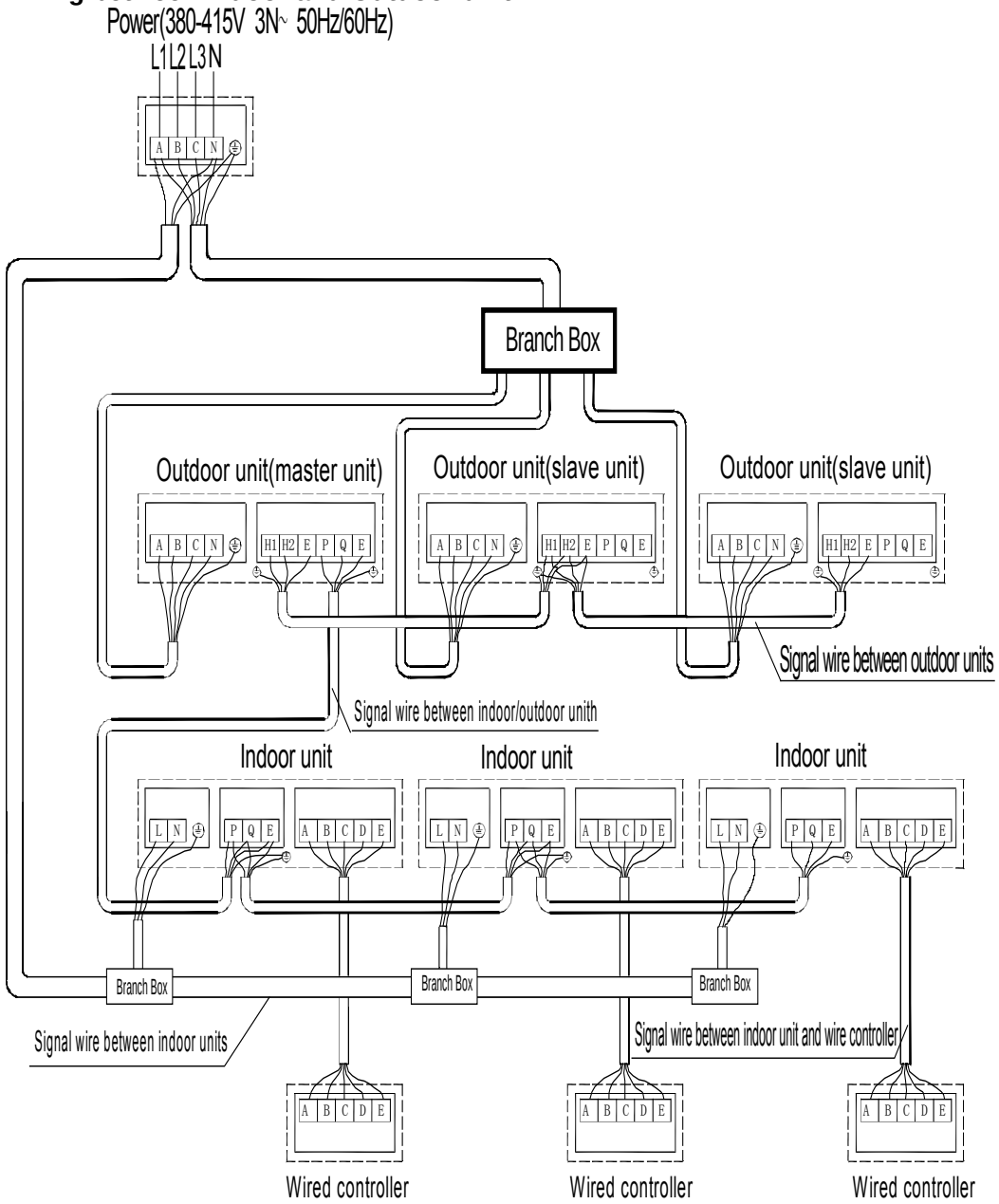
Note:X represents for a system,1-A system,2-B system

5.2 Field Wiring

Terminal of Outdoor unit



Wiring between Indoor and Outdoor unit



Note:

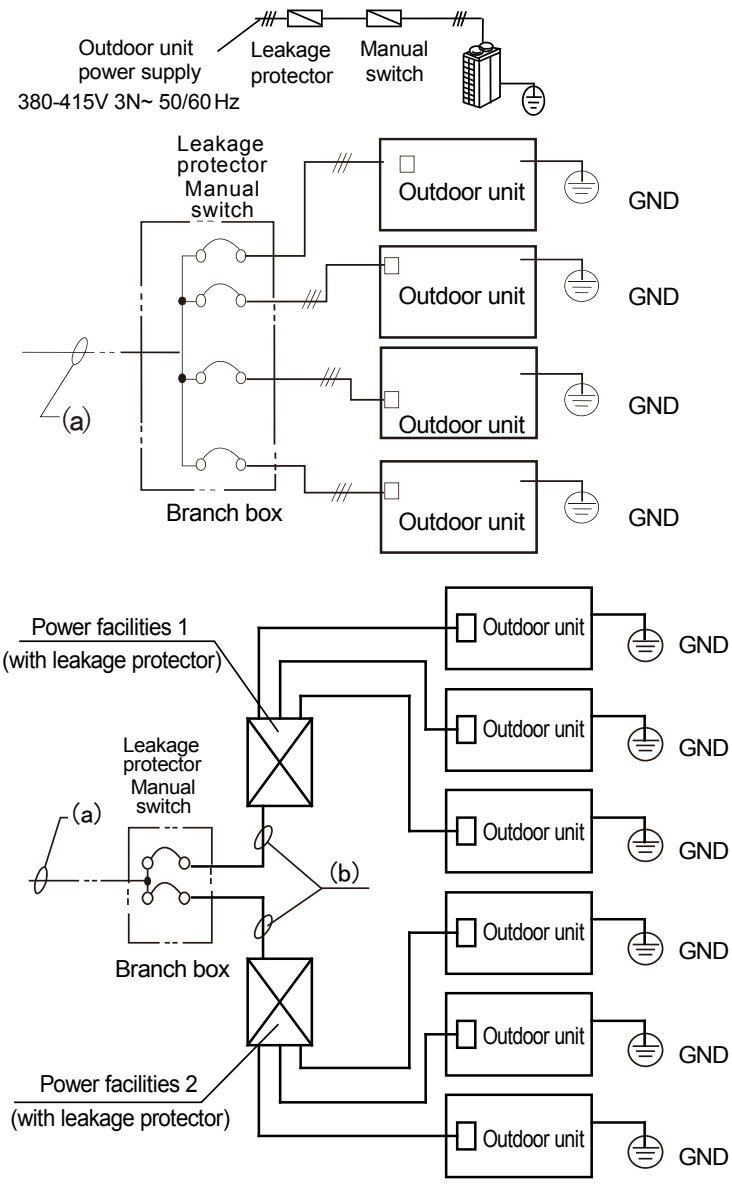
1. The signal connecting line between outdoor units, indoor and outdoor units and indoor units has polarity. When connecting, be careful to prevent error connection.
2. Signal line shall adopt three-core shielded wire with an area above 0.75 mm^2.
3. Do not bind signal line and copper pipe together with belting.
4. Make sure that the shield metal layer should be grounded well indoor control box in order to prevent interference.
5. It's forbidden to connect 200V or above high-volt live wire to the communication terminal.

5.3 Outdoor unit power wiring

5.3.1 Separate Power Supply (without power facility)

Model \ Item	Power supply	Minimum Power wire diameter (mm^2) Wiring of mental and synthetic resin		manual switch（A）		Creepage breaker
		Size	Ground wire	Capacity	Fuse	
MVUH252B-VA3	380V~415V, 3N, 50Hz	4×10 mm^2 (<20 m) 4×16 mm^2 (<50 m)	1×10 mm^2	32	25	100 mA 0.1sec or less
MVUH280B-VA3		4×10 mm^2 (<20 m) 4×16 mm^2 (<50 m)	1×10 mm^2	40	30	
MVUH335B-VA3		4×10 mm^2 (<20 m) 4×16 mm^2 (<50 m)	1×10 mm^2	50	40	
MVUH400B-VA3		4×16 mm^2 (<20 m) 4×25 mm^2 (<50 m)	1×16 mm^2	50	40	
MVUH450B-VA3		4×16 mm^2 (<20 m)	1×16 mm^2	63	50	
MVUH500B-VA3		4×25 mm^2 (<50 m)	1×16 mm^2	63	50	

5.3.2 With power facilities:



Note:

1. Select power cord for these five models separately according to relevant standard.

2. The wiring diameter and the length in the table indicate the condition that the voltage dropping range is within 2%. If the length exceeds the above figure, please select the wire diameter according to relevant standard.

3. Select the wire diameter

Power wiring refer to the main wire (a) connecting to branch box and the wiring (b) between branch box and power facilities. Please select the wire diameter according to the following requirement.

4. Diameter of main wire (a)

Depends on the total horsepower of outdoor unit and following table.

E.g. In system:(8Hp×1unit+8Hp×1unit+10Hp×1unit)

Total Hp=26Hp→(Table.6-4)→size of wire=35mm2(within 50m)

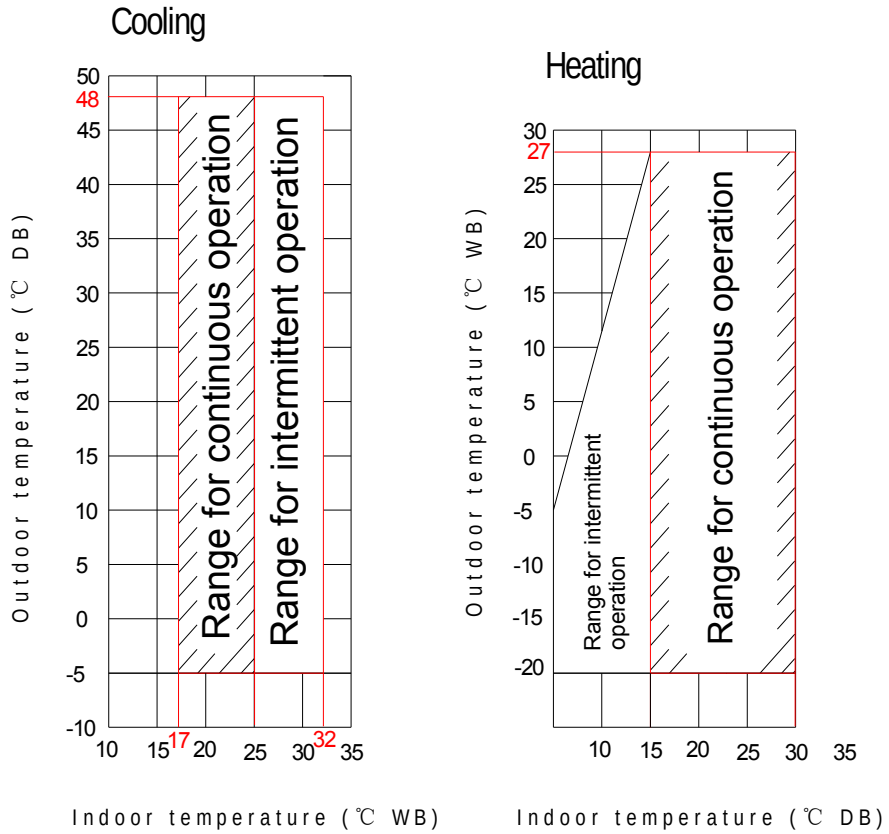
5. Wiring(b):between branch box and power equipment. Depends on the number of combined outdoor unit. If fewer than 5, the diameter is the same as that of main wire (a); if more than 6, there will be 2 electric control boxes, and the diameter of wiring depends on the total horsepower of outdoor units connecting to each electric control box and following table.

5.3.3 Reference table of the cable size for each capacity

Total capacity (HP)	**Min. Diameter of wiring (mm^2)** from weather proof isolator to ODU	
	Below 20 m	20 to 50 m
8	10	16
10	10	16
12	10	16
14	16	25
16	16	25
18	16	25
20	25	35
22	25	35
24	25	35
26	25	35
28	25	35
30	35	50
32	35	50
34	35	50
36	35	50
38	35	50
40	35	50
42	50	70
44	50	70
46	50	70
48	50	70
50	70	95
52	70	95
54	70	95
56	90	110
58	90	110
60	90	110
62	90	110
64	90	110
66	90	110
68	90	110
70	90	110
72	90	110

Remark: The above selection is just for reference, it should be considered that the cable layout, space between cable and surroundings, etc. for an actual electrical project

6. Operation Limits



	Outdoor temp.	Indoor temp.	Room relative humidity
Cooling mode	-5°C ~ 48°C	17°C ~ 32°C	below 80%
Heating mode	-20°C ~ 27°C	15°C ~ 30°C	——

Notes:

1. If the unit is running outside the above condition, protective device will start, and even then the units take place abnormality running.

2. These figures base on the operation conditions between indoor units and outdoor units: Equivalent pipe length is 5m, and height difference is 0m.

Precaution:

The indoor relative humidity should be lower than 80%. If the air conditioner works in an environment with a relative humidity higher than mentioned above, the surface of the air conditioner may condensate. In this case, it is recommended to set the air speed of the indoor unit to high.

7. Capacity Tables

8HP cooling mode

Combination (%) (Capacity index)	Outdoor temperature (°C DB)	Indoor temperature(°C DB/WD)													
		DB:20.8,WB:14		DB:23.3,WB:16		DB:25.8,WB:18		DB:27,WB:19		DB:28.2,WB:20		DB:30.7,WB:22		DB:32,WB:24	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
130%	-5	22.14	2.40	26.37	2.93	30.60	3.14	31.77	3.27	33.30	3.36	34.11	3.66	34.97	3.68
	-2	22.14	2.40	26.37	2.99	30.60	3.14	31.77	3.29	33.30	3.36	34.11	3.70	34.97	3.72
	0	22.14	2.44	26.37	3.04	30.60	3.26	31.77	3.47	33.30	3.56	34.11	3.75	34.97	3.77
	2	22.14	2.49	26.37	3.05	30.60	3.37	31.77	3.66	33.30	3.60	34.11	3.78	34.97	3.82
	4	22.14	2.54	26.37	3.11	30.60	3.48	31.77	3.68	33.30	3.65	34.11	3.77	34.97	3.89
	6	22.14	2.59	26.37	3.17	30.60	3.61	31.77	3.71	32.93	3.76	33.69	3.77	34.58	3.92
	8	22.14	2.65	26.37	3.24	30.60	3.79	31.77	3.89	32.52	3.88	33.33	3.90	34.14	3.96
	10	22.14	2.71	26.37	3.31	30.60	3.93	31.77	4.02	32.13	4.04	32.94	4.06	33.75	4.08
	12	22.14	2.76	26.37	3.37	30.60	4.01	31.32	4.03	31.77	4.06	32.49	4.07	33.30	4.10
	14	22.14	2.81	26.37	3.44	30.51	4.05	30.96	4.06	31.32	4.08	32.13	4.09	32.94	4.19
	16	22.14	2.86	26.37	3.51	30.15	4.06	30.51	4.08	30.87	4.10	31.68	4.12	32.49	4.26
	18	22.14	2.91	26.37	3.58	29.70	4.20	30.06	4.22	30.51	4.24	31.32	4.28	32.13	4.32
	20	22.14	2.98	26.37	3.81	29.25	4.40	29.70	4.43	30.06	4.45	30.87	4.49	31.68	4.54
	21	22.14	3.06	26.37	3.94	29.07	4.51	29.52	4.53	29.88	4.55	30.69	4.60	31.50	4.64
	23	22.14	3.28	26.37	4.23	28.71	4.71	29.07	4.73	29.43	4.76	30.24	4.81	31.05	4.85
	25	22.14	3.50	26.37	4.53	28.26	4.92	28.62	4.94	29.07	4.97	29.88	5.02	30.69	5.07
	27	22.14	3.74	26.37	4.85	27.90	5.12	28.26	5.15	28.62	5.18	29.43	5.23	30.24	5.29
	29	22.14	3.99	26.37	5.18	27.45	5.33	27.81	5.36	28.26	5.39	29.07	5.45	29.88	5.50
	31	22.14	4.26	26.28	5.48	27.00	5.54	27.45	5.57	27.81	5.60	28.62	5.66	29.43	5.72
	33	22.14	4.54	25.83	5.68	26.64	5.75	27.00	5.78	27.45	5.81	28.26	5.87	28.98	5.94
	35	22.14	4.84	25.38	5.89	26.19	5.96	26.64	5.99	27.00	6.03	27.81	6.10	28.62	6.16
	37	22.14	5.15	25.02	6.10	25.83	6.18	26.19	6.21	26.64	6.25	27.36	6.32	28.17	6.39
	39	22.14	5.48	24.57	6.17	25.38	6.38	25.83	6.42	26.19	6.46	27.00	6.53	27.81	6.61
	41	22.14	5.77	24.32	6.23	25.11	6.44	25.56	6.48	25.92	6.52	26.73	6.54	26.74	6.67
	43	22.14	5.91	24.14	6.26	24.98	6.46	25.43	6.51	25.66	6.53	26.25	6.56	26.42	6.69
	45	22.14	6.21	23.99	6.32	24.71	6.52	25.16	6.55	25.28	6.56	25.53	6.58	25.91	6.81
	48	22.14	5.02	24.84	4.84	26.94	5.02	27.44	4.98	27.66	5.00	27.54	5.00	28.04	5.40
120%	-5	20.43	2.32	24.30	2.81	28.26	3.32	30.24	3.62	31.68	3.78	32.40	3.90	33.12	4.00
	-2	20.43	2.34	24.30	2.84	28.26	3.35	30.24	3.64	31.68	3.82	32.40	3.93	33.12	4.01
	0	20.43	2.36	24.30	2.86	28.26	3.39	30.24	3.65	31.68	3.85	32.40	3.95	33.12	4.02
	2	20.43	2.37	24.30	2.89	28.26	3.42	30.24	3.69	31.68	3.87	32.40	3.98	33.12	4.03
	4	20.43	2.39	24.30	2.92	28.26	3.46	30.24	3.72	31.68	3.92	32.40	3.99	33.12	4.04
	6	20.43	2.42	24.30	2.95	28.26	3.51	30.24	3.76	31.68	3.96	32.40	4.02	33.12	4.05
	8	20.43	2.44	24.30	2.98	28.26	3.55	30.24	3.81	31.68	4.00	32.40	4.04	33.12	4.07
	10	20.43	2.47	24.30	3.02	28.26	3.59	30.24	3.88	31.68	4.01	32.40	4.05	33.12	4.09
	12	20.43	2.52	24.30	3.07	28.26	3.66	30.24	3.95	31.23	4.02	31.95	4.03	32.67	4.12
	14	20.43	2.57	24.30	3.14	28.26	3.73	30.24	4.03	30.78	4.05	31.59	4.09	32.31	4.17
	16	20.43	2.61	24.30	3.20	28.26	3.80	30.06	4.10	30.42	4.11	31.14	4.16	31.86	4.23
	18	20.43	2.66	24.30	3.26	28.26	3.93	29.61	4.20	29.97	4.21	30.69	4.25	31.50	4.29
	20	20.43	2.72	24.30	3.39	28.26	4.23	29.25	4.40	29.61	4.42	30.33	4.46	31.05	4.50
	21	20.43	2.74	24.30	3.51	28.26	4.38	28.98	4.50	29.34	4.52	30.15	4.56	30.87	4.61
	23	20.43	2.93	24.30	3.76	28.26	4.69	28.62	4.70	28.98	4.73	29.70	4.77	30.42	4.81
	25	20.43	3.13	24.30	4.02	27.81	4.89	28.17	4.91	28.53	4.93	29.34	4.98	30.06	5.03
	27	20.43	3.34	24.30	4.30	27.45	5.09	27.81	5.12	28.17	5.15	28.89	5.19	29.61	5.24
	29	20.43	3.56	24.30	4.59	27.00	5.30	27.36	5.33	27.72	5.35	28.44	5.41	29.25	5.45
	31	20.43	3.80	24.30	4.90	26.55	5.51	27.00	5.53	27.36	5.57	28.08	5.62	28.80	5.68
	33	20.43	4.05	24.30	5.23	26.19	5.72	26.55	5.75	26.91	5.77	27.63	5.83	28.35	5.89
	35	20.43	4.31	24.30	5.57	25.74	5.92	26.10	5.95	26.55	5.98	27.27	6.05	27.99	6.11
	37	20.43	4.58	24.30	5.94	25.38	6.14	25.74	6.17	26.10	6.20	26.82	6.26	27.54	6.33
	39	20.43	4.88	24.21	6.27	24.93	6.34	25.29	6.38	25.65	6.41	26.46	6.48	27.18	6.55
	41	20.43	5.01	24.01	6.31	24.73	6.39	25.09	6.43	25.45	6.46	26.26	6.50	26.40	6.60
	43	20.43	5.08	23.89	6.36	24.54	6.42	24.90	6.45	25.26	6.48	25.81	6.52	25.99	6.73
	45	20.43	5.14	23.76	6.42	24.30	6.48	24.64	6.51	25.04	6.53	25.29	6.54	25.73	6.87
	48	23.67	3.35	27.29	4.17	27.80	4.22	28.09	4.27	28.69	4.26	28.84	4.20	29.42	4.46
110%	-5	18.72	2.02	22.32	2.52	25.92	3.01	27.72	3.23	29.52	3.47	31.77	3.61	32.49	3.72
	-2	18.72	2.06	22.32	2.55	25.92	3.03	27.72	3.26	29.52	3.50	31.77	3.64	32.49	3.74
	0	18.72	2.08	22.32	2.57	25.92	3.06	27.72	3.28	29.52	3.54	31.77	3.68	32.49	3.78
	2	18.72	2.13	22.32	2.59	25.92	3.10	27.72	3.32	29.52	3.58	31.77	3.73	32.49	3.83
	4	18.72	2.17	22.32	2.62	25.92	3.13	27.72	3.36	29.52	3.63	31.77	3.78	32.49	3.87

	6	18.72	2.19	22.32	2.65	25.92	3.16	27.72	3.41	29.52	3.67	31.77	3.82	32.49	3.93
	8	18.72	2.21	22.32	2.69	25.92	3.20	27.72	3.45	29.52	3.72	31.77	3.85	32.49	3.97
	10	18.72	2.24	22.32	2.73	25.92	3.25	27.72	3.51	29.52	3.78	31.77	3.88	32.49	4.00
	12	18.72	2.29	22.32	2.79	25.92	3.31	27.72	3.58	29.52	3.85	31.41	3.93	32.04	4.05
	14	18.72	2.33	22.32	2.83	25.92	3.37	27.72	3.64	29.52	3.92	30.96	3.97	31.68	4.08
	16	18.72	2.37	22.32	2.89	25.92	3.44	27.72	3.71	29.52	4.00	30.60	4.01	31.23	4.13
	18	18.72	2.41	22.32	2.95	25.92	3.51	27.72	3.82	29.52	4.19	30.15	4.22	30.87	4.26
	20	18.72	2.46	22.32	3.01	25.92	3.71	27.72	4.10	29.07	4.39	29.79	4.43	30.42	4.47
	21	18.72	2.49	22.32	3.10	25.92	3.85	27.72	4.25	28.89	4.50	29.52	4.53	30.24	4.57
	23	18.72	2.60	22.32	3.32	25.92	4.12	27.72	4.56	28.44	4.69	29.16	4.74	29.79	4.78
	25	18.72	2.78	22.32	3.55	25.92	4.41	27.72	4.88	28.08	4.90	28.71	4.95	29.43	4.99
	27	18.72	2.96	22.32	3.79	25.92	4.72	27.27	5.09	27.63	5.11	28.35	5.15	28.98	5.20
	29	18.72	3.16	22.32	4.05	25.92	5.04	26.91	5.30	27.27	5.32	27.90	5.37	28.62	5.42
	31	18.72	3.36	22.32	4.31	25.92	5.38	26.46	5.50	26.82	5.53	27.54	5.57	28.17	5.63
	33	18.72	3.58	22.32	4.60	25.74	5.68	26.10	5.71	26.46	5.73	27.09	5.79	27.81	5.84
	35	18.72	3.81	22.32	4.90	25.29	5.88	25.65	5.91	26.01	5.95	26.64	6.00	27.36	6.06
	37	18.72	4.05	22.32	5.22	24.93	6.10	25.29	6.12	25.56	6.15	26.28	6.21	26.91	6.27
	39	18.72	4.31	22.32	5.56	24.48	6.30	24.84	6.33	25.20	6.37	25.83	6.43	26.55	6.49
	41	18.72	4.35	22.32	5.60	24.29	6.35	24.65	6.38	25.01	6.41	25.50	6.47	25.75	6.54
	43	18.72	4.40	22.32	5.67	24.10	6.39	24.46	6.42	24.82	6.45	25.28	6.50	25.36	6.67
	45	18.72	4.54	22.32	5.71	23.85	6.45	24.20	6.50	24.60	6.51	25.02	6.67	25.12	6.82
	48	20.50	3.35	24.45	4.18	25.74	4.72	26.08	4.79	26.63	4.76	26.95	5.18	27.16	5.00
	-5	17.01	1.84	20.25	2.22	23.58	2.64	25.20	2.83	26.82	3.07	30.15	3.50	31.86	3.65
	-2	17.01	1.87	20.25	2.25	23.58	2.67	25.20	2.88	26.82	3.11	30.15	3.54	31.86	3.68
	0	17.01	1.89	20.25	2.27	23.58	2.70	25.20	2.92	26.82	3.14	30.15	3.60	31.86	3.72
	2	17.01	1.92	20.25	2.30	23.58	2.73	25.20	2.96	26.82	3.18	30.15	3.65	31.86	3.78
	4	17.01	1.94	20.25	2.33	23.58	2.77	25.20	3.00	26.82	3.22	30.15	3.69	31.86	3.82
	6	17.01	1.96	20.25	2.37	23.58	2.81	25.20	3.05	26.82	3.27	30.15	3.74	31.86	3.88
	8	17.01	2.00	20.25	2.41	23.58	2.86	25.20	3.09	26.82	3.32	30.15	3.80	31.86	3.94
	10	17.01	2.03	20.25	2.45	23.58	2.91	25.20	3.14	26.82	3.38	30.15	3.86	31.86	4.00
	12	17.01	2.06	20.25	2.50	23.58	2.96	25.20	3.20	26.82	3.44	30.15	3.93	31.41	4.03
	14	17.01	2.10	20.25	2.55	23.58	3.02	25.20	3.26	26.82	3.51	30.15	4.01	31.05	4.08
	16	17.01	2.14	20.25	2.60	23.58	3.08	25.20	3.32	26.82	3.58	29.97	4.06	30.60	4.12
	18	17.01	2.18	20.25	2.64	23.58	3.13	25.20	3.39	26.82	3.65	29.61	4.20	30.24	4.23
	20	17.01	2.22	20.25	2.70	23.58	3.23	25.20	3.56	26.82	3.91	29.16	4.39	29.79	4.43
100%	21	17.01	2.24	20.25	2.72	23.58	3.35	25.20	3.69	26.82	4.05	28.98	4.50	29.61	4.54
	23	17.01	2.30	20.25	2.91	23.58	3.59	25.20	3.95	26.82	4.34	28.62	4.70	29.16	4.74
	25	17.01	2.45	20.25	3.10	23.58	3.84	25.20	4.24	26.82	4.65	28.17	4.91	28.80	4.95
	27	17.01	2.61	20.25	3.31	23.58	4.10	25.20	4.53	26.82	4.97	27.72	5.11	28.35	5.16
	29	17.01	2.78	20.25	3.53	23.58	4.38	25.20	4.84	26.73	5.28	27.36	5.33	27.99	5.37
	31	17.01	2.96	20.25	3.77	23.58	4.67	25.20	5.16	26.37	5.49	26.91	5.53	27.54	5.58
	33	17.01	3.14	20.25	4.01	23.58	4.98	25.20	5.51	25.92	5.69	26.55	5.74	27.18	5.79
	35	17.01	3.34	20.25	4.27	23.58	5.31	25.20	5.87	25.47	5.90	26.10	5.95	26.73	6.00
	37	17.01	3.55	20.25	4.54	23.58	5.66	24.75	6.08	25.11	6.11	25.74	6.17	26.28	6.21
	39	17.01	3.78	20.25	4.83	23.58	6.02	24.39	6.29	24.66	6.32	25.29	6.37	25.92	6.44
	41	17.01	3.95	20.25	5.01	23.58	6.24	24.01	6.33	24.47	6.41	24.85	6.52	25.54	6.57
	43	17.01	4.13	20.25	5.18	23.58	6.36	23.63	6.40	24.29	6.48	25.00	6.57	25.09	6.64
	45	17.01	4.36	20.25	5.42	23.58	6.47	23.13	6.49	24.17	6.59	24.79	6.67	24.59	6.73
	48	17.62	4.58	20.97	5.61	24.42	6.48	22.97	6.39	24.99	6.66	24.11	6.65	24.91	6.71
	-5	15.30	1.63	18.27	1.96	21.24	2.31	22.68	2.52	24.12	2.68	27.09	3.08	30.06	3.53
	-2	15.30	1.65	18.27	1.98	21.24	2.34	22.68	2.55	24.12	2.71	27.09	3.11	30.06	3.56
	0	15.30	1.67	18.27	2.00	21.24	2.37	22.68	2.58	24.12	2.75	27.09	3.15	30.06	3.59
	2	15.30	1.70	18.27	2.03	21.24	2.40	22.68	2.62	24.12	2.79	27.09	3.21	30.06	3.64
	4	15.30	1.72	18.27	2.06	21.24	2.44	22.68	2.66	24.12	2.83	27.09	3.26	30.06	3.70
	6	15.30	1.75	18.27	2.10	21.24	2.48	22.68	2.71	24.12	2.88	27.09	3.31	30.06	3.76
	8	15.30	1.78	18.27	2.14	21.24	2.53	22.68	2.75	24.12	2.93	27.09	3.37	30.06	3.79
	10	15.30	1.81	18.27	2.18	21.24	2.58	22.68	2.79	24.12	2.99	27.09	3.42	30.06	3.85
90%	12	15.30	1.84	18.27	2.22	21.24	2.63	22.68	2.83	24.12	3.05	27.09	3.48	30.06	3.93
	14	15.30	1.88	18.27	2.26	21.24	2.68	22.68	2.89	24.12	3.10	27.09	3.55	30.06	4.00
	16	15.30	1.91	18.27	2.30	21.24	2.73	22.68	2.94	24.12	3.17	27.09	3.62	29.97	4.07
	18	15.30	1.94	18.27	2.35	21.24	2.78	22.68	3.00	24.12	3.23	27.09	3.69	29.61	4.20
	20	15.30	1.98	18.27	2.40	21.24	2.83	22.68	3.06	24.12	3.35	27.09	3.97	29.16	4.39
	21	15.30	1.99	18.27	2.42	21.24	2.88	22.68	3.17	24.12	3.47	27.09	4.11	28.98	4.50
	23	15.30	2.03	18.27	2.52	21.24	3.09	22.68	3.40	24.12	3.72	27.09	4.41	28.53	4.70
	25	15.30	2.15	18.27	2.69	21.24	3.30	22.68	3.63	24.12	3.97	27.09	4.72	28.17	4.91

	27	15.30	2.28	18.27	2.87	21.24	3.52	22.68	3.88	24.12	4.25	27.09	5.05	27.72	5.11
	29	15.30	2.43	18.27	3.06	21.24	3.76	22.68	4.14	24.12	4.54	26.82	5.28	27.36	5.32
	31	15.30	2.58	18.27	3.25	21.24	4.01	22.68	4.42	24.12	4.84	26.37	5.49	26.91	5.53
	33	15.30	2.74	18.27	3.46	21.24	4.27	22.68	4.71	24.12	5.17	26.01	5.70	26.55	5.74
	35	15.30	2.91	18.27	3.68	21.24	4.55	22.68	5.02	24.12	5.51	25.56	5.91	26.10	5.95
	37	15.30	3.09	18.27	3.91	21.24	4.84	22.68	5.34	24.12	5.87	25.11	6.11	25.74	6.16
	39	15.30	3.28	18.27	4.16	21.24	5.15	22.68	5.69	24.12	6.25	24.75	6.33	25.29	6.37
	41	15.30	3.39	18.27	4.35	21.24	5.34	22.68	5.84	24.12	6.29	24.58	6.49	25.12	6.52
	43	15.30	3.55	18.27	4.54	21.24	5.53	22.68	5.99	24.12	6.43	24.45	6.57	24.90	6.62
	45	15.30	3.78	18.27	4.77	21.24	5.76	22.68	6.19	24.12	6.60	24.32	6.64	24.52	6.71
	48	15.30	2.90	18.27	3.60	21.24	4.30	22.68	4.61	24.12	4.81	26.79	4.79	26.51	4.84
	-5	13.59	1.44	16.20	1.70	18.81	2.01	20.16	2.14	21.51	2.30	24.12	2.66	26.73	3.04
	-2	13.59	1.46	16.20	1.72	18.81	2.03	20.16	2.17	21.51	2.33	24.12	2.69	26.73	3.07
	0	13.59	1.48	16.20	1.74	18.81	2.05	20.16	2.20	21.51	2.37	24.12	2.73	26.73	3.11
	2	13.59	1.51	16.20	1.77	18.81	2.08	20.16	2.24	21.51	2.41	24.12	2.78	26.73	3.17
	4	13.59	1.54	16.20	1.80	18.81	2.12	20.16	2.29	21.51	2.45	24.12	2.83	26.73	3.21
	6	13.59	1.56	16.20	1.84	18.81	2.16	20.16	2.34	21.51	2.50	24.12	2.87	26.73	3.27
	8	13.59	1.59	16.20	1.88	18.81	2.21	20.16	2.38	21.51	2.55	24.12	2.92	26.73	3.33
	10	13.59	1.61	16.20	1.92	18.81	2.26	20.16	2.44	21.51	2.61	24.12	2.98	26.73	3.36
	12	13.59	1.63	16.20	1.96	18.81	2.30	20.16	2.49	21.51	2.67	24.12	3.04	26.73	3.43
	14	13.59	1.66	16.20	1.99	18.81	2.34	20.16	2.53	21.51	2.72	24.12	3.10	26.73	3.49
	16	13.59	1.69	16.20	2.03	18.81	2.39	20.16	2.57	21.51	2.76	24.12	3.16	26.73	3.55
	18	13.59	1.72	16.20	2.07	18.81	2.44	20.16	2.63	21.51	2.82	24.12	3.22	26.73	3.63
	20	13.59	1.75	16.20	2.11	18.81	2.49	20.16	2.68	21.51	2.87	24.12	3.34	26.73	3.88
80%	21	13.59	1.77	16.20	2.12	18.81	2.51	20.16	2.71	21.51	2.94	24.12	3.46	26.73	4.02
	23	13.59	1.80	16.20	2.17	18.81	2.63	20.16	2.88	21.51	3.14	24.12	3.70	26.73	4.31
	25	13.59	1.85	16.20	2.30	18.81	2.81	20.16	3.08	21.51	3.36	24.12	3.97	26.73	4.62
	27	13.59	1.97	16.20	2.45	18.81	2.99	20.16	3.29	21.51	3.59	24.12	4.24	26.73	4.94
	29	13.59	2.10	16.20	2.61	18.81	3.19	20.16	3.50	21.51	3.83	24.12	4.52	26.73	5.28
	31	13.59	2.22	16.20	2.78	18.81	3.40	20.16	3.73	21.51	4.09	24.12	4.83	26.28	5.49
	33	13.59	2.37	16.20	2.95	18.81	3.62	20.16	3.97	21.51	4.35	24.12	5.15	25.92	5.69
	35	13.59	2.51	16.20	3.14	18.81	3.85	20.16	4.23	21.51	4.63	24.12	5.49	25.47	5.90
	37	13.59	2.66	16.20	3.33	18.81	4.09	20.16	4.50	21.51	4.93	24.12	5.85	25.11	6.10
	39	13.59	2.82	16.20	3.55	18.81	4.35	20.16	4.79	21.51	5.25	24.12	6.23	24.66	6.32
	41	13.59	2.88	16.20	3.59	18.81	4.42	20.16	4.92	21.51	5.34	24.12	6.39	24.51	6.43
	43	13.59	2.97	16.20	3.62	18.81	4.48	20.16	5.00	21.51	5.42	24.12	6.46	24.36	6.50
	45	13.59	3.05	16.20	3.66	18.81	4.57	20.16	5.11	21.51	5.51	24.12	6.53	24.05	6.60
	48	13.59	2.00	16.20	2.39	21.16	3.01	20.16	3.40	21.51	3.63	24.12	4.28	26.83	4.38
	-5	11.88	1.28	14.22	1.50	16.47	1.70	17.64	1.83	18.81	1.95	21.06	2.23	23.40	2.57
	-2	11.88	1.29	14.22	1.51	16.47	1.72	17.64	1.86	18.81	1.99	21.06	2.27	23.40	2.60
	0	11.88	1.30	14.22	1.53	16.47	1.75	17.64	1.90	18.81	2.02	21.06	2.31	23.40	2.64
	2	11.88	1.31	14.22	1.54	16.47	1.78	17.64	1.93	18.81	2.06	21.06	2.36	23.40	2.68
	4	11.88	1.33	14.22	1.58	16.47	1.82	17.64	1.97	18.81	2.10	21.06	2.40	23.40	2.74
	6	11.88	1.35	14.22	1.61	16.47	1.86	17.64	2.03	18.81	2.15	21.06	2.44	23.40	2.79
	8	11.88	1.37	14.22	1.65	16.47	1.91	17.64	2.06	18.81	2.20	21.06	2.51	23.40	2.85
	10	11.88	1.40	14.22	1.68	16.47	1.96	17.64	2.11	18.81	2.26	21.06	2.56	23.40	2.88
	12	11.88	1.43	14.22	1.70	16.47	2.00	17.64	2.15	18.81	2.30	21.06	2.61	23.40	2.94
	14	11.88	1.46	14.22	1.73	16.47	2.03	17.64	2.18	18.81	2.34	21.06	2.66	23.40	2.99
	16	11.88	1.48	14.22	1.77	16.47	2.07	17.64	2.22	18.81	2.38	21.06	2.71	23.40	3.05
	18	11.88	1.50	14.22	1.80	16.47	2.11	17.64	2.26	18.81	2.42	21.06	2.76	23.40	3.11
	20	11.88	1.53	14.22	1.83	16.47	2.15	17.64	2.30	18.81	2.47	21.06	2.82	23.40	3.20
70%	21	11.88	1.54	14.22	1.84	16.47	2.16	17.64	2.33	18.81	2.49	21.06	2.86	23.40	3.31
	23	11.88	1.57	14.22	1.88	16.47	2.21	17.64	2.41	18.81	2.62	21.06	3.06	23.40	3.55
	25	11.88	1.60	14.22	1.96	16.47	2.35	17.64	2.57	18.81	2.79	21.06	3.28	23.40	3.79
	27	11.88	1.69	14.22	2.08	16.47	2.51	17.64	2.74	18.81	2.98	21.06	3.50	23.40	4.05
	29	11.88	1.80	14.22	2.21	16.47	2.67	17.64	2.92	18.81	3.17	21.06	3.73	23.40	4.33
	31	11.88	1.90	14.22	2.34	16.47	2.84	17.64	3.10	18.81	3.38	21.06	3.97	23.40	4.62
	33	11.88	2.02	14.22	2.49	16.47	3.02	17.64	3.30	18.81	3.60	21.06	4.24	23.40	4.92
	35	11.88	2.14	14.22	2.64	16.47	3.21	17.64	3.52	18.81	3.83	21.06	4.51	23.40	5.25
	37	11.88	2.26	14.22	2.80	16.47	3.41	17.64	3.73	18.81	4.08	21.06	4.81	23.40	5.59
	39	11.88	2.39	14.22	2.97	16.47	3.62	17.64	3.97	18.81	4.33	21.06	5.11	23.40	5.95
	41	11.88	2.50	14.22	3.07	16.47	3.72	17.64	4.10	18.81	4.46	21.06	5.32	23.40	6.22
	43	11.88	2.70	14.22	3.29	16.47	3.88	17.64	4.32	18.81	4.59	21.06	5.51	23.40	6.41
	45	11.88	2.76	14.22	3.36	16.47	3.96	17.64	4.39	18.81	4.82	21.06	5.81	23.40	6.66
	48	11.88	5.18	14.22	6.28	16.47	7.41	17.64	8.10	18.81	8.75	21.06	10.55	23.40	11.98

	-5	10.17	1.09	12.15	1.27	14.13	1.48	15.12	1.58	16.11	1.70	18.09	1.91	20.07	2.19
	-2	10.17	1.10	12.15	1.29	14.13	1.51	15.12	1.60	16.11	1.72	18.09	1.94	20.07	2.21
	0	10.17	1.12	12.15	1.31	14.13	1.53	15.12	1.62	16.11	1.75	18.09	1.97	20.07	2.23
	2	10.17	1.14	12.15	1.34	14.13	1.55	15.12	1.65	16.11	1.77	18.09	2.01	20.07	2.26
	4	10.17	1.17	12.15	1.36	14.13	1.58	15.12	1.67	16.11	1.80	18.09	2.04	20.07	2.30
	6	10.17	1.18	12.15	1.39	14.13	1.61	15.12	1.71	16.11	1.83	18.09	2.08	20.07	2.35
	8	10.17	1.20	12.15	1.41	14.13	1.64	15.12	1.74	16.11	1.87	18.09	2.12	20.07	2.39
	10	10.17	1.23	12.15	1.44	14.13	1.67	15.12	1.79	16.11	1.91	18.09	2.16	20.07	2.42
	12	10.17	1.25	12.15	1.46	14.13	1.70	15.12	1.82	16.11	1.94	18.09	2.20	20.07	2.46
	14	10.17	1.27	12.15	1.49	14.13	1.73	15.12	1.85	16.11	1.98	18.09	2.24	20.07	2.51
	16	10.17	1.28	12.15	1.51	14.13	1.76	15.12	1.88	16.11	2.01	18.09	2.28	20.07	2.56
	18	10.17	1.31	12.15	1.54	14.13	1.79	15.12	1.92	16.11	2.05	18.09	2.32	20.07	2.60
	20	10.17	1.32	12.15	1.57	14.13	1.82	15.12	1.96	16.11	2.09	18.09	2.37	20.07	2.66
60%	21	10.17	1.34	12.15	1.58	14.13	1.84	15.12	1.97	16.11	2.11	18.09	2.39	20.07	2.68
	23	10.17	1.35	12.15	1.61	14.13	1.87	15.12	2.01	16.11	2.14	18.09	2.49	20.07	2.86
	25	10.17	1.38	12.15	1.63	14.13	1.94	15.12	2.11	16.11	2.28	18.09	2.65	20.07	3.05
	27	10.17	1.43	12.15	1.73	14.13	2.07	15.12	2.25	16.11	2.43	18.09	2.83	20.07	3.25
	29	10.17	1.51	12.15	1.84	14.13	2.20	15.12	2.39	16.11	2.59	18.09	3.02	20.07	3.47
	31	10.17	1.61	12.15	1.95	14.13	2.33	15.12	2.54	16.11	2.75	18.09	3.21	20.07	3.70
	33	10.17	1.69	12.15	2.07	14.13	2.48	15.12	2.70	16.11	2.93	18.09	3.41	20.07	3.94
	35	10.17	1.80	12.15	2.19	14.13	2.63	15.12	2.87	16.11	3.11	18.09	3.63	20.07	4.20
	37	10.17	1.90	12.15	2.32	14.13	2.79	15.12	3.04	16.11	3.30	18.09	3.86	20.07	4.46
	39	10.17	2.00	12.15	2.45	14.13	2.95	15.12	3.22	16.11	3.51	18.09	4.10	20.07	4.75
	41	10.17	2.07	12.15	2.56	14.13	3.06	15.12	3.35	16.11	3.64	18.09	4.29	20.07	4.96
	43	10.17	2.13	12.15	2.67	14.13	3.17	15.12	3.45	16.11	3.76	18.09	4.48	20.07	5.18
	45	10.17	2.23	12.15	2.80	14.13	3.30	15.12	3.58	16.11	3.95	18.09	4.68	20.07	5.47
	48	10.17	3.13	12.15	3.89	14.13	4.51	15.12	4.94	16.11	5.54	18.09	6.41	20.07	7.67
	-5	8.51	0.95	10.17	1.10	11.79	1.26	12.60	1.32	13.41	1.40	15.03	1.59	16.74	1.71
	-2	8.51	0.96	10.17	1.12	11.79	1.28	12.60	1.34	13.41	1.42	15.03	1.61	16.74	1.73
	0	8.51	0.97	10.17	1.14	11.79	1.30	12.60	1.36	13.41	1.44	15.03	1.63	16.74	1.76
	2	8.51	0.99	10.17	1.15	11.79	1.32	12.60	1.38	13.41	1.46	15.03	1.64	16.74	1.80
	4	8.51	1.00	10.17	1.17	11.79	1.34	12.60	1.40	13.41	1.49	15.03	1.68	16.74	1.84
	6	8.51	1.02	10.17	1.19	11.79	1.36	12.60	1.43	13.41	1.52	15.03	1.71	16.74	1.90
	8	8.51	1.04	10.17	1.21	11.79	1.38	12.60	1.46	13.41	1.54	15.03	1.74	16.74	1.96
	10	8.51	1.06	10.17	1.23	11.79	1.40	12.60	1.48	13.41	1.58	15.03	1.78	16.74	1.99
	12	8.51	1.07	10.17	1.24	11.79	1.42	12.60	1.51	13.41	1.61	15.03	1.81	16.74	2.02
	14	8.51	1.08	10.17	1.26	11.79	1.44	12.60	1.54	13.41	1.64	15.03	1.84	16.74	2.06
	16	8.51	1.10	10.17	1.27	11.79	1.46	12.60	1.57	13.41	1.66	15.03	1.88	16.74	2.09
	18	8.51	1.12	10.17	1.30	11.79	1.49	12.60	1.59	13.41	1.69	15.03	1.91	16.74	2.13
	20	8.51	1.13	10.17	1.31	11.79	1.51	12.60	1.61	13.41	1.73	15.03	1.94	16.74	2.17
50%	21	8.51	1.14	10.17	1.33	11.79	1.53	12.60	1.63	13.41	1.74	15.03	1.96	16.74	2.19
	23	8.51	1.16	10.17	1.35	11.79	1.55	12.60	1.66	13.41	1.77	15.03	1.99	16.74	2.24
	25	8.51	1.17	10.17	1.37	11.79	1.58	12.60	1.69	13.41	1.83	15.03	2.10	16.74	2.39
	27	8.51	1.20	10.17	1.42	11.79	1.67	12.60	1.80	13.41	1.94	15.03	2.23	16.74	2.55
	29	8.51	1.26	10.17	1.50	11.79	1.77	12.60	1.92	13.41	2.07	15.03	2.37	16.74	2.72
	31	8.51	1.33	10.17	1.59	11.79	1.88	12.60	2.03	13.41	2.19	15.03	2.52	16.74	2.89
	33	8.51	1.41	10.17	1.69	11.79	1.99	12.60	2.15	13.41	2.33	15.03	2.68	16.74	3.07
	35	8.51	1.49	10.17	1.78	11.79	2.11	12.60	2.28	13.41	2.46	15.03	2.85	16.74	3.26
	37	8.51	1.57	10.17	1.88	11.79	2.23	12.60	2.41	13.41	2.61	15.03	3.02	16.74	3.47
	39	8.51	1.65	10.17	1.99	11.79	2.36	12.60	2.56	13.41	2.77	15.03	3.21	16.74	3.68
	41	8.51	1.72	10.17	2.07	11.79	2.44	12.60	2.68	13.41	2.89	15.03	3.38	16.74	3.85
	43	8.51	1.84	10.17	2.21	11.79	2.53	12.60	2.80	13.41	2.96	15.03	3.55	16.74	4.02
	45	8.51	1.88	10.17	2.27	11.79	2.70	12.60	3.01	13.41	3.09	15.03	3.89	16.74	4.36
	48	8.51	1.99	10.17	2.43	11.79	2.80	12.60	3.13	13.41	3.16	15.03	4.09	16.74	4.56

Note:

1. is shown as reference
2. In cooling mode, avoid the outdoor air temperature range from 42-46 degree C, when selecting the models
3. The above table shows the average value of conditions may operate
4, It is recommended to connect less than 130%

8HP heating mode

Combination (%) (Capacity index)	Outdoor temperature(°C DB		Indoor temperature(°C WB)											
			16		18		20		21		22		24	
			TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
	°C DB	°C WB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
130%	-19.8	-20	17.48	4.34	17.40	4.65	17.32	4.96	17.32	5.11	17.23	5.26	17.23	5.57
	-18.8	-19	17.74	4.44	17.66	4.74	17.66	5.05	17.57	5.20	17.57	5.34	17.48	5.65
	-16.7	-17	18.43	4.65	18.34	4.94	18.26	5.23	18.26	5.37	18.26	5.52	18.17	5.81
	-13.7	-15	19.20	4.86	19.12	5.14	19.03	5.42	19.03	5.56	18.94	5.70	18.94	5.98
	-11.8	-13	19.97	5.08	19.97	5.35	19.89	5.61	19.80	5.75	19.80	5.89	19.71	6.15
	-9.8	-11	20.92	5.30	20.83	5.56	20.74	5.81	20.74	5.94	20.74	6.07	20.66	6.33
	-9.5	-10	21.43	5.42	21.34	5.66	21.26	5.91	21.26	6.04	21.17	6.16	21.17	6.41
	-8.5	-9.1	21.86	5.51	21.77	5.75	21.77	6.00	21.69	6.12	21.69	6.24	21.60	6.49
	-7	-7.6	22.63	5.67	22.63	5.91	22.54	6.14	22.54	6.26	22.46	6.37	22.37	6.61
	-5	-5.6	23.83	5.89	23.74	6.11	23.66	6.33	23.66	6.45	23.57	6.55	23.57	6.77
	-3	-3.7	24.94	6.08	24.86	6.29	24.86	6.50	24.77	6.61	24.77	6.72	24.68	6.92
	0	-0.7	26.91	6.37	26.91	6.57	26.83	6.76	26.83	6.84	26.74	6.96	26.74	7.16
	3	2.2	29.05	6.64	28.97	6.82	28.89	7.00	28.89	7.09	28.89	7.19	28.80	7.36
	5	4.1	30.51	6.80	30.43	6.98	30.43	7.15	30.34	7.24	30.34	7.32	30.26	7.49
	7	6	32.06	6.97	31.97	7.12	31.97	7.29	31.88	7.37	31.88	7.45	30.60	7.16
	9	7.9	33.68	7.11	33.60	7.27	33.60	7.42	33.51	7.50	32.83	7.34	30.60	6.72
	11	9.8	35.40	7.25	35.31	7.40	35.14	7.49	33.94	7.20	32.83	6.90	30.60	6.33
	13	11.8	37.28	7.39	37.20	7.53	35.14	7.02	33.94	6.74	32.83	6.48	30.60	5.94
	15	13.7	39.08	7.52	37.37	7.13	35.14	6.61	33.94	6.36	32.83	6.10	30.60	5.61
120%	-19.8	-20	17.40	4.76	17.31	5.04	17.23	5.33	17.23	5.46	17.23	5.61	17.14	5.89
	-18.8	-19	17.66	4.85	17.57	5.13	17.57	5.41	17.49	5.54	17.49	5.69	17.40	5.97
	-16.7	-17	18.34	5.04	18.26	5.31	18.14	5.57	18.17	5.71	18.17	5.85	18.09	6.11
	-13.7	-15	19.12	5.24	19.03	5.50	18.94	5.75	18.94	5.89	18.94	6.01	18.86	6.27
	-11.8	-13	19.89	5.44	19.89	5.69	19.80	5.93	19.80	6.06	19.72	6.18	19.72	6.43
	-9.8	-11	20.83	5.65	20.74	5.88	20.74	6.12	20.66	6.24	20.66	6.35	20.57	6.59
	-9.5	-10	21.35	5.75	21.26	5.98	21.17	6.21	21.17	6.33	21.17	6.44	21.09	6.67
	-8.5	-9.1	21.77	5.84	21.69	6.06	21.69	6.29	21.60	6.40	21.60	6.52	21.51	6.74
	-7	-7.6	22.54	5.99	22.54	6.21	22.46	6.42	22.46	6.53	22.37	6.64	22.37	6.85
	-5	-5.6	23.74	6.18	23.66	6.39	23.57	6.60	23.57	6.70	23.57	6.81	23.49	7.00
	-3	-3.7	24.86	6.37	24.86	6.57	24.77	6.76	24.77	6.85	24.69	6.96	24.69	7.15
	0	-0.7	26.83	6.64	26.83	6.82	26.74	7.00	26.74	7.09	26.66	7.18	26.66	7.36
	3	2.2	28.97	6.89	28.89	7.05	28.89	7.22	28.80	7.31	28.80	7.39	28.20	7.35
	5	4.1	30.43	7.04	30.34	7.20	30.34	7.36	30.26	7.44	30.26	7.52	28.20	6.90
	7	6	31.97	7.18	31.97	7.33	31.89	7.48	31.37	7.38	30.34	7.08	28.20	6.49
	9	7.9	33.60	7.32	33.52	7.47	32.40	7.22	31.37	6.93	30.34	6.65	28.20	6.11
	11	9.8	35.31	7.45	34.46	7.32	32.40	6.79	31.37	6.53	30.34	6.26	28.20	5.76
	13	11.8	36.60	7.38	34.46	6.87	32.40	6.37	31.37	6.13	30.34	5.89	28.20	5.42
	15	13.7	36.60	6.95	34.46	6.47	32.40	6.01	31.37	5.77	30.34	5.55	28.20	5.11
110%	-19.8	-20	17.31	5.18	17.23	5.43	17.14	5.69	17.14	5.82	17.15	5.95	17.06	6.21
	-18.8	-19	17.57	5.26	17.49	5.51	17.49	5.77	17.49	5.89	17.40	6.02	17.40	6.28
	-16.7	-17	18.26	5.43	18.17	5.68	18.43	5.93	18.09	6.05	18.09	6.17	18.00	6.41
	-13.7	-15	19.03	5.62	18.95	5.85	18.86	6.09	18.86	6.21	18.86	6.33	18.77	6.56
	-11.8	-13	19.80	5.81	19.80	6.03	19.71	6.25	19.71	6.37	19.63	6.48	19.63	6.71
	-9.8	-11	20.74	5.99	20.66	6.21	20.66	6.42	20.57	6.53	20.57	6.64	20.57	6.85
	-9.5	-10	21.26	6.09	21.17	6.29	21.08	6.51	21.08	6.61	21.08	6.72	21.00	6.93
	-8.5	-9.1	21.69	6.17	21.60	6.37	21.60	6.58	21.51	6.69	21.51	6.79	21.51	6.19
	-7	-7.6	22.46	6.31	22.46	6.50	22.37	6.70	22.37	6.80	22.37	6.90	22.29	7.10
	-5	-5.6	23.66	6.49	23.57	6.68	23.49	6.86	23.49	6.96	23.49	7.05	23.40	7.25
	-3	-3.7	24.77	6.65	24.77	6.83	24.69	7.01	24.69	7.10	24.60	7.19	24.60	7.37
	0	-0.7	26.74	6.90	26.74	7.07	26.66	7.24	26.66	7.32	26.66	7.40	25.89	7.26
	3	2.2	28.89	7.13	28.80	7.28	28.80	7.44	28.71	7.51	27.77	7.20	25.89	6.61
	5	4.1	30.34	7.27	30.34	7.42	29.74	7.35	28.71	7.05	27.77	6.77	25.89	6.21
	7	6	31.88	7.40	31.63	7.45	29.74	6.90	28.71	6.63	27.77	6.37	25.89	5.85
	9	7.9	33.51	7.52	31.63	7.00	29.74	6.49	28.71	6.24	27.77	5.99	25.89	5.51
	11	9.8	33.51	7.08	31.63	6.59	29.74	6.11	28.71	5.88	27.77	5.65	25.89	5.20
	13	11.8	33.51	6.64	31.63	6.18	29.74	5.74	28.71	5.53	27.77	5.31	25.89	4.90
	15	13.7	33.51	5.89	31.63	5.83	29.74	5.42	28.71	5.22	27.77	5.02	25.89	4.63
100%	-19.8	-20	17.23	5.59	17.14	5.82	17.14	6.06	17.06	6.18	17.06	6.29	16.97	6.53
	-18.8	-19	17.49	5.66	17.49	5.89	17.40	6.13	17.40	6.25	17.32	6.37	17.32	6.60
	-16.7	-17	18.17	5.82	18.08	6.05	18.08	6.27	18.00	6.38	18.00	6.49	18.00	6.72
	-13.7	-15	18.94	5.99	18.86	6.21	18.77	6.42	18.77	6.53	18.77	6.64	18.69	6.85
	-11.8	-13	19.72	6.17	19.72	6.37	19.63	6.57	19.63	6.68	19.63	6.78	19.54	6.99
	-9.8	-11	20.66	6.33	20.57	6.53	20.57	6.73	20.57	6.83	20.48	6.92	20.48	7.12
	-9.5	-10	21.17	6.42	21.09	6.61	21.09	6.80	21.00	6.90	21.00	7.00	20.91	7.19

	-8.5	-9.1	21.60	6.49	21.51	6.69	21.51	6.87	21.51	6.96	21.43	7.06	21.43	7.24
	-7	-7.6	22.37	6.62	22.37	6.80	22.29	6.98	22.29	7.08	22.29	7.16	22.20	7.35
	-5	-5.6	23.57	6.79	23.48	6.96	23.48	7.13	23.40	7.21	23.40	7.30	23.31	7.48
	-3	-3.7	24.69	6.94	24.69	6.30	24.60	7.27	24.60	7.35	24.60	7.43	23.57	7.12
	0	-0.7	26.66	7.16	26.66	7.32	26.57	7.47	26.14	7.35	25.29	7.04	23.57	6.46
	3	2.2	28.80	7.37	28.71	7.51	27.00	6.95	26.14	6.68	25.29	6.41	23.57	5.89
	5	4.1	30.26	7.51	28.71	7.05	27.00	6.53	26.14	6.29	25.29	6.04	23.57	5.55
	7	6	30.43	7.12	28.71	6.63	27.00	6.15	26.14	5.92	25.29	5.69	23.57	5.23
	9	7.9	30.43	6.69	28.71	6.24	27.00	5.79	26.14	5.50	25.29	5.36	23.57	4.94
	11	9.8	30.43	6.30	28.71	5.88	27.00	5.46	26.14	5.26	25.29	5.06	23.57	4.66
	13	11.8	30.43	5.92	28.71	5.53	27.00	5.14	26.14	4.95	25.29	4.77	23.57	4.40
	15	13.7	30.43	5.58	28.71	5.22	27.00	4.86	26.14	4.68	25.29	4.50	23.57	4.17
	-19.8	-20	17.11	6.01	17.03	6.21	17.03	6.43	16.94	6.53	16.94	6.64	16.94	6.85
	-18.8	-19	17.37	6.07	17.37	6.29	17.28	6.49	17.28	6.60	17.28	6.70	17.20	6.91
	-16.7	-17	18.05	6.22	17.97	6.42	17.97	6.62	17.97	6.72	17.88	6.82	17.88	7.02
	-13.7	-15	18.82	6.37	18.74	6.57	18.74	6.76	18.65	6.85	18.65	6.95	18.65	7.14
	-11.8	-13	19.59	6.53	19.59	6.71	19.51	6.89	19.51	6.99	19.51	7.08	19.42	7.26
	-9.8	-11	20.54	6.68	20.54	6.85	20.45	7.03	20.45	7.12	20.45	7.21	20.36	7.39
	-9.5	-10	21.05	6.76	20.96	6.93	20.96	7.10	20.88	7.19	20.88	7.28	20.88	7.44
	-8.5	-9.1	21.48	6.83	21.48	7.00	21.39	7.16	21.39	7.24	21.39	7.33	21.13	7.40
	-7	-7.6	22.25	6.94	22.25	7.10	22.16	7.27	22.16	7.35	22.16	7.43	21.13	7.07
90%	-5	-5.6	23.44	7.09	23.36	7.24	23.36	7.40	23.27	7.48	22.67	7.24	21.13	6.64
	-3	-3.7	24.56	7.23	24.56	7.37	24.30	7.40	23.44	7.11	22.67	6.82	21.13	6.26
	0	-0.7	26.61	7.44	25.84	7.25	24.30	6.72	23.44	6.45	22.67	6.20	21.13	5.69
	3	2.2	27.38	7.08	25.84	6.60	24.30	6.12	23.44	5.89	22.67	5.65	21.13	5.21
	5	4.1	27.38	6.66	25.84	6.21	24.30	5.77	23.44	5.54	22.67	5.34	21.13	4.91
	7	6	27.38	6.26	25.84	5.85	24.30	5.43	23.44	5.23	22.67	5.03	21.13	4.64
	9	7.9	27.38	5.90	25.84	5.50	24.30	5.12	23.44	4.94	22.67	4.75	21.13	4.39
	11	9.8	27.38	5.56	25.84	5.19	24.30	4.84	23.44	4.66	22.67	4.49	21.13	4.15
	13	11.8	27.38	5.23	25.84	4.90	24.30	4.56	23.44	4.40	22.67	4.24	21.13	3.92
	15	13.7	27.38	4.94	25.84	4.62	24.30	4.32	23.44	4.17	22.67	4.02	21.13	3.72
	-19.8	-20	17.06	6.42	16.97	6.61	16.97	6.80	16.97	6.89	16.88	6.99	16.88	7.17
	-18.8	-19	17.31	6.48	17.31	6.67	17.23	6.85	17.23	6.95	17.23	7.04	17.14	7.23
	-16.7	-17	18.00	6.61	17.92	6.79	17.92	6.97	17.92	7.06	17.92	7.15	17.83	7.32
	-13.7	-15	18.77	6.75	18.69	6.92	18.69	7.09	18.69	7.17	18.60	7.26	18.60	7.44
	-11.8	-13	19.54	6.88	19.54	7.05	19.46	7.21	19.46	7.29	19.46	7.38	18.86	7.18
	-9.8	-11	20.49	7.02	20.49	7.18	20.40	7.34	20.40	7.41	20.23	7.40	18.86	6.78
	-9.5	-10	21.00	7.09	20.91	7.24	20.92	7.40	20.92	7.48	20.23	7.18	18.86	6.58
	-8.5	-9.1	21.43	7.16	19.92	7.31	21.34	7.45	20.92	7.28	20.23	6.99	18.86	6.41
	-7	-7.6	22.20	7.26	22.20	7.40	21.60	7.24	20.92	6.96	20.23	6.68	18.86	6.13
80%	-5	-5.6	23.40	7.39	22.97	7.35	21.60	6.80	20.92	6.54	20.23	6.28	18.86	5.77
	-3	-3.7	24.34	7.43	22.97	6.92	21.60	6.41	20.92	6.17	20.23	5.92	18.86	5.45
	0	-0.7	24.34	6.74	22.97	6.28	21.60	5.83	20.92	5.61	20.23	5.39	18.86	4.97
	3	2.2	24.34	6.14	22.97	5.73	21.60	5.33	20.92	5.13	20.23	4.94	18.86	4.55
	5	4.1	24.34	5.78	22.97	5.40	21.60	5.02	20.92	4.84	20.23	4.66	18.86	4.30
	7	6	24.34	5.45	22.97	5.10	21.60	4.74	20.92	4.58	20.23	4.41	18.86	4.07
	9	7.9	24.34	5.14	22.97	4.81	21.60	4.48	20.92	4.32	20.23	4.17	18.86	3.86
	11	9.8	24.34	4.86	22.97	4.54	21.60	4.24	20.92	4.09	20.23	3.95	18.86	3.66
	13	11.8	24.34	4.58	22.97	4.29	21.60	4.01	20.92	3.87	20.23	3.73	18.86	3.46
	15	13.7	24.34	4.33	22.97	4.07	21.60	3.80	20.92	3.67	20.23	3.54	18.86	3.29
	-19.8	-20	16.93	6.84	16.85	7.00	16.85	7.16	16.85	7.24	16.85	7.33	16.42	7.25
	-18.8	-19	17.19	6.89	17.19	7.05	17.10	7.21	17.10	7.29	17.10	7.38	16.42	7.10
	-16.7	-17	17.87	7.00	17.87	7.16	17.79	7.32	17.79	7.40	17.62	6.59	16.42	6.77
	-13.7	-15	18.64	7.12	18.56	7.28	18.56	7.43	18.22	7.32	17.62	7.02	16.42	6.44
	-11.8	-13	19.41	7.24	19.41	7.39	18.90	7.21	18.22	6.93	17.62	6.65	16.42	6.10
	-9.8	-11	20.35	7.36	20.10	7.36	18.90	6.81	18.22	6.55	17.62	6.29	16.42	5.77
	-9.5	-10	20.87	7.43	20.10	7.14	18.90	6.61	18.22	6.36	17.62	6.11	16.42	5.61
	-8.5	-9.1	21.29	7.47	20.10	6.95	18.90	6.44	18.22	6.19	17.62	5.95	16.42	5.47
	-7	-7.6	21.29	7.13	20.10	6.64	18.90	6.16	18.22	5.93	17.62	5.69	16.42	5.24
70%	-5	-5.6	21.29	6.70	20.10	6.25	18.90	5.80	18.22	5.57	17.62	6.59	16.42	4.94
	-3	-3.7	21.29	6.31	20.10	5.89	18.90	5.47	18.22	5.26	17.62	5.06	16.42	4.67
	0	-0.7	21.29	5.74	20.10	5.37	18.90	4.99	18.22	4.81	17.62	4.63	16.42	4.28
	3	2.2	21.29	5.25	20.10	4.91	18.90	4.58	18.22	4.41	17.62	4.25	16.42	3.93
	5	4.1	21.29	4.95	20.10	4.63	18.90	4.33	18.22	4.17	17.62	4.02	16.42	3.72
	7	6	21.29	4.68	20.10	4.38	18.90	4.09	18.22	3.95	17.62	3.81	16.42	3.53
	9	7.9	21.29	4.42	20.10	4.15	18.90	3.87	18.22	3.74	17.62	3.61	16.42	3.35
	11	9.8	21.29	4.18	20.10	3.92	18.90	3.67	18.22	3.55	17.62	3.43	16.42	3.18
	13	11.8	21.29	3.95	20.10	3.71	18.90	3.47	18.22	3.36	17.62	3.24	16.42	3.02
	15	13.7	21.29	3.75	20.10	3.52	18.90	3.30	18.22	3.19	17.62	3.08	16.42	2.88
	-19.8	-20	16.89	7.25	16.80	7.39	16.20	7.11	15.69	6.83	15.17	6.56	14.14	6.01
60%	-18.8	-19	17.14	7.30	17.14	7.44	16.20	6.96	15.69	6.68	15.17	6.41	14.14	5.89
	-16.7	-17	17.83	7.40	17.23	7.16	16.20	6.64	15.69	6.38	15.17	6.13	14.14	5.63

	-13.7	-15	18.26	7.32	17.23	6.80	16.20	6.31	15.69	6.07	15.17	5.83	14.14	5.36
	-11.8	-13	18.26	6.92	17.23	6.44	16.20	5.98	15.69	5.76	15.17	5.53	14.14	5.12
	-9.8	-11	18.26	6.54	17.23	6.09	16.20	5.66	15.69	5.45	15.17	5.24	14.14	4.83
	-9.5	-10	18.26	6.36	17.23	5.93	16.20	5.50	15.69	5.30	15.17	5.10	14.14	4.70
	-8.5	-9.1	18.26	6.19	17.23	5.77	16.20	5.37	15.69	5.17	15.17	4.97	14.14	4.58
	-7	-7.6	18.26	5.92	17.23	5.53	16.20	5.14	15.69	4.95	15.17	4.76	14.14	4.40
	-5	-5.6	18.26	5.57	17.23	5.21	16.20	4.85	15.69	4.67	15.17	4.50	14.14	4.16
	-3	-3.7	18.26	5.26	17.23	4.92	16.20	4.58	15.69	4.42	15.17	4.26	14.14	3.94
	0	-0.7	18.26	4.81	17.23	4.50	16.20	4.20	15.69	4.06	15.17	3.91	14.14	3.62
	3	2.2	18.26	4.41	17.23	4.14	16.20	3.87	15.69	3.73	15.17	3.60	14.14	3.34
	5	4.1	18.26	4.17	17.23	3.91	16.20	3.66	15.69	3.54	15.17	3.41	14.14	3.17
	7	6	18.26	3.95	17.23	3.71	16.20	3.47	15.69	3.35	15.17	3.24	14.14	3.01
	9	7.9	18.26	3.74	17.23	3.51	16.20	3.29	15.69	3.19	15.17	3.07	14.14	2.87
	11	9.8	18.26	3.55	17.23	3.34	16.20	3.13	15.69	3.03	15.17	2.92	14.14	2.73
	13	11.8	18.26	3.35	17.23	3.16	16.20	2.97	15.69	2.88	15.17	2.78	14.14	2.60
	15	13.7	18.26	3.19	17.23	3.00	16.20	2.83	15.69	2.74	15.17	2.65	14.14	2.48
	-19.8	-20	15.21	6.60	14.35	6.14	13.50	5.70	12.99	5.49	12.56	5.28	11.71	4.86
	-18.8	-19	15.21	6.45	14.35	6.01	13.50	5.59	12.99	5.38	12.56	5.17	11.71	4.77
	-16.7	-17	15.21	6.16	14.35	5.74	13.50	5.34	12.99	5.14	12.56	4.95	11.71	4.57
	-13.7	-15	15.21	5.86	14.35	5.47	13.50	5.09	12.99	4.90	12.56	4.72	11.71	4.36
	-11.8	-13	15.21	5.57	14.35	5.20	13.50	4.84	12.99	4.66	12.56	4.49	11.71	4.15
	-9.8	-11	15.21	5.27	14.35	4.93	13.50	4.59	12.99	4.42	12.56	4.26	11.71	3.95
	-9.5	-10	15.21	5.13	14.35	4.79	13.50	4.47	12.99	4.31	12.56	4.15	11.71	3.84
	-8.5	-9.1	15.21	5.00	14.35	4.68	13.50	4.36	12.99	4.21	12.56	4.06	11.71	3.75
	-7	-7.6	15.21	4.79	14.35	4.49	13.50	4.18	12.99	4.04	12.56	3.90	11.71	3.61
50%	-5	-5.6	15.21	4.52	14.35	4.24	13.50	3.96	12.99	3.83	12.56	3.69	11.71	3.42
	-3	-3.7	15.21	4.28	14.35	4.02	13.50	3.75	12.99	3.63	12.56	3.50	11.71	3.25
	0	-0.7	15.21	3.93	14.35	3.69	13.50	3.46	12.99	3.34	12.56	3.23	11.71	3.00
	3	2.2	15.21	3.62	14.35	3.40	13.50	3.19	12.99	3.08	12.56	2.98	11.71	2.78
	5	4.1	15.21	3.43	14.35	3.23	13.50	3.03	12.99	2.93	12.56	2.84	11.71	2.64
	7	6	15.21	3.26	14.35	3.07	13.50	2.88	12.99	2.79	12.56	2.70	11.71	2.52
	9	7.9	15.21	3.09	14.35	2.92	13.50	2.74	12.99	2.66	12.56	2.57	11.71	2.40
	11	9.8	15.21	2.94	14.35	2.77	13.50	2.61	12.99	2.53	12.56	2.45	11.71	2.29
	13	11.8	15.21	2.80	14.35	2.64	13.50	2.48	12.99	2.41	12.56	2.33	11.71	2.19
	15	13.7	15.21	2.66	14.35	2.52	13.50	2.37	12.99	2.30	12.56	2.23	11.71	2.09

Note

1. is shown as reference
2. In heating mode, avoid the outdoor air temperature range from -15 to -20 degree C, when selecting the models
3. The above table shows the average value of conditions may operate
4. It is recommended to connect less than 130%

10HP cooling mode

Combination (%) (Capacity index)	Outdoor temperature(°C DB	Indoor temperature(°C WB)													
		DB:20.8,WB:14		DB:23.3,WB:16		DB:25.8,WB:18		DB:27,WB:19		DB:28.2,WB:20		DB:30.7,WB:22		DB:32,WB:24	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
130%	—5	24.60	2.86	29.30	3.49	34.00	3.74	35.30	3.90	37.00	4.01	37.90	4.36	38.85	4.38
	—2	24.60	2.86	29.30	3.56	34.00	3.74	35.30	3.92	37.00	4.01	37.90	4.41	38.85	4.43
	0	24.60	2.91	29.30	3.62	34.00	3.88	35.30	4.13	37.00	4.24	37.90	4.47	38.85	4.49
	2	24.60	2.96	29.30	3.63	34.00	4.01	35.30	4.37	37.00	4.29	37.90	4.50	38.85	4.55
	4	24.60	3.03	29.30	3.70	34.00	4.15	35.30	4.39	37.00	4.34	37.90	4.50	38.85	4.64
	6	24.60	3.09	29.30	3.77	34.00	4.31	35.30	4.42	36.58	4.48	37.43	4.50	38.43	4.67
	8	24.60	3.16	29.30	3.86	34.00	4.52	35.30	4.64	36.13	4.63	37.03	3.90	37.93	4.72
	10	24.60	3.23	29.30	3.94	34.00	4.69	35.30	4.79	35.70	4.04	36.60	4.06	37.50	4.86
	12	24.60	3.28	29.30	4.02	34.00	4.78	34.80	4.03	35.30	4.06	36.10	4.07	37.00	4.89
	14	24.60	3.35	29.30	4.09	33.90	4.05	34.40	4.06	34.80	4.08	35.70	4.09	36.60	5.00
	16	24.60	3.41	29.30	4.18	33.50	4.06	33.90	4.08	34.30	4.10	35.20	4.12	36.10	5.08
	18	24.60	3.47	29.30	4.26	33.00	5.00	33.40	5.03	33.90	5.06	34.80	5.10	35.70	5.15
	20	24.60	3.55	29.30	4.54	32.50	5.25	33.00	5.27	33.40	5.30	34.30	5.35	35.20	5.41
	21	24.60	3.64	29.30	4.70	32.30	5.37	32.80	5.40	33.20	5.43	34.10	5.48	35.00	5.53
	23	24.60	3.91	29.30	5.04	31.90	5.61	32.30	5.64	32.70	5.67	33.60	5.73	34.50	5.78
	25	24.60	4.17	29.30	5.40	31.40	5.86	31.80	5.89	32.30	5.93	33.20	5.98	34.10	6.04
	27	24.60	4.45	29.30	5.77	31.00	6.10	31.40	6.14	31.80	6.17	32.70	6.24	33.60	6.30
	29	24.60	4.76	29.30	6.17	30.50	6.35	30.90	6.39	31.40	6.43	32.30	6.49	33.20	6.56
	31	24.60	5.08	29.20	6.53	30.00	6.60	30.50	6.64	30.90	6.67	31.80	6.75	32.70	6.82
	33	24.60	5.41	28.70	6.77	29.60	6.85	30.00	6.89	30.50	6.92	31.40	7.00	32.20	7.08
	35	24.60	5.76	28.20	7.02	29.10	7.10	29.60	7.14	30.00	7.18	30.90	7.26	31.80	7.34
	37	24.60	6.13	27.80	7.27	28.70	7.36	29.10	7.40	29.60	7.44	30.40	7.53	31.30	7.61
	39	24.60	6.53	27.30	7.35	28.20	7.60	28.70	7.65	29.10	7.70	30.00	7.78	30.90	7.88
	41	24.60	6.87	27.02	7.42	27.90	7.68	28.40	7.72	28.80	7.77	29.70	7.80	29.71	7.95
	43	24.60	7.05	26.82	7.46	27.75	7.70	28.26	7.76	28.51	7.78	29.16	7.81	29.36	7.97
	45	24.60	7.40	26.65	7.53	27.46	7.77	27.96	7.81	28.09	7.82	28.37	7.84	28.78	8.12
	48	24.60	5.99	27.60	5.77	29.94	5.98	30.49	5.93	30.74	5.96	30.60	5.96	31.16	6.43
120%	—5	22.70	2.76	27.00	3.35	31.40	3.96	33.60	4.32	35.20	4.50	36.00	4.64	36.80	4.77
	—2	22.70	2.79	27.00	3.38	31.40	4.00	33.60	4.34	35.20	4.55	36.00	4.68	36.80	4.78
	0	22.70	2.82	27.00	3.41	31.40	4.04	33.60	4.35	35.20	4.59	36.00	4.71	36.80	4.79
	2	22.70	2.82	27.00	3.44	31.40	4.07	33.60	4.39	35.20	4.61	36.00	4.75	36.80	4.80
	4	22.70	2.85	27.00	3.48	31.40	4.13	33.60	4.43	35.20	4.67	36.00	4.76	36.80	4.82
	6	22.70	2.88	27.00	3.51	31.40	4.18	33.60	4.48	35.20	4.72	36.00	4.79	36.80	4.83
	8	22.70	2.91	27.00	3.55	31.40	4.24	33.60	4.54	35.20	4.77	36.00	4.81	36.80	4.85
	10	22.70	2.94	27.00	3.59	31.40	4.27	33.60	4.62	35.20	4.77	36.00	4.82	36.80	4.88
	12	22.70	3.00	27.00	3.66	31.40	4.36	33.60	4.71	34.70	4.79	35.50	4.80	36.30	4.91
	14	22.70	3.06	27.00	3.74	31.40	4.44	33.60	4.80	34.20	4.82	35.10	4.87	35.90	4.97
	16	22.70	3.11	27.00	3.81	31.40	4.53	33.40	4.10	33.80	4.90	34.60	4.95	35.40	5.04
	18	22.70	3.17	27.00	3.89	31.40	4.68	32.90	5.00	33.30	5.02	34.10	5.07	35.00	5.11
	20	22.70	3.24	27.00	4.04	31.40	5.04	32.50	5.25	32.90	5.26	33.70	5.31	34.50	5.36
	21	22.70	3.26	27.00	4.18	31.40	5.22	32.20	5.37	32.60	5.39	33.50	5.43	34.30	5.49
	23	22.70	3.49	27.00	4.48	31.40	5.58	31.80	5.60	32.20	5.63	33.00	5.69	33.80	5.74
	25	22.70	3.73	27.00	4.79	30.90	5.83	31.30	5.85	31.70	5.88	32.60	5.93	33.40	5.99
	27	22.70	3.98	27.00	5.12	30.50	6.07	30.90	6.10	31.30	6.13	32.10	6.19	32.90	6.25
	29	22.70	4.25	27.00	5.47	30.00	6.31	30.40	6.35	30.80	6.38	31.60	6.44	32.50	6.50
	31	22.70	4.53	27.00	5.84	29.50	6.57	30.00	6.59	30.40	6.63	31.20	6.70	32.00	6.76
	33	22.70	4.82	27.00	6.23	29.10	6.81	29.50	6.85	29.90	6.88	30.70	6.95	31.50	7.02
	35	22.70	5.13	27.00	6.64	28.60	7.06	29.00	7.09	29.50	7.13	30.30	7.21	31.10	7.28
	37	22.70	5.46	27.00	7.08	28.20	7.31	28.60	7.35	29.00	7.39	29.80	7.46	30.60	7.55
	39	22.70	5.81	26.90	7.47	27.70	7.56	28.10	7.60	28.50	7.64	29.40	7.73	30.20	7.80
	41	22.70	5.97	26.68	7.53	27.48	7.61	27.88	7.66	28.28	7.69	29.18	7.75	29.33	7.86
	43	22.70	6.06	26.54	7.58	27.27	7.66	27.67	7.69	28.07	7.72	28.67	7.77	28.88	8.02
	45	22.70	6.13	26.39	7.65	27.00	7.73	27.38	7.76	27.82	7.78	28.09	7.79	28.59	8.19
	48	26.30	3.99	30.32	4.96	30.88	5.03	31.21	5.08	31.88	5.08	32.05	5.01	32.68	5.31
110%	—5	20.80	2.41	24.80	3.00	28.80	3.59	30.80	3.85	32.80	4.14	35.30	4.30	36.10	4.43
	—2	20.80	2.46	24.80	3.04	28.80	3.62	30.80	3.89	32.80	4.17	35.30	4.34	36.10	4.46
	0	20.80	2.48	24.80	3.06	28.80	3.64	30.80	3.91	32.80	4.22	35.30	4.39	36.10	4.51
	2	20.80	2.54	24.80	3.09	28.80	3.70	30.80	3.95	32.80	4.26	35.30	4.45	36.10	4.57
	4	20.80	2.59	24.80	3.12	28.80	3.74	30.80	4.00	32.80	4.33	35.30	4.51	36.10	4.61
	6	20.80	2.61	24.80	3.16	28.80	3.77	30.80	4.07	32.80	4.38	35.30	4.56	36.10	4.68
	8	20.80	2.64	24.80	3.21	28.80	3.81	30.80	4.11	32.80	4.43	35.30	4.59	36.10	4.73
	10	20.80	2.67	24.80	3.25	28.80	3.87	30.80	4.18	32.80	4.50	35.30	4.62	36.10	4.77
	12	20.80	2.73	24.80	3.32	28.80	3.94	30.80	4.26	32.80	4.59	34.90	4.69	35.60	4.83
	14	20.80	2.77	24.80	3.38	28.80	4.02	30.80	4.34	32.80	4.67	34.40	4.73	35.20	4.87
	16	20.80	2.82	24.80	3.44	28.80	4.09	30.80	4.42	32.80	4.76	34.00	4.78	34.70	4.92
	18	20.80	2.88	24.80	3.51	28.80	4.18	30.80	4.55	32.80	4.99	33.50	5.03	34.30	5.08
	20	20.80	2.93	24.80	3.59	28.80	4.42	30.80	4.89	32.30	5.24	33.10	5.27	33.80	5.32
	21	20.80	2.96	24.80	3.69	28.80	4.59	30.80	5.07	32.10	5.36	32.80	5.40	33.60	5.44
	23	20.80	3.10	24.80	3.95	28.80	4.92	30.80	5.43	31.60	5.59	32.40	5.65	33.10	5.70
	25	20.80	3.31	24.80	4.23	28.80	5.25	30.80	5.82	31.20	5.84	31.90	5.90	32.70	5.94

	27	20.80	3.53	24.80	4.52	28.80	5.62	30.30	6.07	30.70	6.09	31.50	6.14	32.20	6.20
	29	20.80	3.76	24.80	4.82	28.80	6.01	29.90	6.31	30.30	6.34	31.00	6.40	31.80	6.45
	31	20.80	4.01	24.80	5.14	28.80	6.42	29.40	6.56	29.80	6.59	30.60	6.64	31.30	6.71
	33	20.80	4.26	24.80	5.48	28.60	6.76	29.00	6.80	29.40	6.83	30.10	6.90	30.90	6.96
	35	20.80	4.54	24.80	5.84	28.10	7.01	28.50	7.05	28.90	7.09	29.60	7.15	30.40	7.22
	37	20.80	4.83	24.80	6.22	27.70	7.26	28.10	7.29	28.40	7.33	29.20	7.41	29.90	7.47
	39	20.80	5.13	24.80	6.62	27.20	7.51	27.60	7.55	28.00	7.59	28.70	7.66	29.50	7.74
	41	20.80	5.18	24.80	6.68	26.99	7.56	27.39	7.60	27.79	7.64	28.34	7.71	28.61	7.79
	43	20.80	5.24	24.80	6.76	26.77	7.62	27.17	7.65	27.57	7.69	28.08	7.74	28.17	7.95
	45	20.80	5.41	24.80	6.80	26.50	7.69	26.89	7.75	27.33	7.76	27.80	7.95	27.91	8.13
	48	22.78	4.00	27.16	4.98	28.60	5.62	28.98	5.71	29.59	5.67	29.94	6.17	30.17	5.96
	—5	18.90	2.20	22.50	2.65	26.20	3.15	28.00	3.37	29.80	3.66	33.50	4.17	35.40	4.35
	—2	18.90	2.22	22.50	2.68	26.20	3.19	28.00	3.44	29.80	3.71	33.50	4.22	35.40	4.38
	0	18.90	2.25	22.50	2.71	26.20	3.22	28.00	3.48	29.80	3.75	33.50	4.29	35.40	4.43
	2	18.90	2.29	22.50	2.75	26.20	3.26	28.00	3.52	29.80	3.79	33.50	4.35	35.40	4.50
	4	18.90	2.31	22.50	2.77	26.20	3.30	28.00	3.58	29.80	3.84	33.50	4.40	35.40	4.55
	6	18.90	2.34	22.50	2.83	26.20	3.35	28.00	3.64	29.80	3.89	33.50	4.46	35.40	4.62
	8	18.90	2.39	22.50	2.87	26.20	3.41	28.00	3.68	29.80	3.96	33.50	4.53	35.40	4.70
	10	18.90	2.42	22.50	2.92	26.20	3.46	28.00	3.75	29.80	4.03	33.50	4.60	35.40	4.76
	12	18.90	2.45	22.50	2.98	26.20	3.53	28.00	3.81	29.80	4.10	33.50	4.69	34.90	4.80
	14	18.90	2.50	22.50	3.04	26.20	3.59	28.00	3.89	29.80	4.18	33.50	4.78	34.50	4.86
	16	18.90	2.55	22.50	3.09	26.20	3.67	28.00	3.96	29.80	4.26	33.30	4.84	34.00	4.92
	18	18.90	2.59	22.50	3.15	26.20	3.74	28.00	4.04	29.80	4.35	32.90	5.00	33.60	5.04
	20	18.90	2.64	22.50	3.22	26.20	3.85	28.00	4.24	29.80	4.66	32.40	5.24	33.10	5.28
100%	21	18.90	2.67	22.50	3.25	26.20	3.99	28.00	4.40	29.80	4.82	32.20	5.36	32.90	5.41
	23	18.90	2.74	22.50	3.46	26.20	4.27	28.00	4.71	29.80	5.17	31.80	5.60	32.40	5.65
	25	18.90	2.91	22.50	3.70	26.20	4.58	28.00	5.05	29.80	5.54	31.30	5.85	32.00	5.90
	27	18.90	3.11	22.50	3.94	26.20	4.89	28.00	5.40	29.80	5.92	30.80	6.09	31.50	6.15
	29	18.90	3.31	22.50	4.21	26.20	5.22	28.00	5.76	29.70	6.29	30.40	6.35	31.10	6.40
	31	18.90	3.53	22.50	4.49	26.20	5.57	28.00	6.15	29.30	6.54	29.90	6.59	30.60	6.65
	33	18.90	3.75	22.50	4.78	26.20	5.93	28.00	6.57	28.80	6.78	29.50	6.84	30.20	6.91
	35	18.90	3.98	22.50	5.08	26.20	6.33	28.00	7.00	28.30	7.03	29.00	7.09	29.70	7.15
	37	18.90	4.24	22.50	5.42	26.20	6.75	27.50	7.25	27.90	7.28	28.60	7.35	29.20	7.41
	39	18.90	4.50	22.50	5.75	26.20	7.18	27.10	7.49	27.40	7.53	28.10	7.59	28.80	7.67
	41	18.90	4.71	22.50	5.96	26.20	7.44	26.68	7.54	27.19	7.64	27.61	7.77	28.38	7.83
	43	18.90	4.92	22.50	6.17	26.20	7.58	26.26	7.63	26.99	7.72	27.78	7.82	27.88	7.91
	45	18.90	5.20	22.50	6.45	26.20	7.71	25.70	7.74	26.85	7.86	27.54	7.94	27.32	8.02
	48	19.57	5.46	23.30	6.68	27.14	7.72	25.52	7.62	27.77	7.94	26.78	7.92	27.68	8.00
	—5	17.00	1.94	20.30	2.33	23.60	2.75	25.20	3.00	26.80	3.19	30.10	3.67	33.40	4.21
	—2	17.00	1.96	20.30	2.36	23.60	2.79	25.20	3.04	26.80	3.23	30.10	3.71	33.40	4.25
	0	17.00	1.99	20.30	2.39	23.60	2.83	25.20	3.08	26.80	3.27	30.10	3.75	33.40	4.28
	2	17.00	2.02	20.30	2.42	23.60	2.86	25.20	3.13	26.80	3.33	30.10	3.83	33.40	4.34
	4	17.00	2.05	20.30	2.45	23.60	2.91	25.20	3.17	26.80	3.37	30.10	3.89	33.40	4.41
	6	17.00	2.08	20.30	2.50	23.60	2.96	25.20	3.23	26.80	3.43	30.10	3.95	33.40	4.48
	8	17.00	2.12	20.30	2.55	23.60	3.02	25.20	3.27	26.80	3.49	30.10	4.02	33.40	4.52
	10	17.00	2.16	20.30	2.60	23.60	3.08	25.20	3.32	26.80	3.57	30.10	4.07	33.40	4.59
	12	17.00	2.20	20.30	2.65	23.60	3.13	25.20	3.38	26.80	3.63	30.10	4.15	33.40	4.68
	14	17.00	2.24	20.30	2.70	23.60	3.19	25.20	3.44	26.80	3.70	30.10	4.23	33.40	4.76
	16	17.00	2.27	20.30	2.75	23.60	3.25	25.20	3.51	26.80	3.77	30.10	4.31	33.30	4.85
	18	17.00	2.31	20.30	2.80	23.60	3.31	25.20	3.58	26.80	3.85	30.10	4.40	32.90	5.00
	20	17.00	2.36	20.30	2.87	23.60	3.38	25.20	3.65	26.80	3.99	30.10	4.73	32.40	5.24
90%	21	17.00	2.38	20.30	2.89	23.60	3.43	25.20	3.77	26.80	4.13	30.10	4.90	32.20	5.36
	23	17.00	2.42	20.30	3.00	23.60	3.68	25.20	4.05	26.80	4.43	30.10	5.25	31.70	5.60
	25	17.00	2.56	20.30	3.21	23.60	3.93	25.20	4.33	26.80	4.74	30.10	5.62	31.30	5.85
	27	17.00	2.72	20.30	3.42	23.60	4.20	25.20	4.62	26.80	5.07	30.10	6.02	30.80	6.09
	29	17.00	2.90	20.30	3.64	23.60	4.48	25.20	4.93	26.80	5.42	29.80	6.29	30.40	6.34
	31	17.00	3.08	20.30	3.88	23.60	4.77	25.20	5.26	26.80	5.77	29.30	6.54	29.90	6.59
	33	17.00	3.26	20.30	4.12	23.60	5.09	25.20	5.61	26.80	6.16	28.90	6.79	29.50	6.84
	35	17.00	3.47	20.30	4.39	23.60	5.42	25.20	5.98	26.80	6.57	28.40	7.04	29.00	7.09
	37	17.00	3.68	20.30	4.66	23.60	5.77	25.20	6.37	26.80	7.00	27.90	7.28	28.60	7.34
	39	17.00	3.91	20.30	4.96	23.60	6.14	25.20	6.78	26.80	7.45	27.50	7.54	28.10	7.59
	41	17.00	4.04	20.30	5.19	23.60	6.37	25.20	6.96	26.80	7.50	27.31	7.73	27.91	7.77
	43	17.00	4.23	20.30	5.41	23.60	6.59	25.20	7.14	26.80	7.66	27.17	7.83	27.67	7.89
	45	17.00	4.50	20.30	5.68	23.60	6.86	25.20	7.38	26.80	7.87	27.02	7.91	27.25	8.00
	48	17.00	3.45	20.30	4.29	23.60	5.12	25.20	5.49	26.80	5.73	29.77	5.71	29.46	5.77
	—5	15.10	1.71	18.00	2.03	20.90	2.40	22.40	2.55	23.90	2.75	26.80	3.17	29.70	3.62
	—2	15.10	1.74	18.00	2.05	20.90	2.42	22.40	2.59	23.90	2.77	26.80	3.20	29.70	3.66
	0	15.10	1.77	18.00	2.08	20.90	2.45	22.40	2.62	23.90	2.82	26.80	3.25	29.70	3.71
80%	2	15.10	1.80	18.00	2.11	20.90	2.48	22.40	2.67	23.90	2.87	26.80	3.31	29.70	3.78
	4	15.10	1.83	18.00	2.14	20.90	2.53	22.40	2.73	23.90	2.92	26.80	3.38	29.70	3.83
	6	15.10	1.86	18.00	2.19	20.90	2.57	22.40	2.79	23.90	2.98	26.80	3.43	29.70	3.89
	8	15.10	1.90	18.00	2.24	20.90	2.63	22.40	2.84	23.90	3.04	26.80	3.48	29.70	3.97

	10	15.10	1.91	18.00	2.29	20.90	2.70	22.40	2.91	23.90	3.11	26.80	3.56	29.70	4.01
	12	15.10	1.94	18.00	2.33	20.90	2.75	22.40	2.96	23.90	3.18	26.80	3.62	29.70	4.09
	14	15.10	1.98	18.00	2.38	20.90	2.79	22.40	3.01	23.90	3.24	26.80	3.69	29.70	4.16
	16	15.10	2.01	18.00	2.42	20.90	2.85	22.40	3.07	23.90	3.29	26.80	3.76	29.70	4.24
	18	15.10	2.05	18.00	2.46	20.90	2.91	22.40	3.13	23.90	3.36	26.80	3.84	29.70	4.32
	20	15.10	2.09	18.00	2.51	20.90	2.96	22.40	3.19	23.90	3.42	26.80	3.98	29.70	4.62
	21	15.10	2.10	18.00	2.53	20.90	2.99	22.40	3.23	23.90	3.50	26.80	4.12	29.70	4.79
	23	15.10	2.14	18.00	2.58	20.90	3.13	22.40	3.43	23.90	3.75	26.80	4.42	29.70	5.14
	25	15.10	2.21	18.00	2.75	20.90	3.35	22.40	3.67	23.90	4.00	26.80	4.73	29.70	5.50
	27	15.10	2.35	18.00	2.92	20.90	3.57	22.40	3.92	23.90	4.27	26.80	5.05	29.70	5.89
	29	15.10	2.50	18.00	3.11	20.90	3.80	22.40	4.17	23.90	4.57	26.80	5.39	29.70	6.29
	31	15.10	2.65	18.00	3.31	20.90	4.05	22.40	4.44	23.90	4.87	26.80	5.75	29.20	6.54
	33	15.10	2.82	18.00	3.52	20.90	4.31	22.40	4.74	23.90	5.18	26.80	6.13	28.80	6.78
	35	15.10	2.99	18.00	3.75	20.90	4.58	22.40	5.04	23.90	5.52	26.80	6.54	28.30	7.03
	37	15.10	3.17	18.00	3.97	20.90	4.88	22.40	5.37	23.90	5.88	26.80	6.97	27.90	7.27
	39	15.10	3.36	18.00	4.24	20.90	5.19	22.40	5.71	23.90	6.26	26.80	7.42	27.40	7.53
	41	15.10	3.43	18.00	4.27	20.90	5.26	22.40	5.86	23.90	6.37	26.80	7.61	27.23	7.66
	43	15.10	3.54	18.00	4.31	20.90	5.34	22.40	5.96	23.90	6.46	26.80	7.70	27.06	7.74
	45	15.10	3.64	18.00	4.36	20.90	5.44	22.40	6.09	23.90	6.57	26.80	7.79	26.73	7.87
	48	15.10	2.38	18.00	2.84	23.51	3.59	22.40	4.05	23.90	4.33	26.80	5.11	29.82	5.22
	—5	13.20	1.53	15.80	1.79	18.30	2.03	19.60	2.18	20.90	2.32	23.40	2.66	26.00	3.06
	—2	13.20	1.54	15.80	1.80	18.30	2.04	19.60	2.22	20.90	2.37	23.40	2.70	26.00	3.10
	0	13.20	1.55	15.80	1.83	18.30	2.09	19.60	2.26	20.90	2.41	23.40	2.76	26.00	3.14
	2	13.20	1.56	15.80	1.83	18.30	2.12	19.60	2.30	20.90	2.45	23.40	2.81	26.00	3.19
	4	13.20	1.58	15.80	1.88	18.30	2.17	19.60	2.35	20.90	2.50	23.40	2.86	26.00	3.27
	6	13.20	1.60	15.80	1.91	18.30	2.22	19.60	2.42	20.90	2.56	23.40	2.91	26.00	3.33
	8	13.20	1.63	15.80	1.97	18.30	2.27	19.60	2.46	20.90	2.62	23.40	2.99	26.00	3.39
	10	13.20	1.67	15.80	2.00	18.30	2.33	19.60	2.51	20.90	2.69	23.40	3.06	26.00	3.43
	12	13.20	1.71	15.80	2.03	18.30	2.38	19.60	2.56	20.90	2.74	23.40	3.11	26.00	3.50
	14	13.20	1.74	15.80	2.07	18.30	2.42	19.60	2.59	20.90	2.78	23.40	3.17	26.00	3.57
	16	13.20	1.76	15.80	2.10	18.30	2.46	19.60	2.65	20.90	2.84	23.40	3.23	26.00	3.63
	18	13.20	1.79	15.80	2.14	18.30	2.51	19.60	2.70	20.90	2.89	23.40	3.29	26.00	3.71
	20	13.20	1.82	15.80	2.18	18.30	2.56	19.60	2.75	20.90	2.94	23.40	3.36	26.00	3.81
70%	21	13.20	1.84	15.80	2.20	18.30	2.58	19.60	2.77	20.90	2.97	23.40	3.41	26.00	3.94
	23	13.20	1.87	15.80	2.24	18.30	2.63	19.60	2.87	20.90	3.12	23.40	3.65	26.00	4.23
	25	13.20	1.91	15.80	2.33	18.30	2.80	19.60	3.07	20.90	3.33	23.40	3.91	26.00	4.52
	27	13.20	2.02	15.80	2.48	18.30	2.99	19.60	3.26	20.90	3.56	23.40	4.17	26.00	4.83
	29	13.20	2.14	15.80	2.63	18.30	3.18	19.60	3.48	20.90	3.78	23.40	4.44	26.00	5.16
	31	13.20	2.26	15.80	2.79	18.30	3.39	19.60	3.70	20.90	4.03	23.40	4.74	26.00	5.50
	33	13.20	2.41	15.80	2.97	18.30	3.60	19.60	3.93	20.90	4.29	23.40	5.05	26.00	5.87
	35	13.20	2.55	15.80	3.15	18.30	3.82	19.60	4.19	20.90	4.57	23.40	5.38	26.00	6.25
	37	13.20	2.69	15.80	3.34	18.30	4.07	19.60	4.44	20.90	4.86	23.40	5.73	26.00	6.66
	39	13.20	2.85	15.80	3.54	18.30	4.31	19.60	4.73	20.90	5.16	23.40	6.09	26.00	7.09
	41	13.20	2.97	15.80	3.66	18.30	4.44	19.60	4.88	20.90	5.32	23.40	6.34	26.00	7.41
	43	13.20	3.22	15.80	3.91	18.30	4.62	19.60	5.15	20.90	5.47	23.40	6.57	26.00	7.64
	45	13.20	3.29	15.80	4.00	18.30	4.72	19.60	5.23	20.90	5.75	23.40	6.92	26.00	7.93
	48	13.20	6.17	15.80	7.49	18.30	8.83	19.60	9.66	20.90	10.42	23.40	12.57	26.00	14.27
	—5	11.30	1.30	13.50	1.51	15.70	1.76	16.80	1.88	17.90	2.03	20.10	2.28	22.30	2.61
	—2	11.30	1.31	13.50	1.54	15.70	1.80	16.80	1.91	17.90	2.05	20.10	2.31	22.30	2.63
	0	11.30	1.33	13.50	1.56	15.70	1.82	16.80	1.93	17.90	2.08	20.10	2.35	22.30	2.66
	2	11.30	1.36	13.50	1.59	15.70	1.85	16.80	1.97	17.90	2.11	20.10	2.39	22.30	2.70
	4	11.30	1.39	13.50	1.62	15.70	1.89	16.80	1.99	17.90	2.14	20.10	2.43	22.30	2.74
	6	11.30	1.41	13.50	1.65	15.70	1.92	16.80	2.04	17.90	2.19	20.10	2.48	22.30	2.80
	8	11.30	1.43	13.50	1.68	15.70	1.96	16.80	2.07	17.90	2.23	20.10	2.53	22.30	2.84
	10	11.30	1.46	13.50	1.72	15.70	1.99	16.80	2.13	17.90	2.27	20.10	2.57	22.30	2.89
	12	11.30	1.49	13.50	1.74	15.70	2.03	16.80	2.17	17.90	2.31	20.10	2.62	22.30	2.93
	14	11.30	1.51	13.50	1.77	15.70	2.06	16.80	2.21	17.90	2.36	20.10	2.67	22.30	2.99
	16	11.30	1.53	13.50	1.80	15.70	2.09	16.80	2.25	17.90	2.40	20.10	2.72	22.30	3.05
60%	18	11.30	1.56	13.50	1.83	15.70	2.13	16.80	2.28	17.90	2.44	20.10	2.76	22.30	3.10
	20	11.30	1.58	13.50	1.87	15.70	2.17	16.80	2.33	17.90	2.49	20.10	2.82	22.30	3.17
	21	11.30	1.59	13.50	1.88	15.70	2.19	16.80	2.35	17.90	2.51	20.10	2.85	22.30	3.20
	23	11.30	1.61	13.50	1.91	15.70	2.23	16.80	2.40	17.90	2.56	20.10	2.96	22.30	3.41
	25	11.30	1.64	13.50	1.94	15.70	2.31	16.80	2.51	17.90	2.72	20.10	3.16	22.30	3.63
	27	11.30	1.71	13.50	2.07	15.70	2.46	16.80	2.68	17.90	2.90	20.10	3.37	22.30	3.88
	29	11.30	1.80	13.50	2.19	15.70	2.62	16.80	2.85	17.90	3.08	20.10	3.59	22.30	4.14
	31	11.30	1.91	13.50	2.32	15.70	2.78	16.80	3.03	17.90	3.28	20.10	3.82	22.30	4.40
	33	11.30	2.02	13.50	2.46	15.70	2.95	16.80	3.22	17.90	3.49	20.10	4.07	22.30	4.70
	35	11.30	2.14	13.50	2.61	15.70	3.13	16.80	3.41	17.90	3.71	20.10	4.33	22.30	5.00
	37	11.30	2.26	13.50	2.76	15.70	3.32	16.80	3.62	17.90	3.93	20.10	4.60	22.30	5.32
	39	11.30	2.39	13.50	2.92	15.70	3.52	16.80	3.84	17.90	4.18	20.10	4.89	22.30	5.66
	41	11.30	2.46	13.50	3.05	15.70	3.65	16.80	3.99	17.90	4.33	20.10	5.12	22.30	5.92

	43	11.30	2.54	13.50	3.18	15.70	3.77	16.80	4.11	17.90	4.48	20.10	5.33	22.30	6.17
	45	11.30	2.66	13.50	3.34	15.70	3.93	16.80	4.27	17.90	4.71	20.10	5.57	22.30	6.51
	48	11.30	3.73	13.50	4.64	15.70	5.38	16.80	5.88	17.90	6.60	20.10	7.64	22.30	9.14
50%	—5	9.45	1.13	11.30	1.31	13.10	1.51	14.00	1.58	14.90	1.66	16.70	1.89	18.60	2.04
	—2	9.45	1.14	11.30	1.34	13.10	1.52	14.00	1.60	14.90	1.69	16.70	1.92	18.60	2.06
	0	9.45	1.16	11.30	1.36	13.10	1.55	14.00	1.62	14.90	1.71	16.70	1.95	18.60	2.10
	2	9.45	1.18	11.30	1.37	13.10	1.58	14.00	1.64	14.90	1.74	16.70	1.96	18.60	2.14
	4	9.45	1.19	11.30	1.40	13.10	1.59	14.00	1.66	14.90	1.78	16.70	2.00	18.60	2.20
	6	9.45	1.21	11.30	1.42	13.10	1.62	14.00	1.70	14.90	1.81	16.70	2.04	18.60	2.26
	8	9.45	1.24	11.30	1.45	13.10	1.64	14.00	1.74	14.90	1.83	16.70	2.07	18.60	2.33
	10	9.45	1.26	11.30	1.46	13.10	1.67	14.00	1.77	14.90	1.89	16.70	2.12	18.60	2.37
	12	9.45	1.27	11.30	1.48	13.10	1.70	14.00	1.80	14.90	1.92	16.70	2.16	18.60	2.41
	14	9.45	1.29	11.30	1.50	13.10	1.72	14.00	1.84	14.90	1.95	16.70	2.20	18.60	2.45
	16	9.45	1.31	11.30	1.52	13.10	1.75	14.00	1.87	14.90	1.98	16.70	2.24	18.60	2.49
	18	9.45	1.33	11.30	1.55	13.10	1.77	14.00	1.90	14.90	2.02	16.70	2.27	18.60	2.54
	20	9.45	1.35	11.30	1.57	13.10	1.80	14.00	1.92	14.90	2.06	16.70	2.31	18.60	2.58
	21	9.45	1.36	11.30	1.58	13.10	1.82	14.00	1.94	14.90	2.08	16.70	2.34	18.60	2.61
	23	9.45	1.38	11.30	1.60	13.10	1.85	14.00	1.98	14.90	2.11	16.70	2.38	18.60	2.67
	25	9.45	1.40	11.30	1.63	13.10	1.89	14.00	2.02	14.90	2.18	16.70	2.50	18.60	2.85
	27	9.45	1.42	11.30	1.70	13.10	1.99	14.00	2.15	14.90	2.31	16.70	2.66	18.60	3.04
	29	9.45	1.50	11.30	1.79	13.10	2.11	14.00	2.28	14.90	2.46	16.70	2.83	18.60	3.24
	31	9.45	1.58	11.30	1.90	13.10	2.24	14.00	2.42	14.90	2.61	16.70	3.01	18.60	3.44
	33	9.45	1.68	11.30	2.01	13.10	2.38	14.00	2.57	14.90	2.77	16.70	3.20	18.60	3.66
	35	9.45	1.77	11.30	2.12	13.10	2.51	14.00	2.72	14.90	2.93	16.70	3.40	18.60	3.89
	37	9.45	1.87	11.30	2.25	13.10	2.66	14.00	2.88	14.90	3.11	16.70	3.60	18.60	4.13
	39	9.45	1.97	11.30	2.37	13.10	2.81	14.00	3.05	14.90	3.30	16.70	3.82	18.60	4.39
	41	9.45	2.05	11.30	2.47	13.10	2.91	14.00	3.19	14.90	3.44	16.70	4.02	18.60	4.59
	43	9.45	2.19	11.30	2.64	13.10	3.01	14.00	3.33	14.90	3.53	16.70	4.23	18.60	4.79
	45	9.45	2.24	11.30	2.71	13.10	3.22	14.00	3.59	14.90	3.68	16.70	4.64	18.60	5.20
	48	9.45	2.37	11.30	2.89	13.10	3.33	14.00	3.73	14.90	3.76	16.70	4.87	18.60	5.44

Note:

1. is shown as reference
2. In cooling mode, avoid the outdoor air temperature range from 42-46 degree C, when selecting the models
3. The above table shows the average value of conditions may operate
4. It is recommended to connect less than 130%

10HP heating mode

Combination (%) (Capacity index)	Outdoor temperature(°C DB		Indoor temperature(°C WB)											
			16		18		20		21		22		24	
			TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
	°C DB	°C WB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
130%	-19.8	-20	20.40	5.33	20.30	5.71	20.20	6.09	20.20	6.28	20.10	6.46	20.10	6.84
	-18.8	-19	20.70	5.45	20.60	5.82	20.60	6.20	20.50	6.38	20.50	6.56	20.40	6.93
	-16.7	-17	21.50	5.71	21.40	6.06	21.30	6.42	21.30	6.60	21.30	6.77	21.20	7.13
	-13.7	-15	22.40	5.97	22.30	6.31	22.20	6.66	22.20	6.82	22.10	7.00	22.10	7.34
	-11.8	-13	23.30	6.24	23.30	6.57	23.20	6.89	23.10	7.06	23.10	7.23	23.00	7.55
	-9.8	-11	24.40	6.51	24.30	6.82	24.20	7.14	24.20	7.30	24.20	7.45	24.10	7.77
	-9.5	-10	25.00	6.65	24.90	6.95	24.80	7.26	24.80	7.41	24.70	7.56	24.70	7.86
	-8.5	-9.1	25.50	6.77	25.40	7.06	25.40	7.36	25.30	7.51	25.30	7.66	25.20	7.96
	-7	-7.6	26.40	6.96	26.40	7.26	26.30	7.54	26.30	7.69	26.20	7.82	26.10	8.12
	-5	-5.6	27.80	7.23	27.70	7.50	27.60	7.78	27.60	7.91	27.50	8.04	27.50	8.31
	-3	-3.7	29.10	7.46	29.00	7.73	29.00	7.98	28.90	8.12	28.90	8.25	28.80	8.50
	0	-0.7	31.40	7.82	31.40	8.07	31.30	8.30	31.30	8.39	31.20	8.55	31.20	8.79
	3	2.2	33.90	8.15	33.80	8.37	33.70	8.60	33.70	8.71	33.70	8.82	33.60	9.04
	5	4.1	35.60	8.35	35.50	8.57	35.50	8.78	35.40	8.88	35.40	8.99	35.30	9.20
	7	6	37.40	8.55	37.30	8.75	37.30	8.95	37.20	9.05	37.20	9.15	35.70	8.79
	9	7.9	39.30	8.73	39.20	8.92	39.20	9.11	39.10	9.21	38.30	9.01	35.70	8.26
	11	9.8	41.30	8.90	41.20	9.08	41.00	9.20	39.60	8.83	38.30	8.47	35.70	7.78
	13	11.8	43.50	9.07	43.40	9.25	41.00	8.62	39.60	8.28	38.30	7.95	35.70	7.30
	15	13.7	45.60	9.23	43.60	8.76	41.00	8.12	39.60	7.81	38.30	7.49	35.70	6.88
120%	-19.8	-20	20.30	5.84	20.20	6.19	20.10	6.54	20.10	6.71	20.10	6.88	20.00	7.24
	-18.8	-19	20.60	5.95	20.50	6.30	20.50	6.64	20.40	6.81	20.40	6.98	20.30	7.32
	-16.7	-17	21.40	6.19	21.30	6.52	21.17	6.84	21.20	7.01	21.20	7.18	21.10	7.50
	-13.7	-15	22.30	6.43	22.20	6.75	22.10	7.06	22.10	7.23	22.10	7.38	22.00	7.70
	-11.8	-13	23.20	6.68	23.20	6.98	23.10	7.29	23.10	7.44	23.00	7.59	23.00	7.89
	-9.8	-11	24.30	6.93	24.20	7.22	24.20	7.51	24.10	7.66	24.10	7.80	24.00	8.09
	-9.5	-10	24.90	7.06	24.80	7.34	24.70	7.62	24.70	7.77	24.70	7.90	24.60	8.19
	-8.5	-9.1	25.40	7.17	25.30	7.44	25.30	7.72	25.20	7.85	25.20	8.00	25.10	8.28
	-7	-7.6	26.30	7.35	26.30	7.62	26.20	7.88	26.20	8.02	26.10	8.15	26.10	8.41
	-5	-5.6	27.70	7.59	27.60	7.84	27.50	8.10	27.50	8.23	27.50	8.35	27.40	8.60
	-3	-3.7	29.00	7.81	29.00	8.06	28.90	8.30	28.90	8.41	28.80	8.54	28.80	8.78
	0	-0.7	31.30	8.15	31.30	8.37	31.20	8.59	31.20	8.71	31.10	8.81	31.10	9.04
	3	2.2	33.80	8.45	33.70	8.66	33.70	8.86	33.60	8.97	33.60	9.07	32.90	9.02
	5	4.1	35.50	8.64	35.40	8.83	35.40	9.03	35.30	9.13	35.30	9.23	32.90	8.47
	7	6	37.30	8.81	37.30	9.00	37.20	9.19	36.60	9.06	35.40	8.69	32.90	7.97
	9	7.9	39.20	8.99	39.10	9.17	37.80	8.86	36.60	8.51	35.40	8.17	32.90	7.50
	11	9.8	41.20	9.15	40.20	8.99	37.80	8.33	36.60	8.01	35.40	7.69	32.90	7.07
	13	11.8	42.70	9.06	40.20	8.43	37.80	7.81	36.60	7.52	35.40	7.23	32.90	6.65
	15	13.7	42.70	8.53	40.20	7.94	37.80	7.37	36.60	7.09	35.40	6.81	32.90	6.28
110%	-19.8	-20	20.20	6.35	20.10	6.67	20.00	6.99	20.00	7.15	20.01	7.31	19.90	7.63
	-18.8	-19	20.50	6.45	20.40	6.77	20.40	7.08	20.40	7.24	20.30	7.39	20.30	7.71
	-16.7	-17	21.30	6.67	21.20	6.97	21.50	7.28	21.10	7.42	21.10	7.58	21.00	7.87
	-13.7	-15	22.20	6.89	22.10	7.19	22.00	7.47	22.00	7.62	22.00	7.77	21.90	8.05
	-11.8	-13	23.10	7.13	23.10	7.40	23.00	7.68	23.00	7.82	22.90	7.95	22.90	8.24
	-9.8	-11	24.20	7.35	24.10	7.62	24.10	7.88	24.00	8.02	24.00	8.15	24.00	8.41
	-9.5	-10	24.80	7.47	24.70	7.73	24.60	7.99	24.60	8.12	24.60	8.25	24.50	8.50
	-8.5	-9.1	25.30	7.57	25.20	7.82	25.20	8.08	25.10	8.21	25.10	8.33	25.10	7.60
	-7	-7.6	26.20	7.75	26.20	7.98	26.10	8.23	26.10	8.35	26.10	8.47	26.00	8.72
	-5	-5.6	27.60	7.96	27.50	8.20	27.40	8.42	27.40	8.54	27.40	8.66	27.30	8.90
	-3	-3.7	28.90	8.17	28.90	8.38	28.80	8.61	28.80	8.72	28.70	8.83	28.70	9.05
	0	-0.7	31.20	8.47	31.20	8.68	31.10	8.88	31.10	8.98	31.10	9.09	30.20	8.91
	3	2.2	33.70	8.76	33.60	8.94	33.60	9.13	33.50	9.22	32.40	8.84	30.20	8.11
	5	4.1	35.40	8.92	35.40	9.11	34.70	9.02	33.50	8.66	32.40	8.32	30.20	7.63
	7	6	37.20	9.09	36.90	9.15	34.70	8.47	33.50	8.14	32.40	7.82	30.20	7.18
	9	7.9	39.10	9.24	36.90	8.60	34.70	7.97	33.50	7.66	32.40	7.35	30.20	6.77
	11	9.8	39.10	8.69	36.90	8.09	34.70	7.50	33.50	7.22	32.40	6.93	30.20	6.38
	13	11.8	39.10	8.15	36.90	7.59	34.70	7.05	33.50	6.79	32.40	6.52	30.20	6.01
	15	13.7	39.10	7.24	36.90	7.16	34.70	6.66	33.50	6.40	32.40	6.17	30.20	5.69
100%	-19.8	-20	20.10	6.86	20.00	7.15	20.00	7.44	19.90	7.59	19.90	7.73	19.80	8.02
	-18.8	-19	20.40	6.95	20.40	7.24	20.30	7.52	20.30	7.67	20.20	7.82	20.20	8.10
	-16.7	-17	21.20	7.15	21.10	7.42	21.10	7.70	21.00	7.83	21.00	7.97	21.00	8.25
	-13.7	-15	22.10	7.35	22.00	7.62	21.90	7.88	21.90	8.02	21.90	8.15	21.80	8.41
	-11.8	-13	23.00	7.57	23.00	7.82	22.90	8.07	22.90	8.20	22.90	8.32	22.80	8.58
	-9.8	-11	24.10	7.78	24.00	8.02	24.00	8.26	24.00	8.38	23.90	8.50	23.90	8.74
	-9.5	-10	24.70	7.88	24.60	8.12	24.60	8.35	24.50	8.47	24.50	8.59	24.40	8.82
	-8.5	-9.1	25.20	7.97	25.10	8.21	25.10	8.43	25.10	8.55	25.00	8.67	25.00	8.89
	-7	-7.6	26.10	8.13	26.10	8.35	26.00	8.57	26.00	8.69	26.00	8.79	25.90	9.02

	-5	-5.6	27.50	8.33	27.40	8.54	27.40	8.76	27.30	8.85	27.30	8.96	27.20	9.18
	-3	-3.7	28.80	8.52	28.80	7.74	28.70	8.92	28.70	9.02	28.70	9.12	27.50	8.74
	0	-0.7	31.10	8.79	31.10	8.98	31.00	9.17	30.50	9.02	29.50	8.65	27.50	7.93
	3	2.2	33.60	9.05	33.50	9.22	31.50	8.53	30.50	8.20	29.50	7.87	27.50	7.23
	5	4.1	35.30	9.22	33.50	8.66	31.50	8.02	30.50	7.72	29.50	7.41	27.50	6.81
	7	6	35.50	8.75	33.50	8.14	31.50	7.55	30.50	7.27	29.50	6.98	27.50	6.42
	9	7.9	35.50	8.22	33.50	7.66	31.50	7.11	30.50	6.76	29.50	6.58	27.50	6.06
	11	9.8	35.50	7.74	33.50	7.22	31.50	6.71	30.50	6.45	29.50	6.21	27.50	5.73
	13	11.8	35.50	7.27	33.50	6.79	31.50	6.31	30.50	6.08	29.50	5.85	27.50	5.40
	15	13.7	35.50	6.85	33.50	6.40	31.50	5.96	30.50	5.75	29.50	5.53	27.50	5.12
	-19.8	-20	19.96	7.37	19.86	7.63	19.86	7.89	19.77	8.02	19.77	8.16	19.77	8.41
	-18.8	-19	20.26	7.45	20.26	7.72	20.17	7.97	20.17	8.10	20.17	8.23	20.06	8.48
	-16.7	-17	21.06	7.64	20.96	7.88	20.96	8.13	20.96	8.26	20.86	8.37	20.86	8.62
	-13.7	-15	21.96	7.82	21.86	8.06	21.86	8.29	21.76	8.41	21.76	8.53	21.76	8.77
	-11.8	-13	22.86	8.01	22.86	8.24	22.76	8.46	22.76	8.58	22.76	8.69	22.66	8.91
	-9.8	-11	23.96	8.20	23.96	8.41	23.86	8.63	23.86	8.74	23.86	8.85	23.76	9.07
	-9.5	-10	24.56	8.29	24.46	8.51	24.46	8.72	24.36	8.82	24.36	8.93	24.36	9.14
	-8.5	-9.1	25.06	8.38	25.06	8.59	24.96	8.79	24.96	8.89	24.96	9.00	24.66	9.09
	-7	-7.6	25.95	8.52	25.95	8.72	25.86	8.92	25.86	9.02	25.86	9.12	24.66	8.68
90%	-5	-5.6	27.35	8.71	27.25	8.89	27.25	9.08	27.15	9.18	26.45	8.89	24.66	8.16
	-3	-3.7	28.65	8.87	28.65	9.05	28.35	9.09	27.35	8.73	26.45	8.37	24.66	7.69
	0	-0.7	31.05	9.13	30.15	8.90	28.35	8.25	27.35	7.92	26.45	7.61	24.66	6.99
	3	2.2	31.94	8.70	30.15	8.10	28.35	7.51	27.35	7.23	26.45	6.94	24.66	6.39
	5	4.1	31.94	8.18	30.15	7.62	28.35	7.08	27.35	6.80	26.45	6.55	24.66	6.03
	7	6	31.94	7.69	30.15	7.18	28.35	6.67	27.35	6.42	26.45	6.18	24.66	5.70
	9	7.9	31.94	7.25	30.15	6.76	28.35	6.28	27.35	6.06	26.45	5.83	24.66	5.38
	11	9.8	31.94	6.82	30.15	6.37	28.35	5.94	27.35	5.73	26.45	5.51	24.66	5.10
	13	11.8	31.94	6.42	30.15	6.01	28.35	5.60	27.35	5.40	26.45	5.21	24.66	4.81
	15	13.7	31.94	6.07	30.15	5.68	28.35	5.30	27.35	5.12	26.45	4.93	24.66	4.57
	-19.8	-20	19.90	7.88	19.80	8.11	19.80	8.34	19.80	8.46	19.70	8.58	19.70	8.80
	-18.8	-19	20.20	7.95	20.20	8.19	20.10	8.41	20.10	8.53	20.10	8.64	20.00	8.87
	-16.7	-17	21.00	8.12	20.90	8.33	20.90	8.56	20.90	8.67	20.90	8.78	20.80	8.99
	-13.7	-15	21.90	8.29	21.80	8.49	21.80	8.71	21.80	8.80	21.70	8.91	21.70	9.13
	-11.8	-13	22.80	8.45	22.80	8.66	22.70	8.85	22.70	8.95	22.70	9.06	22.00	8.81
	-9.8	-11	23.90	8.62	23.90	8.81	23.80	9.01	23.80	9.10	23.60	9.08	22.00	8.32
	-9.5	-10	24.50	8.71	24.40	8.89	24.40	9.08	24.40	9.18	23.60	8.81	22.00	8.08
	-8.5	-9.1	25.00	8.79	23.24	8.97	24.90	9.15	24.40	8.94	23.60	8.58	22.00	7.86
	-7	-7.6	25.90	8.91	25.90	9.09	25.20	8.89	24.40	8.54	23.60	8.20	22.00	7.52
80%	-5	-5.6	27.30	9.07	26.80	9.02	25.20	8.35	24.40	8.03	23.60	7.71	22.00	7.08
	-3	-3.7	28.40	9.12	26.80	8.49	25.20	7.86	24.40	7.57	23.60	7.27	22.00	6.69
	0	-0.7	28.40	8.28	26.80	7.71	25.20	7.16	24.40	6.89	23.60	6.62	22.00	6.10
	3	2.2	28.40	7.54	26.80	7.03	25.20	6.54	24.40	6.29	23.60	6.06	22.00	5.59
	5	4.1	28.40	7.10	26.80	6.63	25.20	6.17	24.40	5.94	23.60	5.73	22.00	5.28
	7	6	28.40	6.69	26.80	6.26	25.20	5.82	24.40	5.62	23.60	5.41	22.00	5.00
	9	7.9	28.40	6.31	26.80	5.90	25.20	5.50	24.40	5.30	23.60	5.12	22.00	4.74
	11	9.8	28.40	5.96	26.80	5.58	25.20	5.21	24.40	5.02	23.60	4.84	22.00	4.49
	13	11.8	28.40	5.62	26.80	5.26	25.20	4.92	24.40	4.75	23.60	4.58	22.00	4.25
	15	13.7	28.40	5.31	26.80	4.99	25.20	4.67	24.40	4.50	23.60	4.34	22.00	4.04
	-19.8	-20	19.75	8.39	19.66	8.59	19.66	8.80	19.66	8.89	19.66	9.00	19.16	8.90
	-18.8	-19	20.05	8.46	20.05	8.66	19.96	8.85	19.96	8.95	19.96	9.06	19.16	8.72
	-16.7	-17	20.85	8.60	20.85	8.80	20.75	8.98	20.75	9.08	20.55	8.09	19.16	8.31
	-13.7	-15	21.75	8.75	21.65	8.93	21.65	9.12	21.25	8.98	20.55	8.62	19.16	7.90
	-11.8	-13	22.65	8.89	22.65	9.07	22.05	8.85	21.25	8.51	20.55	8.17	19.16	7.49
	-9.8	-11	23.75	9.04	23.45	9.03	22.05	8.36	21.25	8.04	20.55	7.72	19.16	7.09
	-9.5	-10	24.35	9.12	23.45	8.77	22.05	8.12	21.25	7.80	20.55	7.50	19.16	6.89
	-8.5	-9.1	24.84	9.17	23.45	8.53	22.05	7.90	21.25	7.60	20.55	7.30	19.16	6.72
	-7	-7.6	24.84	8.76	23.45	8.15	22.05	7.56	21.25	7.27	20.55	6.99	19.16	6.43
70%	-5	-5.6	24.84	8.23	23.45	7.67	22.05	7.12	21.25	6.84	20.55	8.08	19.16	6.07
	-3	-3.7	24.84	7.75	23.45	7.23	22.05	6.72	21.25	6.46	20.55	6.22	19.16	5.74
	0	-0.7	24.84	7.05	23.45	6.59	22.05	6.13	21.25	5.90	20.55	5.69	19.16	5.26
	3	2.2	24.84	6.44	23.45	6.03	22.05	5.62	21.25	5.41	20.55	5.22	19.16	4.82
	5	4.1	24.84	6.08	23.45	5.69	22.05	5.31	21.25	5.12	20.55	4.93	19.16	4.57
	7	6	24.84	5.75	23.45	5.38	22.05	5.02	21.25	4.84	20.55	4.68	19.16	4.33
	9	7.9	24.84	5.43	23.45	5.09	22.05	4.76	21.25	4.59	20.55	4.43	19.16	4.11
	11	9.8	24.84	5.14	23.45	4.81	22.05	4.51	21.25	4.35	20.55	4.21	19.16	3.90
	13	11.8	24.84	4.85	23.45	4.56	22.05	4.26	21.25	4.13	20.55	3.98	19.16	3.71
	15	13.7	24.84	4.60	23.45	4.32	22.05	4.05	21.25	3.92	20.55	3.78	19.16	3.53
	-19.8	-20	19.70	8.90	19.60	9.07	18.90	8.73	18.30	8.38	17.70	8.05	16.50	7.38
	-18.8	-19	20.00	8.96	20.00	9.13	18.90	8.54	18.30	8.21	17.70	7.87	16.50	7.23
60%	-16.7	-17	20.80	9.08	20.10	8.79	18.90	8.15	18.30	7.83	17.70	7.52	16.50	6.91
	-13.7	-15	21.30	8.98	20.10	8.35	18.90	7.75	18.30	7.45	17.70	7.16	16.50	6.58
	-11.8	-13	21.30	8.50	20.10	7.91	18.90	7.34	18.30	7.07	17.70	6.79	16.50	6.28

	-9.8	-11	21.30	8.03	20.10	7.48	18.90	6.95	18.30	6.69	17.70	6.43	16.50	5.93
	-9.5	-10	21.30	7.80	20.10	7.28	18.90	6.76	18.30	6.51	17.70	6.26	16.50	5.76
	-8.5	-9.1	21.30	7.60	20.10	7.09	18.90	6.59	18.30	6.34	17.70	6.10	16.50	5.63
	-7	-7.6	21.30	7.27	20.10	6.78	18.90	6.30	18.30	6.08	17.70	5.84	16.50	5.40
	-5	-5.6	21.30	6.84	20.10	6.39	18.90	5.95	18.30	5.74	17.70	5.52	16.50	5.11
	-3	-3.7	21.30	6.46	20.10	6.04	18.90	5.63	18.30	5.43	17.70	5.23	16.50	4.83
	0	-0.7	21.30	5.90	20.10	5.53	18.90	5.16	18.30	4.98	17.70	4.79	16.50	4.44
	3	2.2	21.30	5.41	20.10	5.08	18.90	4.75	18.30	4.58	17.70	4.42	16.50	4.10
	5	4.1	21.30	5.12	20.10	4.80	18.90	4.49	18.30	4.34	17.70	4.19	16.50	3.89
	7	6	21.30	4.84	20.10	4.55	18.90	4.26	18.30	4.12	17.70	3.98	16.50	3.70
	9	7.9	21.30	4.59	20.10	4.31	18.90	4.04	18.30	3.91	17.70	3.77	16.50	3.52
	11	9.8	21.30	4.35	20.10	4.10	18.90	3.84	18.30	3.72	17.70	3.59	16.50	3.35
	13	11.8	21.30	4.12	20.10	3.88	18.90	3.65	18.30	3.53	17.70	3.41	16.50	3.19
	15	13.7	21.30	3.92	20.10	3.69	18.90	3.47	18.30	3.36	17.70	3.26	16.50	3.04
	-19.8	-20	17.74	8.10	16.75	7.54	15.75	7.00	15.15	6.75	14.65	6.48	13.66	5.97
	-18.8	-19	17.74	7.92	16.75	7.38	15.75	6.86	15.15	6.60	14.65	6.34	13.66	5.85
	-16.7	-17	17.74	7.56	16.75	7.05	15.75	6.56	15.15	6.31	14.65	6.08	13.66	5.61
	-13.7	-15	17.74	7.20	16.75	6.72	15.75	6.25	15.15	6.02	14.65	5.79	13.66	5.35
	-11.8	-13	17.74	6.83	16.75	6.38	15.75	5.94	15.15	5.73	14.65	5.51	13.66	5.10
	-9.8	-11	17.74	6.47	16.75	6.05	15.75	5.64	15.15	5.43	14.65	5.24	13.66	4.84
	-9.5	-10	17.74	6.29	16.75	5.88	15.75	5.49	15.15	5.29	14.65	5.10	13.66	4.72
	-8.5	-9.1	17.74	6.14	16.75	5.75	15.75	5.35	15.15	5.17	14.65	4.98	13.66	4.61
	-7	-7.6	17.74	5.88	16.75	5.51	15.75	5.14	15.15	4.96	14.65	4.78	13.66	4.43
50%	-5	-5.6	17.74	5.55	16.75	5.21	15.75	4.86	15.15	4.70	14.65	4.53	13.66	4.20
	-3	-3.7	17.74	5.26	16.75	4.93	15.75	4.61	15.15	4.45	14.65	4.29	13.66	3.99
	0	-0.7	17.74	4.82	16.75	4.53	15.75	4.25	15.15	4.10	14.65	3.96	13.66	3.69
	3	2.2	17.74	4.44	16.75	4.18	15.75	3.91	15.15	3.78	14.65	3.66	13.66	3.41
	5	4.1	17.74	4.22	16.75	3.96	15.75	3.72	15.15	3.60	14.65	3.48	13.66	3.25
	7	6	17.74	4.00	16.75	3.76	15.75	3.54	15.15	3.42	14.65	3.31	13.66	3.10
	9	7.9	17.74	3.79	16.75	3.58	15.75	3.36	15.15	3.26	14.65	3.16	13.66	2.95
	11	9.8	17.74	3.61	16.75	3.40	15.75	3.21	15.15	3.11	14.65	3.01	13.66	2.81
	13	11.8	17.74	3.43	16.75	3.24	15.75	3.05	15.15	2.96	14.65	2.86	13.66	2.69
	15	13.7	17.74	3.26	16.75	3.09	15.75	2.91	15.15	2.82	14.65	2.74	13.66	2.57

Note:

1. is shown as reference
2. In heating mode, avoid the outdoor air temperature range from -15 to -20 degree C, when selecting the models
3. The above table shows the average value of conditions may operate
4. It is recommended to connect less than 130%

12HP cooling mode

Combination (%) (Capacity index)	Outdoor temperature(°C DB	Indoor temperature(°C WB)													
		DB:20.8,WB:14		DB:23.3,WB:16		DB:25.8,WB:18		DB:27,WB:19		DB:28.2,WB:20		DB:30.7,WB:22		DB:32,WB:24	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
130%	—5	29.43	3.59	35.05	4.39	40.68	4.70	42.23	4.89	44.26	5.03	45.34	5.47	46.48	5.51
	—2	29.43	3.59	35.05	4.47	40.68	4.70	42.23	4.92	44.26	5.03	45.34	5.54	46.48	5.56
	0	29.43	3.65	35.05	4.55	40.68	4.87	42.23	5.19	44.26	5.32	45.34	5.61	46.48	5.63
	2	29.43	3.72	35.05	4.56	40.68	5.04	42.23	5.48	44.26	5.38	45.34	5.65	46.48	5.72
	4	29.43	3.80	35.05	4.65	40.68	5.21	42.23	5.51	44.26	5.45	45.34	5.65	46.48	5.83
	6	29.43	3.88	35.05	4.74	40.68	5.41	42.23	5.55	43.77	5.62	44.79	5.64	45.97	5.87
	8	29.43	3.97	35.05	4.85	40.68	5.68	42.23	5.82	43.23	5.81	44.30	3.90	45.39	5.93
	10	29.43	4.05	35.05	4.95	40.68	5.89	42.23	6.02	42.71	4.04	43.79	4.06	44.86	6.10
	12	29.43	4.12	35.05	5.05	40.68	6.01	41.63	4.03	42.23	4.06	43.19	4.07	44.27	6.14
	14	29.43	4.21	35.05	5.14	40.56	4.05	41.16	4.06	41.63	4.08	42.71	4.09	43.79	6.28
	16	29.43	4.28	35.05	5.25	40.08	4.06	40.56	4.08	41.04	4.10	42.11	4.12	43.19	6.37
	18	29.43	4.36	35.05	5.36	39.48	6.28	39.96	6.31	40.56	6.35	41.63	6.41	42.71	6.47
	20	29.43	4.45	35.05	5.70	38.88	6.59	39.48	6.62	39.96	6.66	41.04	6.72	42.11	6.79
	21	29.43	4.57	35.05	5.90	38.64	6.74	39.24	6.78	39.72	6.81	40.80	6.88	41.87	6.94
	23	29.43	4.90	35.05	6.33	38.16	7.05	38.64	7.08	39.12	7.12	40.20	7.19	41.27	7.26
	25	29.43	5.24	35.05	6.78	37.57	7.36	38.04	7.39	38.64	7.44	39.72	7.51	40.80	7.58
	27	29.43	5.59	35.05	7.25	37.09	7.67	37.57	7.71	38.04	7.75	39.12	7.83	40.20	7.91
	29	29.43	5.97	35.05	7.75	36.49	7.97	36.97	8.02	37.57	8.07	38.64	8.15	39.72	8.23
	31	29.43	6.37	34.94	8.20	35.89	8.29	36.49	8.34	36.97	8.38	38.04	8.47	39.12	8.57
	33	29.43	6.79	34.33	8.51	35.41	8.60	35.89	8.65	36.49	8.70	37.57	8.79	38.52	8.89
	35	29.43	7.24	33.74	8.81	34.81	8.92	35.41	8.97	35.89	9.02	36.97	9.12	38.04	9.22
	37	29.43	7.70	33.26	9.13	34.34	9.24	34.81	9.29	35.41	9.35	36.37	9.45	37.45	9.56
	39	29.43	8.20	32.66	9.23	33.74	9.55	34.34	9.61	34.81	9.67	35.89	9.77	36.97	9.89
	41	29.43	8.63	32.32	9.32	33.38	9.64	33.98	9.70	34.46	9.76	35.54	9.79	35.55	9.98
	43	29.43	8.85	32.09	9.36	33.21	9.67	33.81	9.74	34.11	9.77	34.89	9.81	35.13	10.00
	45	29.43	9.29	31.89	9.45	32.85	9.75	33.45	9.81	33.61	9.82	33.94	9.85	34.44	10.19
	48	29.43	7.52	33.02	7.24	35.82	7.51	36.48	7.45	36.77	7.49	36.61	7.48	37.28	8.08
120%	—5	27.16	3.47	32.30	4.20	37.57	4.97	40.20	5.42	42.11	5.65	43.07	5.83	44.03	5.99
	—2	27.16	3.50	32.30	4.25	37.57	5.02	40.20	5.45	42.11	5.72	43.07	5.88	44.03	6.01
	0	27.16	3.54	32.30	4.28	37.57	5.08	40.20	5.47	42.11	5.77	43.07	5.92	44.03	6.02
	2	27.16	3.55	32.30	4.32	37.57	5.11	40.20	5.52	42.11	5.79	43.07	5.96	44.03	6.03
	4	27.16	3.58	32.30	4.38	37.57	5.18	40.20	5.57	42.11	5.87	43.07	5.97	44.03	6.05
	6	27.16	3.62	32.30	4.41	37.57	5.25	40.20	5.63	42.11	5.93	43.07	6.02	44.03	6.07
	8	27.16	3.65	32.30	4.45	37.57	5.32	40.20	5.70	42.11	5.99	43.07	6.04	44.03	6.10
	10	27.16	3.70	32.30	4.51	37.57	5.37	40.20	5.80	42.11	6.00	43.07	6.06	44.03	6.12
	12	27.16	3.77	32.30	4.60	37.57	5.47	40.20	5.91	41.52	6.02	42.47	6.02	43.43	6.16
	14	27.16	3.84	32.30	4.69	37.57	5.58	40.20	6.03	40.92	6.06	41.99	6.12	42.95	6.24
	16	27.16	3.91	32.30	4.79	37.57	5.69	39.96	4.10	40.44	6.15	41.40	6.22	42.35	6.33
	18	27.16	3.98	32.30	4.88	37.57	5.88	39.36	6.28	39.84	6.30	40.80	6.36	41.87	6.42
	20	27.16	4.06	32.30	5.07	37.57	6.33	38.88	6.59	39.36	6.61	40.32	6.67	41.28	6.73
	21	27.16	4.10	32.30	5.25	37.57	6.55	38.52	6.74	39.00	6.76	40.08	6.82	41.04	6.89
	23	27.16	4.38	32.30	5.63	37.57	7.01	38.05	7.04	38.52	7.07	39.48	7.14	40.44	7.20
	25	27.16	4.68	32.30	6.02	36.97	7.32	37.45	7.35	37.93	7.38	39.00	7.45	39.96	7.52
	27	27.16	5.00	32.30	6.43	36.49	7.62	36.97	7.67	37.45	7.70	38.40	7.77	39.36	7.84
	29	27.16	5.33	32.30	6.87	35.89	7.93	36.37	7.97	36.85	8.01	37.81	8.09	38.88	8.16
	31	27.16	5.69	32.30	7.33	35.29	8.24	35.89	8.28	36.37	8.33	37.33	8.41	38.28	8.49
	33	27.16	6.05	32.30	7.82	34.81	8.55	35.29	8.60	35.77	8.64	36.73	8.73	37.69	8.81
	35	27.16	6.44	32.30	8.34	34.22	8.86	34.70	8.91	35.29	8.96	36.25	9.05	37.21	9.15
	37	27.16	6.86	32.30	8.88	33.74	9.18	34.22	9.23	34.70	9.28	35.65	9.37	36.61	9.48
	39	27.16	7.30	32.18	9.38	33.14	9.49	33.62	9.55	34.10	9.60	35.17	9.70	36.13	9.80
	41	27.16	7.50	31.92	9.45	32.88	9.56	33.36	9.62	33.84	9.66	34.91	9.73	35.09	9.87
	43	27.16	7.61	31.75	9.52	32.62	9.61	33.10	9.65	33.58	9.70	34.31	9.76	34.55	10.07
	45	27.16	7.70	31.58	9.61	32.31	9.70	32.75	9.74	33.28	9.77	33.61	9.79	34.20	10.29
	48	31.47	5.01	36.28	6.23	36.95	6.31	37.34	6.38	38.14	6.37	38.34	6.29	39.10	6.67
110%	—5	24.89	3.03	29.67	3.77	34.46	4.50	36.85	4.83	39.24	5.20	42.24	5.40	43.19	5.57
	—2	24.89	3.09	29.67	3.82	34.46	4.54	36.85	4.88	39.24	5.24	42.24	5.45	43.19	5.60
	0	24.89	3.12	29.67	3.84	34.46	4.57	36.85	4.91	39.24	5.30	42.24	5.51	43.19	5.66
	2	24.89	3.19	29.67	3.88	34.46	4.65	36.85	4.96	39.24	5.35	42.24	5.59	43.19	5.73
	4	24.89	3.25	29.67	3.92	34.46	4.69	36.85	5.03	39.24	5.44	42.24	5.66	43.19	5.79
	6	24.89	3.28	29.67	3.97	34.46	4.74	36.85	5.11	39.24	5.50	42.24	5.72	43.19	5.88
	8	24.89	3.31	29.67	4.03	34.46	4.79	36.85	5.16	39.24	5.56	42.24	5.76	43.19	5.94
	10	24.89	3.35	29.67	4.09	34.46	4.86	36.85	5.25	39.24	5.65	42.24	5.80	43.19	5.99
	12	24.89	3.42	29.67	4.17	34.46	4.95	36.85	5.35	39.24	5.76	41.76	5.89	42.59	6.07
	14	24.89	3.48	29.67	4.24	34.46	5.05	36.85	5.45	39.24	5.86	41.16	5.94	42.12	6.11
	16	24.89	3.54	29.67	4.32	34.46	5.14	36.85	5.56	39.24	5.98	40.68	6.01	41.52	6.18
	18	24.89	3.61	29.67	4.41	34.46	5.25	36.85	5.71	39.24	6.27	40.08	6.31	41.04	6.37
	20	24.89	3.68	29.67	4.50	34.46	5.56	36.85	6.14	38.65	6.58	39.60	6.62	40.44	6.68
	21	24.89	3.72	29.67	4.63	34.46	5.76	36.85	6.36	38.41	6.73	39.25	6.78	40.20	6.84
	23	24.89	3.90	29.67	4.96	34.46	6.17	36.85	6.82	37.81	7.02	38.77	7.09	39.60	7.16
	25	24.89	4.16	29.67	5.31	34.46	6.60	36.85	7.31	37.33	7.33	38.17	7.40	39.12	7.46

	27	24.89	4.43	29.67	5.67	34.46	7.06	36.25	7.62	36.73	7.64	37.69	7.71	38.53	7.78
	29	24.89	4.73	29.67	6.05	34.46	7.55	35.77	7.93	36.25	7.96	37.09	8.03	38.05	8.10
	31	24.89	5.03	29.67	6.46	34.46	8.06	35.18	8.23	35.65	8.27	36.61	8.34	37.45	8.42
	33	24.89	5.35	29.67	6.88	34.22	8.49	34.70	8.54	35.18	8.58	36.01	8.66	36.97	8.74
	35	24.89	5.70	29.67	7.33	33.62	8.80	34.10	8.85	34.58	8.90	35.42	8.98	36.37	9.06
	37	24.89	6.07	29.67	7.81	33.14	9.12	33.62	9.16	33.98	9.21	34.94	9.30	35.77	9.38
	39	24.89	6.44	29.67	8.32	32.54	9.43	33.02	9.48	33.50	9.53	34.34	9.62	35.30	9.71
	41	24.89	6.51	29.67	8.38	32.29	9.50	32.77	9.54	33.25	9.59	33.90	9.69	34.23	9.78
	43	24.89	6.58	29.67	8.49	32.03	9.56	32.51	9.61	32.99	9.66	33.60	9.72	33.71	9.98
	45	24.89	6.79	29.67	8.54	31.71	9.65	32.17	9.73	32.70	9.75	33.26	9.99	33.39	10.21
	48	27.25	5.02	32.50	6.25	34.22	7.06	34.67	7.17	35.40	7.12	35.82	7.75	36.10	7.48
	—5	22.61	2.76	26.92	3.32	31.35	3.96	33.50	4.24	35.65	4.60	40.08	5.24	42.35	5.47
	—2	22.61	2.79	26.92	3.37	31.35	4.00	33.50	4.32	35.65	4.66	40.08	5.30	42.35	5.50
	0	22.61	2.82	26.92	3.40	31.35	4.04	33.50	4.37	35.65	4.70	40.08	5.39	42.35	5.56
	2	22.61	2.88	26.92	3.45	31.35	4.09	33.50	4.43	35.65	4.76	40.08	5.47	42.35	5.65
	4	22.61	2.90	26.92	3.48	31.35	4.15	33.50	4.49	35.65	4.82	40.08	5.52	42.35	5.71
	6	22.61	2.94	26.92	3.55	31.35	4.20	33.50	4.57	35.65	4.89	40.08	5.60	42.35	5.80
	8	22.61	3.00	26.92	3.60	31.35	4.28	33.50	4.62	35.65	4.97	40.08	5.69	42.35	5.90
	10	22.61	3.03	26.92	3.67	31.35	4.35	33.50	4.70	35.65	5.06	40.08	5.78	42.35	5.98
	12	22.61	3.08	26.92	3.74	31.35	4.43	33.50	4.79	35.65	5.15	40.08	5.89	41.75	6.03
	14	22.61	3.14	26.92	3.81	31.35	4.51	33.50	4.88	35.65	5.25	40.08	6.01	41.28	6.10
	16	22.61	3.20	26.92	3.89	31.35	4.61	33.50	4.98	35.65	5.35	39.84	6.08	40.68	6.17
	18	22.61	3.26	26.92	3.96	31.35	4.69	33.50	5.07	35.65	5.46	39.36	6.28	40.20	6.33
	20	22.61	3.32	26.92	4.04	31.35	4.83	33.50	5.33	35.65	5.85	38.76	6.57	39.60	6.63
100%	21	22.61	3.35	26.92	4.08	31.35	5.01	33.50	5.52	35.65	6.05	38.53	6.73	39.36	6.79
	23	22.61	3.44	26.92	4.35	31.35	5.37	33.50	5.91	35.65	6.49	38.05	7.04	38.76	7.10
	25	22.61	3.66	26.92	4.64	31.35	5.75	33.50	6.34	35.65	6.95	37.45	7.34	38.28	7.40
	27	22.61	3.91	26.92	4.95	31.35	6.14	33.50	6.78	35.65	7.44	36.85	7.65	37.69	7.72
	29	22.61	4.16	26.92	5.28	31.35	6.55	33.50	7.24	35.53	7.90	36.37	7.97	37.21	8.03
	31	22.61	4.43	26.92	5.64	31.35	6.99	33.50	7.72	35.05	8.21	35.77	8.28	36.61	8.35
	33	22.61	4.70	26.92	6.01	31.35	7.45	33.50	8.25	34.46	8.52	35.30	8.59	36.13	8.67
	35	22.61	5.00	26.92	6.39	31.35	7.95	33.50	8.79	33.86	8.83	34.70	8.91	35.53	8.98
	37	22.61	5.32	26.92	6.80	31.35	8.47	32.90	9.10	33.38	9.15	34.22	9.23	34.94	9.30
	39	22.61	5.65	26.92	7.23	31.35	9.02	32.42	9.41	32.78	9.45	33.62	9.54	34.46	9.63
	41	22.61	5.91	26.92	7.49	31.35	9.34	31.92	9.47	32.53	9.60	33.04	9.76	33.96	9.83
	43	22.61	6.18	26.92	7.75	31.35	9.52	31.42	9.58	32.29	9.69	33.23	9.82	33.36	9.94
	45	22.61	6.53	26.92	8.11	31.35	9.68	30.75	9.71	32.13	9.87	32.95	9.98	32.69	10.07
	48	23.42	6.86	27.88	8.39	32.47	9.70	30.53	9.57	33.22	9.97	32.05	9.95	33.11	10.04
	—5	20.34	2.44	24.29	2.93	28.24	3.45	30.15	3.77	32.06	4.01	36.01	4.61	39.96	5.28
	—2	20.34	2.46	24.29	2.96	28.24	3.50	30.15	3.82	32.06	4.06	36.01	4.66	39.96	5.33
	0	20.34	2.50	24.29	3.00	28.24	3.55	30.15	3.87	32.06	4.11	36.01	4.71	39.96	5.37
	2	20.34	2.54	24.29	3.03	28.24	3.59	30.15	3.93	32.06	4.18	36.01	4.81	39.96	5.45
	4	20.34	2.58	24.29	3.08	28.24	3.65	30.15	3.98	32.06	4.23	36.01	4.88	39.96	5.53
	6	20.34	2.61	24.29	3.14	28.24	3.72	30.15	4.06	32.06	4.30	36.01	4.96	39.96	5.63
	8	20.34	2.66	24.29	3.20	28.24	3.79	30.15	4.11	32.06	4.38	36.01	5.05	39.96	5.68
	10	20.34	2.71	24.29	3.27	28.24	3.86	30.15	4.17	32.06	4.48	36.01	5.11	39.96	5.77
	12	20.34	2.76	24.29	3.33	28.24	3.93	30.15	4.24	32.06	4.56	36.01	5.21	39.96	5.88
	14	20.34	2.81	24.29	3.39	28.24	4.00	30.15	4.32	32.06	4.64	36.01	5.31	39.96	5.98
	16	20.34	2.85	24.29	3.45	28.24	4.09	30.15	4.41	32.06	4.74	36.01	5.41	39.84	6.09
	18	20.34	2.90	24.29	3.52	28.24	4.16	30.15	4.49	32.06	4.83	36.01	5.52	39.36	6.28
	20	20.34	2.96	24.29	3.60	28.24	4.24	30.15	4.58	32.06	5.01	36.01	5.93	38.76	6.57
90%	21	20.34	2.99	24.29	3.62	28.24	4.31	30.15	4.74	32.06	5.19	36.01	6.15	38.53	6.73
	23	20.34	3.04	24.29	3.77	28.24	4.62	30.15	5.08	32.06	5.57	36.01	6.60	37.93	7.04
	25	20.34	3.21	24.29	4.03	28.24	4.94	30.15	5.44	32.06	5.95	36.01	7.06	37.45	7.34
	27	20.34	3.41	24.29	4.29	28.24	5.27	30.15	5.80	32.06	6.36	36.01	7.56	36.85	7.65
	29	20.34	3.64	24.29	4.57	28.24	5.63	30.15	6.20	32.06	6.80	35.65	7.90	36.37	7.96
	31	20.34	3.86	24.29	4.87	28.24	5.99	30.15	6.61	32.06	7.25	35.06	8.21	35.77	8.28
	33	20.34	4.10	24.29	5.18	28.24	6.40	30.15	7.05	32.06	7.74	34.58	8.53	35.29	8.59
	35	20.34	4.36	24.29	5.51	28.24	6.81	30.15	7.51	32.06	8.24	33.98	8.84	34.70	8.91
	37	20.34	4.62	24.29	5.85	28.24	7.25	30.15	8.00	32.06	8.79	33.38	9.15	34.22	9.22
	39	20.34	4.90	24.29	6.23	28.24	7.71	30.15	8.52	32.06	9.36	32.90	9.47	33.62	9.54
	41	20.34	5.07	24.29	6.51	28.24	7.99	30.15	8.74	32.06	9.41	32.67	9.71	33.39	9.76
	43	20.34	5.32	24.29	6.79	28.24	8.27	30.15	8.97	32.06	9.62	32.51	9.83	33.11	9.91
	45	20.34	5.66	24.29	7.13	28.24	8.61	30.15	9.27	32.06	9.88	32.32	9.93	32.60	10.04
	48	20.34	4.33	24.29	5.38	28.24	6.43	30.15	6.90	32.06	7.19	35.61	7.17	35.24	7.25
	—5	18.07	2.15	21.54	2.54	25.00	3.01	26.80	3.20	28.60	3.45	32.06	3.99	35.53	4.55
	—2	18.07	2.18	21.54	2.57	25.00	3.04	26.80	3.25	28.60	3.48	32.06	4.02	35.53	4.59
	0	18.07	2.22	21.54	2.61	25.00	3.07	26.80	3.29	28.60	3.54	32.06	4.08	35.53	4.66
80%	2	18.07	2.26	21.54	2.64	25.00	3.12	26.80	3.35	28.60	3.61	32.06	4.16	35.53	4.74
	4	18.07	2.30	21.54	2.69	25.00	3.18	26.80	3.43	28.60	3.67	32.06	4.24	35.53	4.81
	6	18.07	2.34	21.54	2.75	25.00	3.23	26.80	3.50	28.60	3.74	32.06	4.30	35.53	4.89
	8	18.07	2.38	21.54	2.82	25.00	3.30	26.80	3.56	28.60	3.82	32.06	4.37	35.53	4.99

	10	18.07	2.40	21.54	2.88	25.00	3.39	26.80	3.65	28.60	3.91	32.06	4.47	35.53	5.03
	12	18.07	2.44	21.54	2.93	25.00	3.45	26.80	3.72	28.60	3.99	32.06	4.55	35.53	5.13
	14	18.07	2.49	21.54	2.99	25.00	3.51	26.80	3.78	28.60	4.06	32.06	4.63	35.53	5.22
	16	18.07	2.52	21.54	3.03	25.00	3.58	26.80	3.85	28.60	4.13	32.06	4.73	35.53	5.32
	18	18.07	2.57	21.54	3.09	25.00	3.65	26.80	3.93	28.60	4.22	32.06	4.82	35.53	5.43
	20	18.07	2.62	21.54	3.15	25.00	3.72	26.80	4.00	28.60	4.30	32.06	5.00	35.53	5.80
	21	18.07	2.64	21.54	3.18	25.00	3.76	26.80	4.05	28.60	4.40	32.06	5.18	35.53	6.02
	23	18.07	2.69	21.54	3.25	25.00	3.93	26.80	4.31	28.60	4.70	32.06	5.54	35.53	6.46
	25	18.07	2.77	21.54	3.45	25.00	4.21	26.80	4.61	28.60	5.02	32.06	5.94	35.53	6.91
	27	18.07	2.95	21.54	3.67	25.00	4.48	26.80	4.92	28.60	5.37	32.06	6.34	35.53	7.39
	29	18.07	3.14	21.54	3.91	25.00	4.77	26.80	5.24	28.60	5.73	32.06	6.76	35.53	7.90
	31	18.07	3.33	21.54	4.16	25.00	5.08	26.80	5.58	28.60	6.11	32.06	7.23	34.94	8.21
	33	18.07	3.54	21.54	4.42	25.00	5.41	26.80	5.95	28.60	6.50	32.06	7.70	34.46	8.52
	35	18.07	3.76	21.54	4.70	25.00	5.76	26.80	6.33	28.60	6.93	32.06	8.21	33.86	8.83
	37	18.07	3.98	21.54	4.99	25.00	6.12	26.80	6.74	28.60	7.38	32.06	8.75	33.38	9.13
	39	18.07	4.22	21.54	5.32	25.00	6.52	26.80	7.17	28.60	7.85	32.06	9.32	32.78	9.45
	41	18.07	4.31	21.54	5.37	25.00	6.61	26.80	7.36	28.60	8.00	32.06	9.56	32.58	9.62
	43	18.07	4.44	21.54	5.41	25.00	6.71	26.80	7.48	28.60	8.11	32.06	9.67	32.38	9.72
	45	18.07	4.57	21.54	5.48	25.00	6.84	26.80	7.64	28.60	8.25	32.06	9.78	31.98	9.88
	48	18.07	2.99	21.54	3.57	28.13	4.51	26.80	5.08	28.60	5.44	32.06	6.41	35.67	6.55
	—5	15.79	1.92	18.90	2.25	21.90	2.55	23.45	2.74	25.00	2.92	28.00	3.34	31.11	3.84
	—2	15.79	1.94	18.90	2.26	21.90	2.57	23.45	2.79	25.00	2.97	28.00	3.39	31.11	3.89
	0	15.79	1.95	18.90	2.29	21.90	2.62	23.45	2.84	25.00	3.02	28.00	3.46	31.11	3.94
	2	15.79	1.96	18.90	2.30	21.90	2.66	23.45	2.89	25.00	3.08	28.00	3.53	31.11	4.01
	4	15.79	1.98	18.90	2.36	21.90	2.72	23.45	2.95	25.00	3.15	28.00	3.59	31.11	4.10
	6	15.79	2.01	18.90	2.40	21.90	2.79	23.45	3.04	25.00	3.22	28.00	3.66	31.11	4.18
	8	15.79	2.05	18.90	2.47	21.90	2.85	23.45	3.09	25.00	3.29	28.00	3.76	31.11	4.26
	10	15.79	2.09	18.90	2.51	21.90	2.93	23.45	3.15	25.00	3.38	28.00	3.84	31.11	4.31
	12	15.79	2.14	18.90	2.55	21.90	2.99	23.45	3.21	25.00	3.44	28.00	3.91	31.11	4.40
	14	15.79	2.18	18.90	2.59	21.90	3.03	23.45	3.26	25.00	3.49	28.00	3.98	31.11	4.48
	16	15.79	2.22	18.90	2.64	21.90	3.09	23.45	3.33	25.00	3.57	28.00	4.05	31.11	4.56
	18	15.79	2.25	18.90	2.69	21.90	3.15	23.45	3.39	25.00	3.63	28.00	4.13	31.11	4.66
	20	15.79	2.29	18.90	2.74	21.90	3.21	23.45	3.45	25.00	3.70	28.00	4.22	31.11	4.79
70%	21	15.79	2.31	18.90	2.76	21.90	3.23	23.45	3.48	25.00	3.73	28.00	4.28	31.11	4.95
	23	15.79	2.35	18.90	2.81	21.90	3.31	23.45	3.60	25.00	3.92	28.00	4.58	31.11	5.31
	25	15.79	2.39	18.90	2.93	21.90	3.52	23.45	3.85	25.00	4.18	28.00	4.90	31.11	5.67
	27	15.79	2.54	18.90	3.12	21.90	3.76	23.45	4.10	25.00	4.47	28.00	5.24	31.11	6.07
	29	15.79	2.69	18.90	3.31	21.90	3.99	23.45	4.37	25.00	4.75	28.00	5.58	31.11	6.48
	31	15.79	2.84	18.90	3.51	21.90	4.25	23.45	4.64	25.00	5.06	28.00	5.95	31.11	6.91
	33	15.79	3.02	18.90	3.73	21.90	4.53	23.45	4.94	25.00	5.39	28.00	6.34	31.11	7.37
	35	15.79	3.20	18.90	3.96	21.90	4.80	23.45	5.26	25.00	5.73	28.00	6.75	31.11	7.85
	37	15.79	3.38	18.90	4.19	21.90	5.11	23.45	5.58	25.00	6.10	28.00	7.19	31.11	8.36
	39	15.79	3.58	18.90	4.44	21.90	5.41	23.45	5.94	25.00	6.48	28.00	7.64	31.11	8.91
	41	15.79	3.74	18.90	4.60	21.90	5.57	23.45	6.13	25.00	6.68	28.00	7.96	31.11	9.30
	43	15.79	4.04	18.90	4.92	21.90	5.80	23.45	6.46	25.00	6.87	28.00	8.25	31.11	9.59
	45	15.79	4.13	18.90	5.02	21.90	5.92	23.45	6.57	25.00	7.22	28.00	8.69	31.11	9.96
	48	15.79	7.75	18.90	9.40	21.90	11.08	23.45	12.13	25.00	13.09	28.00	15.78	31.11	17.92
	—5	13.52	1.64	16.15	1.90	18.78	2.21	20.10	2.36	21.42	2.55	24.05	2.86	26.68	3.28
	—2	13.52	1.65	16.15	1.93	18.78	2.25	20.10	2.39	21.42	2.57	24.05	2.90	26.68	3.30
	0	13.52	1.67	16.15	1.95	18.78	2.28	20.10	2.42	21.42	2.62	24.05	2.95	26.68	3.34
	2	13.52	1.70	16.15	2.00	18.78	2.33	20.10	2.47	21.42	2.65	24.05	3.01	26.68	3.39
	4	13.52	1.75	16.15	2.04	18.78	2.37	20.10	2.50	21.42	2.69	24.05	3.05	26.68	3.43
	6	13.52	1.77	16.15	2.08	18.78	2.42	20.10	2.56	21.42	2.74	24.05	3.11	26.68	3.52
	8	13.52	1.80	16.15	2.11	18.78	2.46	20.10	2.60	21.42	2.80	24.05	3.17	26.68	3.57
	10	13.52	1.84	16.15	2.16	18.78	2.50	20.10	2.68	21.42	2.85	24.05	3.23	26.68	3.62
	12	13.52	1.87	16.15	2.19	18.78	2.55	20.10	2.72	21.42	2.90	24.05	3.29	26.68	3.68
	14	13.52	1.90	16.15	2.23	18.78	2.58	20.10	2.77	21.42	2.96	24.05	3.35	26.68	3.75
	16	13.52	1.92	16.15	2.26	18.78	2.63	20.10	2.82	21.42	3.01	24.05	3.41	26.68	3.83
60%	18	13.52	1.95	16.15	2.30	18.78	2.68	20.10	2.87	21.42	3.07	24.05	3.47	26.68	3.90
	20	13.52	1.98	16.15	2.35	18.78	2.72	20.10	2.93	21.42	3.13	24.05	3.54	26.68	3.98
	21	13.52	2.00	16.15	2.36	18.78	2.75	20.10	2.95	21.42	3.15	24.05	3.58	26.68	4.02
	23	13.52	2.03	16.15	2.40	18.78	2.80	20.10	3.01	21.42	3.21	24.05	3.72	26.68	4.28
	25	13.52	2.06	16.15	2.44	18.78	2.90	20.10	3.15	21.42	3.41	24.05	3.97	26.68	4.56
	27	13.52	2.14	16.15	2.59	18.78	3.09	20.10	3.36	21.42	3.64	24.05	4.23	26.68	4.87
	29	13.52	2.26	16.15	2.75	18.78	3.29	20.10	3.58	21.42	3.87	24.05	4.51	26.68	5.20
	31	13.52	2.40	16.15	2.91	18.78	3.49	20.10	3.80	21.42	4.12	24.05	4.80	26.68	5.53
	33	13.52	2.53	16.15	3.09	18.78	3.71	20.10	4.04	21.42	4.38	24.05	5.11	26.68	5.90
	35	13.52	2.69	16.15	3.28	18.78	3.93	20.10	4.29	21.42	4.65	24.05	5.44	26.68	6.28
	37	13.52	2.84	16.15	3.47	18.78	4.17	20.10	4.55	21.42	4.94	24.05	5.78	26.68	6.68
	39	13.52	3.00	16.15	3.67	18.78	4.42	20.10	4.82	21.42	5.25	24.05	6.14	26.68	7.11
	41	13.52	3.09	16.15	3.83	18.78	4.58	20.10	5.01	21.42	5.44	24.05	6.42	26.68	7.43

	43	13.52	3.19	16.15	3.99	18.78	4.74	20.10	5.16	21.42	5.63	24.05	6.70	26.68	7.75
	45	13.52	3.34	16.15	4.19	18.78	4.93	20.10	5.36	21.42	5.91	24.05	7.00	26.68	8.18
	48	13.52	4.68	16.15	5.82	18.78	6.75	20.10	7.39	21.42	8.29	24.05	9.59	26.68	11.48
50%	—5	11.31	1.42	13.52	1.64	15.67	1.89	16.75	1.98	17.83	2.09	19.98	2.37	22.25	2.56
	—2	11.31	1.43	13.52	1.68	15.67	1.91	16.75	2.01	17.83	2.13	19.98	2.41	22.25	2.59
	0	11.31	1.46	13.52	1.71	15.67	1.94	16.75	2.03	17.83	2.15	19.98	2.45	22.25	2.64
	2	11.31	1.48	13.52	1.73	15.67	1.98	16.75	2.06	17.83	2.19	19.98	2.46	22.25	2.69
	4	11.31	1.49	13.52	1.76	15.67	2.00	16.75	2.09	17.83	2.23	19.98	2.52	22.25	2.76
	6	11.31	1.52	13.52	1.78	15.67	2.03	16.75	2.14	17.83	2.27	19.98	2.56	22.25	2.84
	8	11.31	1.56	13.52	1.82	15.67	2.06	16.75	2.18	17.83	2.30	19.98	2.60	22.25	2.93
	10	11.31	1.59	13.52	1.84	15.67	2.10	16.75	2.22	17.83	2.37	19.98	2.67	22.25	2.97
	12	11.31	1.60	13.52	1.86	15.67	2.13	16.75	2.26	17.83	2.42	19.98	2.71	22.25	3.02
	14	11.31	1.62	13.52	1.88	15.67	2.16	16.75	2.31	17.83	2.45	19.98	2.76	22.25	3.08
	16	11.31	1.65	13.52	1.91	15.67	2.19	16.75	2.35	17.83	2.49	19.98	2.81	22.25	3.13
	18	11.31	1.67	13.52	1.94	15.67	2.23	16.75	2.38	17.83	2.54	19.98	2.85	22.25	3.19
	20	11.31	1.69	13.52	1.97	15.67	2.26	16.75	2.42	17.83	2.58	19.98	2.90	22.25	3.25
	21	11.31	1.71	13.52	1.99	15.67	2.29	16.75	2.44	17.83	2.61	19.98	2.94	22.25	3.28
	23	11.31	1.73	13.52	2.01	15.67	2.32	16.75	2.49	17.83	2.65	19.98	2.98	22.25	3.35
	25	11.31	1.75	13.52	2.05	15.67	2.37	16.75	2.54	17.83	2.74	19.98	3.14	22.25	3.58
	27	11.31	1.79	13.52	2.13	15.67	2.50	16.75	2.70	17.83	2.90	19.98	3.34	22.25	3.81
	29	11.31	1.88	13.52	2.25	15.67	2.65	16.75	2.87	17.83	3.09	19.98	3.55	22.25	4.06
	31	11.31	1.99	13.52	2.38	15.67	2.81	16.75	3.04	17.83	3.28	19.98	3.78	22.25	4.32
	33	11.31	2.11	13.52	2.52	15.67	2.98	16.75	3.22	17.83	3.48	19.98	4.02	22.25	4.60
	35	11.31	2.23	13.52	2.67	15.67	3.15	16.75	3.41	17.83	3.68	19.98	4.26	22.25	4.88
	37	11.31	2.35	13.52	2.82	15.67	3.34	16.75	3.61	17.83	3.91	19.98	4.52	22.25	5.19
	39	11.31	2.48	13.52	2.97	15.67	3.53	16.75	3.83	17.83	4.15	19.98	4.80	22.25	5.51
	41	11.31	2.58	13.52	3.10	15.67	3.66	16.75	4.00	17.83	4.32	19.98	5.05	22.25	5.76
	43	11.31	2.75	13.52	3.31	15.67	3.79	16.75	4.18	17.83	4.44	19.98	5.31	22.25	6.02
	45	11.31	2.81	13.52	3.40	15.67	4.04	16.75	4.51	17.83	4.62	19.98	5.82	22.25	6.53
	48	11.31	2.98	13.52	3.63	15.67	4.18	16.75	4.68	17.83	4.73	19.98	6.12	22.25	6.83

Note:

1. is shown as reference
2. In cooling mode, avoid the outdoor air temperature range from 42-46 degree C, when selecting the models
3. The above table shows the average value of conditions may operate
4. It is recommended to connect less than 130%

12HP heating mode

Combination (%) (Capacity index)	Outdoor temperature(°C DB		Indoor temperature(°C WB)											
			16		18		20		21		22		24	
			TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
	°C DB	°C WB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
130%	-19.8	-20	24.28	6.35	24.16	6.80	24.05	7.25	24.05	7.47	23.93	7.69	23.93	8.15
	-18.8	-19	24.64	6.49	24.52	6.94	24.52	7.38	24.40	7.60	24.40	7.81	24.28	8.25
	-16.7	-17	25.59	6.80	25.47	7.22	25.35	7.65	25.35	7.86	25.35	8.07	25.24	8.49
	-13.7	-15	26.66	7.11	26.55	7.52	26.43	7.93	26.43	8.13	26.31	8.34	26.31	8.75
	-11.8	-13	27.74	7.43	27.74	7.82	27.62	8.21	27.50	8.41	27.50	8.60	27.38	8.99
	-9.8	-11	29.05	7.75	28.93	8.13	28.81	8.50	28.81	8.69	28.81	8.87	28.69	9.25
	-9.5	-10	29.76	7.92	29.64	8.28	29.52	8.64	29.52	8.83	29.40	9.00	29.40	9.36
	-8.5	-9.1	30.35	8.06	30.24	8.41	30.24	8.77	30.12	8.94	30.12	9.12	30.00	9.48
	-7	-7.6	31.43	8.29	31.43	8.64	31.31	8.98	31.31	9.15	31.19	9.32	31.07	9.67
	-5	-5.6	33.09	8.60	32.97	8.93	32.85	9.26	32.85	9.42	32.74	9.57	32.74	9.90
	-3	-3.7	34.64	8.88	34.52	9.20	34.52	9.50	34.40	9.67	34.40	9.82	34.28	10.12
	0	-0.7	37.38	9.32	37.38	9.61	37.26	9.89	37.26	9.99	37.14	10.18	37.14	10.46
	3	2.2	40.35	9.70	40.24	9.97	40.12	10.24	40.12	10.37	40.12	10.51	40.00	10.76
	5	4.1	42.38	9.95	42.26	10.20	42.26	10.45	42.14	10.58	42.14	10.71	42.02	10.95
	7	6	44.52	10.18	44.40	10.41	44.40	10.66	44.28	10.78	44.28	10.89	42.50	10.46
	9	7.9	46.78	10.39	46.66	10.62	46.66	10.85	46.55	10.96	45.59	10.73	42.50	9.83
	11	9.8	49.16	10.60	49.05	10.81	48.81	10.95	47.14	10.52	45.59	10.09	42.50	9.26
	13	11.8	51.78	10.80	51.66	11.01	48.81	10.26	47.14	9.85	45.59	9.47	42.50	8.69
	15	13.7	54.28	10.99	51.90	10.43	48.81	9.67	47.14	9.29	45.59	8.92	42.50	8.20
120%	-19.8	-20	24.17	6.96	24.05	7.37	23.93	7.79	23.93	7.99	23.93	8.20	23.81	8.62
	-18.8	-19	24.53	7.09	24.41	7.50	24.41	7.90	24.29	8.10	24.29	8.31	24.17	8.72
	-16.7	-17	25.48	7.37	25.36	7.76	25.20	8.15	25.24	8.35	25.24	8.55	25.12	8.93
	-13.7	-15	26.55	7.66	26.43	8.03	26.31	8.41	26.31	8.61	26.31	8.79	26.19	9.17
	-11.8	-13	27.62	7.95	27.62	8.31	27.50	8.68	27.50	8.86	27.38	9.04	27.38	9.40
	-9.8	-11	28.93	8.25	28.81	8.59	28.81	8.94	28.69	9.12	28.69	9.28	28.57	9.63
	-9.5	-10	29.65	8.41	29.53	8.75	29.41	9.07	29.41	9.25	29.41	9.41	29.29	9.75
	-8.5	-9.1	30.24	8.53	30.12	8.86	30.12	9.19	30.00	9.35	30.00	9.53	29.88	9.85
	-7	-7.6	31.31	8.76	31.31	9.07	31.19	9.39	31.19	9.55	31.07	9.70	31.07	10.02
	-5	-5.6	32.98	9.04	32.86	9.34	32.74	9.64	32.74	9.80	32.74	9.95	32.62	10.24
	-3	-3.7	34.53	9.31	34.53	9.60	34.41	9.88	34.41	10.02	34.29	10.17	34.29	10.45
	0	-0.7	37.26	9.70	37.26	9.97	37.14	10.23	37.14	10.37	37.02	10.50	37.02	10.76
	3	2.2	40.24	10.06	40.12	10.31	40.12	10.55	40.00	10.68	40.00	10.80	39.17	10.74
	5	4.1	42.26	10.29	42.14	10.52	42.14	10.75	42.02	10.87	42.02	10.99	39.17	10.09
	7	6	44.41	10.50	44.41	10.72	44.29	10.94	43.57	10.79	42.14	10.34	39.17	9.49
	9	7.9	46.67	10.71	46.55	10.92	45.00	10.55	43.57	10.14	42.14	9.73	39.17	8.93
	11	9.8	49.05	10.89	47.86	10.71	45.00	9.92	43.57	9.54	42.14	9.15	39.17	8.42
	13	11.8	50.83	10.79	47.86	10.04	45.00	9.31	43.57	8.96	42.14	8.61	39.17	7.92
	15	13.7	50.83	10.16	47.86	9.46	45.00	8.78	43.57	8.44	42.14	8.11	39.17	7.47
110%	-19.8	-20	24.05	7.57	23.93	7.94	23.81	8.32	23.81	8.51	23.82	8.70	23.69	9.08
	-18.8	-19	24.41	7.68	24.29	8.06	24.29	8.43	24.29	8.62	24.17	8.80	24.17	9.18
	-16.7	-17	25.36	7.94	25.24	8.30	25.59	8.66	25.12	8.84	25.12	9.03	25.00	9.38
	-13.7	-15	26.43	8.21	26.31	8.56	26.19	8.90	26.19	9.07	26.19	9.25	26.07	9.59
	-11.8	-13	27.50	8.49	27.50	8.81	27.38	9.14	27.38	9.31	27.26	9.47	27.26	9.81
	-9.8	-11	28.81	8.76	28.69	9.07	28.69	9.39	28.57	9.55	28.57	9.70	28.57	10.02
	-9.5	-10	29.52	8.90	29.40	9.20	29.28	9.52	29.28	9.67	29.28	9.82	29.17	10.12
	-8.5	-9.1	30.12	9.01	30.00	9.32	30.00	9.62	29.88	9.77	29.88	9.92	29.88	9.05
	-7	-7.6	31.19	9.22	31.19	9.50	31.07	9.80	31.07	9.95	31.07	10.09	30.95	10.38
	-5	-5.6	32.86	9.48	32.74	9.76	32.62	10.03	32.62	10.17	32.62	10.31	32.50	10.59
	-3	-3.7	34.41	9.73	34.41	9.98	34.29	10.25	34.29	10.38	34.17	10.51	34.17	10.78
	0	-0.7	37.14	10.09	37.14	10.33	37.03	10.58	37.03	10.69	37.03	10.82	35.95	10.61
	3	2.2	40.12	10.43	40.00	10.65	40.00	10.87	39.88	10.98	38.57	10.53	35.95	9.66
	5	4.1	42.14	10.62	42.14	10.85	41.31	10.74	39.88	10.31	38.57	9.90	35.95	9.08
	7	6	44.28	10.82	43.93	10.89	41.31	10.09	39.88	9.69	38.57	9.31	35.95	8.55
	9	7.9	46.55	11.00	43.93	10.24	41.31	9.49	39.88	9.12	38.57	8.76	35.95	8.06
	11	9.8	46.55	10.34	43.93	9.63	41.31	8.93	39.88	8.59	38.57	8.25	35.95	7.60
	13	11.8	46.55	9.70	43.93	9.04	41.31	8.39	39.88	8.08	38.57	7.76	35.95	7.16
	15	13.7	46.55	8.62	43.93	8.52	41.31	7.93	39.88	7.62	38.57	7.34	35.95	6.77
100%	-19.8	-20	23.93	8.17	23.81	8.51	23.81	8.86	23.69	9.04	23.69	9.20	23.57	9.55
	-18.8	-19	24.29	8.28	24.29	8.62	24.17	8.95	24.17	9.13	24.05	9.31	24.05	9.64
	-16.7	-17	25.24	8.51	25.12	8.84	25.12	9.17	25.00	9.33	25.00	9.49	25.00	9.82
	-13.7	-15	26.31	8.76	26.19	9.07	26.07	9.39	26.07	9.55	26.07	9.70	25.95	10.02
	-11.8	-13	27.38	9.01	27.38	9.31	27.26	9.61	27.26	9.76	27.26	9.91	27.14	10.22
	-9.8	-11	28.69	9.26	28.57	9.55	28.57	9.83	28.57	9.98	28.45	10.12	28.45	10.40
	-9.5	-10	29.40	9.39	29.29	9.67	29.29	9.95	29.17	10.09	29.17	10.23	29.05	10.51
	-8.5	-9.1	30.00	9.49	29.88	9.77	29.88	10.04	29.88	10.18	29.76	10.32	29.76	10.59

	-7	-7.6	31.07	9.68	31.07	9.95	30.95	10.20	30.95	10.34	30.95	10.47	30.83	10.74
	-5	-5.6	32.74	9.92	32.62	10.17	32.62	10.43	32.50	10.54	32.50	10.67	32.38	10.93
	-3	-3.7	34.29	10.15	34.29	9.21	34.17	10.62	34.17	10.74	34.17	10.86	32.74	10.40
	0	-0.7	37.02	10.47	37.02	10.69	36.90	10.92	36.31	10.74	35.12	10.30	32.74	9.44
	3	2.2	40.00	10.78	39.88	10.97	37.50	10.16	36.31	9.76	35.12	9.38	32.74	8.60
	5	4.1	42.02	10.97	39.88	10.31	37.50	9.55	36.31	9.19	35.12	8.83	32.74	8.11
	7	6	42.26	10.41	39.88	9.69	37.50	8.99	36.31	8.65	35.12	8.31	32.74	7.65
	9	7.9	42.26	9.78	39.88	9.12	37.50	8.46	36.31	8.04	35.12	7.83	32.74	7.22
	11	9.8	42.26	9.21	39.88	8.59	37.50	7.99	36.31	7.68	35.12	7.39	32.74	6.82
	13	11.8	42.26	8.65	39.88	8.08	37.50	7.52	36.31	7.24	35.12	6.97	32.74	6.43
	15	13.7	42.26	8.16	39.88	7.62	37.50	7.10	36.31	6.84	35.12	6.59	32.74	6.09
	-19.8	-20	23.77	8.78	23.65	9.08	23.65	9.40	23.53	9.55	23.53	9.71	23.53	10.02
	-18.8	-19	24.12	8.87	24.12	9.19	24.01	9.49	24.01	9.64	24.01	9.80	23.88	10.10
	-16.7	-17	25.08	9.09	24.95	9.39	24.95	9.68	24.95	9.83	24.84	9.97	24.84	10.26
	-13.7	-15	26.14	9.32	26.02	9.60	26.02	9.88	25.91	10.02	25.91	10.16	25.91	10.44
	-11.8	-13	27.21	9.54	27.21	9.81	27.09	10.08	27.09	10.22	27.09	10.34	26.98	10.61
	-9.8	-11	28.52	9.76	28.52	10.02	28.40	10.27	28.40	10.40	28.40	10.54	28.28	10.80
	-9.5	-10	29.23	9.88	29.12	10.13	29.12	10.38	29.00	10.51	29.00	10.64	29.00	10.88
	-8.5	-9.1	29.83	9.98	29.83	10.23	29.71	10.47	29.71	10.59	29.71	10.72	29.35	10.82
	-7	-7.6	30.90	10.15	30.90	10.38	30.78	10.62	30.78	10.74	30.78	10.86	29.35	10.33
90%	-5	-5.6	32.56	10.37	32.44	10.59	32.44	10.81	32.32	10.93	31.49	10.59	29.35	9.71
	-3	-3.7	34.11	10.57	34.11	10.78	33.75	10.82	32.56	10.39	31.49	9.97	29.35	9.15
	0	-0.7	36.96	10.87	35.89	10.60	33.75	9.82	32.56	9.43	31.49	9.06	29.35	8.32
	3	2.2	38.03	10.36	35.89	9.64	33.75	8.94	32.56	8.60	31.49	8.27	29.35	7.61
	5	4.1	38.03	9.74	35.89	9.07	33.75	8.43	32.56	8.10	31.49	7.80	29.35	7.18
	7	6	38.03	9.15	35.89	8.55	33.75	7.94	32.56	7.65	31.49	7.36	29.35	6.78
	9	7.9	38.03	8.63	35.89	8.04	33.75	7.48	32.56	7.22	31.49	6.95	29.35	6.41
	11	9.8	38.03	8.13	35.89	7.59	33.75	7.08	32.56	6.82	31.49	6.56	29.35	6.07
	13	11.8	38.03	7.65	35.89	7.16	33.75	6.67	32.56	6.43	31.49	6.20	29.35	5.73
	15	13.7	38.03	7.23	35.89	6.76	33.75	6.32	32.56	6.09	31.49	5.87	29.35	5.44
	-19.8	-20	23.69	9.39	23.57	9.66	23.57	9.94	23.57	10.08	23.45	10.22	23.45	10.48
	-18.8	-19	24.05	9.47	24.05	9.75	23.93	10.02	23.93	10.16	23.93	10.29	23.81	10.57
	-16.7	-17	25.00	9.67	24.88	9.92	24.88	10.19	24.88	10.32	24.88	10.45	24.76	10.71
	-13.7	-15	26.07	9.87	25.95	10.11	25.95	10.37	25.95	10.48	25.83	10.61	25.83	10.87
	-11.8	-13	27.14	10.06	27.14	10.31	27.02	10.54	27.02	10.66	27.02	10.79	26.19	10.50
	-9.8	-11	28.45	10.26	28.45	10.50	28.33	10.73	28.33	10.83	28.10	10.81	26.19	9.91
	-9.5	-10	29.17	10.37	29.04	10.59	29.05	10.81	29.05	10.93	28.10	10.50	26.19	9.62
	-8.5	-9.1	29.76	10.46	27.66	10.68	29.64	10.89	29.05	10.65	28.10	10.22	26.19	9.36
	-7	-7.6	30.83	10.61	30.83	10.82	30.00	10.59	29.05	10.17	28.10	9.76	26.19	8.95
80%	-5	-5.6	32.50	10.80	31.91	10.74	30.00	9.95	29.05	9.56	28.10	9.18	26.19	8.43
	-3	-3.7	33.81	10.86	31.91	10.11	30.00	9.36	29.05	9.01	28.10	8.65	26.19	7.96
	0	-0.7	33.81	9.85	31.91	9.18	30.00	8.52	29.05	8.21	28.10	7.88	26.19	7.26
	3	2.2	33.81	8.98	31.91	8.37	30.00	7.79	29.05	7.50	28.10	7.22	26.19	6.65
	5	4.1	33.81	8.45	31.91	7.89	30.00	7.34	29.05	7.07	28.10	6.82	26.19	6.29
	7	6	33.81	7.96	31.91	7.45	30.00	6.93	29.05	6.69	28.10	6.44	26.19	5.95
	9	7.9	33.81	7.52	31.91	7.03	30.00	6.55	29.05	6.32	28.10	6.09	26.19	5.64
	11	9.8	33.81	7.10	31.91	6.64	30.00	6.20	29.05	5.98	28.10	5.77	26.19	5.35
	13	11.8	33.81	6.69	31.91	6.27	30.00	5.86	29.05	5.65	28.10	5.45	26.19	5.06
	15	13.7	33.81	6.33	31.91	5.94	30.00	5.56	29.05	5.36	28.10	5.17	26.19	4.81
	-19.8	-20	23.52	9.99	23.40	10.23	23.40	10.47	23.40	10.59	23.40	10.72	22.81	10.60
	-18.8	-19	23.87	10.07	23.87	10.31	23.76	10.54	23.76	10.66	23.76	10.79	22.81	10.38
	-16.7	-17	24.82	10.24	24.82	10.47	24.71	10.69	24.71	10.81	24.47	9.63	22.81	9.90
	-13.7	-15	25.89	10.41	25.77	10.64	25.77	10.86	25.30	10.69	24.47	10.26	22.81	9.41
	-11.8	-13	26.96	10.59	26.96	10.80	26.25	10.54	25.30	10.13	24.47	9.73	22.81	8.92
	-9.8	-11	28.27	10.76	27.91	10.75	26.25	9.96	25.30	9.57	24.47	9.19	22.81	8.44
	-9.5	-10	28.98	10.86	27.91	10.44	26.25	9.67	25.30	9.29	24.47	8.93	22.81	8.21
	-8.5	-9.1	29.58	10.92	27.91	10.16	26.25	9.41	25.30	9.05	24.47	8.70	22.81	8.00
	-7	-7.6	29.58	10.43	27.91	9.70	26.25	9.00	25.30	8.66	24.47	8.32	22.81	7.66
70%	-5	-5.6	29.58	9.80	27.91	9.13	26.25	8.48	25.30	8.15	24.47	9.63	22.81	7.23
	-3	-3.7	29.58	9.22	27.91	8.60	26.25	8.00	25.30	7.69	24.47	7.40	22.81	6.83
	0	-0.7	29.58	8.39	27.91	7.85	26.25	7.30	25.30	7.03	24.47	6.77	22.81	6.26
	3	2.2	29.58	7.67	27.91	7.18	26.25	6.69	25.30	6.44	24.47	6.21	22.81	5.74
	5	4.1	29.58	7.24	27.91	6.77	26.25	6.33	25.30	6.09	24.47	5.87	22.81	5.44
	7	6	29.58	6.84	27.91	6.41	26.25	5.98	25.30	5.77	24.47	5.57	22.81	5.16
	9	7.9	29.58	6.47	27.91	6.06	26.25	5.66	25.30	5.46	24.47	5.28	22.81	4.89
	11	9.8	29.58	6.12	27.91	5.73	26.25	5.37	25.30	5.18	24.47	5.01	22.81	4.65
	13	11.8	29.58	5.78	27.91	5.43	26.25	5.08	25.30	4.92	24.47	4.74	22.81	4.41
	15	13.7	29.58	5.48	27.91	5.15	26.25	4.82	25.30	4.67	24.47	4.51	22.81	4.20
	-19.8	-20	23.45	10.60	23.33	10.80	22.50	10.39	21.79	9.98	21.07	9.58	19.64	8.79
60%	-18.8	-19	23.81	10.67	23.81	10.87	22.50	10.17	21.79	9.77	21.07	9.37	19.64	8.60
	-16.7	-17	24.76	10.81	23.93	10.47	22.50	9.70	21.79	9.33	21.07	8.95	19.64	8.23
	-13.7	-15	25.36	10.69	23.93	9.95	22.50	9.22	21.79	8.87	21.07	8.52	19.64	7.83

	-11.8	-13	25.36	10.12	23.93	9.42	22.50	8.74	21.79	8.42	21.07	8.09	19.64	7.48
	-9.8	-11	25.36	9.56	23.93	8.91	22.50	8.28	21.79	7.96	21.07	7.66	19.64	7.06
	-9.5	-10	25.36	9.29	23.93	8.66	22.50	8.04	21.79	7.75	21.07	7.45	19.64	6.86
	-8.5	-9.1	25.36	9.05	23.93	8.44	22.50	7.85	21.79	7.55	21.07	7.26	19.64	6.70
	-7	-7.6	25.36	8.65	23.93	8.08	22.50	7.51	21.79	7.24	21.07	6.96	19.64	6.43
	-5	-5.6	25.36	8.15	23.93	7.61	22.50	7.09	21.79	6.83	21.07	6.57	19.64	6.08
	-3	-3.7	25.36	7.69	23.93	7.19	22.50	6.70	21.79	6.47	21.07	6.22	19.64	5.76
	0	-0.7	25.36	7.03	23.93	6.58	22.50	6.14	21.79	5.93	21.07	5.71	19.64	5.29
	3	2.2	25.36	6.44	23.93	6.05	22.50	5.65	21.79	5.45	21.07	5.27	19.64	4.88
	5	4.1	25.36	6.09	23.93	5.72	22.50	5.35	21.79	5.17	21.07	4.99	19.64	4.63
	7	6	25.36	5.77	23.93	5.42	22.50	5.07	21.79	4.90	21.07	4.74	19.64	4.40
	9	7.9	25.36	5.46	23.93	5.14	22.50	4.81	21.79	4.66	21.07	4.49	19.64	4.19
	11	9.8	25.36	5.18	23.93	4.88	22.50	4.58	21.79	4.42	21.07	4.27	19.64	3.99
	13	11.8	25.36	4.90	23.93	4.62	22.50	4.34	21.79	4.20	21.07	4.06	19.64	3.79
	15	13.7	25.36	4.67	23.93	4.39	22.50	4.13	21.79	4.00	21.07	3.88	19.64	3.62
	-19.8	-20	21.12	9.64	19.94	8.98	18.75	8.34	18.04	8.03	17.45	7.72	16.26	7.11
	-18.8	-19	21.12	9.43	19.94	8.79	18.75	8.17	18.04	7.86	17.45	7.55	16.26	6.97
	-16.7	-17	21.12	9.00	19.94	8.39	18.75	7.81	18.04	7.52	17.45	7.24	16.26	6.68
	-13.7	-15	21.12	8.57	19.94	8.00	18.75	7.44	18.04	7.17	17.45	6.90	16.26	6.37
	-11.8	-13	21.12	8.14	19.94	7.60	18.75	7.07	18.04	6.82	17.45	6.56	16.26	6.07
	-9.8	-11	21.12	7.71	19.94	7.20	18.75	6.71	18.04	6.47	17.45	6.23	16.26	5.77
	-9.5	-10	21.12	7.50	19.94	7.00	18.75	6.54	18.04	6.30	17.45	6.07	16.26	5.62
	-8.5	-9.1	21.12	7.31	19.94	6.84	18.75	6.37	18.04	6.15	17.45	5.93	16.26	5.49
	-7	-7.6	21.12	7.00	19.94	6.56	18.75	6.12	18.04	5.91	17.45	5.70	16.26	5.28
50%	-5	-5.6	21.12	6.61	19.94	6.20	18.75	5.79	18.04	5.59	17.45	5.39	16.26	5.00
	-3	-3.7	21.12	6.26	19.94	5.87	18.75	5.49	18.04	5.30	17.45	5.11	16.26	4.75
	0	-0.7	21.12	5.74	19.94	5.39	18.75	5.05	18.04	4.88	17.45	4.72	16.26	4.39
	3	2.2	21.12	5.29	19.94	4.97	18.75	4.66	18.04	4.51	17.45	4.35	16.26	4.06
	5	4.1	21.12	5.02	19.94	4.72	18.75	4.42	18.04	4.28	17.45	4.14	16.26	3.86
	7	6	21.12	4.76	19.94	4.48	18.75	4.21	18.04	4.07	17.45	3.95	16.26	3.69
	9	7.9	21.12	4.52	19.94	4.26	18.75	4.00	18.04	3.89	17.45	3.76	16.26	3.51
	11	9.8	21.12	4.30	19.94	4.05	18.75	3.82	18.04	3.70	17.45	3.58	16.26	3.35
	13	11.8	21.12	4.09	19.94	3.85	18.75	3.63	18.04	3.53	17.45	3.41	16.26	3.20
	15	13.7	21.12	3.89	19.94	3.68	18.75	3.47	18.04	3.36	17.45	3.26	16.26	3.06

Note:

1. is shown as reference
2. In heating mode, avoid the outdoor air temperature range from -15 to -20 degree C, when selecting the models
3. The above table shows the average value of conditions may operate
4. It is recommended to connect less than 130%

14HP cooling mode

Combination (%) (Capacity index)	Outdoor temperature(°C DB	Indoor temperature(°C WB)													
		DB:20.8,WB:14		DB:23.3,WB:16		DB:25.8,WB:18		DB:27,WB:19		DB:28.2,WB:20		DB:30.7,WB:22		DB:32,WB:24	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
130%	—5	35.14	4.62	41.86	5.64	48.57	6.04	50.43	6.29	52.85	6.47	54.14	7.03	55.50	7.08
	—2	35.14	4.62	41.86	5.75	48.57	6.04	50.43	6.33	52.85	6.47	54.14	7.12	55.50	7.15
	0	35.14	4.70	41.86	5.85	48.57	6.27	50.43	6.67	52.85	6.84	54.14	7.21	55.50	7.24
	2	35.14	4.78	41.86	5.86	48.57	6.48	50.43	7.05	52.85	6.92	54.14	7.26	55.50	7.35
	4	35.14	4.89	41.86	5.97	48.57	6.70	50.43	7.08	52.85	7.01	54.14	7.26	55.50	7.49
	6	35.14	4.98	41.86	6.09	48.57	6.95	50.43	7.14	52.26	7.23	53.48	7.26	54.89	7.55
	8	35.14	5.10	41.86	6.23	48.57	7.30	50.43	7.49	51.62	7.47	52.90	3.90	54.19	7.62
	10	35.14	5.21	41.86	6.37	48.57	7.57	50.43	7.74	51.00	4.04	52.28	4.06	53.57	7.84
	12	35.14	5.30	41.86	6.49	48.57	7.72	49.71	4.03	50.43	4.06	51.57	4.07	52.86	7.89
	14	35.14	5.41	41.86	6.61	48.43	4.05	49.14	4.06	49.71	4.08	51.00	4.09	52.28	8.07
	16	35.14	5.50	41.86	6.75	47.86	4.06	48.43	4.08	49.00	4.10	50.28	4.12	51.57	8.20
	18	35.14	5.60	41.86	6.88	47.14	8.07	47.71	8.12	48.43	8.16	49.71	8.24	51.00	8.32
	20	35.14	5.73	41.86	7.33	46.43	8.47	47.14	8.51	47.71	8.56	49.00	8.64	50.28	8.73
	21	35.14	5.88	41.86	7.59	46.14	8.67	46.85	8.71	47.43	8.76	48.71	8.85	50.00	8.92
	23	35.14	6.31	41.86	8.13	45.57	9.06	46.14	9.11	46.71	9.15	48.00	9.24	49.28	9.34
	25	35.14	6.73	41.86	8.71	44.85	9.46	45.43	9.50	46.14	9.56	47.43	9.66	48.71	9.75
	27	35.14	7.19	41.86	9.32	44.28	9.85	44.85	9.91	45.43	9.96	46.71	10.07	48.00	10.17
	29	35.14	7.68	41.86	9.96	43.57	10.25	44.14	10.31	44.85	10.37	46.14	10.48	47.43	10.59
	31	35.14	8.19	41.71	10.54	42.85	10.66	43.57	10.72	44.14	10.77	45.43	10.89	46.71	11.01
	33	35.14	8.73	41.00	10.94	42.28	11.06	42.85	11.12	43.57	11.18	44.85	11.30	46.00	11.42
	35	35.14	9.31	40.28	11.33	41.57	11.47	42.28	11.53	42.85	11.59	44.14	11.73	45.43	11.85
	37	35.14	9.90	39.71	11.74	41.00	11.88	41.57	11.94	42.28	12.02	43.43	12.15	44.71	12.29
	39	35.14	10.54	39.00	11.86	40.28	12.28	41.00	12.35	41.57	12.43	42.85	12.56	44.14	12.72
	41	35.14	11.09	38.60	11.98	39.86	12.39	40.58	12.47	41.15	12.54	42.43	12.59	42.45	12.83
	43	35.14	11.37	38.31	12.04	39.65	12.43	40.36	12.52	40.72	12.56	41.66	12.61	41.94	12.86
	45	35.14	11.94	38.07	12.15	39.23	12.54	39.94	12.61	40.13	12.62	40.53	12.66	41.12	13.10
	48	35.14	9.66	39.43	9.31	42.76	9.66	43.56	9.58	43.91	9.63	43.72	9.62	44.51	10.38
120%	—5	32.43	4.46	38.57	5.40	44.86	6.39	48.00	6.97	50.29	7.26	51.43	7.50	52.57	7.70
	—2	32.43	4.51	38.57	5.46	44.86	6.45	48.00	7.01	50.29	7.35	51.43	7.56	52.57	7.72
	0	32.43	4.55	38.57	5.50	44.86	6.53	48.00	7.03	50.29	7.42	51.43	7.60	52.57	7.74
	2	32.43	4.56	38.57	5.55	44.86	6.57	48.00	7.09	50.29	7.44	51.43	7.66	52.57	7.75
	4	32.43	4.60	38.57	5.63	44.86	6.67	48.00	7.16	50.29	7.54	51.43	7.68	52.57	7.78
	6	32.43	4.65	38.57	5.67	44.86	6.75	48.00	7.24	50.29	7.63	51.43	7.74	52.57	7.80
	8	32.43	4.70	38.57	5.73	44.86	6.84	48.00	7.33	50.29	7.70	51.43	7.76	52.57	7.84
	10	32.43	4.75	38.57	5.80	44.86	6.90	48.00	7.46	50.29	7.71	51.43	7.79	52.57	7.87
	12	32.43	4.84	38.57	5.91	44.86	7.04	48.00	7.60	49.57	7.74	50.71	7.74	51.86	7.92
	14	32.43	4.93	38.57	6.03	44.86	7.17	48.00	7.75	48.86	7.79	50.14	7.86	51.28	8.02
	16	32.43	5.03	38.57	6.15	44.86	7.31	47.71	4.10	48.28	7.90	49.43	7.99	50.57	8.14
	18	32.43	5.12	38.57	6.27	44.86	7.55	47.00	8.07	47.57	8.10	48.72	8.18	50.00	8.25
	20	32.43	5.22	38.57	6.52	44.86	8.13	46.43	8.47	47.00	8.50	48.14	8.57	49.29	8.65
	21	32.43	5.27	38.57	6.75	44.86	8.42	46.00	8.66	46.57	8.70	47.86	8.77	49.00	8.86
	23	32.43	5.63	38.57	7.23	44.86	9.02	45.43	9.05	46.00	9.09	47.14	9.18	48.28	9.26
	25	32.43	6.02	38.57	7.74	44.14	9.41	44.71	9.44	45.28	9.49	46.57	9.58	47.71	9.67
	27	32.43	6.43	38.57	8.27	43.57	9.79	44.14	9.85	44.71	9.90	45.86	9.99	47.00	10.08
	29	32.43	6.85	38.57	8.83	42.86	10.19	43.43	10.25	44.00	10.29	45.14	10.40	46.43	10.49
	31	32.43	7.31	38.57	9.43	42.14	10.60	42.86	10.65	43.43	10.71	44.57	10.81	45.71	10.92
	33	32.43	7.78	38.57	10.05	41.57	11.00	42.14	11.06	42.71	11.10	43.86	11.22	45.00	11.33
	35	32.43	8.28	38.57	10.72	40.86	11.39	41.43	11.45	42.14	11.51	43.28	11.64	44.43	11.76
	37	32.43	8.82	38.57	11.42	40.28	11.80	40.86	11.86	41.43	11.92	42.57	12.05	43.71	12.18
	39	32.43	9.38	38.43	12.06	39.57	12.20	40.14	12.27	40.72	12.34	42.00	12.47	43.14	12.59
	41	32.43	9.64	38.12	12.15	39.26	12.29	39.83	12.36	40.40	12.42	41.69	12.51	41.90	12.69
	43	32.43	9.78	37.91	12.23	38.95	12.36	39.52	12.41	40.09	12.47	40.96	12.54	41.25	12.94
	45	32.43	9.90	37.71	12.35	38.58	12.47	39.11	12.52	39.74	12.56	40.14	12.58	40.84	13.22
	48	37.57	6.44	43.32	8.01	44.12	8.12	44.59	8.20	45.54	8.19	45.78	8.08	46.69	8.57
110%	—5	29.71	3.90	35.43	4.85	41.14	5.79	44.00	6.21	46.86	6.68	50.43	6.94	51.57	7.16
	—2	29.71	3.97	35.43	4.91	41.14	5.84	44.00	6.27	46.86	6.74	50.43	7.01	51.57	7.19
	0	29.71	4.01	35.43	4.94	41.14	5.88	44.00	6.31	46.86	6.81	50.43	7.08	51.57	7.28
	2	29.71	4.10	35.43	4.99	41.14	5.97	44.00	6.38	46.86	6.88	50.43	7.18	51.57	7.37
	4	29.71	4.18	35.43	5.04	41.14	6.03	44.00	6.46	46.86	6.99	50.43	7.28	51.57	7.44
	6	29.71	4.22	35.43	5.10	41.14	6.09	44.00	6.56	46.86	7.07	50.43	7.36	51.57	7.55
	8	29.71	4.26	35.43	5.18	41.14	6.16	44.00	6.63	46.86	7.15	50.43	7.41	51.57	7.63
	10	29.71	4.31	35.43	5.25	41.14	6.24	44.00	6.75	46.86	7.27	50.43	7.46	51.57	7.70
	12	29.71	4.40	35.43	5.36	41.14	6.37	44.00	6.88	46.86	7.40	49.86	7.57	50.86	7.80
	14	29.71	4.48	35.43	5.45	41.14	6.49	44.00	7.01	46.86	7.54	49.14	7.63	50.29	7.86
	16	29.71	4.55	35.43	5.56	41.14	6.61	44.00	7.14	46.86	7.69	48.57	7.72	49.57	7.94
	18	29.71	4.65	35.43	5.67	41.14	6.75	44.00	7.34	46.86	8.06	47.86	8.12	49.00	8.19
	20	29.71	4.74	35.43	5.79	41.14	7.14	44.00	7.89	46.14	8.45	47.29	8.51	48.29	8.59
	21	29.71	4.78	35.43	5.95	41.14	7.40	44.00	8.18	45.86	8.65	46.86	8.71	48.00	8.79
	23	29.71	5.01	35.43	6.38	41.14	7.94	44.00	8.77	45.15	9.03	46.29	9.12	47.29	9.20
	25	29.71	5.35	35.43	6.82	41.14	8.48	44.00	9.40	44.57	9.43	45.57	9.52	46.71	9.60

	27	29.71	5.70	35.43	7.29	41.14	9.08	43.29	9.79	43.86	9.82	45.00	9.91	46.00	10.01
	29	29.71	6.08	35.43	7.78	41.14	9.70	42.72	10.19	43.29	10.23	44.29	10.33	45.43	10.42
	31	29.71	6.47	35.43	8.30	41.14	10.36	42.00	10.59	42.57	10.63	43.72	10.72	44.71	10.83
	33	29.71	6.88	35.43	8.85	40.86	10.92	41.43	10.98	42.00	11.03	43.00	11.13	44.14	11.24
	35	29.71	7.33	35.43	9.43	40.15	11.32	40.72	11.38	41.29	11.44	42.29	11.54	43.43	11.65
	37	29.71	7.80	35.43	10.04	39.57	11.73	40.15	11.77	40.57	11.83	41.72	11.96	42.72	12.06
	39	29.71	8.28	35.43	10.69	38.86	12.12	39.43	12.18	40.00	12.24	41.00	12.37	42.15	12.49
	41	29.71	8.37	35.43	10.78	38.55	12.21	39.12	12.27	39.70	12.33	40.48	12.45	40.88	12.57
	43	29.71	8.46	35.43	10.92	38.25	12.29	38.82	12.36	39.39	12.42	40.12	12.50	40.25	12.83
	45	29.71	8.73	35.43	10.98	37.86	12.41	38.41	12.50	39.04	12.53	39.71	12.84	39.87	13.13
	48	32.54	6.45	38.80	8.04	40.86	9.07	41.40	9.22	42.27	9.16	42.78	9.96	43.11	9.62
	—5	27.00	3.55	32.14	4.27	37.43	5.09	40.00	5.45	42.57	5.91	47.86	6.73	50.57	7.03
	—2	27.00	3.59	32.14	4.33	37.43	5.14	40.00	5.55	42.57	5.99	47.86	6.81	50.57	7.07
	0	27.00	3.63	32.14	4.37	37.43	5.20	40.00	5.62	42.57	6.05	47.86	6.93	50.57	7.15
	2	27.00	3.70	32.14	4.43	37.43	5.25	40.00	5.69	42.57	6.11	47.86	7.03	50.57	7.27
	4	27.00	3.73	32.14	4.47	37.43	5.33	40.00	5.77	42.57	6.19	47.86	7.10	50.57	7.35
	6	27.00	3.78	32.14	4.57	37.43	5.40	40.00	5.88	42.57	6.28	47.86	7.20	50.57	7.46
	8	27.00	3.85	32.14	4.63	37.43	5.50	40.00	5.94	42.57	6.38	47.86	7.31	50.57	7.58
	10	27.00	3.90	32.14	4.72	37.43	5.59	40.00	6.05	42.57	6.50	47.86	7.43	50.57	7.69
	12	27.00	3.96	32.14	4.81	37.43	5.70	40.00	6.15	42.57	6.63	47.86	7.57	49.86	7.75
	14	27.00	4.04	32.14	4.90	37.43	5.80	40.00	6.27	42.57	6.75	47.86	7.72	49.28	7.84
	16	27.00	4.11	32.14	4.99	37.43	5.92	40.00	6.40	42.57	6.88	47.57	7.81	48.57	7.93
	18	27.00	4.19	32.14	5.09	37.43	6.03	40.00	6.52	42.57	7.02	47.00	8.07	48.00	8.13
	20	27.00	4.26	32.14	5.19	37.43	6.21	40.00	6.85	42.57	7.52	46.28	8.45	47.28	8.53
100%	21	27.00	4.31	32.14	5.24	37.43	6.44	40.00	7.10	42.57	7.78	46.00	8.65	47.00	8.73
	23	27.00	4.42	32.14	5.59	37.43	6.90	40.00	7.60	42.57	8.35	45.43	9.05	46.28	9.12
	25	27.00	4.71	32.14	5.97	37.43	7.39	40.00	8.15	42.57	8.94	44.72	9.44	45.71	9.52
	27	27.00	5.03	32.14	6.37	37.43	7.89	40.00	8.71	42.57	9.56	44.00	9.84	45.00	9.93
	29	27.00	5.34	32.14	6.79	37.43	8.42	40.00	9.31	42.43	10.16	43.43	10.25	44.43	10.32
	31	27.00	5.70	32.14	7.25	37.43	8.98	40.00	9.93	41.86	10.55	42.72	10.64	43.71	10.74
	33	27.00	6.05	32.14	7.72	37.43	9.58	40.00	10.60	41.14	10.95	42.14	11.04	43.14	11.15
	35	27.00	6.43	32.14	8.21	37.43	10.22	40.00	11.30	40.43	11.35	41.43	11.45	42.43	11.54
	37	27.00	6.84	32.14	8.74	37.43	10.89	39.28	11.70	39.86	11.76	40.86	11.86	41.72	11.96
	39	27.00	7.26	32.14	9.29	37.43	11.59	38.71	12.09	39.14	12.15	40.14	12.26	41.14	12.38
	41	27.00	7.60	32.14	9.63	37.43	12.01	38.11	12.18	38.84	12.34	39.45	12.55	40.54	12.64
	43	27.00	7.94	32.14	9.97	37.43	12.24	37.51	12.32	38.56	12.46	39.68	12.63	39.83	12.78
	45	27.00	8.39	32.14	10.42	37.43	12.44	36.71	12.49	38.36	12.68	39.34	12.82	39.03	12.95
	48	27.96	8.82	33.29	10.78	38.76	12.46	36.46	12.30	39.67	12.82	38.26	12.79	39.54	12.91
	—5	24.29	3.14	29.00	3.77	33.71	4.44	36.00	4.85	38.29	5.16	43.00	5.93	47.71	6.79
	—2	24.29	3.17	29.00	3.80	33.71	4.50	36.00	4.91	38.29	5.22	43.00	5.99	47.71	6.85
	0	24.29	3.22	29.00	3.85	33.71	4.57	36.00	4.97	38.29	5.28	43.00	6.05	47.71	6.91
	2	24.29	3.26	29.00	3.90	33.71	4.61	36.00	5.05	38.29	5.37	43.00	6.18	47.71	7.01
	4	24.29	3.31	29.00	3.96	33.71	4.69	36.00	5.12	38.29	5.44	43.00	6.28	47.71	7.11
	6	24.29	3.36	29.00	4.04	33.71	4.78	36.00	5.21	38.29	5.53	43.00	6.37	47.71	7.23
	8	24.29	3.42	29.00	4.11	33.71	4.88	36.00	5.28	38.29	5.63	43.00	6.49	47.71	7.30
	10	24.29	3.49	29.00	4.20	33.71	4.96	36.00	5.36	38.29	5.76	43.00	6.57	47.71	7.42
	12	24.29	3.55	29.00	4.28	33.71	5.06	36.00	5.45	38.29	5.86	43.00	6.70	47.71	7.55
	14	24.29	3.61	29.00	4.36	33.71	5.15	36.00	5.56	38.29	5.97	43.00	6.82	47.71	7.69
	16	24.29	3.67	29.00	4.43	33.71	5.25	36.00	5.67	38.29	6.09	43.00	6.96	47.57	7.83
	18	24.29	3.73	29.00	4.52	33.71	5.34	36.00	5.77	38.29	6.21	43.00	7.10	47.00	8.07
	20	24.29	3.81	29.00	4.63	33.71	5.45	36.00	5.89	38.29	6.44	43.00	7.63	46.29	8.45
90%	21	24.29	3.84	29.00	4.66	33.71	5.54	36.00	6.09	38.29	6.67	43.00	7.90	46.00	8.65
	23	24.29	3.91	29.00	4.84	33.71	5.94	36.00	6.53	38.29	7.16	43.00	8.48	45.28	9.05
	25	24.29	4.13	29.00	5.18	33.71	6.35	36.00	6.99	38.29	7.64	43.00	9.08	44.72	9.44
	27	24.29	4.39	29.00	5.51	33.71	6.78	36.00	7.46	38.29	8.18	43.00	9.72	44.00	9.84
	29	24.29	4.67	29.00	5.88	33.71	7.23	36.00	7.96	38.29	8.74	42.57	10.16	43.43	10.23
	31	24.29	4.96	29.00	6.26	33.71	7.71	36.00	8.50	38.29	9.32	41.86	10.55	42.71	10.64
	33	24.29	5.27	29.00	6.65	33.71	8.22	36.00	9.06	38.29	9.94	41.28	10.96	42.14	11.04
	35	24.29	5.60	29.00	7.08	33.71	8.76	36.00	9.65	38.29	10.60	40.57	11.36	41.43	11.45
	37	24.29	5.94	29.00	7.52	33.71	9.32	36.00	10.28	38.29	11.30	39.86	11.76	40.86	11.85
	39	24.29	6.30	29.00	8.01	33.71	9.91	36.00	10.95	38.29	12.03	39.29	12.17	40.14	12.26
	41	24.29	6.52	29.00	8.37	33.71	10.28	36.00	11.24	38.29	12.10	39.01	12.48	39.87	12.55
	43	24.29	6.84	29.00	8.73	33.71	10.64	36.00	11.53	38.29	12.36	38.81	12.64	39.53	12.74
	45	24.29	7.27	29.00	9.17	33.71	11.07	36.00	11.91	38.29	12.70	38.60	12.77	38.93	12.91
	48	24.29	5.57	29.00	6.92	33.71	8.27	36.00	8.87	38.29	9.25	42.53	9.22	42.08	9.32
	—5	21.57	2.77	25.72	3.27	29.86	3.87	32.00	4.12	34.14	4.43	38.28	5.12	42.43	5.85
	—2	21.57	2.81	25.72	3.31	29.86	3.90	32.00	4.18	34.14	4.47	38.28	5.17	42.43	5.90
	0	21.57	2.85	25.72	3.35	29.86	3.95	32.00	4.23	34.14	4.55	38.28	5.25	42.43	5.99
80%	2	21.57	2.91	25.72	3.40	29.86	4.01	32.00	4.31	34.14	4.64	38.28	5.35	42.43	6.10
	4	21.57	2.96	25.72	3.46	29.86	4.09	32.00	4.41	34.14	4.72	38.28	5.45	42.43	6.18
	6	21.57	3.01	25.72	3.54	29.86	4.15	32.00	4.51	34.14	4.81	38.28	5.53	42.43	6.29
	8	21.57	3.07	25.72	3.62	29.86	4.25	32.00	4.58	34.14	4.91	38.28	5.61	42.43	6.41

	10	21.57	3.09	25.72	3.70	29.86	4.36	32.00	4.69	34.14	5.03	38.28	5.74	42.43	6.47
	12	21.57	3.14	25.72	3.76	29.86	4.43	32.00	4.78	34.14	5.13	38.28	5.85	42.43	6.59
	14	21.57	3.20	25.72	3.84	29.86	4.51	32.00	4.86	34.14	5.22	38.28	5.95	42.43	6.72
	16	21.57	3.24	25.72	3.90	29.86	4.60	32.00	4.95	34.14	5.32	38.28	6.08	42.43	6.84
	18	21.57	3.31	25.72	3.98	29.86	4.69	32.00	5.06	34.14	5.42	38.28	6.20	42.43	6.98
	20	21.57	3.37	25.72	4.05	29.86	4.78	32.00	5.15	34.14	5.53	38.28	6.43	42.43	7.46
	21	21.57	3.40	25.72	4.08	29.86	4.83	32.00	5.21	34.14	5.65	38.28	6.66	42.43	7.74
	23	21.57	3.46	25.72	4.17	29.86	5.06	32.00	5.54	34.14	6.05	38.28	7.13	42.43	8.30
	25	21.57	3.56	25.72	4.43	29.86	5.41	32.00	5.92	34.14	6.46	38.28	7.63	42.43	8.88
	27	21.57	3.79	25.72	4.72	29.86	5.76	32.00	6.32	34.14	6.90	38.28	8.15	42.43	9.50
	29	21.57	4.04	25.72	5.03	29.86	6.14	32.00	6.73	34.14	7.37	38.28	8.70	42.43	10.16
	31	21.57	4.28	25.72	5.35	29.86	6.53	32.00	7.17	34.14	7.86	38.28	9.29	41.72	10.55
	33	21.57	4.55	25.72	5.68	29.86	6.96	32.00	7.65	34.14	8.36	38.28	9.90	41.14	10.95
	35	21.57	4.83	25.72	6.05	29.86	7.40	32.00	8.13	34.14	8.91	38.28	10.55	40.43	11.35
	37	21.57	5.12	25.72	6.41	29.86	7.87	32.00	8.67	34.14	9.49	38.28	11.25	39.86	11.74
	39	21.57	5.42	25.72	6.84	29.86	8.38	32.00	9.21	34.14	10.10	38.28	11.99	39.14	12.15
	41	21.57	5.54	25.72	6.90	29.86	8.50	32.00	9.46	34.14	10.28	38.28	12.29	38.90	12.37
	43	21.57	5.71	25.72	6.96	29.86	8.62	32.00	9.62	34.14	10.42	38.28	12.43	38.66	12.50
	45	21.57	5.87	25.72	7.04	29.86	8.79	32.00	9.82	34.14	10.60	38.28	12.57	38.18	12.70
	48	21.57	3.84	25.72	4.59	33.59	5.80	32.00	6.53	34.14	6.99	38.28	8.24	42.60	8.42
	—5	18.86	2.47	22.57	2.89	26.14	3.28	28.00	3.52	29.86	3.75	33.43	4.29	37.14	4.94
	—2	18.86	2.49	22.57	2.91	26.14	3.30	28.00	3.58	29.86	3.82	33.43	4.36	37.14	5.00
	0	18.86	2.50	22.57	2.95	26.14	3.37	28.00	3.65	29.86	3.89	33.43	4.45	37.14	5.07
	2	18.86	2.52	22.57	2.96	26.14	3.42	28.00	3.72	29.86	3.96	33.43	4.54	37.14	5.15
	4	18.86	2.55	22.57	3.04	26.14	3.50	28.00	3.79	29.86	4.04	33.43	4.62	37.14	5.27
	6	18.86	2.59	22.57	3.09	26.14	3.58	28.00	3.91	29.86	4.14	33.43	4.70	37.14	5.38
	8	18.86	2.64	22.57	3.18	26.14	3.66	28.00	3.97	29.86	4.23	33.43	4.83	37.14	5.48
	10	18.86	2.69	22.57	3.23	26.14	3.76	28.00	4.05	29.86	4.34	33.43	4.93	37.14	5.54
	12	18.86	2.76	22.57	3.27	26.14	3.84	28.00	4.13	29.86	4.42	33.43	5.03	37.14	5.65
	14	18.86	2.80	22.57	3.33	26.14	3.90	28.00	4.19	29.86	4.49	33.43	5.12	37.14	5.76
	16	18.86	2.85	22.57	3.40	26.14	3.97	28.00	4.28	29.86	4.58	33.43	5.21	37.14	5.86
	18	18.86	2.89	22.57	3.46	26.14	4.05	28.00	4.36	29.86	4.66	33.43	5.31	37.14	5.98
	20	18.86	2.94	22.57	3.52	26.14	4.13	28.00	4.43	29.86	4.75	33.43	5.42	37.14	6.15
70%	21	18.86	2.97	22.57	3.55	26.14	4.16	28.00	4.48	29.86	4.80	33.43	5.50	37.14	6.37
	23	18.86	3.02	22.57	3.61	26.14	4.25	28.00	4.63	29.86	5.04	33.43	5.89	37.14	6.82
	25	18.86	3.08	22.57	3.76	26.14	4.52	28.00	4.95	29.86	5.38	33.43	6.30	37.14	7.29
	27	18.86	3.26	22.57	4.01	26.14	4.83	28.00	5.27	29.86	5.74	33.43	6.73	37.14	7.80
	29	18.86	3.46	22.57	4.25	26.14	5.13	28.00	5.62	29.86	6.11	33.43	7.17	37.14	8.33
	31	18.86	3.65	22.57	4.51	26.14	5.47	28.00	5.97	29.86	6.50	33.43	7.65	37.14	8.88
	33	18.86	3.88	22.57	4.80	26.14	5.82	28.00	6.35	29.86	6.93	33.43	8.15	37.14	9.47
	35	18.86	4.11	22.57	5.09	26.14	6.17	28.00	6.76	29.86	7.37	33.43	8.68	37.14	10.10
	37	18.86	4.34	22.57	5.39	26.14	6.56	28.00	7.17	29.86	7.84	33.43	9.24	37.14	10.75
	39	18.86	4.60	22.57	5.71	26.14	6.96	28.00	7.63	29.86	8.33	33.43	9.82	37.14	11.45
	41	18.86	4.80	22.57	5.91	26.14	7.16	28.00	7.88	29.86	8.58	33.43	10.23	37.14	11.96
	43	18.86	5.19	22.57	6.32	26.14	7.46	28.00	8.31	29.86	8.84	33.43	10.60	37.14	12.33
	45	18.86	5.31	22.57	6.45	26.14	7.61	28.00	8.44	29.86	9.28	33.43	11.18	37.14	12.81
	48	18.86	9.96	22.57	12.09	26.14	14.25	28.00	15.59	29.86	16.82	33.43	20.29	37.14	23.04
	—5	16.14	2.11	19.29	2.44	22.43	2.85	24.00	3.03	25.57	3.27	28.71	3.68	31.86	4.22
	—2	16.14	2.12	19.29	2.48	22.43	2.90	24.00	3.08	25.57	3.31	28.71	3.73	31.86	4.24
	0	16.14	2.15	19.29	2.51	22.43	2.94	24.00	3.11	25.57	3.36	28.71	3.79	31.86	4.30
	2	16.14	2.19	19.29	2.57	22.43	2.99	24.00	3.17	25.57	3.41	28.71	3.86	31.86	4.35
	4	16.14	2.25	19.29	2.62	22.43	3.05	24.00	3.21	25.57	3.46	28.71	3.92	31.86	4.42
	6	16.14	2.27	19.29	2.67	22.43	3.11	24.00	3.29	25.57	3.53	28.71	4.00	31.86	4.52
	8	16.14	2.32	19.29	2.71	22.43	3.16	24.00	3.35	25.57	3.60	28.71	4.08	31.86	4.59
	10	16.14	2.36	19.29	2.77	22.43	3.21	24.00	3.44	25.57	3.67	28.71	4.16	31.86	4.66
	12	16.14	2.41	19.29	2.82	22.43	3.27	24.00	3.50	25.57	3.73	28.71	4.23	31.86	4.74
	14	16.14	2.44	19.29	2.86	22.43	3.32	24.00	3.56	25.57	3.81	28.71	4.31	31.86	4.83
	16	16.14	2.47	19.29	2.91	22.43	3.38	24.00	3.62	25.57	3.87	28.71	4.39	31.86	4.92
60%	18	16.14	2.51	19.29	2.95	22.43	3.44	24.00	3.68	25.57	3.94	28.71	4.46	31.86	5.01
	20	16.14	2.54	19.29	3.02	22.43	3.50	24.00	3.76	25.57	4.02	28.71	4.55	31.86	5.12
	21	16.14	2.57	19.29	3.03	22.43	3.53	24.00	3.79	25.57	4.05	28.71	4.60	31.86	5.16
	23	16.14	2.60	19.29	3.09	22.43	3.59	24.00	3.87	25.57	4.13	28.71	4.78	31.86	5.50
	25	16.14	2.65	19.29	3.14	22.43	3.73	24.00	4.05	25.57	4.39	28.71	5.10	31.86	5.86
	27	16.14	2.76	19.29	3.33	22.43	3.97	24.00	4.32	25.57	4.67	28.71	5.44	31.86	6.26
	29	16.14	2.91	19.29	3.53	22.43	4.23	24.00	4.60	25.57	4.98	28.71	5.80	31.86	6.68
	31	16.14	3.09	19.29	3.75	22.43	4.49	24.00	4.89	25.57	5.30	28.71	6.17	31.86	7.11
	33	16.14	3.26	19.29	3.97	22.43	4.77	24.00	5.19	25.57	5.63	28.71	6.56	31.86	7.58
	35	16.14	3.46	19.29	4.22	22.43	5.06	24.00	5.51	25.57	5.98	28.71	6.99	31.86	8.07
	37	16.14	3.65	19.29	4.46	22.43	5.36	24.00	5.85	25.57	6.35	28.71	7.43	31.86	8.59
	39	16.14	3.85	19.29	4.72	22.43	5.68	24.00	6.20	25.57	6.75	28.71	7.89	31.86	9.14
	41	16.14	3.98	19.29	4.92	22.43	5.89	24.00	6.45	25.57	6.99	28.71	8.26	31.86	9.55

	43	16.14	4.10	19.29	5.13	22.43	6.09	24.00	6.64	25.57	7.24	28.71	8.61	31.86	9.96
	45	16.14	4.29	19.29	5.39	22.43	6.34	24.00	6.89	25.57	7.60	28.71	9.00	31.86	10.51
	48	16.14	6.02	19.29	7.49	22.43	8.68	24.00	9.50	25.57	10.65	28.71	12.33	31.86	14.76
50%	—5	13.50	1.83	16.14	2.11	18.71	2.43	20.00	2.54	21.29	2.68	23.86	3.05	26.57	3.29
	—2	13.50	1.84	16.14	2.16	18.71	2.46	20.00	2.58	21.29	2.73	23.86	3.09	26.57	3.33
	0	13.50	1.87	16.14	2.19	18.71	2.50	20.00	2.61	21.29	2.76	23.86	3.14	26.57	3.39
	2	13.50	1.90	16.14	2.22	18.71	2.54	20.00	2.65	21.29	2.81	23.86	3.16	26.57	3.46
	4	13.50	1.92	16.14	2.26	18.71	2.57	20.00	2.68	21.29	2.87	23.86	3.24	26.57	3.54
	6	13.50	1.95	16.14	2.29	18.71	2.61	20.00	2.75	21.29	2.92	23.86	3.29	26.57	3.65
	8	13.50	2.00	16.14	2.33	18.71	2.65	20.00	2.81	21.29	2.96	23.86	3.34	26.57	3.77
	10	13.50	2.04	16.14	2.36	18.71	2.70	20.00	2.85	21.29	3.05	23.86	3.43	26.57	3.82
	12	13.50	2.06	16.14	2.39	18.71	2.74	20.00	2.91	21.29	3.11	23.86	3.49	26.57	3.88
	14	13.50	2.09	16.14	2.42	18.71	2.77	20.00	2.97	21.29	3.15	23.86	3.55	26.57	3.96
	16	13.50	2.12	16.14	2.45	18.71	2.82	20.00	3.02	21.29	3.20	23.86	3.61	26.57	4.02
	18	13.50	2.15	16.14	2.50	18.71	2.86	20.00	3.06	21.29	3.26	23.86	3.67	26.57	4.10
	20	13.50	2.18	16.14	2.53	18.71	2.91	20.00	3.11	21.29	3.32	23.86	3.73	26.57	4.17
	21	13.50	2.19	16.14	2.56	18.71	2.94	20.00	3.14	21.29	3.35	23.86	3.78	26.57	4.22
	23	13.50	2.22	16.14	2.59	18.71	2.98	20.00	3.20	21.29	3.41	23.86	3.84	26.57	4.31
	25	13.50	2.25	16.14	2.63	18.71	3.05	20.00	3.26	21.29	3.52	23.86	4.04	26.57	4.60
	27	13.50	2.30	16.14	2.74	18.71	3.21	20.00	3.47	21.29	3.73	23.86	4.29	26.57	4.90
	29	13.50	2.42	16.14	2.89	18.71	3.41	20.00	3.69	21.29	3.97	23.86	4.57	26.57	5.22
	31	13.50	2.56	16.14	3.06	18.71	3.61	20.00	3.91	21.29	4.22	23.86	4.86	26.57	5.56
	33	13.50	2.71	16.14	3.24	18.71	3.84	20.00	4.14	21.29	4.48	23.86	5.16	26.57	5.91
	35	13.50	2.86	16.14	3.43	18.71	4.05	20.00	4.39	21.29	4.74	23.86	5.48	26.57	6.27
	37	13.50	3.02	16.14	3.62	18.71	4.29	20.00	4.64	21.29	5.02	23.86	5.82	26.57	6.67
	39	13.50	3.18	16.14	3.82	18.71	4.54	20.00	4.92	21.29	5.33	23.86	6.17	26.57	7.08
	41	13.50	3.31	16.14	3.99	18.71	4.70	20.00	5.15	21.29	5.56	23.86	6.50	26.57	7.41
	43	13.50	3.53	16.14	4.26	18.71	4.87	20.00	5.38	21.29	5.70	23.86	6.83	26.57	7.74
	45	13.50	3.61	16.14	4.37	18.71	5.20	20.00	5.80	21.29	5.94	23.86	7.48	26.57	8.40
	48	13.50	3.83	16.14	4.67	18.71	5.38	20.00	6.02	21.29	6.08	23.86	7.87	26.57	8.77

Note:

1. is shown as reference
2. In cooling mode, avoid the outdoor air temperature range from 42-46 degree C, when selecting the models
3. The above table shows the average value of conditions may operate
4. It is recommended to connect less than 130%

14HP heating mode

Combination (%) (Capacity index)	Outdoor temperature(°C DB)		Indoor temperature(°C WB)											
			16		18		20		21		22		24	
			TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
	°C DB	°C WB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
130%	-19.8	-20	29.14	7.91	29.00	8.46	28.86	9.02	28.86	9.30	28.72	9.58	28.72	10.14
	-18.8	-19	29.57	8.08	29.43	8.63	29.43	9.18	29.29	9.46	29.29	9.72	29.14	10.27
	-16.7	-17	30.71	8.46	30.57	8.98	30.43	9.52	30.43	9.78	30.43	10.04	30.29	10.57
	-13.7	-15	32.00	8.85	31.86	9.36	31.71	9.87	31.71	10.11	31.57	10.38	31.57	10.89
	-11.8	-13	33.29	9.24	33.29	9.74	33.14	10.22	33.00	10.46	33.00	10.71	32.86	11.19
	-9.8	-11	34.86	9.65	34.71	10.11	34.57	10.58	34.57	10.81	34.57	11.04	34.43	11.51
	-9.5	-10	35.71	9.85	35.57	10.30	35.43	10.75	35.43	10.99	35.28	11.20	35.28	11.65
	-8.5	-9.1	36.43	10.03	36.29	10.46	36.29	10.91	36.14	11.13	36.14	11.35	36.00	11.80
	-7	-7.6	37.71	10.32	37.71	10.75	37.57	11.18	37.57	11.39	37.43	11.60	37.28	12.03
	-5	-5.6	39.71	10.71	39.57	11.12	39.43	11.52	39.43	11.73	39.29	11.92	39.29	12.32
	-3	-3.7	41.57	11.06	41.43	11.45	41.43	11.83	41.28	12.03	41.28	12.22	41.14	12.60
	0	-0.7	44.85	11.60	44.85	11.96	44.71	12.31	44.71	12.44	44.57	12.67	44.57	13.02
	3	2.2	48.42	12.08	48.29	12.41	48.14	12.75	48.14	12.90	48.14	13.08	48.00	13.40
	5	4.1	50.85	12.38	50.71	12.70	50.71	13.01	50.57	13.17	50.57	13.33	50.43	13.63
	7	6	53.43	12.67	53.28	12.96	53.28	13.27	53.14	13.41	53.14	13.56	51.00	13.02
	9	7.9	56.14	12.93	56.00	13.22	56.00	13.50	55.86	13.65	54.71	13.36	51.00	12.24
	11	9.8	59.00	13.20	58.86	13.46	58.57	13.63	56.57	13.09	54.71	12.56	51.00	11.52
	13	11.8	62.14	13.44	62.00	13.70	58.57	12.77	56.57	12.26	54.71	11.79	51.00	10.81
	15	13.7	65.14	13.68	62.28	12.98	58.57	12.03	56.57	11.57	54.71	11.10	51.00	10.20
120%	-19.8	-20	29.00	8.66	28.86	9.17	28.71	9.69	28.71	9.94	28.71	10.20	28.57	10.72
	-18.8	-19	29.43	8.82	29.29	9.33	29.29	9.84	29.14	10.09	29.14	10.35	29.00	10.86
	-16.7	-17	30.57	9.17	30.43	9.66	30.24	10.14	30.29	10.39	30.29	10.64	30.14	11.12
	-13.7	-15	31.86	9.53	31.72	10.00	31.57	10.46	31.57	10.71	31.57	10.94	31.43	11.41
	-11.8	-13	33.15	9.90	33.15	10.35	33.00	10.80	33.00	11.03	32.86	11.25	32.86	11.70
	-9.8	-11	34.71	10.27	34.57	10.70	34.57	11.13	34.43	11.35	34.43	11.55	34.29	11.99
	-9.5	-10	35.58	10.46	35.43	10.89	35.29	11.29	35.29	11.51	35.29	11.71	35.14	12.13
	-8.5	-9.1	36.29	10.62	36.14	11.03	36.14	11.44	36.00	11.64	36.00	11.86	35.86	12.26
	-7	-7.6	37.57	10.90	37.57	11.29	37.43	11.68	37.43	11.89	37.29	12.08	37.29	12.47
	-5	-5.6	39.57	11.25	39.43	11.63	39.28	12.00	39.28	12.19	39.28	12.38	39.15	12.75
	-3	-3.7	41.43	11.58	41.43	11.95	41.29	12.29	41.29	12.47	41.14	12.66	41.14	13.01
	0	-0.7	44.72	12.08	44.72	12.41	44.57	12.73	44.57	12.91	44.43	13.06	44.43	13.40
	3	2.2	48.29	12.53	48.14	12.83	48.14	13.14	48.00	13.30	48.00	13.44	47.00	13.37
	5	4.1	50.72	12.80	50.57	13.09	50.57	13.38	50.43	13.53	50.43	13.68	47.00	12.56
	7	6	53.29	13.06	53.29	13.34	53.15	13.62	52.29	13.43	50.57	12.88	47.00	11.82
	9	7.9	56.00	13.33	55.86	13.59	54.00	13.14	52.29	12.62	50.57	12.11	47.00	11.12
	11	9.8	58.86	13.56	57.43	13.33	54.00	12.35	52.29	11.87	50.57	11.39	47.00	10.48
	13	11.8	61.00	13.43	57.43	12.50	54.00	11.58	52.29	11.15	50.57	10.71	47.00	9.85
	15	13.7	61.00	12.64	57.43	11.77	54.00	10.93	52.29	10.51	50.57	10.10	47.00	9.30
110%	-19.8	-20	28.86	9.42	28.72	9.88	28.57	10.36	28.57	10.60	28.58	10.83	28.43	11.31
	-18.8	-19	29.29	9.56	29.14	10.03	29.14	10.49	29.14	10.73	29.00	10.96	29.00	11.42
	-16.7	-17	30.43	9.88	30.29	10.33	30.71	10.78	30.14	11.00	30.14	11.23	30.00	11.67
	-13.7	-15	31.72	10.22	31.58	10.65	31.43	11.07	31.43	11.29	31.43	11.51	31.28	11.93
	-11.8	-13	33.00	10.56	33.00	10.97	32.86	11.38	32.86	11.58	32.71	11.79	32.71	12.21
	-9.8	-11	34.57	10.90	34.43	11.29	34.43	11.68	34.28	11.89	34.28	12.08	34.28	12.47
	-9.5	-10	35.43	11.07	35.29	11.45	35.14	11.84	35.14	12.03	35.14	12.22	35.00	12.60
	-8.5	-9.1	36.14	11.22	36.00	11.60	36.00	11.97	35.86	12.16	35.86	12.35	35.86	11.26
	-7	-7.6	37.43	11.48	37.43	11.83	37.29	12.19	37.29	12.38	37.29	12.56	37.14	12.92
	-5	-5.6	39.43	11.80	39.29	12.15	39.14	12.48	39.14	12.66	39.14	12.83	39.00	13.18
	-3	-3.7	41.29	12.11	41.29	12.43	41.14	12.76	41.14	12.92	41.00	13.08	41.00	13.41
	0	-0.7	44.57	12.56	44.57	12.86	44.43	13.17	44.43	13.31	44.43	13.47	43.14	13.21
	3	2.2	48.14	12.98	48.00	13.25	48.00	13.53	47.86	13.66	46.29	13.11	43.14	12.02
	5	4.1	50.57	13.22	50.57	13.50	49.57	13.37	47.86	12.83	46.29	12.32	43.14	11.31
	7	6	53.14	13.47	52.71	13.56	49.57	12.56	47.86	12.06	46.29	11.58	43.14	10.64
	9	7.9	55.86	13.69	52.71	12.74	49.57	11.81	47.86	11.35	46.29	10.90	43.14	10.03
	11	9.8	55.86	12.88	52.71	11.99	49.57	11.12	47.86	10.70	46.29	10.27	43.14	9.46
	13	11.8	55.86	12.08	52.71	11.25	49.57	10.45	47.86	10.06	46.29	9.66	43.14	8.91
	15	13.7	55.86	10.73	52.71	10.61	49.57	9.87	47.86	9.49	46.29	9.14	43.14	8.43
100%	-19.8	-20	28.71	10.17	28.57	10.59	28.57	11.03	28.43	11.25	28.43	11.45	28.29	11.89
	-18.8	-19	29.14	10.30	29.14	10.72	29.00	11.15	29.00	11.36	28.86	11.58	28.86	12.00
	-16.7	-17	30.29	10.59	30.14	11.00	30.14	11.41	30.00	11.61	30.00	11.81	30.00	12.22
	-13.7	-15	31.57	10.90	31.43	11.29	31.28	11.68	31.28	11.89	31.28	12.08	31.14	12.47
	-11.8	-13	32.86	11.22	32.86	11.58	32.72	11.96	32.72	12.15	32.72	12.34	32.57	12.72
	-9.8	-11	34.43	11.52	34.29	11.89	34.29	12.24	34.29	12.43	34.14	12.60	34.14	12.95
	-9.5	-10	35.28	11.68	35.15	12.03	35.15	12.38	35.00	12.56	35.00	12.73	34.86	13.08
	-8.5	-9.1	36.00	11.81	35.86	12.16	35.86	12.50	35.86	12.67	35.72	12.85	35.72	13.18

	-7	-7.6	37.29	12.05	37.29	12.38	37.14	12.70	37.14	12.88	37.14	13.04	37.00	13.37
	-5	-5.6	39.29	12.35	39.14	12.66	39.14	12.98	39.00	13.12	39.00	13.28	38.86	13.60
	-3	-3.7	41.14	12.63	41.14	11.47	41.00	13.22	41.00	13.37	41.00	13.52	39.29	12.95
	0	-0.7	44.43	13.04	44.43	13.31	44.28	13.59	43.57	13.37	42.14	12.82	39.29	11.76
	3	2.2	48.00	13.41	47.86	13.66	45.00	12.64	43.57	12.15	42.14	11.67	39.29	10.71
	5	4.1	50.43	13.66	47.86	12.83	45.00	11.89	43.57	11.44	42.14	10.99	39.29	10.10
	7	6	50.72	12.96	47.86	12.06	45.00	11.19	43.57	10.77	42.14	10.35	39.29	9.52
	9	7.9	50.72	12.18	47.86	11.35	45.00	10.54	43.57	10.01	42.14	9.75	39.29	8.98
	11	9.8	50.72	11.47	47.86	10.70	45.00	9.94	43.57	9.56	42.14	9.20	39.29	8.49
	13	11.8	50.72	10.77	47.86	10.06	45.00	9.36	43.57	9.01	42.14	8.68	39.29	8.01
	15	13.7	50.72	10.16	47.86	9.49	45.00	8.84	43.57	8.52	42.14	8.20	39.29	7.59
	-19.8	-20	28.52	10.93	28.38	11.31	28.38	11.70	28.24	11.89	28.24	12.09	28.24	12.47
	-18.8	-19	28.95	11.04	28.95	11.44	28.81	11.81	28.81	12.00	28.81	12.19	28.66	12.57
	-16.7	-17	30.09	11.32	29.95	11.68	29.95	12.05	29.95	12.24	29.80	12.41	29.80	12.77
	-13.7	-15	31.37	11.60	31.23	11.95	31.23	12.29	31.09	12.47	31.09	12.64	31.09	12.99
	-11.8	-13	32.66	11.87	32.66	12.21	32.51	12.54	32.51	12.72	32.51	12.88	32.37	13.21
	-9.8	-11	34.23	12.15	34.23	12.47	34.08	12.79	34.08	12.95	34.08	13.12	33.94	13.44
	-9.5	-10	35.08	12.29	34.94	12.61	34.94	12.92	34.80	13.08	34.80	13.24	34.80	13.54
	-8.5	-9.1	35.79	12.43	35.79	12.73	35.65	13.04	35.65	13.18	35.65	13.34	35.22	13.47
	-7	-7.6	37.08	12.63	37.08	12.92	36.94	13.22	36.94	13.37	36.94	13.51	35.22	12.86
90%	-5	-5.6	39.07	12.90	38.93	13.18	38.93	13.46	38.79	13.60	37.79	13.18	35.22	12.09
	-3	-3.7	40.93	13.15	40.93	13.41	40.50	13.47	39.07	12.93	37.79	12.41	35.22	11.39
	0	-0.7	44.35	13.53	43.07	13.20	40.50	12.22	39.07	11.74	37.79	11.28	35.22	10.36
	3	2.2	45.64	12.89	43.07	12.00	40.50	11.13	39.07	10.71	37.79	10.29	35.22	9.47
	5	4.1	45.64	12.12	43.07	11.29	40.50	10.49	39.07	10.09	37.79	9.71	35.22	8.94
	7	6	45.64	11.39	43.07	10.64	40.50	9.88	39.07	9.52	37.79	9.16	35.22	8.44
	9	7.9	45.64	10.74	43.07	10.01	40.50	9.31	39.07	8.98	37.79	8.65	35.22	7.98
	11	9.8	45.64	10.11	43.07	9.45	40.50	8.81	39.07	8.49	37.79	8.17	35.22	7.56
	13	11.8	45.64	9.52	43.07	8.91	40.50	8.30	39.07	8.01	37.79	7.72	35.22	7.14
	15	13.7	45.64	9.00	43.07	8.41	40.50	7.86	39.07	7.59	37.79	7.31	35.22	6.77
	-19.8	-20	28.43	11.68	28.29	12.02	28.29	12.37	28.29	12.54	28.14	12.72	28.14	13.05
	-18.8	-19	28.86	11.79	28.86	12.13	28.71	12.47	28.71	12.64	28.71	12.80	28.57	13.15
	-16.7	-17	30.00	12.03	29.86	12.35	29.86	12.69	29.86	12.85	29.86	13.01	29.71	13.33
	-13.7	-15	31.28	12.28	31.14	12.58	31.14	12.90	31.14	13.05	31.00	13.21	31.00	13.53
	-11.8	-13	32.57	12.53	32.57	12.83	32.43	13.12	32.43	13.27	32.43	13.43	31.43	13.06
	-9.8	-11	34.14	12.77	34.14	13.06	34.00	13.35	34.00	13.49	33.71	13.46	31.43	12.34
	-9.5	-10	35.00	12.90	34.85	13.18	34.86	13.46	34.86	13.60	33.71	13.06	31.43	11.97
	-8.5	-9.1	35.72	13.02	33.20	13.30	35.57	13.56	34.86	13.25	33.71	12.72	31.43	11.65
	-7	-7.6	37.00	13.21	37.00	13.47	36.00	13.18	34.86	12.66	33.71	12.15	31.43	11.15
80%	-5	-5.6	39.00	13.44	38.29	13.37	36.00	12.38	34.86	11.90	33.71	11.42	31.43	10.49
	-3	-3.7	40.57	13.52	38.29	12.58	36.00	11.65	34.86	11.22	33.71	10.77	31.43	9.91
	0	-0.7	40.57	12.27	38.29	11.42	36.00	10.61	34.86	10.22	33.71	9.81	31.43	9.04
	3	2.2	40.57	11.17	38.29	10.42	36.00	9.69	34.86	9.33	33.71	8.98	31.43	8.28
	5	4.1	40.57	10.52	38.29	9.82	36.00	9.14	34.86	8.81	33.71	8.49	31.43	7.83
	7	6	40.57	9.91	38.29	9.27	36.00	8.63	34.86	8.33	33.71	8.02	31.43	7.41
	9	7.9	40.57	9.36	38.29	8.75	36.00	8.15	34.86	7.86	33.71	7.59	31.43	7.02
	11	9.8	40.57	8.84	38.29	8.27	36.00	7.72	34.86	7.44	33.71	7.18	31.43	6.66
	13	11.8	40.57	8.33	38.29	7.80	36.00	7.29	34.86	7.03	33.71	6.79	31.43	6.29
	15	13.7	40.57	7.88	38.29	7.40	36.00	6.92	34.86	6.67	33.71	6.44	31.43	5.99
	-19.8	-20	28.22	12.44	28.08	12.73	28.08	13.04	28.08	13.18	28.08	13.34	27.37	13.19
	-18.8	-19	28.65	12.54	28.65	12.83	28.51	13.12	28.51	13.27	28.51	13.43	27.37	12.92
	-16.7	-17	29.79	12.74	29.79	13.04	29.65	13.31	29.65	13.46	29.36	11.99	27.37	12.32
	-13.7	-15	31.07	12.96	30.93	13.24	30.93	13.51	30.36	13.31	29.36	12.77	27.37	11.71
	-11.8	-13	32.35	13.18	32.35	13.44	31.50	13.12	30.36	12.61	29.36	12.11	27.37	11.10
	-9.8	-11	33.92	13.40	33.49	13.38	31.50	12.40	30.36	11.92	29.36	11.44	27.37	10.51
	-9.5	-10	34.78	13.51	33.49	12.99	31.50	12.03	30.36	11.57	29.36	11.12	27.37	10.22
	-8.5	-9.1	35.49	13.59	33.49	12.64	31.50	11.71	30.36	11.26	29.36	10.83	27.37	9.95
	-7	-7.6	35.49	12.98	33.49	12.08	31.50	11.20	30.36	10.78	29.36	10.36	27.37	9.53
70%	-5	-5.6	35.49	12.19	33.49	11.36	31.50	10.55	30.36	10.14	29.36	11.98	27.37	9.00
	-3	-3.7	35.49	11.48	33.49	10.71	31.50	9.95	30.36	9.58	29.36	9.21	27.37	8.50
	0	-0.7	35.49	10.45	33.49	9.77	31.50	9.08	30.36	8.75	29.36	8.43	27.37	7.79
	3	2.2	35.49	9.55	33.49	8.94	31.50	8.33	30.36	8.02	29.36	7.73	27.37	7.15
	5	4.1	35.49	9.01	33.49	8.43	31.50	7.88	30.36	7.59	29.36	7.31	27.37	6.77
	7	6	35.49	8.52	33.49	7.98	31.50	7.44	30.36	7.18	29.36	6.93	27.37	6.42
	9	7.9	35.49	8.05	33.49	7.54	31.50	7.05	30.36	6.80	29.36	6.57	27.37	6.09
	11	9.8	35.49	7.61	33.49	7.14	31.50	6.68	30.36	6.45	29.36	6.23	27.37	5.78
	13	11.8	35.49	7.19	33.49	6.76	31.50	6.32	30.36	6.12	29.36	5.90	27.37	5.49
	15	13.7	35.49	6.82	33.49	6.41	31.50	6.00	30.36	5.81	29.36	5.61	27.37	5.23
	-19.8	-20	28.14	13.19	28.00	13.44	27.00	12.93	26.14	12.42	25.29	11.93	23.57	10.94
60%	-18.8	-19	28.57	13.28	28.57	13.53	27.00	12.66	26.14	12.16	25.29	11.67	23.57	10.71
	-16.7	-17	29.71	13.46	28.71	13.03	27.00	12.08	26.14	11.61	25.29	11.15	23.57	10.24
	-13.7	-15	30.43	13.31	28.71	12.38	27.00	11.48	26.14	11.04	25.29	10.61	23.57	9.75

	-11.8	-13	30.43	12.60	28.71	11.73	27.00	10.88	26.14	10.48	25.29	10.07	23.57	9.31
	-9.8	-11	30.43	11.90	28.71	11.09	27.00	10.30	26.14	9.91	25.29	9.53	23.57	8.79
	-9.5	-10	30.43	11.57	28.71	10.78	27.00	10.01	26.14	9.65	25.29	9.27	23.57	8.54
	-8.5	-9.1	30.43	11.26	28.71	10.51	27.00	9.77	26.14	9.40	25.29	9.04	23.57	8.34
	-7	-7.6	30.43	10.77	28.71	10.06	27.00	9.34	26.14	9.01	25.29	8.66	23.57	8.01
	-5	-5.6	30.43	10.14	28.71	9.47	27.00	8.82	26.14	8.50	25.29	8.18	23.57	7.57
	-3	-3.7	30.43	9.58	28.71	8.95	27.00	8.34	26.14	8.05	25.29	7.75	23.57	7.16
	0	-0.7	30.43	8.75	28.71	8.20	27.00	7.64	26.14	7.38	25.29	7.11	23.57	6.58
	3	2.2	30.43	8.02	28.71	7.53	27.00	7.03	26.14	6.79	25.29	6.55	23.57	6.07
	5	4.1	30.43	7.59	28.71	7.12	27.00	6.66	26.14	6.44	25.29	6.21	23.57	5.77
	7	6	30.43	7.18	28.71	6.74	27.00	6.31	26.14	6.10	25.29	5.90	23.57	5.48
	9	7.9	30.43	6.80	28.71	6.39	27.00	5.99	26.14	5.80	25.29	5.59	23.57	5.22
	11	9.8	30.43	6.45	28.71	6.07	27.00	5.70	26.14	5.51	25.29	5.32	23.57	4.97
	13	11.8	30.43	6.10	28.71	5.75	27.00	5.41	26.14	5.23	25.29	5.06	23.57	4.72
	15	13.7	30.43	5.81	28.71	5.46	27.00	5.14	26.14	4.98	25.29	4.82	23.57	4.50
	-19.8	-20	25.35	12.00	23.92	11.17	22.50	10.38	21.65	10.00	20.93	9.61	19.51	8.85
	-18.8	-19	25.35	11.74	23.92	10.94	22.50	10.17	21.65	9.78	20.93	9.40	19.51	8.68
	-16.7	-17	25.35	11.20	23.92	10.45	22.50	9.72	21.65	9.36	20.93	9.01	19.51	8.31
	-13.7	-15	25.35	10.67	23.92	9.95	22.50	9.26	21.65	8.92	20.93	8.59	19.51	7.93
	-11.8	-13	25.35	10.13	23.92	9.46	22.50	8.81	21.65	8.49	20.93	8.17	19.51	7.56
	-9.8	-11	25.35	9.59	23.92	8.97	22.50	8.36	21.65	8.05	20.93	7.76	19.51	7.18
	-9.5	-10	25.35	9.33	23.92	8.72	22.50	8.14	21.65	7.85	20.93	7.56	19.51	6.99
	-8.5	-9.1	25.35	9.10	23.92	8.52	22.50	7.93	21.65	7.66	20.93	7.38	19.51	6.83
	-7	-7.6	25.35	8.72	23.92	8.17	22.50	7.61	21.65	7.35	20.93	7.09	19.51	6.57
50%	-5	-5.6	25.35	8.23	23.92	7.72	22.50	7.21	21.65	6.96	20.93	6.71	19.51	6.22
	-3	-3.7	25.35	7.79	23.92	7.31	22.50	6.83	21.65	6.60	20.93	6.36	19.51	5.91
	0	-0.7	25.35	7.15	23.92	6.71	22.50	6.29	21.65	6.07	20.93	5.87	19.51	5.46
	3	2.2	25.35	6.58	23.92	6.19	22.50	5.80	21.65	5.61	20.93	5.42	19.51	5.06
	5	4.1	25.35	6.25	23.92	5.87	22.50	5.51	21.65	5.33	20.93	5.16	19.51	4.81
	7	6	25.35	5.93	23.92	5.58	22.50	5.25	21.65	5.07	20.93	4.91	19.51	4.59
	9	7.9	25.35	5.62	23.92	5.30	22.50	4.98	21.65	4.84	20.93	4.68	19.51	4.37
	11	9.8	25.35	5.35	23.92	5.04	22.50	4.75	21.65	4.61	20.93	4.46	19.51	4.17
	13	11.8	25.35	5.09	23.92	4.80	22.50	4.52	21.65	4.39	20.93	4.24	19.51	3.98
	15	13.7	25.35	4.84	23.92	4.58	22.50	4.32	21.65	4.19	20.93	4.05	19.51	3.81

Note:

1. is shown as reference
2. In heating mode, avoid the outdoor air temperature range from -15 to -20 degree C, when selecting the models
3. The above table shows the average value of conditions may operate
4. It is recommended to connect less than 130%

16HP cooling mode

Combination (%) (Capacity index)	Outdoor temperature(°C DB	Indoor temperature(°C WB)													
		DB:20.8,WB:14		DB:23.3,WB:16		DB:25.8,WB:18		DB:27,WB:19		DB:28.2,WB:20		DB:30.7,WB:22		DB:32,WB:24	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
130%	—5	39.54	5.41	47.09	6.61	54.64	7.08	56.73	7.37	59.46	7.58	60.91	8.24	62.44	8.29
	—2	39.54	5.41	47.09	6.73	54.64	7.08	56.73	7.41	59.46	7.58	60.91	8.35	62.44	8.38
	0	39.54	5.50	47.09	6.85	54.64	7.34	56.73	7.82	59.46	8.02	60.91	8.45	62.44	8.49
	2	39.54	5.60	47.09	6.87	54.64	7.59	56.73	8.26	59.46	8.11	60.91	8.51	62.44	8.61
	4	39.54	5.73	47.09	7.00	54.64	7.85	56.73	8.29	59.46	8.22	60.91	8.50	62.44	8.78
	6	39.54	5.84	47.09	7.14	54.64	8.14	56.73	8.36	58.80	8.47	60.16	8.50	61.75	8.84
	8	39.54	5.98	47.09	7.30	54.64	8.55	56.73	8.77	58.07	8.75	59.51	3.90	60.97	8.93
	10	39.54	6.10	47.09	7.46	54.64	8.87	56.73	9.07	57.37	4.04	58.82	4.06	60.27	9.19
	12	39.54	6.21	47.09	7.60	54.64	9.05	55.93	4.03	56.73	4.06	58.02	4.07	59.46	9.24
	14	39.54	6.34	47.09	7.74	54.48	4.05	55.29	4.06	55.93	4.08	57.37	4.09	58.82	9.45
	16	39.54	6.44	47.09	7.91	53.84	4.06	54.48	4.08	55.12	4.10	56.57	4.12	58.02	9.60
	18	39.54	6.57	47.09	8.07	53.04	9.46	53.68	9.51	54.48	9.57	55.93	9.65	57.37	9.74
	20	39.54	6.71	47.09	8.58	52.23	9.92	53.04	9.97	53.68	10.03	55.12	10.12	56.57	10.22
	21	39.54	6.89	47.09	8.89	51.91	10.15	52.71	10.21	53.35	10.26	54.80	10.37	56.25	10.46
	23	39.54	7.39	47.09	9.53	51.27	10.62	51.91	10.67	52.55	10.72	54.00	10.83	55.44	10.94
	25	39.54	7.89	47.09	10.21	50.46	11.08	51.10	11.14	51.91	11.21	53.35	11.31	54.80	11.42
	27	39.54	8.42	47.09	10.92	49.82	11.55	50.46	11.62	51.10	11.67	52.55	11.80	54.00	11.92
	29	39.54	8.99	47.09	11.67	49.02	12.01	49.66	12.08	50.46	12.15	51.91	12.28	53.35	12.40
	31	39.54	9.60	46.93	12.35	48.21	12.49	49.02	12.56	49.66	12.62	51.10	12.76	52.55	12.90
	33	39.54	10.22	46.12	12.81	47.57	12.95	48.21	13.03	49.02	13.10	50.46	13.24	51.75	13.38
	35	39.54	10.90	45.32	13.28	46.77	13.44	47.57	13.51	48.21	13.58	49.66	13.74	51.10	13.88
	37	39.54	11.60	44.68	13.76	46.12	13.92	46.77	13.99	47.57	14.08	48.85	14.24	50.30	14.40
	39	39.54	12.35	43.87	13.90	45.32	14.38	46.12	14.47	46.77	14.56	48.21	14.72	49.66	14.90
	41	39.54	13.00	43.42	14.04	44.84	14.52	45.65	14.61	46.29	14.70	47.74	14.75	47.76	15.04
	43	39.54	13.33	43.10	14.10	44.61	14.56	45.41	14.67	45.81	14.72	46.87	14.78	47.19	15.07
	45	39.54	13.99	42.83	14.24	44.13	14.69	44.93	14.77	45.15	14.78	45.60	14.83	46.26	15.35
	48	39.54	11.32	44.36	10.91	48.11	11.32	49.00	11.22	49.40	11.28	49.18	11.27	50.08	12.17
120%	—5	36.48	5.23	43.39	6.33	50.47	7.49	54.00	8.17	56.57	8.51	57.86	8.78	59.14	9.02
	—2	36.48	5.28	43.39	6.40	50.47	7.56	54.00	8.21	56.57	8.61	57.86	8.86	59.14	9.05
	0	36.48	5.33	43.39	6.44	50.47	7.65	54.00	8.23	56.57	8.69	57.86	8.91	59.14	9.07
	2	36.48	5.34	43.39	6.51	50.47	7.70	54.00	8.31	56.57	8.72	57.86	8.98	59.14	9.08
	4	36.48	5.39	43.39	6.59	50.47	7.81	54.00	8.39	56.57	8.84	57.86	8.99	59.14	9.11
	6	36.48	5.45	43.39	6.64	50.47	7.90	54.00	8.48	56.57	8.93	57.86	9.07	59.14	9.14
	8	36.48	5.50	43.39	6.71	50.47	8.01	54.00	8.59	56.57	9.02	57.86	9.10	59.14	9.18
	10	36.48	5.57	43.39	6.80	50.47	8.08	54.00	8.74	56.57	9.03	57.86	9.12	59.14	9.22
	12	36.48	5.67	43.39	6.92	50.47	8.24	54.00	8.90	55.77	9.07	57.05	9.07	58.34	9.28
	14	36.48	5.78	43.39	7.07	50.47	8.40	54.00	9.08	54.96	9.12	56.41	9.21	57.69	9.39
	16	36.48	5.89	43.39	7.21	50.47	8.57	53.68	4.10	54.32	9.26	55.61	9.37	56.89	9.54
	18	36.48	6.00	43.39	7.35	50.47	8.85	52.88	9.46	53.52	9.49	54.80	9.58	56.25	9.67
	20	36.48	6.12	43.39	7.64	50.47	9.53	52.23	9.92	52.88	9.96	54.16	10.05	55.45	10.14
	21	36.48	6.17	43.39	7.90	50.47	9.87	51.75	10.15	52.39	10.19	53.84	10.28	55.13	10.38
	23	36.48	6.60	43.39	8.48	50.47	10.56	51.11	10.60	51.75	10.65	53.03	10.76	54.32	10.85
	25	36.48	7.05	43.39	9.06	49.66	11.03	50.30	11.06	50.95	11.12	52.39	11.22	53.68	11.33
	27	36.48	7.53	43.39	9.69	49.02	11.47	49.66	11.55	50.30	11.60	51.59	11.71	52.88	11.81
	29	36.48	8.03	43.39	10.35	48.21	11.94	48.86	12.01	49.50	12.06	50.79	12.19	52.23	12.29
	31	36.48	8.57	43.39	11.04	47.41	12.42	48.21	12.47	48.86	12.54	50.14	12.67	51.43	12.79
	33	36.48	9.12	43.39	11.78	46.76	12.88	47.41	12.95	48.05	13.01	49.34	13.15	50.62	13.28
	35	36.48	9.71	43.39	12.56	45.96	13.34	46.61	13.42	47.41	13.49	48.69	13.63	49.98	13.78
	37	36.48	10.33	43.39	13.38	45.32	13.83	45.96	13.90	46.61	13.97	47.89	14.12	49.18	14.27
	39	36.48	10.99	43.23	14.13	44.52	14.29	45.16	14.38	45.80	14.45	47.25	14.61	48.54	14.76
	41	36.48	11.29	42.88	14.23	44.17	14.39	44.81	14.48	45.46	14.55	46.90	14.65	47.14	14.87
	43	36.48	11.46	42.65	14.33	43.82	14.48	44.46	14.54	45.11	14.61	46.08	14.69	46.41	15.17
	45	36.48	11.60	42.42	14.47	43.40	14.62	44.00	14.67	44.71	14.72	45.15	14.74	45.94	15.49
	48	42.27	7.55	48.73	9.39	49.64	9.51	50.16	9.61	51.23	9.60	51.50	9.47	52.53	10.05
110%	—5	33.43	4.56	39.86	5.68	46.29	6.78	49.50	7.28	52.71	7.83	56.73	8.13	58.02	8.38
	—2	33.43	4.65	39.86	5.76	46.29	6.84	49.50	7.35	52.71	7.89	56.73	8.21	58.02	8.43
	0	33.43	4.70	39.86	5.79	46.29	6.89	49.50	7.40	52.71	7.98	56.73	8.30	58.02	8.53
	2	33.43	4.80	39.86	5.84	46.29	7.00	49.50	7.48	52.71	8.07	56.73	8.41	58.02	8.64
	4	33.43	4.90	39.86	5.91	46.29	7.06	49.50	7.57	52.71	8.19	56.73	8.53	58.02	8.72
	6	33.43	4.95	39.86	5.98	46.29	7.13	49.50	7.69	52.71	8.28	56.73	8.62	58.02	8.85
	8	33.43	4.99	39.86	6.07	46.29	7.21	49.50	7.77	52.71	8.38	56.73	8.68	58.02	8.94
	10	33.43	5.05	39.86	6.16	46.29	7.32	49.50	7.90	52.71	8.51	56.73	8.74	58.02	9.02
	12	33.43	5.16	39.86	6.28	46.29	7.46	49.50	8.07	52.71	8.67	56.09	8.87	57.22	9.14
	14	33.43	5.25	39.86	6.39	46.29	7.60	49.50	8.21	52.71	8.83	55.29	8.94	56.57	9.20
	16	33.43	5.34	39.86	6.51	46.29	7.74	49.50	8.37	52.71	9.01	54.65	9.05	55.77	9.30
	18	33.43	5.44	39.86	6.64	46.29	7.90	49.50	8.60	52.71	9.44	53.84	9.51	55.13	9.60
	20	33.43	5.55	39.86	6.78	46.29	8.37	49.50	9.24	51.91	9.90	53.20	9.97	54.33	10.06
	21	33.43	5.60	39.86	6.98	46.29	8.67	49.50	9.58	51.59	10.14	52.72	10.21	54.00	10.30
	23	33.43	5.87	39.86	7.48	46.29	9.30	49.50	10.28	50.79	10.58	52.08	10.69	53.20	10.78
	25	33.43	6.26	39.86	7.99	46.29	9.94	49.50	11.01	50.14	11.05	51.27	11.15	52.55	11.24

	27	33.43	6.67	39.86	8.55	46.29	10.64	48.70	11.47	49.34	11.51	50.63	11.62	51.75	11.72
	29	33.43	7.12	39.86	9.12	46.29	11.37	48.05	11.94	48.70	11.99	49.82	12.10	51.11	12.21
	31	33.43	7.58	39.86	9.73	46.29	12.13	47.25	12.40	47.89	12.46	49.18	12.56	50.30	12.69
	33	33.43	8.07	39.86	10.37	45.97	12.79	46.61	12.87	47.25	12.92	48.38	13.04	49.66	13.17
	35	33.43	8.58	39.86	11.05	45.16	13.26	45.81	13.33	46.45	13.40	47.57	13.53	48.86	13.65
	37	33.43	9.14	39.86	11.76	44.52	13.74	45.16	13.79	45.65	13.87	46.93	14.01	48.05	14.13
	39	33.43	9.71	39.86	12.53	43.72	14.20	44.36	14.28	45.00	14.35	46.13	14.49	47.41	14.63
	41	33.43	9.81	39.86	12.63	43.37	14.30	44.01	14.38	44.66	14.45	45.54	14.59	45.98	14.73
	43	33.43	9.91	39.86	12.79	43.03	14.40	43.67	14.48	44.32	14.55	45.13	14.64	45.28	15.03
	45	33.43	10.23	39.86	12.86	42.59	14.54	43.21	14.65	43.92	14.68	44.68	15.04	44.86	15.38
	48	36.61	7.56	43.65	9.42	45.97	10.63	46.57	10.80	47.56	10.73	48.12	11.67	48.49	11.27
	—5	30.38	4.16	36.16	5.00	42.11	5.96	45.00	6.38	47.89	6.92	53.84	7.89	56.89	8.24
	—2	30.38	4.21	36.16	5.07	42.11	6.02	45.00	6.50	47.89	7.02	53.84	7.98	56.89	8.29
	0	30.38	4.25	36.16	5.12	42.11	6.09	45.00	6.58	47.89	7.08	53.84	8.12	56.89	8.38
	2	30.38	4.33	36.16	5.19	42.11	6.16	45.00	6.67	47.89	7.16	53.84	8.24	56.89	8.51
	4	30.38	4.37	36.16	5.24	42.11	6.25	45.00	6.77	47.89	7.26	53.84	8.31	56.89	8.61
	6	30.38	4.43	36.16	5.35	42.11	6.33	45.00	6.88	47.89	7.36	53.84	8.43	56.89	8.74
	8	30.38	4.51	36.16	5.43	42.11	6.45	45.00	6.96	47.89	7.48	53.84	8.57	56.89	8.88
	10	30.38	4.57	36.16	5.53	42.11	6.55	45.00	7.08	47.89	7.62	53.84	8.71	56.89	9.01
	12	30.38	4.64	36.16	5.64	42.11	6.67	45.00	7.21	47.89	7.76	53.84	8.87	56.09	9.08
	14	30.38	4.73	36.16	5.75	42.11	6.80	45.00	7.35	47.89	7.90	53.84	9.05	55.44	9.19
	16	30.38	4.82	36.16	5.85	42.11	6.94	45.00	7.49	47.89	8.07	53.52	9.15	54.64	9.30
	18	30.38	4.91	36.16	5.96	42.11	7.07	45.00	7.64	47.89	8.23	52.88	9.46	54.00	9.53
	20	30.38	5.00	36.16	6.09	42.11	7.28	45.00	8.03	47.89	8.82	52.07	9.90	53.19	9.99
100%	21	30.38	5.05	36.16	6.14	42.11	7.55	45.00	8.31	47.89	9.12	51.75	10.14	52.88	10.22
	23	30.38	5.17	36.16	6.55	42.11	8.08	45.00	8.90	47.89	9.78	51.11	10.60	52.07	10.69
	25	30.38	5.51	36.16	6.99	42.11	8.65	45.00	9.55	47.89	10.47	50.31	11.06	51.43	11.15
	27	30.38	5.89	36.16	7.46	42.11	9.24	45.00	10.21	47.89	11.21	49.50	11.53	50.63	11.63
	29	30.38	6.26	36.16	7.96	42.11	9.87	45.00	10.90	47.73	11.90	48.86	12.01	49.98	12.10
	31	30.38	6.67	36.16	8.49	42.11	10.53	45.00	11.63	47.09	12.37	48.06	12.47	49.18	12.58
	33	30.38	7.08	36.16	9.05	42.11	11.22	45.00	12.42	46.29	12.83	47.41	12.94	48.54	13.06
	35	30.38	7.53	36.16	9.62	42.11	11.97	45.00	13.24	45.48	13.29	46.61	13.42	47.73	13.53
	37	30.38	8.01	36.16	10.24	42.11	12.76	44.19	13.70	44.84	13.77	45.96	13.90	46.93	14.01
	39	30.38	8.51	36.16	10.88	42.11	13.58	43.55	14.17	44.03	14.24	45.16	14.36	46.29	14.51
	41	30.38	8.91	36.16	11.28	42.11	14.08	42.88	14.27	43.70	14.46	44.38	14.70	45.61	14.80
	43	30.38	9.31	36.16	11.68	42.11	14.34	42.20	14.43	43.38	14.60	44.64	14.80	44.81	14.97
	45	30.38	9.83	36.16	12.21	42.11	14.58	41.30	14.63	43.16	14.86	44.26	15.03	43.91	15.17
	48	31.46	10.33	37.45	12.64	43.61	14.60	41.01	14.41	44.63	15.02	43.05	14.99	44.48	15.13
	—5	27.32	3.68	32.63	4.41	37.93	5.20	40.50	5.68	43.07	6.04	48.37	6.95	53.68	7.95
	—2	27.32	3.71	32.63	4.46	37.93	5.27	40.50	5.76	43.07	6.11	48.37	7.01	53.68	8.03
	0	27.32	3.77	32.63	4.51	37.93	5.35	40.50	5.83	43.07	6.19	48.37	7.09	53.68	8.09
	2	27.32	3.82	32.63	4.57	37.93	5.41	40.50	5.92	43.07	6.29	48.37	7.24	53.68	8.21
	4	27.32	3.88	32.63	4.64	37.93	5.50	40.50	6.00	43.07	6.37	48.37	7.35	53.68	8.33
	6	27.32	3.93	32.63	4.73	37.93	5.60	40.50	6.11	43.07	6.48	48.37	7.47	53.68	8.47
	8	27.32	4.01	32.63	4.82	37.93	5.71	40.50	6.19	43.07	6.59	48.37	7.61	53.68	8.55
	10	27.32	4.09	32.63	4.92	37.93	5.82	40.50	6.28	43.07	6.74	48.37	7.70	53.68	8.69
	12	27.32	4.16	32.63	5.01	37.93	5.92	40.50	6.39	43.07	6.87	48.37	7.85	53.68	8.85
	14	27.32	4.23	32.63	5.10	37.93	6.03	40.50	6.51	43.07	6.99	48.37	7.99	53.68	9.01
	16	27.32	4.30	32.63	5.19	37.93	6.16	40.50	6.64	43.07	7.14	48.37	8.15	53.52	9.17
	18	27.32	4.37	32.63	5.30	37.93	6.26	40.50	6.76	43.07	7.28	48.37	8.31	52.88	9.46
	20	27.32	4.46	32.63	5.42	37.93	6.39	40.50	6.91	43.07	7.55	48.37	8.94	52.07	9.90
90%	21	27.32	4.50	32.63	5.46	37.93	6.49	40.50	7.14	43.07	7.82	48.37	9.26	51.75	10.13
	23	27.32	4.59	32.63	5.67	37.93	6.96	40.50	7.66	43.07	8.39	48.37	9.94	50.94	10.60
	25	27.32	4.83	32.63	6.07	37.93	7.44	40.50	8.19	43.07	8.96	48.37	10.63	50.31	11.06
	27	27.32	5.14	32.63	6.46	37.93	7.94	40.50	8.74	43.07	9.58	48.37	11.38	49.50	11.53
	29	27.32	5.48	32.63	6.89	37.93	8.48	40.50	9.33	43.07	10.24	47.89	11.90	48.86	11.99
	31	27.32	5.82	32.63	7.33	37.93	9.03	40.50	9.96	43.07	10.92	47.09	12.37	48.05	12.47
	33	27.32	6.17	32.63	7.80	37.93	9.63	40.50	10.62	43.07	11.65	46.45	12.85	47.41	12.94
	35	27.32	6.57	32.63	8.30	37.93	10.26	40.50	11.31	43.07	12.42	45.64	13.31	46.61	13.42
	37	27.32	6.96	32.63	8.81	37.93	10.92	40.50	12.04	43.07	13.24	44.84	13.77	45.96	13.88
	39	27.32	7.39	32.63	9.39	37.93	11.62	40.50	12.83	43.07	14.10	44.20	14.26	45.16	14.36
	41	27.32	7.64	32.63	9.81	37.93	12.04	40.50	13.17	43.07	14.18	43.89	14.62	44.86	14.70
	43	27.32	8.01	32.63	10.23	37.93	12.46	40.50	13.51	43.07	14.48	43.66	14.81	44.47	14.93
	45	27.32	8.52	32.63	10.74	37.93	12.97	40.50	13.96	43.07	14.89	43.42	14.96	43.79	15.13
	48	27.32	6.53	32.63	8.11	37.93	9.69	40.50	10.39	43.07	10.84	47.84	10.80	47.34	10.92
	—5	24.27	3.24	28.93	3.83	33.59	4.54	36.00	4.82	38.41	5.19	43.07	6.00	47.73	6.85
	—2	24.27	3.29	28.93	3.88	33.59	4.57	36.00	4.90	38.41	5.24	43.07	6.06	47.73	6.92
	0	24.27	3.34	28.93	3.93	33.59	4.63	36.00	4.95	38.41	5.34	43.07	6.15	47.73	7.01
80%	2	24.27	3.41	28.93	3.98	33.59	4.70	36.00	5.05	38.41	5.43	43.07	6.27	47.73	7.15
	4	24.27	3.47	28.93	4.05	33.59	4.79	36.00	5.16	38.41	5.53	43.07	6.38	47.73	7.24
	6	24.27	3.53	28.93	4.15	33.59	4.86	36.00	5.28	38.41	5.63	43.07	6.48	47.73	7.37
	8	24.27	3.59	28.93	4.24	33.59	4.97	36.00	5.36	38.41	5.76	43.07	6.57	47.73	7.51

	10	24.27	3.62	28.93	4.34	33.59	5.10	36.00	5.50	38.41	5.89	43.07	6.73	47.73	7.58
	12	24.27	3.68	28.93	4.41	33.59	5.19	36.00	5.60	38.41	6.01	43.07	6.85	47.73	7.73
	14	24.27	3.75	28.93	4.50	33.59	5.28	36.00	5.69	38.41	6.12	43.07	6.98	47.73	7.87
	16	24.27	3.80	28.93	4.57	33.59	5.39	36.00	5.80	38.41	6.23	43.07	7.12	47.73	8.01
	18	24.27	3.87	28.93	4.66	33.59	5.50	36.00	5.92	38.41	6.35	43.07	7.26	47.73	8.17
	20	24.27	3.94	28.93	4.75	33.59	5.60	36.00	6.03	38.41	6.48	43.07	7.53	47.73	8.74
	21	24.27	3.98	28.93	4.78	33.59	5.66	36.00	6.10	38.41	6.62	43.07	7.80	47.73	9.06
	23	24.27	4.05	28.93	4.89	33.59	5.92	36.00	6.49	38.41	7.08	43.07	8.35	47.73	9.73
	25	24.27	4.18	28.93	5.19	33.59	6.33	36.00	6.94	38.41	7.57	43.07	8.94	47.73	10.40
	27	24.27	4.44	28.93	5.53	33.59	6.75	36.00	7.41	38.41	8.08	43.07	9.55	47.73	11.13
	29	24.27	4.73	28.93	5.89	33.59	7.19	36.00	7.89	38.41	8.64	43.07	10.19	47.73	11.90
	31	24.27	5.01	28.93	6.26	33.59	7.66	36.00	8.40	38.41	9.21	43.07	10.88	46.93	12.37
	33	24.27	5.34	28.93	6.66	33.59	8.15	36.00	8.96	38.41	9.80	43.07	11.60	46.29	12.83
	35	24.27	5.66	28.93	7.08	33.59	8.67	36.00	9.53	38.41	10.44	43.07	12.37	45.48	13.29
	37	24.27	6.00	28.93	7.51	33.59	9.23	36.00	10.15	38.41	11.12	43.07	13.19	44.84	13.76
	39	24.27	6.35	28.93	8.01	33.59	9.81	36.00	10.80	38.41	11.83	43.07	14.04	44.04	14.24
	41	24.27	6.50	28.93	8.08	33.59	9.96	36.00	11.08	38.41	12.05	43.07	14.40	43.77	14.49
	43	24.27	6.69	28.93	8.15	33.59	10.10	36.00	11.27	38.41	12.21	43.07	14.57	43.50	14.65
	45	24.27	6.88	28.93	8.25	33.59	10.30	36.00	11.51	38.41	12.42	43.07	14.73	42.96	14.89
	48	24.27	4.50	28.93	5.38	37.79	6.79	36.00	7.65	38.41	8.19	43.07	9.66	47.92	9.87
70%	—5	21.22	2.89	25.39	3.39	29.41	3.84	31.50	4.12	33.59	4.40	37.61	5.03	41.78	5.78
	—2	21.22	2.92	25.39	3.41	29.41	3.87	31.50	4.20	33.59	4.48	37.61	5.11	41.78	5.86
	0	21.22	2.93	25.39	3.45	29.41	3.95	31.50	4.28	33.59	4.56	37.61	5.21	41.78	5.94
	2	21.22	2.95	25.39	3.47	29.41	4.01	31.50	4.36	33.59	4.63	37.61	5.32	41.78	6.04
	4	21.22	2.99	25.39	3.56	29.41	4.10	31.50	4.44	33.59	4.74	37.61	5.41	41.78	6.18
	6	21.22	3.03	25.39	3.62	29.41	4.20	31.50	4.58	33.59	4.85	37.61	5.51	41.78	6.30
	8	21.22	3.09	25.39	3.72	29.41	4.29	31.50	4.65	33.59	4.95	37.61	5.66	41.78	6.42
	10	21.22	3.15	25.39	3.78	29.41	4.41	31.50	4.75	33.59	5.09	37.61	5.78	41.78	6.50
	12	21.22	3.23	25.39	3.84	29.41	4.50	31.50	4.84	33.59	5.18	37.61	5.89	41.78	6.62
	14	21.22	3.28	25.39	3.91	29.41	4.57	31.50	4.91	33.59	5.26	37.61	6.00	41.78	6.75
	16	21.22	3.34	25.39	3.98	29.41	4.66	31.50	5.01	33.59	5.37	37.61	6.10	41.78	6.87
	18	21.22	3.39	25.39	4.05	29.41	4.75	31.50	5.10	33.59	5.46	37.61	6.23	41.78	7.01
	20	21.22	3.44	25.39	4.12	29.41	4.84	31.50	5.19	33.59	5.57	37.61	6.35	41.78	7.21
	21	21.22	3.48	25.39	4.16	29.41	4.87	31.50	5.25	33.59	5.62	37.61	6.44	41.78	7.46
	23	21.22	3.53	25.39	4.23	29.41	4.98	31.50	5.42	33.59	5.91	37.61	6.91	41.78	7.99
	25	21.22	3.60	25.39	4.41	29.41	5.30	31.50	5.80	33.59	6.30	37.61	7.39	41.78	8.55
	27	21.22	3.82	25.39	4.69	29.41	5.66	31.50	6.17	33.59	6.73	37.61	7.89	41.78	9.14
	29	21.22	4.05	25.39	4.98	29.41	6.01	31.50	6.58	33.59	7.16	37.61	8.40	41.78	9.76
	31	21.22	4.28	25.39	5.28	29.41	6.41	31.50	7.00	33.59	7.62	37.61	8.96	41.78	10.40
	33	21.22	4.55	25.39	5.62	29.41	6.82	31.50	7.44	33.59	8.12	37.61	9.55	41.78	11.10
	35	21.22	4.82	25.39	5.96	29.41	7.23	31.50	7.92	33.59	8.64	37.61	10.17	41.78	11.83
	37	21.22	5.09	25.39	6.32	29.41	7.69	31.50	8.40	33.59	9.19	37.61	10.83	41.78	12.60
	39	21.22	5.39	25.39	6.69	29.41	8.15	31.50	8.94	33.59	9.76	37.61	11.51	41.78	13.42
	41	21.22	5.63	25.39	6.93	29.41	8.39	31.50	9.24	33.59	10.06	37.61	11.98	41.78	14.01
	43	21.22	6.08	25.39	7.40	29.41	8.74	31.50	9.73	33.59	10.36	37.61	12.42	41.78	14.45
	45	21.22	6.22	25.39	7.56	29.41	8.92	31.50	9.89	33.59	10.87	37.61	13.09	41.78	15.00
	48	21.22	11.67	25.39	14.16	29.41	16.69	31.50	18.27	33.59	19.71	37.61	23.77	41.78	27.00
60%	—5	18.16	2.47	21.70	2.86	25.23	3.33	27.00	3.55	28.77	3.84	32.30	4.31	35.84	4.94
	—2	18.16	2.48	21.70	2.91	25.23	3.40	27.00	3.60	28.77	3.88	32.30	4.37	35.84	4.97
	0	18.16	2.52	21.70	2.94	25.23	3.44	27.00	3.65	28.77	3.94	32.30	4.44	35.84	5.04
	2	18.16	2.56	21.70	3.01	25.23	3.50	27.00	3.72	28.77	3.99	32.30	4.53	35.84	5.10
	4	18.16	2.64	21.70	3.07	25.23	3.57	27.00	3.77	28.77	4.05	32.30	4.60	35.84	5.17
	6	18.16	2.66	21.70	3.13	25.23	3.64	27.00	3.85	28.77	4.13	32.30	4.69	35.84	5.30
	8	18.16	2.71	21.70	3.18	25.23	3.71	27.00	3.92	28.77	4.22	32.30	4.78	35.84	5.38
	10	18.16	2.77	21.70	3.25	25.23	3.76	27.00	4.03	28.77	4.30	32.30	4.87	35.84	5.46
	12	18.16	2.82	21.70	3.30	25.23	3.84	27.00	4.10	28.77	4.37	32.30	4.96	35.84	5.55
	14	18.16	2.85	21.70	3.35	25.23	3.89	27.00	4.17	28.77	4.46	32.30	5.05	35.84	5.66
	16	18.16	2.89	21.70	3.41	25.23	3.96	27.00	4.25	28.77	4.53	32.30	5.14	35.84	5.76
	18	18.16	2.94	21.70	3.46	25.23	4.03	27.00	4.32	28.77	4.62	32.30	5.23	35.84	5.87
	20	18.16	2.98	21.70	3.53	25.23	4.10	27.00	4.41	28.77	4.71	32.30	5.33	35.84	5.99
	21	18.16	3.02	21.70	3.55	25.23	4.14	27.00	4.44	28.77	4.75	32.30	5.39	35.84	6.05
	23	18.16	3.05	21.70	3.62	25.23	4.21	27.00	4.53	28.77	4.83	32.30	5.60	35.84	6.44
	25	18.16	3.10	21.70	3.68	25.23	4.37	27.00	4.75	28.77	5.14	32.30	5.98	35.84	6.87
	27	18.16	3.23	21.70	3.91	25.23	4.66	27.00	5.07	28.77	5.48	32.30	6.37	35.84	7.33
	29	18.16	3.41	21.70	4.14	25.23	4.96	27.00	5.39	28.77	5.83	32.30	6.80	35.84	7.83
	31	18.16	3.62	21.70	4.39	25.23	5.26	27.00	5.73	28.77	6.21	32.30	7.23	35.84	8.33
	33	18.16	3.82	21.70	4.66	25.23	5.58	27.00	6.08	28.77	6.60	32.30	7.69	35.84	8.88
	35	18.16	4.05	21.70	4.94	25.23	5.92	27.00	6.46	28.77	7.01	32.30	8.19	35.84	9.46
	37	18.16	4.28	21.70	5.23	25.23	6.28	27.00	6.85	28.77	7.44	32.30	8.71	35.84	10.06
	39	18.16	4.51	21.70	5.53	25.23	6.65	27.00	7.26	28.77	7.90	32.30	9.24	35.84	10.70
	41	18.16	4.66	21.70	5.77	25.23	6.90	27.00	7.55	28.77	8.19	32.30	9.68	35.84	11.19

	43	18.16	4.80	21.70	6.01	25.23	7.14	27.00	7.78	28.77	8.48	32.30	10.09	35.84	11.67
	45	18.16	5.03	21.70	6.32	25.23	7.43	27.00	8.07	28.77	8.90	32.30	10.54	35.84	12.32
	48	18.16	7.05	21.70	8.77	25.23	10.17	27.00	11.13	28.77	12.48	32.30	14.44	35.84	17.29
50%	—5	15.19	2.14	18.16	2.48	21.05	2.85	22.50	2.98	23.95	3.14	26.84	3.58	29.89	3.85
	—2	15.19	2.16	18.16	2.53	21.05	2.88	22.50	3.02	23.95	3.20	26.84	3.62	29.89	3.91
	0	15.19	2.19	18.16	2.57	21.05	2.93	22.50	3.06	23.95	3.24	26.84	3.68	29.89	3.97
	2	15.19	2.22	18.16	2.60	21.05	2.98	22.50	3.11	23.95	3.29	26.84	3.70	29.89	4.05
	4	15.19	2.25	18.16	2.65	21.05	3.01	22.50	3.14	23.95	3.36	26.84	3.79	29.89	4.15
	6	15.19	2.29	18.16	2.69	21.05	3.06	22.50	3.22	23.95	3.42	26.84	3.85	29.89	4.28
	8	15.19	2.34	18.16	2.73	21.05	3.11	22.50	3.29	23.95	3.47	26.84	3.91	29.89	4.41
	10	15.19	2.39	18.16	2.77	21.05	3.16	22.50	3.34	23.95	3.57	26.84	4.01	29.89	4.48
	12	15.19	2.41	18.16	2.80	21.05	3.21	22.50	3.41	23.95	3.64	26.84	4.09	29.89	4.55
	14	15.19	2.44	18.16	2.84	21.05	3.25	22.50	3.48	23.95	3.69	26.84	4.16	29.89	4.64
	16	15.19	2.48	18.16	2.87	21.05	3.30	22.50	3.53	23.95	3.75	26.84	4.23	29.89	4.71
	18	15.19	2.52	18.16	2.93	21.05	3.35	22.50	3.59	23.95	3.82	26.84	4.30	29.89	4.80
	20	15.19	2.55	18.16	2.96	21.05	3.41	22.50	3.64	23.95	3.89	26.84	4.37	29.89	4.89
	21	15.19	2.57	18.16	3.00	21.05	3.44	22.50	3.68	23.95	3.93	26.84	4.42	29.89	4.94
	23	15.19	2.60	18.16	3.03	21.05	3.50	22.50	3.75	23.95	4.00	26.84	4.50	29.89	5.05
	25	15.19	2.64	18.16	3.09	21.05	3.57	22.50	3.82	23.95	4.12	26.84	4.73	29.89	5.39
	27	15.19	2.69	18.16	3.21	21.05	3.76	22.50	4.07	23.95	4.37	26.84	5.03	29.89	5.75
	29	15.19	2.84	18.16	3.39	21.05	4.00	22.50	4.32	23.95	4.66	26.84	5.35	29.89	6.12
	31	15.19	3.00	18.16	3.59	21.05	4.23	22.50	4.59	23.95	4.94	26.84	5.69	29.89	6.51
	33	15.19	3.18	18.16	3.80	21.05	4.50	22.50	4.85	23.95	5.25	26.84	6.05	29.89	6.92
	35	15.19	3.35	18.16	4.01	21.05	4.75	22.50	5.14	23.95	5.55	26.84	6.42	29.89	7.35
	37	15.19	3.53	18.16	4.25	21.05	5.03	22.50	5.44	23.95	5.89	26.84	6.82	29.89	7.81
	39	15.19	3.73	18.16	4.48	21.05	5.32	22.50	5.76	23.95	6.24	26.84	7.23	29.89	8.30
	41	15.19	3.88	18.16	4.67	21.05	5.51	22.50	6.03	23.95	6.51	26.84	7.61	29.89	8.68
	43	15.19	4.14	18.16	4.99	21.05	5.70	22.50	6.30	23.95	6.68	26.84	8.00	29.89	9.07
	45	15.19	4.23	18.16	5.12	21.05	6.09	22.50	6.79	23.95	6.96	26.84	8.77	29.89	9.84
	48	15.19	4.49	18.16	5.47	21.05	6.30	22.50	7.05	23.95	7.12	26.84	9.22	29.89	10.28

Note:

1. is shown as reference
2. In cooling mode, avoid the outdoor air temperature range from 42-46 degree C, when selecting the models
3. The above table shows the average value of conditions may operate
4. It is recommended to connect less than 130%

16HP heating mode

Combination (%) (Capacity index)	Outdoor temperature(°C DB)		Indoor temperature(°C WB)											
			16		18		20		21		22		24	
			TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
	°C DB	°C WB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
130%	-19.8	-20	32.38	9.04	32.22	9.67	32.07	10.32	32.07	10.63	31.91	10.95	31.91	11.59
	-18.8	-19	32.86	9.24	32.70	9.87	32.70	10.50	32.54	10.81	32.54	11.11	32.38	11.74
	-16.7	-17	34.13	9.67	33.97	10.27	33.81	10.88	33.81	11.18	33.81	11.48	33.65	12.08
	-13.7	-15	35.55	10.12	35.40	10.70	35.24	11.28	35.24	11.56	35.08	11.86	35.08	12.44
	-11.8	-13	36.99	10.56	36.99	11.13	36.83	11.68	36.67	11.96	36.67	12.24	36.51	12.79
	-9.8	-11	38.73	11.03	38.57	11.56	38.41	12.09	38.41	12.36	38.41	12.62	38.25	13.16
	-9.5	-10	39.68	11.26	39.53	11.78	39.37	12.29	39.37	12.56	39.21	12.81	39.21	13.32
	-8.5	-9.1	40.47	11.46	40.32	11.96	40.32	12.47	40.16	12.72	40.16	12.97	40.00	13.49
	-7	-7.6	41.91	11.79	41.91	12.29	41.75	12.77	41.75	13.02	41.59	13.25	41.43	13.75
	-5	-5.6	44.13	12.24	43.97	12.71	43.81	13.17	43.81	13.40	43.65	13.62	43.65	14.09
	-3	-3.7	46.19	12.64	46.03	13.09	46.03	13.52	45.87	13.75	45.87	13.97	45.71	14.40
	0	-0.7	49.84	13.25	49.84	13.67	49.68	14.07	49.68	14.22	49.52	14.48	49.52	14.88
	3	2.2	53.81	13.80	53.65	14.19	53.49	14.57	53.49	14.75	53.49	14.95	53.33	15.32
	5	4.1	56.51	14.15	56.35	14.52	56.35	14.87	56.19	15.05	56.19	15.23	56.03	15.58
	7	6	59.36	14.49	59.21	14.82	59.21	15.17	59.05	15.33	59.05	15.50	56.67	14.88
	9	7.9	62.38	14.78	62.22	15.12	62.22	15.43	62.06	15.60	60.79	15.27	56.67	13.99
	11	9.8	65.55	15.08	65.40	15.38	65.08	15.58	62.86	14.97	60.79	14.35	56.67	13.17
	13	11.8	69.04	15.36	68.89	15.66	65.08	14.60	62.86	14.02	60.79	13.47	56.67	12.36
	15	13.7	72.38	15.63	69.20	14.83	65.08	13.75	62.86	13.22	60.79	12.69	56.67	11.66
120%	-19.8	-20	32.22	9.90	32.06	10.48	31.90	11.08	31.90	11.36	31.90	11.66	31.75	12.26
	-18.8	-19	32.70	10.08	32.54	10.66	32.54	11.25	32.38	11.53	32.38	11.83	32.22	12.41
	-16.7	-17	33.97	10.48	33.81	11.05	33.60	11.59	33.65	11.88	33.65	12.16	33.49	12.71
	-13.7	-15	35.40	10.90	35.24	11.43	35.08	11.96	35.08	12.24	35.08	12.51	34.92	13.04
	-11.8	-13	36.83	11.31	36.83	11.83	36.67	12.34	36.67	12.61	36.51	12.86	36.51	13.37
	-9.8	-11	38.57	11.74	38.41	12.23	38.41	12.72	38.25	12.97	38.25	13.21	38.10	13.70
	-9.5	-10	39.53	11.96	39.37	12.44	39.21	12.91	39.21	13.16	39.21	13.39	39.05	13.87
	-8.5	-9.1	40.32	12.14	40.16	12.61	40.16	13.07	40.00	13.31	40.00	13.55	39.84	14.02
	-7	-7.6	41.75	12.46	41.75	12.91	41.59	13.35	41.59	13.59	41.43	13.80	41.43	14.25
	-5	-5.6	43.97	12.86	43.81	13.29	43.65	13.72	43.65	13.94	43.65	14.15	43.50	14.57
	-3	-3.7	46.04	13.24	46.04	13.65	45.88	14.05	45.88	14.25	45.72	14.47	45.72	14.87
	0	-0.7	49.68	13.80	49.68	14.19	49.53	14.55	49.53	14.75	49.37	14.93	49.37	15.32
	3	2.2	53.65	14.32	53.49	14.67	53.49	15.02	53.33	15.20	53.33	15.36	52.22	15.28
	5	4.1	56.35	14.63	56.19	14.97	56.19	15.30	56.03	15.46	56.03	15.63	52.22	14.35
	7	6	59.21	14.93	59.21	15.25	59.05	15.56	58.10	15.35	56.19	14.72	52.22	13.51
	9	7.9	62.23	15.23	62.07	15.53	60.00	15.02	58.10	14.42	56.19	13.84	52.22	12.71
	11	9.8	65.40	15.50	63.81	15.23	60.00	14.12	58.10	13.57	56.19	13.02	52.22	11.98
	13	11.8	67.78	15.35	63.81	14.28	60.00	13.24	58.10	12.74	56.19	12.24	52.22	11.26
	15	13.7	67.78	14.45	63.81	13.46	60.00	12.49	58.10	12.01	56.19	11.54	52.22	10.63
110%	-19.8	-20	32.06	10.76	31.91	11.29	31.75	11.84	31.75	12.11	31.76	12.38	31.59	12.92
	-18.8	-19	32.54	10.93	32.38	11.46	32.38	11.99	32.38	12.26	32.22	12.52	32.22	13.06
	-16.7	-17	33.81	11.29	33.65	11.81	34.12	12.33	33.49	12.57	33.49	12.84	33.33	13.34
	-13.7	-15	35.24	11.68	35.09	12.18	34.92	12.66	34.92	12.91	34.92	13.16	34.76	13.64
	-11.8	-13	36.67	12.08	36.67	12.54	36.51	13.01	36.51	13.24	36.35	13.47	36.35	13.95
	-9.8	-11	38.41	12.46	38.25	12.91	38.25	13.36	38.09	13.59	38.09	13.80	38.09	14.25
	-9.5	-10	39.37	12.66	39.21	13.09	39.05	13.54	39.05	13.75	39.05	13.97	38.89	14.40
	-8.5	-9.1	40.16	12.82	40.00	13.26	40.00	13.69	39.84	13.90	39.84	14.12	39.84	12.87
	-7	-7.6	41.59	13.12	41.59	13.52	41.43	13.94	41.43	14.15	41.43	14.35	41.27	14.77
	-5	-5.6	43.81	13.49	43.65	13.89	43.49	14.27	43.49	14.47	43.49	14.67	43.33	15.07
	-3	-3.7	45.88	13.84	45.88	14.20	45.72	14.58	45.72	14.77	45.56	14.95	45.56	15.33
	0	-0.7	49.52	14.35	49.52	14.70	49.37	15.05	49.37	15.22	49.37	15.40	47.94	15.10
	3	2.2	53.49	14.83	53.33	15.15	53.33	15.46	53.17	15.61	51.43	14.98	47.94	13.74
	5	4.1	56.19	15.12	56.19	15.43	55.08	15.28	53.17	14.67	51.43	14.09	47.94	12.92
	7	6	59.05	15.40	58.57	15.50	55.08	14.35	53.17	13.79	51.43	13.24	47.94	12.16
	9	7.9	62.06	15.65	58.57	14.57	55.08	13.50	53.17	12.97	51.43	12.46	47.94	11.46
	11	9.8	62.06	14.72	58.57	13.70	55.08	12.71	53.17	12.23	51.43	11.74	47.94	10.81
	13	11.8	62.06	13.80	58.57	12.86	55.08	11.94	53.17	11.49	51.43	11.05	47.94	10.18
	15	13.7	62.06	12.26	58.57	12.13	55.08	11.28	53.17	10.85	51.43	10.45	47.94	9.63

	-19.8	-20	31.91	11.63	31.75	12.11	31.75	12.61	31.59	12.86	31.59	13.09	31.43	13.59
	-18.8	-19	32.38	11.78	32.38	12.26	32.22	12.74	32.22	12.99	32.07	13.24	32.07	13.72
	-16.7	-17	33.65	12.11	33.49	12.57	33.49	13.04	33.34	13.27	33.34	13.50	33.34	13.97
	-13.7	-15	35.08	12.46	34.92	12.91	34.76	13.36	34.76	13.59	34.76	13.80	34.61	14.25
	-11.8	-13	36.51	12.82	36.51	13.24	36.35	13.67	36.35	13.89	36.35	14.10	36.19	14.53
	-9.8	-11	38.26	13.17	38.10	13.59	38.10	13.99	38.10	14.20	37.94	14.40	37.94	14.80
	-9.5	-10	39.21	13.36	39.05	13.75	39.05	14.15	38.89	14.35	38.89	14.55	38.73	14.95
	-8.5	-9.1	40.00	13.50	39.84	13.90	39.84	14.29	39.84	14.48	39.69	14.68	39.69	15.07
	-7	-7.6	41.43	13.77	41.43	14.15	41.27	14.52	41.27	14.72	41.27	14.90	41.11	15.28
100%	-5	-5.6	43.65	14.12	43.49	14.47	43.49	14.83	43.34	15.00	43.34	15.18	43.18	15.55
	-3	-3.7	45.72	14.43	45.72	13.11	45.56	15.12	45.56	15.28	45.56	15.45	43.65	14.80
	0	-0.7	49.37	14.90	49.37	15.21	49.21	15.53	48.42	15.28	46.83	14.65	43.65	13.44
	3	2.2	53.34	15.33	53.18	15.61	50.00	14.45	48.42	13.89	46.83	13.34	43.65	12.24
	5	4.1	56.03	15.61	53.18	14.67	50.00	13.59	48.42	13.07	46.83	12.56	43.65	11.54
	7	6	56.35	14.82	53.18	13.79	50.00	12.79	48.42	12.31	46.83	11.83	43.65	10.88
	9	7.9	56.35	13.92	53.18	12.97	50.00	12.04	48.42	11.44	46.83	11.15	43.65	10.27
	11	9.8	56.35	13.11	53.18	12.22	50.00	11.36	48.42	10.93	46.83	10.51	43.65	9.70
	13	11.8	56.35	12.31	53.18	11.49	50.00	10.70	48.42	10.30	46.83	9.92	43.65	9.15
	15	13.7	56.35	11.61	53.18	10.85	50.00	10.10	48.42	9.73	46.83	9.37	43.65	8.67
	-19.8	-20	31.69	12.49	31.53	12.92	31.53	13.37	31.37	13.59	31.37	13.82	31.37	14.25
	-18.8	-19	32.17	12.62	32.17	13.07	32.01	13.50	32.01	13.72	32.01	13.94	31.85	14.37
	-16.7	-17	33.44	12.94	33.27	13.36	33.27	13.77	33.27	13.99	33.12	14.19	33.12	14.60
	-13.7	-15	34.86	13.25	34.70	13.65	34.70	14.05	34.54	14.25	34.54	14.45	34.54	14.85
	-11.8	-13	36.28	13.57	36.28	13.95	36.13	14.33	36.13	14.53	36.13	14.72	35.97	15.10
	-9.8	-11	38.03	13.89	38.03	14.25	37.87	14.62	37.87	14.80	37.87	15.00	37.71	15.36
	-9.5	-10	38.98	14.05	38.82	14.42	38.82	14.77	38.66	14.95	38.66	15.13	38.66	15.48
	-8.5	-9.1	39.77	14.20	39.77	14.55	39.61	14.90	39.61	15.07	39.61	15.25	39.14	15.40
	-7	-7.6	41.20	14.43	41.20	14.77	41.04	15.11	41.04	15.28	41.04	15.45	39.14	14.70
90%	-5	-5.6	43.42	14.75	43.26	15.07	43.26	15.38	43.10	15.55	41.99	15.07	39.14	13.82
	-3	-3.7	45.48	15.03	45.48	15.33	45.00	15.40	43.42	14.78	41.99	14.19	39.14	13.02
	0	-0.7	49.28	15.46	47.85	15.08	45.00	13.97	43.42	13.42	41.99	12.89	39.14	11.84
	3	2.2	50.71	14.73	47.85	13.72	45.00	12.72	43.42	12.24	41.99	11.76	39.14	10.83
	5	4.1	50.71	13.85	47.85	12.91	45.00	11.99	43.42	11.53	41.99	11.10	39.14	10.22
	7	6	50.71	13.02	47.85	12.16	45.00	11.29	43.42	10.88	41.99	10.46	39.14	9.65
	9	7.9	50.71	12.28	47.85	11.44	45.00	10.65	43.42	10.26	41.99	9.88	39.14	9.12
	11	9.8	50.71	11.56	47.85	10.80	45.00	10.07	43.42	9.70	41.99	9.34	39.14	8.64
	13	11.8	50.71	10.88	47.85	10.18	45.00	9.48	43.42	9.15	41.99	8.82	39.14	8.16
	15	13.7	50.71	10.28	47.85	9.62	45.00	8.99	43.42	8.67	41.99	8.35	39.14	7.74
	-19.8	-20	31.59	13.35	31.43	13.74	31.43	14.14	31.43	14.33	31.27	14.53	31.27	14.92
	-18.8	-19	32.06	13.47	32.06	13.87	31.90	14.25	31.90	14.45	31.90	14.63	31.75	15.03
	-16.7	-17	33.33	13.75	33.18	14.12	33.18	14.50	33.18	14.68	33.18	14.87	33.02	15.23
	-13.7	-15	34.76	14.04	34.60	14.38	34.60	14.75	34.60	14.92	34.44	15.10	34.44	15.46
	-11.8	-13	36.19	14.32	36.19	14.67	36.03	15.00	36.03	15.16	36.03	15.35	34.92	14.93
	-9.8	-11	37.94	14.60	37.94	14.93	37.78	15.26	37.78	15.41	37.46	15.38	34.92	14.10
	-9.5	-10	38.89	14.75	38.72	15.06	38.73	15.38	38.73	15.55	37.46	14.93	34.92	13.69
	-8.5	-9.1	39.68	14.88	36.88	15.20	39.52	15.50	38.73	15.15	37.46	14.53	34.92	13.32
	-7	-7.6	41.11	15.10	41.11	15.40	40.00	15.06	38.73	14.47	37.46	13.89	34.92	12.74
80%	-5	-5.6	43.33	15.36	42.54	15.28	40.00	14.15	38.73	13.60	37.46	13.05	34.92	11.99
	-3	-3.7	45.08	15.45	42.54	14.38	40.00	13.32	38.73	12.82	37.46	12.31	34.92	11.33
	0	-0.7	45.08	14.02	42.54	13.05	40.00	12.13	38.73	11.68	37.46	11.21	34.92	10.33
	3	2.2	45.08	12.77	42.54	11.91	40.00	11.08	38.73	10.66	37.46	10.26	34.92	9.47
	5	4.1	45.08	12.03	42.54	11.23	40.00	10.45	38.73	10.07	37.46	9.70	34.92	8.95
	7	6	45.08	11.33	42.54	10.60	40.00	9.87	38.73	9.52	37.46	9.17	34.92	8.47
	9	7.9	45.08	10.70	42.54	10.00	40.00	9.32	38.73	8.99	37.46	8.67	34.92	8.02
	11	9.8	45.08	10.10	42.54	9.45	40.00	8.82	38.73	8.50	37.46	8.20	34.92	7.61
	13	11.8	45.08	9.52	42.54	8.92	40.00	8.34	38.73	8.04	37.46	7.76	34.92	7.19
	15	13.7	45.08	9.00	42.54	8.45	40.00	7.91	38.73	7.62	37.46	7.36	34.92	6.84
	-19.8	-20	31.36	14.22	31.20	14.55	31.20	14.90	31.20	15.06	31.20	15.25	30.41	15.08
	-18.8	-19	31.83	14.33	31.83	14.67	31.68	15.00	31.68	15.16	31.68	15.35	30.41	14.77
70%	-16.7	-17	33.10	14.57	33.10	14.90	32.94	15.21	32.94	15.38	32.62	13.70	30.41	14.09
	-13.7	-15	34.52	14.82	34.37	15.13	34.37	15.45	33.73	15.21	32.62	14.60	30.41	13.39
	-11.8	-13	35.95	15.06	35.95	15.36	35.00	15.00	33.73	14.42	32.62	13.84	30.41	12.69

	-9.8	-11	37.69	15.31	37.22	15.30	35.00	14.17	33.73	13.62	32.62	13.07	30.41	12.01
	-9.5	-10	38.64	15.45	37.22	14.85	35.00	13.75	33.73	13.22	32.62	12.71	30.41	11.68
	-8.5	-9.1	39.43	15.53	37.22	14.45	35.00	13.39	33.73	12.87	32.62	12.37	30.41	11.38
	-7	-7.6	39.43	14.83	37.22	13.80	35.00	12.81	33.73	12.32	32.62	11.84	30.41	10.90
	-5	-5.6	39.43	13.94	37.22	12.99	35.00	12.06	33.73	11.59	32.62	13.70	30.41	10.28
	-3	-3.7	39.43	13.12	37.22	12.24	35.00	11.38	33.73	10.95	32.62	10.53	30.41	9.72
	0	-0.7	39.43	11.94	37.22	11.16	35.00	10.38	33.73	10.00	32.62	9.63	30.41	8.90
	3	2.2	39.43	10.91	37.22	10.22	35.00	9.52	33.73	9.17	32.62	8.84	30.41	8.17
	5	4.1	39.43	10.30	37.22	9.63	35.00	9.00	33.73	8.67	32.62	8.35	30.41	7.74
	7	6	39.43	9.73	37.22	9.12	35.00	8.50	33.73	8.20	32.62	7.92	30.41	7.34
	9	7.9	39.43	9.20	37.22	8.62	35.00	8.06	33.73	7.77	32.62	7.51	30.41	6.96
	11	9.8	39.43	8.70	37.22	8.16	35.00	7.64	33.73	7.37	32.62	7.13	30.41	6.61
	13	11.8	39.43	8.22	37.22	7.72	35.00	7.23	33.73	6.99	32.62	6.74	30.41	6.28
	15	13.7	39.43	7.79	37.22	7.32	35.00	6.86	33.73	6.64	32.62	6.41	30.41	5.98
	-19.8	-20	31.27	15.08	31.11	15.36	30.00	14.78	29.05	14.20	28.10	13.64	26.19	12.51
	-18.8	-19	31.75	15.18	31.75	15.46	30.00	14.47	29.05	13.90	28.10	13.34	26.19	12.24
	-16.7	-17	33.02	15.38	31.91	14.90	30.00	13.80	29.05	13.27	28.10	12.74	26.19	11.71
	-13.7	-15	33.81	15.21	31.91	14.15	30.00	13.12	29.05	12.62	28.10	12.12	26.19	11.14
	-11.8	-13	33.81	14.40	31.91	13.40	30.00	12.44	29.05	11.98	28.10	11.51	26.19	10.65
	-9.8	-11	33.81	13.60	31.91	12.67	30.00	11.78	29.05	11.33	28.10	10.90	26.19	10.05
	-9.5	-10	33.81	13.22	31.91	12.32	30.00	11.44	29.05	11.03	28.10	10.60	26.19	9.77
	-8.5	-9.1	33.81	12.87	31.91	12.01	30.00	11.16	29.05	10.75	28.10	10.33	26.19	9.53
	-7	-7.6	33.81	12.31	31.91	11.49	30.00	10.68	29.05	10.30	28.10	9.90	26.19	9.15
60%	-5	-5.6	33.81	11.59	31.91	10.83	30.00	10.08	29.05	9.72	28.10	9.35	26.19	8.65
	-3	-3.7	33.81	10.95	31.91	10.23	30.00	9.53	29.05	9.20	28.10	8.85	26.19	8.19
	0	-0.7	33.81	10.00	31.91	9.37	30.00	8.74	29.05	8.44	28.10	8.12	26.19	7.52
	3	2.2	33.81	9.17	31.91	8.60	30.00	8.04	29.05	7.76	28.10	7.49	26.19	6.94
	5	4.1	33.81	8.67	31.91	8.14	30.00	7.61	29.05	7.36	28.10	7.09	26.19	6.59
	7	6	33.81	8.20	31.91	7.71	30.00	7.21	29.05	6.98	28.10	6.74	26.19	6.26
	9	7.9	33.81	7.77	31.91	7.31	30.00	6.84	29.05	6.63	28.10	6.39	26.19	5.96
	11	9.8	33.81	7.37	31.91	6.94	30.00	6.51	29.05	6.30	28.10	6.08	26.19	5.68
	13	11.8	33.81	6.98	31.91	6.58	30.00	6.18	29.05	5.98	28.10	5.78	26.19	5.40
	15	13.7	33.81	6.64	31.91	6.25	30.00	5.88	29.05	5.70	28.10	5.51	26.19	5.15
	-19.8	-20	28.17	13.72	26.58	12.77	25.00	11.86	24.05	11.43	23.26	10.98	21.68	10.12
	-18.8	-19	28.17	13.42	26.58	12.51	25.00	11.63	24.05	11.18	23.26	10.75	21.68	9.92
	-16.7	-17	28.17	12.81	26.58	11.94	25.00	11.11	24.05	10.70	23.26	10.30	21.68	9.50
	-13.7	-15	28.17	12.19	26.58	11.38	25.00	10.58	24.05	10.20	23.26	9.82	21.68	9.07
	-11.8	-13	28.17	11.58	26.58	10.81	25.00	10.07	24.05	9.70	23.26	9.33	21.68	8.64
	-9.8	-11	28.17	10.96	26.58	10.25	25.00	9.55	24.05	9.20	23.26	8.87	21.68	8.20
	-9.5	-10	28.17	10.66	26.58	9.97	25.00	9.30	24.05	8.97	23.26	8.64	21.68	7.99
	-8.5	-9.1	28.17	10.40	26.58	9.73	25.00	9.07	24.05	8.75	23.26	8.44	21.68	7.81
	-7	-7.6	28.17	9.97	26.58	9.33	25.00	8.70	24.05	8.40	23.26	8.11	21.68	7.51
50%	-5	-5.6	28.17	9.40	26.58	8.82	25.00	8.24	24.05	7.96	23.26	7.67	21.68	7.11
	-3	-3.7	28.17	8.90	26.58	8.35	25.00	7.81	24.05	7.54	23.26	7.27	21.68	6.76
	0	-0.7	28.17	8.17	26.58	7.67	25.00	7.19	24.05	6.94	23.26	6.71	21.68	6.25
	3	2.2	28.17	7.52	26.58	7.08	25.00	6.63	24.05	6.41	23.26	6.20	21.68	5.78
	5	4.1	28.17	7.14	26.58	6.71	25.00	6.30	24.05	6.10	23.26	5.90	21.68	5.50
	7	6	28.17	6.78	26.58	6.38	25.00	6.00	24.05	5.80	23.26	5.61	21.68	5.25
	9	7.9	28.17	6.43	26.58	6.06	25.00	5.70	24.05	5.53	23.26	5.35	21.68	5.00
	11	9.8	28.17	6.11	26.58	5.76	25.00	5.43	24.05	5.27	23.26	5.10	21.68	4.77
	13	11.8	28.17	5.81	26.58	5.48	25.00	5.17	24.05	5.02	23.26	4.85	21.68	4.55
	15	13.7	28.17	5.53	26.58	5.23	25.00	4.93	24.05	4.78	23.26	4.63	21.68	4.35

Note:

1. is shown as reference
2. In heating mode, avoid the outdoor air temperature range from -15 to -20 degree C, when selecting the models
3. The above table shows the average value of conditions may operate
4. It is recommended to connect less than 130%

18HP cooling mode

Combination (%) (Capacity index)	Outdoor temperature (°C DB)	Indoor temperature(°C DB/WD)													
		DB:20.8,WB:14		DB:23.3,WB:16		DB:25.8,WB:18		DB:27,WB:19		DB:28.2,WB:20		DB:30.7,WB:22		DB:32,WB:24	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
130%	-5	43.93	6.05	52.32	7.38	60.71	7.91	63.03	8.23	66.06	8.47	67.68	9.21	69.38	9.27
	-2	43.93	6.05	52.32	7.52	60.71	7.91	63.03	8.28	66.06	8.47	67.68	9.32	69.38	9.36
	0	43.93	6.15	52.32	7.65	60.71	8.20	63.03	8.74	66.06	8.96	67.68	9.44	69.38	9.48
	2	43.93	6.26	52.32	7.67	60.71	8.48	63.03	9.23	66.06	9.06	67.68	9.51	69.38	9.62
	4	43.93	6.40	52.32	7.82	60.71	8.78	63.03	9.27	66.06	9.18	67.68	9.50	69.38	9.81
	6	43.93	6.52	52.32	7.98	60.71	9.10	63.03	9.34	65.33	9.47	66.85	9.50	68.62	9.88
	8	43.93	6.68	52.32	8.16	60.71	9.56	63.03	9.80	64.52	9.77	66.12	3.90	67.74	9.98
	10	43.93	6.82	52.32	8.33	60.71	9.91	63.03	10.13	63.75	4.04	65.36	4.06	66.96	10.26
	12	43.93	6.94	52.32	8.49	60.71	10.11	62.14	4.03	63.03	4.06	64.46	4.07	66.07	10.33
	14	43.93	7.08	52.32	8.65	60.53	4.05	61.43	4.06	62.14	4.08	63.75	4.09	65.36	10.56
	16	43.93	7.20	52.32	8.83	59.82	4.06	60.53	4.08	61.25	4.10	62.86	4.12	64.46	10.73
	18	43.93	7.34	52.32	9.01	58.93	10.57	59.64	10.63	60.53	10.69	62.14	10.79	63.75	10.89
	20	43.93	7.50	52.32	9.59	58.03	11.09	58.93	11.14	59.64	11.21	61.25	11.30	62.86	11.42
	21	43.93	7.70	52.32	9.93	57.68	11.35	58.57	11.40	59.28	11.46	60.89	11.58	62.50	11.68
	23	43.93	8.25	52.32	10.65	56.96	11.86	57.68	11.92	58.39	11.98	60.00	12.10	61.60	12.22
	25	43.93	8.81	52.32	11.40	56.07	12.38	56.78	12.44	57.68	12.52	59.28	12.64	60.89	12.76
	27	43.93	9.41	52.32	12.20	55.36	12.90	56.07	12.98	56.78	13.04	58.39	13.18	60.00	13.32
	29	43.93	10.05	52.32	13.04	54.46	13.42	55.18	13.50	56.07	13.58	57.68	13.72	59.28	13.86
	31	43.93	10.73	52.14	13.80	53.57	13.96	54.46	14.04	55.18	14.10	56.78	14.26	58.39	14.42
	33	43.93	11.42	51.25	14.32	52.86	14.47	53.57	14.55	54.46	14.63	56.07	14.79	57.50	14.95
	35	43.93	12.18	50.35	14.83	51.96	15.01	52.86	15.09	53.57	15.17	55.18	15.35	56.78	15.51
	37	43.93	12.96	49.64	15.37	51.25	15.55	51.96	15.63	52.86	15.73	54.28	15.91	55.89	16.09
	39	43.93	13.80	48.75	15.53	50.35	16.07	51.25	16.17	51.96	16.27	53.57	16.45	55.18	16.65
	41	43.93	14.52	48.25	15.68	49.83	16.22	50.72	16.32	51.43	16.42	53.04	16.48	53.06	16.80
	43	43.93	14.89	47.89	15.76	49.56	16.27	50.46	16.40	50.90	16.44	52.08	16.51	52.43	16.84
	45	43.93	15.63	47.59	15.91	49.03	16.42	49.93	16.50	50.16	16.52	50.66	16.57	51.40	17.15
	48	43.93	16.19	49.29	16.42	53.46	16.57	54.45	16.65	54.88	16.71	54.64	16.86	55.64	16.90
120%	-5	40.54	5.84	48.21	7.07	56.07	8.37	60.00	9.12	62.86	9.51	64.29	9.81	65.72	10.08
	-2	40.54	5.90	48.21	7.15	56.07	8.45	60.00	9.18	62.86	9.62	64.29	9.90	65.72	10.11
	0	40.54	5.95	48.21	7.20	56.07	8.55	60.00	9.20	62.86	9.71	64.29	9.96	65.72	10.13
	2	40.54	5.97	48.21	7.27	56.07	8.61	60.00	9.29	62.86	9.75	64.29	10.03	65.72	10.15
	4	40.54	6.03	48.21	7.36	56.07	8.73	60.00	9.37	62.86	9.88	64.29	10.05	65.72	10.18
	6	40.54	6.09	48.21	7.42	56.07	8.83	60.00	9.48	62.86	9.98	64.29	10.13	65.72	10.21
	8	40.54	6.15	48.21	7.50	56.07	8.95	60.00	9.60	62.86	10.08	64.29	10.17	65.72	10.26
	10	40.54	6.22	48.21	7.60	56.07	9.03	60.00	9.77	62.86	10.09	64.29	10.20	65.72	10.30
	12	40.54	6.34	48.21	7.74	56.07	9.21	60.00	9.95	61.97	10.13	63.39	10.14	64.82	10.37
	14	40.54	6.46	48.21	7.90	56.07	9.39	60.00	10.15	61.07	10.20	62.68	10.29	64.10	10.49
	16	40.54	6.58	48.21	8.05	56.07	9.57	59.64	4.10	60.36	10.34	61.78	10.46	63.21	10.65
	18	40.54	6.70	48.21	8.21	56.07	9.89	58.75	10.57	59.46	10.61	60.89	10.71	62.50	10.81
	20	40.54	6.84	48.21	8.53	56.07	10.65	58.04	11.09	58.75	11.12	60.18	11.23	61.61	11.32
	21	40.54	6.90	48.21	8.83	56.07	11.03	57.50	11.34	58.21	11.38	59.82	11.48	61.25	11.60
	23	40.54	7.38	48.21	9.47	56.07	11.80	56.79	11.84	57.50	11.90	58.93	12.02	60.36	12.12
	25	40.54	7.88	48.21	10.13	55.18	12.32	55.89	12.36	56.61	12.42	58.21	12.54	59.64	12.66
	27	40.54	8.41	48.21	10.83	54.46	12.82	55.18	12.90	55.89	12.96	57.32	13.08	58.75	13.20
	29	40.54	8.97	48.21	11.56	53.57	13.34	54.29	13.42	55.00	13.48	56.43	13.62	58.04	13.74
	31	40.54	9.57	48.21	12.34	52.68	13.88	53.57	13.94	54.29	14.02	55.72	14.15	57.14	14.30
	33	40.54	10.19	48.21	13.16	51.96	14.39	52.68	14.47	53.39	14.53	54.82	14.69	56.25	14.83
	35	40.54	10.85	48.21	14.04	51.07	14.91	51.79	14.99	52.68	15.07	54.10	15.23	55.53	15.39
	37	40.54	11.54	48.21	14.95	50.36	15.45	51.07	15.53	51.79	15.61	53.21	15.77	54.64	15.95
	39	40.54	12.28	48.04	15.79	49.47	15.97	50.18	16.07	50.89	16.15	52.50	16.33	53.93	16.49
	41	40.54	12.62	47.65	15.90	49.08	16.08	49.79	16.18	50.51	16.26	52.11	16.37	52.38	16.61
	43	40.54	12.81	47.39	16.02	48.69	16.18	49.40	16.24	50.12	16.32	51.21	16.42	51.56	16.94
	45	40.54	12.96	47.13	16.17	48.22	16.33	48.89	16.40	49.68	16.45	50.17	16.47	51.05	17.31
	48	46.97	13.06	54.14	16.34	55.15	16.48	55.74	16.52	56.93	16.58	57.23	16.53	58.36	17.53
110%	-5	37.14	5.10	44.29	6.35	51.43	7.58	55.00	8.13	58.57	8.75	63.04	9.09	64.47	9.37
	-2	37.14	5.20	44.29	6.43	51.43	7.64	55.00	8.21	58.57	8.82	63.04	9.18	64.47	9.42
	0	37.14	5.25	44.29	6.47	51.43	7.70	55.00	8.27	58.57	8.92	63.04	9.27	64.47	9.53

	2	37.14	5.36	44.29	6.53	51.43	7.82	55.00	8.36	58.57	9.01	63.04	9.40	64.47	9.65
	4	37.14	5.47	44.29	6.60	51.43	7.89	55.00	8.46	58.57	9.15	63.04	9.53	64.47	9.74
	6	37.14	5.53	44.29	6.68	51.43	7.97	55.00	8.59	58.57	9.25	63.04	9.63	64.47	9.89
	8	37.14	5.58	44.29	6.79	51.43	8.06	55.00	8.68	58.57	9.36	63.04	9.70	64.47	9.99
	10	37.14	5.64	44.29	6.88	51.43	8.18	55.00	8.83	58.57	9.51	63.04	9.77	64.47	10.08
	12	37.14	5.76	44.29	7.02	51.43	8.33	55.00	9.01	58.57	9.69	62.33	9.91	63.57	10.21
	14	37.14	5.86	44.29	7.14	51.43	8.49	55.00	9.17	58.57	9.87	61.43	9.99	62.86	10.28
	16	37.14	5.96	44.29	7.28	51.43	8.65	55.00	9.35	58.57	10.07	60.72	10.11	61.96	10.40
	18	37.14	6.08	44.29	7.42	51.43	8.83	55.00	9.61	58.57	10.55	59.82	10.63	61.25	10.73
	20	37.14	6.20	44.29	7.58	51.43	9.35	55.00	10.33	57.68	11.07	59.11	11.14	60.36	11.24
	21	37.14	6.26	44.29	7.80	51.43	9.69	55.00	10.71	57.32	11.33	58.58	11.40	60.00	11.50
	23	37.14	6.56	44.29	8.35	51.43	10.39	55.00	11.48	56.43	11.82	57.86	11.94	59.11	12.04
	25	37.14	7.00	44.29	8.93	51.43	11.10	55.00	12.30	55.71	12.34	56.97	12.46	58.39	12.56
	27	37.14	7.46	44.29	9.55	51.43	11.88	54.11	12.82	54.82	12.86	56.25	12.98	57.50	13.10
	29	37.14	7.95	44.29	10.19	51.43	12.70	53.39	13.34	54.11	13.40	55.36	13.52	56.79	13.64
	31	37.14	8.47	44.29	10.87	51.43	13.56	52.50	13.86	53.22	13.92	54.65	14.04	55.89	14.18
	33	37.14	9.01	44.29	11.58	51.07	14.29	51.79	14.38	52.50	14.43	53.75	14.57	55.18	14.71
	35	37.14	9.59	44.29	12.34	50.18	14.81	50.90	14.89	51.61	14.97	52.86	15.11	54.29	15.25
	37	37.14	10.21	44.29	13.14	49.46	15.35	50.18	15.41	50.72	15.49	52.15	15.65	53.39	15.79
	39	37.14	10.85	44.29	14.00	48.57	15.87	49.29	15.95	50.00	16.03	51.25	16.19	52.68	16.35
	41	37.14	10.96	44.29	14.11	48.19	15.98	48.91	16.06	49.62	16.14	50.60	16.30	51.09	16.46
	43	37.14	11.07	44.29	14.29	47.81	16.09	48.52	16.17	49.24	16.25	50.15	16.36	50.31	16.80
	45	37.14	11.43	44.29	14.37	47.33	16.24	48.01	16.37	48.80	16.40	49.64	16.81	49.84	17.18
	48	40.68	11.83	48.50	15.59	51.08	16.35	51.75	16.48	52.84	16.58	53.47	16.87	53.88	17.37
100%	-5	33.75	4.65	40.18	5.59	46.79	6.66	50.00	7.13	53.22	7.74	59.82	8.82	63.22	9.20
	-2	33.75	4.70	40.18	5.67	46.79	6.73	50.00	7.26	53.22	7.84	59.82	8.92	63.22	9.26
	0	33.75	4.75	40.18	5.72	46.79	6.80	50.00	7.35	53.22	7.91	59.82	9.07	63.22	9.36
	2	33.75	4.84	40.18	5.80	46.79	6.88	50.00	7.45	53.22	8.00	59.82	9.20	63.22	9.51
	4	33.75	4.88	40.18	5.86	46.79	6.98	50.00	7.56	53.22	8.11	59.82	9.29	63.22	9.62
	6	33.75	4.95	40.18	5.98	46.79	7.07	50.00	7.69	53.22	8.22	59.82	9.42	63.22	9.76
	8	33.75	5.04	40.18	6.07	46.79	7.20	50.00	7.78	53.22	8.36	59.82	9.57	63.22	9.93
	10	33.75	5.10	40.18	6.18	46.79	7.32	50.00	7.91	53.22	8.51	59.82	9.73	63.22	10.07
	12	33.75	5.18	40.18	6.30	46.79	7.46	50.00	8.05	53.22	8.67	59.82	9.91	62.32	10.15
	14	33.75	5.28	40.18	6.42	46.79	7.60	50.00	8.21	53.22	8.83	59.82	10.11	61.61	10.27
	16	33.75	5.38	40.18	6.54	46.79	7.76	50.00	8.37	53.22	9.01	59.47	10.23	60.72	10.39
	18	33.75	5.48	40.18	6.66	46.79	7.90	50.00	8.53	53.22	9.19	58.75	10.57	60.00	10.65
	20	33.75	5.58	40.18	6.80	46.79	8.13	50.00	8.97	53.22	9.85	57.86	11.07	59.11	11.16
	21	33.75	5.64	40.18	6.86	46.79	8.43	50.00	9.29	53.22	10.19	57.50	11.32	58.75	11.42
	23	33.75	5.78	40.18	7.32	46.79	9.03	50.00	9.95	53.22	10.92	56.79	11.84	57.86	11.94
	25	33.75	6.16	40.18	7.82	46.79	9.67	50.00	10.67	53.22	11.70	55.90	12.36	57.14	12.46
	27	33.75	6.58	40.18	8.33	46.79	10.33	50.00	11.40	53.22	12.52	55.00	12.88	56.25	13.00
	29	33.75	7.00	40.18	8.89	46.79	11.03	50.00	12.18	53.04	13.30	54.29	13.42	55.54	13.52
	31	33.75	7.46	40.18	9.49	46.79	11.76	50.00	13.00	52.32	13.82	53.40	13.94	54.64	14.05
	33	33.75	7.91	40.18	10.11	46.79	12.54	50.00	13.88	51.43	14.33	52.68	14.45	53.93	14.59
	35	33.75	8.41	40.18	10.75	46.79	13.38	50.00	14.79	50.54	14.85	51.79	14.99	53.04	15.11
	37	33.75	8.95	40.18	11.44	46.79	14.25	49.10	15.31	49.82	15.39	51.07	15.53	52.15	15.65
	39	33.75	9.51	40.18	12.16	46.79	15.17	48.39	15.83	48.93	15.91	50.18	16.05	51.43	16.21
	41	33.75	9.95	40.18	12.61	46.79	15.73	47.64	15.94	48.55	16.15	49.31	16.43	50.68	16.54
	43	33.75	10.40	40.18	13.05	46.79	16.02	46.89	16.13	48.20	16.31	49.60	16.53	49.79	16.73
	45	33.75	10.99	40.18	13.64	46.79	16.29	45.89	16.35	47.95	16.61	49.18	16.79	48.79	16.95
	48	34.96	11.47	41.61	14.12	48.46	16.32	45.57	16.53	49.58	16.90	47.83	16.96	49.42	17.11
90%	-5	30.36	4.11	36.25	4.93	42.14	5.81	45.00	6.34	47.86	6.75	53.75	7.76	59.64	8.89
	-2	30.36	4.15	36.25	4.98	42.14	5.89	45.00	6.43	47.86	6.83	53.75	7.84	59.64	8.97
	0	30.36	4.21	36.25	5.04	42.14	5.98	45.00	6.51	47.86	6.92	53.75	7.92	59.64	9.04
	2	30.36	4.27	36.25	5.11	42.14	6.04	45.00	6.61	47.86	7.03	53.75	8.09	59.64	9.18
	4	30.36	4.34	36.25	5.18	42.14	6.14	45.00	6.70	47.86	7.12	53.75	8.22	59.64	9.31
	6	30.36	4.40	36.25	5.28	42.14	6.26	45.00	6.83	47.86	7.24	53.75	8.34	59.64	9.47
	8	30.36	4.48	36.25	5.38	42.14	6.38	45.00	6.91	47.86	7.37	53.75	8.50	59.64	9.56
	10	30.36	4.57	36.25	5.50	42.14	6.50	45.00	7.02	47.86	7.54	53.75	8.61	59.64	9.71
	12	30.36	4.64	36.25	5.60	42.14	6.62	45.00	7.13	47.86	7.68	53.75	8.77	59.64	9.89
	14	30.36	4.72	36.25	5.70	42.14	6.74	45.00	7.28	47.86	7.81	53.75	8.93	59.64	10.07
	16	30.36	4.80	36.25	5.80	42.14	6.88	45.00	7.42	47.86	7.97	53.75	9.11	59.46	10.25

	18	30.36	4.88	36.25	5.92	42.14	7.00	45.00	7.56	47.86	8.13	53.75	9.29	58.75	10.57
	20	30.36	4.98	36.25	6.06	42.14	7.14	45.00	7.71	47.86	8.43	53.75	9.99	57.86	11.06
	21	30.36	5.02	36.25	6.10	42.14	7.26	45.00	7.97	47.86	8.73	53.75	10.35	57.50	11.32
	23	30.36	5.12	36.25	6.34	42.14	7.77	45.00	8.55	47.86	9.37	53.75	11.10	56.61	11.84
	25	30.36	5.40	36.25	6.78	42.14	8.31	45.00	9.15	47.86	10.01	53.75	11.88	55.89	12.36
	27	30.36	5.74	36.25	7.22	42.14	8.87	45.00	9.77	47.86	10.71	53.75	12.72	55.00	12.88
	29	30.36	6.12	36.25	7.69	42.14	9.47	45.00	10.43	47.86	11.44	53.21	13.30	54.28	13.40
	31	30.36	6.50	36.25	8.19	42.14	10.09	45.00	11.12	47.86	12.20	52.32	13.82	53.39	13.93
	33	30.36	6.90	36.25	8.71	42.14	10.76	45.00	11.86	47.86	13.02	51.61	14.35	52.68	14.45
	35	30.36	7.34	36.25	9.27	42.14	11.46	45.00	12.64	47.86	13.88	50.72	14.87	51.79	14.99
	37	30.36	7.77	36.25	9.85	42.14	12.20	45.00	13.46	47.86	14.79	49.82	15.39	51.07	15.51
	39	30.36	8.25	36.25	10.49	42.14	12.98	45.00	14.33	47.86	15.75	49.11	15.93	50.18	16.05
	41	30.36	8.54	36.25	10.96	42.14	13.45	45.00	14.71	47.86	15.84	48.77	16.33	49.84	16.43
	43	30.36	8.95	36.25	11.43	42.14	13.93	45.00	15.09	47.86	16.18	48.52	16.55	49.41	16.68
	45	30.36	9.52	36.25	12.00	42.14	14.49	45.00	15.60	47.86	16.63	48.25	16.72	48.66	16.90
	48	30.36	10.05	36.25	12.56	42.14	15.04	45.00	15.80	47.86	16.77	53.16	16.95	52.60	17.13
	-5	26.96	3.62	32.14	4.28	37.32	5.07	40.00	5.39	42.68	5.80	47.86	6.71	53.04	7.65
	-2	26.96	3.67	32.14	4.33	37.32	5.11	40.00	5.47	42.68	5.86	47.86	6.77	53.04	7.73
	0	26.96	3.74	32.14	4.39	37.32	5.17	40.00	5.54	42.68	5.96	47.86	6.87	53.04	7.84
	2	26.96	3.81	32.14	4.45	37.32	5.25	40.00	5.64	42.68	6.07	47.86	7.01	53.04	7.98
	4	26.96	3.88	32.14	4.52	37.32	5.35	40.00	5.77	42.68	6.17	47.86	7.13	53.04	8.09
	6	26.96	3.94	32.14	4.63	37.32	5.43	40.00	5.90	42.68	6.29	47.86	7.24	53.04	8.23
	8	26.96	4.01	32.14	4.74	37.32	5.56	40.00	5.99	42.68	6.43	47.86	7.35	53.04	8.39
	10	26.96	4.05	32.14	4.85	37.32	5.70	40.00	6.14	42.68	6.58	47.86	7.52	53.04	8.47
	12	26.96	4.11	32.14	4.92	37.32	5.80	40.00	6.26	42.68	6.72	47.86	7.66	53.04	8.63
	14	26.96	4.19	32.14	5.02	37.32	5.90	40.00	6.36	42.68	6.84	47.86	7.80	53.04	8.79
	16	26.96	4.25	32.14	5.10	37.32	6.02	40.00	6.48	42.68	6.96	47.86	7.96	53.04	8.95
	18	26.96	4.33	32.14	5.20	37.32	6.14	40.00	6.62	42.68	7.10	47.86	8.11	53.04	9.13
	20	26.96	4.41	32.14	5.30	37.32	6.26	40.00	6.74	42.68	7.24	47.86	8.41	53.04	9.77
80%	21	26.96	4.45	32.14	5.34	37.32	6.32	40.00	6.82	42.68	7.40	47.86	8.71	53.04	10.13
	23	26.96	4.53	32.14	5.46	37.32	6.62	40.00	7.26	42.68	7.91	47.86	9.33	53.04	10.87
	25	26.96	4.67	32.14	5.80	37.32	7.08	40.00	7.76	42.68	8.45	47.86	9.99	53.04	11.62
	27	26.96	4.96	32.14	6.18	37.32	7.54	40.00	8.27	42.68	9.03	47.86	10.67	53.04	12.44
	29	26.96	5.28	32.14	6.58	37.32	8.03	40.00	8.81	42.68	9.65	47.86	11.38	53.04	13.30
	31	26.96	5.60	32.14	7.00	37.32	8.55	40.00	9.39	42.68	10.29	47.86	12.16	52.14	13.82
	33	26.96	5.96	32.14	7.44	37.32	9.11	40.00	10.01	42.68	10.95	47.86	12.96	51.43	14.33
	35	26.96	6.32	32.14	7.91	37.32	9.69	40.00	10.65	42.68	11.66	47.86	13.82	50.54	14.85
	37	26.96	6.70	32.14	8.39	37.32	10.31	40.00	11.34	42.68	12.42	47.86	14.73	49.82	15.37
	39	26.96	7.10	32.14	8.95	37.32	10.97	40.00	12.06	42.68	13.22	47.86	15.69	48.93	15.91
	41	26.96	7.26	32.14	9.03	37.32	11.13	40.00	12.38	42.68	13.46	47.86	16.09	48.63	16.19
	43	26.96	7.47	32.14	9.11	37.32	11.29	40.00	12.59	42.68	13.64	47.86	16.28	48.33	16.36
	45	26.96	7.68	32.14	9.22	37.32	11.50	40.00	12.86	42.68	13.88	47.86	16.46	47.73	16.63
	48	26.96	7.94	32.14	9.28	41.99	11.68	40.00	13.04	42.68	14.00	47.86	16.62	53.24	16.86
	-5	23.57	3.23	28.21	3.79	32.68	4.29	35.00	4.60	37.32	4.91	41.79	5.62	46.43	6.46
	-2	23.57	3.26	28.21	3.81	32.68	4.32	35.00	4.69	37.32	5.00	41.79	5.71	46.43	6.55
	0	23.57	3.28	28.21	3.86	32.68	4.41	35.00	4.78	37.32	5.09	41.79	5.82	46.43	6.64
	2	23.57	3.29	28.21	3.88	32.68	4.48	35.00	4.87	37.32	5.18	41.79	5.95	46.43	6.75
	4	23.57	3.34	28.21	3.97	32.68	4.58	35.00	4.96	37.32	5.29	41.79	6.05	46.43	6.90
	6	23.57	3.39	28.21	4.04	32.68	4.69	35.00	5.12	37.32	5.42	41.79	6.15	46.43	7.04
	8	23.57	3.45	28.21	4.16	32.68	4.80	35.00	5.20	37.32	5.53	41.79	6.33	46.43	7.17
	10	23.57	3.52	28.21	4.23	32.68	4.92	35.00	5.30	37.32	5.68	41.79	6.46	46.43	7.26
	12	23.57	3.61	28.21	4.29	32.68	5.02	35.00	5.40	37.32	5.78	41.79	6.58	46.43	7.40
70%	14	23.57	3.67	28.21	4.37	32.68	5.10	35.00	5.48	37.32	5.88	41.79	6.70	46.43	7.54
	16	23.57	3.73	28.21	4.45	32.68	5.20	35.00	5.60	37.32	6.00	41.79	6.82	46.43	7.68
	18	23.57	3.79	28.21	4.53	32.68	5.30	35.00	5.70	37.32	6.10	41.79	6.96	46.43	7.84
	20	23.57	3.85	28.21	4.61	32.68	5.40	35.00	5.80	37.32	6.22	41.79	7.10	46.43	8.05
	21	23.57	3.89	28.21	4.65	32.68	5.44	35.00	5.86	37.32	6.28	41.79	7.20	46.43	8.33
	23	23.57	3.95	28.21	4.73	32.68	5.56	35.00	6.06	37.32	6.60	41.79	7.72	46.43	8.93
	25	23.57	4.03	28.21	4.92	32.68	5.92	35.00	6.48	37.32	7.04	41.79	8.25	46.43	9.55
	27	23.57	4.27	28.21	5.24	32.68	6.32	35.00	6.90	37.32	7.52	41.79	8.81	46.43	10.21
	29	23.57	4.53	28.21	5.56	32.68	6.72	35.00	7.36	37.32	8.00	41.79	9.39	46.43	10.91
	31	23.57	4.78	28.21	5.90	32.68	7.16	35.00	7.82	37.32	8.51	41.79	10.01	46.43	11.62

	33	23.57	5.08	28.21	6.28	32.68	7.62	35.00	8.31	37.32	9.07	41.79	10.67	46.43	12.40
	35	23.57	5.38	28.21	6.66	32.68	8.07	35.00	8.85	37.32	9.65	41.79	11.36	46.43	13.22
	37	23.57	5.68	28.21	7.06	32.68	8.59	35.00	9.39	37.32	10.27	41.79	12.10	46.43	14.08
	39	23.57	6.02	28.21	7.48	32.68	9.11	35.00	9.99	37.32	10.91	41.79	12.86	46.43	14.99
	41	23.57	6.29	28.21	7.74	32.68	9.38	35.00	10.32	37.32	11.24	41.79	13.39	46.43	15.66
	43	23.57	6.80	28.21	8.27	32.68	9.76	35.00	10.87	37.32	11.57	41.79	13.88	46.43	16.14
	45	23.57	6.95	28.21	8.45	32.68	9.97	35.00	11.05	37.32	12.15	41.79	14.63	46.43	16.76
	48	23.57	7.13	28.21	8.53	32.68	10.07	35.00	11.23	37.32	12.48	41.79	15.29	46.43	17.16
	-5	20.18	2.76	24.11	3.20	28.04	3.73	30.00	3.97	31.97	4.29	35.89	4.81	39.82	5.52
	-2	20.18	2.77	24.11	3.25	28.04	3.79	30.00	4.03	31.97	4.33	35.89	4.89	39.82	5.56
	0	20.18	2.81	24.11	3.29	28.04	3.84	30.00	4.08	31.97	4.40	35.89	4.96	39.82	5.63
	2	20.18	2.86	24.11	3.36	28.04	3.91	30.00	4.16	31.97	4.46	35.89	5.06	39.82	5.70
	4	20.18	2.94	24.11	3.43	28.04	3.99	30.00	4.21	31.97	4.53	35.89	5.14	39.82	5.78
	6	20.18	2.97	24.11	3.49	28.04	4.07	30.00	4.30	31.97	4.62	35.89	5.24	39.82	5.92
	8	20.18	3.03	24.11	3.55	28.04	4.14	30.00	4.38	31.97	4.71	35.89	5.34	39.82	6.01
	10	20.18	3.09	24.11	3.63	28.04	4.21	30.00	4.50	31.97	4.80	35.89	5.44	39.82	6.10
	12	20.18	3.15	24.11	3.69	28.04	4.29	30.00	4.59	31.97	4.88	35.89	5.54	39.82	6.20
	14	20.18	3.19	24.11	3.75	28.04	4.35	30.00	4.66	31.97	4.98	35.89	5.64	39.82	6.32
	16	20.18	3.23	24.11	3.81	28.04	4.43	30.00	4.74	31.97	5.06	35.89	5.74	39.82	6.44
	18	20.18	3.29	24.11	3.87	28.04	4.50	30.00	4.82	31.97	5.16	35.89	5.84	39.82	6.56
	20	20.18	3.33	24.11	3.95	28.04	4.59	30.00	4.92	31.97	5.26	35.89	5.96	39.82	6.70
60%	21	20.18	3.37	24.11	3.97	28.04	4.62	30.00	4.96	31.97	5.30	35.89	6.02	39.82	6.76
	23	20.18	3.41	24.11	4.05	28.04	4.70	30.00	5.06	31.97	5.40	35.89	6.26	39.82	7.20
	25	20.18	3.47	24.11	4.11	28.04	4.88	30.00	5.30	31.97	5.74	35.89	6.68	39.82	7.67
	27	20.18	3.61	24.11	4.37	28.04	5.20	30.00	5.66	31.97	6.12	35.89	7.12	39.82	8.19
	29	20.18	3.81	24.11	4.62	28.04	5.54	30.00	6.02	31.97	6.52	35.89	7.59	39.82	8.75
	31	20.18	4.05	24.11	4.90	28.04	5.88	30.00	6.40	31.97	6.94	35.89	8.07	39.82	9.31
	33	20.18	4.27	24.11	5.20	28.04	6.24	30.00	6.80	31.97	7.38	35.89	8.59	39.82	9.93
	35	20.18	4.53	24.11	5.52	28.04	6.62	30.00	7.22	31.97	7.83	35.89	9.15	39.82	10.56
	37	20.18	4.78	24.11	5.84	28.04	7.02	30.00	7.65	31.97	8.31	35.89	9.73	39.82	11.24
	39	20.18	5.04	24.11	6.18	28.04	7.44	30.00	8.11	31.97	8.83	35.89	10.33	39.82	11.96
	41	20.18	5.21	24.11	6.45	28.04	7.71	30.00	8.44	31.97	9.16	35.89	10.81	39.82	12.50
	43	20.18	5.37	24.11	6.72	28.04	7.98	30.00	8.69	31.97	9.48	35.89	11.27	39.82	13.04
	45	20.18	5.62	24.11	7.06	28.04	8.30	30.00	9.01	31.97	9.94	35.89	11.78	39.82	13.76
	48	20.18	5.83	24.11	7.37	28.04	8.58	30.00	9.25	31.97	10.33	35.89	12.21	39.82	14.41
	-5	16.88	2.39	20.18	2.77	23.39	3.18	25.00	3.33	26.61	3.51	29.82	4.00	33.22	4.31
	-2	16.88	2.41	20.18	2.82	23.39	3.22	25.00	3.38	26.61	3.58	29.82	4.05	33.22	4.36
	0	16.88	2.45	20.18	2.87	23.39	3.27	25.00	3.42	26.61	3.62	29.82	4.12	33.22	4.44
	2	16.88	2.49	20.18	2.91	23.39	3.33	25.00	3.47	26.61	3.68	29.82	4.13	33.22	4.52
	4	16.88	2.51	20.18	2.96	23.39	3.36	25.00	3.51	26.61	3.75	29.82	4.24	33.22	4.64
	6	16.88	2.56	20.18	3.00	23.39	3.42	25.00	3.59	26.61	3.82	29.82	4.30	33.22	4.78
	8	16.88	2.62	20.18	3.06	23.39	3.47	25.00	3.67	26.61	3.88	29.82	4.37	33.22	4.93
	10	16.88	2.67	20.18	3.09	23.39	3.53	25.00	3.73	26.61	3.99	29.82	4.49	33.22	5.00
	12	16.88	2.69	20.18	3.13	23.39	3.59	25.00	3.81	26.61	4.07	29.82	4.56	33.22	5.08
	14	16.88	2.73	20.18	3.17	23.39	3.63	25.00	3.89	26.61	4.13	29.82	4.64	33.22	5.18
	16	16.88	2.77	20.18	3.21	23.39	3.69	25.00	3.95	26.61	4.19	29.82	4.72	33.22	5.26
	18	16.88	2.81	20.18	3.27	23.39	3.75	25.00	4.01	26.61	4.27	29.82	4.80	33.22	5.36
	20	16.88	2.85	20.18	3.31	23.39	3.81	25.00	4.07	26.61	4.35	29.82	4.88	33.22	5.46
50%	21	16.88	2.87	20.18	3.35	23.39	3.85	25.00	4.11	26.61	4.39	29.82	4.94	33.22	5.52
	23	16.88	2.91	20.18	3.39	23.39	3.91	25.00	4.19	26.61	4.47	29.82	5.02	33.22	5.64
	25	16.88	2.95	20.18	3.45	23.39	3.99	25.00	4.27	26.61	4.60	29.82	5.28	33.22	6.02
	27	16.88	3.01	20.18	3.59	23.39	4.21	25.00	4.55	26.61	4.88	29.82	5.62	33.22	6.42
	29	16.88	3.17	20.18	3.79	23.39	4.47	25.00	4.82	26.61	5.20	29.82	5.98	33.22	6.84
	31	16.88	3.35	20.18	4.01	23.39	4.72	25.00	5.12	26.61	5.52	29.82	6.36	33.22	7.28
	33	16.88	3.55	20.18	4.25	23.39	5.02	25.00	5.42	26.61	5.86	29.82	6.76	33.22	7.73
	35	16.88	3.75	20.18	4.49	23.39	5.30	25.00	5.74	26.61	6.20	29.82	7.18	33.22	8.21
	37	16.88	3.95	20.18	4.74	23.39	5.62	25.00	6.08	26.61	6.58	29.82	7.62	33.22	8.73
	39	16.88	4.17	20.18	5.00	23.39	5.94	25.00	6.44	26.61	6.98	29.82	8.07	33.22	9.27
	41	16.88	4.34	20.18	5.22	23.39	6.16	25.00	6.74	26.61	7.28	29.82	8.50	33.22	9.70
	43	16.88	4.63	20.18	5.58	23.39	6.37	25.00	7.04	26.61	7.47	29.82	8.93	33.22	10.13
	45	16.88	4.73	20.18	5.72	23.39	6.80	25.00	7.59	26.61	7.78	29.82	9.80	33.22	10.99
	48	16.88	4.84	20.18	5.88	23.39	7.20	25.00	8.07	26.61	8.13	29.82	10.58	33.22	11.83

Note:

1. is shown as reference
2. In cooling mode, avoid the outdoor air temperature range from 42-46 degree C, when selecting the models
3. The above table shows the average value of conditions may operate
4. It is recommended to connect less than 130%

18HP heating mode

Combination (%) (Capacity index)	Outdoor temperature(°C DB		Indoor temperature(°C WB)											
			16		18		20		21		22		24	
			TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
	°C DB	°C WB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
130%	-19.8	-20	36.26	10.17	36.09	10.88	35.91	11.61	35.91	11.97	35.73	12.32	35.73	13.05
	-18.8	-19	36.80	10.40	36.62	11.11	36.62	11.82	36.44	12.17	36.44	12.51	36.26	13.22
	-16.7	-17	38.22	10.88	38.04	11.55	37.86	12.25	37.86	12.58	37.86	12.92	37.69	13.59
	-13.7	-15	39.82	11.39	39.65	12.04	39.47	12.69	39.47	13.01	39.29	13.35	39.29	14.00
	-11.8	-13	41.42	11.89	41.42	12.53	41.24	13.14	41.07	13.46	41.07	13.78	40.89	14.40
	-9.8	-11	43.38	12.41	43.20	13.01	43.02	13.61	43.02	13.91	43.02	14.21	42.84	14.81
	-9.5	-10	44.44	12.68	44.27	13.26	44.09	13.83	44.09	14.13	43.91	14.42	43.91	14.99
	-8.5	-9.1	45.33	12.90	45.16	13.46	45.16	14.04	44.98	14.32	44.98	14.60	44.80	15.18
	-7	-7.6	46.93	13.27	46.93	13.83	46.75	14.38	46.75	14.66	46.58	14.92	46.40	15.48
	-5	-5.6	49.42	13.78	49.24	14.30	49.06	14.83	49.06	15.09	48.89	15.33	48.89	15.85
	-3	-3.7	51.73	14.23	51.56	14.73	51.56	15.22	51.38	15.48	51.38	15.72	51.20	16.21
	0	-0.7	55.82	14.92	55.82	15.39	55.64	15.84	55.64	16.00	55.47	16.30	55.47	16.75
	3	2.2	60.26	15.54	60.09	15.97	59.91	16.40	59.91	16.60	59.91	16.83	59.73	17.24
	5	4.1	63.29	15.93	63.11	16.34	63.11	16.73	62.93	16.94	62.93	17.14	62.76	17.54
	7	6	66.49	16.30	66.31	16.68	66.31	17.07	66.13	17.26	66.13	17.44	63.46	16.75
	9	7.9	69.86	16.64	69.68	17.01	69.68	17.37	69.51	17.56	68.09	17.18	63.46	15.74
	11	9.8	73.42	16.98	73.25	17.31	72.89	17.54	70.40	16.85	68.09	16.15	63.46	14.83
	13	11.8	77.33	17.29	77.15	17.63	72.89	16.43	70.40	15.78	68.09	15.16	63.46	13.91
	15	13.7	81.06	17.59	77.51	16.70	72.89	15.48	70.40	14.88	68.09	14.28	63.46	13.12
120%	-19.8	-20	36.09	11.14	35.91	11.80	35.73	12.47	35.73	12.79	35.73	13.12	35.55	13.80
	-18.8	-19	36.63	11.35	36.45	12.00	36.45	12.66	36.27	12.98	36.27	13.31	36.09	13.97
	-16.7	-17	38.05	11.80	37.87	12.43	37.63	13.05	37.69	13.37	37.69	13.69	37.51	14.30
	-13.7	-15	39.65	12.26	39.47	12.86	39.29	13.46	39.29	13.78	39.29	14.08	39.11	14.68
	-11.8	-13	41.25	12.73	41.25	13.31	41.07	13.89	41.07	14.19	40.89	14.47	40.89	15.05
	-9.8	-11	43.20	13.22	43.02	13.76	43.02	14.32	42.84	14.60	42.84	14.86	42.67	15.43
	-9.5	-10	44.27	13.46	44.09	14.00	43.91	14.53	43.91	14.81	43.91	15.07	43.74	15.61
	-8.5	-9.1	45.16	13.67	44.98	14.19	44.98	14.71	44.80	14.98	44.80	15.26	44.62	15.78
	-7	-7.6	46.76	14.02	46.76	14.53	46.58	15.03	46.58	15.29	46.40	15.54	46.40	16.04
	-5	-5.6	49.24	14.47	49.07	14.96	48.89	15.44	48.89	15.69	48.89	15.93	48.72	16.40
	-3	-3.7	51.56	14.90	51.56	15.37	51.38	15.82	51.38	16.04	51.20	16.29	51.20	16.73
	0	-0.7	55.65	15.54	55.65	15.97	55.47	16.38	55.47	16.60	55.29	16.81	55.29	17.24
	3	2.2	60.09	16.12	59.91	16.51	59.91	16.90	59.73	17.11	59.73	17.29	58.49	17.20
	5	4.1	63.11	16.47	62.94	16.85	62.94	17.22	62.76	17.41	62.76	17.59	58.49	16.15
	7	6	66.31	16.81	66.31	17.16	66.14	17.52	65.07	17.27	62.94	16.57	58.49	15.20
	9	7.9	69.69	17.15	69.52	17.48	67.20	16.90	65.07	16.23	62.94	15.57	58.49	14.30
	11	9.8	73.25	17.44	71.47	17.15	67.20	15.89	65.07	15.27	62.94	14.66	58.49	13.48
	13	11.8	75.91	17.27	71.47	16.08	67.20	14.90	65.07	14.34	62.94	13.78	58.49	12.68
	15	13.7	75.91	16.27	71.47	15.14	67.20	14.06	65.07	13.52	62.94	12.99	58.49	11.97
110%	-19.8	-20	35.91	12.12	35.74	12.71	35.56	13.33	35.56	13.63	35.57	13.93	35.38	14.55
	-18.8	-19	36.45	12.30	36.27	12.90	36.27	13.50	36.27	13.80	36.09	14.10	36.09	14.70
	-16.7	-17	37.87	12.71	37.69	13.29	38.22	13.87	37.51	14.15	37.51	14.45	37.33	15.01
	-13.7	-15	39.47	13.14	39.30	13.70	39.11	14.25	39.11	14.53	39.11	14.81	38.93	15.35
	-11.8	-13	41.07	13.59	41.07	14.12	40.89	14.64	40.89	14.90	40.71	15.16	40.71	15.70
	-9.8	-11	43.02	14.02	42.84	14.53	42.84	15.03	42.66	15.29	42.66	15.54	42.66	16.04
	-9.5	-10	44.09	14.25	43.91	14.73	43.73	15.24	43.73	15.48	43.73	15.72	43.56	16.21
	-8.5	-9.1	44.98	14.43	44.80	14.92	44.80	15.41	44.62	15.65	44.62	15.89	44.62	14.49
	-7	-7.6	46.58	14.77	46.58	15.22	46.40	15.69	46.40	15.93	46.40	16.15	46.22	16.62
	-5	-5.6	49.07	15.18	48.89	15.63	48.71	16.06	48.71	16.28	48.71	16.51	48.53	16.96
	-3	-3.7	51.38	15.57	51.38	15.99	51.20	16.42	51.20	16.62	51.02	16.83	51.02	17.26
	0	-0.7	55.47	16.15	55.47	16.55	55.29	16.94	55.29	17.13	55.29	17.33	53.69	16.99
	3	2.2	59.91	16.70	59.73	17.05	59.73	17.41	59.56	17.58	57.60	16.86	53.69	15.46
	5	4.1	62.94	17.01	62.94	17.37	61.69	17.20	59.56	16.51	57.60	15.85	53.69	14.55
	7	6	66.13	17.33	65.60	17.44	61.69	16.15	59.56	15.52	57.60	14.90	53.69	13.69
	9	7.9	69.51	17.61	65.60	16.40	61.69	15.20	59.56	14.60	57.60	14.02	53.69	12.90
	11	9.8	69.51	16.57	65.60	15.43	61.69	14.30	59.56	13.76	57.60	13.22	53.69	12.17
	13	11.8	69.51	15.54	65.60	14.47	61.69	13.44	59.56	12.94	57.60	12.43	53.69	11.46
	15	13.7	69.51	13.80	65.60	13.65	61.69	12.70	59.56	12.21	57.60	11.76	53.69	10.84

	-19.8	-20	35.73	13.09	35.55	13.63	35.55	14.19	35.38	14.47	35.38	14.73	35.20	15.29
	-18.8	-19	36.27	13.26	36.27	13.80	36.09	14.34	36.09	14.62	35.91	14.90	35.91	15.44
	-16.7	-17	37.69	13.63	37.51	14.15	37.51	14.68	37.34	14.94	37.34	15.20	37.34	15.72
	-13.7	-15	39.29	14.02	39.11	14.53	38.93	15.03	38.93	15.29	38.93	15.54	38.76	16.04
	-11.8	-13	40.89	14.43	40.89	14.90	40.71	15.39	40.71	15.63	40.71	15.87	40.53	16.36
	-9.8	-11	42.85	14.83	42.67	15.29	42.67	15.74	42.67	15.99	42.49	16.21	42.49	16.66
	-9.5	-10	43.91	15.03	43.74	15.48	43.74	15.93	43.56	16.15	43.56	16.38	43.38	16.83
	-8.5	-9.1	44.80	15.20	44.62	15.65	44.62	16.08	44.62	16.30	44.45	16.53	44.45	16.96
	-7	-7.6	46.40	15.50	46.40	15.93	46.22	16.34	46.22	16.56	46.22	16.77	46.04	17.20
100%	-5	-5.6	48.89	15.89	48.71	16.28	48.71	16.70	48.54	16.88	48.54	17.09	48.36	17.50
	-3	-3.7	51.20	16.25	51.20	14.75	51.02	17.01	51.02	17.20	51.02	17.39	48.89	16.66
	0	-0.7	55.29	16.77	55.29	17.13	55.11	17.48	54.22	17.20	52.44	16.49	48.89	15.12
	3	2.2	59.74	17.26	59.56	17.57	56.00	16.27	54.22	15.63	52.44	15.01	48.89	13.78
	5	4.1	62.75	17.57	59.56	16.51	56.00	15.29	54.22	14.71	52.44	14.13	48.89	12.99
	7	6	63.11	16.68	59.56	15.52	56.00	14.40	54.22	13.85	52.44	13.31	48.89	12.25
	9	7.9	63.11	15.67	59.56	14.60	56.00	13.56	54.22	12.88	52.44	12.54	48.89	11.55
	11	9.8	63.11	14.75	59.56	13.76	56.00	12.79	54.22	12.30	52.44	11.83	48.89	10.92
	13	11.8	63.11	13.85	59.56	12.94	56.00	12.04	54.22	11.59	52.44	11.16	48.89	10.30
	15	13.7	63.11	13.07	59.56	12.21	56.00	11.37	54.22	10.96	52.44	10.55	48.89	9.76
	-19.8	-20	35.49	14.06	35.32	14.55	35.32	15.05	35.14	15.29	35.14	15.55	35.14	16.04
	-18.8	-19	36.03	14.21	36.03	14.71	35.85	15.20	35.85	15.44	35.85	15.69	35.67	16.17
	-16.7	-17	37.45	14.56	37.27	15.03	37.27	15.50	37.27	15.74	37.09	15.97	37.09	16.43
	-13.7	-15	39.04	14.92	38.86	15.37	38.86	15.82	38.69	16.04	38.69	16.27	38.69	16.71
	-11.8	-13	40.64	15.27	40.64	15.70	40.46	16.13	40.46	16.36	40.46	16.56	40.28	16.99
	-9.8	-11	42.59	15.63	42.59	16.04	42.41	16.45	42.41	16.66	42.41	16.88	42.24	17.29
	-9.5	-10	43.66	15.82	43.48	16.23	43.48	16.62	43.30	16.83	43.30	17.03	43.30	17.42
	-8.5	-9.1	44.54	15.99	44.54	16.38	44.37	16.77	44.37	16.96	44.37	17.16	43.83	17.33
	-7	-7.6	46.14	16.25	46.14	16.62	45.96	17.01	45.96	17.20	45.96	17.39	43.83	16.55
90%	-5	-5.6	48.63	16.60	48.45	16.96	48.45	17.31	48.27	17.50	47.03	16.96	43.83	15.55
	-3	-3.7	50.93	16.92	50.93	17.26	50.40	17.33	48.63	16.64	47.03	15.97	43.83	14.66
	0	-0.7	55.19	17.41	53.60	16.98	50.40	15.72	48.63	15.11	47.03	14.51	43.83	13.33
	3	2.2	56.79	16.58	53.60	15.44	50.40	14.32	48.63	13.78	47.03	13.24	43.83	12.19
	5	4.1	56.79	15.59	53.60	14.53	50.40	13.50	48.63	12.97	47.03	12.49	43.83	11.50
	7	6	56.79	14.66	53.60	13.69	50.40	12.71	48.63	12.25	47.03	11.78	43.83	10.86
	9	7.9	56.79	13.82	53.60	12.88	50.40	11.98	48.63	11.55	47.03	11.12	43.83	10.26
	11	9.8	56.79	13.01	53.60	12.15	50.40	11.33	48.63	10.92	47.03	10.51	43.83	9.72
	13	11.8	56.79	12.25	53.60	11.46	50.40	10.68	48.63	10.30	47.03	9.93	43.83	9.18
	15	13.7	56.79	11.57	53.60	10.83	50.40	10.11	48.63	9.76	47.03	9.40	43.83	8.71
	-19.8	-20	35.38	15.03	35.20	15.46	35.20	15.91	35.20	16.13	35.02	16.36	35.02	16.79
	-18.8	-19	35.91	15.16	35.91	15.61	35.73	16.04	35.73	16.26	35.73	16.47	35.56	16.92
	-16.7	-17	37.33	15.48	37.16	15.89	37.16	16.32	37.16	16.53	37.16	16.73	36.98	17.14
	-13.7	-15	38.93	15.80	38.76	16.19	38.76	16.60	38.76	16.79	38.58	16.99	38.58	17.40
	-11.8	-13	40.54	16.12	40.54	16.51	40.36	16.88	40.36	17.07	40.36	17.28	39.11	16.81
	-9.8	-11	42.49	16.43	42.49	16.81	42.31	17.18	42.31	17.35	41.96	17.31	39.11	15.87
	-9.5	-10	43.55	16.60	43.37	16.96	43.38	17.31	43.38	17.50	41.96	16.81	39.11	15.40
	-8.5	-9.1	44.45	16.75	41.31	17.11	44.27	17.44	43.38	17.05	41.96	16.36	39.11	14.99
	-7	-7.6	46.05	16.99	46.05	17.33	44.80	16.96	43.38	16.28	41.96	15.63	39.11	14.34
80%	-5	-5.6	48.53	17.29	47.64	17.20	44.80	15.93	43.38	15.31	41.96	14.69	39.11	13.50
	-3	-3.7	50.49	17.39	47.64	16.19	44.80	14.99	43.38	14.43	41.96	13.85	39.11	12.75
	0	-0.7	50.49	15.78	47.64	14.69	44.80	13.65	43.38	13.14	41.96	12.62	39.11	11.63
	3	2.2	50.49	14.38	47.64	13.40	44.80	12.47	43.38	12.00	41.96	11.55	39.11	10.66
	5	4.1	50.49	13.54	47.64	12.64	44.80	11.76	43.38	11.33	41.96	10.92	39.11	10.08
	7	6	50.49	12.75	47.64	11.93	44.80	11.11	43.38	10.71	41.96	10.32	39.11	9.53
	9	7.9	50.49	12.04	47.64	11.25	44.80	10.49	43.38	10.11	41.96	9.76	39.11	9.03
	11	9.8	50.49	11.37	47.64	10.64	44.80	9.93	43.38	9.57	41.96	9.23	39.11	8.56
	13	11.8	50.49	10.71	47.64	10.04	44.80	9.38	43.38	9.05	41.96	8.73	39.11	8.10
	15	13.7	50.49	10.13	47.64	9.52	44.80	8.90	43.38	8.58	41.96	8.28	39.11	7.70
	-19.8	-20	35.12	16.00	34.94	16.38	34.94	16.77	34.94	16.96	34.94	17.16	34.06	16.97
	-18.8	-19	35.65	16.13	35.65	16.51	35.48	16.88	35.48	17.07	35.48	17.27	34.06	16.62
70%	-16.7	-17	37.07	16.40	37.07	16.77	36.90	17.13	36.90	17.31	36.54	15.42	34.06	15.85
	-13.7	-15	38.67	16.68	38.49	17.03	38.49	17.39	37.78	17.13	36.54	16.43	34.06	15.07
	-11.8	-13	40.26	16.96	40.26	17.29	39.20	16.88	37.78	16.23	36.54	15.57	34.06	14.28

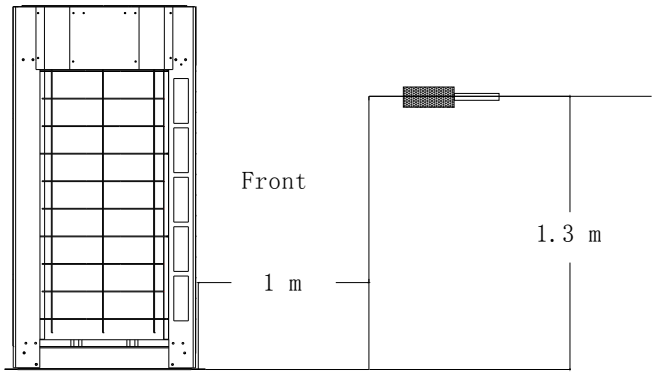
	-9.8	-11	42.21	17.24	41.68	17.22	39.20	15.95	37.78	15.33	36.54	14.71	34.06	13.52
	-9.5	-10	43.28	17.39	41.68	16.71	39.20	15.48	37.78	14.88	36.54	14.30	34.06	13.14
	-8.5	-9.1	44.17	17.48	41.68	16.26	39.20	15.07	37.78	14.49	36.54	13.93	34.06	12.81
	-7	-7.6	44.17	16.69	41.68	15.54	39.20	14.41	37.78	13.87	36.54	13.33	34.06	12.26
	-5	-5.6	44.17	15.69	41.68	14.62	39.20	13.57	37.78	13.05	36.54	15.42	34.06	11.57
	-3	-3.7	44.17	14.77	41.68	13.78	39.20	12.81	37.78	12.32	36.54	11.85	34.06	10.94
	0	-0.7	44.17	13.44	41.68	12.56	39.20	11.68	37.78	11.25	36.54	10.84	34.06	10.02
	3	2.2	44.17	12.28	41.68	11.50	39.20	10.71	37.78	10.32	36.54	9.95	34.06	9.20
	5	4.1	44.17	11.59	41.68	10.84	39.20	10.13	37.78	9.76	36.54	9.40	34.06	8.71
	7	6	44.17	10.96	41.68	10.26	39.20	9.57	37.78	9.23	36.54	8.92	34.06	8.26
	9	7.9	44.17	10.36	41.68	9.70	39.20	9.07	37.78	8.75	36.54	8.45	34.06	7.83
	11	9.8	44.17	9.80	41.68	9.18	39.20	8.60	37.78	8.30	36.54	8.02	34.06	7.44
	13	11.8	44.17	9.25	41.68	8.69	39.20	8.13	37.78	7.87	36.54	7.59	34.06	7.07
	15	13.7	44.17	8.77	41.68	8.24	39.20	7.72	37.78	7.48	36.54	7.22	34.06	6.73
	-19.8	-20	35.02	16.98	34.84	17.29	33.60	16.64	32.53	15.98	31.47	15.35	29.33	14.08
	-18.8	-19	35.56	17.09	35.56	17.41	33.60	16.28	32.53	15.65	31.47	15.01	29.33	13.78
	-16.7	-17	36.98	17.31	35.73	16.77	33.60	15.54	32.53	14.94	31.47	14.34	29.33	13.18
	-13.7	-15	37.87	17.12	35.73	15.93	33.60	14.77	32.53	14.21	31.47	13.65	29.33	12.54
	-11.8	-13	37.87	16.21	35.73	15.09	33.60	14.00	32.53	13.48	31.47	12.96	29.33	11.98
	-9.8	-11	37.87	15.31	35.73	14.26	33.60	13.25	32.53	12.75	31.47	12.26	29.33	11.31
	-9.5	-10	37.87	14.88	35.73	13.87	33.60	12.88	32.53	12.41	31.47	11.93	29.33	10.99
	-8.5	-9.1	37.87	14.49	35.73	13.52	33.60	12.56	32.53	12.10	31.47	11.63	29.33	10.73
	-7	-7.6	37.87	13.85	35.73	12.94	33.60	12.02	32.53	11.59	31.47	11.14	29.33	10.30
60%	-5	-5.6	37.87	13.05	35.73	12.19	33.60	11.35	32.53	10.94	31.47	10.52	29.33	9.74
	-3	-3.7	37.87	12.32	35.73	11.52	33.60	10.73	32.53	10.36	31.47	9.96	29.33	9.22
	0	-0.7	37.87	11.25	35.73	10.54	33.60	9.83	32.53	9.50	31.47	9.14	29.33	8.47
	3	2.2	37.87	10.32	35.73	9.68	33.60	9.05	32.53	8.73	31.47	8.43	29.33	7.81
	5	4.1	37.87	9.76	35.73	9.16	33.60	8.56	32.53	8.28	31.47	7.98	29.33	7.42
	7	6	37.87	9.23	35.73	8.67	33.60	8.11	32.53	7.85	31.47	7.59	29.33	7.05
	9	7.9	37.87	8.75	35.73	8.23	33.60	7.70	32.53	7.46	31.47	7.20	29.33	6.71
	11	9.8	37.87	8.30	35.73	7.81	33.60	7.33	32.53	7.09	31.47	6.84	29.33	6.39
	13	11.8	37.87	7.85	35.73	7.40	33.60	6.95	32.53	6.73	31.47	6.51	29.33	6.08
	15	13.7	37.87	7.48	35.73	7.03	33.60	6.62	32.53	6.41	31.47	6.21	29.33	5.80
	-19.8	-20	31.54	15.44	29.77	14.38	28.00	13.35	26.94	12.86	26.05	12.36	24.28	11.39
	-18.8	-19	31.54	15.11	29.77	14.08	28.00	13.09	26.94	12.58	26.05	12.10	24.28	11.16
	-16.7	-17	31.54	14.41	29.77	13.44	28.00	12.51	26.94	12.04	26.05	11.59	24.28	10.69
	-13.7	-15	31.54	13.72	29.77	12.81	28.00	11.91	26.94	11.48	26.05	11.05	24.28	10.21
	-11.8	-13	31.54	13.03	29.77	12.17	28.00	11.33	26.94	10.92	26.05	10.51	24.28	9.72
	-9.8	-11	31.54	12.34	29.77	11.53	28.00	10.75	26.94	10.36	26.05	9.98	24.28	9.24
	-9.5	-10	31.54	12.00	29.77	11.22	28.00	10.47	26.94	10.09	26.05	9.72	24.28	8.99
	-8.5	-9.1	31.54	11.70	29.77	10.96	28.00	10.21	26.94	9.85	26.05	9.50	24.28	8.79
	-7	-7.6	31.54	11.22	29.77	10.51	28.00	9.80	26.94	9.46	26.05	9.12	24.28	8.45
50%	-5	-5.6	31.54	10.58	29.77	9.93	28.00	9.27	26.94	8.96	26.05	8.64	24.28	8.00
	-3	-3.7	31.54	10.02	29.77	9.40	28.00	8.79	26.94	8.49	26.05	8.19	24.28	7.61
	0	-0.7	31.54	9.20	29.77	8.64	28.00	8.09	26.94	7.81	26.05	7.55	24.28	7.03
	3	2.2	31.54	8.47	29.77	7.96	28.00	7.46	26.94	7.22	26.05	6.97	24.28	6.51
	5	4.1	31.54	8.04	29.77	7.55	28.00	7.09	26.94	6.86	26.05	6.64	24.28	6.19
	7	6	31.54	7.63	29.77	7.18	28.00	6.75	26.94	6.52	26.05	6.32	24.28	5.91
	9	7.9	31.54	7.23	29.77	6.82	28.00	6.41	26.94	6.23	26.05	6.02	24.28	5.63
	11	9.8	31.54	6.88	29.77	6.49	28.00	6.11	26.94	5.93	26.05	5.74	24.28	5.37
	13	11.8	31.54	6.54	29.77	6.17	28.00	5.81	26.94	5.65	26.05	5.46	24.28	5.12
	15	13.7	31.54	6.23	29.77	5.89	28.00	5.55	26.94	5.38	26.05	5.22	24.28	4.90

Note:

1. is shown as reference
2. In heating mode, avoid the outdoor air temperature range from -15 to -20 degree C, when selecting the models
3. The above table shows the average value of conditions may operate
4. It is recommended to connect less than 130%

8. Sound Levels

Standard of testing

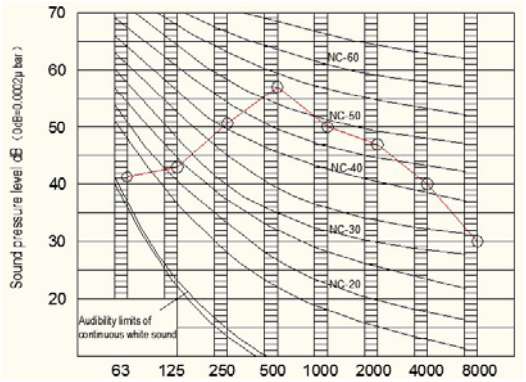


Test value

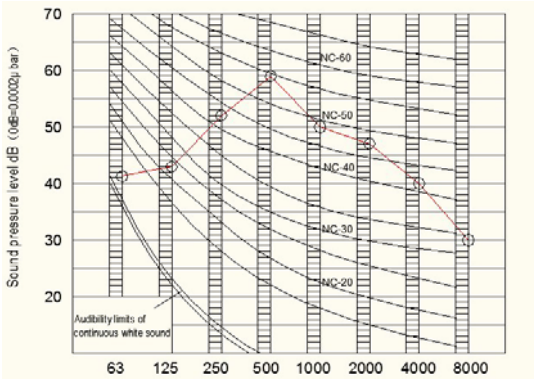
Outdoor unit (HP)	Noise level (dB)
8	57
10	57
12	59
14	61
16	62
18	62

Sound Curve:

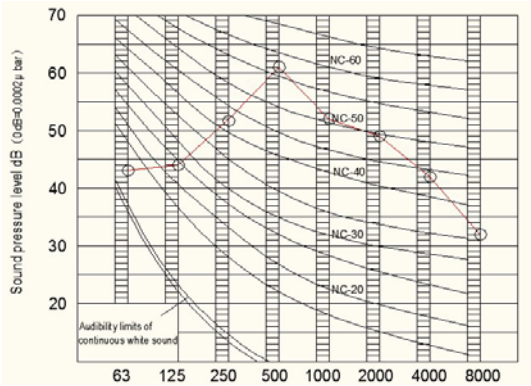
8,10 HP



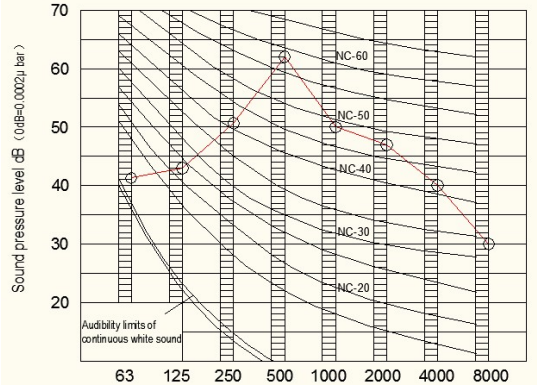
12 HP



14 HP

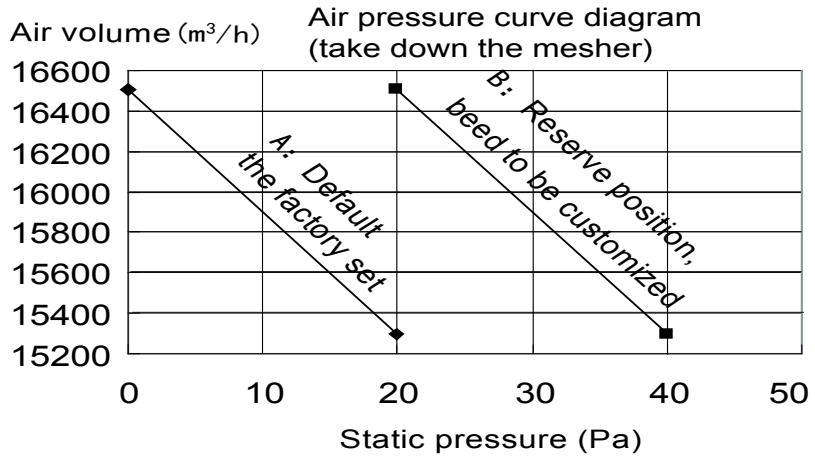


16,18HP

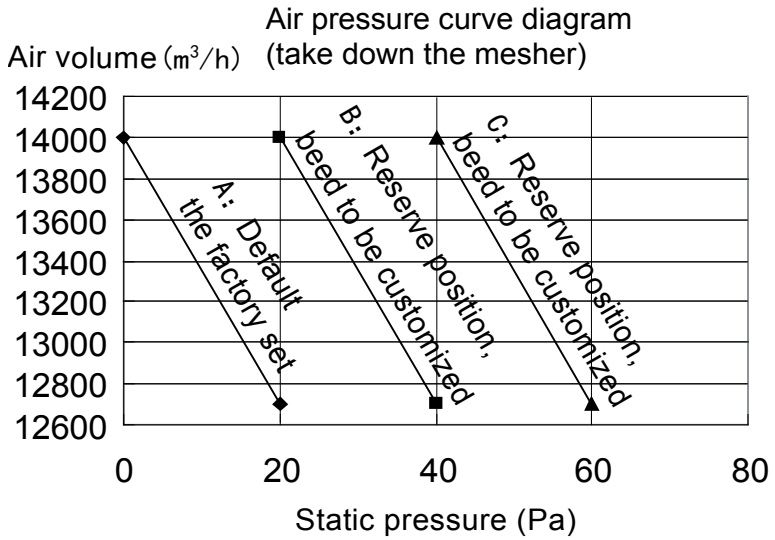


9. Outdoor Fan performance

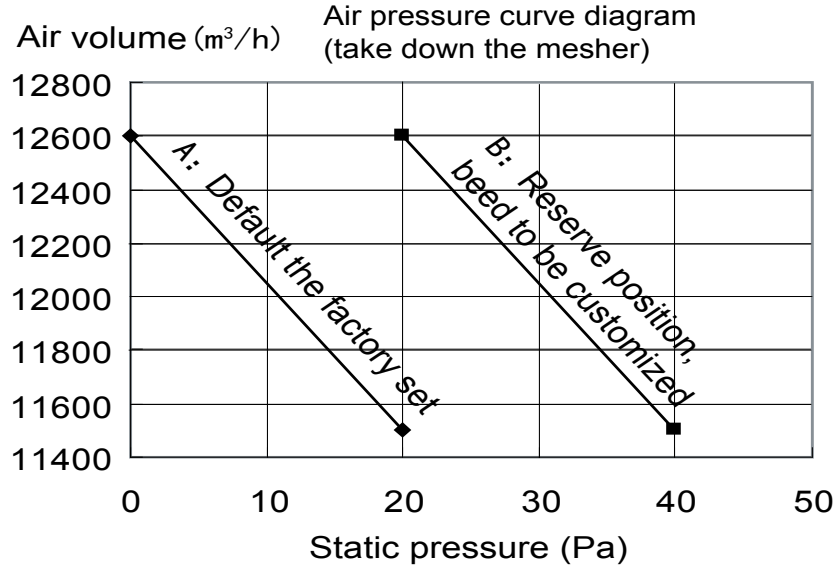
8,10HP Curve diagram of static pressure, air flow volume:



12HP Curve diagram of static pressure, air flow volume:



14, 16, 18HP Curve diagram of static pressure, air flow volume:



10. Accessories

10.1 Standard accessories

No	Name	Quantity	Purpose
1	Installation manual of outdoor unit	1	/
2	Outdoor unit owner's manual	1	Be sure to deliver it to the customer
3	Indoor unit owner's manual	1	Be sure to deliver it to the customer
4	Toggling flathead screw	1	For toggling of indoor and outdoor units
5	Gauge point subassembly	1	For purpose of air tight test units
6	90° mouthing elbow	1	For connecting pipes
7	Seal plug	8	For pipe cleaning
8	Connective pipe accessory	1	Connect to the side of liquid pipe
9	Bolt bage	1	Stone for service
10	Switching pipe (Air side)	1 (the qty. of 12,14HP are 2)	Connect to the air pipe side, use when it is needed

10.2 Optional accessories

Optional accessories	Model name	Function
Branch Joint of outdoor side	FQZHW-02N1	Distribute the refrigerant to indoor units and balance the resistance between each outdoor unit.
	FQZHW-03N1	
	FQZHW-04N1	
Branch Joint of indoor side	FQZHN-01	
	FQZHN-02	
	FQZHN-03	
	FQZHN-04	
	FQZHN-05	
Outdoor controller	MD-CCM02/E	Monitor the outdoor operating parameter
Three phase electricity power protector	202301600580 DPA51CM44 or 202300800224 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

11. Functional parts and safety devices

Item	Symbol	Name		MVUH252B-VA3	MVUH280B-VA3	MVUH335B-VA3
Compressor	Inverter	Inverter compressor		E655DHD-65D2YG	E655DHD-65D2YG	E655DHD-65D2YG+ E405DHD-36D2YG
	Compressor Safety OLP	Open temperature		160±5℃		
	CCH	Crank case heater		DJRD-520A-1500-27.6W		DJRD-520A-1500-27.6W*2
Motor and Security Devices	Motor	Fan motor	Model	0BWZDK750-38G-4	1BWZDK750-38G-4	2BWZDK750-38G-4(2sets)
			Output power	454W	454W	232W*2
		Safety thermostat	On	115℃		
			Off	/		
	HP	High pressure switch		OFF：44（±1）kg/cm^2/ON：32（±1）kg/cm^2		
	LP	Low pressure switch		OFF：0.3（±1）kg/cm^2/ON：1.0（±1）kg/cm^2		
Temperature sensor	T3,T4	Temperature sensor (condenser outlet/ambient temperature)		25℃=10KΩ		
	Discharge thermostat	Thermostat (Inverter/Fixed discharge)		BW130℃ ON:130℃ OFF:85℃		
Pressure sensor	HPSH	High pressure sensor (discharge)		Model: YLCGQ-45CP2-7K6J10, Character: Vout=1.1603*P+0.5(MPa)		
Functional Parts	PMV	Electronic expansion valve		VPF-32D40FoshanHualu		
	4-W/V	4-way valve		STF-01VN1FoshanHualu		
	SV	Solenoid valve		FDF2A-217-PK, etc. Zhejiang Dunan		

Item	Symbol	Name		MVUH400B-VA3	MVUH450B-VA3	MVUH500B-VA3
Compressor	Inverter	Inverter compressor		E655DHD-65D2YG+E405 DHD-36D2YG	E655DHD-65D2YG+E405D HD-36D2YG	E655DHD-65D2YG+ E655DHD-65D2YG
	Compressor Safety OLP	Open temperature		160±5℃		
	CCH	Crank case heater		27.6W *2		
Motor and Security Devices	Motor	Fan motor	Model	3BWZDK750-38G-4(2 sets)	4BWZDK750-38G-4(2 sets)	WZDK560-38G(A)(2 sets)
			Output power	383W*2	383W*2	560W*2
		Safety thermostat	On	115℃		
			Off	/		
	HP	High pressure switch		OFF：44（±1）kg/cm^2/ON：32（±1）kg/cm^2		
	LP	Low pressure switch		OFF：0.3（±1）kg/cm^2/ON：1.0（±1）kg/cm^2		
Temperature sensor	T3,T4	Temperature sensor (condenser outlet/ambient temperature)		25℃=10KΩ		
	Discharg e thermost	Thermostat (Inverter/Fixed discharge)		BW130℃ ON:130℃ OFF:85℃		
Pressure sensor	HPSH	High pressure sensor (discharge)		Model: YLCGQ-45CP2-7K6J10, Character: Vout=1.1603*P+0.5(MPa)		
Functional Parts	PMV	Electronic expansion valve		VPF-32D40 (2 sets)FoshanHualu		
	4-W/V	4-way valve		STF-01VN1FoshanHualu		
	SV	Solenoid valve		FDF2A-217-PK, etc. Zhejiang Dunan		

Part 4 Installation

1. Installation Introduction

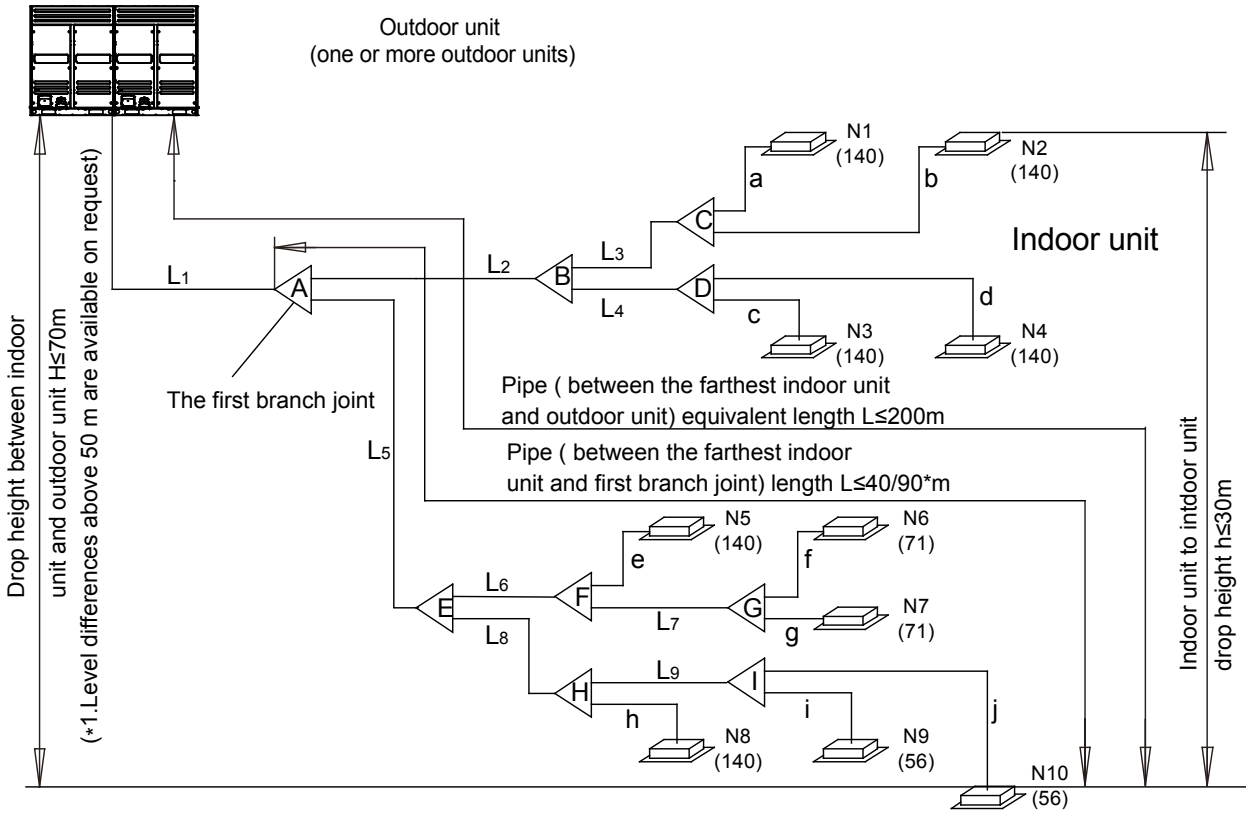
1.1 Select the Refrigerant Piping for MIV V5 series modular type

1.1.1 Length and drop height permitted of the refrigerant piping

Table 4-1

			permitted length	Pipe
Pipe length	Total pipe length(actual length)		≤1000m	L1+(L2+L3+…+L8+L9) ×2+a+b+c+…+i+j
	Farthest pipe length	Actual length	≤175m	$L_1+L_5+L_8+L_9+j$
		Equivalent length	≤200m	
	Equivalent length L of pipe from the first branch to the farthest one		≤40m/90m(*1)	$L_5+L_8+L_9+j$
Drop height	Drop height between indoor unit and outdoor unit	Outdoor unit up	≤ 70m(*2)	—
		Outdoor unit down	≤110m	
	Drop height between indoor unit and indoor unit		≤30m	

Fig 4-1



Note：

*1.The allowable length of the first branch joint which connected to the indoor unit should be equal to or shorter than 40m. But when the following conditions are all met, the allowable length can be extended to 90m.

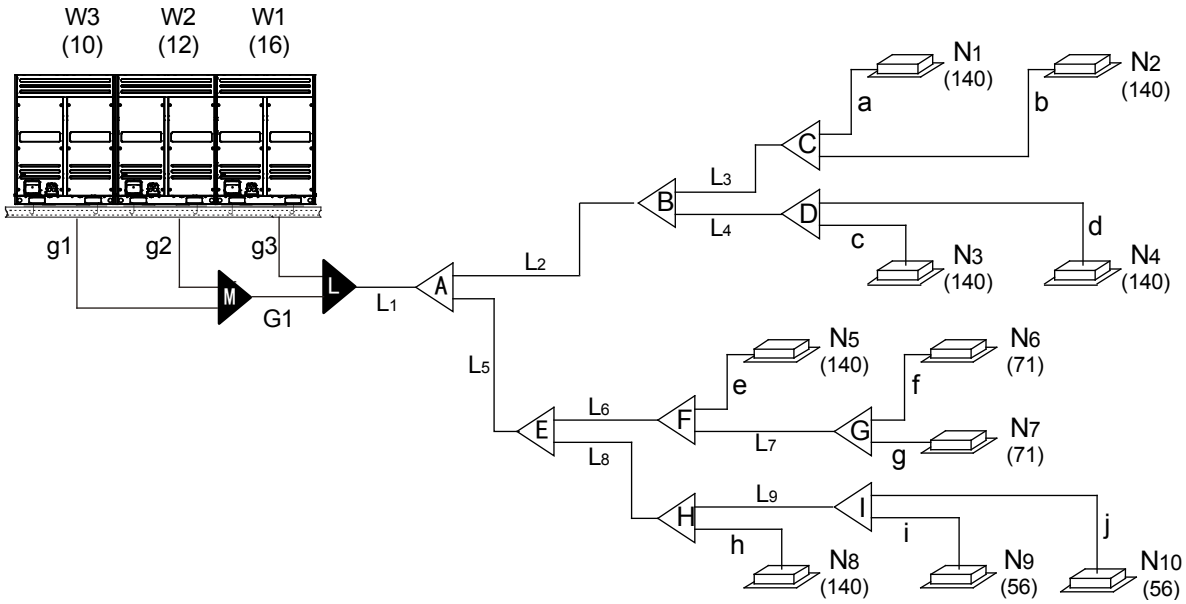
Condition	Example
1.It is needed to increase all the pipe diameters of the the main distribution pipe which between the first and the last branch joint assembly. (Please change the pipe diameter at field) If the pipe diameter of the main slave pipe is the same as the main pipe, then it is not needed to be increased.	N10 L5+L8+L9+j≤90m L2,L3,L4,L5,L6,L7,L8,L9 Need to increase the pipe diameter of the distribution pipe Increasing size as the following: Φ9.5→Φ12.7 Φ12.7→Φ15.9 Φ15.9→Φ19.1 Φ19.1→Φ22.2 Φ22.2→Φ25.4 Φ25.4→Φ28.6 Φ28.6→Φ31.8 Φ31.8→Φ38.1 Φ38.1→Φ41.3 Φ41.3→Φ44.5 Φ44.5→Φ54.0
2. When counting the total extended length, the actual length of above distribution pipes must be doubled.(Expect the main pipe and the distribution pipes which no need to be increased.) L1+(L2+L3+L4+L5+L6+L7+L8+L9)× 2+a+b+c+d+e+f+g+h+i+j≤1000m	Reference Figure.4-1
3. The length from the indoor unit to the nearest branch joint assembly ≤40m a,b,c,...j≤40m(Pipe diameter requirements, please refers to table .4-3)	Reference Figure.4-1
4. The distance difference between [the outdoor unit to the farthest indoor unit] and [the outdoor unit to the nearest indoor unit] is ≤40m. The farthest indoor unit N10 The nearest indoor unit N1 (L1+L5+L8+L9+j)-(L1+L2+L3+a)≤40m	Reference Figure.4-1

*2.Level difference above 50m are not supported by default but the project need to be approved by the manufacture. (If the outdoor unit is above the indoor unit.)

3. Each branch equals to 0.5m pipe length. All branches must be purchased from Midea, otherwise system is induced to malfunction.

1.1.2 Select the refrigerant piping

Fig 4-2



Note: In the above drawing, the capacity unit of indoor side is (×100W), and the outdoor side is HP.

Table 4-2

The Pipe Type	The Detailed Pipe Place	Code
Outdoor unit pipe	The pipe between outdoor unit and outdoor branch, pipe between outdoor branches	g1, g2, g3, G1
Outdoor branch	The outdoor branch assy.	L, M
The main pipe	The pipe between outdoor and the No.1 indoor branch	L1
Indoor main pipe	The pipe between indoor branches	L2~L9
Indoor branch	The indoor branch assy.	A ~ I
Indoor unit pipe	The pipe connecting directly to indoor unit	a ~ j

1.1.2.1 Selection of the indoor unit pipes

E.g. The pipe (a ~ j) in the above drawing.
Please refer to the following table.

Table 4-3

The total capacity of Indoor units(×100W)	When indoor unit pipe length≤10m		When indoor unit pipe length>10m	
	Gas side	Liquid side	Gas side	Liquid side
A≤45	Φ12.7mm	Φ6.4mm	Φ15.9mm	Φ9.5mm
A≥56	Φ15.9mm	Φ9.5mm	Φ19.1mm	Φ12.7mm

1.1.2.2 Selection of the branches and indoor main pipe

E.g. The branches (A ~I) and indoor main pipe (L2~L9) in the above drawing.
Please refer to the following table.

Table 4-4

The capacity of downward indoor units(×100W)	The indoor main pipe dimension (mm)		The branches
	Gas pipe	Liquid pipe	
A<166	Φ15.9	Φ9.5	FQZHN-01
166≤A<230	Φ19.1	Φ9.5	FQZHN-01
230≤A<330	Φ22.2	Φ9.5	FQZHN-02
330≤A<460	Φ28.6	Φ12.7	FQZHN-03
460≤A<660	Φ28.6	Φ15.9	FQZHN-03
660≤A<920	Φ31.8	Φ19.1	FQZHN-03
920≤A<1350	Φ38.1	Φ19.1	FQZHN-04
1350≤A<1800	Φ41.3	Φ22.2	FQZHN-05
1800≤A	Φ44.5	Φ25.4	FQZHN-05

1.1.2.3 Selection of the main pipe (L1)

E.g. The main pipe (L1) in the above drawing
Please refer to the following table:

Table 4-5

The capacity of outdoor units	When total equivalent length<90m			When total equivalent length≥90m		
	Gas side (mm)	Liquid side (mm)	The indoor No.1 distributor	Gas side (mm)	Liquid side (mm)	The indoor No.1 branch
8HP	Φ22.2	Φ9.53	FQZHN-02	Φ22.2	Φ12.7	FQZHN-02
10HP	Φ22.2	Φ9.53	FQZHN-02	Φ25.4	Φ12.7	FQZHN-02
12~14HP	Φ25.4	Φ12.7	FQZHN-03	Φ28.6	Φ15.9	FQZHN-03
16HP	Φ28.6	Φ12.7	FQZHN-03	Φ31.8	Φ15.9	FQZHN-03
18~22HP	Φ28.6	Φ15.9	FQZHN-03	Φ31.8	Φ19.1	FQZHN-03
24HP	Φ28.6	Φ15.9	FQZHN-03	Φ31.8	Φ19.1	FQZHN-03
26~32HP	Φ31.8	Φ19.1	FQZHN-03	Φ38.1	Φ22.2	FQZHN-04
34~48HP	Φ38.1	Φ19.1	FQZHN-04	Φ38.1	Φ22.2	FQZHN-04
50~64HP	Φ41.3	Φ22.2	FQZHN-05	Φ44.5	Φ25.4	FQZHN-05
66~72HP	Φ44.5	Φ25.4	FQZHN-05	Φ54.0	Φ25.4	FQZHN-06

Notice: If the total indoor units' capacity is more than the total outdoor units', please select the main pipe dia. according to the bigger one.

E.g. When the total capacity of 16HP+16HP+14HP paralleled outdoor units is 46HP, if the total pipe length is more than 90m, the pipe dia. is Φ41.3 and Φ22.2 according to the above table. While the total indoor units' capacity is 136kW, the pipe dia. is Φ44.5 and Φ22.2 according to the No.**1.1.2.2** table. Then, according to the principle of selecting the bigger, the main pipe dia. should beΦ44.5 and Φ22.2.

1.1.2.4 Selection of the branch (L, M) and the outdoor unit pipe (g1, g2, g3, G1)

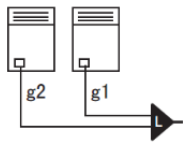
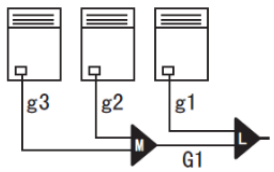
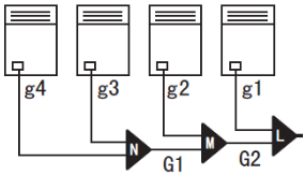
E.g. The branch (L, M) and outdoor unit pipe (g1, g2, g3, G1) in the above drawing.
When there is only single outdoor unit, please refer to the following table:

Table 4-6

Model	The outdoor unit pipe dia. (mm)	
8HP,10HP	Φ25.4	Φ12.7
12HP,14HP,16HP	Φ31.8	Φ15.9
18HP	Φ31.8	Φ19.1

When the multi outdoor units are paralleled, please refer to the following table:

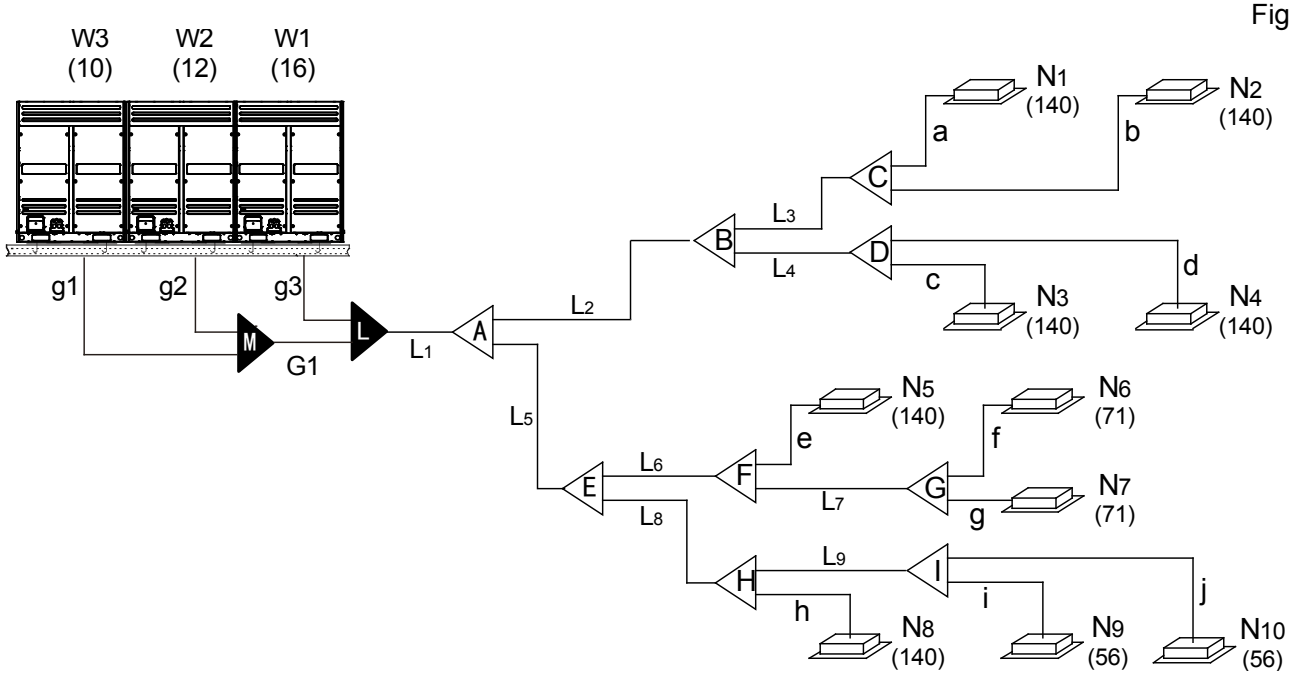
Table 4-7

Outdoor unit quantity	Drawing example	Outdoor unit pipe dia.(mm)	Outdoor branch
2		g1、g2： 8、10HP：Φ25.4/12.7； 12～18HP：Φ31.8/Φ15.9	L： FQZHW-02N1
3		g1、g2、g3： 8、10HP：Φ25.4Φ/12.7； 12～18HP：Φ31.8Φ/15.9； G1：Φ38.1/Φ19.1	L+M： FQZHW-03N
4		g1、g2、g3、g4： 8、10HP：Φ25.4Φ/12.7； 12～18HP：Φ31.8/Φ15.9； G1：Φ38.1/Φ19.1； G2：Φ41.3/Φ22.2	L+M+N： FQZHW-04N1

Notice: All branches must be purchased from Midea.

1.1.3 Pipe selection example

Fig 4-3



Notice: Suppose total equivalent pipe length beyond 90m.

1.1.3.1 Select each indoor unit pipe(a~j) according to the table 4-3:

Indoor unit pipe	capacity of indoor units (×100W)	Range	indoor unit pipe length	Pipe size Gas/liquid
a	140	A≥56	Suppose ≤10m	Φ15.9/Φ9.5
b	140	A≥56	Suppose ≤10m	Φ15.9/Φ9.5
c	140	A≥56	Suppose ≤10m	Φ15.9/Φ9.5
d	140	A≥56	Suppose >10m	Φ19.1/Φ12.7
e	140	A≥56	Suppose >10m	Φ19.1/Φ12.7
f	71	A≥56	Suppose ≤10m	Φ15.9/Φ9.5
g	71	A≥56	Suppose ≤10m	Φ15.9/Φ9.5
h	140	A≥56	Suppose ≤10m	Φ15.9/Φ9.5
i	56	A≥56	Suppose ≤10m	Φ15.9/Φ9.5
j	56	A≥56	Suppose >10m	Φ19.1/Φ12.7

1.1.3.2 Select main pipe(L1),indoor main pipe(L2-L9),indoor branch(A-I) according to the table 4-4

Indoor main pipe/ indoor branch	Total capacity of indoor units (×100W)	Range	Pipe dimension (Gas/Liquid)	Branch
L3/C	N1+N2=280	230≤A<330	Φ22.2/Φ9.5	FQZHN-02
L4/D	N3+ N4=280	230≤A<330	Φ22.2/Φ9.5	FQZHN-02
L2/B	N1+……+N4=560	460≤A<660	Φ28.6/Φ15.9	FQZHN-03
L7/G	N6+N7=142	A<166	Φ15.9/Φ9.5	FQZHN-01
L6/F	N5+……+N7=282	230≤A<330	Φ22.2/Φ9.5	FQZHN-02
L9/I	N9+N10=136	230≤A<330	Φ22.2/Φ9.5	FQZHN-02
L8/H	N8+……+N10=276	230≤A<330	Φ22.2/Φ9.5	FQZHN-02
L5/E	N5+……N10=558	460≤A<660	Φ28.6/Φ15.9	FQZHN-03
L1/A	N1+……N10=1118	920≤A<1350	Φ38.1/Φ19.1	FQZHN-04

1.1.3.3 Select main pipe(L1) and outdoor unit pipe(g1-g3,G1)，outdoor branch,

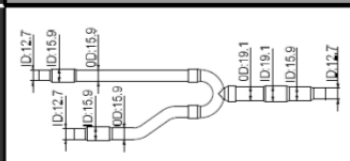
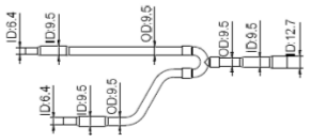
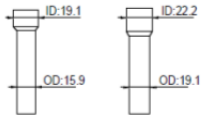
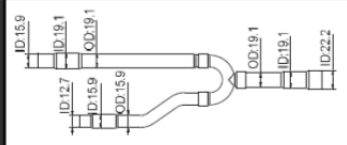
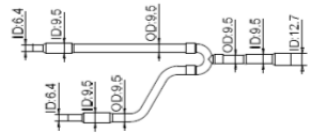
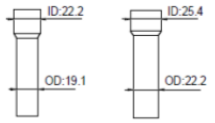
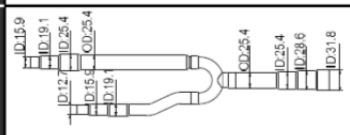
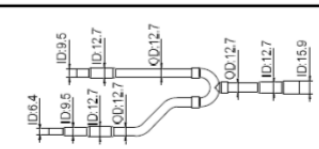
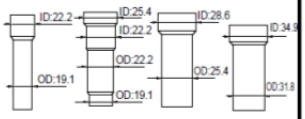
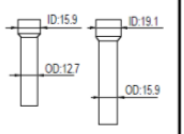
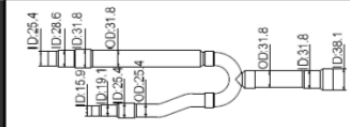
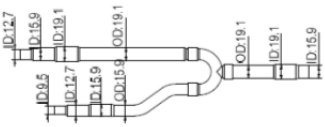
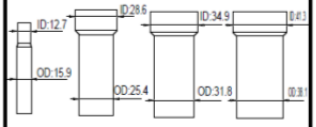
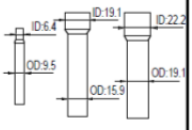
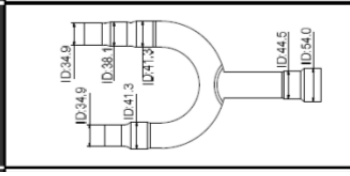
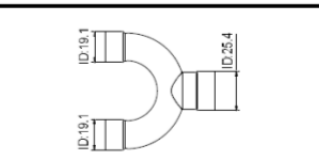
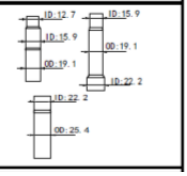
Main pipe/outdoor unit pipe/branch	Model	The Max. equivalent pipe length≥ 90m	Range	Branch	Refer to
		Gas Side/ Liquid Side			
g1	10HP	Φ25.4 (Welding)/ Φ12.7(Flaring Nut)	8≤W3≤10HP	/	according to the table 4-7
g2	14HP	Φ31.8(Welding)/15.9 (Flaring Nut)	12≤W2≤16HP	/	
g3	16HP	Φ31.8(Welding)/15.9 (Flaring Nut)	12≤W1≤16HP	/	
G1	24HP	Φ38.1Welding)/ Φ19.1(Welding)	Two modular combination	/	
L1	40HP	Φ38.1(Welding)/ Φ19.1(Welding)	34-48HP	/	according to the table 4-5
L+M	/	/	Three modular combination	FQZHW-03N1	according to the table 4-7

1.1.3.4 Compare the total capacity from indoor side and outdoor side, select the main pipe dia. according to the bigger one.

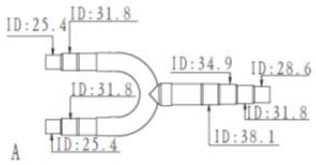
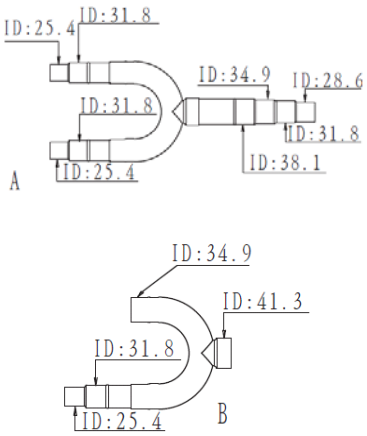
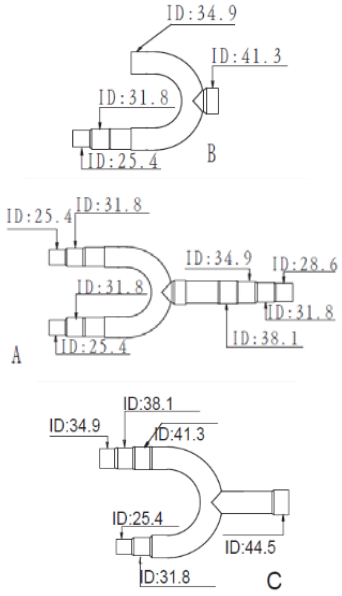
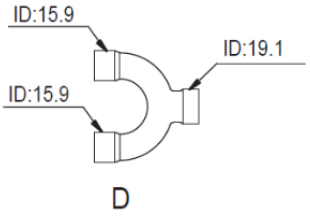
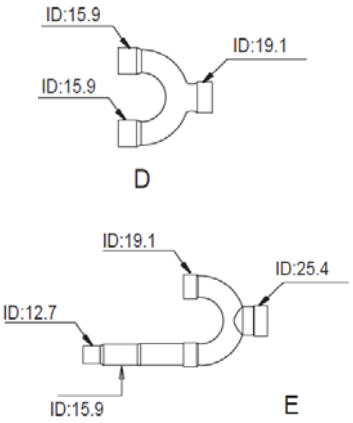
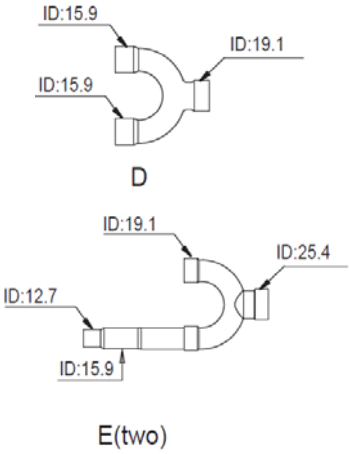
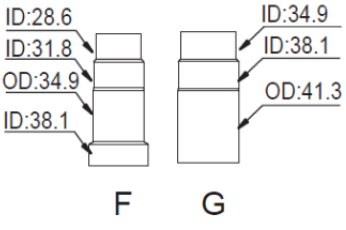
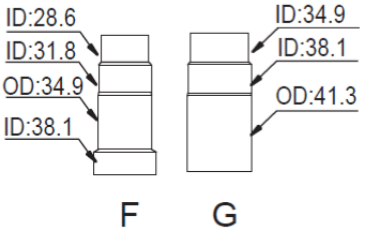
Main pipe L1 in the Fig.4-3, which upstream outdoor units total capacity is 10+12+16＝38, base on table.4-5, the gas/liquid pipe diameter are Φ38.1/Φ22.2, total capacity of the downstream indoor unit is 140×6+56×2+71×2＝1094, based on table.4-4, the gas/liquid pipe diameter are Φ38.1/Φ19.1, take the large one for your selection, final confirm the main pipe diameter is: gas/liquid pipe Φ38.1/Φ22.2.

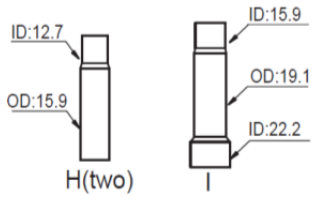
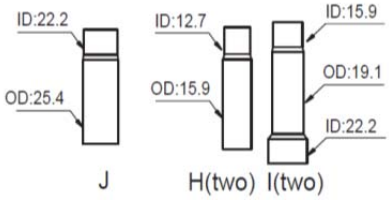
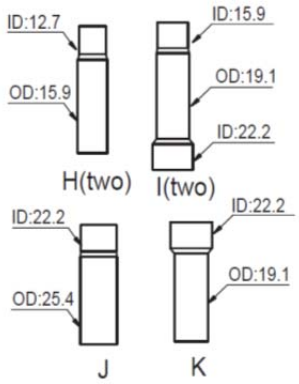
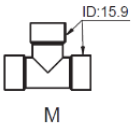
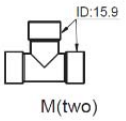
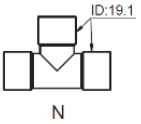
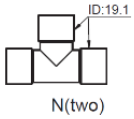
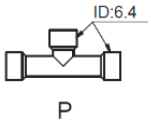
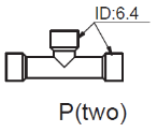
1.1.4 Branch drawing

1.1.4.1 Indoor branch drawing

Name	Gas side joints	Liquid side joints	Converter pipe (gas pipe used)	Converter pipe (liquid pipe used)
FQZHN-01				
FQZHN-02				
FQZHN-03				
FQZHN-04				
FQZHN-05				

1.1.4.2 Outdoor branch drawing

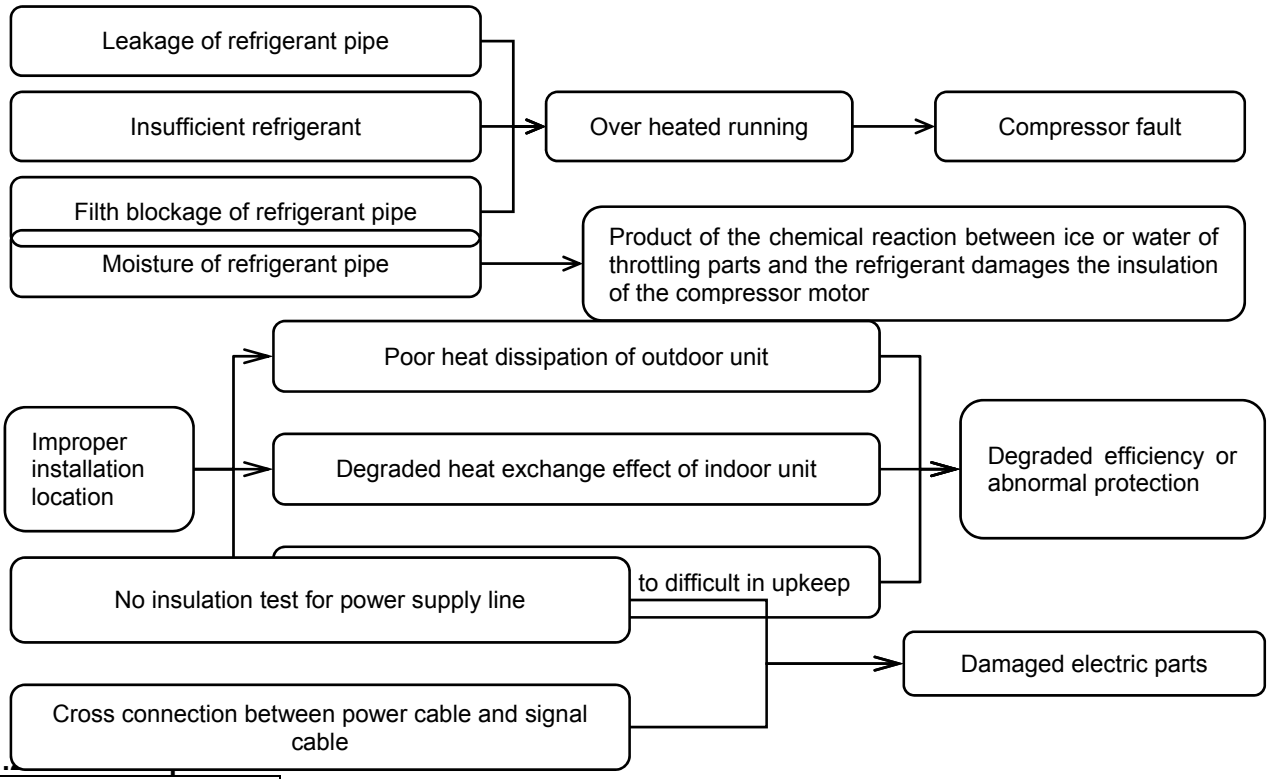
Outdoor branch	FQZHW-02N1	FQZHW-03N1	FQZHW-04N1
Gas side			
Liquid side			
Converter pipe (gas pipe used)			

Converter pipe (liquid pipe used)			
Gas balance joint 1			
Gas balance joint 2			
Oil balance	/		

1.2 Installation Procedure

1.2.1 Importance of the Installation Operation

Effect of installation issues on equipment:



1.

Pipe pre-install engineering ..... Ensure that the water drainage pipe inclines downward

⇩

Installing indoor unit — Make sure the model is correct.

⇩

Refrigerant piping engineering ..... Keep the refrigerant pipes dry, clean and sealed

⇩

Water drainage piping engineering ..... Downward inclination

⇩

Air duct engineering ..... Ensure sufficient ventilation rate

⇩

Thermal insulation engineering ..... Ensure no gap between the thermal insulation materials

⇩

Electric engineering ..... Select proper power cables

(signal cable, power cable) ..... (Signal cable should use 3-cores shielded wires)

⇩

Basement work for outdoor unit ..... Avoid short-circuit ventilation and ensure sufficient maintenance space

Installing outdoor unit ..... Avoid short-circuit ventilation and ensure sufficient maintenance space

⇩

Air tightness test ..... Check whether the air pressure remains at 4.0Mpa **(R410a)** after correction is made within 24 hours

⇩

Vacuum drying ..... Use vacuum pump that has a vacuum degree of less than -775mmHg

⇩

recharging refrigerant ..... Record the amount of refrigerant to be recharged on the outdoor unit and document it

⇩

Installing decorative panel ..... Ensure no gap between decorative panel and ceiling

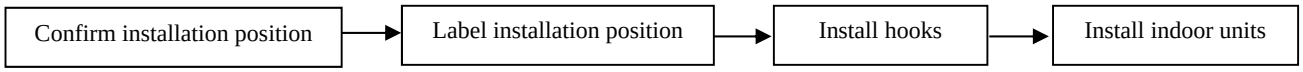
⇩

Test Running and commissioning ..... Run the indoor units one by one to check whether any pipe or cable is incorrectly installed

Delivering operation instructions ..... Deliver related materials while providing operation instruction to the user

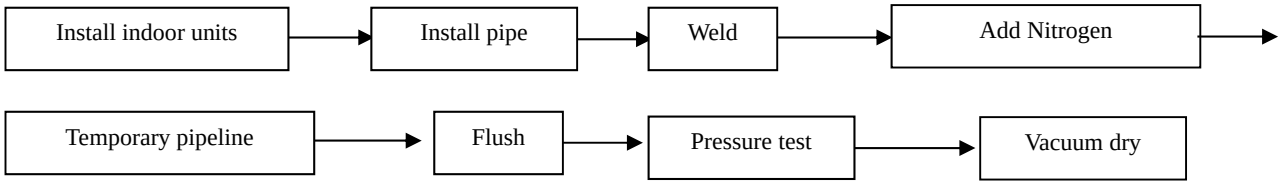
Note: The general procedure for refrigerant machine is subject to change according to the situation

1.2.3 Install indoor unit's procedure

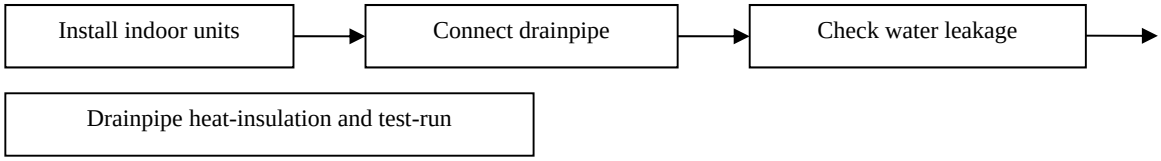


Note: 1. The hook must strong enough to sustain the weight of indoor unit.
2. Check the models of indoor units before installation.
3. Pay attention to the main devices, such as the pipeline.
4. Hold enough places for maintenance.

1.2.4 Refrigerant pipe procedure



1.2.5 Drainage pipe procedure



Note: It is no need to insulate the drainpipe if you choose the plastic pipe as drainpipe.

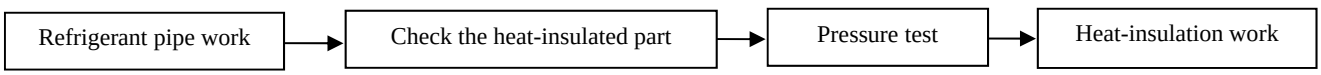
1.2.6 Electric wiring

1.2.6.1 Please select power supply for indoor unit and outdoor unit separately. Both indoor units and outdoor units should be grounded well.
1.2.6.2 The power supply should have specified branch circuit with leakage protector and manual switch.
1.2.6.3 Please put the connective wiring system between indoor unit and outdoor unit with refrigerant piping system together.
1.2.6.4 Power wiring should be done by professional electrician and complied with relevant National Electric Standard.
1.2.6.5 The power supply, leakage protector and manual switch 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.)
1.2.6.6 It is suggested to use 3-core shielded wire as signal wire between indoor and outdoor units, multi-core wire is unavailable. Pay attention to the consistency. When signal wire parallel to the power wire, please keep enough distance (about 300mm at least) to prevent interference.
1.2.6.7 The power wire and signal wire can't be enlaced together.

1.2.7 Lay the indoor pipeline

Note: Collocate the air-outlet reasonably to prevent airflow short-circuit. Check the static pressure whether in the allowable range. The air filters should be easy to unpick and wash. Do pressure test on pipeline.

1.2.8 Heat-insulation procedure

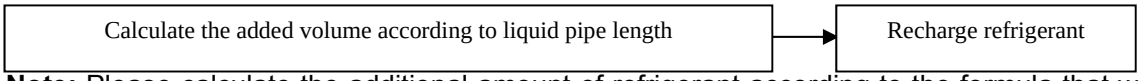


Note: For welding part, flare part and branch pipe, heat-insulation work must be done after finished the pressure test.

1.2.9 Install outdoor unit

Note: 1. Gutter must be set around the foundation to drain the condensation water.
2. When installing outdoor units at the roof, please check the strength of the roof and pay attention not to destroy the waterproof of the roof.

1.2.10 Recharge refrigerant procedure



Note: Please calculate the additional amount of refrigerant according to the formula that we supply to you, and the calculation result must be correct

1.2.11 Main points of test running and Commissioning

Please check the following issues before turning on the power:

1.2.11.1 Vacuum dry: Make sure the vacuum degree accord with our requirement about 10^{-5}.

1.2.11.2 Wiring: Includes the power wiring and communication wiring; Recheck the connection according to our corresponding wire diagrams. Especially, please remember our communication wire is polar; it means you must connect the communication wire correspondingly to the terminal block.

1.2.11.3 Additional charge of refrigerant: Recheck the calculation formula and recalculate the total recharge volume according to our supplied formula.

1.2.11.4 Open the stop-valve of gas and liquid pipe with Allen key; Check leakage of stop-valve with soap water. Please confirm whether the outdoor unit has been connected to the power for 12hr before start test running.

Test running: Turn on all of the indoor units with cooling mode and set the temperature in 17degree with high fan speed first, after the system operated, test following operation parameters of the system, including indoor units and outdoor units parameters.

1.3 Installation Preparation

1.3.1 Installation tools and instruments

All the necessary tools should be available, and their models and specifications should meet the installation and technical requirements. The instruments and meters should be tested or verified, and their scales and accuracy should meet the requirements. The common tools for installing refrigerant machine are listed below.

No.	Name	Specification/Model	No.	Name	Specification/Model
1	Pipe cutter		15	Electronic scale	
2	Steel saw		16	Stop	
3	Pipe bender	Spring, mechanic	17	Thermometer	
4	Pipe expander	Depend on the pipe diameter specification	18	Meter rule	
5	Flaring tool	Depend on the pipe diameter specification	19	Screw driver	“-”, “+”
6	Brazing welder	Depend on the nozzle size		Adjustable spanner	
7	Scraper		21	Resistance tester	
8	File/Rasp		22	Electro probe	
9	Injection tube		23	Multimeter	
10	Double-ended pressure gauge	4.0MPa	24	Pressure reducing valve	
11	Pressure gauge	1.5MPa, 4.0MPa	25	Wire pliers	
12	Vacuum gauge	-756mmHg	26	Clamping pliers	
13	Vacuum pump	At least 4 liters/second	27	Hexagon ring spanner	
14	Horizontal rule		28	Torque wrench	

In addition, tools such as electric welder, cutter, A-shape ladder, electric drill, folding machine, forming machine, nitrogen cylinder are also generally used during the installation.

1.3.2 Audit of construction drawings

Before the engineering installation, read carefully the related drawings to understand the design intention, audit the drawings, and then work out a detailed engineering organization plan.

1. Make sure that the pipe diameters and branch pipe models meet the technical specifications.
2. Ratio of slope, drainage mode and thermal insulation of condensate water.
3. Making of air duct and air opening, and air ventilation organization.
4. Configuration specifications, model and control mode of power cables.
5. Making, total length and control mode of control cable.

The engineering construction staff should follow the construction drawing strictly during the construction. If any change is required, such change should be approved by the design department and be documented.

1.3.3. Construction organization plan

Construction organization plan serves as the comprehensive technical and economic documents that guide the construction preparation and scientific construction organization. A reasonable construction organization plan and careful implementation of it are essential to ensure smooth construction, shorten construction

period, ensure construction quality, and improve economic results.
The construction plan should be concise and focuses on key procedures, construction method, and time coordination, space disposal of the construction around the features of the engineering, thus to ensure smooth construction operation.

1.3.4. Training of installation team

Establish sound training mechanisms. Service engineers are required to train installation team managers, work supervisors to train workers, and managers to train workers of special type. Establish a management mechanism in which pre-working training, before-shift disclosure and after-shift implementation are available.

1.3.5. Coordination with other sectors

Ensure smooth coordination and meticulous organization between these sectors: air conditioning, civil work, electricity, water supply and drainage, fire protection, decoration, intelligence, etc. Try best to lay pipes of the air conditioning system along the bottom of the beam. If pipes meet together at the same height, follow these principles:

1. Ensure that gravity pipes take precedence over water drainage pipes, air ducts and pressure pipes.
2. Ensure that large pipes take precedence over air ducts and small pipes.

1.3.6. Pipe pre-install engineering

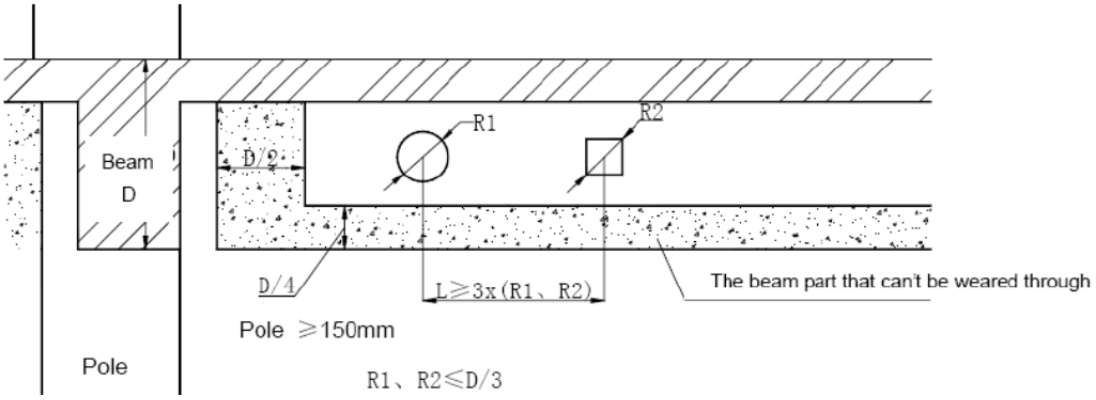
1.3.6.1. Operation procedure

Raise requirements to the civil work sector and coordinate → Determine the position, size and quantity of the machines, and conduct pre-installing → Check the pre-installing results

1.3.6.2. Pipeline route

1. The pipe for condensate water should have a downward slope (the slope should be at least 1/100).
2. The diameter of the through hole for the refrigerant pipe should take the thickness of the thermal insulation material into consideration (it is recommended to lay the gas pipe and liquid pipe in two separate columns).
3. Note that sometimes through hole is not allowed because of the structure of the beam.

eg. Strengthen the transfixion hole



Highlights:

1) When selecting the parts to be pre-installed, ensure that the weight of the accessories is also calculated.
2) In a situation where metal parts to be pre-installed is not allowed, use expansion bolts while ensuring sufficient load-bearing capacity.

Caution: The above figure is for reference only. It is not recommended to dig holes on either the beam or the shear wall. If such operation is indeed needed, please consult the property owner (or manager) and the civil work sector, and get written approval from the competent authority.

1.3.7 Warning

(1) Be sure only trained and qualified service personnel to install, repair or service the equipment.
Improper installation, repair, and maintenance may result in electric shocks, short-circuit, leaks, fire or other damage to the equipment.
(2) Install according to this installation instructions strictly.
If installation is defective, it will cause water leakage, electrical shock fire.
(3) When installing the unit in a small room, take measures against to keep refrigerant concentration from exceeding allowable safety limits in the event of refrigerant leakage.
Contact the place of purchase for more information. Excessive refrigerant in a closed ambient can lead to oxygen deficiency.
(4) Use the attached accessories parts and specified parts for installation. otherwise, it will cause the set to fall, water leakage, electrical shock fire.
(5) Install at a strong and firm location which is able to withstand the set' s weight.
If the strength is not enough or installation is not properly done, the set will drop to cause injury.
(6) The appliance must be installed 2.5m above floor.

(7) The appliance shall not be installed in the laundry.
(8) Before obtaining access to terminals, all supply circuits must be disconnected.
(9) The appliance must be positioned so that the plug is accessible.
(10) The enclosure of the appliance shall be marked by word, or by symbols, with the direction of the fluid flow.
(11) For electrical work, follow the local national wiring standard, regulation and installation instruction. An independent circuit and single outlet must be used.
If electrical circuit capacity is not enough or defect in electrical work, it will cause electrical shock fire.
(12) Use the specified cable and connect tightly and clamp the cable so that no external force will be acted on the terminal.
If connection or fixing is not perfect, it will cause heat-up or fire at the connection.
(13) Wiring routing must be properly arranged so that control board cover is fixed properly.
If control board cover is not fixed perfectly, it will cause heat-up at connection point of terminal, fire or electrical shock.
(14) If the supply cord is damaged, it must be replaced by the manufacture or its service agent or similarly qualified person in order to avoid a hazard.
(15) An all-pole disconnection switch having a contract separation of at least 3mm in poles should be connected in fixed wiring.
(16) When carrying out piping connection, take care not to let air substances go into refrigeration cycle.
Otherwise, it will cause lower capacity, abnormal high pressure in the refrigeration cycle, explosion and injury.
(17) Do not modify the length of the power supply cord or use of extension cord, and do not share the single outlet with other electrical appliances.
Otherwise, it will cause fire or electrical shock.
(18) Carry out the specified installation work after taking into account strong winds, typhoons or earthquakes.
Improper installation work may result in the equipment falling and causing accidents.
Remark: Failure to observe a warning may result in death.

1.3.8 Caution

(1) Ground the air conditioner.
Do not connect the ground wire to gas or water pipes, lightning rod or a telephone ground wire. Incomplete grounding may result in electric shocks.
(2) Be sure to install an earth leakage breaker.
Failure to install an earth leakage breaker may result in electric shocks.
(3) Connect the outdoor unit wires, and then connect the indoor unit wires.
You are not allowed to connect the air conditioner with the power source until wiring and piping the air conditioner is done.
(4) While following the instructions in this installation manual, install drain piping in order to ensure proper drainage and insulate piping in order to prevent condensation.
Improper drain piping may result in water leakage and property damage.
(5) Install the indoor and outdoor units, power supply wiring and connecting wires at least 1 meter away from televisions or radios in order to prevent image interference or noise.
Depending on the radio waves, a distance of 1 meter may not be sufficient enough to eliminate the noise.
(6) The appliance is not intended for use by young children or infirm persons without supervision. Young children should be supervised to ensure that they do not play with the appliance.
(7) Don't install the air conditioner in the following locations:
There is petrolatum existing.
There is salty air surrounding (near the coast).
There is caustic gas (the sulfide, for example) existing in the air (near a hot spring).
The Volt vibrates violently (in the factories).
In buses or cabinets.
In kitchen where there is full of oil gas.
There is strong electromagnetic wave existing.
There are inflammable materials or gas.
There is acid or alkaline liquid evaporating.
Other special conditions.
(8) The insulation of the metal parts of the building and the air conditioner should comply with the regulation of National Electric Standard.
Remark: Failure to observe a caution may result in injury or damage to the equipment.

2. Units Installation

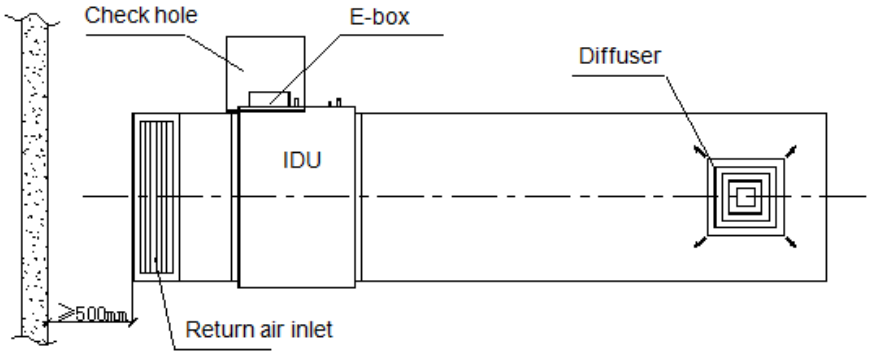
2.1 Installation of Indoor Unit

2.1.1 Installation procedure

Determine the installation position → Scribing and locating → Installing suspension road → Installing the indoor unit

2.1.2 Cautions for installation and check

1) Drawing check: Confirm the specification, model and installation direction of the set.
2) Height: Ensure that it closely fits the ceiling.
3) Suspension strength: The suspension road shall be strong enough to bear the weight twice of the indoor unit to ensure that no abnormal vibration or noise is generated when the set is running.
4) When installing the indoor unit, ensure that sufficient space is available for installing condensate water pipe.
5) Horizontal degree: It shall be kept within ±1°.
Purpose: Ensure smooth drainage of condensate water. Also ensure stability of the machine body to induce the risks caused by vibration and noise.
Hidden trouble of incorrect operation: a. Water leakage; b. Abnormal vibration and noise
6) Ensure sufficient maintenance & upkeep is available (keep a large enough maintenance hole, typically 400x400mm).
7) Avoid short-circuit ventilation.
Purpose: Ensure sufficient heat exchange of indoor unit and good air conditioning effect.
Risk of incorrect operation: Poor air conditioning effect; abnormal protection of the set.



2.2. Installation of Outdoor Unit

2.2.1. Acceptance and unpacking

1. After the machine arrives, check whether it is damaged during the shipment. If the surface or inner side of the machine is damaged, submit a written report to the shipping company.
2. Check whether the model, specification and quantity of the equipment conform to the contract.
3. After removing the outer package, please keep the operation instructions well and count the accessories.

2.2.2. Hoisting outdoor unit

Do not remove any package before the hoisting. Use two ropes to hoist the machine, keep the machine in balance, and then raise it safely and steadily. In case of no package or if the package is damaged, use plates or packing material to protect it.
When conveying and hoisting the outdoor unit, keep it upright, ensure that the slope does not exceed 30°, and keep safety in mind.

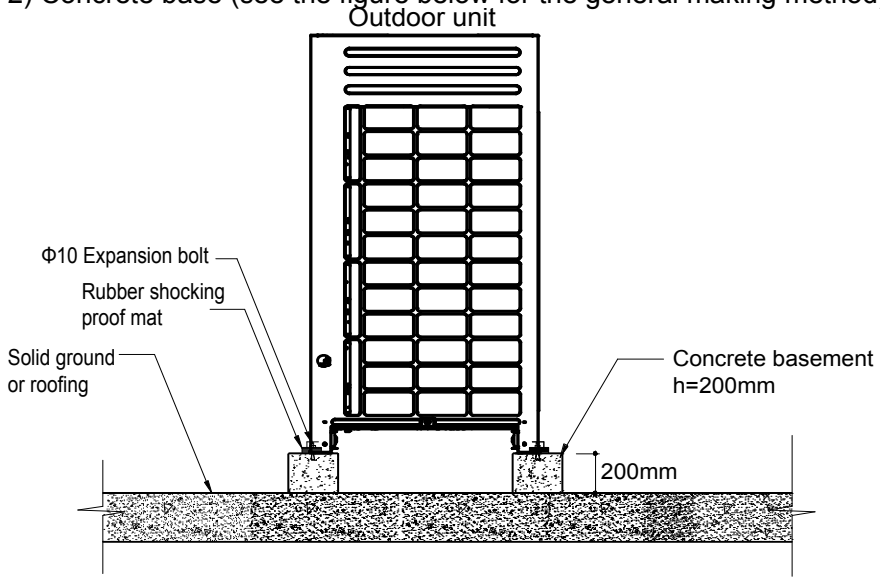
2.2.3. Selecting installation position

1. Ensure that the outdoor unit is installed in a dry, well-ventilated place.
2. Ensure that the noise and exhaust ventilation of the outdoor unit do not affect the neighbors of the property owner or the surrounding ventilation.
3. Ensure that the outdoor unit is installed in a well-ventilated place that is possibly closest to the indoor unit.
4. Ensure that the outdoor unit is installed in a cool place without direct sunshine exposure or direct radiation of a high-temperature heat source.
5. 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.
6. Do not install the outdoor unit in a place with oil pollution, salt or high content of harmful gases such as sulfurous gas.

2.2.4. Base for outdoor unit

1. A solid, correct base can:
1) Avoid the outdoor unit from sinking.
2) Avoid the abnormal noise generated due to base.
2. Base types

1) Steel structure base
2) Concrete base (see the figure below for the general making method)



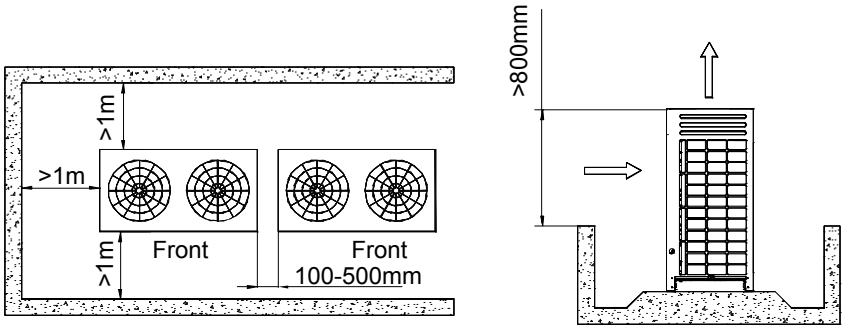
Remark:
The key points to make basement:
1) The master unit's basement must be made on the solid concrete ground. Refer to the structure diagram to make concrete basement in detail, or make after field measurements.
2) In order to ensure every point can contact equality, the basement should be on completely level.
3) 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 Φ10 strengthen reinforcing steel bar, the surface of the cement and sand plasm must be flat, border of the basement must be chamfer angle.
4) In order to drain off the seeper around the equipment, a discharge ditch must be setup around the basement.
5) Please check the affordability of the roofing to ensure the load capacity.

2.2.5. Installation highlights for outdoor unit

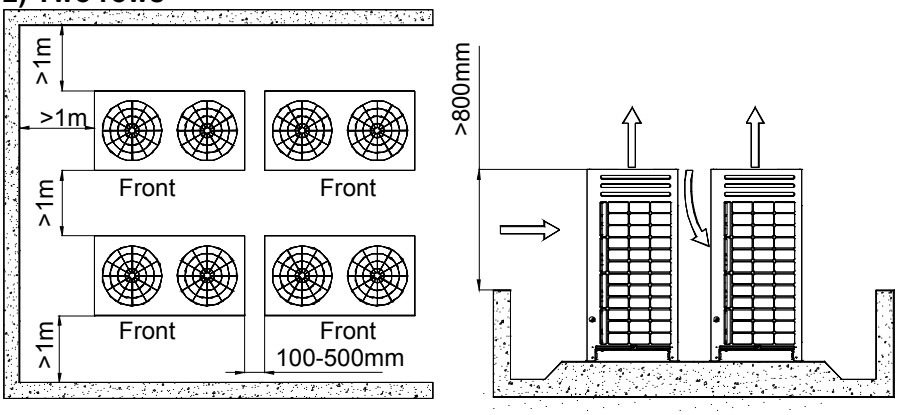
1. Install vibration isolator or isolating pad between the set and the base by the design specification.
2. Ensure close between the outdoor unit and the base, or significant vibration and noise may occur.
3. Ensure that outdoor unit is well grounded.
4. Before commissioning, do not turn on the valves of the gas pipe and liquid pipe of the outdoor unit.
5. Ensure sufficient maintenance space is available at the installation site.

2.2.6. Installation space for outdoor unit.

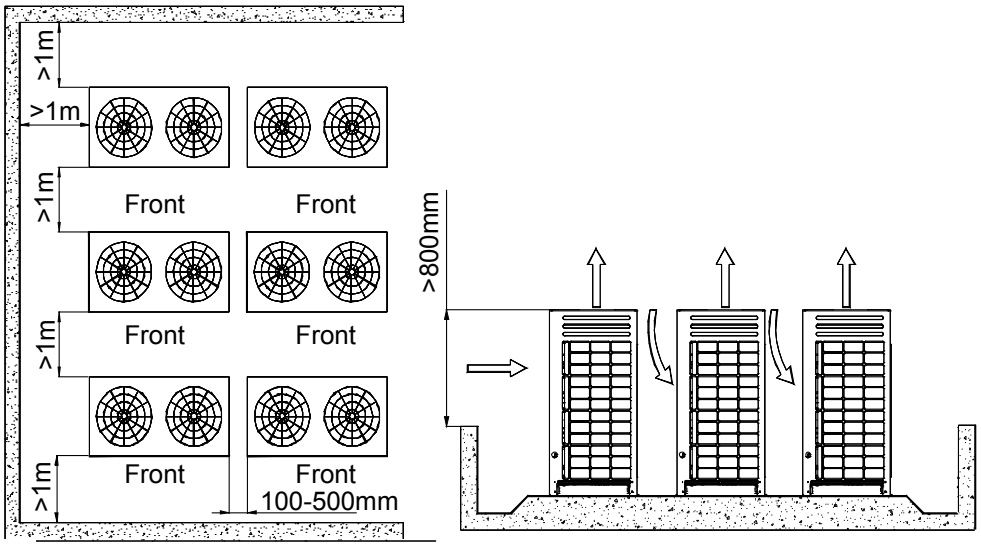
1) One row:



2) Two rows

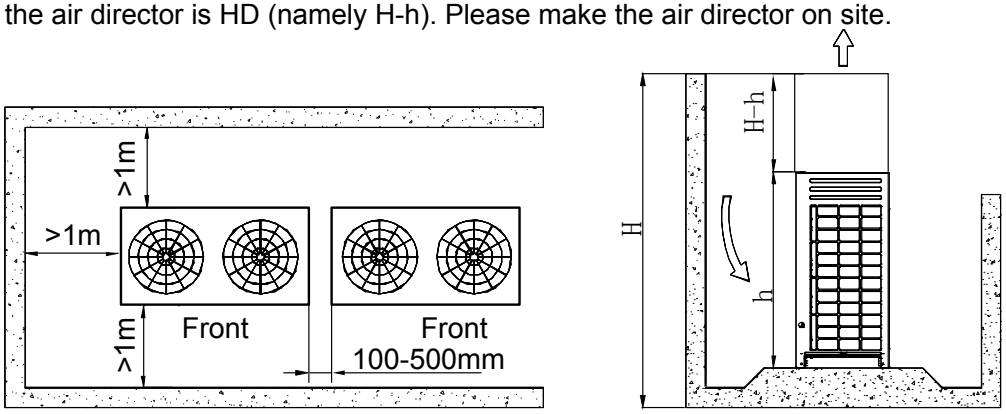


3) More than two rows



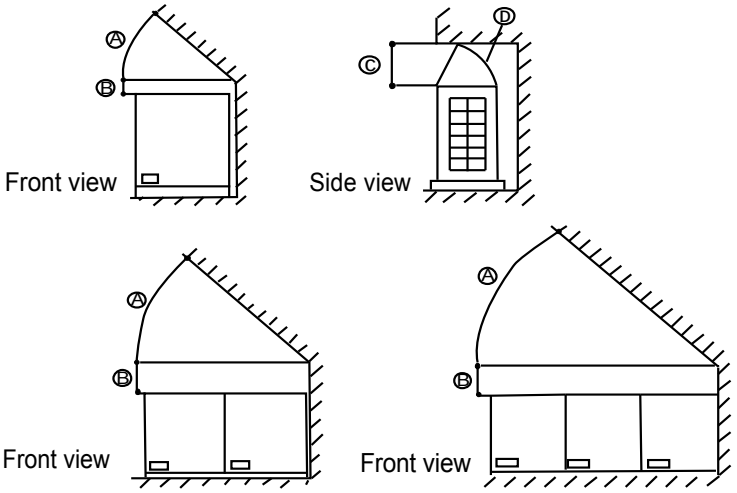
4) When the outdoor unit is lower than the surrounding obstacle,

Refer to the layout used when the outdoor unit is higher than the surrounding obstacle. However, 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.



5) For limited space installation

The dimensions should meet the request according to the marks, otherwise, a mechanic exhaust device must be added.

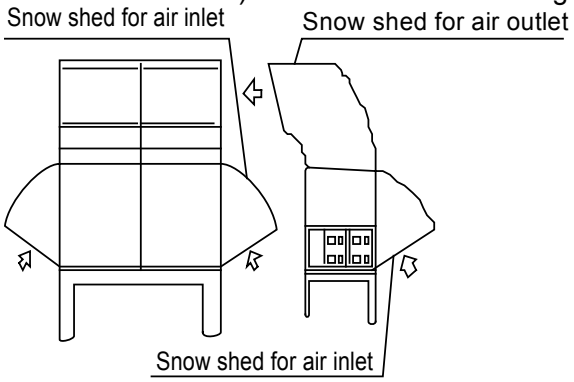


Ⓐ >45° Ⓑ >300mm

Ⓒ >1000mm Ⓓ Airflow deflector

6) 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 shed at the air inlet and air outlet.

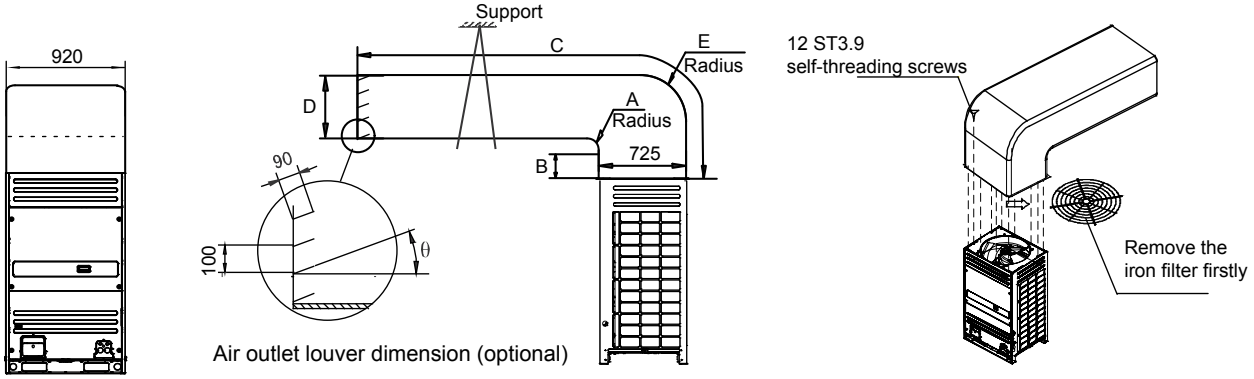


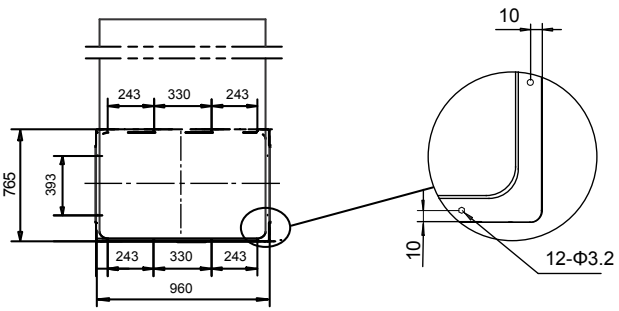
2.2.7. Mount the air deflector

When installing, takes off the mesh firstly, and then conduct in according of the following two schedules.

2.2.7.1 Installation of 8HP, 10HP.

Schedule 1:

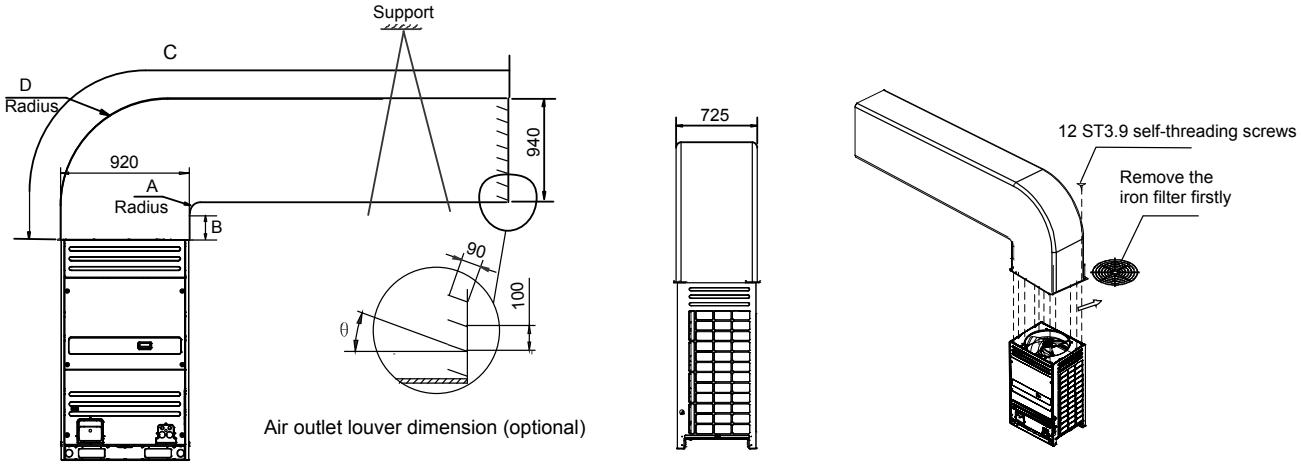




Unit: mm

A	A≥300
B	B≥250
C	C≤3000
D	725≤D≤760
E	E=A+725
θ	θ≤15°

Schedule 2:



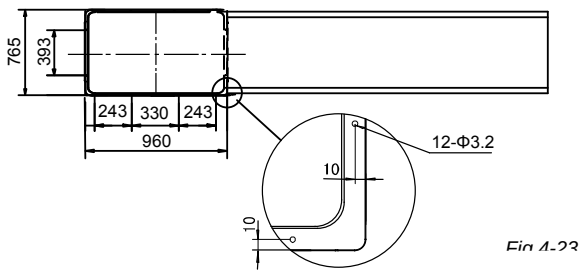
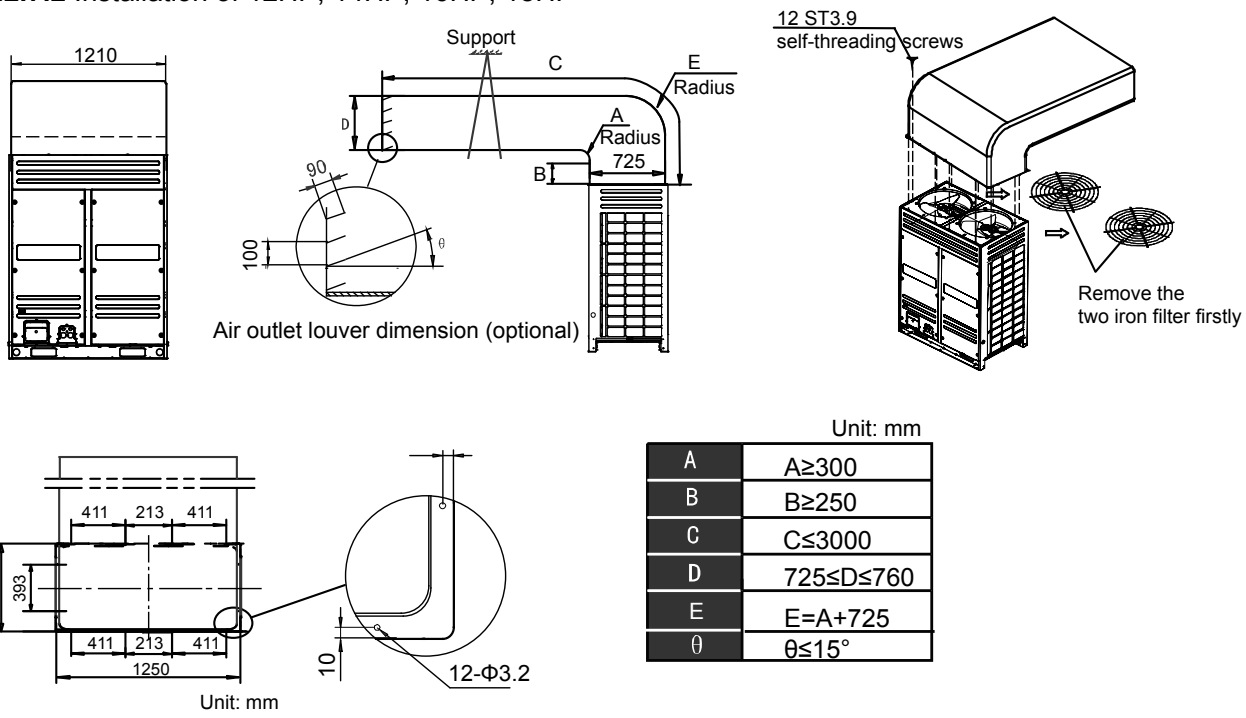


Fig 4-23

Unit: mm

A	A≥300
B	B≥250
C	C≤3000
D	D=A+920
θ	θ≤15°

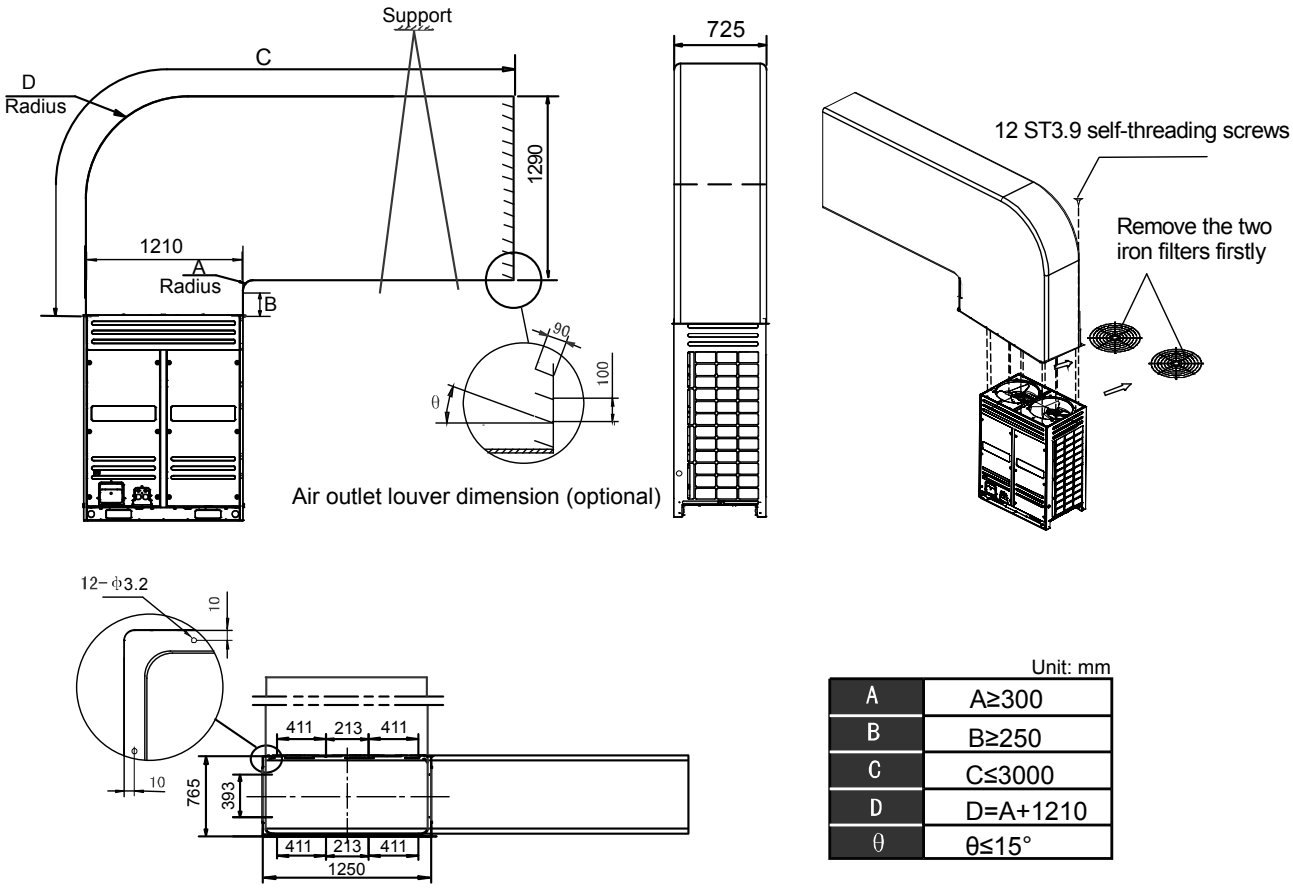
2.2.7.2 Installation of 12HP, 14HP, 16HP, 18HP



Unit: mm

A	A≥300
B	B≥250
C	C≤3000
D	725≤D≤760
E	E=A+725
θ	θ≤15°

Schedule 2:



Unit: mm

A	A≥300
B	B≥250
C	C≤3000
D	D=A+1210
θ	θ≤15°

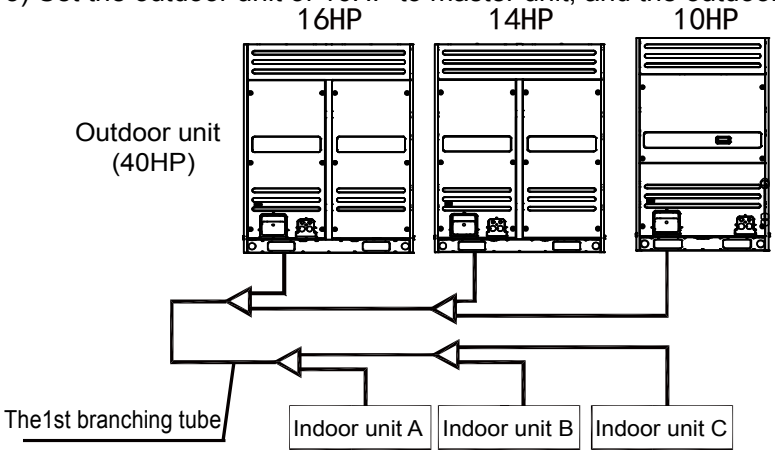
Note: Before install the air deflector, please ensuring the mesh enclosure has been took off; otherwise the air supply efficiency would be block down.
Once mounting the shutter to the unit, air volume, cooling (heating) capacity and efficiency would be block down, this affection enhance along with the angle of the shutter. Thus, we are not recommend you to mount the shutter, if necessary in use, please adjust the angle of shutter no larger than 15°.
Only one bending site is allowanced in the air duct, otherwise, device may be disoperation.

2.2.8. Arrangement of outdoor units

If more than two outdoor units are combined in the system, these outdoor units shall be arranged according to the descending order of their cooling capacity, and the outdoor unit with the highest cooling capacity shall be placed at the first branch pipe. In addition, the outdoor unit with the highest cooling capacity shall be set to master unit, while others shall be set to slave units.

The following takes a system with outdoor units of 40HP (10HP+14HP+16HP) as an example:

1) Place the outdoor unit of 16HP beside the first branch pipe (see the figure below)
2) Place the outdoor units in the descending order of their cooling capacity, namely, 16HP, 14HP and 10HP.
3) Set the outdoor unit of 16HP to master unit, and the outdoor units of 14HP and 10HP to slave unit.



Remark: All the outdoor units should be installed on the location of same level, or it may cause imbalance of refrigerant distributing and lead the fault of the compressors.

Although the MIV V5 series outdoor units can auto balance the load due to the master free cycle duty operation, but it is still recommended to install the biggest unit close to the first branch and set as master also.

3. Refrigerant Pipe Engineering

3.1. Refrigerant Pipe Processing

3.1.1 Basic requirements

3.1.1.1. Operation procedure

Determine the route and size of the pipeline according to the construction drawing → Make and installing bracket, hanger and support → Make and arrange pipe accessories → Recharge nitrogen gas for protection → Brazing welding → Pipe flushing → air tightness test → Thermal insulation → Vacuum drying

3.1.1.2. Three principles for refrigerant piping

Item	Reasons	Countermeasure
Dry	The rain comes into/engineering water comes into produced condensate water in the pipe	The process of tubing must be criterion → Below cleanly → Vacuum
Cleanness	There are oxide produced by welding\outside dust\sundries comes into	Charge nitrogen gas to prevent when welding Attention the cleanness during the piping process → Below cleanly
Air tightness	Imprecision weld /unqualified airproof to flaring pipe /leakage of the fringe	Use the suited welding rod to weld Comply to the welding operation criteria Comply to the bell mouth connecting operation criteria Comply to the interface operation criteria → Air tightness test

Caution: Removing oil for copper pipe of a system that uses R410A

For the system that uses R410A, oil-free copper pipes should be selected (they can also be customized). If ordinary (oily) copper pipes are used, it must be cleaned with gauze that is dipped into tetrachloroethylene solution.

Purpose of cleansing copper pipe: Remove the lube (industrial oil used during the processing of the copper pipe) attached to the inner wall of the copper pipe. The ingredients of such lube are different from those of the lube used by the R410A refrigerant, and they will produce deposit through reaction, which may cause complicated system fault.

Special Note: Never use CCl4 for pipe cleansing and flushing, or the system will be seriously damaged.

3.1.1.3. Support for refrigerant pipe

1. Fixing horizontal pipe

When the air conditioner is running, the refrigerant pipe will deform (for example, shrunk/expanded or inclined downward). To avoid pipe damage, use hanger or support to support it (see the table below for the criteria).

Pipe Diameter (mm)	Less than Φ20	Φ20-40	Larger than Φ40
Interval between support points (m)	1	1.5	2

In general, gas pipe and liquid pipe should be suspended in parallel, and the interval between support points should be selected according to the diameter of the air pipe. Since the temperature of the flowing refrigerant will change as the operation and working condition change, which will result in hot expansion and cold shrinkage of the refrigerant pipe, so the pipe with thermal insulation should not be clamped tightly, otherwise the copper pipe may get broken due to stress concentration.

2. Fixing vertical pipe

Fix the pipe along the wall according to the pipeline route. Round log should be used at the pipe clip to replace thermal insulation material, “U”-shape pipe should be fixed outside the round log, and the round log should be provided with anticorrosion treatment.

Pipe Diameter (mm)	Less than Φ20	Φ20-40	Larger than Φ40
Interval between support points (m)	1. 5	2. 0	2. 5

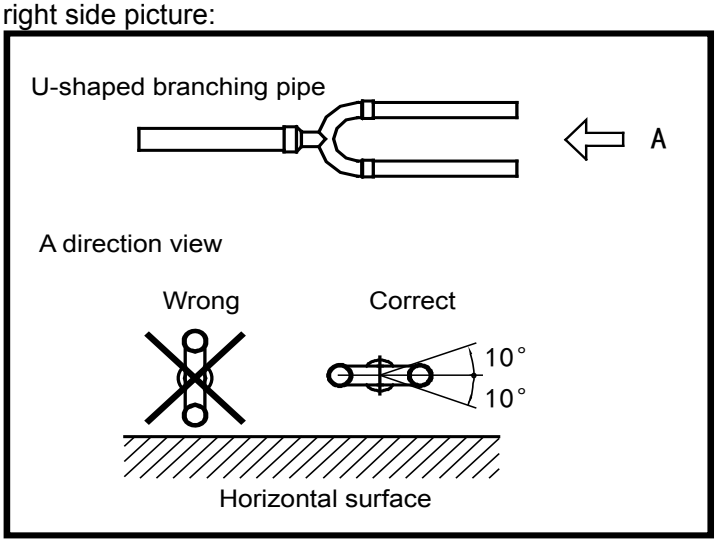
3. Local fixing

To avoid stress concentration due to expansion and shrinkage of the pipe, it is usually required to conduct local fixing beside the wall through-holes of the branch pipe and end pipe.

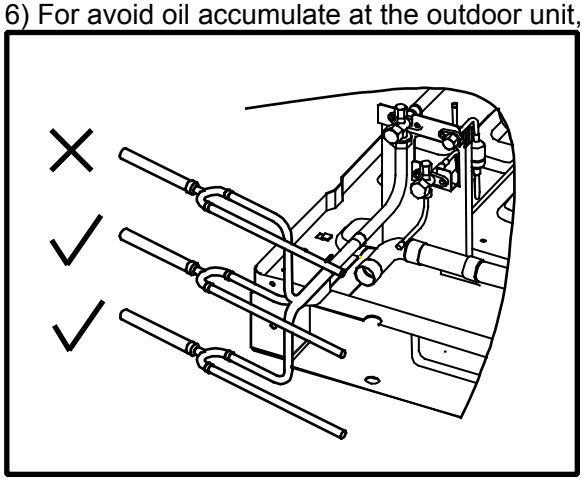
3.1.1.4 Requirements for installing branch pipe subassembly

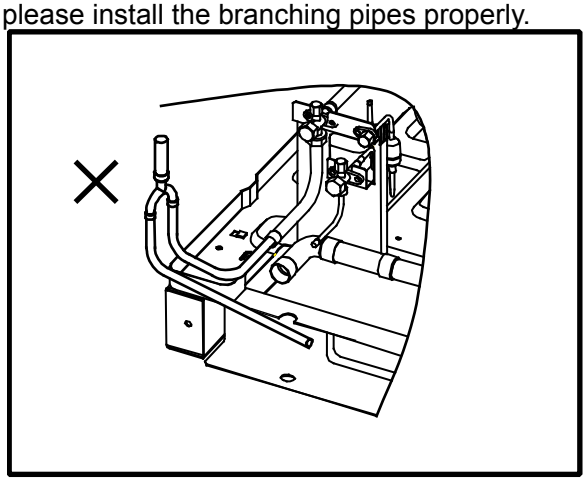
When laying the branch pipe subassembly, pay attention to the following:

1) Do not replace branch pipe with tee pipe.
2) Follow the construction drawing and installation instructions to confirm the models of branch pipe subassembly as well as the diameters of main pipe and branch pipe.
3) Neither sharp bend (an angle of 90°) nor connection to other branch pipe subassembly is allowed at places within 500mm away from the branch pipe subassembly.
4) Try best to install the branch pipe subassembly at a place that facilitates welding (if doing so is impossible, it is recommended to prefabricate the subassembly).
5) Install vertical or horizontal branch joint, and ensure that the horizontal angle is within 10°. Refer to the right side picture:

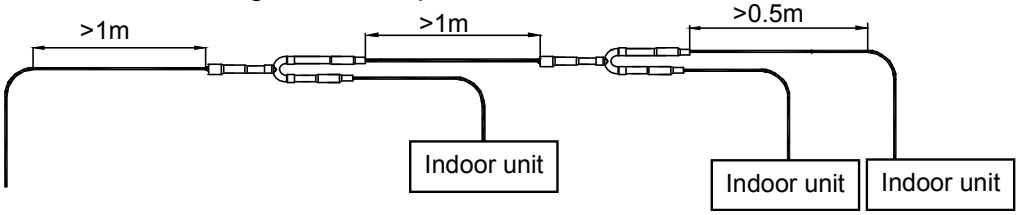


6) For avoid oil accumulate at the outdoor unit, please install the branching pipes properly.





7) To ensure even diversion of refrigerant, pay attention to the distance between the branch pipe subassembly and the horizontal straight pipe.
a. Ensure that the distance between the bending point of copper pipe and the horizontal straight pipe section of the adjacent branch pipe is larger than or equal to 1m.
b. Ensure that the distance between the horizontal straight pipe sections of the two adjacent branch pipes is larger than or equal to 1m.
c. Ensure that the distance between the branch pipe and the horizontal straight pipe section used to connect the indoor unit is larger than or equal to 0. 5m.

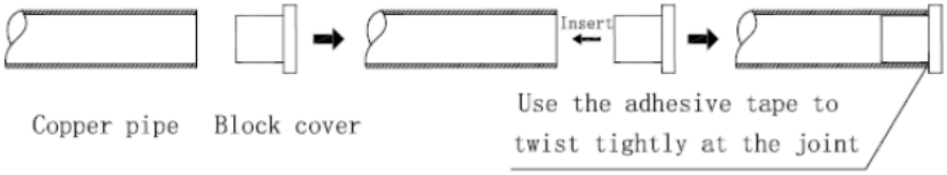


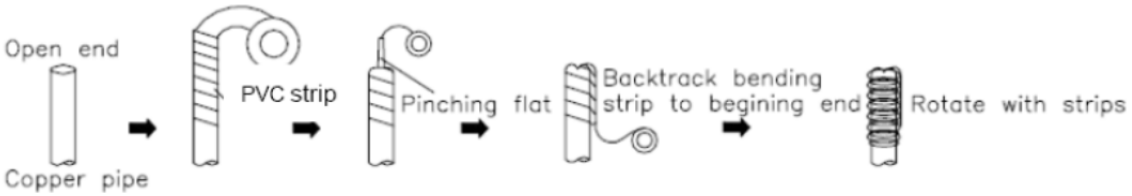
3.1.2. Storage and maintain of copper pipe
3.1.2.1. Pipe carriage and storage
1. Avoid the pipe from bending or deforming during the carriage.
2. Seal the openings of the copper pipe with end cover or adhesive tape during the storage.
3. Place the coil upright to avoid compressing deformation due to self weight.
4. Use wooden support to ensure that the copper pipe is higher than the ground, so as to make the pipe

dust-proof and water-proof.
5. Take dust-proof and water-proof measures at both ends of the pipe.
6. Keep the pipes on special bracket or bench at specified place on the construction site.

3.1.2.2. Correct to seal the opening

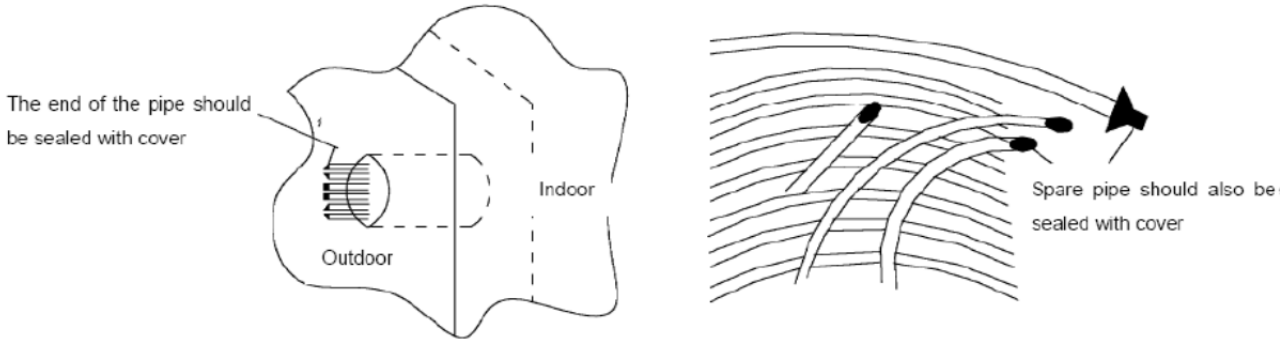
1. There are two ways for opening sealing:
1) Sealing with cover or adhesive tape (suitable for short-term storage)
2) Sealing welding (suitable for long-term storage)
Caution: The openings of the copper pipe must be sealed at any time during the construction.
● Method of sealing with cover or adhesive tape



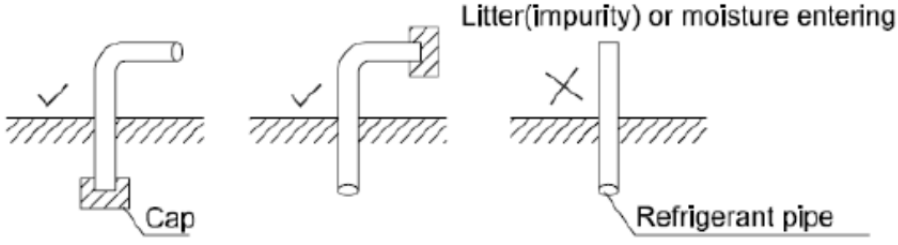


※It is recommended to seal the openings of the pipe with both cover and adhesive tape.
● Method of sealing welding

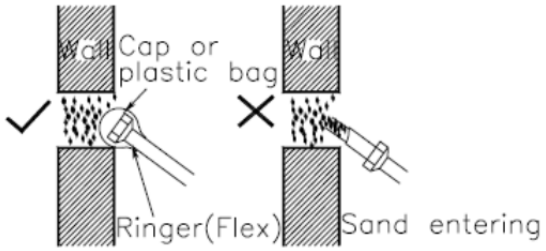
2. Special attention:
1) When putting the copper pipe through the hole in the wall（dirt is easy to enter into the pipe）.



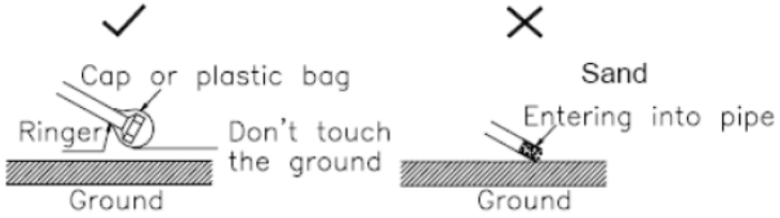
2) When the copper pipe goes outside the wall, ensure that no rain water can enter the pipe, particularly when the pipe is placed upright.
3) Before completing the pipe connection, seal the openings of the pipe with covers.
4) Place the openings of the pipe vertically or horizontally.



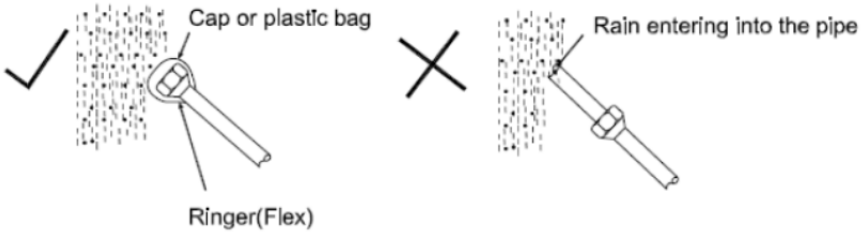
5) Before putting the pipe outside the wall, seal the opening of the pipe with a cover.



6) Do not place the pipe on the ground directly, or keep it away from ground friction.



7) When conduct piping on a raining day, remember to seal the openings of the pipe first.



3.1.3 Processing of copper pipe

3.1.3.1. Pipe cutting

1. Tool

Use a pipe cutter instead of a saw or cutting machine to cut the pipe.

2. Correct operation procedure:

Rotate the pipe evenly and slowly, and apply force to it. Cut the pipe off while ensuring that it does not deform.

3. Risk if a saw or cutting machine is used to cut pipe:

Copper chip will enter the pipe (in this case, it will be very hard to clean up), or which may even enter the compressor or blocking the throttling unit.

3.1.3.2. Rectify opening of copper pipe

1. Purpose

Clear out the burr at the opening of the copper pipe, clean the inside of the pipe, and rectify the opening of the pipe, so as to avoid scratch at the opening to be sealed during flaring.

2. Operation procedure

1) Use a scraper to remove the inner spurs. When doing so, keep the opening of the pipe downwards to avoid copper chip from entering the pipe.

2) After the chamfering is completed, use veiling to remove the copper chip out of the pipe.

3) Ensure no scar of produced, so as to avoid the pipe from getting broken during flaring.

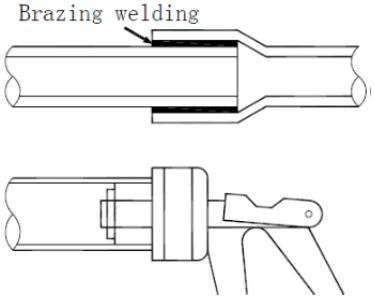
4) If the pipe end obviously deforms, cut the end off and then cut the pipe again.

3.1.3.3. Pipe expansion

1. Purpose: Expand the opening of the pipe so that another copper pipe can be inserted to replace direct connection and reduce welding spots.

2. Highlight: Ensure that the connection part is smooth and even; after cutting the pipe off, remove the inner spurs.

3. Operation method: Insert the expanding header of the pipe expander into the pipe to expand the pipe. After completing pipe expansion, rotate the copper pipe a small angle to rectify the straight line scratch left by the expanding header.



3.1.3.4. Opening bell-mouthed opening

1. Purpose: Flaring Bell-mouthed opening is used for screw thread connection.

2. Highlight:

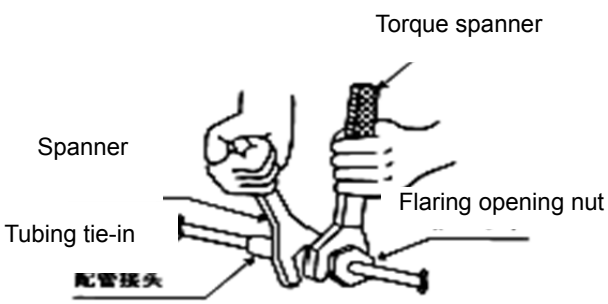
1) Before performing the Bell-mouthed opening operation, perform fire annealing for the hard pipe.

2) Use pipe cutter to cut pipe to ensure even cross section and avoid refrigerant leakage; do not use a steel saw or metal cutting device to cut pipe, otherwise the cross section will get deformed and the copper chip will enter the pipe.

3) Remove burr carefully to avoid scar on the bell-mouthed opening, which may lead to refrigerant leakage.

4) When connecting pipes, use two spanners (one torque wrench and one non-adjustable spanner).
5) Before conducting opening bell-mouthed, install pipe onto the flaring nut.
6) Use proper torque to tighten the flaring nut.

Pipe Diameter	Torque		Legend
	(kgf-cm)	(N-cm)	
1/4" (6. 35)	144~176	1420~1720	
3/8" (9. 52)	333~407	3270~3990	
1/2" (12. 7)	504~616	4950~6030	
5/8" (15. 88)	630~770	6180~7540	
3/4" (19. 05)	990~1210	9270~11860	

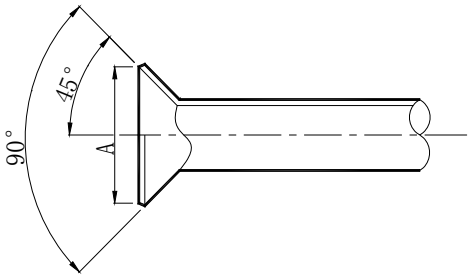


Caution: When you are tightening the flaring nut with a spanner, the tightening torque will be suddenly increased at a certain point. From this point, further tighten the flaring nut to the angles shown below.

Pipe Diameter	Angle of further tightening	Recommended length of tool lever
3/8" (9. 52)	60°~90°	About 200mm
1/2" (12. 7)	30°~60°	About 250mm
5/8" (15. 88)	30°~60°	About 300mm

7) Check whether the surface of the flaring opening is damaged. The size of the flaring opening is as shown below.

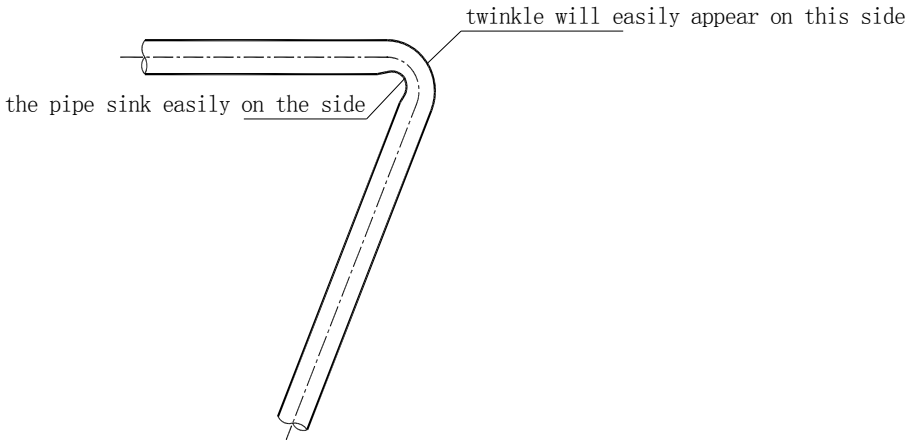
Pipe Diameter	R410A	Legend
	Size of Flaring Opening (A)	
1/4" (6. 35)	8. 7~9. 1	
3/8" (9. 52)	12. 8~13. 2	
1/2" (12. 7)	16. 2~16. 6	
5/8" (15. 88)	19. 3~19. 7	
3/4" (19. 05)	23. 6~24. 0	



Cautions:
a. Apply some refrigeration oil onto the inner surface and outer surface of the flaring opening, to facilitate the connection or rotation of the flaring nut, ensure close sticking between the sealing surface and the bearing surface, and avoid pipe bending.
b. Ensure that the flaring opening is not cracked or deformed, otherwise it cannot be sealed or, after the system runs for some time, refrigerant leakage will occur.

3.1.3.5. Pipe bending

1. Method
1) Manual bending: Suitable for thin copper pipes (ф6. 35-ф12. 7).
2) Mechanical bending: Suitable in a wide range of copper pipes (ф6. 35-ф67). Spring bender, manual bender or electric bender is used.
Purpose: Reduce welding joints and required elbows, and improve engineering quality; In order to save material, no joint is needed.
2. Caution
1) When bending a copper pipe, ensure that there is no twinkle or deformation on the inner side of the pipe.
2) When using a spring bender, ensure that the bender is clean before inserting it in the copper pipe.
3) When using a spring bender, ensure that the bending angle does not exceed 90°, otherwise twinkle will appear on the inner side of the pipe, and the pipe may easily get broken.
4) Ensure that the pipe does not sink during the bending process; ensure that the cross section of the bending pipe is larger than 2/3 of the original area, otherwise it cannot be used.



3.1.4 Brazing welding operation

3.1.4.1. Selecting refrigerant pipe

1. All pipe use shall comply with national or local standards (for example, pipe diameter, material, thickness, etc.)
2. Specification: Seamless phosphorus to oxygenate copper pipe
3. Try best to use straight pipe or coil and avoid too much brazing welding.

Note: Select the pipes according to the pipe diameters shown below (O—coil, 1/2H—straight pipe)

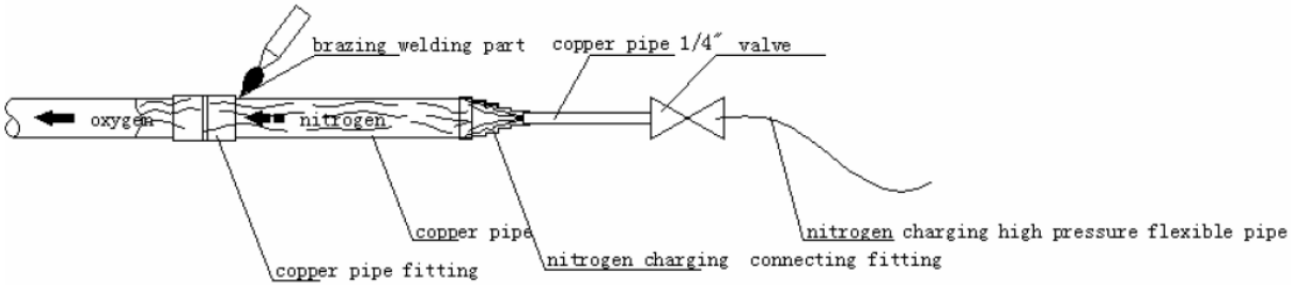
Outer Diameter	Material	Minimum Thickness	Outer Diameter	Material	Minimum Thickness	Outer Diameter	Material	Minimum Thickness
Φ6. 35	O	0. 8	Φ19. 0	O	1. 0	Φ38. 0	1/2H	1. 5
Φ9. 52	O	0. 8	Φ22. 0	1/2H	1. 2	Φ45. 0	1/2H	1. 5
Φ12. 7	O	0. 8	Φ25. 0	1/2H	1. 2	Φ54. 0	1/2H	1. 8
Φ15. 9	O	1. 0	Φ28. 6	1/2H	1. 3	Φ67. 0	1/2H	1. 8

3.1.4.2. Nitrogen filling for protecting copper pipe during brazing welding

1. Purpose: Avoid oxide scale from appearing on the inner wall of the copper pipe in the high temp.
2. Risks of non-protective welding:

If no sufficient nitrogen is charged into the refrigerant pipe being welded, oxides will be generated on the inner wall of the copper pipe. These oxides will block the refrigerant system, which will lead to all kinds of malfunctions such as burn-out the compressor, poor cooling efficiency.

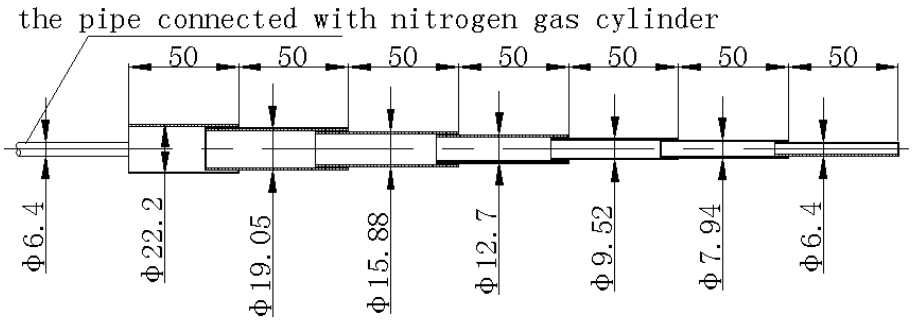
To avoid these problems, charge nitrogen continuously into the refrigerant pipe during the brazing welding, and ensure that the nitrogen passes through the operating point until the welding is completed and the copper pipe cools down completely. The schematic diagram for nitrogen charging is shown below.



3. Making Nitrogen-Charging Pipe Joint

When welding the pipe joint, connect the nitrogen-charging joint to the pipe fittings to be welded.

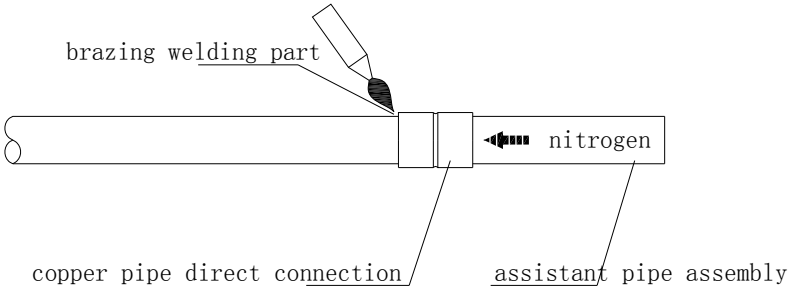
The nitrogen-charging joint is shown below:

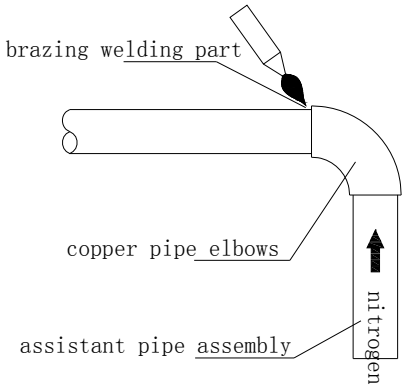


4. Cautions for Welding Pipe Fittings

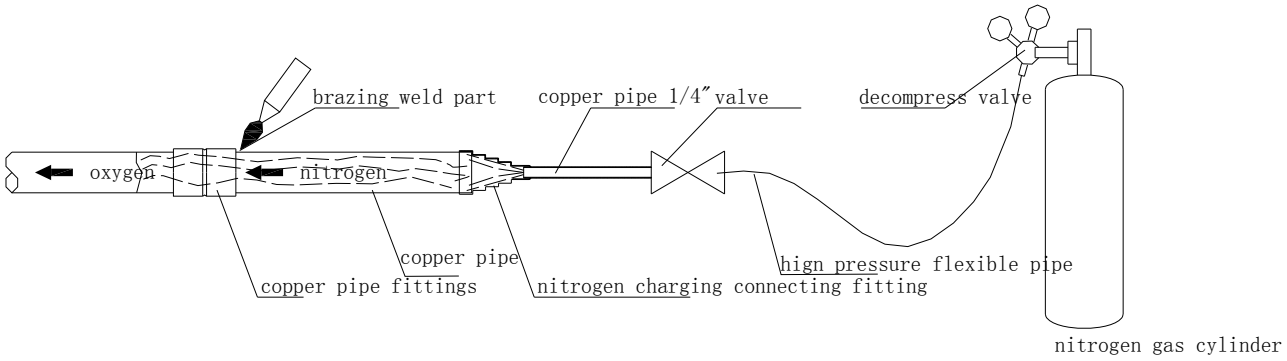
1) Adopt transition pipe.

2) Charge nitrogen from the side of the short pipe, because short distance may result in perfectible nitrogen replacement effect.





5. Standard operation of Brazing Welding



6. Highlight

1) Control the nitrogen pressure to be about 0.2-0.3kgf/cm² during the welding.

2) Ensure the gas is nitrogen; oxygen will easily leads explosion, so it is forbidden.

3) Use pressure reducing valve, and control the pressure of the charged nitrogen to be about 0.2kg/ cm².

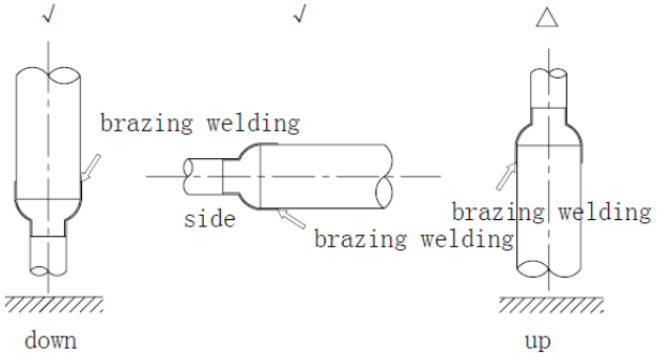
4) Select a proper position for charging nitrogen.

5) Ensure that the nitrogen passes through the welding spots.

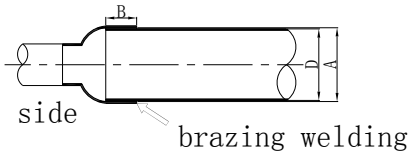
6) If the pipeline between the position for charging nitrogen and the welding spot is rather long, ensure that the nitrogen is charged for sufficient time so as to discharge all the air from the welding spot.

7) After completing the welding, charge the nitrogen continuously until the pipe cools down completely.

8) Try best to conduct welding downwards or horizontally and avoid face-down welding.



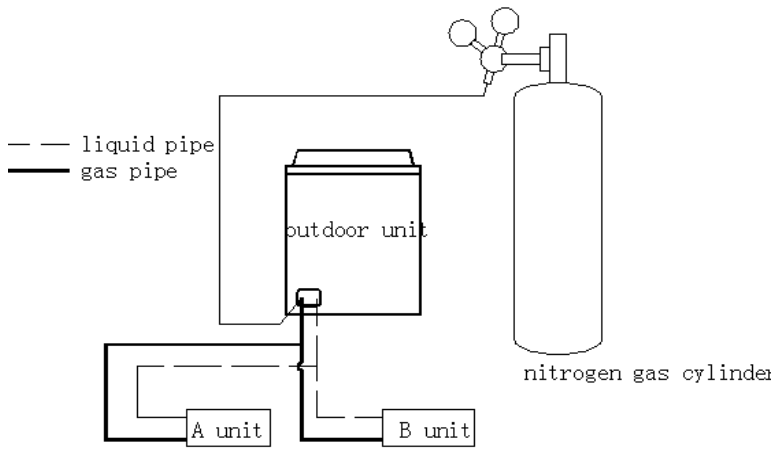
7. Cautions
1) Take fire-prevention measures when conducting welding (ensure that a fire extinguisher is available beside the operating position).
2) Avoid getting burnt.
3) Pay attention to the fit gap of the position where the pipe is inserted.
Note: The follow table shows the relation between the minimum embedded depth and gap at the copper pipe joint.

Type	Outer Diameter of Pipe (D) (mm)	Minimum Inlaid Depth (B) (mm)	Gap A—D (mm)
	5<D<8	6	0. 05—0. 21
	8<D<12	7	
	11<D<16	8	0. 05—0. 27
	16<D<25	10	
	25<D<35	12	0. 05—0. 35
	35<D<45	14	

3.1.5 Pipe cleaning out
3.1.5.1. Flushing copper pipe
1. Function: use pressure gas to flush pipeline (raw material or welded assembly) for eliminating dust, trash and moisture. Solid impurity is hard to be washed out, so special attention shall be drawn to the protection of copper pipeline during construction.
2. Purpose
1) Eliminate oxide powder or part oxide layer in copper pipe.
2) Help to clear out dirt and humidity in pipe.
3. Risk in case of no flushing:
If the remaining solid impurity and moisture in pipeline could not be eliminated effectively, serious malfunctions shall happen, such as ice blockage, dirt blockage and compressor being jammed.

3.1.5.2. Procedure of flushing

1. Mounting pressure adjusting valve on nitrogen gas cylinder. The applied gas must be nitrogen. If adopting polytetrafluoro ethylene or carbon dioxide, there is a risk of condensation. If using oxygen, there is a risk of explosion.
2. Making use of inflation tube to connect outlet of pressure adjusting valve and inlet at liquid pipe side of outdoor unit.

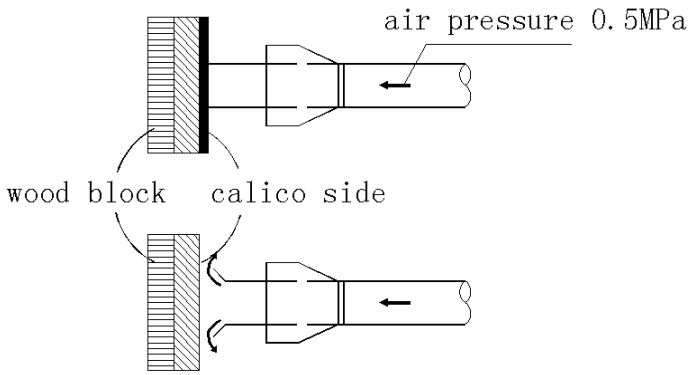


3. Use blind plug to block all connectors of liquid side copper line (including unit B) soundly, excluding indoor unit A.
4. Turn on nitrogen gas cylinder valve, and then pressurize to 5kgf/cm2 gradually through adjusting valve.
5. Check whether nitrogen has passed through the liquid pipe at the side of indoor unit A. Connector at the side of indoor unit body has been covered by tape to prevent the entering of dirt.

3.1.5.3. Detailed steps for flushing

1. Hold proper blockage material (such as block bag and white cotton) to push against the main pipe opening at the gas side of indoor unit.
2. When pressure increases and hands could not push against the opening, suddenly release pipe opening (flushing for first time).

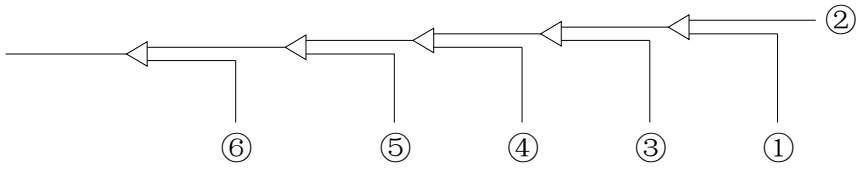
Repeat above step1 and step 2 to re-flush dirt (flushing for multi-times)



3. During flushing, place a piece of white cotton at the pipe opening for checking, and you shall find some humidity occasionally.

Way of thoroughly drying pipeline is as follows:

1) Making use of nitrogen gas to flush the inner part of pipe until no dirt and humidity.
2) Carry out vacuum drying operation (see vacuum drying of MIV refrigerant piping in detail).
3) Shut down nitrogen main valve.
4) Repeat above operations to the connected copper pipe of all indoor units.
5) Sequence of flushing: when pipeline has been connected to system, sequence of flushing is from far to near, that is, in light of principal unit, flushing from the farthest pipe opening to principal unit in turn (i.e. 1)-2)-3)-4)-5)-6)).



Caution: When flushing one pipe opening, block all pipe openings which are connected to this opening.

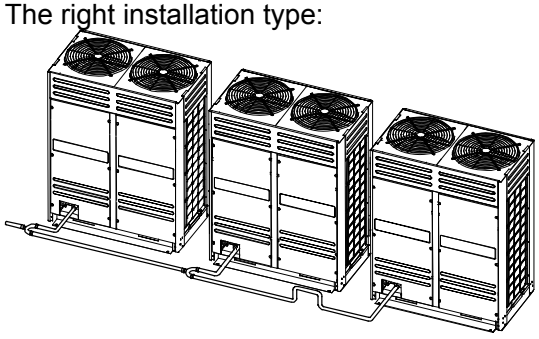
6) After finishing flushing, seal soundly all openings linked with atmosphere to prevent the entering of dust, trash and moisture.

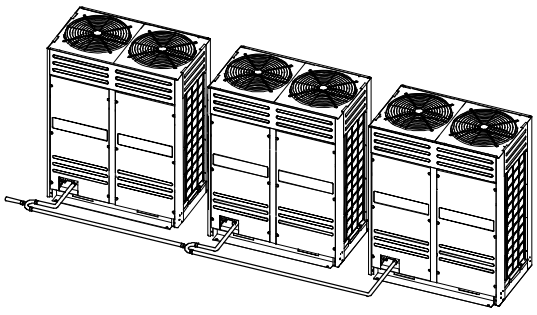
3.1.6 Installation highlight of pipe system

1) Pipe between outdoor units must install horizontally, the mid-connecting pipe between those pipes aren't allowed downward drop.

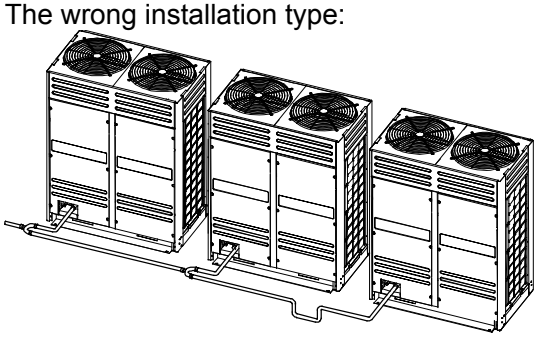
2) All pipes between outdoor units cannot be higher than the outdoor units' outlet.

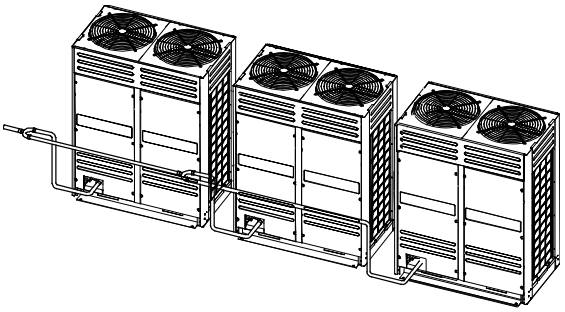
The right installation type:





The wrong installation type:





3.2. Air Tight Test

3.2.1 Purpose and operation procedure of air tightness test

3.2.1.1. Purpose

Search leak source, make sure there is no leakage in system to prevent system fault due to leakage of refrigerant.

3.2.1.2. Operation tips

Subsection detection, overall pressure-keeping, grading pressurization.

3.2.1.3. Operation procedure

1. After piping of indoor unit has been connected, weld port of high-pressure side piping.
2. Weld low-pressure side piping with connector for pressure gauge together.
3. Charge nitrogen slowly into pressure gauge connector to conduct air tightness test.

3.2.2 Operation of air tightness test

3.2.2.1. Operation procedure

1. When conducting air tightness test, make sure that gas pipe and liquid pipe are kept in full-shut status; otherwise, nitrogen might enter the circulation system of outdoor unit. Both gas valve and liquid valve need to be strengthened before pressurization d.
2. Each refrigerant system shall be slowly pressurized from the two sides of gas pipe and liquid pipe.
3. Make use of dry nitrogen as medium to conduct air tightness test. Phase-in control diagram of pressurization is as follows:

No.	Phase (phase-in pressurization)	Criteria
1	Phase 1: appear large leakage after over three minutes of pressurization with 3.0kgf/cm^2.	No pressure drop after modification
2	Phase 2: appear major leakage after over three minutes of pressurization with 15. 0kgf/cm^2.	
3	Phase 3: appear small leakage after over 24 hours of pressurization with R410A: 40.0kgf/cm^2.	

3.2.2.2. Pressure observation

1. Pressurize to regulated value and maintain 24 hours. When modifying pressure according to variation of temperature, it is qualified if pressure drop does not happen. If pressure falls, find out the leak source and modify it.
2. Modification method

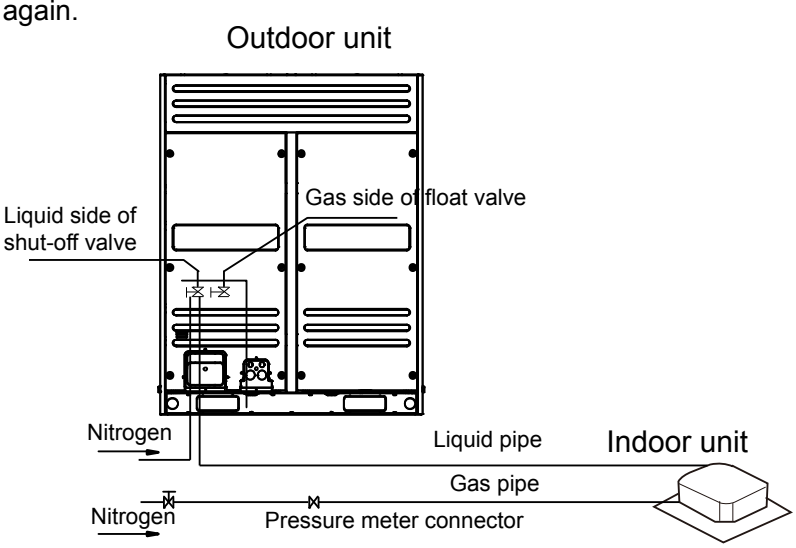
When ambient temperature difference is ±1□, the pressure difference shall be ±0.1 kgf/cm^2.

Modification formula: Real value = pressure of pressurization + (temperature of pressurization – temperature during observation) x 0.1 kgf/cm^2

You can find out whether the pressure drops or not by comparing the modification value with pressurization value.

3. General ways for searching leak source

Conduct detection through three phases; find out leak source when pressure drop happens.
1) Audition detection-----hear large leakage sound
2) Hand-touching detection-----place hand at the joint of pipeline to feel whether there is leakage
3) Soap water detection-----bubbles shall burst out from leak source.
4) Detection by use of halogen leak detector
Using halogen leak detector when finding out pressure drop but not finding the leak source.
a. Keep nitrogen at 3.0kgf/cm^2.
b. Supplement refrigerant to 5.0kgf/cm^2.
c. Use halogen leak detector, methane leak detector and electric leak detector for detection.
d. If the leak source still could not be found, continuously pressurize to 40.0kgf/cm^2 (R410A) and then detect again.



4. Caution
1) The air tightness test is conducted by pressurize nitrogen (R410Asystem: 40kgf/cm^2).
2) It is not allowed to adopt oxide, flammable gas and toxic gas to conduct air tightness test.
3) Before pressure-keeping reading, let it rest for several minutes till pressure is stable, to record temperature, pressure value for future modification.
4) After pressure-keeping is over, release system pressure to 5~8 kgf/cm^2 and then conduct pressure-keeping and storage.
5) If pipeline is too long, conduct phase-in detection.
a. Inner side of pipeline
b. Inner side of pipeline + upright
c. Inner side of pipeline + upright+ outer side of pipeline

3.3. Vacuum Drying
3.3.1 Purpose and highlights of vacuum drying
3.3.1.1. Purpose of vacuum drying
1. Dehumidify the system to prevent ice-blockage and copperizing. Ice-blockage shall cause abnormal operation, while copperizing shall damage compressor.
2. Eliminating the non-condensable gas of system to prevent oxidizing components, system pressure fluctuation, and bad heat exchanging during the system operation.
3. Detect leak source from reverse rotate.
3.3.1.2. Selection of vacuum pump
1. The limit of vacuum degree is below -756mmHg.
2. The discharge of vacuum pump is over 4L/s.
3. The precision of vacuum pump is over 0. 02mmHg.
Highlights of R410A system:
After the vacuum process of R410A refrigerant circulation is over, vacuum pump stops running and the lubricant in vacuum pump shall flow back to air conditioning system, for the inner of pump soft pipe is in vacuum status. In addition, same situation shall happen if vacuum pump suddenly stops during operation. At this moment, different oils will mix, which induce the refrigerant circulating system to malfunction, so it is recommended to use one-way valve to prevent reverse flow of oil in vacuum pump.
3.3.1.3. Vacuum drying for pipe
Vacuum drying: Use vacuum pump to make the moisture (liquid) in pipeline change into steam, which will eliminate the moist of the pipeline and keep drying of pipe inner. Under atmospheric pressure, water's boiling point (steam temperature) is 100°C, while its boiling point will decline when using vacuum pump reduce the pipeline pressure to vacuum. When the boiling point declines under outdoor temperature,

moisture in pipe shall be evaporated.

Boiling Point of Water (℃)	Air Pressure (mmHg)	Vacuum Degree (mmHg)	Boiling Point of Water (℃)	Air Pressure (mmHg)	Vacuum Degree (mmHg)
40	55	-705	17. 8	15	-745
30	36	-724	15	13	-747
26. 7	25	-735	11. 7	10	-750
24. 4	23	-737	7. 2	8	-752
22. 2	20	-740	0	5	-755
20. 6	18	-742			

3.3.2 Operation procedure for vacuum drying

3.3.2.1. Methods of vacuum drying

By different construction environment, there are two kinds of vacuum drying ways: ordinary vacuum drying and special vacuum drying.

3.3.2.1.1. Ordinary vacuum drying

1) Firstly, connect the pressure gauge to the infusing mouth of gas pipe and liquid pipe, keep vacuum pump running for above 2 hours, and it is quality that vacuum degree of vacuum pump is below -755mmHg.
2) If the vacuum degree of vacuum pump could not be below -755mmHg after 2 hours of drying, system will continue drying for one hour.
3) If the vacuum degree of vacuum pump could not be below -755mmHg after 3 hours of drying, please check the system leakage source.
4) Vacuum placement test: when the vacuum degree reaches -755mmH, keep rest for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture and leak source.
5) Vacuum drying shall be conduct from liquid pipe and gas pipe simultaneously. There are a lot of functional parts like valves, which could shut down the gas flow midway.

3.3.2.1.2. Special vacuum drying

This kind of vacuum drying method shall be adopted when:
1) Finding moisture during flushing refrigerant pipe.
2) Conducting construction on rainy day, because rain water might penetrated into pipeline.
3) Construction period is long, and rain water might penetrated into pipeline.
4) Rain water might penetrate into pipeline during construction.
Procedures of special vacuum drying are as follows:
a. The first vacuum drying 2 hours.
b. The second vacuum damage, filling nitrogen to 0.5Kgf/cm^2.
Because nitrogen is dry gas, vacuum damage could achieve the effect of vacuum drying, but this method could not achieve drying thoroughly when there is too much moisture. Therefore, special attention shall be drawn to prevent the entering of water and the formation of condensate water.
c. The second vacuum drying 1 hour.
It is qualified when vacuum degree is under -755mmHg; if the vacuum degree is still above -755mmHg within 2 hours drying, please repeat the procedures of “vacuum damage---vacuum drying”.
d. Vacuum placement test: when the vacuum degree reaches -755mmH, keep rest for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture and leak source.

3.4. Recharge Refrigerant

3.4.1 Operation procedure for recharging refrigerant

3.4.1.1. Operation procedure

Calculate the required refrigerant volume by the length of liquid pipe → recharging refrigerant.
※The refrigerant volume from factory does not include the recharged amount of the pipeline extending.

3.4.1.2. Detailed steps for recharging refrigerant

1. Make sure vacuum drying is qualified before recharging refrigerant.
2. Calculate the required refrigerant volume by the dia. and the length of liquid pipe.
3. Use electronic scale or fluid infusion apparatus to weight the recharged refrigerant volume.
4. Use soft pipe to connect refrigerant cylinder, pressure gauge, and examine valve of outdoor unit. And recharge with liquid mode. Before recharging, eliminate the air in the soft pipe and pressure gauge’s pipe.
5. After finishing the recharging, by the gas leak detector or soap water, to detect whether there is refrigerant leakage in expansion part of indoor and outdoor units.
6. Write the recharged refrigerant volume in the indicating plate of outdoor unit.

Caution

1) The recharged refrigerant volume must be calculated according to the formula in the technical reference

of outdoor unit. It isn't allowed to calculate by running current, pressure and temperature. Because current and pressure is changeable due to the difference of temperature and length of pipeline.
2) In the cold ambient, use warm water and hot wind to warm up refrigerant storage cylinder, and don't allow heating up directly by flame.

3.4.1.3. Recharging R410A refrigerant

If R410A refrigerant is adopted, the tool shall be different. Confirm the following items before Recharged:
1) The different vacuum pump with one-way valve.
2) The different pressure gauge: the nut of connector and pressure scale are different.
3) The different recharging soft pipe and connector.
4) The charging method is different. Recharge into the outdoor unit with liquid phase.
5) The different leak detector.

3.4.2 Calculating the recharged refrigerant volume

Calculate the recharged refrigerant volume by the length and dia. of liquid pipe of indoor units

R410A			
Diameter of Liquid Pipe	Equivalent Refrigerant for Pipe Length of 1m (kg/m)	Diameter of Liquid Pipe	Equivalent Refrigerant for Pipe Length of 1m (kg/m)
Φ6. 4	0.023	Φ19. 1	0.270
Φ9. 5	0.060	Φ22. 2	0.380
Φ12. 7	0.120	Φ25. 4	0.520
Φ15. 9	0.170	Φ28. 6	0.680

Calculating formula (R410A):

The recharged volume: R (Kg) = (L1×0. 023 kg/m) + (L2×0. 060 kg/m) + (L3×0. 120 kg/m) + (L4×0.180 kg/m) + (L5×0. 270 kg/m) + (L6×0. 380 kg/m) + (L7×0. 520kg/m) + (L8×0. 680kg/m)
L1: Actual total length of Φ6.4 liquid pipe (m); L2: Actual total length of Φ9.5 liquid pipe (m);
L3: Actual total length of Φ12.7 liquid pipe (m); L4: Actual total length of Φ15.9 liquid pipe (m);
L5: Actual total length of Φ19.1 liquid pipe (m); L6: Actual total length of Φ22.2 liquid pipe (m);
L7: Actual total length of Φ25.4 liquid pipe (m); L8: Actual total length of Φ28.6 liquid pipe (m)

4. Drainage Pipe Engineering

4.1 Installation Highlights of Drainage Pipe

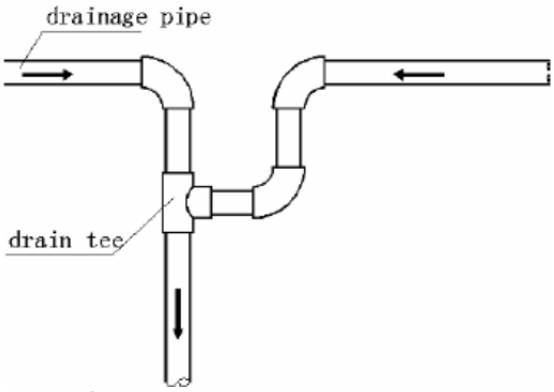
4.1.1. Installation principle of drainage pipe:

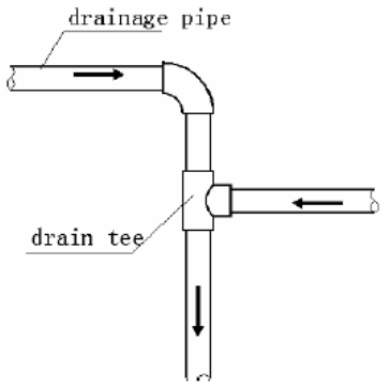
1) Slope; 2) reasonable pipe diameter; 3) nearby discharge

4.1.2. Installation highlights of drainage pipe:

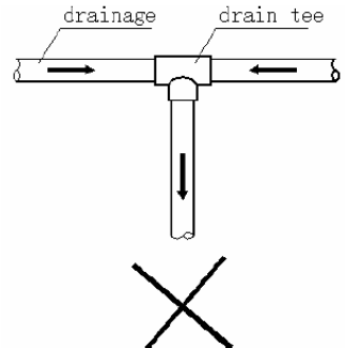
1. Before installing condensate water pipeline, determine its route and elevation to avoid intersection with other pipelines and ensure slope is smooth and straight.
2. Make sure that the two horizontal fluid pipes shall avoid encountering, and preventing flow backwards and drainage difficulty.

a. Correct connection:





b. Incorrect connection:



Advantages of correct connection:

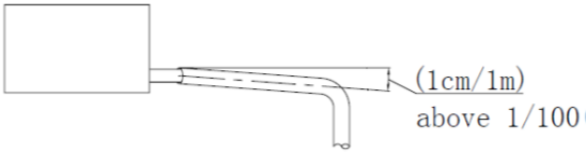
1. Do not cause flow backwards of one pipe.
2. The slope of two pipes can be regulated separately.

Disadvantages of incorrect connection:

1. Interfere drainage.
2. The side of branch pipe with large quantity of fluid volume will flow to the side with small quantity, thus leading to the water backwards of branch pipe with small quantity.
3. Suspender gap:

In general, the horizontal gap is 0.8m-1m and the vertical gap is 1.5m-2.0m. Each vertical pipe shall be equipped with not less than two suspenders. Overlarge suspender gap for horizontal pipe shall create bending, thus leading to air resistance.

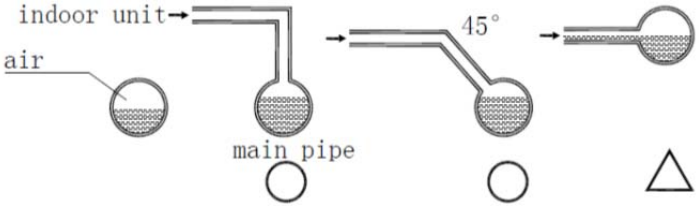
4. The highest point of drainage pipe shall be designed with air hole to ensure that condensate water could be discharged smoothly. The outlet air hole shall face down to prevent dirt entering pipe.
5. After finishing connection, conduct water passing test and overflowing water test to pipelines to check the smoothness of drainage and leakage of pipeline system.
6. Use specific glue to adhesive the seam of thermal insulation materials, and then bind with rubber or plastics adhesive tape. The width of the adhesive tape shall not be less than 50mm to ensure fastness and prevent condensation.
7. The drainage pipe of air conditioner shall be installed separately with other waste pipe, rainwater pipe and other drainage pipe in building.
8. The slope of drainage pipe shall be kept above 1/100.



9. In case 1/100 slope cannot need, consider to use larger-sized pipe and use its dia. to create slope.
10. Conflux towards horizontal pipe shall come from upside as much as possible. If it comes from transverse

route, reflux is easy to be created.

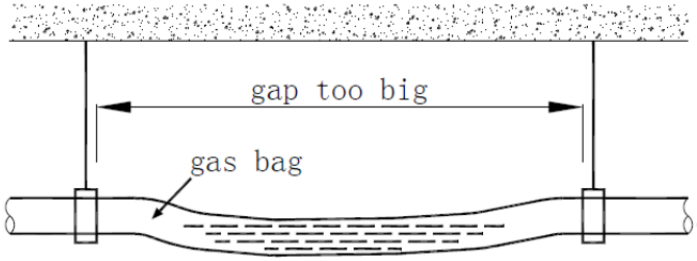
11. The end of drainage pipe shall not contact with ground directly.



4.1.3. Caution

1. The drainage pipe diameter shall meet the draining requirement of indoor unit.
2. The outlet air vent cannot be installed nearby the lifting pump of the indoor unit.
3. Check whether condensate water pump can be started up and shut down normally by infusing water into the water-containing plate of indoor unit and powering on.
4. All joints shall be firm (particularly PVC pipe).
5. The drainage pipe is not allowed to turn to adverse slope, horizontal, and bending.
6. Dimension of drainage pipe shall be not less than the connecting mouth size of drain piping to indoor unit.
7. Work out thermal insulation of drainage pipe, otherwise it is easy to produce condensation. Thermal insulation processing shall be continued to the connecting part of indoor unit.
8. Indoor units with different draining pattern shall not share the same concentrated drainage pipe.
9. Discharge of condensate water cannot influence normal life and working of other people.
10. As for long drainage pipe, hanging bolt shall be used to ensure 1/100 slope without bending PVC pipe.

※The support gap of horizontal pipe is 0.8-1.0mm. If the gap is too large, it shall produce bending and air resistance, while air resistance could seriously influence smoothness of water flow to cause abnormal water level. As shown in following figure:



4.2 Water Storing Elbow of Drainage Pipe

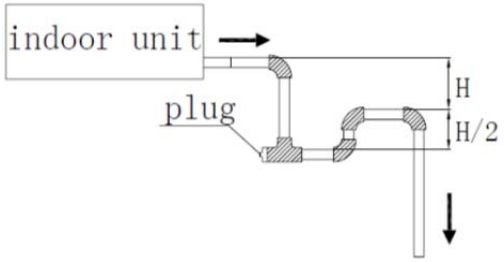
4.2.1. To indoor unit with large negative pressure at the outlet of water-containing plate, the drainage pipe must be equipped with water storing elbow.

Function of water storing elbow:

When indoor unit is in motion, prevent generating negative pressure to cause drainage difficulty or blow water out of the air outlet.

Installation of water storing elbow:

1. Install water storing elbow as shown in following figure: H shall be above 50mm.
2. Install one water storing elbow for each unit.
3. When installation, consider it shall be convenient in future clean.



4.3 Concentrated Drainage Pipe

4.3.1. Pipeline diameter of concentrated drainage pipe

Select drainage pipe diameter according to indoor unit's combined flow volume.

E.g. If one 1HP unit with 2L/h discharging condensate water, the calculation of the combined flow volume of three 2HP units and two 1.5HP units is: 2HP x 2L/h x 3 + 1.5HP x 2L/h x 2 =18L

4.3.2. Relation between horizontal pipeline diameter and permitted displacement of condensate water

PVC piping	Inner diameter of piping (reference value: mm)	Inner diameter of piping (mm)	Permitted displacement(l/h)		Remark
			Slope 1:50	Slope 1:100	
PVC25	19	20	39	27	(Reference value) could not used for confluence pipe
PVC32	27	25	70	50	
PVC40	34	31	125	88	Could be used for confluence pipe
PVC50	44	40	247	175	
PVC63	56	51	473	334	

Attention: through converge point need use PVC40 or larger pipe.

4.3.3. Relation between vertical pipeline diameter and displacement of condensate water

PVC piping	Inner diameter of piping (reference value: mm)	Inner diameter of piping (mm)	Permitted displacement(l/h)	Remark
PVC25	19	20	220	(Reference value) could not used for confluence pipe
PVC32	27	25	410	
PVC40	34	31	730	Could be used for confluence pipe
PVC50	44	40	1440	
PVC63	56	51	2760	
PVC75	66	67	5710	
PVC90	79	77	8280	

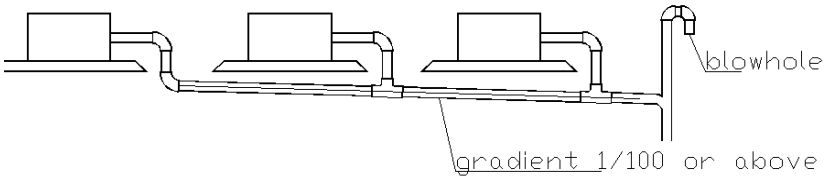
Attention: through converge point need use PVC40 or larger pipe.

4.3.4. Operation process of concentrated drainage

Install indoor unit → connect drainage pipe → water passing test and overflowing water test → thermal insulation of drainage pipe

Caution:

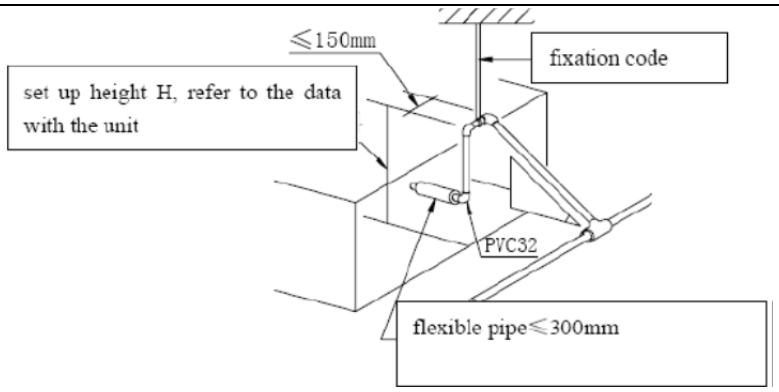
1) Increase drainage point as much as possible and reduce quantity of connected indoor units, to ensure horizontal main drainage pipe not be too long.
2) Units with drainage pump and natural drainage shall converge to different drainage system separately.
3) Add two elbows at air outlet, and make sure its mouth faces down to prevent dirt and so on dropping into pipe to create blockage.



4.4 Lifting of Drainage Pipe (for the Unit with Lift Pump)

4.4.1. Installation of lift pipe

1. When connecting drainage pipe with indoor unit, use pipe clamp shipped with unit to fix. Glue splicing is not permitted for ensuring convenience in repairing.
2. To ensure 1/100 slope, total lift height of drainage pipe (H) shall depend on indoor unit's pump, and do not set vent pipe on the lifting pipe section. After lifting vertically, immediately place down inclined, otherwise it will cause error operation of switch at water pump. The connecting method is shown as follows:



Note: Air outlet could not be installed on the lifting part; otherwise water shall be discharged to ceiling or could not be discharged.

4.5 Overflowing Water Test and Water Passing Test

4.5.1. Overflowing water test

After finishing the construction of drainage pipe system, fill the pipe with water and keep it for 24 hours to check whether there is leakage at joint section.

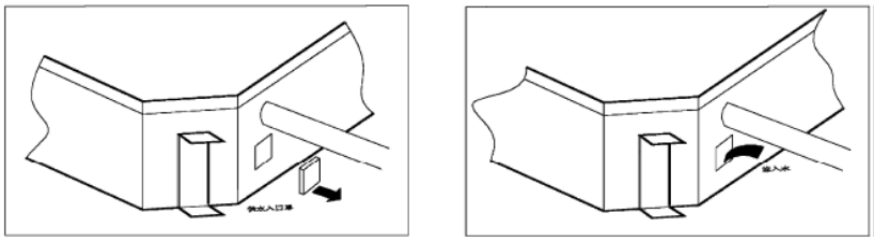
4.5.2. Water passing test

1. Natural drainage mode

Infuse water-containing plate with above 600ml water through check port slowly, and observe transparent hard pipe at drainage outlet to confirm whether it can discharge water.

2. Pump drainage mode

1) Remove plug of water level switch, remove water-finding cover and slowly infuse water-containing plate with about 2000ml water through water-finding port to prevent touching the motor of drainage pump.



2) Power on and let the air conditioner operate for cooling. Check operation status of drainage pump, and then turn on water level switch, check operation sound of pump and observe transparent hard pipe at drainage outlet to confirm whether it can discharge water. (In light of the length of drainage pipe, water shall be discharged after delaying about 1 minute)

3) Stop the operation of air conditioner, turn down power supply and put water-finding cover to the original place.

a. After stopping the operation of air conditioner, check whether there is something abnormal 3 minutes later. If drainage pipe have not been distributed properly, over back-flow water shall cause the flashing of alarm indicator at remote-controlled receiving board and even water shall run over the water-containing plate.

b. Continuously add water until reaching alarm water level, check whether the drainage pump could discharge water at once. If water level does not decline under warning water level 3 minutes later, it shall cause shutdown of unit. When this situation happens, normal startup shall be carried out by turning down power supply and eliminating accumulated water.

Note: Drain plug at the main water-containing plate is used for eliminating accumulated water in water-containing plate when maintaining air conditioner fault. During normal operation, the plug shall be filled in to prevent leakage.

5. Duct Engineering

5.1. Fabrication of Duct

1. The material, specification, performance and thickness of metal duct should be in accordance with the relevant regulations of present National Products Standard. The thickness of steel sheet or galvanized steel sheet should not be less than the regulation in table below:

Thickness of steel sheet duct (mm)

Diameter (D) or edge length (b) of duct	Circular duct	Rectangle duct	
		Middle/low pressure system	High pressure system
D(b) ≤ 320	0.5	0.5	0.75
320 < D(b) ≤ 450	0.6	0.6	0.75
450 < D(b) ≤ 630	0.75	0.6	0.75
630 < D(b) ≤1000	0.75	0.75	1.0
1000< D(b) ≤1250	1.0	1.0	1.0

2. The material, specification, performance and thickness of non-metal duct should be in compliance with design and regulations of present National Products Standard.

3. The body, frame, fixing material and sealed cushion of fire-proof air duct should be made of non-combustible materials. Its fire resistance rating should be in accordance with the design requirement.

4. The sheathing of composite duct should be made of non-combustible materials. Inner insulation material should be no burning or burning retardant with rating B1, and no harm to people's body.

5. The permitting deviation to outer diameter or long edge of duct: when no more than 300mm, it is 2mm; when more than 300mm, it is 3mm. The permitting deviation of pipe end flatness is 2mm.

Discrepancy between two diagonal lines of rectangle duct shall not be more than 3mm. Discrepancy between two diameters of any cross-cut circular flange shall not be more than 2mm.

5.2. Connection of Duct

1. Connection of metal duct

1) The seam of duct board splice should be stagger and cross-seam is not allowed.

2) Specification of metal duct flange shall not be less than the data as shown in table below.

Specification to flange and bolt of circular metal duct (mm)

Diameter of duct (D)	Specification of flange		Specification of bolt
	Flat steel	Angle steel	
D ≤ 140	20 × 4	—	M6
140 <D ≤ 280	25 × 4	—	
280 < D ≤ 630	—	25 × 3	
630 < D ≤ 1250	—	30 × 4	M8
1250 < D ≤ 2000	—	40 × 4	

Specification to flange and bolt of rectangle metal duct (mm)

Dimension of long edge of duct (b)	Specification of flange (angle steel)	Specification of bolt
B ≤ 630	25 × 3	M6
630 < b ≤ 1500	30 × 3	M8
	40 × 4	
2500 < b ≤ 4000	50 × 5	M10

3) Diameter of bolt and rivet to duct flange for middle/low pressure system should be no more than 150mm. As for duct of high pressure system, it should be no more than 100mm.

4) Four angles of rectangle duct flange should be designed with screw hole.

5) When improving the strength of duct flange position by adopting reinforcement method, the applied condition corresponding to flange specification could be extended.

2. Connection of nonmetallic duct

Specification of flange should be in accordance with standard, gap of bolt hole should be no more than

120m. Four angles of rectangle duct flange should be designed with screw hole.
3. Strengthening of metal duct
When edge length of rectangle duct is more than 630mm, edge length of insulation duct is more than 800mm and length of pipe section is more than 1250mm, or single-edge level area of low pressure duct is more than 1.2 square meters and single-edge level area of high/middle pressure duct is more than 1.0 square meter, strengthening measures should be conducted.
4. Strengthening of nonmetallic duct
When diameter or edge length of HPVC duct is more than 500mm, the joint section of duct and flange should be equipped with strengthening board and the gap should not be more than 450mm.

5.3. Connecting Highlights of Duct
1. Supporting, hanging and mounting bracket should be made of angle steel. Position of expansion bolt should be correct, firm and reliable. The buried part could not be painted and oil pollution should be eliminated. Gap should be in accordance with regulation below:
1) If duct is installed horizontally, gap should be no more than 4m when diameter or edge length is less than or equal to 400mm, while the gap should be no more than 3m when diameter or edge length is more than 400mm.
2) If duct is installed vertically, gap should be no more than 4m and make sure there is at least 2 fixed points on single straight pipe.
2. Supporting, hanging and mounting bracket could not be installed at air opening, valve, checking door and automatically controlled device, and distance to air opening or plugged tube shall not be less than 200mm.
3. Hanging bracket should not be hung above flange.
4. Thickness of flange gasket should be 3-5mm. Gasket should be flat on flange and inserting to pipe is not allowed. Set up fixed points at proper place for hanging pipe to prevent vibration.
5. Vertical splice seam of duct should be stagger. Make sure there is no vertical seam at the bottom of duct installed horizontally. As for the installation of flexible short duct, keep proper tightness and no distortion.
6. All metal parts (including supporting, hanging and mounting bracket) on pipeline system engineering should be conducted anti-corrosion treatment.

5.4. Installation of Assembly
1. The regulating device of duct should be installed in place where is easy to operate, flexible and reliable.
2. The air port should be installed firmly and air pipe should be connected tightly. Frame should be tightly contact with decorate of building. The appearance should be smooth and flat, and regulation is flexible.
3. If air port is installed horizontally, deviation of levelness is no more than 3/1000. If air port is installed vertically, deviation of perpendicular should be no more than 2/1000.
4. The same air port in same room should be installed at the same height, and put in order

6. Heat Insulation Engineering

The insulation of refrigerating equipment and pipe is carried out through general insulation method, which binding the equipment and pipe with solid multi-hole insulation material and exploiting proper wet-proof and protection measures, called insulation structure. The form of insulation structure shall be different in light of different insulation materials. This is a traditional insulation method which is adopted very early. Although its insulation performance is general, but it is simply in structure, convenient in construction and cheap in price, so that it is widely used in refrigeration engineering.

6.1 Insulation of Refrigerant Piping

6.1.1. Operational procedure of refrigerant piping insulation

Construction of refrigerant pipe → insulation (excluding connecting section) → test for air sealing → connecting section insulation

Connecting section: for instance, insulation construction just could be carried out after air tightness test at welding area, opening expending area and flange joint is successful.

6.1.2. Purpose of refrigerant piping insulation

1. During operation, temperature of gas pipe and liquid pipe shall be over-heating or over-cooling extremely. Therefore, it is necessary to carry out insulation; otherwise it shall reduce the performance of unit and burn compressor.
2. Gas pipe temperature is very low during cooling. If insulation is not enough, it shall form dew and cause leakage.
3. Temperature of outlet pipe (gas pipe) is very high (generally 50-100□) during heating. Touching due to carelessness shall cause hurt, so it is necessary to take insulation measures to avoid getting hurt.

6.1.3. Selection of insulation materials for refrigerant piping

Adopt hole-closed foam insulation materials with level B1of burning retardant and over 120□ of constant burning performance.

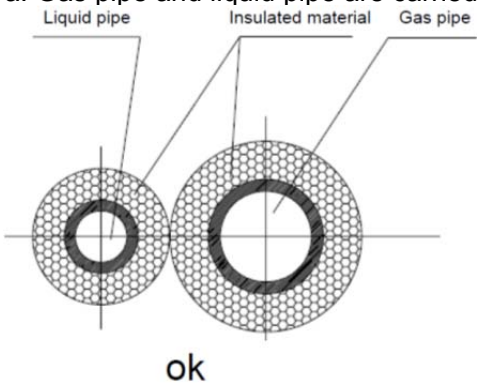
6.1.4. Thickness of insulation layer

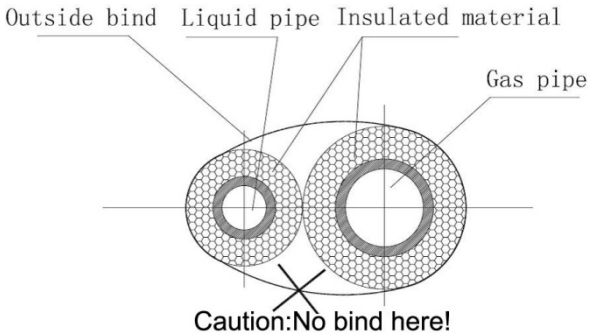
1. When outer diameter of copper pipe (d) is less than or equal to 12.7mm, the thickness of insulation layer (δ) shall be above 15mm.
When outer diameter of copper pipe (d) is more than or equal to 15.88mm, the thickness of insulation layer (δ) shall be above 20mm.
2. In hot and wet environment, the above recommended value shall be increased one time.

Note: The outdoor pipeline shall be protected by metal case to proof sunshine, storm and air erosion, and prevent damage of external force or man-made destroy.

6.1.5. Installation and highlights of insulation construction

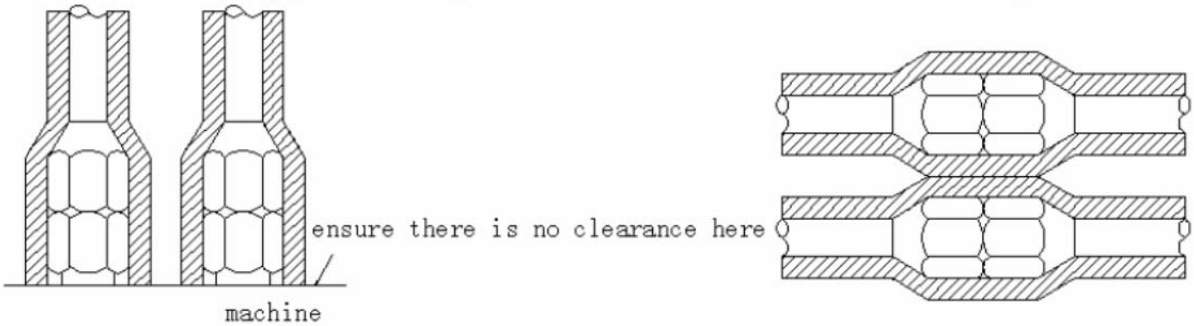
1. Example of wrong operation: Gas pipe and liquid pipe are carried out insulation together; causing the operation effect of air conditioner is bad.
2. Example of correct operation:
a. Gas pipe and liquid pipe are carried out heat insulation separately.





Note: After gas pipe and liquid pipe are carried out heat insulation separately, bind with tape. If it is bound over tightly, the spliced insulation joint shall be damaged.

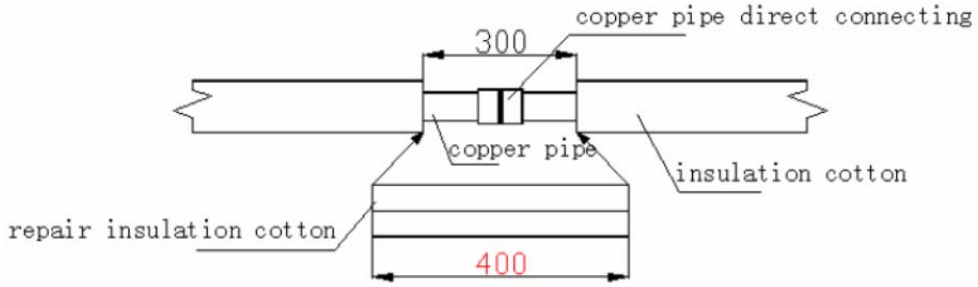
b. The surrounding of pipe connecting section shall be carried out insulation entirely.



Highlights:

1. No gap in joint of insulation materials.
2. If the joint of insulation materials is linked tardily and tape is bound over tightly, shrinkage and leakage shall be produced easily to create phenomena of dew-drop. The over-tightened tape shall edge out air in material, leading to decrease the insulation effect at this part; meanwhile tape shall be easily aged and drop down.
3. In indoor shield space, it is no necessary to bind belting, so as to avoid influencing insulation effect.

Correct repairing method for insulation cotton: (see the figure below)



Firstly cut out the material longer than gap, expend the two ends and embed the insulated cotton, at last, paste joint with glue.

Highlights of insulation repairing:

1. Repaired length of insulation (insulation tube with filled gap) shall be 5-10cm longer than the length of gap under natural status.
2. Sliver the cut of insulation to be repaired and cross-section shall be even.
3. Insert gap with insulation for repairing and cross-section shall be pressed tightly.
4. All cross-section and cut need to be pasted with glue.
5. Finally, bind the seam with rubber/plastic tape.
6. Prohibit conducting insulation by using binder fabric in concealed section, so as to avoid influencing insulation effect.

6.2 Insulation of Condensate Water Pipe

6.2.1. Insulation of condensate water pipe

1. Select rubber/plastic tube with burning retardant of rating B1.
2. Thickness of insulation layer is usually above 10mm.
3. The insulation material at water outlet of unit body should be pasted with glue on the unit body, so as to avoid dewing and dripping.
4. Pipe installed in wall shall not be conduct insulation.
5. Use specific glue to paste the seam of insulation material, and then bind with cloth tape. The width of tape shall not be less than 5cm. Make sure it is firm and avoid dewing.

6.3 Insulation of Duct

I. Insulation of duct

1. Insulation of duct parts and equipment should be conducted after confirming that the leakage test and quality of duct is qualified.
2. Usually making use of centrifugal glass cotton, rubber/plastic material or other late-model insulation duct to conduct insulation.
3. Insulation layer should be even and tight. Crack, gap and other defects are not allowed.
4. The supporting, hanging and mounting bracket of duct should be set up to the outside of insulation layer, and insert bed timber between bracket and duct.
5. Thickness of insulation layer

1) As for the inlet and outlet duct installed in room free of air conditioner, the thickness of insulation layer should be above 40mm when adopting centrifugal glass cotton for insulation.
2) As for the inlet and outlet duct installed in room with air conditioner, the thickness of insulation layer should be above 25mm when adopting centrifugal glass cotton for insulation.
3) When adopting rubber/plastic material and other materials, the thickness of insulation layer should be come out in accordance with design requirement or calculation.

7. Electrical Engineering

Please refer to "Part 3. Outdoor Units Specification & Performance".

Highlights of electrical installation

1. Purchased wiring, parts and materials should be in compliance with the local and national regulations.
2. All field wiring construction should be finished by qualified electrician.
3. Air conditioning equipment should be grounded according to the relevant local and national electrical regulations.
4. Current leakage protection switch should be installed (select current leakage breaker in light of the 1.5-2 times of total loading rated current.)
5. When connecting wiring and wire holder, use cable clamp to fix and make sure no exposure.
6. Refrigerant piping system and wiring system of indoor and outdoor unit belongs to the different system.
7. Do not connect the power wire to the terminal of signal wire.
8. When power wire is parallel with signal wire, put wires to their own wire tube and remain proper gap (the current capacity of power wire is: 10A below 300mm, 50A below 500mm).
9. Voltage discrepancy of power wire terminal (side of power transformer) and end voltage (side of unit) should be less than 2%. If its length could not be shortened, thicken the power wire. Voltage discrepancy between phases shall not pass 2% rated value and Current discrepancy between highest and lowest phase should be less than 3% rated value.

Selection of Wiring

1. The selection of wiring area shall in accordance with the requirements below:

1) Voltage lose of wire shall meet the requirement of terminal voltage for normal operation and startup.
2) The wiring current-carrying capacity determined by installed method and environment is not less than the largest current of unit.
3) Wiring shall ensure the stability of movement and heating.
4) The smallest sectional area should satisfy the requirement of mechanical strength.

Sectional area of core to phase line S(mm^2)	Smallest sectional area of PE line (mm^2)
S ≤ 16	S
16 < S ≤ 35	16
S > 35	S/2

When earth protection line (shortly called PE line) is made of material the same as phase line, the smallest sectional area of PE line should be in accordance with the regulation below:

Sectional area of core to phase line S(mm2) Smallest sectional area of PE line (mm2)

Distribution highlights of distribution wiring

1. When distributing wiring, select wirings with different colors for phase line, zero line and protection earth according to relevant regulations.
2. The power wire and control wire of concealed engineering is prohibited to bind together with refrigerant piping. It is necessary to pass through wire tube and be distributed separately, and the gap between control line and power wire should be 500mm at least.
3. When distributing wiring by passing through pipe, the following should be paid attention to:

1) Metal wire tube could be used in indoor and outdoor, but it is not suitable to place with acid - alkali corrosion.
2) Plastic wire tube is generally used in indoor and place with corrosion, but it is not suitable to situation with mechanical damage.
3) The wiring through pipe shall not be in the form with ends jointing. If joint is a must, connection box should be installed at the corresponding place.
4) The wiring with different voltage should not pass through the same wire tube.
5) Total sectional area of wiring through wire tube shall not exceed 40% valid area of stuffing tube.
6) Fixing point of wire tube support shall follow the standard below:

Nominal diameter of wire tube	Largest gap between fixed points of wire tube	
(mm)	Metal pipe	Plastic pipe
15-20	1.5	1
25-32	2	1.5
40-50	2.5	2

Nominal diameter of wire tube Largest gap between fixed points of wire tube

Control System and Installation

Connecting highlights of control line (RS-485 communication)

1. The control line should be shielded wire. Using other wiring shall create signal interference, thus leading to error operation.
2. Single end to shield net of shielded wire should be grounded.

Note: 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.

3. 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 300mm so as to preventing signal interference.
4. Control wire could not form closed loop.
5. Control wire has polarity, so be careful when connecting.

8. Commissioning and Trial Running

8.1 Work before Commissioning

8.1.1. Inspection and confirmation before Commissioning

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

8.1.2. Preparation before Commissioning

1. Calculating the additional refrigerant quantity for each set of unit according to the actual length of liquid pipe.
2. Keep required refrigerant ready.
3. Keep system plan, system piping diagram and control wiring diagram ready.
4. Record the setting address code on the system plan.
5. Turn on power switches outdoor unit in advance, and keep connected for above 12 hours so that heater heating up refrigerant oil in compressor.
6. Turn on gas pipe stop valve, liquid pipe stop valve, oil balance valve and gas balance valve totally. If the above valves do not be turned on totally, the unit should be damaged.
7. Check whether the power phase sequence of outdoor unit is correct.
8. All dial switches to indoor and outdoor unit have been set according to the Technical Requirement of Product.

Note: The setting of outdoor unit's dial switch should be conducted under power-off, otherwise the unit shall not identify. The following table shows the address and power of outdoor master and slave unit:

ADDRESS dial switch		POWER dial switch	
0	Master unit	0	8HP
1	Salve unit 1	1	10HP
2	Salve unit 2	2	12HP
3	Salve unit 3	3	14HP
⩾4	Invalid address, system error	4	16HP
/		⩾5	Invalid dial switch

8.2 Commissioning of Trial Run

8.2.1. Commissioning for trail run of single unit.

1. Each independent refrigeration system (i.e. each outdoor unit) should be conducted trail operation.
2. Detection details of trail run:

1) As for fan in unit, make sure the rotating route of its impeller is correct and impeller turns around smoothly. No abnormal vibration and noise.
2) Check whether there is abnormal noise during operation of refrigerant system and compressor.
3) Check outdoor unit whether it can detect each indoor unit.
4) Check whether drainage is smooth and its lift pump can be in motion.
5) Check whether microcomputer controller can be in motion normally and whether any trouble appears.
6) Check whether operating current is within the allowed range.
7) Check whether each operating parameter is within the range permitted by the equipment.

Note: When conducting trial run, separately test cooling mode and heating mode to judge the stability and reliability of system.

8.2.2. Commissioning for the trial run of the paralleled system

1. Check and confirm that operation of single unit is normal through trial operation. After confirm it is normal, conduct operation of the whole system, i.e., Commissioning of MIV system.
2. Commissioning is carried out according to the Technical Requirement of Product. When Commissioning, analyze and record operation status so as to understand the operation status of the whole system for convenient maintenance and examination.
3. After finishing Commissioning, fill out Commissioning report in detail.

The commissioning report form is shown as follows:

Commissioning Report for Midea MIV System

Date:_____dd_____mm____yy

Item name:	
Address:	**Tel:**
Supplier:	**Delivery date: dd mm yy**
Installation section:	**Principal:**
Commissioning section:	**Principal:**
Remark: recharged refrigeration quantity to system: _____kg **Name of refrigerant:_____ (R22, R407C, R410A)**	

Installing section:_____
(seal)

Signature:_____

Date: _____dd____mm____yy

Commissioning name:_____
(seal)

Signature:_____

Date: _____dd____mm____yy

Test Data for Test Run of _____System

Model of outdoor unit	Production series no.

Operation data of outdoor unit (Cooling)

Unit	No.1		No.2		No.3	
Run Voltage V						
Total current of run A						
Operation current of compressor A						
High-pressure pressure Kg/cm^2						
Low-pressure pressure Kg/cm^2						
Inlet air temperature □°C						
Outlet air temperature °C						

Operation data of indoor unit

No.	Position	Model	Bar code of indoor unit	Inlet air temperature °C	Outlet air temperature °C
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

System parameter

SW2:

(CHECK)——Used to query outdoor unit data. Check point sequence and corresponding actuality is as follows:

No.	Display code	Display content	Note	No.	Display code	Display content	Remark
1	0--	Address of outdoor unit	0,1,2,3	18	17--	Current of inverter compressor A	Actual value
2	1--	Capacity of outdoor unit	8,10,12,14,16,18	19	18--	Current of inverter compressor B	Actual value
3	2--	Qty .of Modular outdoor unit	Available for main unit	20	19--	Opening angle of EXV A	Actual value ÷8
4.	3--	Qty. setting of indoor units	Available for main unit	21	20--	Opening angle of EXV B	Actual value ÷8
5	4--	Total cap. of outdoor unit	Capacity requirement	22	21--	High pressure	Actual value ×10
6	5--	Total requirement of indoor unit capacity	Available for main unit	23	22--	Reserve	
7	6--	Total requirement of main unit corrected capacity	Available for main unit	24	23--	Qty. of indoor units	
8	7--	Operation mode	0,2,3,4	25	24--	Qty. of the working indoor units	Actual value
9	8--	This outdoor unit actual operation capacity	Capacity requirement	26	25--	Priority mode	0,1,2,3,4
10	9--	Speed of fan A	0,1,……,14,15	27	26--	Night noise control mode	0,1,2,3
11	10--	Speed of fan B	0,1,……,14,15	28	27--	Static pressure mode	0,1,2,3
12	11--	T2/T2B average temp.	Actual value	29	28--	DC voltage A	Actual value ÷10
13	12--	T3 Pipe temp.	Actual value	30	29--	DC voltage B	Actual value ÷10
14	13--	T4 ambient temp.	Actual value	31	30--	Reserve	
15	14--	Discharge Temp. of Inverter Compressor A	Actual value	32	31--	Reserve	Display code 8.8.8
16	15--	Discharge Temp. of Inverter compressor B	Actual value	33	32--	——	Check end
17	16--	Reserve					

Note: When operation of system lasts 1 hour and stays stable, press checkup button on PCB of outdoor master unit, query one by one and fill out the above table according to facts.

Description of display:

Operation mode: 0---Turn off; 2---Cooling; 3---Heating; 4---Forced cooling

Fan speed: 0——OFF; 1~15——Speed increasing sequentially; 15——is the max. fan level.

PMV opening angle: pulse count = display value x 8.

Noise control mode: 0—Night silent mode; 1——Silent mode; 2——Super silent mode; 3——None silent mode

Priority mode: 0——heating priority mode;1——cooling priority mode; 2——opening the priority mode; 3——response the heating mode only; 4——response the cooling mode only.

SW1: Constrain cool button

SW2: Query switch

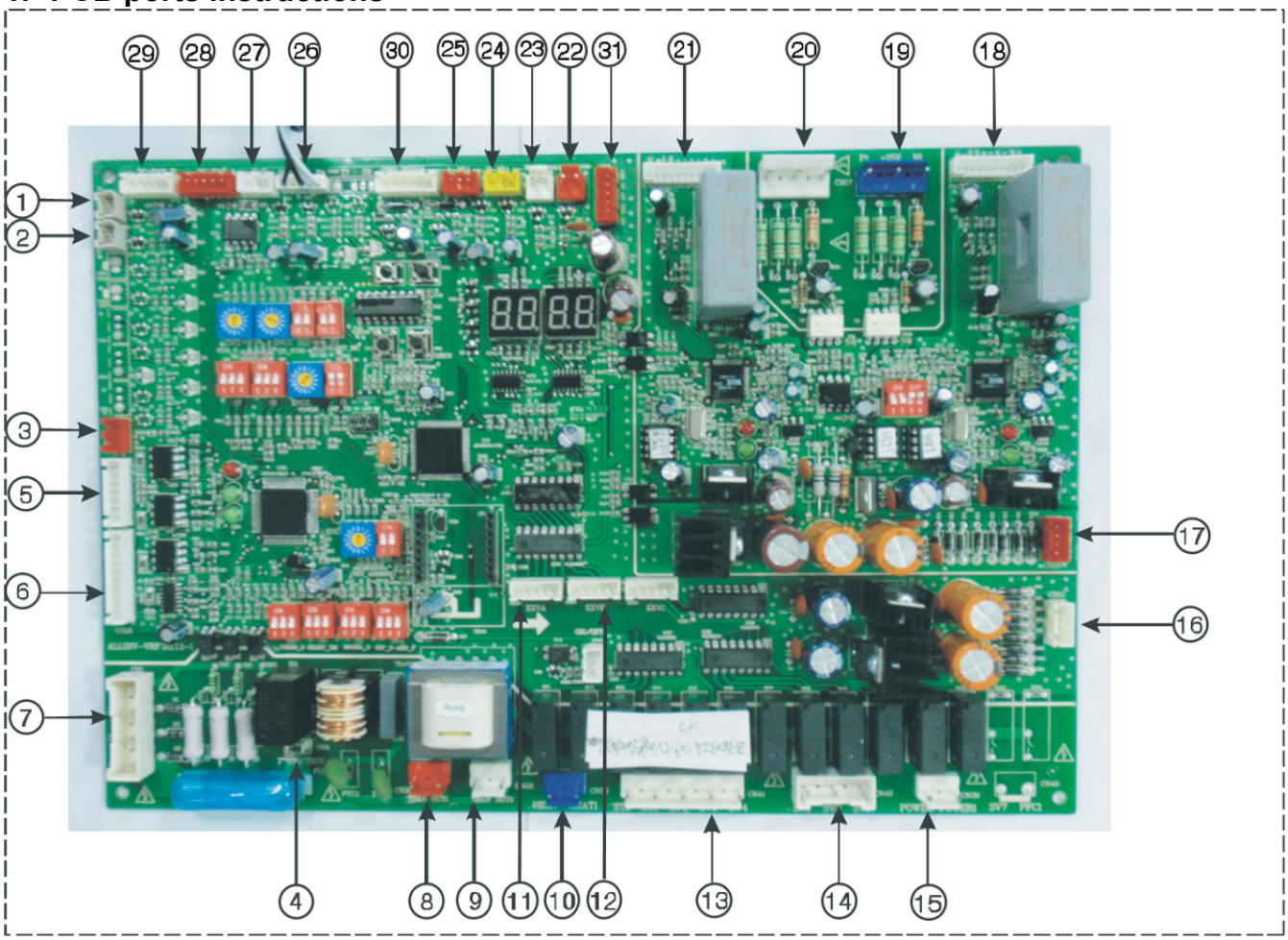
ENC1: Outdoor units address setting switch. ENC2: Outdoor units capacity setting switch. ENC3: Indoor units Qty. Setting switch.

ENC4: Network address setting switch.

Normal display: when in standby mode, it indicates number of indoor units, when running, it indicates output percentage value of compressor.

Part 5 Troubleshooting

1. PCB ports instructions

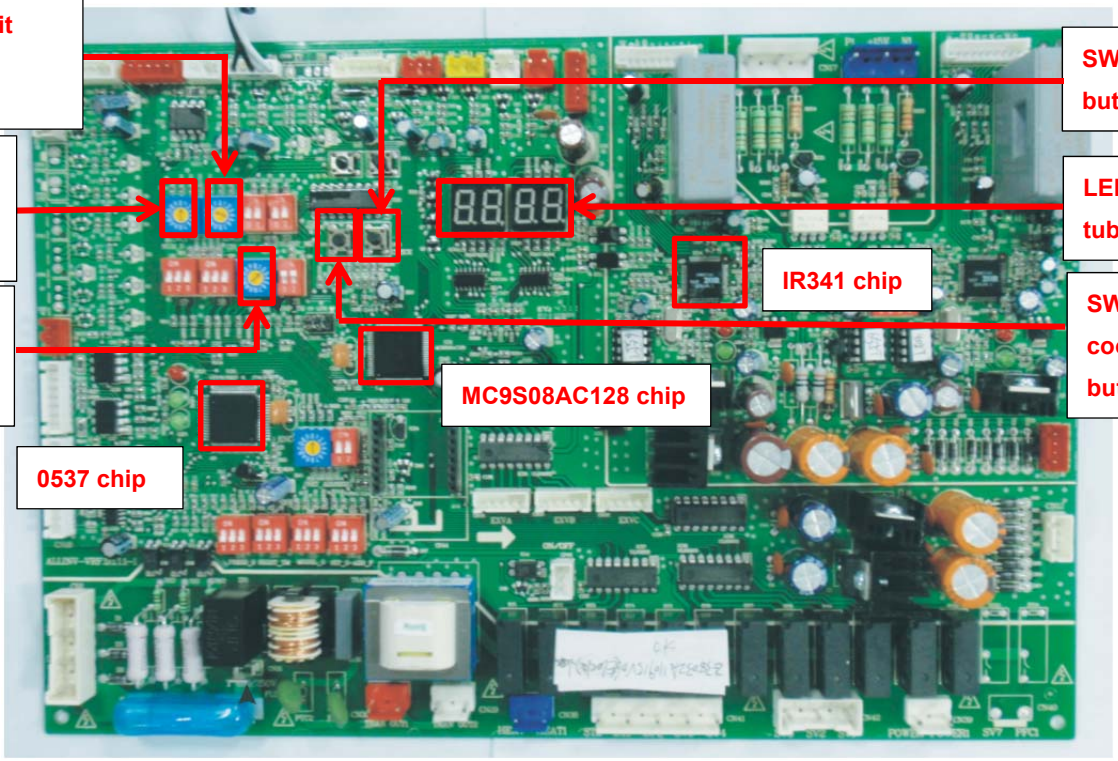


PCB ports instruction

No.	Content	Port voltage
1 CN10	Discharge temp. sensor port of the inverter compressor A	DC0~5V (in dynamic change)
2 CN11	Discharge temp. sensor port of the inverter compressor A or B	DC0~5V (in dynamic change)
3 CN2	Reserve	
4 CN31	Reserve	
5 CN22	Reserve	
6 CN16	Wiring port for communication between indoor and outdoor units, indoor unit network, outdoor unit network and network accounting	DC2.5~2.7V
7 CN1	Phase inspection port	380V
8 CN30	Power input of the NO.1 transformer	220V
9 CN29	Power input of the NO.2 transformer	220V
10 CN38	Loading output terminal	220V
11 CN36	EXV A driving port	The first pin on the left: DC 12V
12 CN35	EXV B driving port	The first pin on the left: DC 12V
13 CN41	Loading output terminal	220V
14 CN42	Loading output terminal	220V
15 CN39	Loading output terminal	220V
16 CN12	Power output of the NO.1 transformer	Yellow-Yellow: AC 9V
17 CN15	Power output of the NO.2 transformer	Yellow-Yellow: AC 14.5V
18 CN14	Activation port of inverter module B	The left the third pin: DC3.3V
19 CN17	Port for inverter module B voltage inspection	DC540V,+15V,N
20 CN18	Power supply port of 12V DC	12V
21 CN13	Activation port of inverter module A	The left the third pin: DC3.3V
22 CN25	ON/OFF signal input port for system low pressure inspection	0 or 5V
23 CN26	ON/OFF signal input port for system high pressure inspection	0 or 5V
24 CN7	Input port for system high pressure inspection	DC0~5V (in dynamic change)
25 CN6	Reserve	
26 CN28	Inspection port for outdoor ambient temp. and condenser coil	DC0~5V (in dynamic change)

27 CN24	Communication ports between outdoor units	DC2.5~2.7V
28 CN20	Control port of DC fan A	The left the first pin: DC5V
29 CN21	Control port of DC fan B	The left the first pin: DC5V
30 CN43	Current inspection port of the inverter compressors A and B	AC0~7.8V (in dynamic change)
31 CN19	Power supply connected port of the main control panel	GND +5V +12V

2. PCB parts instructions



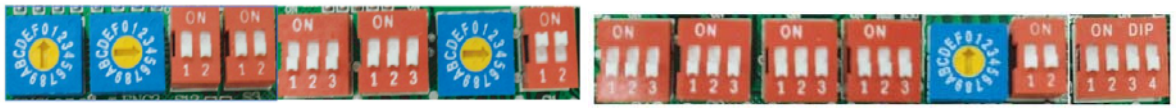
2.1 SW2 query instructions

No.	Content	Note
1	Address of outdoor unit	0,1,2,3
2	Capacity of outdoor unit	8,10,12,14,16,18
3	Quantity of Modular outdoor unit	Available for main unit
4.	Quantity setting of indoor units	Available for main unit
5	Total capacity of outdoor unit	Capacity requirement
6	Total requirement of indoor unit capacity	Available for main unit
7	Total requirement of main unit corrected capacity	Available for main unit
8	Operation mode	0,2,3,4(0---Turn off; 2---Cooling; 3---Heating; 4---Forced cooling)
9	This outdoor unit actual operation capacity	Capacity requirement
10	Speed of fan A	0,1,……,14,15
11	Speed of fan B	0,1,……,14,15
12	T2/T2B average temp.	Actual value
13	T3 Pipe temp.	Actual value
14	T4 ambient temp.	Actual value
15	Discharge Temperature of Inverter Compressor A	Actual value
16	Discharge Temperature of Inverter compressor B	Actual value
17	Reserve	
18	Current of inverter compressor A	Actual value
19	Current of inverter compressor B	Actual value
20	Opening angle of EXV A	Actual value=Display value×8
21	Opening angle of EXV B	Actual value=Display value×8
22	High pressure	Actual value=Display value×0.1MPa
23	Reserve	
24	Quantity of indoor units	Actual value
25	Quantity of the working indoor units	Actual value
26	Priority mode	0,1,2,3,4
27	Night noise control mode	0,1,2,3
28	Static pressure mode	0,1,2,3
29	DC voltage A	Actual value ÷10
30	DC voltage B	Actual value ÷10
31	Reserve	

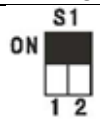
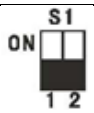
32	Reserve	
33	——	Check end

2.2 Dial codes definition

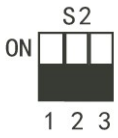
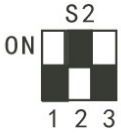
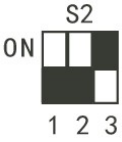
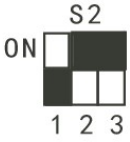
ENC1 ENC3 S12 S3 S7 S8 ENC2 S1 S4 S2 S5 S6 ENC4 S10 S11



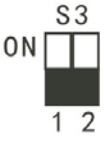
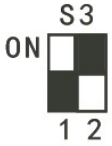
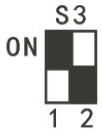
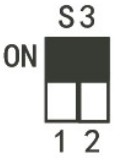
S1: starting up time setting

	
Starting time is set about 10 minutes	Starting time is set about 12 minutes(Default)

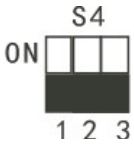
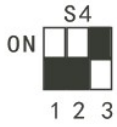
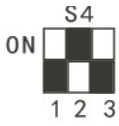
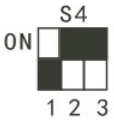
S2: night silent time selection

			
Night time selection is 6h/10h(Default)	Night time selection is 8h/10h	Night time selection is 6h/12h	Night time selection is 8h/12h

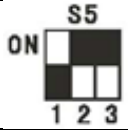
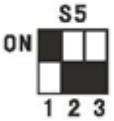
S3: silent mode selection

			
Night silent mode (Default the factory set)	Silent mode	Super silent mode	None silent mode

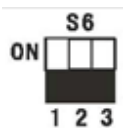
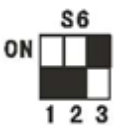
S4: ODU static pressure selection

			
Static pressure mode is 0 MPa (Default)	Static pressure mode is low pressure (Reserve position, use for customized unit)	Static pressure mode is medium pressure (Reserve position, use for customized unit)	Static pressure mode is high pressure (Reserve position, use for customized unit)

S5 : locking modes selection

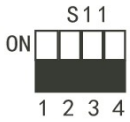
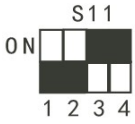
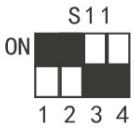
				
Heating priority mode(default)	Cooling priority mode	Priority mode (VIP priority or Capacity priority)	Only respond to the heating mode	Only respond to the cooling mode

S6: addressing type selection

		
Automatic search addressing	Nonautomatic search address (The communication way of the original digital indoor units) (Default)	Clean the indoor unit addresses (Effective to automatic searching new

		digital indoor uints)

S7: reserved
S8 : reserved
S10: reserved
S11: outdoor unit capacity setting

		
8, 10 HP outdoor unit setting	12, 14, 16 HP outdoor unit setting	18 HP outdoor unit setting

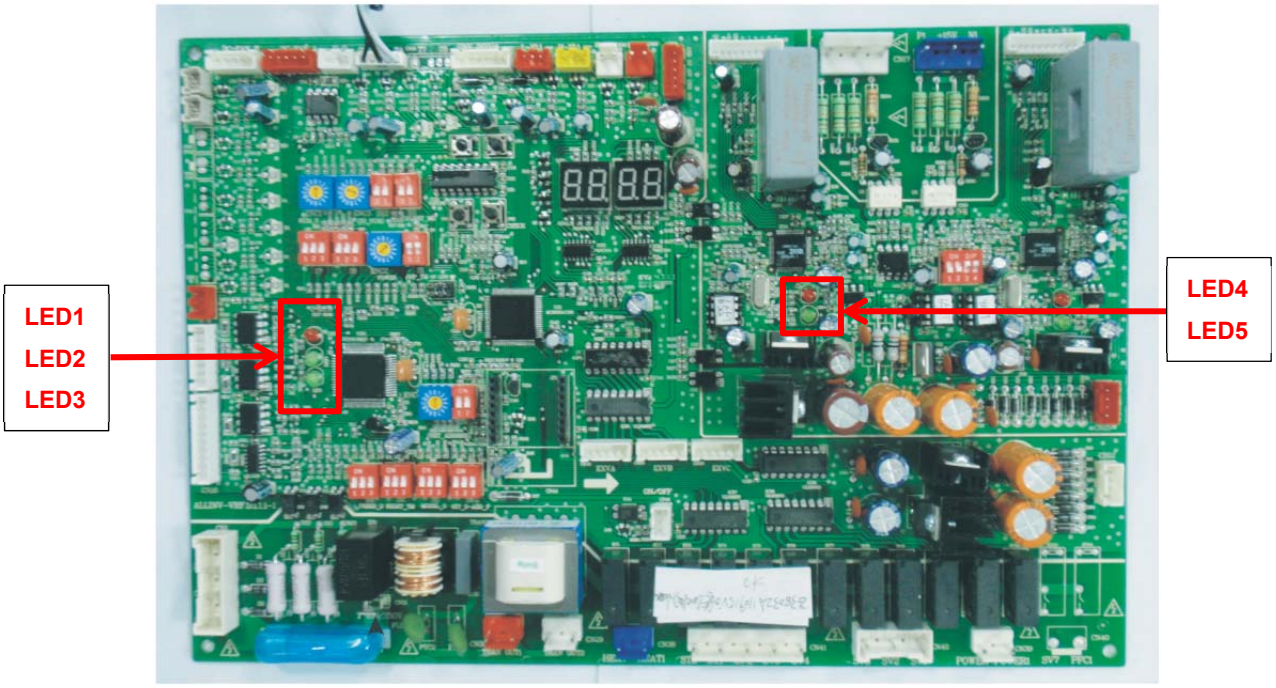
ENC1: Outdoor unit address setting switch, 0 indicates the master unit, 1-3 indicate slave unit.
ENC2: Outdoor unit capacity setting switch, effect to 0-5, 0-5 stand for 8HP-18HP.
ENC3 and S12:

		Setting the numbers of indoor unit to be 0-15
		Setting the numbers of indoor unit to be 16-31
		Setting the numbers of indoor unit to be 32-47
		Setting the numbers of indoor unit to be 48-63

ENC4 :

	Network address setting dial switch Effective to 0-7 0-7 stand for 0-7

2.3. LED on PCB instructions



LED1: Power supply indicator lamp of network centralized control chip. The lamp will be on if the power supply is normal.

LED2: Running indicator lamp of network centralized control chip. 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: 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.

LED5: Running indicator lamp of inverter module. The lamp will be on if the compressor is running.

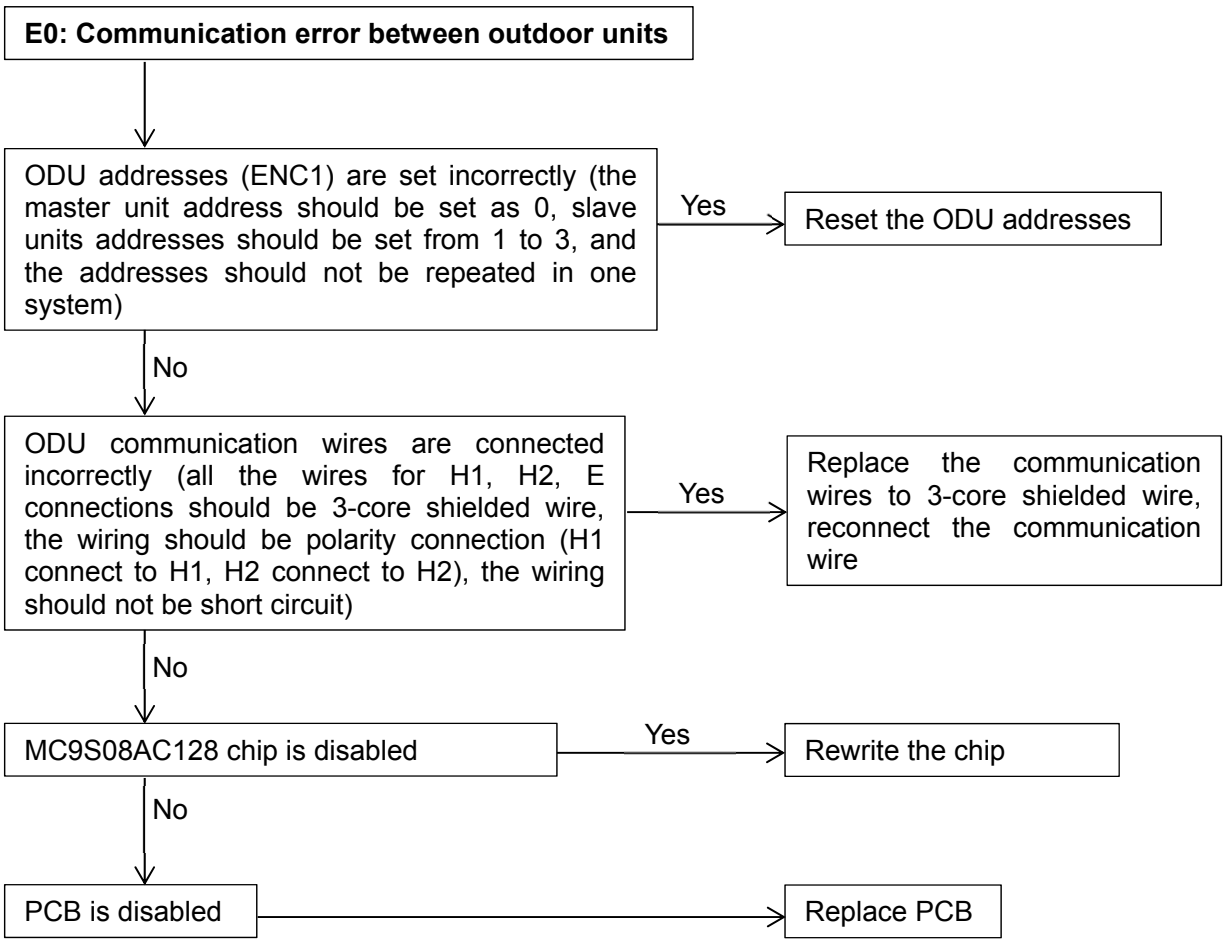
3. Error code table

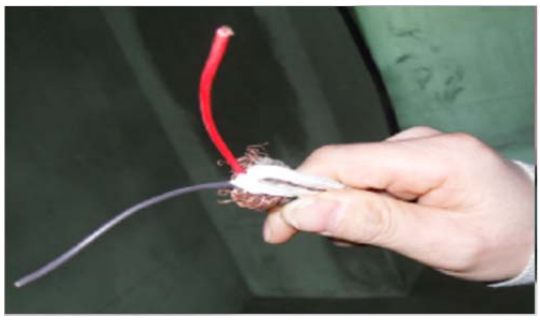
Error code	Content	Note
E0	Communication error between outdoor units	Only display on faulty slave unit, all the ODU in standby
E1	Phase sequence error	Display on faulty unit, all the ODU in standby
E2	Indoor units and master unit communication error	Only display on master unit, all the ODU in standby
E3	Reserve	
E4	Ambient temperature sensor error	Display on faulty unit, all the ODU in standby
E5	Voltage error	Display on faulty unit, all the ODU in standby
E6	Reserve	
E7	Discharge temperature sensor error	Pc ≥3.5 MPa and discharge temperature ≤15 ℃ lasts for 2 minutes
E8	Outdoor unit address is wrong	
xE9	S11 setting doesn't match the capacity	x represents for a system, 1 is A system, 2 is B system.
xH0	Communication error between DSP and the main chip	x represents for a system, 1 is A system, 2 is B system.
H1	Communication error between 0537 and main chip	
H2	Outdoor unit quantities decreasing malfunction	Only master unit will display
H3	Outdoor unit quantities increasing malfunction	Only master unit will display
H4	There are 3 times P6 protection in 60 minutes	Recovery after power on again
H5	There are 3 times P2 protection in 60 minutes	Recovery after power on again
H6	There are 3 times P4 protection in 100 minutes	Recovery after power on again
H7	Indoor unit quantities decreasing malfunction	Indoor unit quantities decreasing over 3 minutes. Recovery when detected the max. number of units.
H8	High pressure sensor malfunction	Exhaust pressure ≤0.3Mpa will protect
H9	There are 3 times P9 protection in 60 minutes	Recovery after power on again
Hb	Low pressure sensor malfunction	Open circuit or short circuit fault
xHd	Slave unit malfunction	x represents which outdoor unit it is
P0	Inverter compressor top temperature protection	
P1	High pressure protection	
P2	Low pressure protection	There are 3 times P2 protection in 30 minutes. Display H5,can't recover.
xP3	Compressor over current protection	x represents for a system, 1 is A system, 2 is B system.
P4	Discharge temp. sensor protection	There are 3 times P2 protection in 100 minutes. Display H6, can't recover.
P5	Pipe temp. sensor protection	
xP6	Inverter module protection	x represents the system which it is. There are 3 times P6 protection in 30 minutes. Display H4, can't recover.
P9	Fan module protection	There are 3 times P9 protection in 30 minutes. Display H9, can't recover.
xL0	Module malfunction	x represents for a system, 1 is A system, 2 is B system.
xL1	DC bus low voltage protection	x represents for a system, 1 is A system, 2 is B system.
xL2	DC bus high voltage protection	x represents for a system, 1 is A system, 2 is B system.
xL3	Reserve	x represents for a system, 1 is A system, 2 is B system.
xL4	MCE malfunction/simultaneously/cycle loop	x represents for a system, 1 is A system, 2

		is B system.
xL5	Zero speed protection	x represents for a system, 1 is A system, 2 is B system.
xL6	Reserve	x represents for a system, 1 is A system, 2 is B system.
xL7	Wrong phase protection	x represents for a system, 1 is A system, 2 is B system.
xL8	Protection of the speed change between a moment before and after is ＞15Hz	x represents for a system, 1 is A system, 2 is B system.
xL9	Protection of the speed change between the setting speed and the actual speed ＞15Hz	x represents for a system, 1 is A system, 2 is B system.

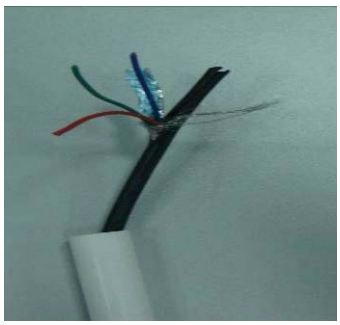
4. Troubleshooting

4.1 E0: Communication error between outdoor units (Only display on faulty slave unit, all the ODU in standby)



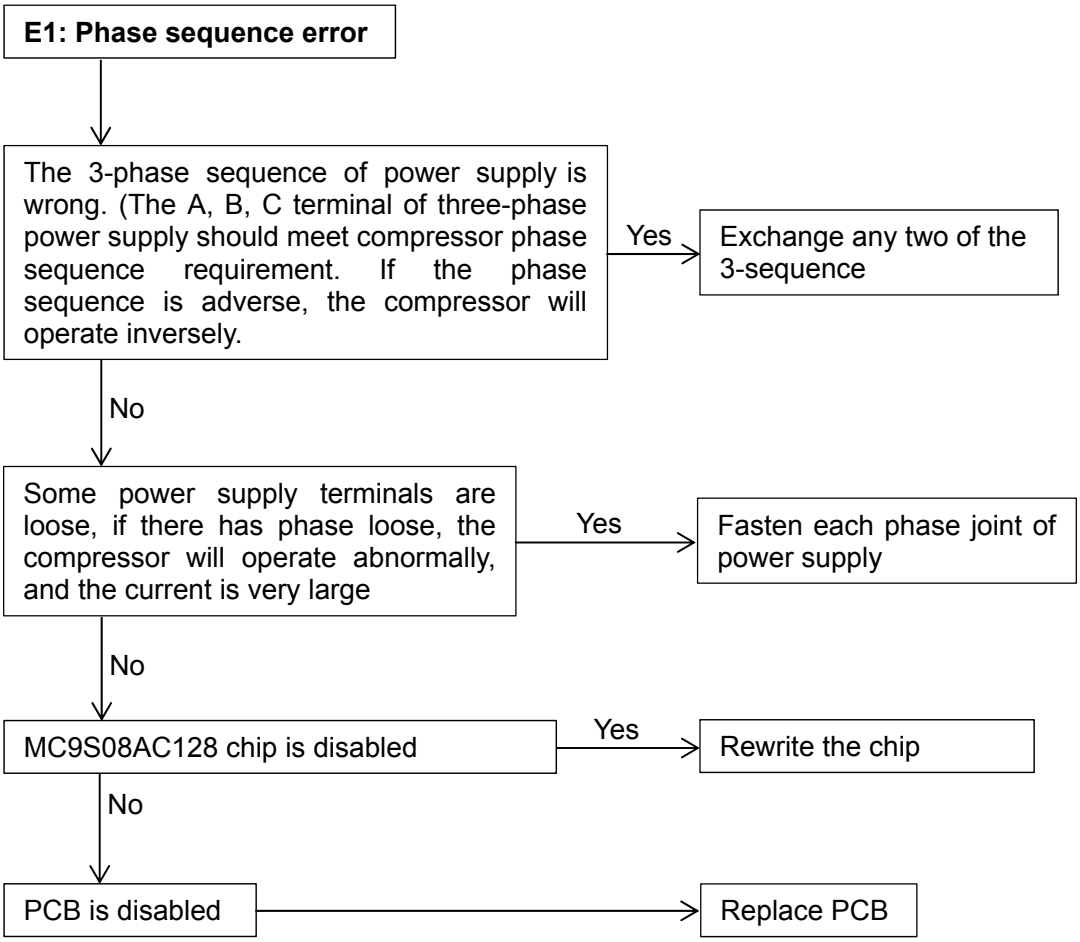


2-core shielded wire (×)

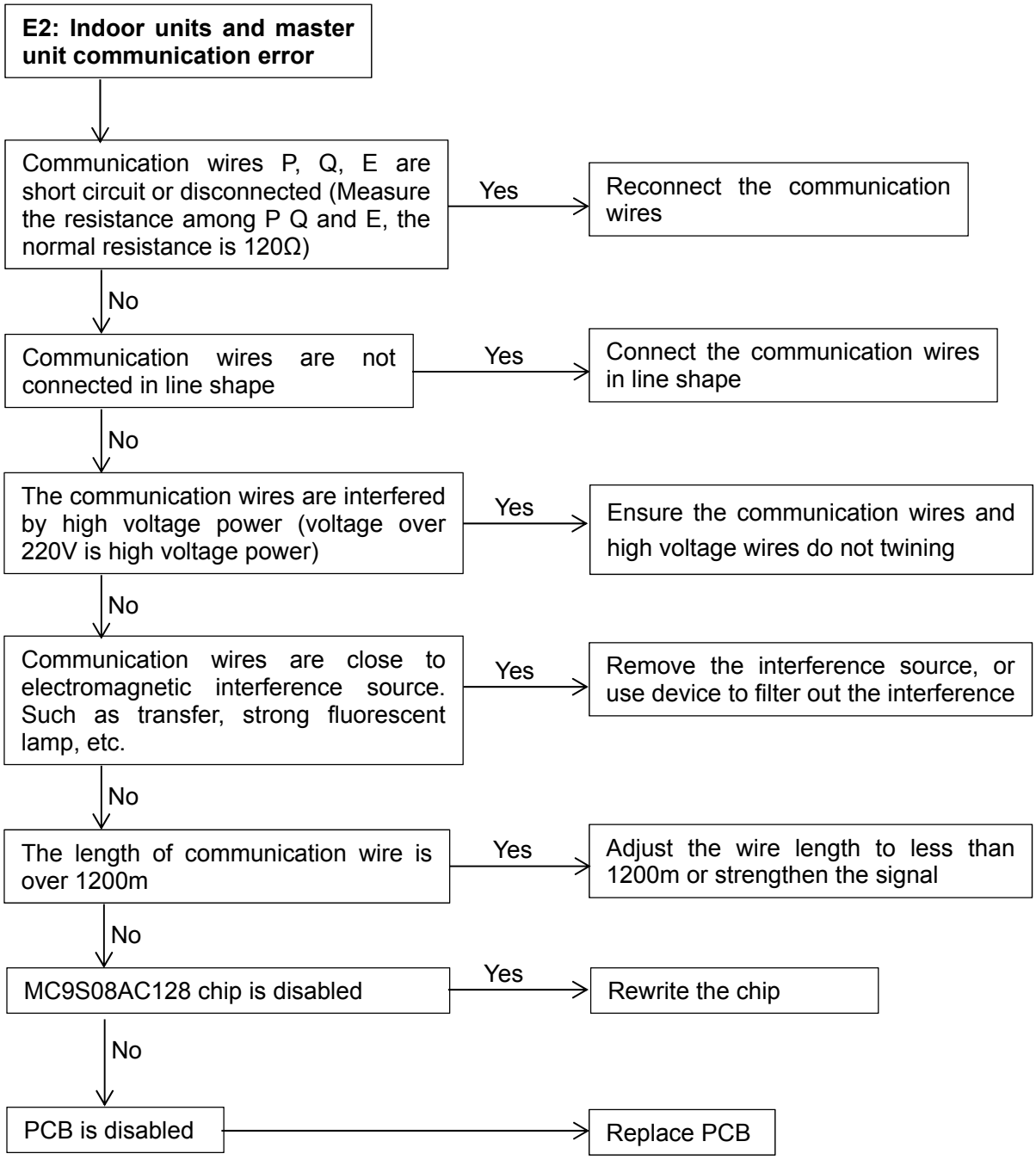


3-core shielded wire (√)

4.2 E1: Phase sequence error (Display on faulty unit, all the ODU in standby)



4.3 E2: Indoor units and master unit communication error (Only display on master unit, all the ODU in standby)



1. Press indoor unit's receiver button for 5 seconds, the indoor unit's communication address code is displayed; press it for 10 seconds, power code is displayed. Check every unit's address code.

Codes are as follows:

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

Address	0	1	2	3	4	5	6	7	8	9
Capacity (×100W)	22	28	36	45	56	71	80	90	112	140
HP	0.8	1.0	1.2	1.6	2.0	2.5	3.0	3.2	4.0	5.0

For example:

Press the button for 5 seconds:

If the "Running"、"Timer" and "Fan/defend fan" lights are normally on and the buzzer isn't "warning", that means the address code is 14=(8+4+2)

If the 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 "Running"、"Timer" and "Fan/defend fan" lights are normally on and the buzzer is "warning", that means the address code is 46=32+(8+4+2)

If the lights are flash and the buzzer is "warning", that means the address code is 62=48+ (8+4+2)

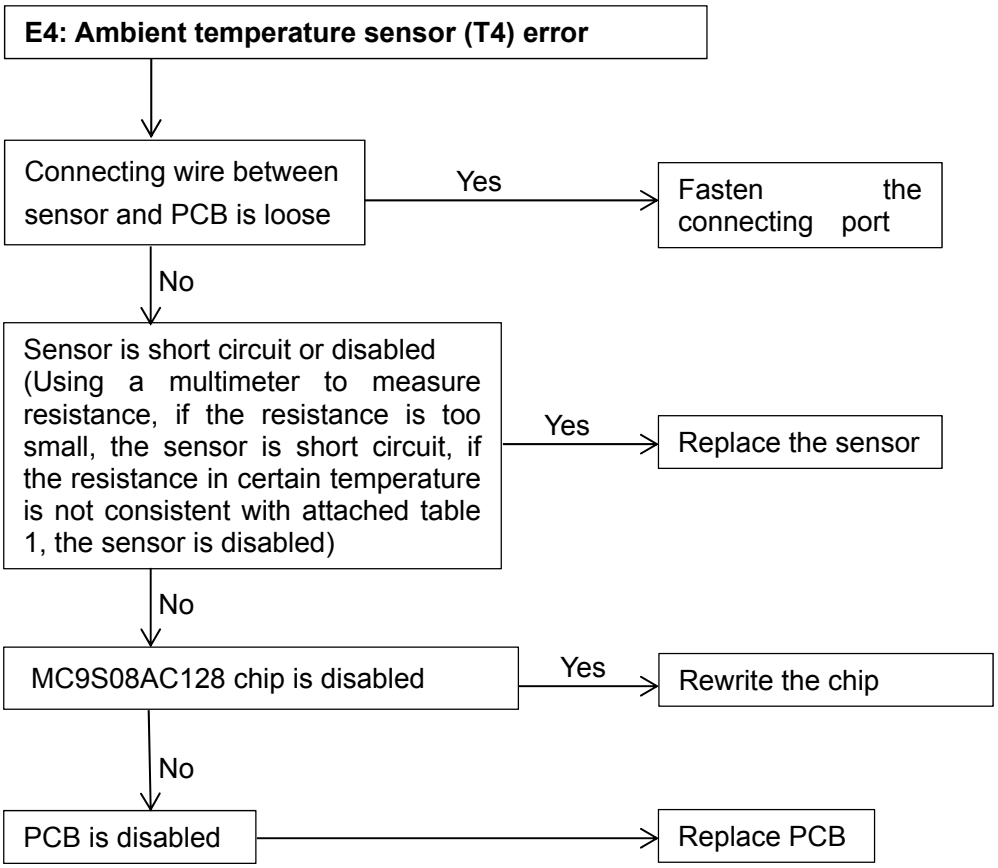
Press the button for 10 seconds:

If the "timer" and "warning" lights are normally on, that means the capacity code is 5=(4＋1) and the capacity of indoor unit is 71×100W(2.5HP).

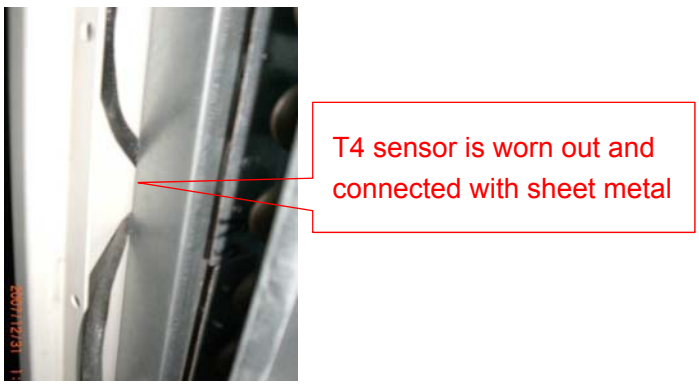
Note:

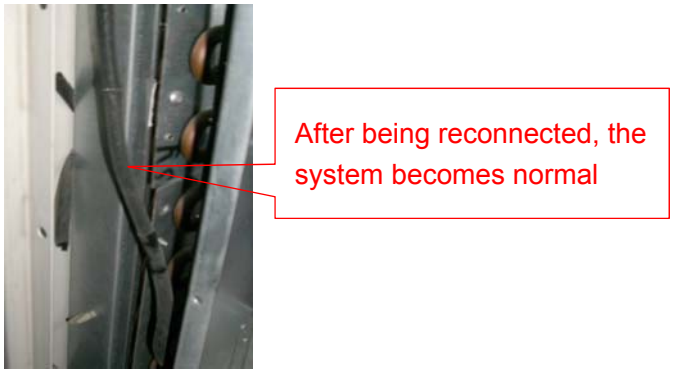
Communication wires should be shield wire and indoor units should be connected in series.

4.4 E4: Ambient temperature sensor (T4) error/ (Display on faulty unit, all the ODU in standby)

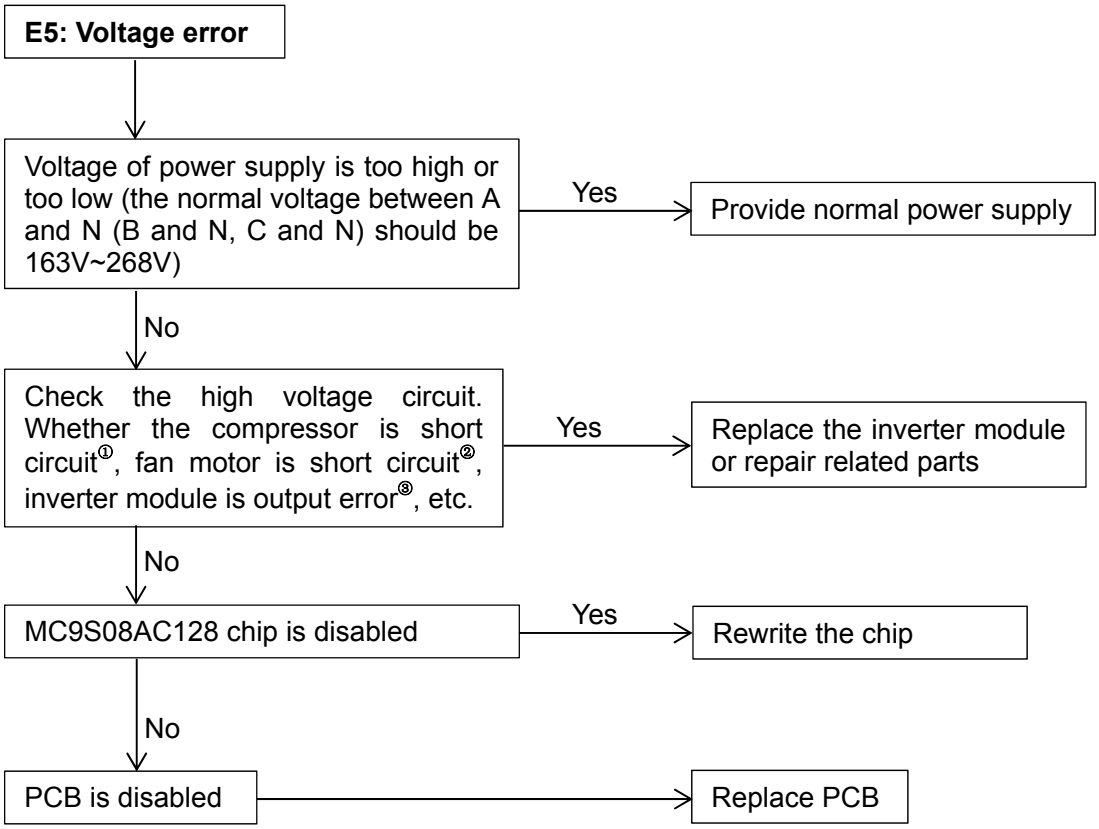


Case: There is no display on PCB of one system, and the problem still exists after replacing PCB. Voltage values on measuring plate (such as 220V, 5V, 12V, etc.) are normal; after measuring resistance value of sensor, find that T4 thermo-bulb is earth-continuity, and further discover that the thermal cable of T4 sensor is punched by bolt, as follows:





4.5 E5: Voltage error (Display on faulty unit, others in 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.

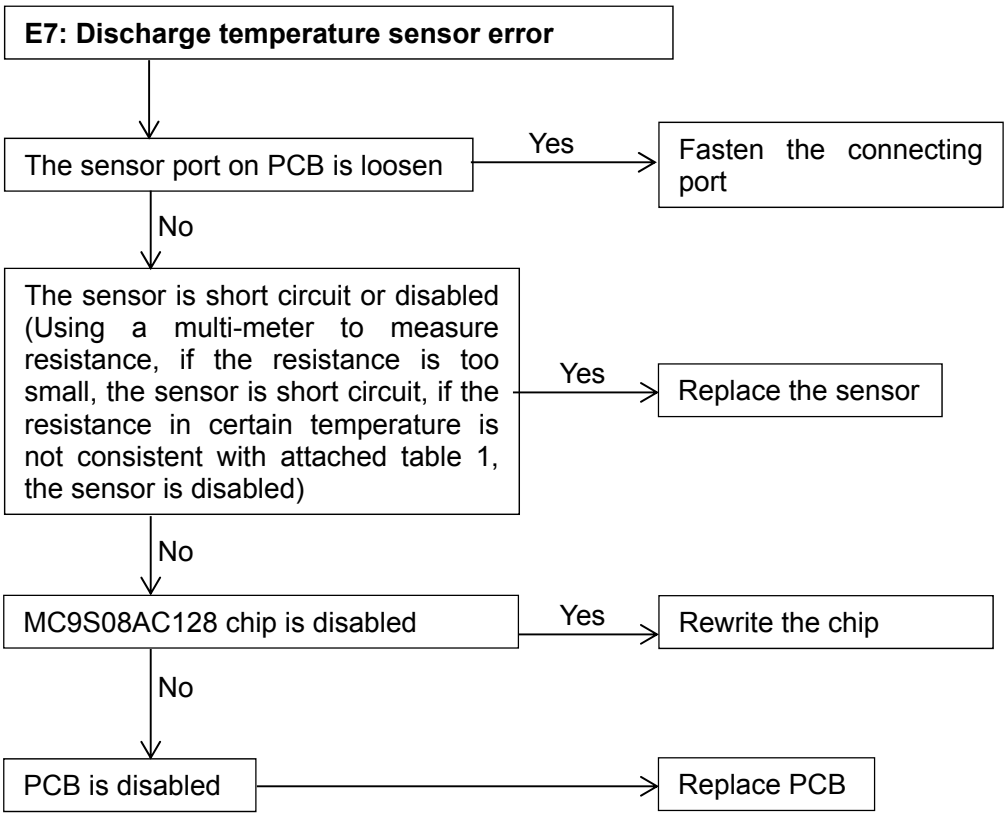
2. How to check whether the fan motor is short circuit②:

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.

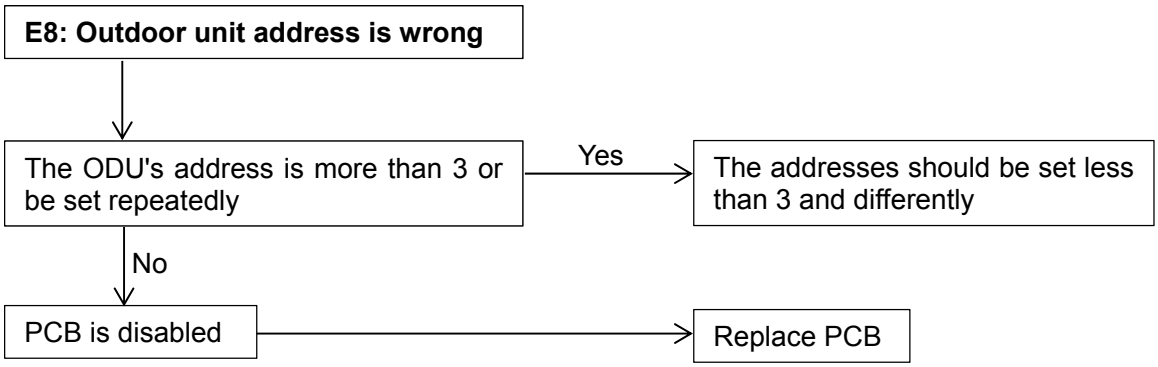
3. How to check whether the inverter module is output error③:

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

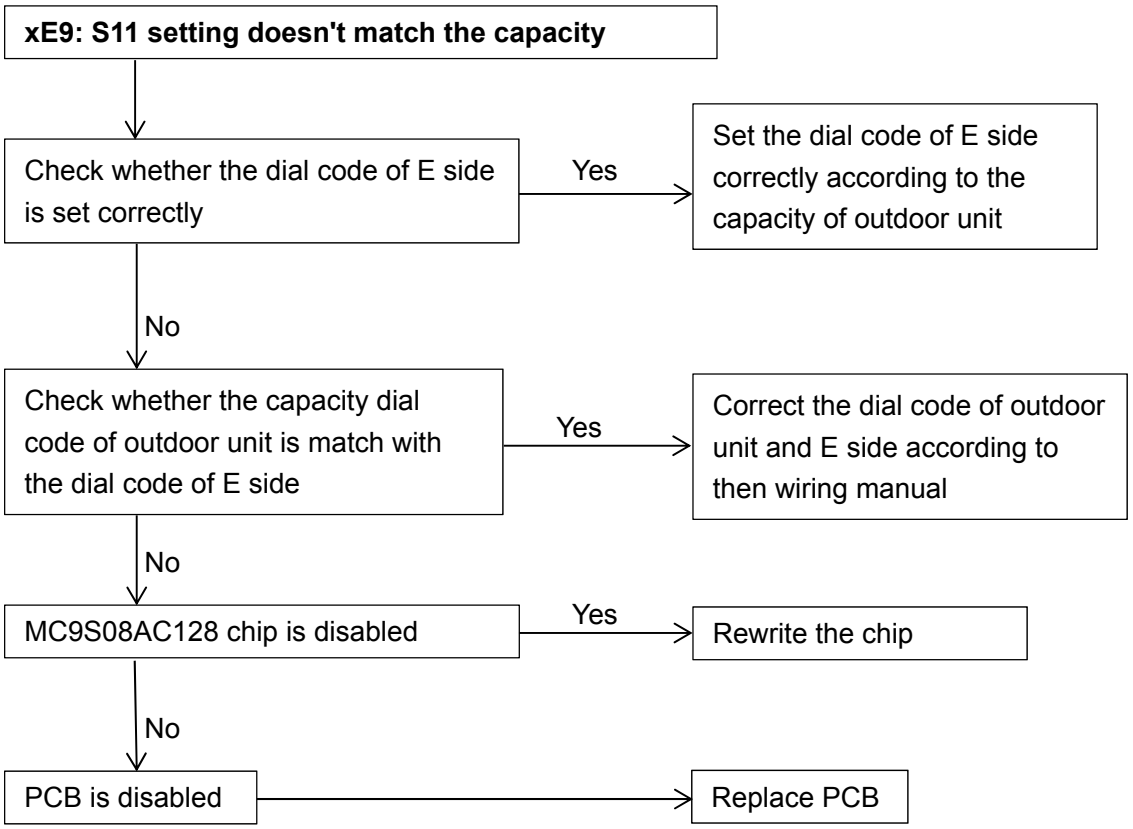
4.6 E7: Discharge temperature sensor error (Display on faulty unit, all the ODU in standby)



4.7 E8: Outdoor unit address is wrong (Only display on faulty slave unit, all the ODU in standby)



4.8 xE9: S11 setting doesn't match the capacity (Display on faulty unit, all the ODU in standby)



4.9 xH0/H1

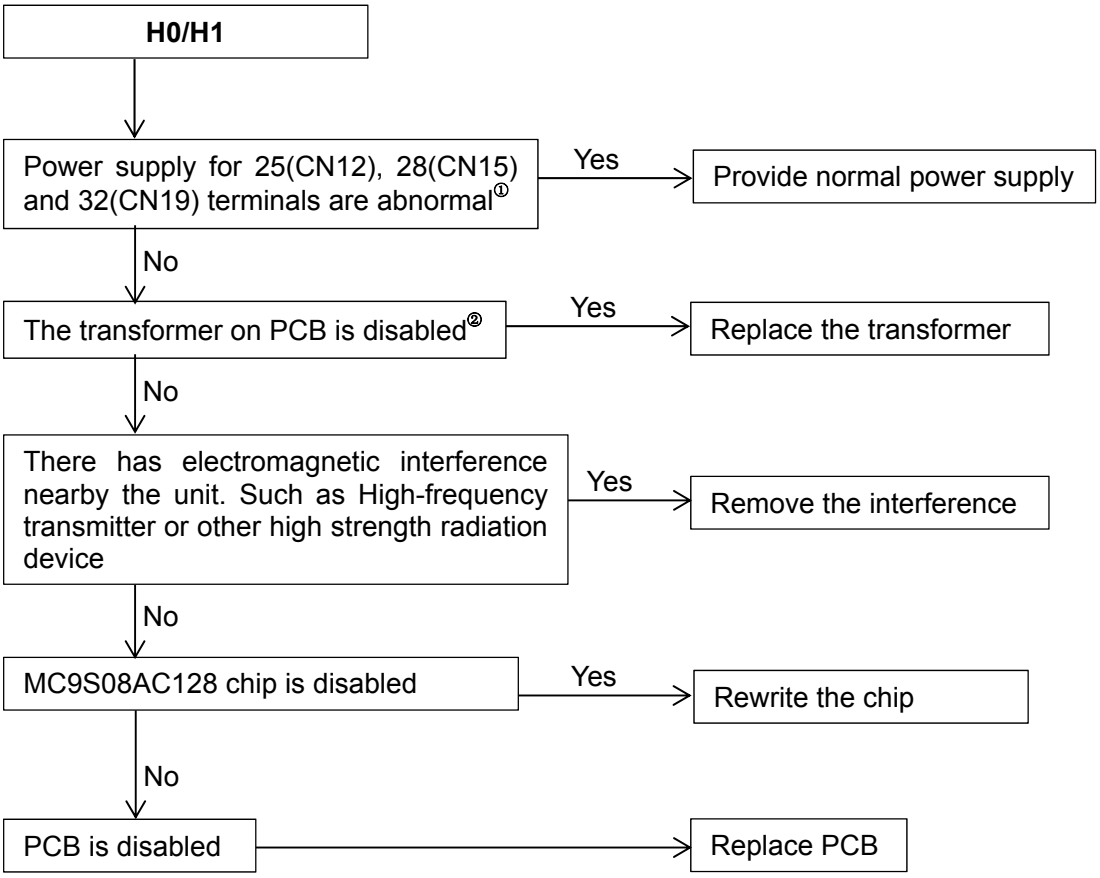
xH0: Communication error between DSP and the main chip (Display on faulty unit, all the ODU in standby)

H1: Communication error between 0537 and main chip (Display on faulty unit, all the ODU in standby)

IR341 chip: IR 341chip is used for inverter compressor drive.

0537 chip: 0537chip is used for control the communication between indoor unit and outdoor unit, and the communication between outdoors.

MC9S08AC128 chip: MC9S08AC128 chip is the main chip, it used for the whole system control.



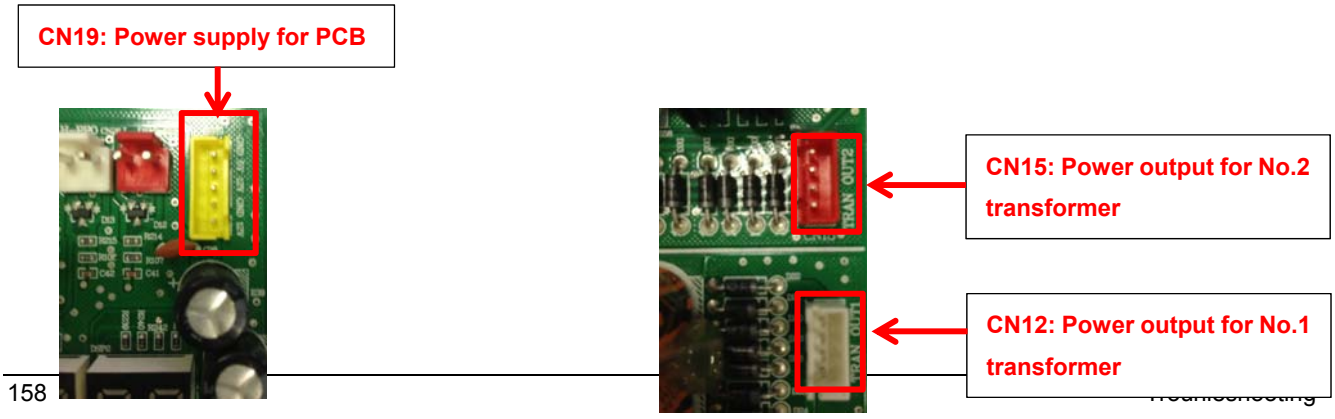
Note:

1. How to check whether power supply for 25(CN12), 28(CN15) and 32(CN19) terminals are abnormal①

The voltage input for 25(CN12) and 28(CN15) terminals are both 220V, the voltage input between "GND" and "+5V" terminals of 32(CN19) port is 5V, and between "GND" and "+12V" terminals of 32(CN19) port is 12V.

2. How to check whether the transformer on PCB is disabled②

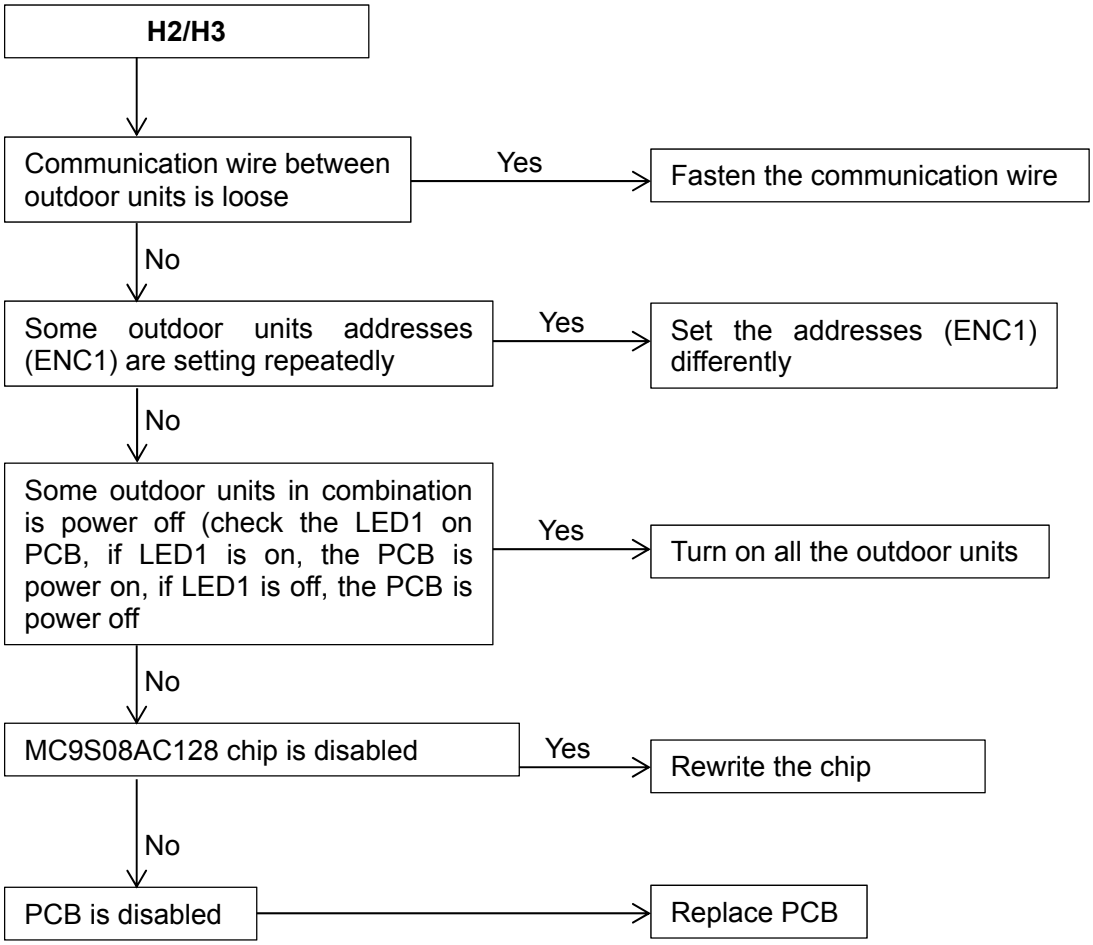
The voltage input for 25(CN12) and 28(CN15) terminals are both 220V, the voltage output of 25(CN12) terminal is AC9V (yellow-yellow) and AC13.5V (brown-brown); the voltage output of 28(CN15) terminal is AC14.5V (yellow-yellow) and AC 14.5V (blue-blue). If the voltage is out of the range, the transformer is disabled.



4.10 H2/H3

H2: Quantity of outdoor units decrease error (Only display on master unit, all the ODU in standby)

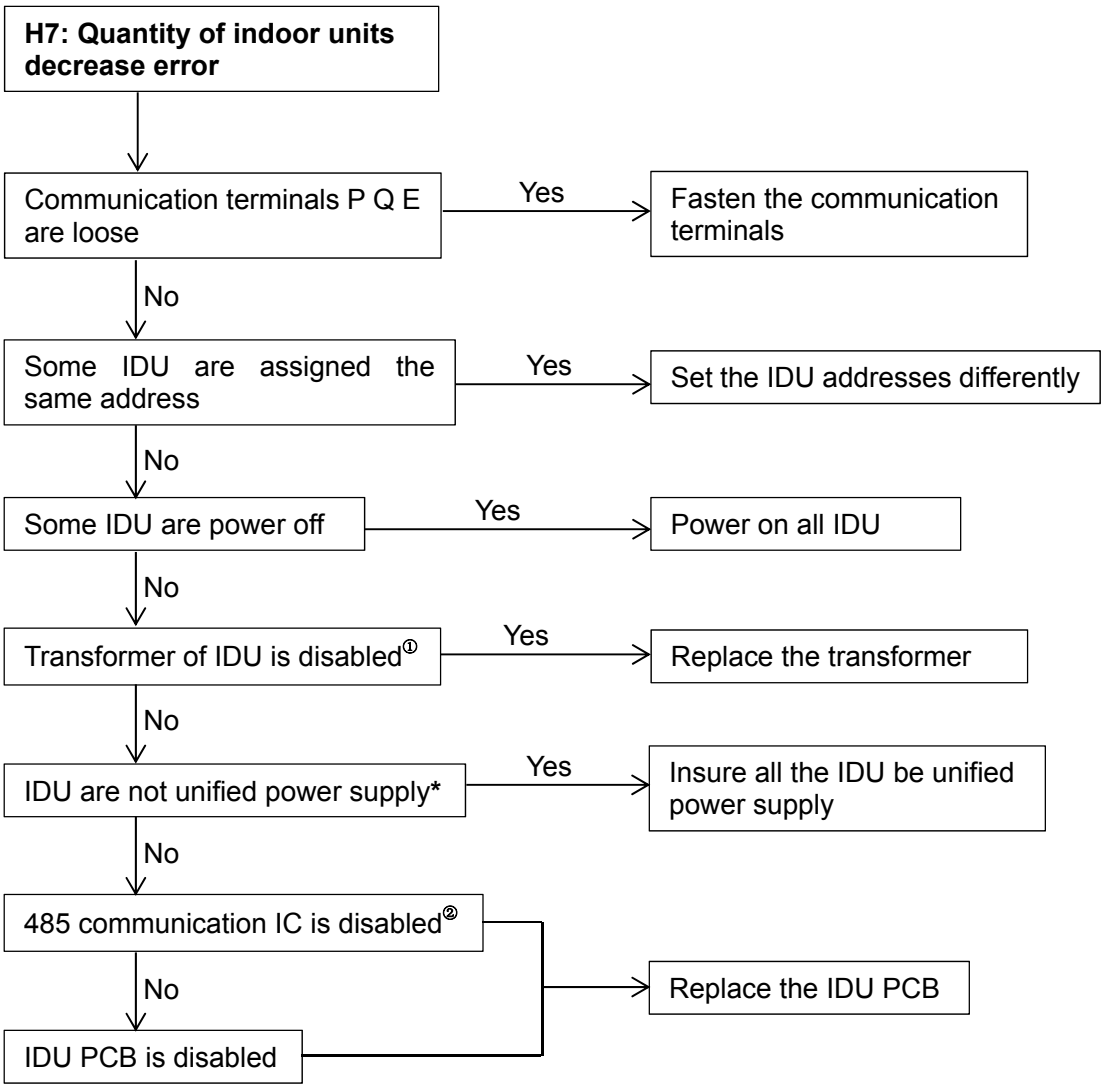
H3: Quantity of outdoor units increase error (Only display on master unit, all the ODU in standby)



Note: All the outdoor units should be unified power supply. If the outdoor units are note be unified power supply, once some outdoor unit is power off, other outdoor units are still running, it may cause system unbalance and damage devices.

4.11 H7: Quantity of indoor units decrease error (Only display on master unit, all the ODU in standby)

"H7" error will display when the quantity of indoor units decrease above 3 minutes.



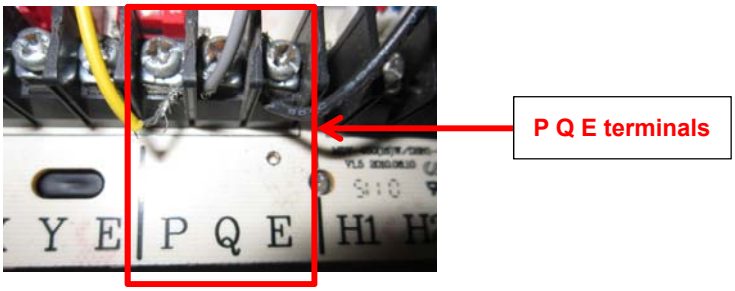
Note:

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.

4.12 P0/P4/H6: High temperature protection (Display on faulty unit, all the ODU in standby)

P0: Top temperature protection of inverter compressor

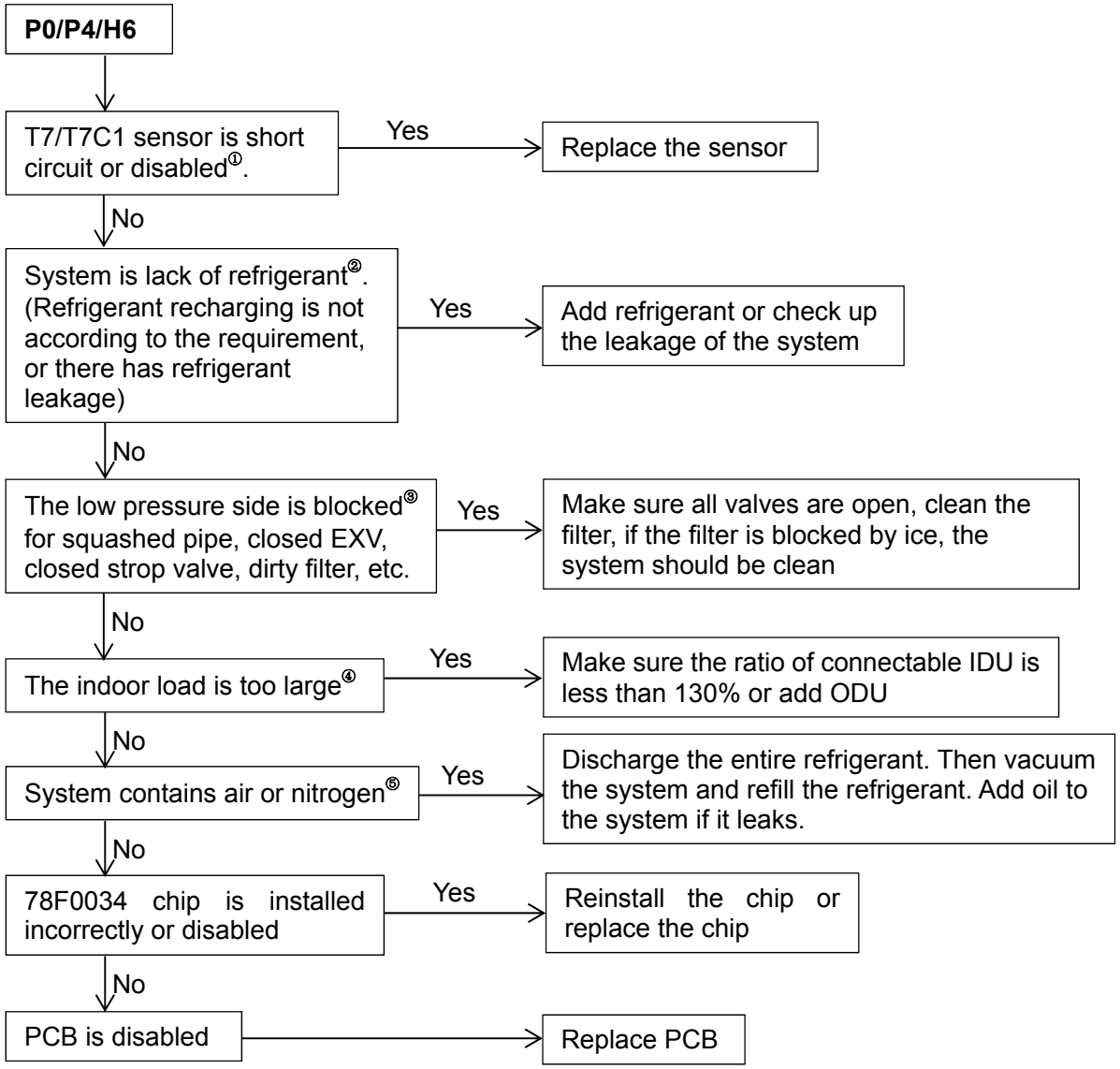
When the top temperature is over 120℃, the operation will stop, when the temperature goes back to normal range, P0 disappear and normal operation resumes.

P4: Discharge temperature protection of all compressors

When the discharge temperature of any compressor is over 120℃, the operation will stop, when the temperature goes back to normal range, P4 disappear and normal operation resumes.

H6: When system appear 3 times P4 protection in 100 minutes

It cannot resume automatically, and it can resume only by restarting the machine.



Note:

1. How to check whether the T7/T7C1 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.

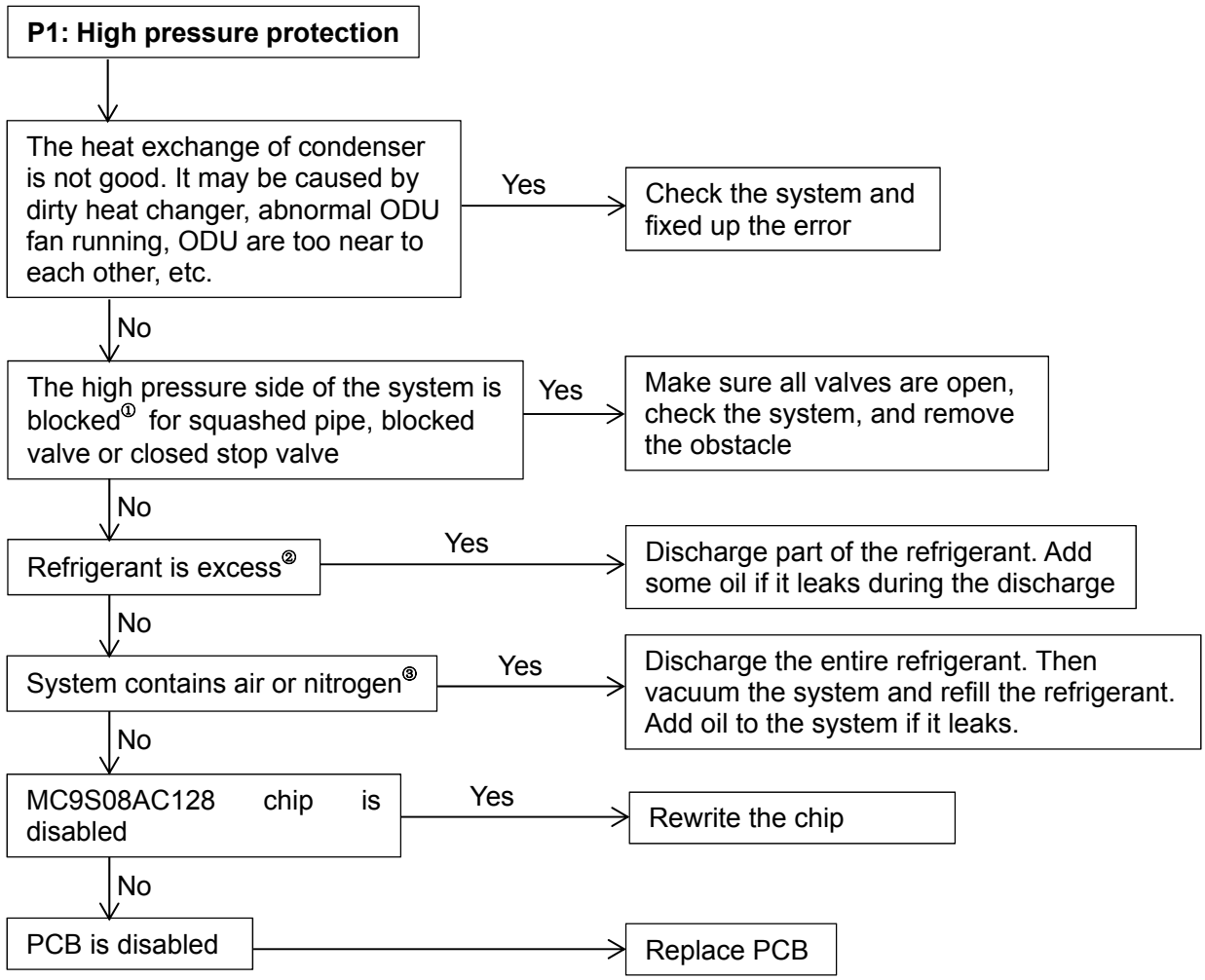
5. The phenomenon of the system contains air or nitrogen⑤:

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.

4.13 P1: High pressure protection (Display on faulty unit, all the ODU in standby)

When the pressure is over 4.4MPa, the system will display P1 protection, all 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.

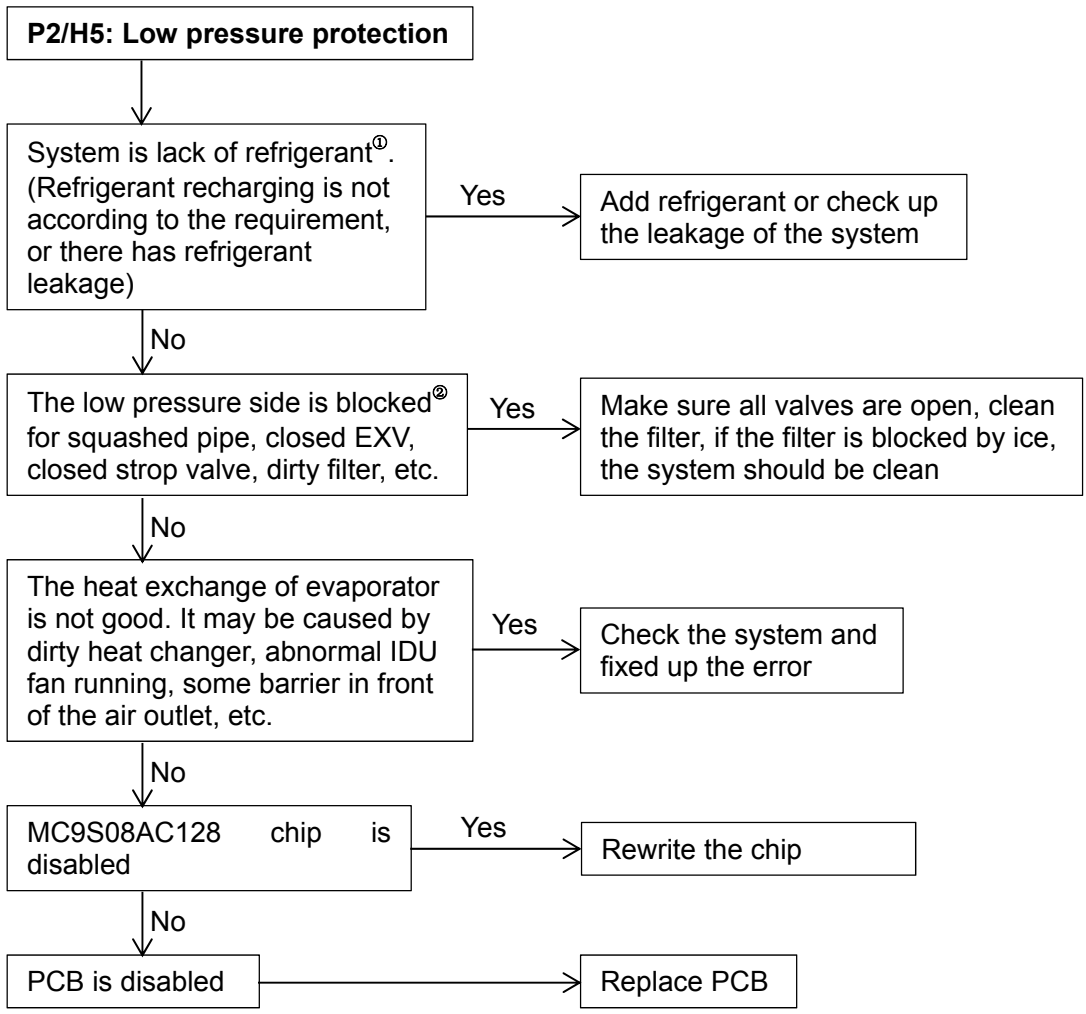
*If the system install three-phase protector, and the three-phase protector connect with high pressure switch in series connection, the system will display P1 protection when fist power on, and P1 protection will disappear after system is steady.

*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 (Display on faulty unit, all the ODU in standby)

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

H5 error will display when system appear 3 times P2 protection in 30 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.

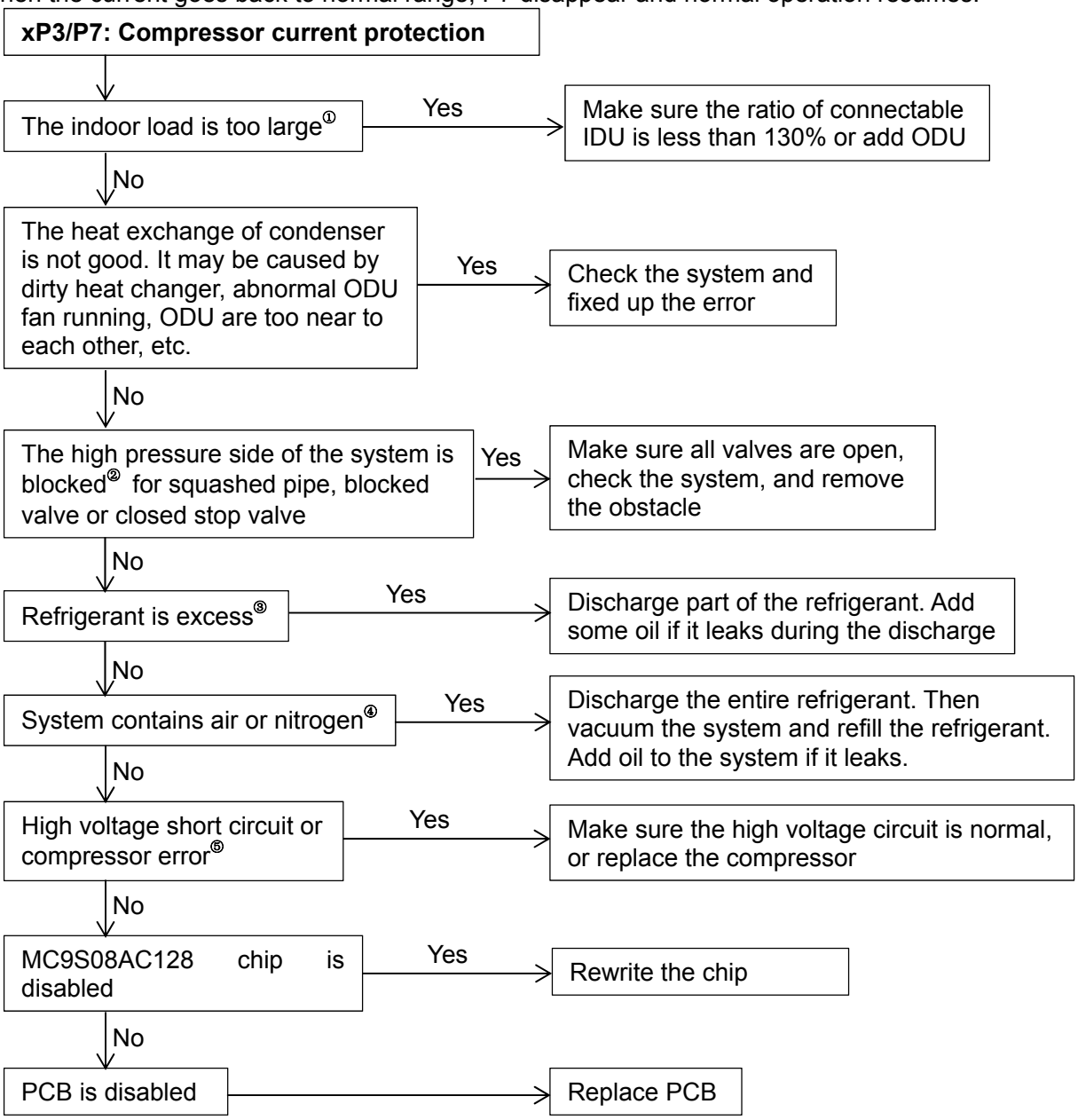
4.15 xP3/P7: Compressor current protection (Display on faulty unit, all the ODU in standby)

P3: Current protection of inverter compressor

When the current of inverter compressor is over 12A, the system will display P3 protection, all the ODU in standby. When the current goes back to normal range, P3 disappear and normal operation resumes.

P7: Current protection of fixed compressor

When the current of fixed compressor is over 17A, the system will display P7 protection, all the ODU in standby. When the current goes back to normal range, P7 disappear 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.

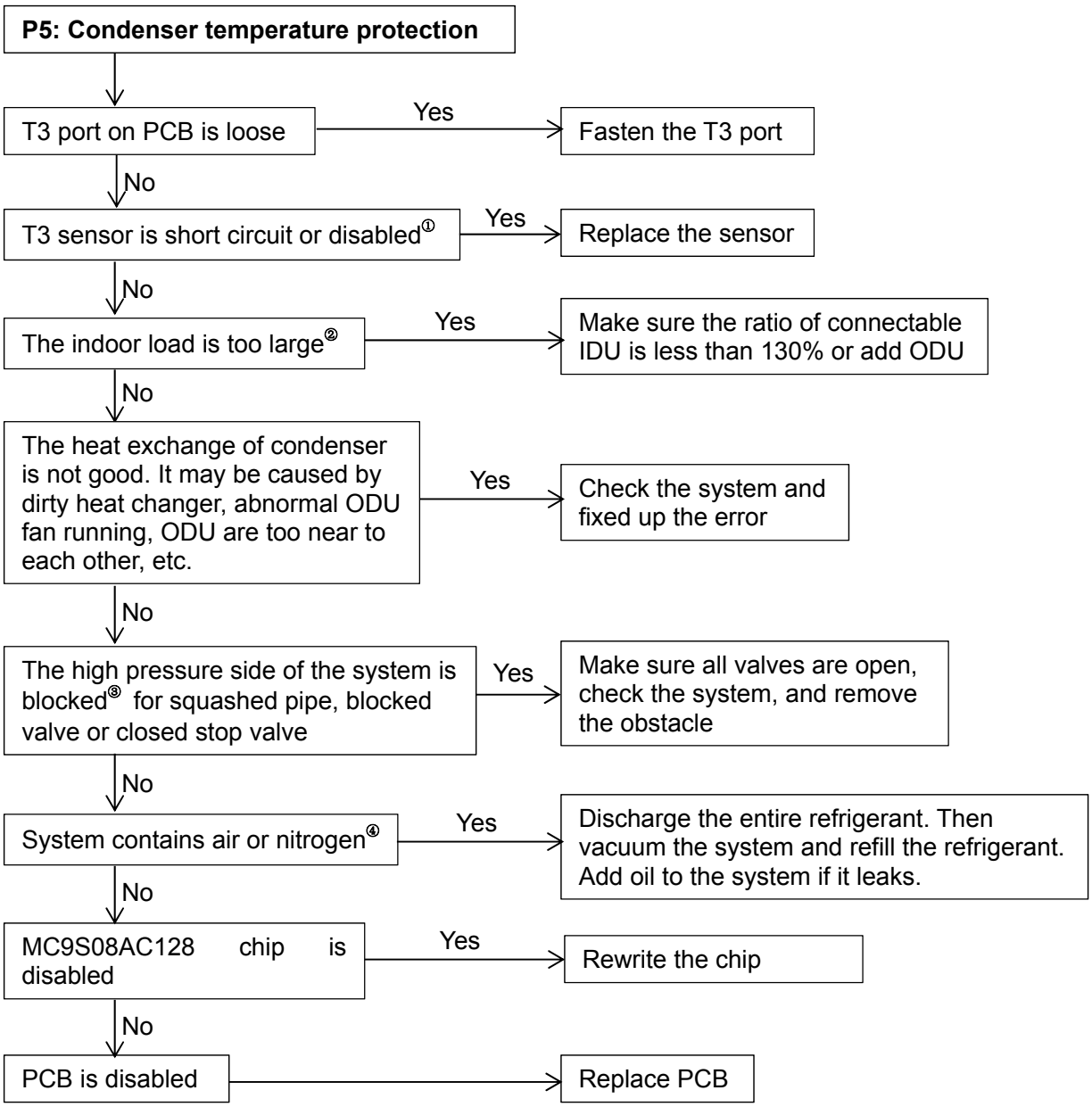
5. How to check whether compressor is error⑤:

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.

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

4.16 P5: Condenser temperature T3 protection (Display on faulty unit, all the ODU in standby)

When condenser temperature is over 65℃, the system will display P5 protection, all 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 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:

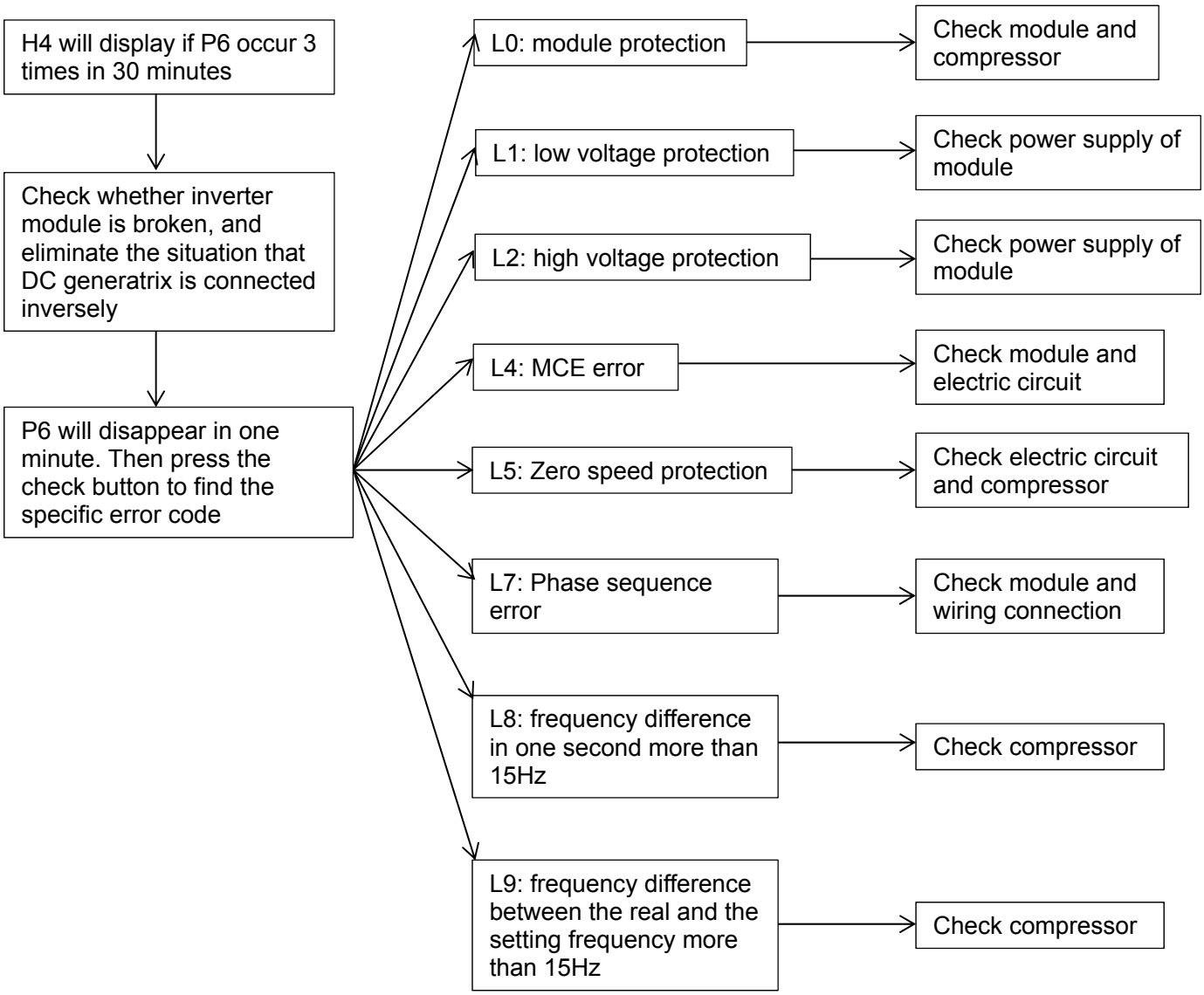
The high pressure is higher than normal value, the low pressure is lower than normal value, and the discharge temperature is higher than normal value.

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

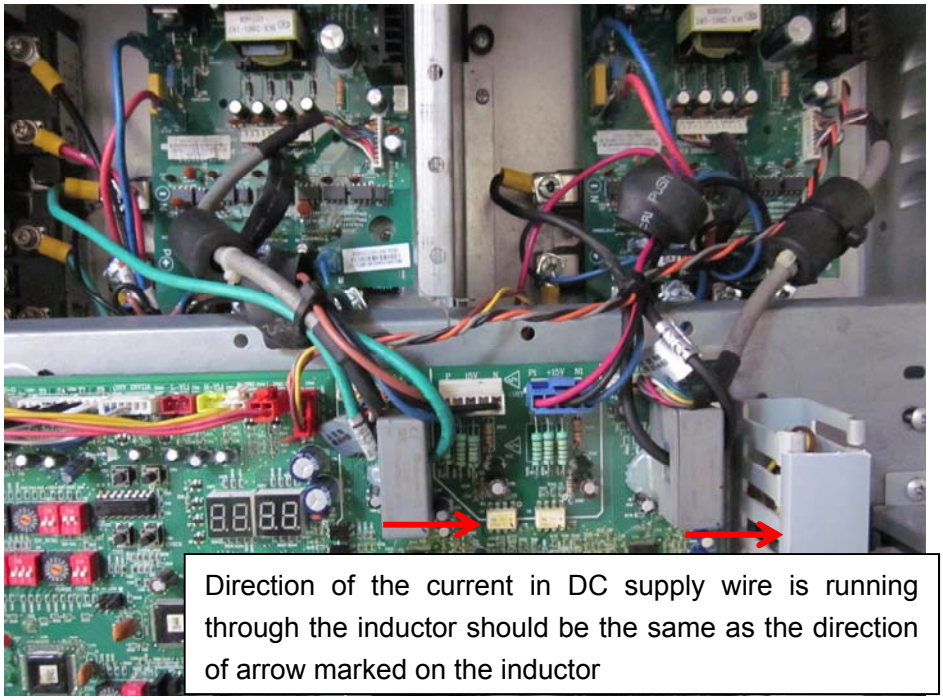
The high pressure is higher than normal value, current is larger than normal value, discharge temperature is higher than normal value, compressor makes noise, pressure meter do not display steady.

4.17 xP6/H4: Inverter module protection (Display on faulty unit, all the ODU in standby)

If the system display three times P6 protection in 30 minutes, the system will stop and display H4 error code. 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.



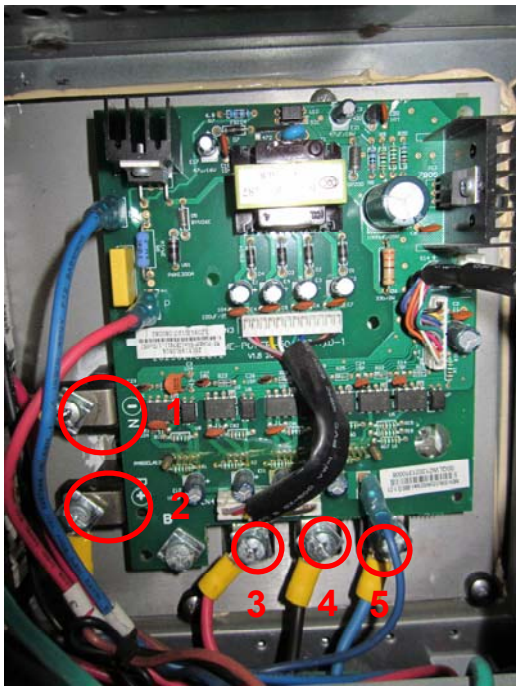
DC generatrix check



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

1) Check the voltage of DC generatrix, the normal value should be 510 to 580V. If the value is less than 510V, go to next step.
2) Check the wiring connection of rectifier circuit, find out any loose in the circuit, and check the filter board, single-phase rectifier stack, and three-phase rectifier stack. Note DC and AC switch in the measurement.
3) If none of the above works, replace the PCB.

Module check



1) DC voltage between P and N should be about 1.41 times of the local power supply voltage.
2) DC voltage between 1 and 2 should be 510V to 580V
3) First adjust multi -meter to diode position, put the red pen on the 1 point (N terminal), put black pen on the 3 or 4 or 5 point, the value should be approximate 0.378, if the value is 0, the IPM is

broken. And then change the red pen to the 2 point (P terminal), the value should be infinity, if the value is 0, the IPM is broken.

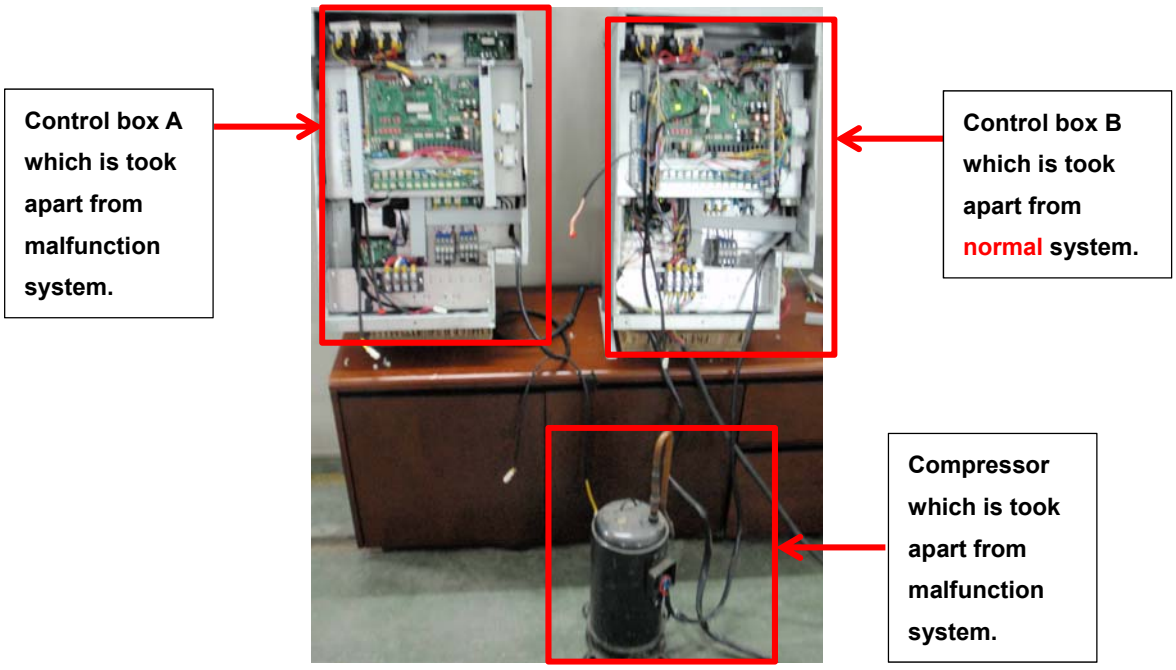
4.18.1 xL0/xL8/xL9 troubleshooting

Step 1: Replace the modular with correctly wire connection and start the system, if system is still malfunction, then go to step 2 to check the compressor.

Step 2: Take out the compressor from the malfunction system, short-circuit the suction and the discharge, vacuum dry and charge 0.3kg~0.4kg R410A, and then connect the U,V,W terminals to control box B which is took apart from normal system.

If the compressor start normally, that means compressor is OK, control box A is malfunction, then check the inverter module.

If the compressor could not start normally, that means the compressor is malfunction, then go to step 3 to check the compressor.



Step 3: Check the compressor

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

Fig. A

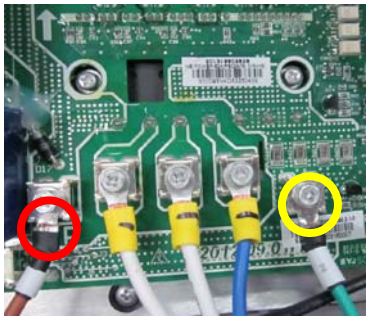
Fig. B

Fig. C

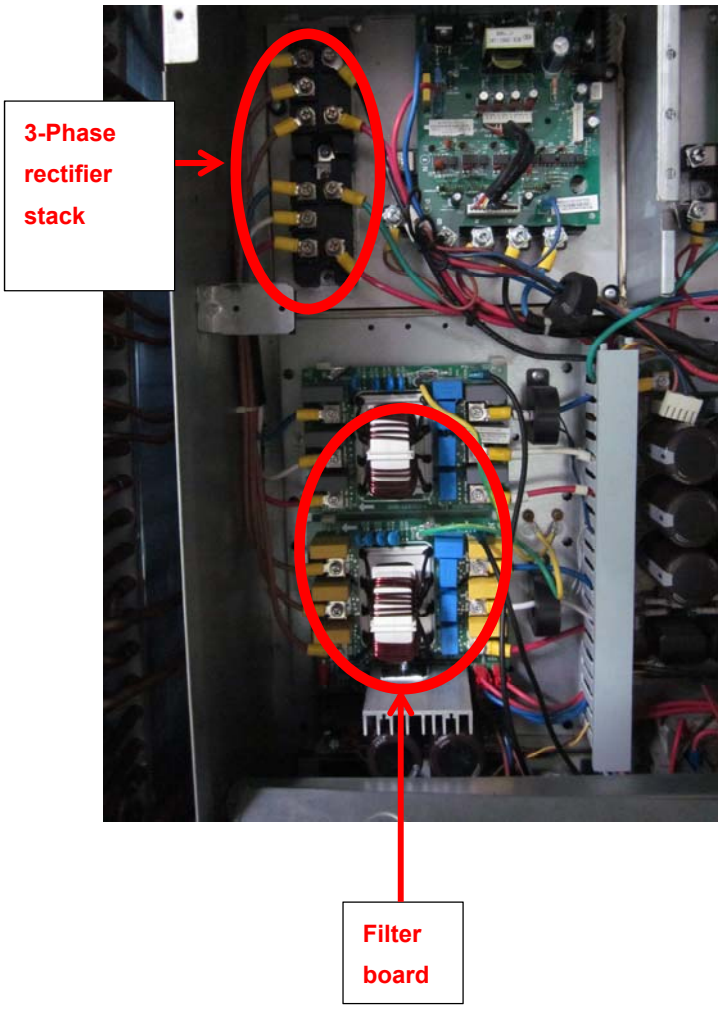
Fig. D

4.19.2 xL1/xL4 troubleshooting

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

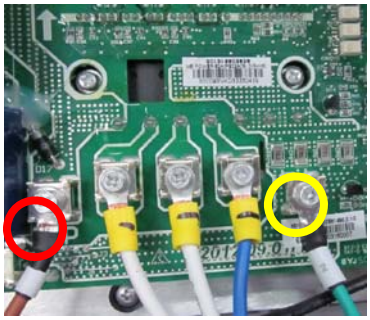


Step 2: Check whether the wires of rectifier circuit are loose or not. If wires are loosen, fasten the wires. If wires are OK, replace the PCB.

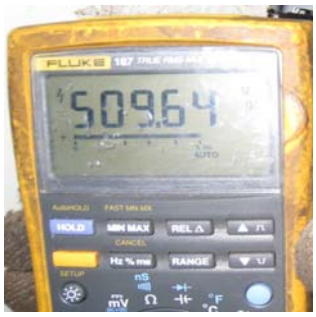


4.20.3 xL2 troubleshooting

Step 1: Check the DC voltage between P and N terminal, the normal value should be 510V~580V or 296V~324V, if the voltage is higher than 580V or 310V, go to step 2.



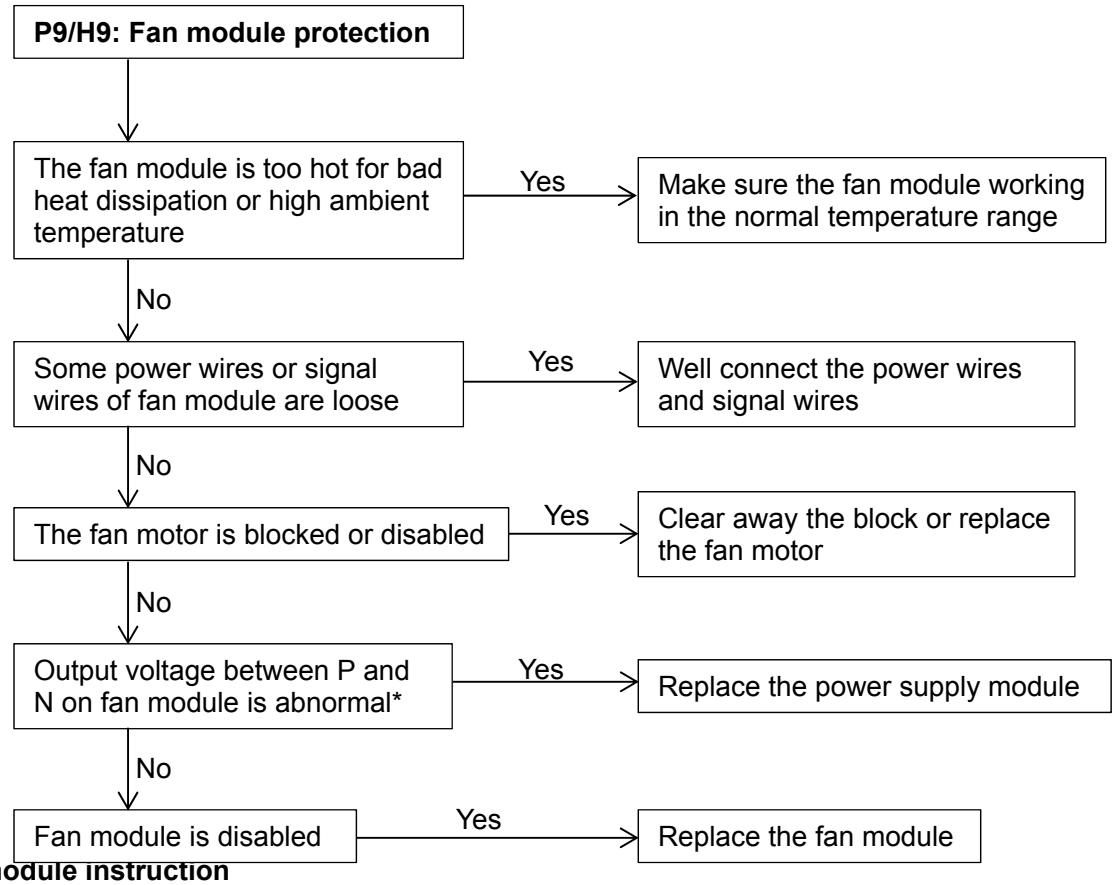
Step 2: Check the voltage between two electrolytic capacitors, the normal value should be 510V±30V or 310V±30V, if not in the range then the PCB has malfunction, it needs to be replaced.



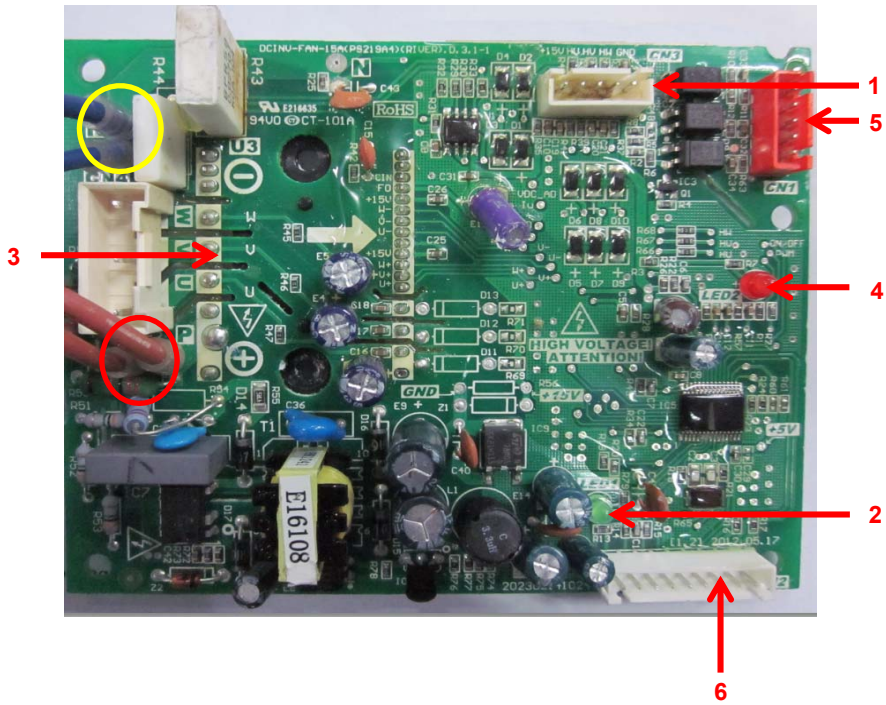
Turn the measure range of the meter to 1kV and measure the voltage between two electrolytic capacitors

4.21 xP9/xH9: Fan module protection (Display on faulty unit, all the ODU in standby)

If the system display three times P9 protection in 30 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 PCB.

Attached table 1:

Resistance value of ambient temperature and pipe temperature sensor

Temperature (℃)	Resistance value (kΩ)	Temperature (℃)	Resistance value (kΩ)	Temperature (℃)	Resistance value (kΩ)	Temperature (℃)	Resistance value (kΩ)
-20	115.266	**20**	12.6431	**60**	2.35774	**100**	0.62973
-19	108.146	**21**	12.0561	**61**	2.27249	**101**	0.61148
-18	101.517	**22**	11.5	**62**	2.19073	**102**	0.59386
-17	96.3423	**23**	10.9731	**63**	2.11241	**103**	0.57683
-16	89.5865	**24**	10.4736	**64**	2.03732	**104**	0.56038
-15	84.219	**25**	10	**65**	1.96532	**105**	0.54448
-14	79.311	**26**	9.55074	**66**	1.89627	**106**	0.52912
-13	74.536	**27**	9.12445	**67**	1.83003	**107**	0.51426
-12	70.1698	**28**	8.71983	**68**	1.76647	**108**	0.49989
-11	66.0898	**29**	8.33566	**69**	1.70547	**109**	0.486
-10	62.2756	**30**	7.97078	**70**	1.64691	**110**	0.47256
-9	58.7079	**31**	7.62411	**71**	1.59068	**111**	0.45957
-8	56.3694	**32**	7.29464	**72**	1.53668	**112**	0.44699
-7	52.2438	**33**	6.98142	**73**	1.48481	**113**	0.43482
-6	49.3161	**34**	6.68355	**74**	1.43498	**114**	0.42304
-5	46.5725	**35**	6.40021	**75**	1.38703	**115**	0.41164
-4	44	**36**	6.13059	**76**	1.34105	**116**	0.4006
-3	41.5878	**37**	5.87359	**77**	1.29078	**117**	0.38991
-2	39.8239	**38**	5.62961	**78**	1.25423	**118**	0.37956
-1	37.1988	**39**	5.39689	**79**	1.2133	**119**	0.36954
0	35.2024	**40**	5.17519	**80**	1.17393	**120**	0.35982
1	33.3269	**41**	4.96392	**81**	1.13604	**121**	0.35042
2	31.5635	**42**	4.76253	**82**	1.09958	**122**	0.3413
3	29.9058	**43**	4.5705	**83**	1.06448	**123**	0.33246
4	28.3459	**44**	4.38736	**84**	1.03069	**124**	0.3239
5	26.8778	**45**	4.21263	**85**	0.99815	**125**	0.31559
6	25.4954	**46**	4.04589	**86**	0.96681	**126**	0.30754
7	24.1932	**47**	3.88673	**87**	0.93662	**127**	0.29974
8	22.5662	**48**	3.73476	**88**	0.90753	**128**	0.29216
9	21.8094	**49**	3.58962	**89**	0.8795	**129**	0.28482
10	20.7184	**50**	3.45097	**90**	0.85248	**130**	0.2777
11	19.6891	**51**	3.31847	**91**	0.82643	**131**	0.27078
12	18.7177	**52**	3.19183	**92**	0.80132	**132**	0.26408
13	17.8005	**53**	3.07075	**93**	0.77709	**133**	0.25757
14	16.9341	**54**	2.95896	**94**	0.75373	**134**	0.25125
15	16.1156	**55**	2.84421	**95**	0.73119	**135**	0.24512
16	15.3418	**56**	2.73823	**96**	0.70944	**136**	0.23916
17	14.6181	**57**	2.63682	**97**	0.68844	**137**	0.23338
18	13.918	**58**	2.53973	**98**	0.66818	**138**	0.22776
19	13.2631	**59**	2.44677	**99**	0.64862	**139**	0.22231

Attached table 2:

Resistance value of compressor discharge temperature sensor

Temperature (℃)	Resistance value (kΩ)	Temperature (℃)	Resistance value (kΩ)	Temperature (℃)	Resistance value (kΩ)	Temperature (℃)	Resistance value (kΩ)
-20	542.7	**20**	68.66	**60**	13.59	**100**	3.702
-19	511.9	**21**	65.62	**61**	13.11	**101**	3.595
-18	483	**22**	62.73	**62**	12.65	**102**	3.492
-17	455.9	**23**	59.98	**63**	12.21	**103**	3.392
-16	430.5	**24**	57.37	**64**	11.79	**104**	3.296
-15	406.7	**25**	54.89	**65**	11.38	**105**	3.203
-14	384.3	**26**	52.53	**66**	10.99	**106**	3.113
-13	363.3	**27**	50.28	**67**	10.61	**107**	3.025
-12	343.6	**28**	48.14	**68**	10.25	**108**	2.941
-11	325.1	**29**	46.11	**69**	9.902	**109**	2.86
-10	307.7	**30**	44.17	**70**	9.569	**110**	2.781
-9	291.3	**31**	42.33	**71**	9.248	**111**	2.704
-8	275.9	**32**	40.57	**72**	8.94	**112**	2.63
-7	261.4	**33**	38.89	**73**	8.643	**113**	2.559
-6	247.8	**34**	37.3	**74**	8.358	**114**	2.489
-5	234.9	**35**	35.78	**75**	8.084	**115**	2.422
-4	222.8	**36**	34.32	**76**	7.82	**116**	2.357
-3	211.4	**37**	32.94	**77**	7.566	**117**	2.294
-2	200.7	**38**	31.62	**78**	7.321	**118**	2.233
-1	190.5	**39**	30.36	**79**	7.086	**119**	2.174
0	180.9	**40**	29.15	**80**	6.859	**120**	2.117
1	171.9	**41**	28	**81**	6.641	**121**	2.061
2	163.3	**42**	26.9	**82**	6.43	**122**	2.007
3	155.2	**43**	25.86	**83**	6.228	**123**	1.955
4	147.6	**44**	24.85	**84**	6.033	**124**	1.905
5	140.4	**45**	23.89	**85**	5.844	**125**	1.856
6	133.5	**46**	22.89	**86**	5.663	**126**	1.808
7	127.1	**47**	22.1	**87**	5.488	**127**	1.762
8	121	**48**	21.26	**88**	5.32	**128**	1.717
9	115.2	**49**	20.46	**89**	5.157	**129**	1.674
10	109.8	**50**	19.69	**90**	5	**130**	1.632
11	104.6	**51**	18.96	**91**	4.849		
12	99.69	**52**	18.26	**92**	4.703		
13	95.05	**53**	17.58	**93**	4.562		
14	90.66	**54**	16.94	**94**	4.426		
15	86.49	**55**	16.32	**95**	4.294	B(25/50)=3950K+-%	
16	82.54	**56**	15.73	**96**	4.167		
17	78.79	**57**	15.16	**97**	4.045	R(90℃)=5KΩ+-3%	
18	75.24	**58**	14.62	**98**	3.927		
19	71.86	**59**	14.09	**99**	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℃. When ambient temperature is low, operate the system in heating mode and set the temperature 30℃. Then get the parameters after system running normally more than 30 minutes.

Outdoor unit cooling parameters table

Ambient temperature (T4)	℃	20-27	27-33	33-38	38-45
Discharge pressure (spot check)	MPa	2.1-2.3	2.8-3.1	3.3-3.5	3.7-3.9
Pressure of high pressure valve	MPa	1.8-2.0	2.4-2.7	2.8-3.0	3.2-3.5
Pressure of low pressure valve	MPa	0.7-0.9	0.8-1.0	1.0-1.2	1.2-1.4
Discharge temperature (spot check)	℃	50-65	70-85	70-90	80-90
DC Inverter compressor current (spot check)	A	4-5	6-7	7-8	9-11
Fixed compressor current (spot check)	A	6-7	8-9	9-11	11-12
Average temperature of evaporator outlet T2B	℃	8-9	12-15	16-17	20

Outdoor unit heating parameters table

Ambient temperature (T4)	℃	-15--5	-5-5	5-12	12-18
Discharge pressure (spot check)	MPa	2.0-2.2	2.2-2.7	3.0-3.1	2.6-2.7
Pressure of high pressure valve	MPa	1.7-1.8	1.8-2.4	2.6-2.8	2.1-2.4
Pressure of low pressure valve	MPa	2.0-2.2	2.2-2.6	3.0-3.1	2.5-2.7
Discharge temperature (spot check)	℃	50-70	60-70	60-85	60-70
DC Inverter compressor current (spot check)	A	5	5-6	6-8	5-6
Fixed compressor current (spot check)	A	6	6-7	9-10	8-9
Average temperature of condenser outlet T2	℃	33	33-40	46-50	39-41

Part 6 Control System

1. Wireless remote controller

Controller	Appearance	Model	Description
Wireless remote controller		RM05/BG(T)E-A	General functions, big screen and LCD display, with back light display, clock function. address setting function,
		R05/BGE-A	General functions, big screen and LCD display, with back light display, clock function.

Notes: General functions include the ON/OFF, setting mode (AUTO, COOL, HEAT, DRY and FAN), Fan speed, Temperature setting, Timer function.

1.1 R05/BGE-A; RM05/BG (T) E-A

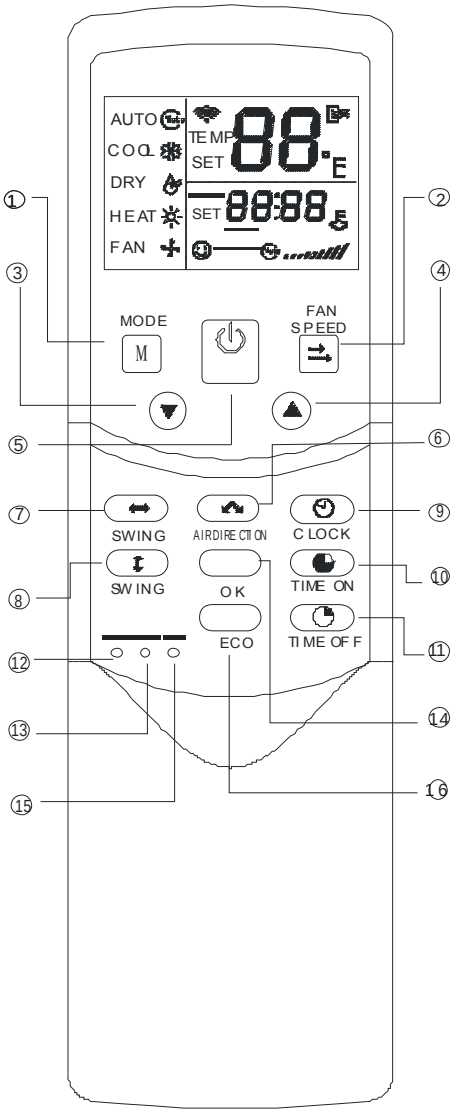
Remote controller specifications

Model	R05/BGE-A; RM05/BG (T) E-A
Rated Voltage	3.0V(2 pieces of LR03 7# batteries)
Lowest Voltage	2.4V
Effective Distance	8M~11M
Operation Condition	-5℃~60℃

Performance Features

1. Operating Mode: COOL HEAT DRY FAN and AUTO.
2. Timer Setting Function in 24 hours.
3. Indoor Setting Temperature Range: 17°C ~30°C.
4. LCD (Liquid Crystal Display) of all functions.
5. Night Light Function

1.1.1 Parts name



(1) Mode Button

Once pressing, running mode will be selected in the following sequence:

AUTO → COOL → DRY → HEAT → FAN

Notes: No heating mode for cool only type unit.

(2) FanSpeed

Fan speed will be selected in following sequence once pressing this button:

AUTO → LOW → MED → HIGH

(3) Adjust button ▼

Decrease the set temp. Keeping pressing will decrease the temp with 1℃ per 0.5s.

(4) Adjust button ▲

Increase the set temp. Keeping pressing will increase the temp with 1℃ per 0.5s.

(5) ON/OFF button

For turning on or turning off the air conditioner.

(6) Air Direction

Activate swing function of air deflector. Once pressing, air deflector will turn 6℃. For normal operation and better cooling and heating effect, deflector will not turn to the degree which is the state of deflector when the unit is turned off (Only available when remote controller is used with corresponding unit.)

(7) Horiz Swing

Activate or turn off horizontal swing function. (Only available when remote controller is used with corresponding unit.)

(8) Vert Swing

Activate or turn off vertical swing function. (Only available when remote controller is used with corresponding unit.)

(9) Clock

Display the current time. (12:00 is displayed when resetting or electrifying for the first time.) Press CLOCK for 5s, icon indicating hour will flash with 0.5s. Press it again,▼ and ▲ are used to adjust the figure. Setting or modification is effective onlyby pressing OK button to make confirmation.

(10) Time ON

For time ON setting. Once pressing this button, the time will increase by 0.5 hour. When the set time exceeds10 hours, pressing the button will increase the time by 1 hour. Adjusting the figure to 0.00 will cancel time ON setting.

(11) Time OFF

For time OFF setting. Once pressing this button, the time will increase by 0.5 hour. When the set time exceeds10 hours, pressing the button will increase the time by 1 hour. Adjust the figure to 0.00 will cancel time ON setting.

(12) **Reset Button**(inner located)

Press this button with a needle of 1mm to cancel the current setting and reset remote controller.

(13) **Lock Button**(inner located)

Press this button with a needle of 1mm to lock or unlock the current setting.

(14) OK button

Used to confirm the time setting and modification.

(15) COOL/HEAT (inner located)

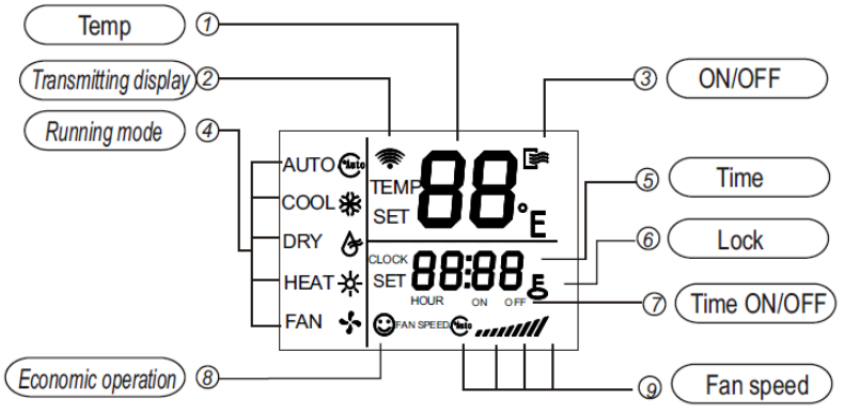
Press this button with a needle of 1mm to shift mode between COOL only and COOL&HEAT.

During setting, backlight will be lightened. Factory default mode is COOL &HEAT.

(16) ECO Button

Activate or turn off economic operation mode. It is suggested to turn on this function when sleeping. (Only available when remote controller is used with corresponding unit.)

1.1.2 LCD display



Notes: RM05/BG(T)E-A is able to set the indoor units' addresses individually.

1.1.3 How to set address through Wireless Remote Controller RM05

- Press the LOCK button for more than 5 seconds, then the controller gets into address setting mode.
- Press the ON/OFF button to start transmitting signal in the address setting mode. If the transmitting signal icon has been turned on, then step can be omitted. When working in address setting mode, press ON/OFF will not turn the controller off.
- In the address setting mode, there are 2 main functions:

  Querying address: Please point the remote controller to the indoor unit, then press MODE button, the corresponding indoor unit will display its address.

  Setting address: Use the UP and DOWN buttons to choose an address you want. Then point the remote controller to the indoor unit and then press the FAN button to set the indoor unit's address. The corresponding indoor unit will display the new address and record it. After about 4 seconds, this displaying will fade out and the indoor units turn to normal display mode.

  Note: the address cannot be repeated in the same system
- After setting all the addresses, users can press the LOCK button for 5 seconds to exit the address setting mode.

2. Wired controller

2.1 KJR-10B/DP (T)-E

KJR-10B/DP (T)-E

Model	Description
KJR-10B/DP(T)-E	General control function and without backlight. With the Air filter cleaning remind function, setting address, initialization settings and connected to the indoor unit display panel's corresponding port.

Wired controller specifications

Model	KJR-10B/DP(T)-E
Power Supply Voltage	5.0V DC
Ambient Temperature Range	-15°C～43°C(-5℉～109℉)
Ambient Humidity Range	RH40%~RH90%

Performance Features

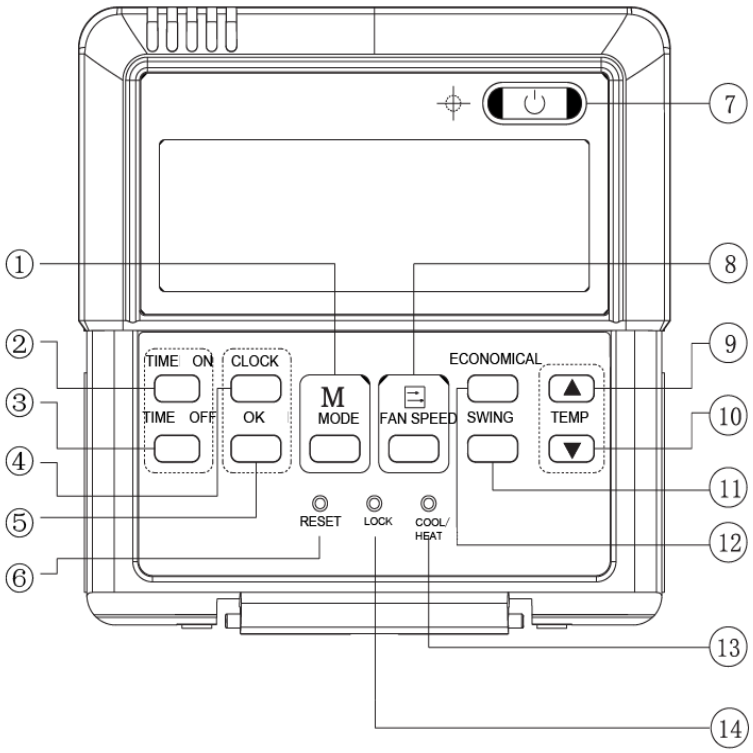
1. Operating mode: Cool, heat, dry, fan and auto.

2. Set the mode through buttons.

3. Indoor setting temperature range: 17°C ~30°C.

4. LCD (Liquid Crystal Display).

2.1.1 Parts name



(1) Mode Selection Button

The mode is selected in a sequence as the following figure indicates:

AUTO → COOL → DRY → HEAT → FAN

Notes: no heating mode if wired controller is set as cooling-only.

(2) Timer on Button

Press this button to initiate the auto-on time. Each press will increase the auto-on time in 30minutes increments. When the setting time displays 10Hr, each press will increase the auto-on time in 60 minutes increments. If want to cancel the TIMER ON, then adjust the time of TIMER ON as 0.0.

(3) Timer off Button

Press this button to initiate the auto-off time. Each press will increase the auto-off time in 30minutes increments. When the setting time displays 10Hr, each press will increase the auto-off time in 60 minutes increments. If want to cancel the TIMER OFF, then adjust the time of TIMER OFF as 0.0.

(4) Clock Button

Normally display the clock set currently (display 12:00 for the first electrifying or resetting).When press the button for 5 seconds, the hour part on the clock display flashes every 0.5 seconds, then press ▲and ▼to adjust hour; press the button CLOCK again, the minute part flashes every 0.5 seconds, then press ▲and ▼

button to adjust minute. When set clock or alter clock setting, must Press the confirm button to complete the setting.

(5) OK Button

The button is used at the state of CLOCK adjustment. After setting the time, Press the button to confirm then exit, the current clock will display

(6) Reset Button (hidden)

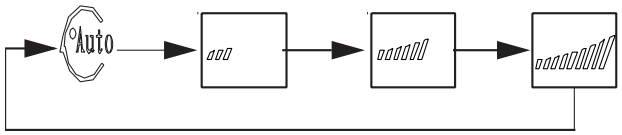
Use a small stick with a diameter of 1mm to Press the RESET button to cancel the current settings and get into the condition of resetting.

(7) ON/OFF Button

Press the button at the condition of OFF, the OPERATION lamp lights, and the wired controller enters into ON operation, simultaneously sends the setting operation information (e.g. temperature, fan speed, timer etc.) to the units. Press the button at the condition of ON, the OPERATION lamp extinguishes, simultaneously enters into OFF. If having set TIMER ON or TIMER OFF, the wired controller will cancel these settings before entering into OFF, close the relevant indicator, and then send the OFF information.

(8) Fan Speed Selection Button

Select the fan speed from "AUTO", "LOW"," MED", to "HIGH". Each time Press the button, the fan speed will change in turn as fellow.



(9) Adjust Button ▲

Set indoor temperature up. If press and hold on, it will increase at 1 degree per 0.5 second.

(10) Adjust Button ▼

Set indoor temperature down. If press and hold on, it will decrease at 1degreeper 0.5 second.

(11) Swing Button

Press this button for the first time in running time, start the swing function. Press the button for the second time, cancel the swing function. (Match to some model with swing function)

(12) Economical Button

Press the button to set the economical operation mode, Press again to cancel the mode. The operation mode is suitable for sleeping time.

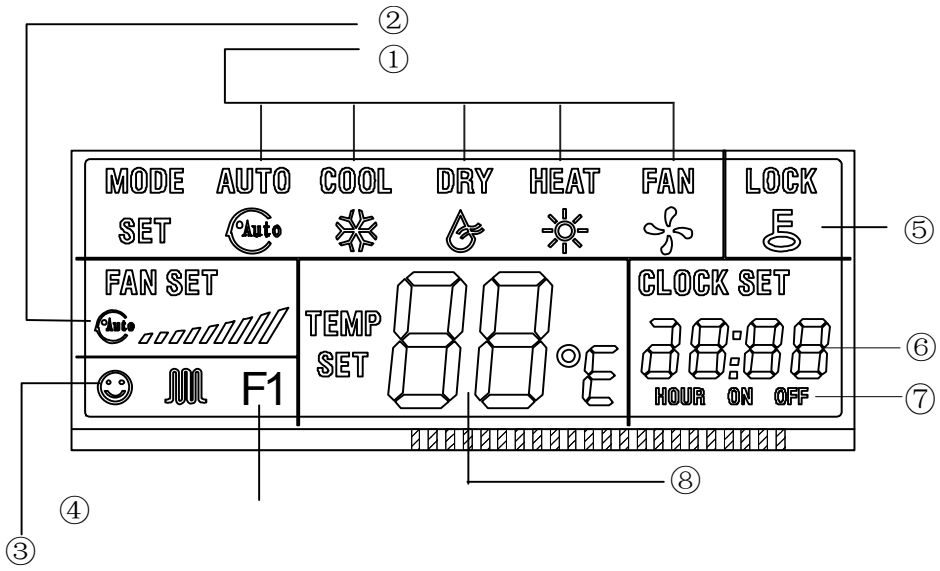
(13) Cooling-only/cooling and heating selection button (hidden)

Use a small stick with a diameter of 1mm to Press the button to switch modes. For Cooling-only type, it will be no heating mode when pressing MODE button. The factory-setting mode is COOLING and HEATING.

(14)Lock Button (hidden)

Use a small stick with the diameter of 1mm to press the LOCK button to lock the current setting, press the button again then cancel the setting.

2.1.2 LCD display



(1) Mode Display

Press MODE button can select "AUTO""COOL", "DRY", "HEAT", or "FAN “mode.(HEAT is invalid for COOL ONLY wired controller.)

(2) Fan Speed Display

Press FAN SPEED to select fan speed from "AUTO", "LOW"," MED" to “HIGH”.

Notes: some air conditioners have no MED fan speed, and then the MED is regarded as HIGH.

(3) Economical Operation Display

When indoor unit has this function, under cool, heat or auto mode, press ECONOMICAL button can operate the economic mode. If press ECONOMICAL button again, then the display icon will disappear.

(4) Air Filter Cleaning Remind Display

When the calculated operating time reaches the setting filter cleaning time, the filter cleaning icon will be lighted up, to remind the user to clean the filter screen. After cleaning filter, the user can long press the "ECONOMICAL" button for 3 seconds to cancel the icon.

(5) Lock Display

Press LOCK button, the LOCK icon will display. Press the button again, and then the icon of LOCK disappears. In the LOCK mode, all the buttons are invalid except for the LOCK button and RESET button.

(6) Clock Display

Usually display the actual time. Press the button CLOCK for 5 seconds, the HOUR part will flash, press "▲" and"▲" to adjust HOUR. Press the CLOCK again, the minute part flash, press "▲" or "▼" to adjust MINUTE. After clock set or clock operation, it must press the OK button to complete the set.

(7) Timer ON/OFF Display

When adjust setting on timer or only on timer is set, the "ON" is lighted. When adjust setting off timer or only off timer is set, the "OFF" is lighted. If on and off timer are both set, the “ON" and "OFF” are both lighted.

(8) Temperature Display Area

Usually displays the set temperature. It can be adjusted by press temperature button ▲ and ▼, under the FAN mode, there is no figure display in the area.

2.1.3 Operating the wired controller

1）AUTO Operation

※ Insert the power supply of indoor unit, and operation lamp of indoor unit will flash.

※ Press MODE to select AUTO.

※ Set the desired temperature by Pressing the TEMP▲and TEMP ▼, usually the temperature range is set from 17°C to 30°C.

※ Press ON/OFF, the operation lamp of indoor unit lights, the air conditioner starts operating at the automatic mode, and the fan speed is controlled automatically, wired controller display screen display AUTO, so the fan speed is un-adjustable.

※ Press the button ON/OFF again, and the air conditioner stops operating.

Notes: The ECONOMICAL button is available at the auto operation mode.

2) COOL/HEAT/FAN ONLY Operation

※ Press the MODE button to select any one of COOL, DRY, HEAT or FAN ONLY mode.

※ Select the desired temperature by Pressing the TEMP▲and TEMP ▼, usually the temperature range is set from 17°C to 30°C.

※ Press the button FAN SPEED to select any one of AUTO, LOW, MED or HIGH fan speed modes.

※ Press the ON/OFF, the operation lamp on indoor unit lights, the air conditioner operates according the mode selected.

※ Press the button ON/OFF again, stop the air conditioner.

Notes:

1. Under fan only mode, the temperature cannot be set.

2. The economical button is valid in cool, heat mode.

3. Cooling only unit has not heat mode.

3) DRY Operation

※ Press MODE to select DRY mode.

※ Select the desired temperature by pressing the TEMP ▲ and TEMP ▼, usually the temperature range is set from 17°C to 30°C.

※ Press the ON/OFF, the operation lamp of indoor unit lights, and the air conditioner will start to dehumidify.

※ Press the ON/OFF again, stop the air conditioner.

Notes: The FAN SPEED and ECONOMICAL buttons are invalid in the dry mode.

4) Only Set the Time of Timer On

※ Press button TIME ON, the wired controller display SETTING, the icons of HOUR and ON display on the timer setting area. The wired controller enters into the setting of timer off.

※ Press button TIME ON again, and then adjust the time of timer off as desired.

※ Continuously Press the button, the time of timer will increase 0.5 hours per time. After the time of timer reaches to 10 hours, the time will increase 1 hour each time.

※ 0.5 seconds later, after finishing the adjustment, the wired controller sends the information of time off, the timer off setting is completed.

5) Only Set the Time of Timer Off

※ Press button TIME OFF, the wired controller display SETTING, the icons of HOUR and OFF display on the timer setting area. The wired controller enters into the setting of timer off.

※ Press button TIME OFF again, and then adjust the time of timer off as desired.

※ Continuously Press the button, the time of timer will increase 0.5 hours per time. After the time of timer reaches to 10 hours, the time will increase 1 hour each time.

※ 0.5 seconds later, after finishing the adjustment, the wired controller sends the information of time off, the timer off setting is completed.

6) Set the Time of Timer ON and Timer OFF Simultaneously

※ Press button TIME ON, the wired controller display SETTING, the icons of HOUR and ON display on the timer setting area. The wired controller enters into the setting of timer off.

※ Press button TIME ON again, and then adjust the time of timer off as desired.

※ Press button TIME OFF, the wired controller display SETTING, the icons of HOUR and OFF display on the timer setting area. The wired controller enters into the setting of timer off.

※ Press button TIME OFF again, and then adjust the time of timer off as desired.

※ When set the timer on and timer off simultaneously, if the setting times of timer on and timer off are less than 10 hours, then timer off time will always 0.5 hours later than the timer on. If the setting times of timer on and timer off is always later 1 hour than timer on.

※ 0.5 seconds later, after finishing the adjustment, the wired controller sends the information of timer, the timer off and timer on setting are completed.

7) Cancel the Timer Setting

※ Press the TIME ON and TIME OFF, OK once more.

※ Adjust the time of timer on and timer off as 0.0 to cancel the timer on and timer off.

Notes: The time of timer on is the relative time; it is relative to the standard time of operating wired controller. If having setting the timer on or timer off, then the clock cannot be adjusted.

8) Cancel the Filter Cleaning Icon

When the calculated operating time reach the setting filter cleaning time, the filter cleaning icon will be lighted up, to remind the user to clean the filter screen. After cleaning it can long press the ECONOMICIAL button for 3 seconds to cancel the icon.

9) Initialization Parameters Setting

For some functions of the wired controller, if the default setting in following list cannot meet the user's request, the user can select the function for setting follow the below method.

First code(Y)	First code function	Second code (X)				
		0	1	2	3	4
0	Cooling only/Cooling and heating selection setting	Cooling and heating (Default)	Cooling only	/	/	/
2	Power-off memory setting	Yes (Default)	No	/	/	/
3	Time setting for reminding to clean the filter	Cancel the function	1250 hours	2500 hours (Default)	5000 hours	10000 hours
6	Centigrade/Fahrenheit selection setting	Centigrade (Default)	Fahrenheit	/	/	/

※ Long press the FAN SPEED and MODE buttons for 5 seconds together, and enter into the initialization function setting interface.

※ After enter into the setting interface, the temperature display area will display YX. Y means the first function code, and X means the second function code, details refer to the up table. Y will on all the time, X will flash with 1Hz frequency.

※ Press TEMP▲and TEMP ▼, to select the detail function under Y code, then press the OK button and the setting will work, and the system will automatically shift to next Y code setting, until all the function codes have been set, then the system will quit the setting interface automatically.

10) Query for Initialization Function Parameters

After setting the initialization function, use the following method for query:

※ Long press FAN SPEED button for 2 seconds to enter into the query interface.

※ After enter to the interface, the LCD temperature display area, minute display area will display a series of numbers, which is the current initialization parameter value. If the current initialization function is cooling and heating (00), no power-off memory (21), the filter screen cleaning time is 5000 hours (33), centigrade display (60), their combination is 0130, and it will display 0130.

※ After enter to the interface for 3 seconds, it will automatically exit.

※ Under this interface, it will not respond any key operation.

11) Indoor unit address setting and query

※ Long press the LOCK key for 5 seconds, enter into the indoor unit address setting interface.

※ After enter into the interface, the temperature display area will display 00, means the address which is going to be set, then press TEMP ▲ and TEMP ▼ to select the address, and then press the FAN SPEED key to finish indoor unit address setting.

※ After enter into the interface, press MODE key to query the address.

※ Under the address setting interface, long press LOCK for 5 seconds again, then it will quit the indoor unit setting interface.

2.1.4 Wired controller Installation

(1) Make sure the following pasts has been prepared.

NO.	Name	QTY.	Remarks
1	Wired controller	1	With Cover
2	Wood Mounting Screw	3	M4×20(For mounting on the wall)
3	Mounting Screw	3	M4×25(For Mounting on the electrical switch box)
4	Installation Manual	1	/
5	Owner's Manual	1	/

(2) Preparation before Installation:

Prepare for the following at installation site.

NO.	Name	QTY.		Remarks
		Install into the wall	Install on the wall	
1	5-core Shield Cable	1	1	0.05mm^2×5 Cable no more than 15M
2	Switch Box	1	/	/
3	Wiring Tube(Insulating Sleeve and Tightening Screw)	1	/	/

Notes: Do not turn screws too tightly, or else the cover would be sunk or the Liquid Crystal may be broken.

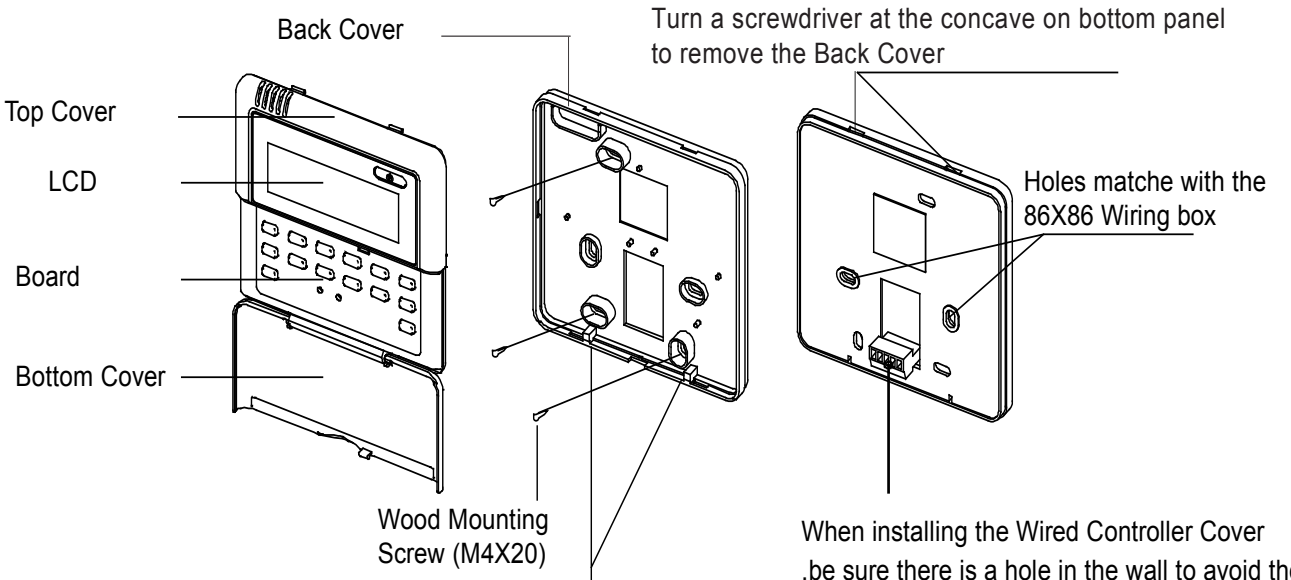
(3) Installation procedure

※ Circuit of wired controller is low voltage circuit. Never connect it with a standard 220V/380V circuit or put it into a same wiring tube with the circuit.

※ The shield cable must be connected stable to the ground, or transmission may fail.

※ Do not attempt to extend the shield cable by cutting, if it is necessary, use terminal connection block to connect.

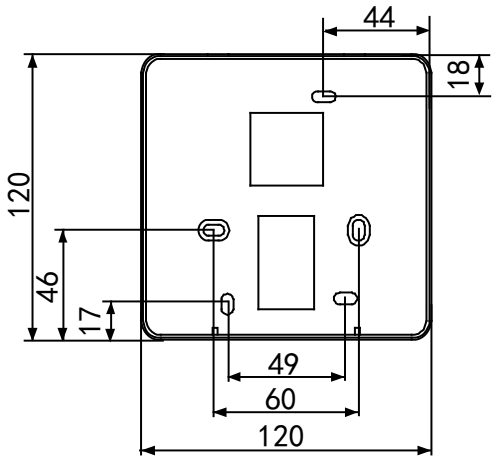
※ Wired controller installation size refers to the following picture (Unit: mm):



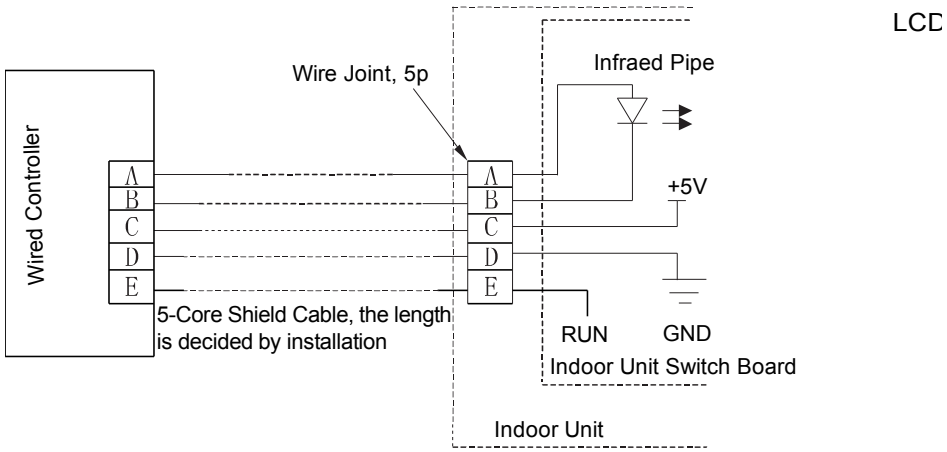
When installing the Wired Controller, you should adjust the bottom of the Wired Controller Board to the Wired Controller Back Cover which should be fixed first, then press the other end of the Wired Controller Board.

When installing the Wired Controller Cover ,be sure there is a hole in the wall to avoid the Back Cover being fixed directly to the wall which is not allowed for the Wire Joint extrudes out of the Back Cover

(4) Dimensions: 120*120*15mm



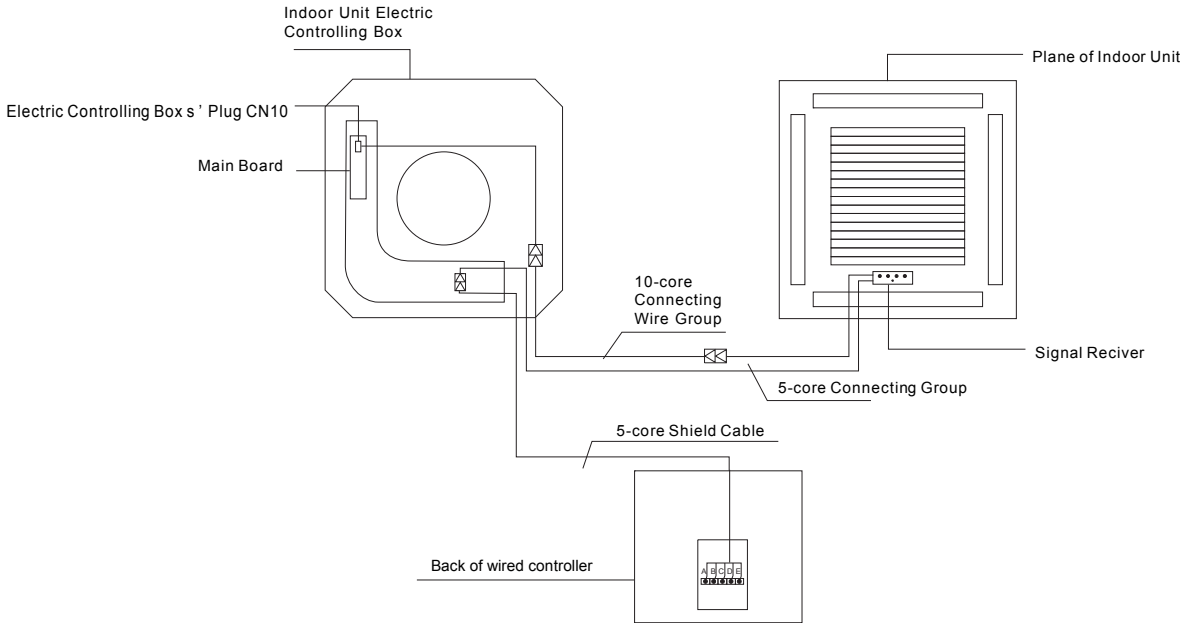
(5) Wiring method



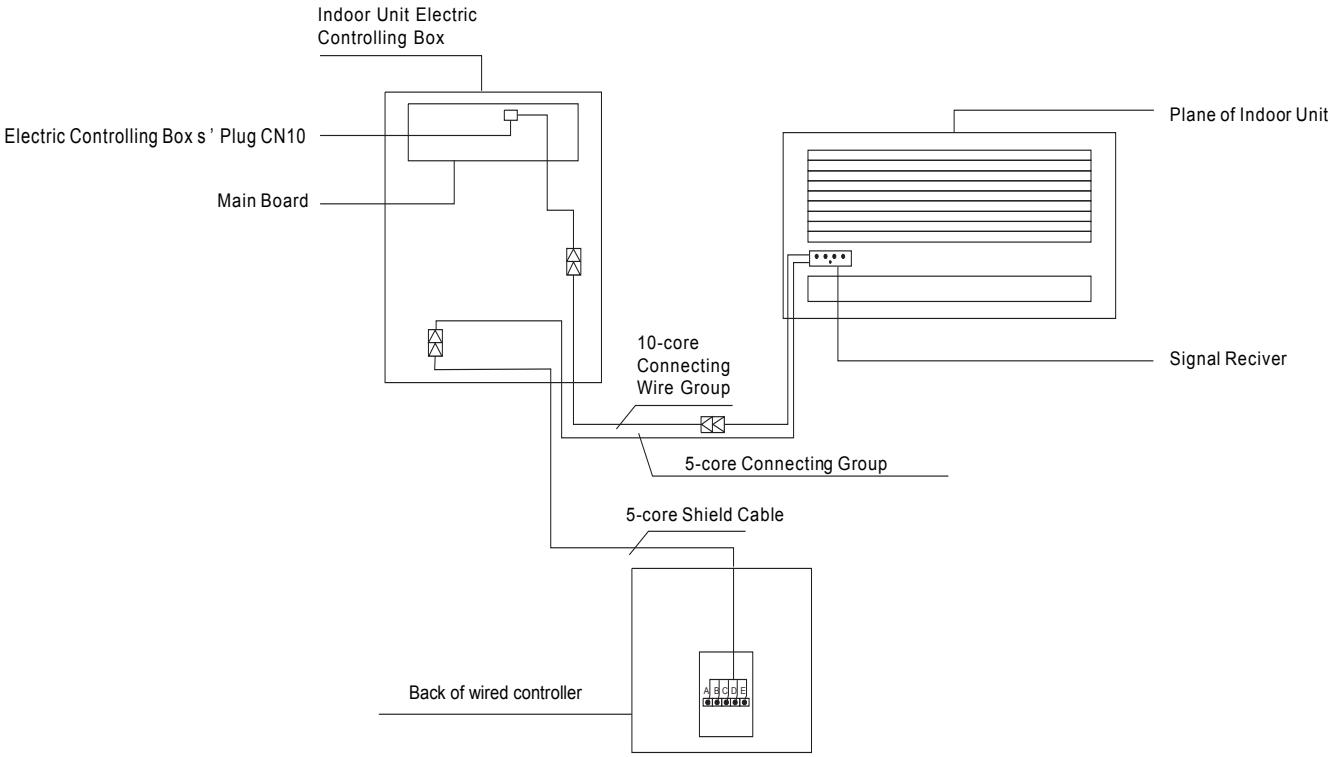
Notes: When install the wired controller, an additional 5-terminal is needed to install in indoor unit, fasten an infrared emission (fasten with glue), connect the anode and the cathode respectively to A and B, then connect the +5V GND and RUN respectively to C, D and E on the terminal.

(6) Wiring diagram of wired controller

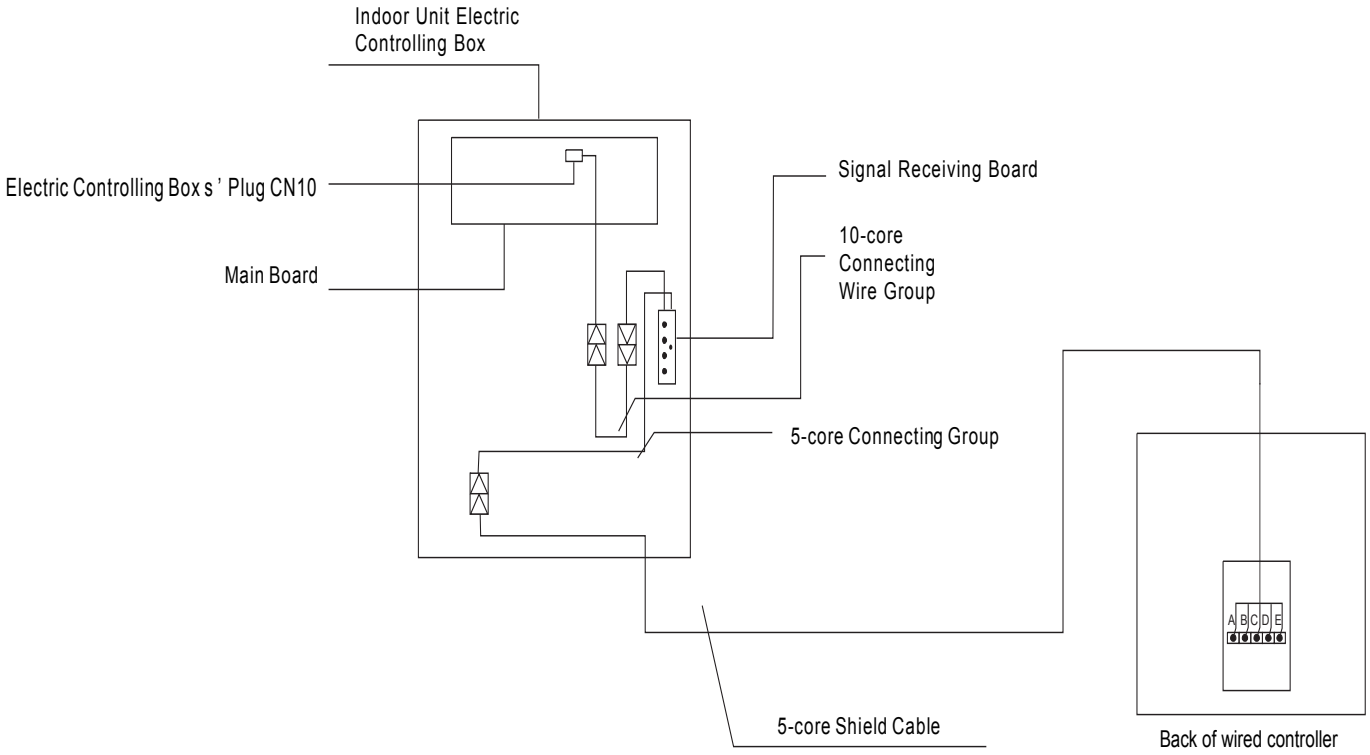
1) Wiring diagram between wired controller and four-way cassette of indoor unit:



2) Wiring diagram between wired controller and duct type of indoor unit:



3) Wiring diagram between wired controller and high static duct type of indoor unit:



2.2 KJR-12B/DP (T)-E

KJR-12B/DP (T)-E

Model	Description
KJR-12B/DP(T)-E	General functions and integrates FOLLOW ME function.

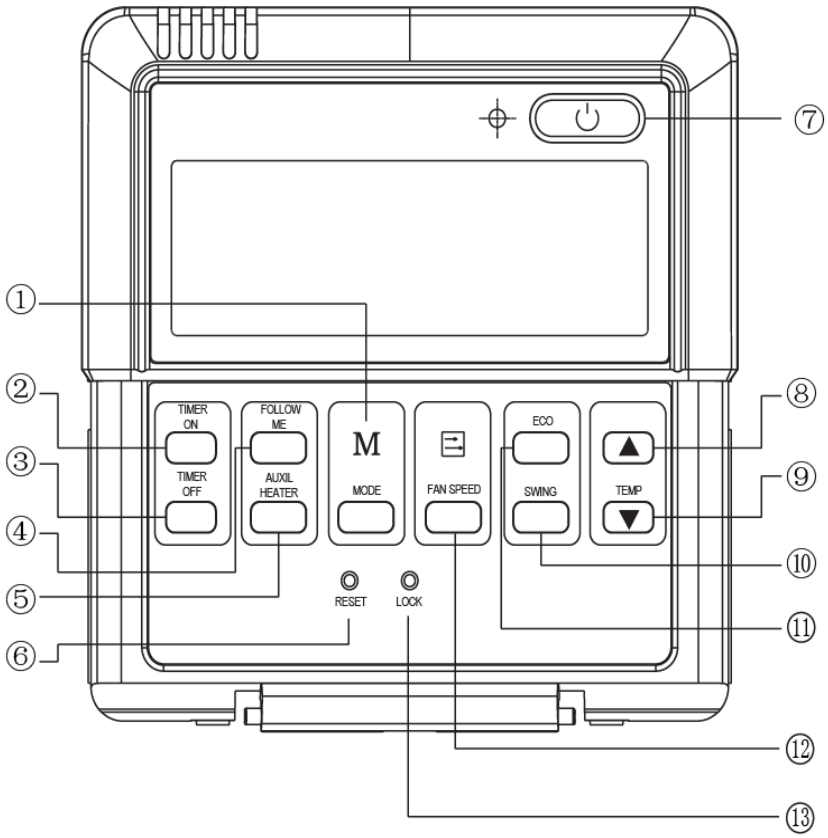
2.2.1 Wired controller specifications

Model	KJR-12B/DP(T)-E
Power Supply Voltage	5.0V DC
Ambient Temperature Range	-15°C～43°C(-5℉～109℉)
Ambient Humidity Range	RH40%~RH90%

Performance Features

1. Operating mode: Cool, heat, dry, fan and auto.
2. Set the mode through buttons.
3. Indoor setting temperature range: 17°C ~30°C.
4. LCD (Liquid Crystal Display).
5. Follow me function.

2.2.2 Appearance



(1) Mode Button

The mode is selected in a sequence as the following figure indicates

(HEAT is invalid for COOL ONLY wired controller.)

(2) Timer on Button

Press this button to initiate the auto-on time. Each press will increase the auto-on time in 30minutes increments. When the setting time displays 10Hr, each press will increase the auto-on time in 60 minutes increments. If want to cancel the TIMER ON, then adjust the time of TIMER ON as 0.0.

(3) Timer off Button

Press this button to initiate the auto-off time. Each press will increase the auto-off time in 30minutes increments. When the setting time displays 10Hr, each press will increase the auto-off time in 60 minutes increments. If want to cancel the TIMER OFF, then adjust the time of TIMER OFF as 0.0.

(4) Follow me Button

When under cooling, heating and auto mode, press this button, follow me function will be active. Press again, this function will be ineffective.

(5) Electrical Heater Button

If press this button in heating mode, electrical heater function become effective.

(6) Reset Button (hidden)

Use a small stick with diameter of 1mm to Press the RESET button to cancel the current settings and get into the condition of resetting.

(7) ON/OFF Button

Press the button at the condition of OFF, the OPERATION lamp lights, and the wired controller enters into ON operation, simultaneously sends the setting operation information (e.g. temperature, fan speed, timer etc.) to the units. Press the button at the condition of ON, the OPERATION lamp extinguishes, simultaneously enters into OFF. If having set TIMER ON or TIMER OFF, the wired controller will cancel these settings before entering into OFF, close the relevant indicator, and then send the OFF information.

(8) Adjust Button ▲

Set indoor temperature up. If press and hold on, it will increase at 1 degree per 0.5 second.

(9) Adjust Button ▼

Set indoor temperature down. If press and hold on, it will decrease at 1degreeper 0.5 second.

(10)Swing Button

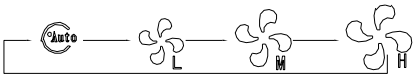
Press this button for the first time in running time, start the swing function. Press the button for the second time, cancel the swing function. (Match to some model with swing function)

(11)Economical Button

Press the button to set the economical operation mode, Press again to cancel the mode. The operation mode is suitable for sleeping time.

(12)Fan Speed Selection Button

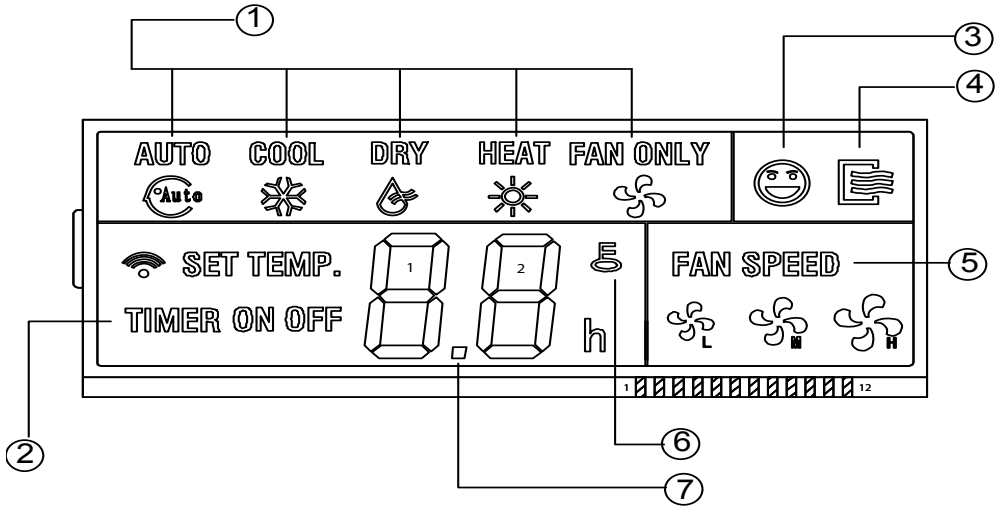
Select the fan speed from "AUTO", "LOW"," MED", to "HIGH". Each time Press the button, the fan speed will change in turn as follow.



(13)Lock Button (hidden)

Use a small stick with the diameter of 1mm to press the LOCK button, all current settings are locked in and the wired controller does not accept any operation except that of the LOCK button. Use the lock mode when you want to prevent setting from being changed accidentally or play fully. Press the button again then cancel the LOCK setting.

2.2.3 LCD display



(1) Mode display

When press “MODE” button, the following mode can be selected in circle.

AUTO → COOL → DRY → HEAT → FAN

Notes: For cooling only model, heat mode is invalid.

(2) TIMER ON/OFF Display

When adjust setting on timer or only on timer is set, the "ON" is lighted. When adjust setting off timer or only off timer is set, the "OFF" is lighted. If on and off timer are both set, the “ON" and "OFF” are both lighted.

(3) Follow Me Function

There is a temperature sensor inside the wired controller, after setting temperature, it will compare the two temperatures, and the temperatures at wired controller space will be the same as setting temperature. It is available under cooling, heating, and auto mode.

(4) ON/OFF Display

When it is on, the icon display, otherwise it is extinguished.

(5) Fan Speed Display

Press FAN SPEED to select fan speed from "AUTO", "LOW"," MED" to “HIGH”.

NOTES: some air conditioners without MED fan speed, and then the MED is regarded as HIGH.

(6) Lock Display

It will display in LOCK mode, and disappear not in lock mode. In LOCK mode, all the buttons are invalid except for LOCK button.

(7) Temperature Display Area

Display the setting temperature; it can be adjusted by press temperature button ▲ and ▼. Under FAN mode, there is no display here.

2.2.4 Wired controller installation

Preparation before Installation:

Make sure the following pasts has been prepared.

NO.	Name	QTY.	Remarks
1	Wired Controller	1	/
2	Wood Mounting Screw	3	M4×20(For mounting on the wall)
3	Mounting Screw	3	M4×25(For Mounting on the electrical switch box)
4	Installation Manual	1	/
5	Owner's Manual	1	/
6	5-terminal Group	1	RS9005E
7	Terminal installation Screw	2	ST3.9×12-F-H GB845-85

Prepare for the following at installation site.

NO.	Name	QTY.	Type	Remarks
1	5-core Shield Cable	1	RVVP-0.5 mm^2×5	0.05mm^2×5Cable no more than 15M
2	Switch Box	1	/	/
3	Wiring Tube(Insulating Sleeve and Tightening Screw)	1	/	/

Notes:

Never turn screws too tightly, or else the cover would be sunk or the Liquid Crystal breaks.

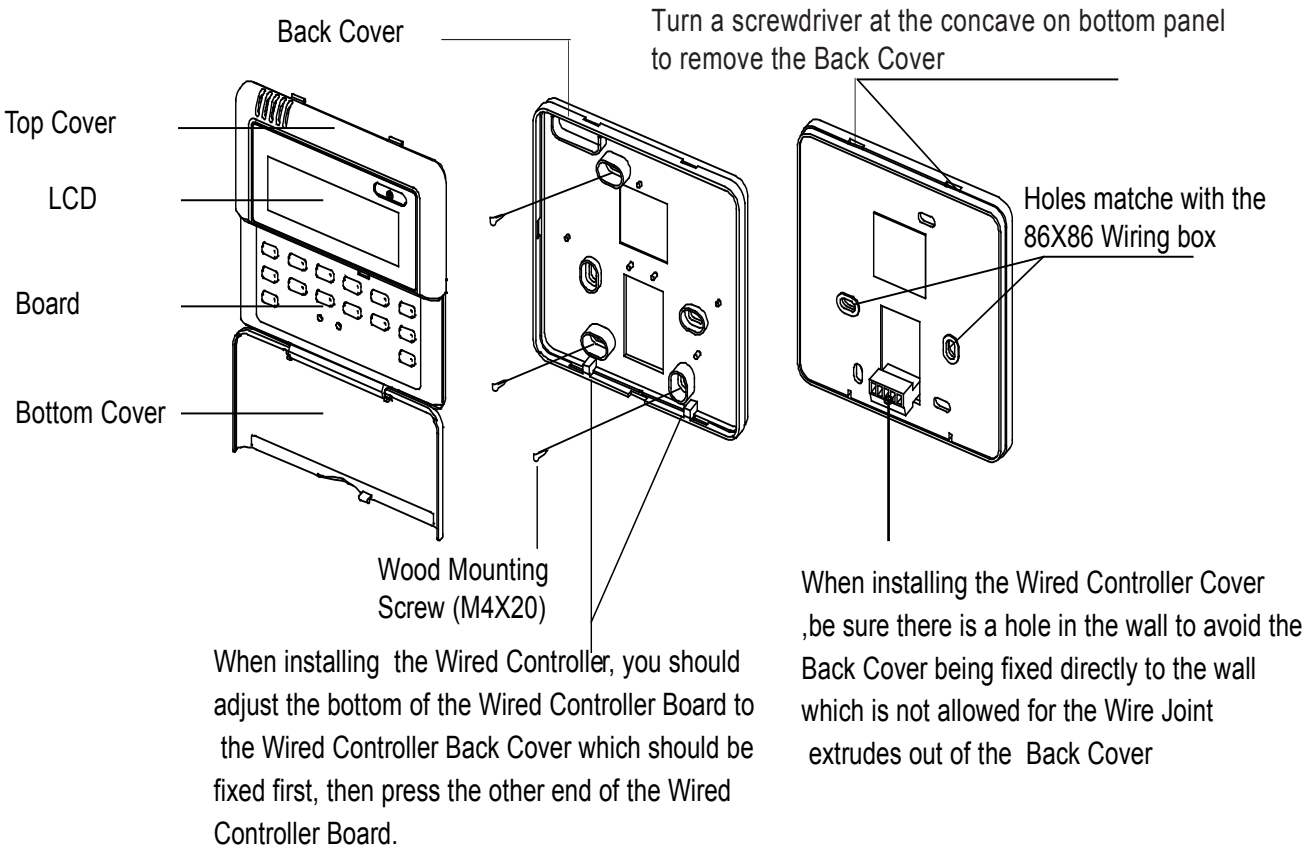
Installation of wired controller KJR-12B/DP (T)-E is the same to KJR-10B/DP (T)-E.

(1) Installation procedure

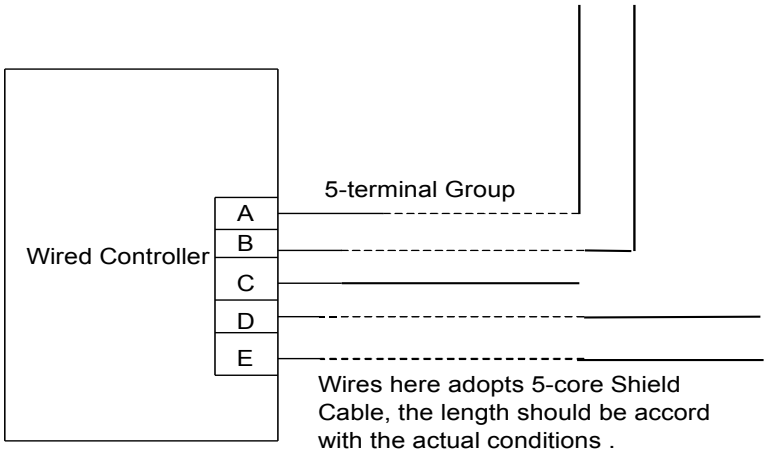
※ Circuit of wired controller is low voltage circuit. Never connect it with a standard 220V/380V circuit or put it into a same wiring tube with the circuit.

※ The shield cable must be connected stable to the ground, or transmission may fail.

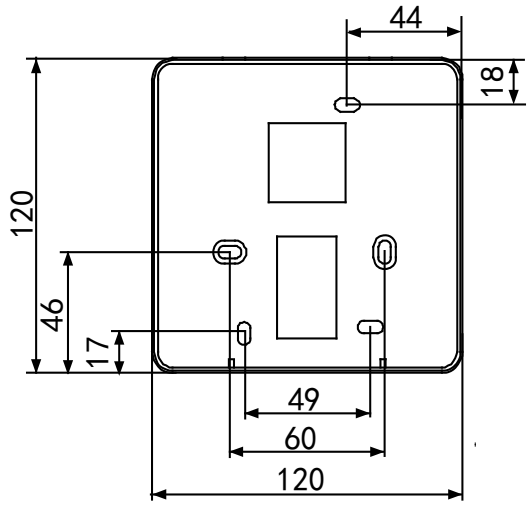
※ Do not attempt to extend the shield cable by cutting, if it is necessary, use terminal connection block to connect.



※ When install the wired controller, an additional 5-terminal is needed to install in indoor unit, fasten an infrared emitter whose anode and cathode connecting with A and B near the receiver in the indoor unit switch board, then connecting the terminal +5V, GND and Run in the switch board to C, D, E respectively.

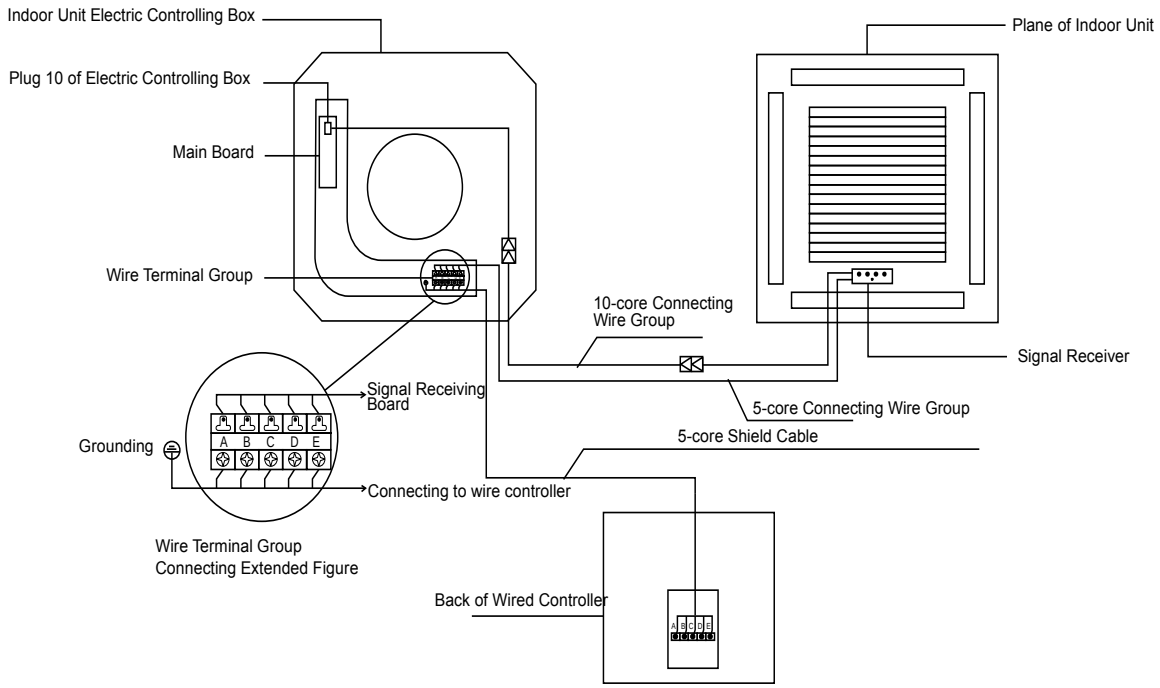


(2) Dimension: 120*120*15mm

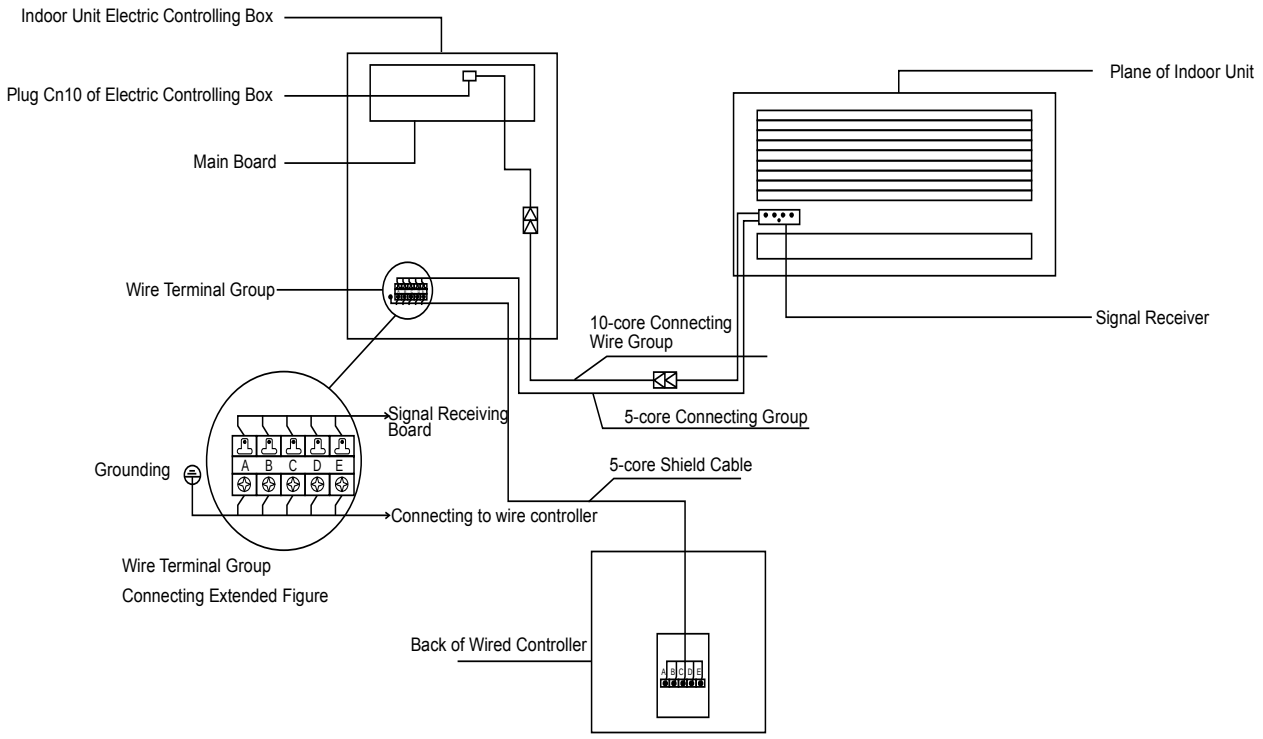


(3) Wiring diagram

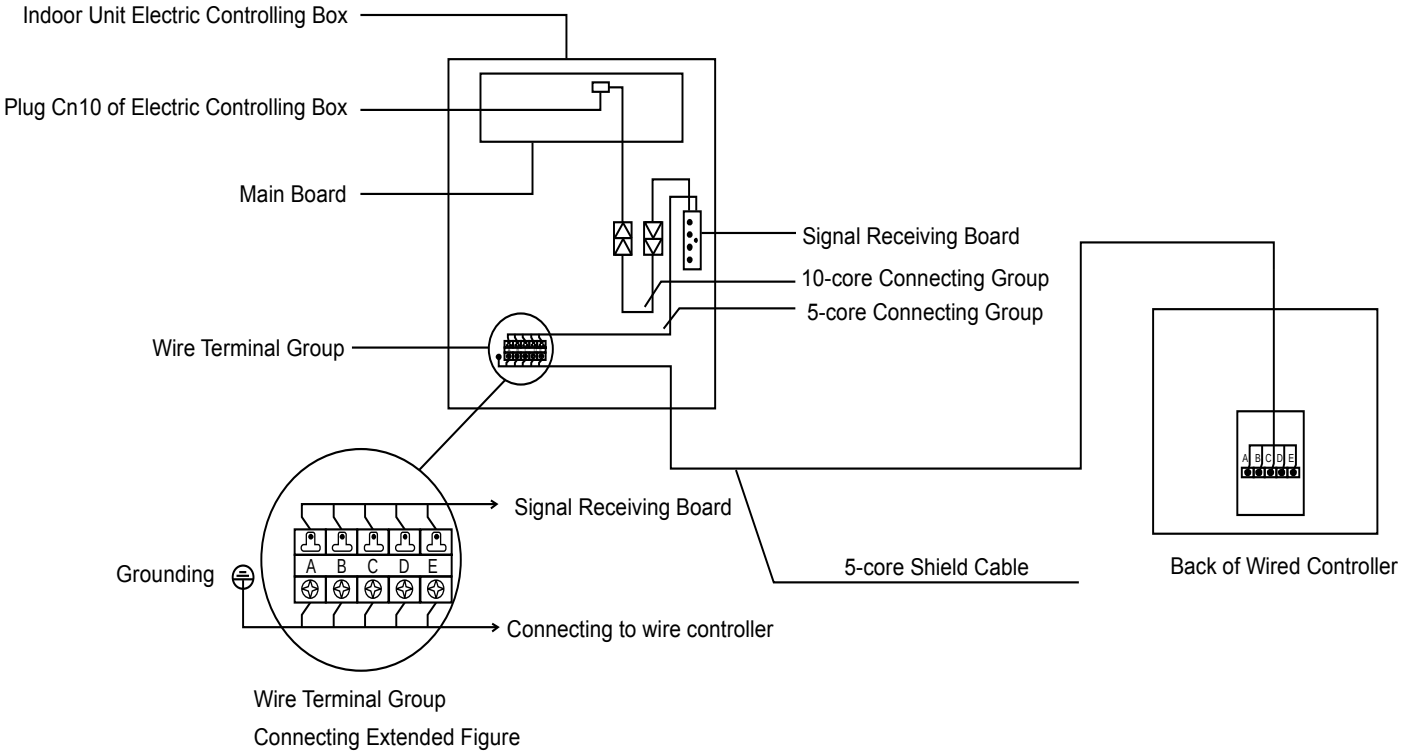
1) Wiring diagram between wired controller and four-way cassette of indoor unit:



2) Wiring diagram between wired controller and duct type of indoor unit:



3) Wiring diagram between wired controller and high static duct type of indoor unit:



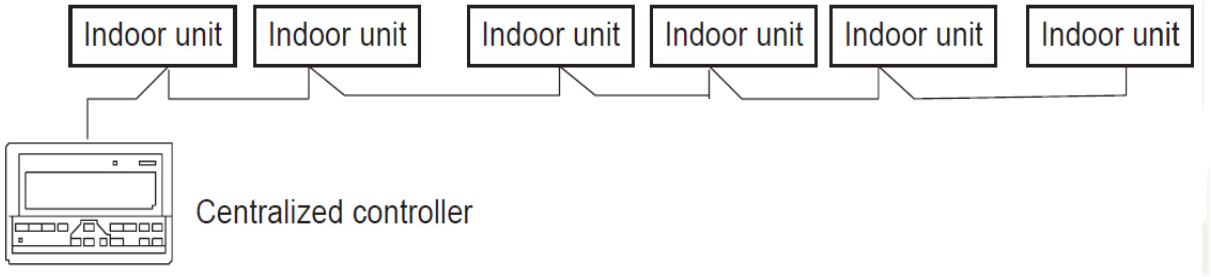
3. Centralized controller

MD-CCM03/E

MD-CCM09/E

3.1 MD-CCM03/E

MD-CCM03/E is a multifunctional device which is able to control up to 64 indoor units. And the connection length can be up to 1200m. Both of the following wiring modes centralized monitor and indoor units are applicable.



3.1.1 General function description

1) Power on or reset

When the centralized controller is powered on or reset, all display segments of the LCD are luminous for 2 seconds and then goes off. 1 second later, the system enters the normal display status. The centralized controller is in the main page display status and displays the first page, and searches the in-service air conditioners in the network. Once the search is finished, the centralized controller enters the mode setting page, and sets the first in-service air conditioner by default.

2) Network area address of centralized controller

The local computer or gateway can be up to connect with 16 centralized controllers for communication. Each centralized controller serves as an area of the air conditioner network. The centralized controllers are differentiated by bit selection address. The configurable range is 0~15.

3) State indications

If any local keypad operation is setting the operation status of the air conditioner, the indicator is on when the signals are sent. Upon completion of the setting process, the indicator goes off. If an in-service air conditioner in the network is faulty, or the centralized controller network itself is faulty, the indicator will blink at 2Hz.

If one or more in-service air conditioners in the network are running, including under setting of timing start/shutdown, the indicator will be luminous. Otherwise, the indicator is off.

4) Locking of centralized controller

After receiving the centralized controller locking command sent from the computer, the centralized controller disables the startup/shutdown and setting of the air conditioner, and sends commands to lock remote controllers of all air conditioners in the network of the centralized controller. After receiving the unlocking command, the centralized controller enables the startup/shutdown operation, and sends commands to unlock the remote controller of all air conditioners.

The locking status of the remote controller can be locked or unlocked by the computer or centralized controller separately. The locking status of the centralized controller is memorized after power failure of the centralized controller, and will not vanish after the power supply is restored, unless the command of unlocking is received.

5) Mode locking function

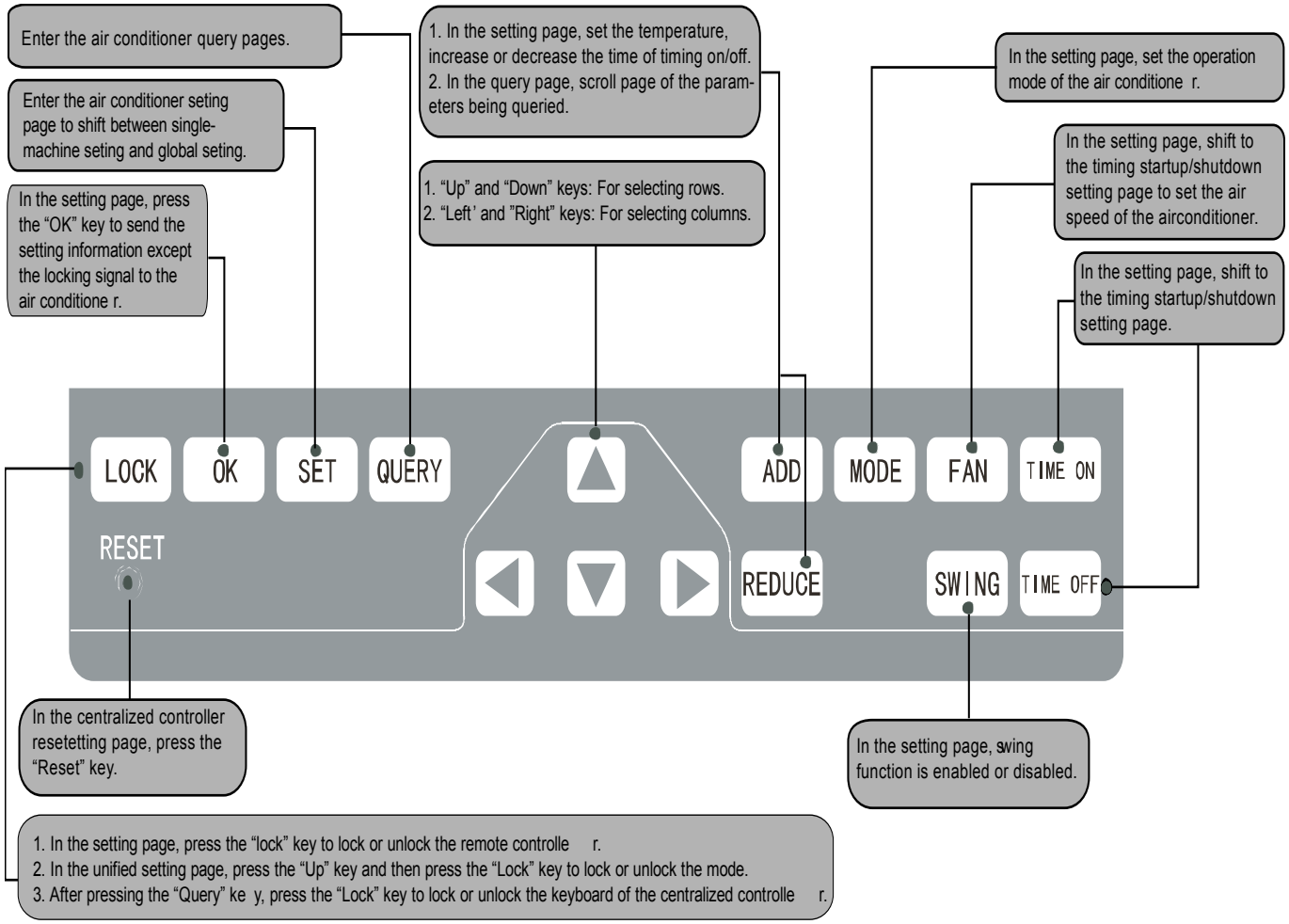
After the mode locking command is received, the command is forwarded to the air conditioner, and the centralized controller displays the mode locking flag. After the command of unlocking is received, the non-conflict mode can be selected freely. The centralized controller can also lock modes of all indoor units.

6) Emergent shutdown and compulsory startup

When the emergent shutdown switch of the centralized controller is shorted, all air conditioners in the network of the centralized controller will shut down compulsorily. The centralized controller and computer and all functional modules are disabled from startup and shutdown until the foregoing switch is open. When the compulsory startup switch of the centralized controller is shorted, all air conditioners in the network of the centralized controller will start up compulsorily. In default conditions, they will run in the cooling mode. The startup and shut down operations of the centralized controller and the computer and all functional modules will be disabled (only the command of startup is sent to the air conditioner, without affecting operation of the remote controller after startup) until the foregoing switch is opened.

If the foregoing two switches are shorted in the same time, the emergent shutdown switch shall have preference.

3.1.2 Buttons and Functions



Keys of centralized controller

1) Query button

Any time when you press the button, the selected operation mode is to query the operation status of the air conditioner. By default, the first in-service air conditioner will be queried. Through the Increase and Decrease keys, you can change the parameter page to be queried; through the Up, Down, Left and Right keys, you can change to query status of other in-service air conditioners.

2) Set button

In other display mode, press the button to enter the setting mode. By default, it is single setting, and the first in-service air conditioner is displayed. In setting operation mode, press the key again, and the operation will be performed for all air conditioners in the network. Press the key repeatedly to shift between single setting and global setting.

↱ Single → Global ↴

3) Mode setting

In setting operation mode, press this button to set the operation

→cooling → heating → supply air only → off →

In other display mode, press the key to enter the setting mode. By default, it is single-machine setting, and the first in-service air conditioner is displayed.

4) Fan speed

In setting operation mode, press this button to set the fan of the indoor unit of the air conditioner to run in the automatic, high, medium or low level of air:

→auto →low → medium → high →

5) Time on

In setting operation mode, press this button to set the timing startup of air conditioner; press the key again to exit the timing setting, and restore the normal temperature regulation operation mode.

→ time on → set temperature regulation →

6) Time off

In setting operation mode, press this button to set the timing shutdown of air conditioner; press the key again to exit the timing setting, and restore the normal temperature regulation operation mode.

→ time off → set temperature regulation →

7) Swing

In setting operation mode, press this key to enable or disable the swing function. If all currently selected air conditioners have no swing function, no effect will result after pressing the key.

8) Leftward button

In the query mode, every time when you press the button, the operation status data of the previous air conditioner will be displayed. If it is currently on the first machine, press the key again, and the data of the last machine will be displayed. If you hold down this key, the address will decrease one by one.

In the setting mode, every time when you press the key, if it is in single operation mode, the air conditioner of the previous in-service address number will be selected. If it is in the global operation mode, no effect will result after the key is pressed.

In the main page, press the button to enter the query mode. By default, it is the first air conditioner in-service.

9) Rightward button

In the query mode, every time when you press the button, the operation status data of the last air conditioner will be displayed. If it is currently on the last machine, press the key, and the data of the first machine will be displayed. If you hold down this key, the address will increase one by one.

In the setting mode, every time when you press the key, if it is in the single operation mode, the air conditioner of the next in-service address number will be selected. If it is in the global operation mode, no effect will result after the key is pressed.

In the main page, press the key to enter the query mode. By default, it is the first in-service air conditioner.

10) Downward button

In the query mode, every time when you press the key, the operation status data of the air conditioner corresponding to the next row of the matrix will be displayed. If it is currently in the last row, press the key, and the data of the air conditioner corresponding to the first row will be displayed. If you hold down this key, the row will increase one by one.

In the setting mode, every time when you press the key, if it is in the single operation mode, the air conditioner corresponding to the last row will be selected. If it is in the global operation mode, no effect will result after the key is pressed.

In the main page, press the button to enter the query mode. By default, it is the first in-service air conditioner.

11) Upward button

In the query mode, every time when you press the button, the operation status data of the air conditioner corresponding to the previous row of the matrix will be displayed. If it is currently in the first row, press the key, and the data of the air conditioner corresponding to the last row will be displayed. If you hold down this key, the row will decrease one by one. In the setting mode, every time when you press the key, if it is in the single operation mode, the air conditioner corresponding to the previous row will be selected. If it is in the global operation mode, no effect will result after the key is pressed.

In the main page, press the key to enter the query mode. By default, it is the first in-service air conditioner.

12) Add button

In the main page or the query mode, every time when you press the button, the data of the last page will be displayed. If it is now in the last page, press the key again, and the first page will be displayed.

In the setting mode, every time when you press the key, if it is in the temperature regulation mode, the set temperature will decrease by 1 °C until the highest allowed set temperature; if it is in the timing

startup/shutdown time setting mode, select the upper-level set time, if no time is set, 0.0 will be displayed, if you hold down the key, the upper-level data will be selected consecutively.

The specific change mode is as follows:

0.0→0.5→1.0→1.5→2.0→2.5→3.0→3.5→4.0→4.5→5.0→5.5→6.0→6.5→7.0→7.5→

8.0→8.5→9.0→9.5→10→11→12→13→14→15→16→17→18→19→20→21→22→23→24

13) Reduce button

In the main page or the query mode, every time when you press this key, the data of the current page will be displayed. If it is now in the first page, press the key again, and the last page will be displayed.

In the setting mode, every time when you press the key, if it is in the temperature regulation mode, the set temperature will decrease by 1 degree until the lowest allowed set temperature; if it is in the timing startup/shutdown time setting mode, select the upper-level set time, if no time is set, 0.0 will be displayed, if you hold down the key, the upper-level data will be selected consecutively.

The specific change mode is as follows:

0.0← .5←1.0←1.5←2.0←2.5←3.0←3.5←4.0←4.5←5.0←5.5←6.0←6.5←7.0←7.5←8.0←8.5

←9.0←9.5←10←11←12←13←14←15←16←17←18←19←20←21←22←23←24

14) ON/OFF key

Any time when you press the key, the centralized startup/shutdown operation is performed for all current in-service air conditioners in the centralized controller network. If all in-service air conditioners in the network are in the power-off status, press the key to perform the startup operation.

If it is in the mode setting page currently, and the parameters such as startup mode, temperature and air speed are selected, the air conditioner will be started according to the selected parameters.

If no mode is selected currently, and the air conditioner is powered off or it is in other display page currently, and the default startup mode is: Cooling, strong air, set temperature 24°C, swing function enabled. The default startup mode is locked according to the system mode or judged according to other constraint conditions. If any conflict exists, the next conflict-free mode will apply automatically. If conflict exists for all modes, startup will be impossible. If one or more in-service air conditioners in the network (including in the timing process of timing startup/shutdown), pressing this key will shut down all air conditioners. When performing the shutdown operation, the shutdown command is issued to the air conditioners in the startup status only, and is not issued to those in the shutdown status.

15) Lock button

In the mode setting mode, press the Lock button, and the remote controller of the currently selected air conditioner will be locked/unlocked. The operation mode is: If you select single-machine setting, the

operation is performed for the air conditioner of the current address only. If the remote controller of the air conditioner is locked currently, issue the lock command; otherwise, send the lock command. If you does not select the single-machine mode, and the remote controller of one or more currently selected air conditioners is locked, issue the unlock command; if the remote controllers of all currently selected air conditioners are in the non-locked status, issue the remote controller lock command. When the remote controller of the air conditioner is locked, the air conditioner does not receive remote control signals from the remote controller or wired controller until the remote controller is unlocked. Press the Query key and then press the Lock key, and the keys of the centralized controller will be locked or unlocked. If the keys are currently locked, press the foregoing keys concurrently again, and the keys will be unlocked; if the keys are currently unlocked, press the foregoing keys concurrently, and the keys will be locked. If the keys are locked, pressing of any key other than the Unlock key will be ineffective.

In the unified setting page, press the Up button and the Lock button concurrently to lock all air conditioner modes in the network. The mode locking is cancelled when the key is pressed again.

16) Confirmation button

In the setting mode, press the button to send the currently selected mode status and the auxiliary function status to the selected air conditioner, and display the mode setting operation results.

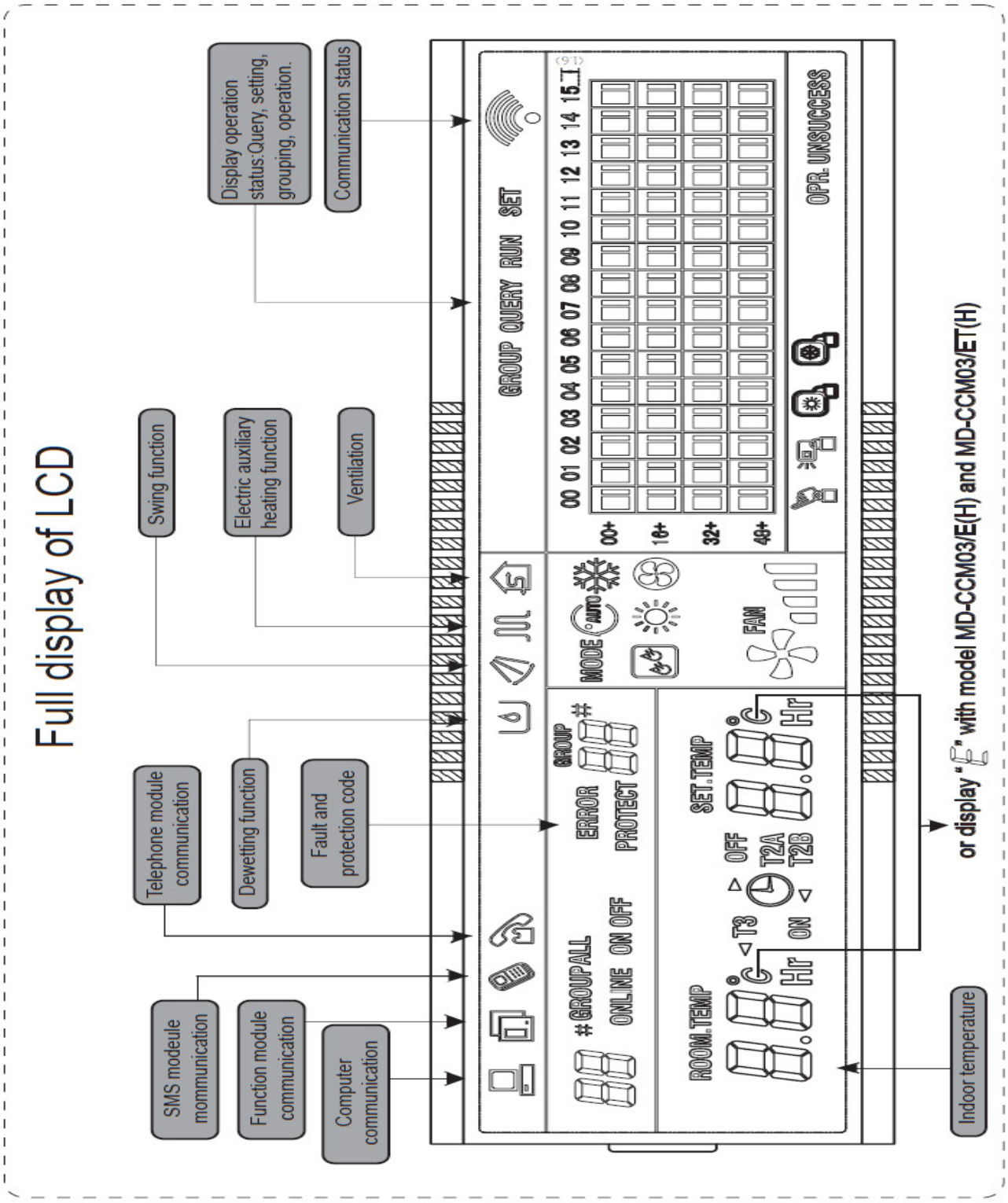
After you select the operation mode and auxiliary function status information of the air conditioner, if you do not press the confirmation key, the selected information will not be sent to the air conditioner, and will not affect the current operation of the air conditioner.

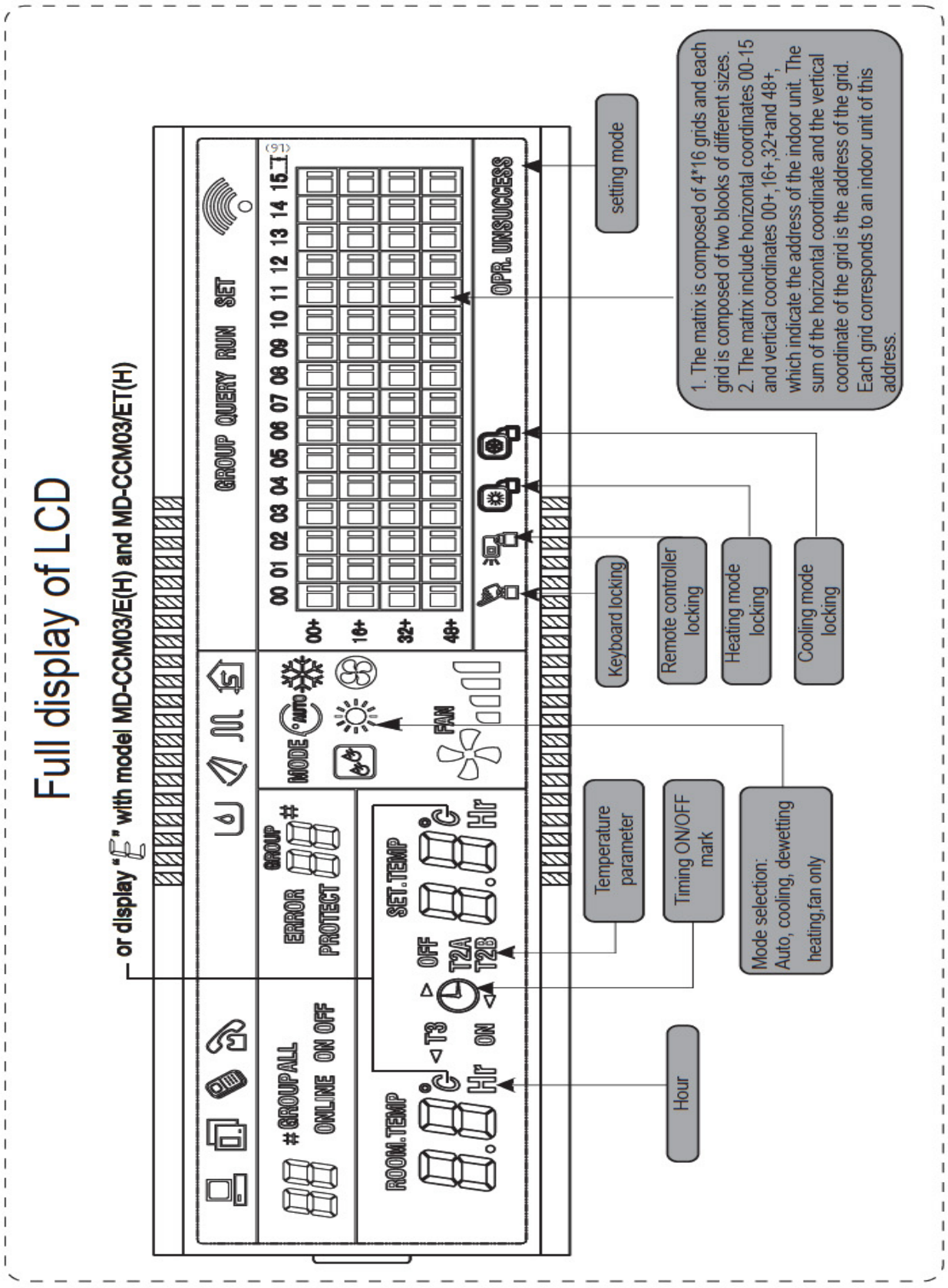
The operations of remote controller locking and unlocking do not need pressing the confirmation key. The command information is sent directly after the locking key is pressed.

17) Reset button

Anytime when the reset button is pressed, the centralized controller will reset. The result is the same as the result of restoring power-on after power failure.

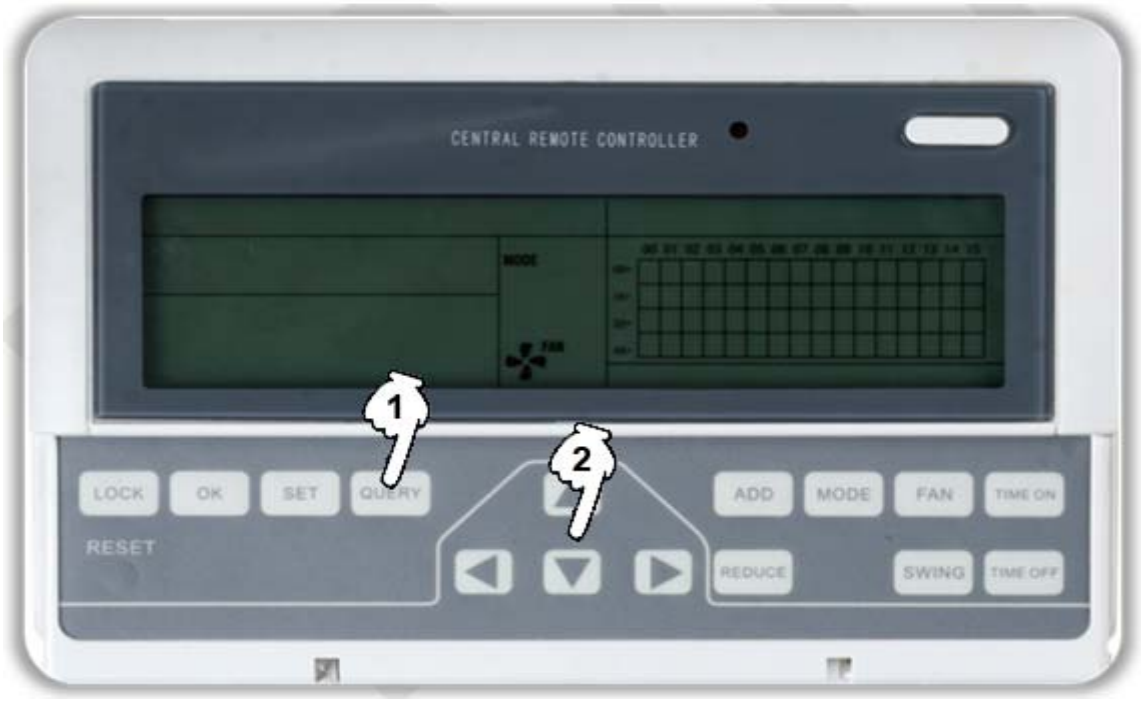
3.1.3 LCD display




Full display of LCD
or display "F" with model MD-CCM03/E(H) and MD-CCM03/ET(H)
GROUP QUERY RUN SET
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15
00+
16+
32+
48+
OPR UNSUCCESS
GROUP ALL
ONLINE ON OFF
GROUP
ERROR
PROTECT
MODE
FAN
ROOM.TEMP
SET.TEMP
T3
OFF
T2A
T2B
ON
Hr
setting mode
1. The matrix is composed of 4*16 grids and each grid is composed of two blocks of different sizes.
2. The matrix include horizontal coordinates 00-15 and vertical coordinates 00+,16+,32+and 48+, which indicate the address of the indoor unit. The sum of the horizontal coordinate and the vertical coordinate of the grid is the address of the grid. Each grid corresponds to an indoor unit of this address.
Keyboard locking
Remote controller locking
Heating mode locking
Cooling mode locking
Temperature parameter
Timing ON/OFF mark
Mode selection: Auto, cooling, dewetting heating,fan only
Hour

3.1.4 Query and Error code

The CCM03 centralized controller offers the function of query of indoor units' running state and displays the error code when some of the indoor units fail down.



1. Press the query button to activate the query function. Firstly the display panel will display the 1st units' state.

2. Use the UP, DOWN, LEFT, RIGHT buttons to select the unit we want to query.

The indication of error codes are as the 2 tables below:

Table 1: Fault code

Fault code	Content
EF	Other faults
EE	Water level detection malfunction
ED	Outdoor unit malfunction
EC	Cleaning malfunction
EB	Inverter module protection
EA	Current of compressor is too large (4 Times)
E9	Communication malfunction between main board and display board
E8	Wind blowing speed is out of control

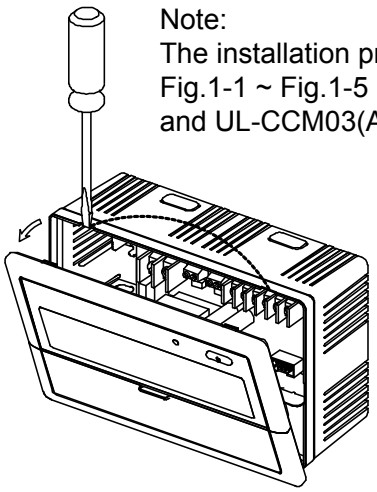
E7	EEPROM error
E6	Detection of current direction alternating is abnormal
E5	T3 or T4 senor of discharge of compressor fails down
E4	T2B sensor malfunction
E3	T2A sensor malfunction
E2	T1 sensor malfunction
E1	Communication malfunction
E0	Phase sequence disorder or loss of power phase
07#	
06#	
05#	
04#	
03#	Communication malfunction between centralized controller and PC(gateway)
02#	Communication malfunction between centralized controller and functional module
01#	Communication malfunction between centralized controller and network interface module
00#	Communication malfunction between network interface module and main control board

Table 2: Protection code

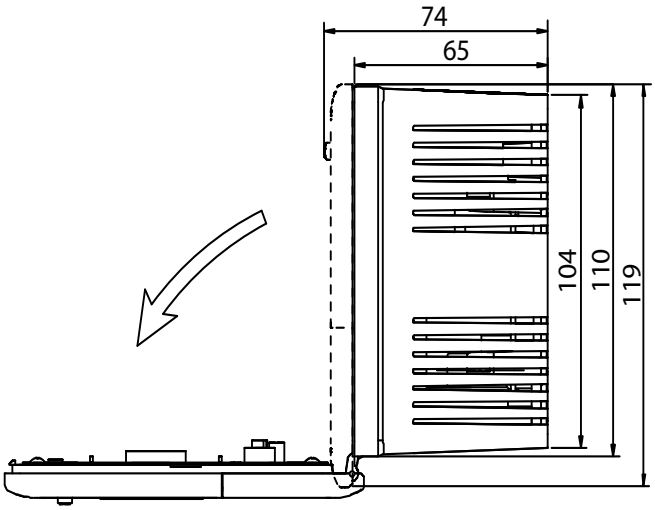
Protection code	Content
PF	Other protection
PE	Reserved
PD	Reserved
PC	Reserved
PB	Reserved
PA	Reserved
P9	Reserved
P8	Compressor’s current is too large
P7	Voltage of power supply is too high or too low
P6	Pressure of discharge is too low
P5	Pressure of discharge is too high

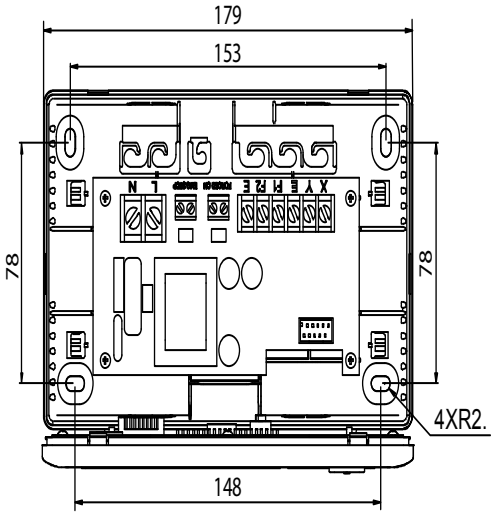
P4	Temp. of discharge pipe is abnormal
P3	Temp. of compressor is abnormal
P2	Condenser high-temperature protection
P1	Anti-cool air or defrost protection
P0	Evaporator temperature protection

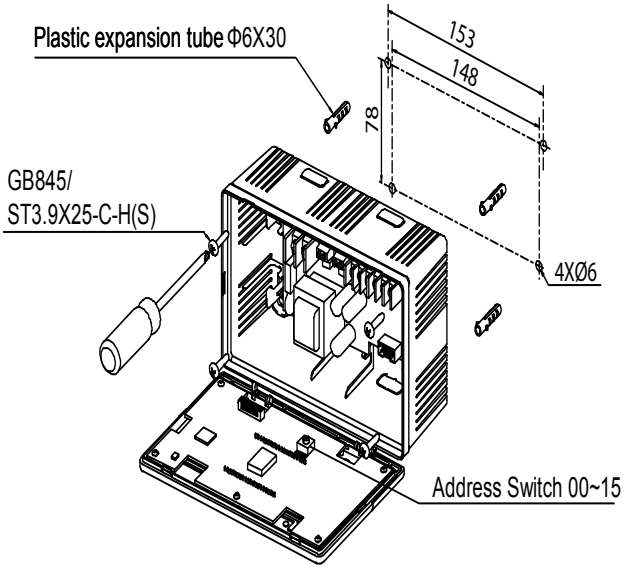
3.1.5 Installation

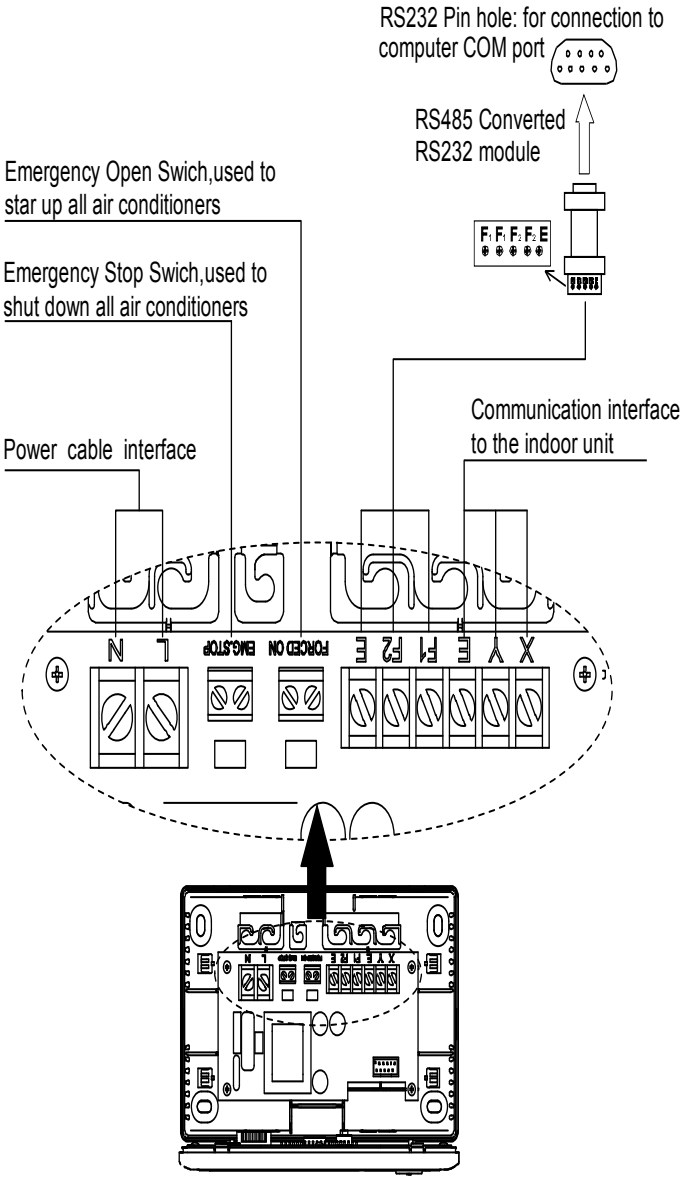


Note:
The installation procedure show in Fig.1-1 ~ Fig.1-5 is for MD-CCM03(A) and UL-CCM03(A)/E

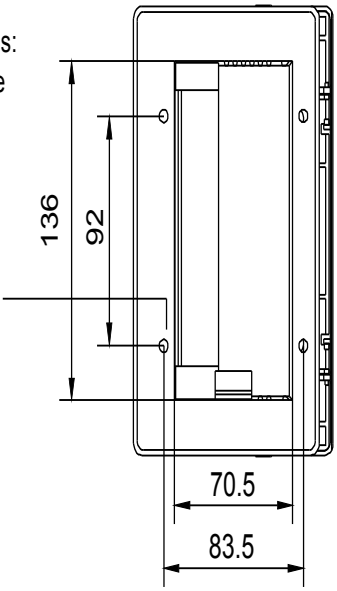


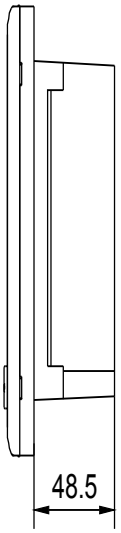

179
153
78
78
4XR2.
148


Plastic expansion tube Φ6X30
153
148
78
GB845/
ST3.9X25-C-H(S)
4XØ6
Address Switch 00~15

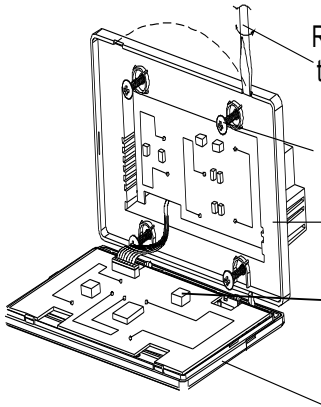

RS232 Pin hole: for connection to computer COM port
RS485 Converted RS232 module
Emergency Open Swich,used to star up all air conditioners
Emergency Stop Swich,used to shut down all air conditioners
Power cable interface
Communication interface to the indoor unit
N
L
EMG.STOP
FORCED ON
E
F2
F1
E
Y
X

Installation dimensions:
As shown in the figure on the right side.

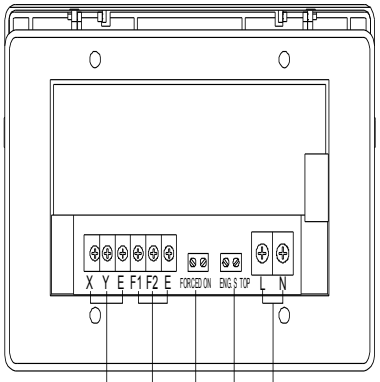


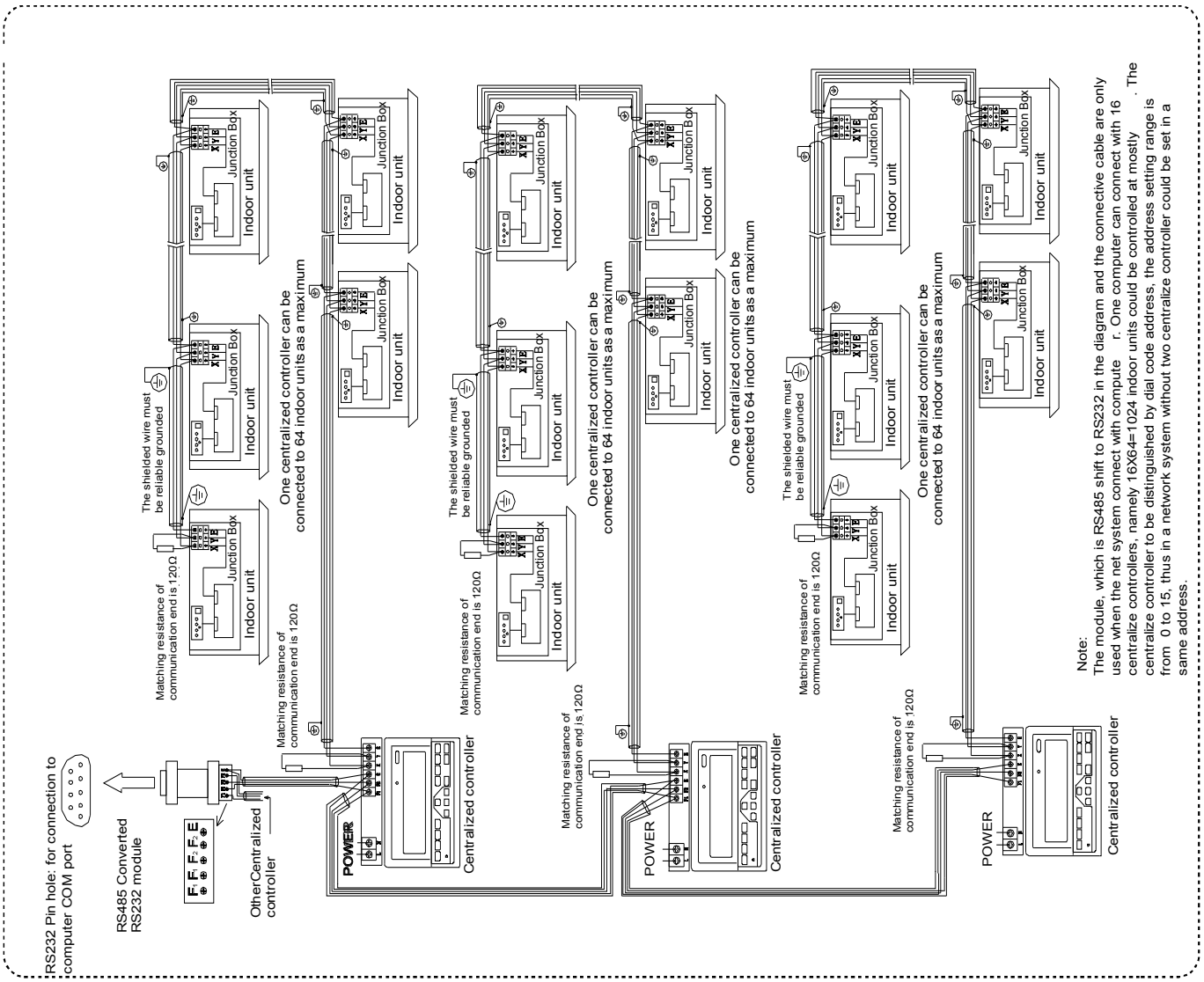


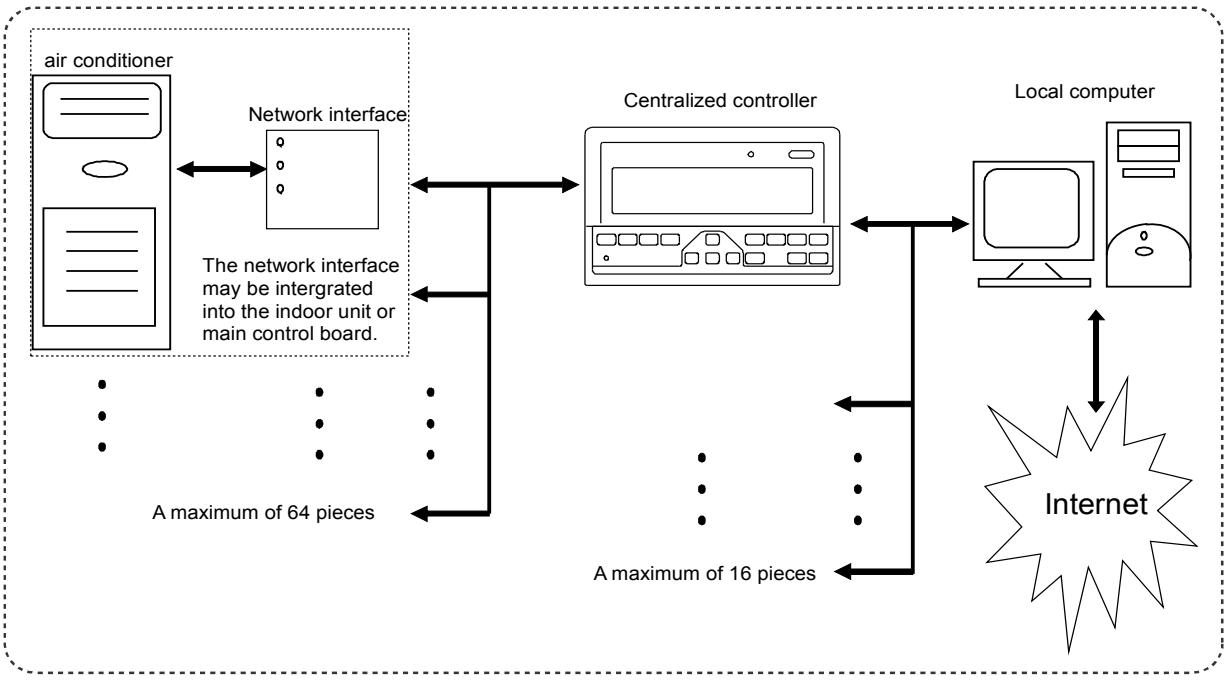
Note:
The installation procedure show in Fig.1-6 ~ Fig.1-8 is for MD-CCM03/E, MD-CCM03/E(M), MD-CCM03/E(T), MD-CCM03/E(H) and MD-CCM03/ET(H).



Bit location	Address range
~	00 ~ 15







Notes: Before starting the network, please confirm that every CCM03's address is different with each other.

3.2 Weekly schedule timer centralized controller: MD-CCM09/E

MD-CCM09/E is designed base on the CCM03, max. 64 indoor units control, weekly schedule timer function. With the function above, CCM09/E can't be connected to the network control system. And actually it does not have the port F1, F2, E, which are needed if connects to the computer.

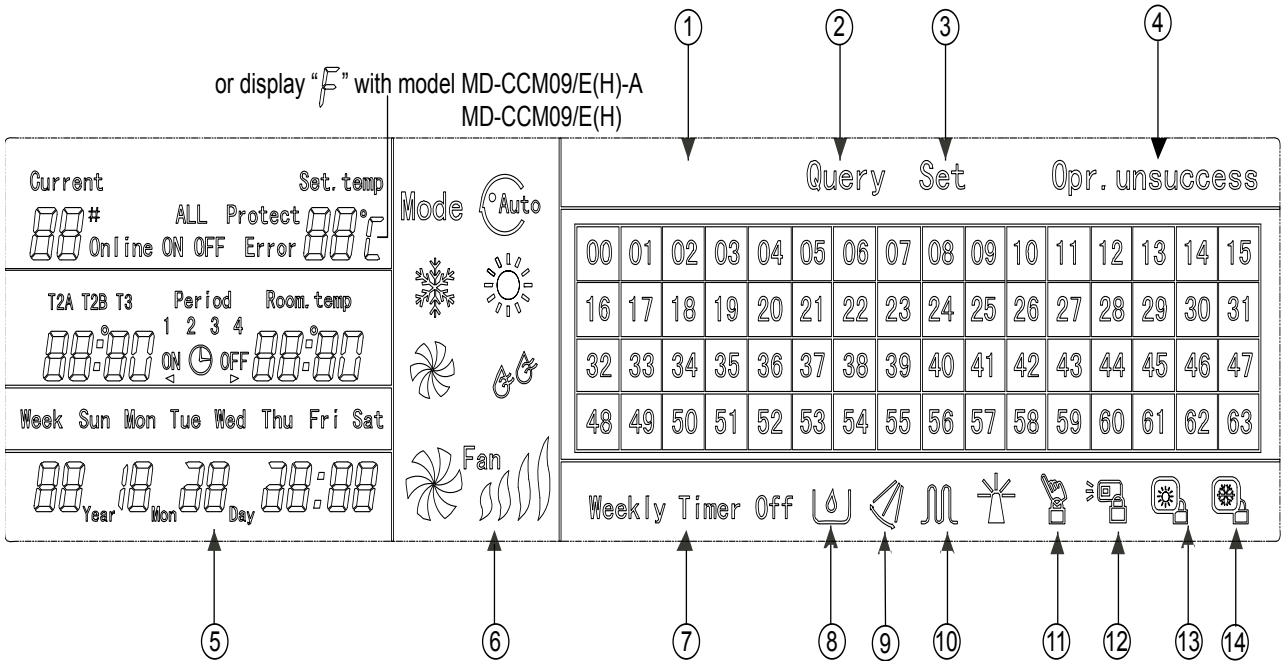
- 7 -days Weekly schedule setting (Maximum 128 weekly & daily schedules)
- Max. 64 indoor units group control or individual setting
- Clear and bright screen with LCD backlight
- Temperature setting
- Wireless remote control restriction
- Sleep and Silent mode
- Mode lock
- Permanent schedule setting storage

3.2.1 System configure

MD-CCM09/E is only an indoor unit centralized controller, but with this device we could set the indoor unit's functions compactly and conveniently.

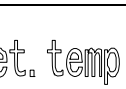
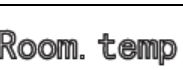
1. All the indoor units and outdoor units are MIV V5 series, the topology of the network can be as follows. Moreover the 2nd way of connecting is also adaptable in this condition.

3.2.2 LCD display



1	On-line condition matrix table of AC 0-63		8	Economy run
2	Query		9	Swing
3	Set		10	Electric auxiliary heater
4	Operate result		11	Locking keyboard
5	Date time		12	Remote controller locking: Does not respond signal from remote controller.
6	Run mode		13	Heating mode locking: only heating mode is effective
7	Weekly-timer off		14	Cooling mode locking: only cooling mode is effective

3.2.3 LCD icon description

Icon	Meaning	Icon	Meaning
	Auto mode		Fan only mode
	Cooling mode		Dry mode
	Heating mode		Fan speed
	Electric auxiliary heating		Lock heat mode
	Lock cool mode		Wireless controller lock
	Lock keyboard		Set mode
	Query mode		Operating result
	Weekly timer off		All units are selected
	Online status		Protection code follows
	Error code follows		Set temperature
	Corresponding period		Room temperature
	Temp. of the middle of evaporator		Temp. of the outlet of the condenser

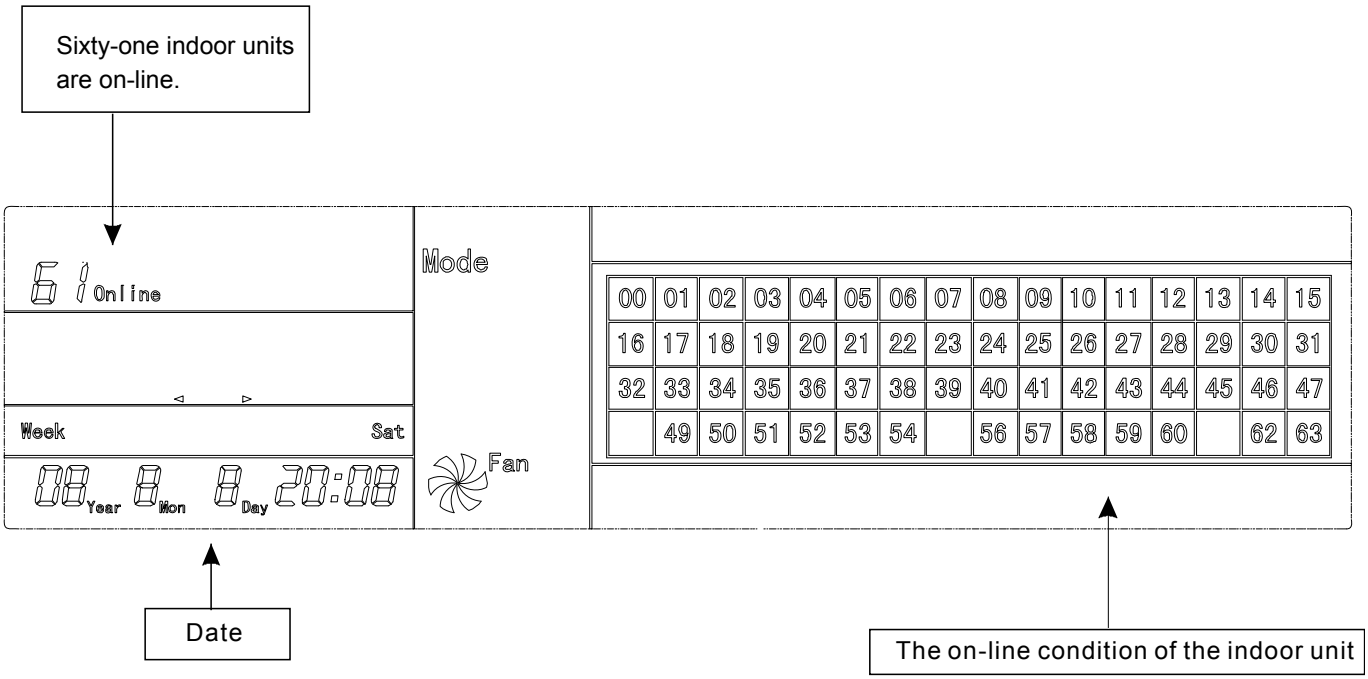
T3	Temp. Of outdoor pipe	Mon	Monday
Tue	Tuesday	Wed	Wednesday
Thu	Thursday	Fri	Friday
Sat	Saturday	Sun	Sunday

- The main interface of the weekly-timer central controller (user interface)

1) Under the other pages, press Cancel to return to the main interface.

2) Under the other pages, automatically return to the main interface when no operation for a period of time.

3) The main interface displays the on-line condition of the indoor unit.

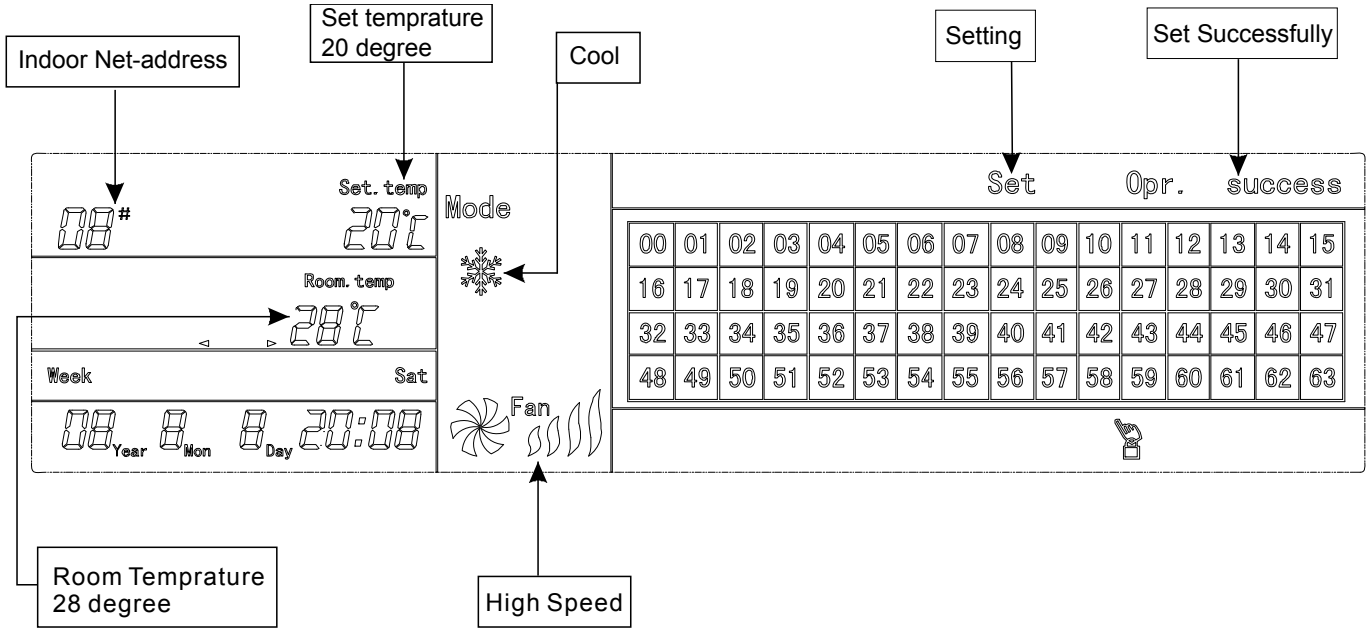


- Setting interface of single weekly-timer central controller

1) Under the main interface, press Set to select to the single setting interface.

2) Automatically return to the main interface when no operation for a period of time.

3) Set the running status of single air conditioner under this page.



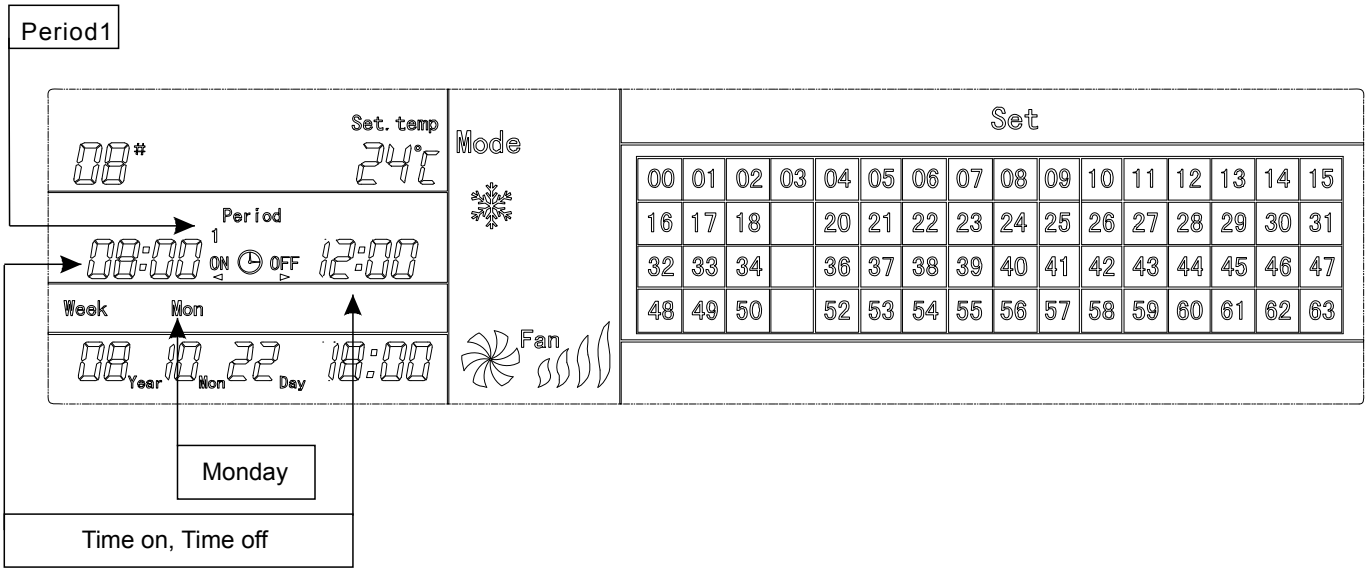
- Setting interface of weekly timer parameters of single weekly-timer central controller

1) Under the main interface, press Program to display the parameter setting interface of single weekly timer.

2) Automatically return to the main interface if no operation is performed for a period of time.

3) Under this page, set the weekly timer parameters of single air conditioner, including startup time, shutdown time, the running mode of this period, temperature and wind speed.

4) One air conditioner can be at most set with four periods in one day from Monday to Sunday.

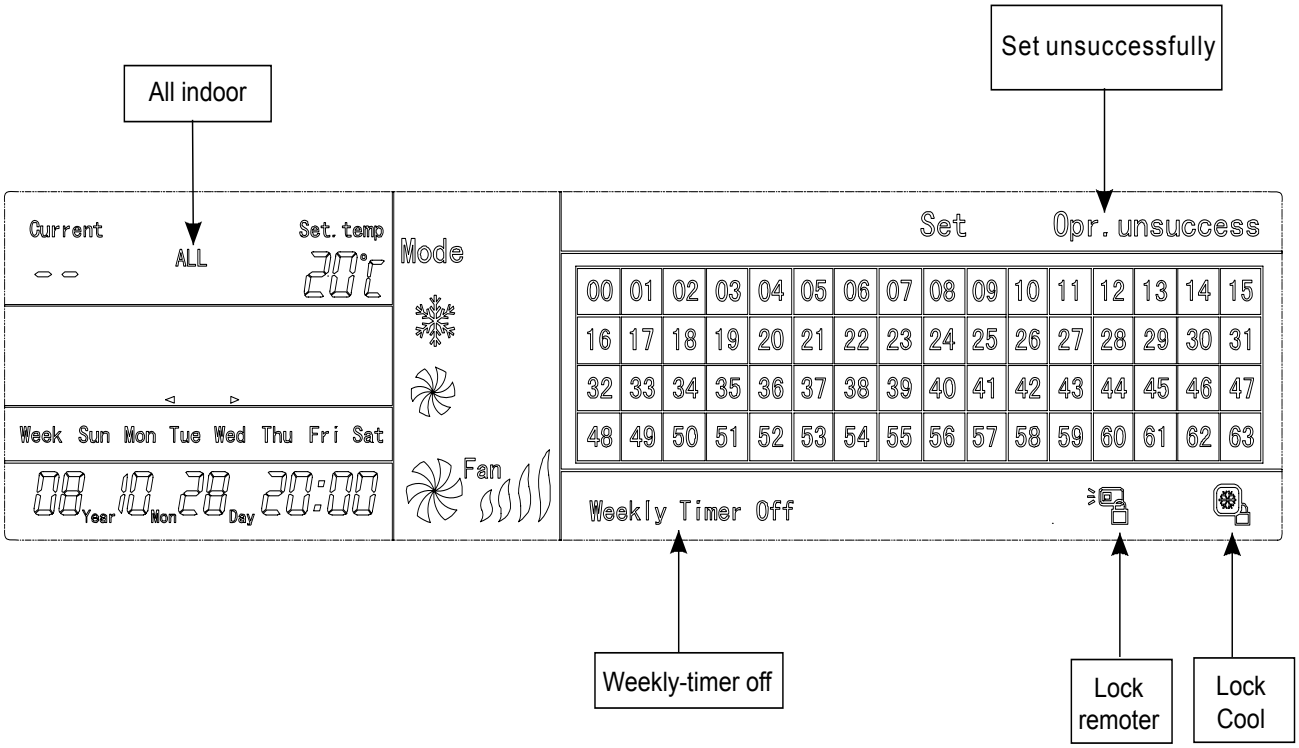


- Unified setting interface of the weekly-timer central controller

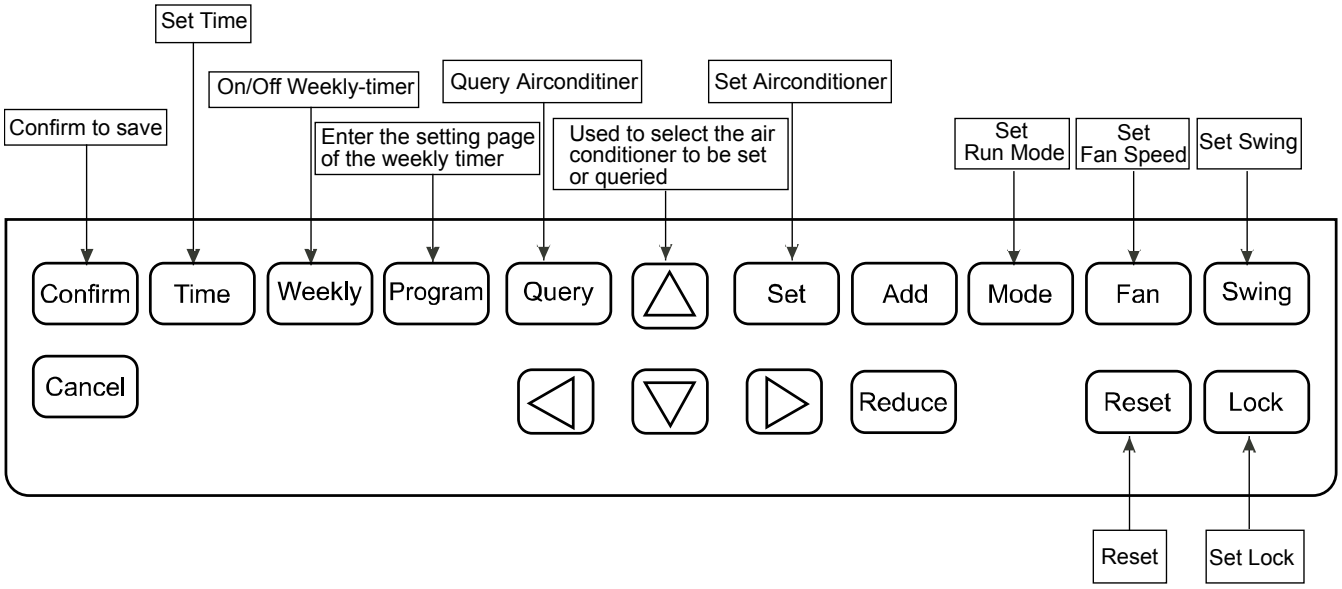
1) Under the main interface, press Set to display the unified setting interface.

2) Automatically return to the main interface if no operation is performed for a period of time.

3) Set the running mode of all air conditioners under this page, including mode, temperature and Fan speed.



3.2.4 Button names



1) On/Off key

Press the ON/OFF button. All air conditioners will be shut down if they are running; on the contrary, they will be started up. If you press the button for less than 5 seconds, the startup mode is the last running mode of the air conditioner. If you press the button for more than 5 seconds, the startup mode is cooling, fan runs at high Speed, and the set temp. is 24 degrees.

2) SET key

Press the SET button, and then select set single or set all. Set single indicates to set the parameter (such as mode/ temperature/Fan speed/ weekly timer) of a single selected air conditioner. Set all indicates to set the parameter of all air conditioners controlled by the central controller.

3) Query key

Press the Query button to query the running condition of the air conditioner, such as on or off, temperature setting, indoor temperature, fan speed and running mode. Press direction keys to select the air conditioner that you want to query.

4) Up, Down, Left, Right keys (Direction keys)

When querying or setting the indoor units, press these four keys to select the indoor units that we need to set or queried. When setting the weekly timer, it is used for selecting the day of the week and the time of startup and shutdown.

5) Add key

When querying the indoor unit, press the Add button to query more parameter of the indoor unit. When setting the indoor unit, it is for adjust the setting temperature. When setting the weekly timer, it is for adjust the time of startup and shutdown.

6) Reduce key

When querying the indoor unit, press the “Reduce” button to query more parameter of the indoor unit. When setting the indoor unit, it is for modifying the setting temperature. When setting the weekly timer, it is for modifying the time of startup and shutdown.

7) Mode key

When setting the indoor unit, it is used for setting the running mode of the indoor unit which includes Automation, Cooling, Heating, Fan mode, Dry and shutting down.

8) Fan key

When setting the indoor unit, it is for setting the wind speed of the indoor unit which includes high speed, middle speed, low speed and automatic speed.

9) Swing key

In setting the indoor unit, it is for setting the swing function of the indoor unit. The running modes are swing on or swing off.

10) Lock key

When setting, press the Lock button to lock the remote controller of all or single indoor unit. Press the Query button and hold under the main page, then repress the Lock button again to lock the keyboard of the central controller; press the Mode button and then press the Lock button again to lock the running mode.

11) Reset key

The central controller re-scans the indoor unit in the network as recharging after power off.

12) Program key

Under the main page, press the Program button to set the weekly timer of single indoor unit or all indoor units. Press the Query button and hold, and then press the Program button to query the weekly timer parameters of the indoor unit.

13) Weekly key

Under the main page, press the Weekly button to start up or shut down the weekly timer function.

14) Time key

Under the main page, press the Time button for 5 seconds to enter the time-modifying status, and then press Add or Reduce button to change the setting time. Press Left or Right to select minute/ hour/ day/ month/ year. Finally, press the Confirm button to save the modification.

15) Confirm key

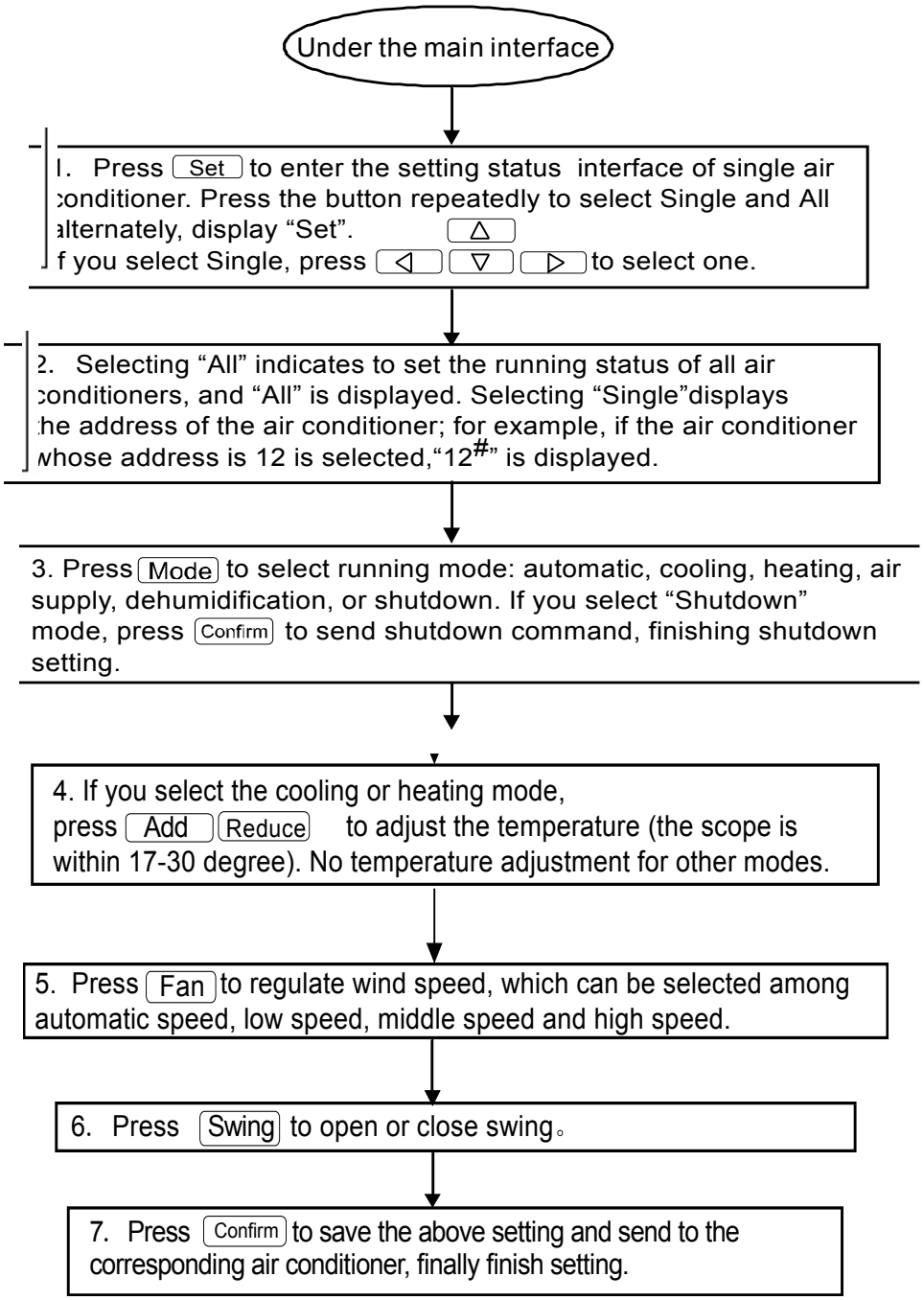
Save data and send the command required to the indoor unit, such as setting the mode of the air conditioner.

16) Cancel key

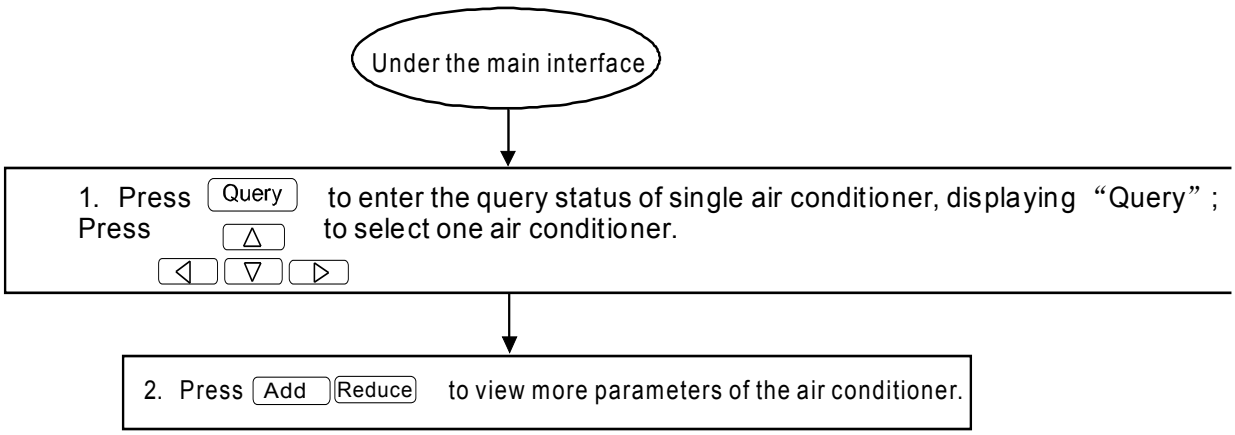
Cancel the last operation and return to the last interface.

3.2.5 Operating the centralized controller

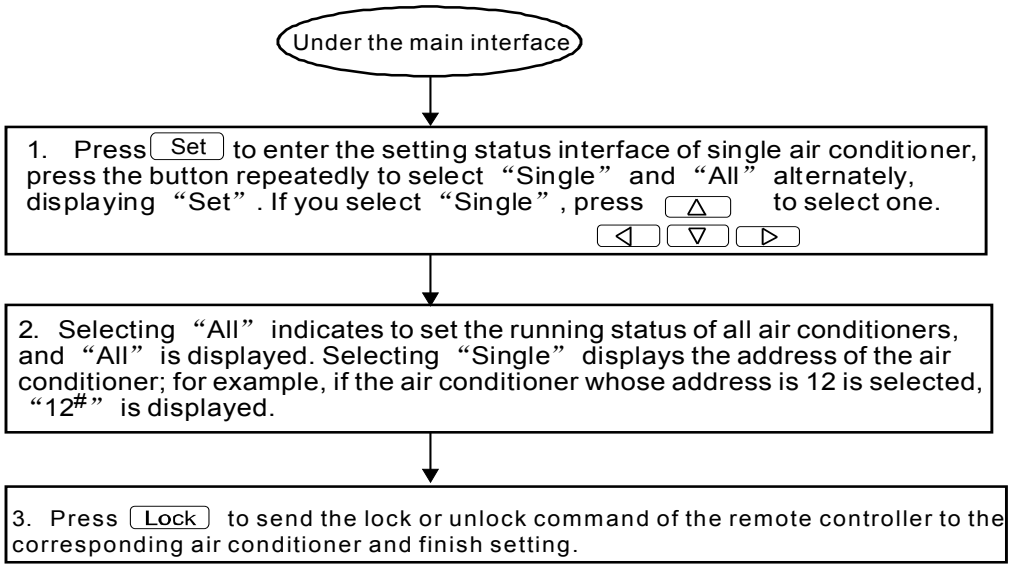
(1) How to set the running status of the air conditioner?



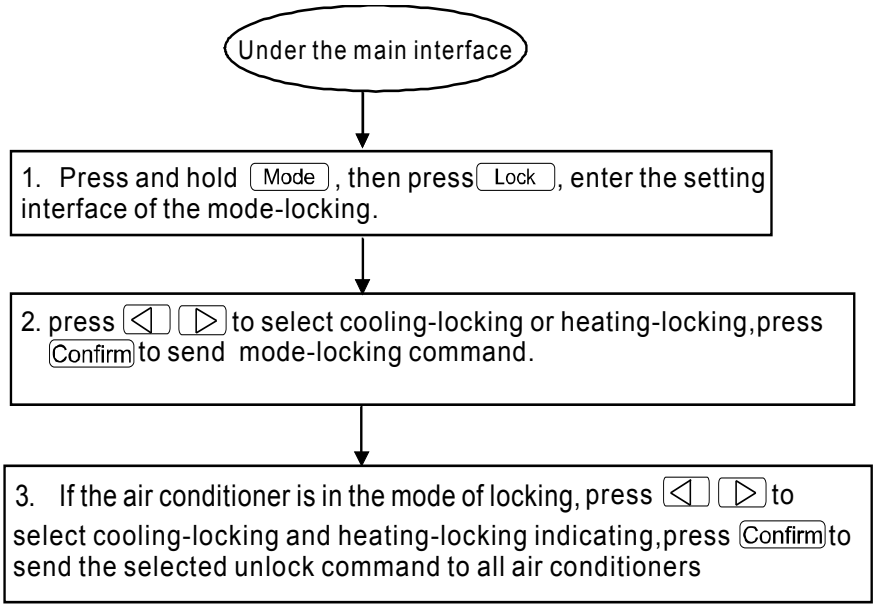
(2) How to query the running status of the air conditioner?



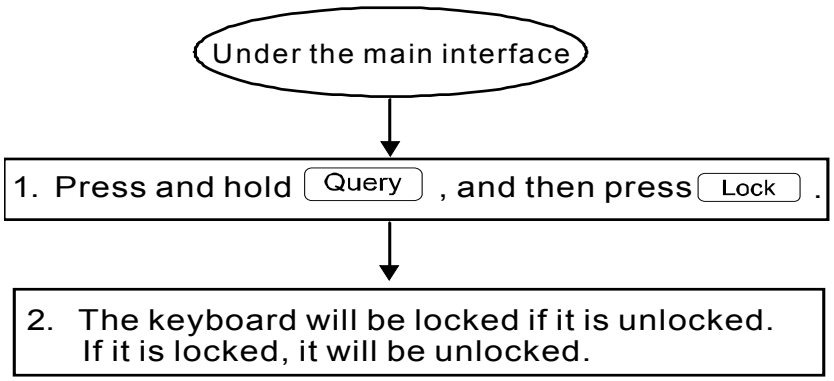
(3) How to lock and unlock the remote controller of the air conditioner?



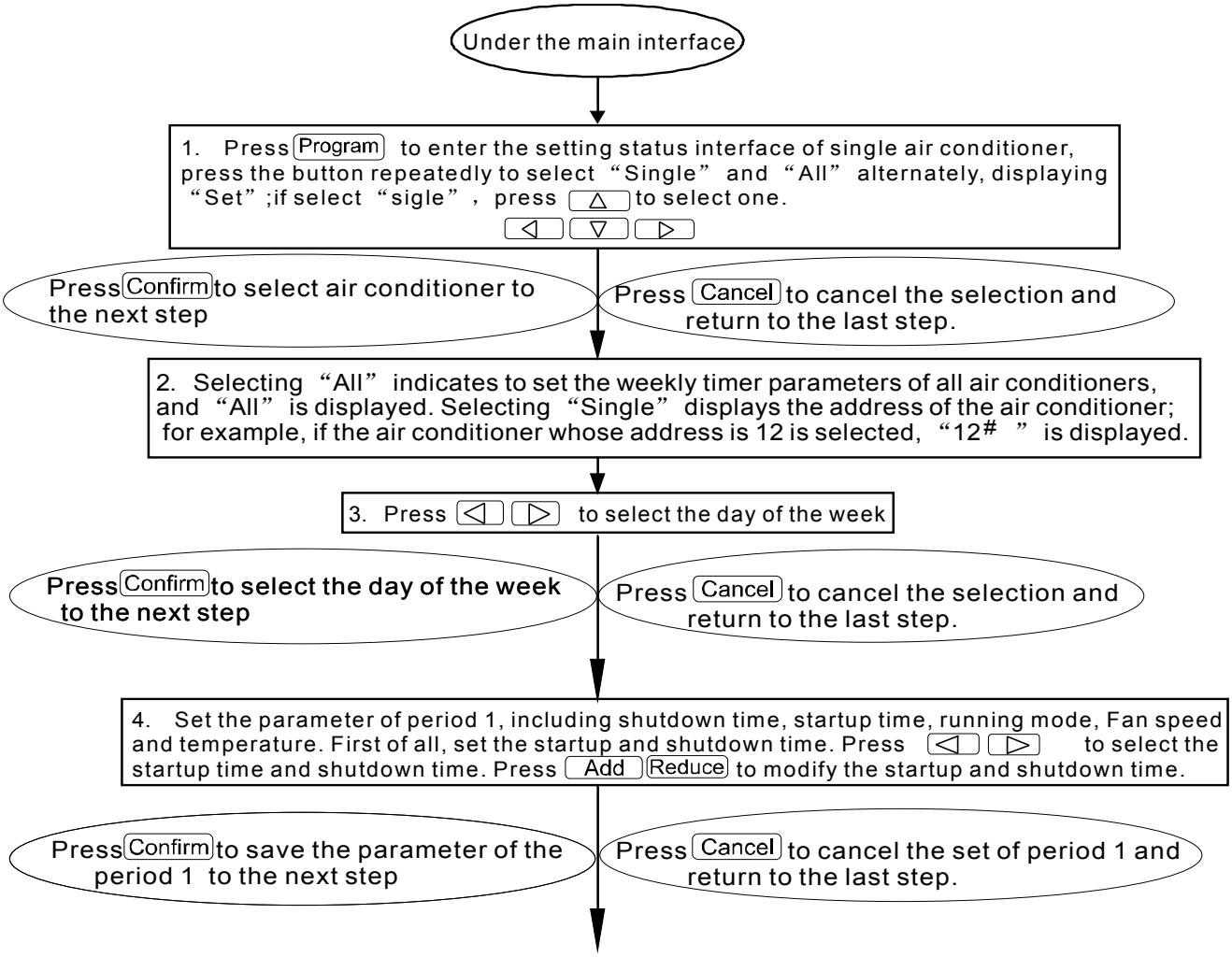
(4) How to lock and unlock the mode of the air conditioner?

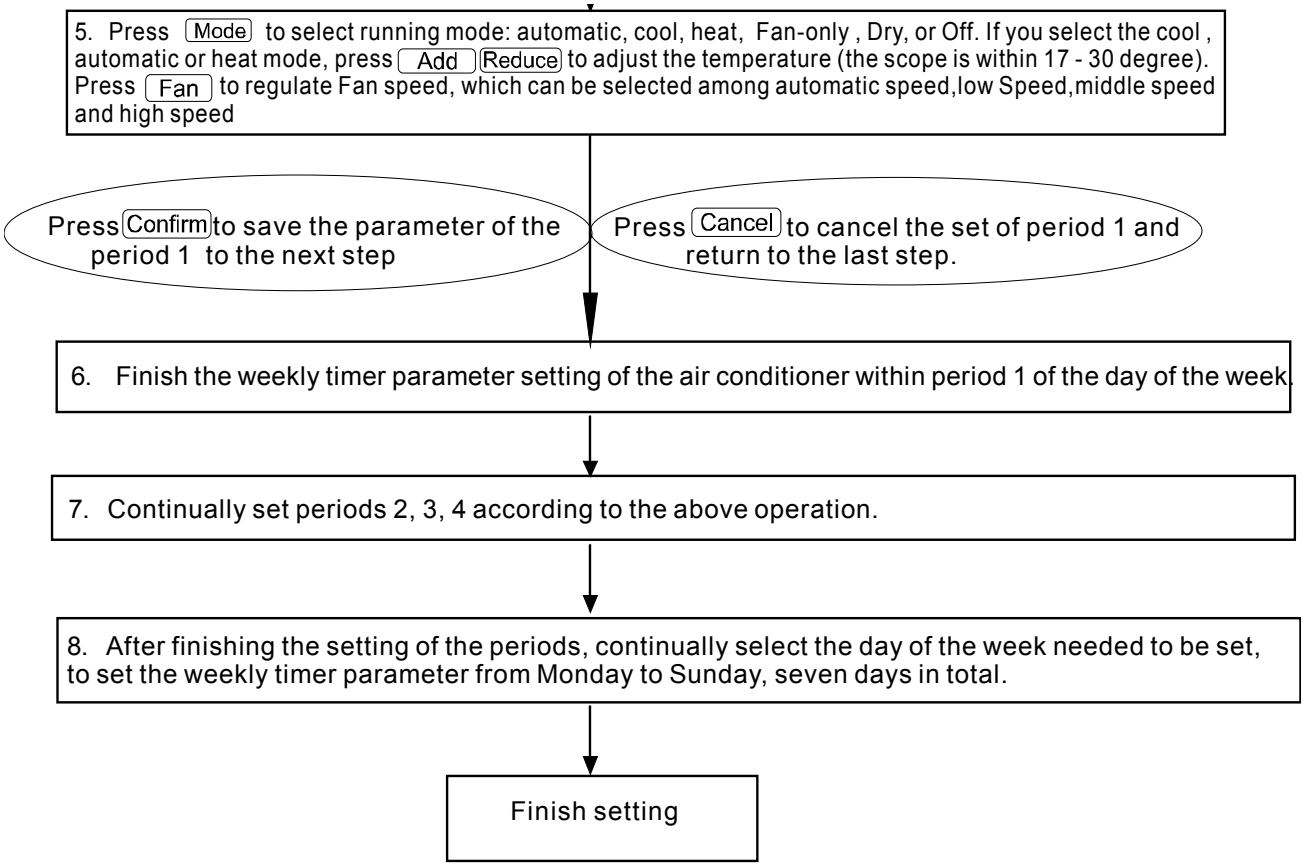


(5) How to lock and unlock the key board of the weekly-timer central controller?

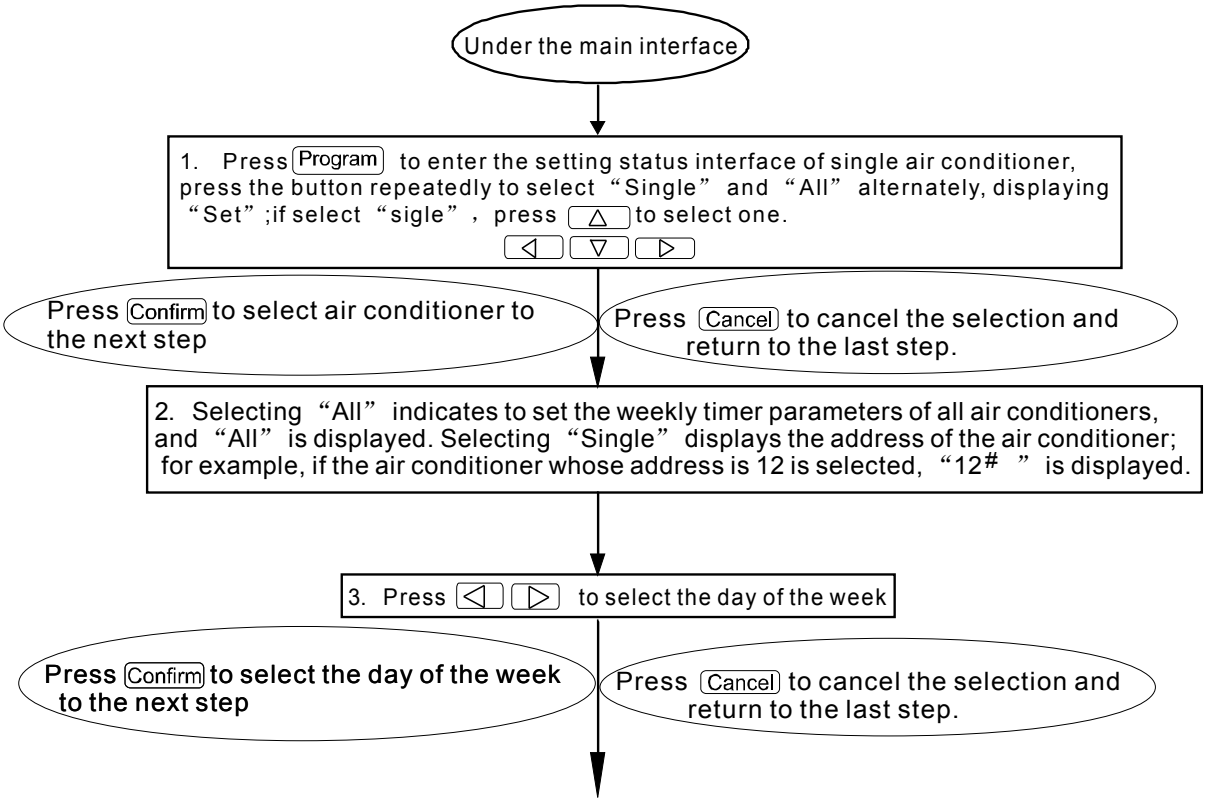


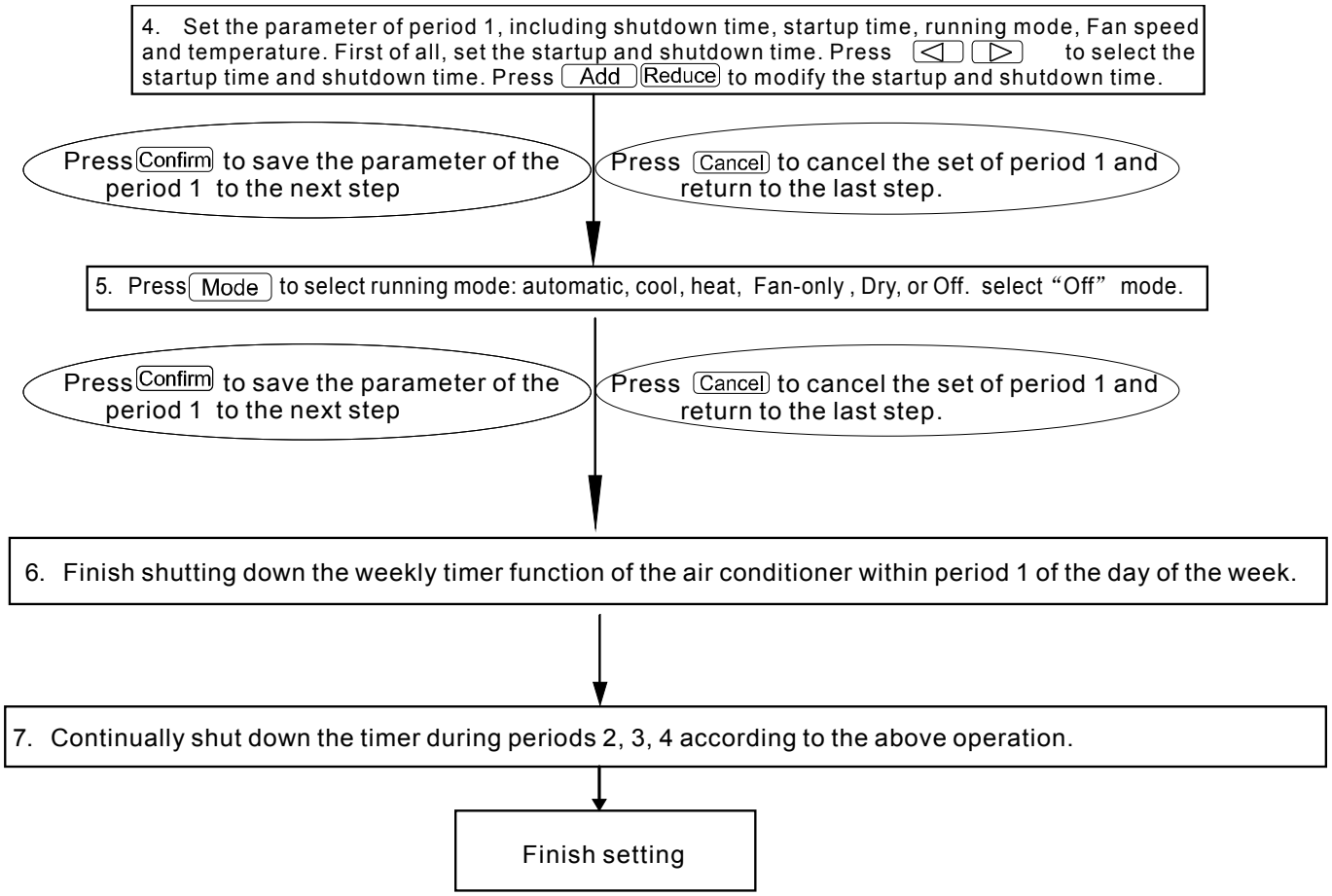
(6) How to set the function and relevant parameters of the weekly timer of the air conditioner?



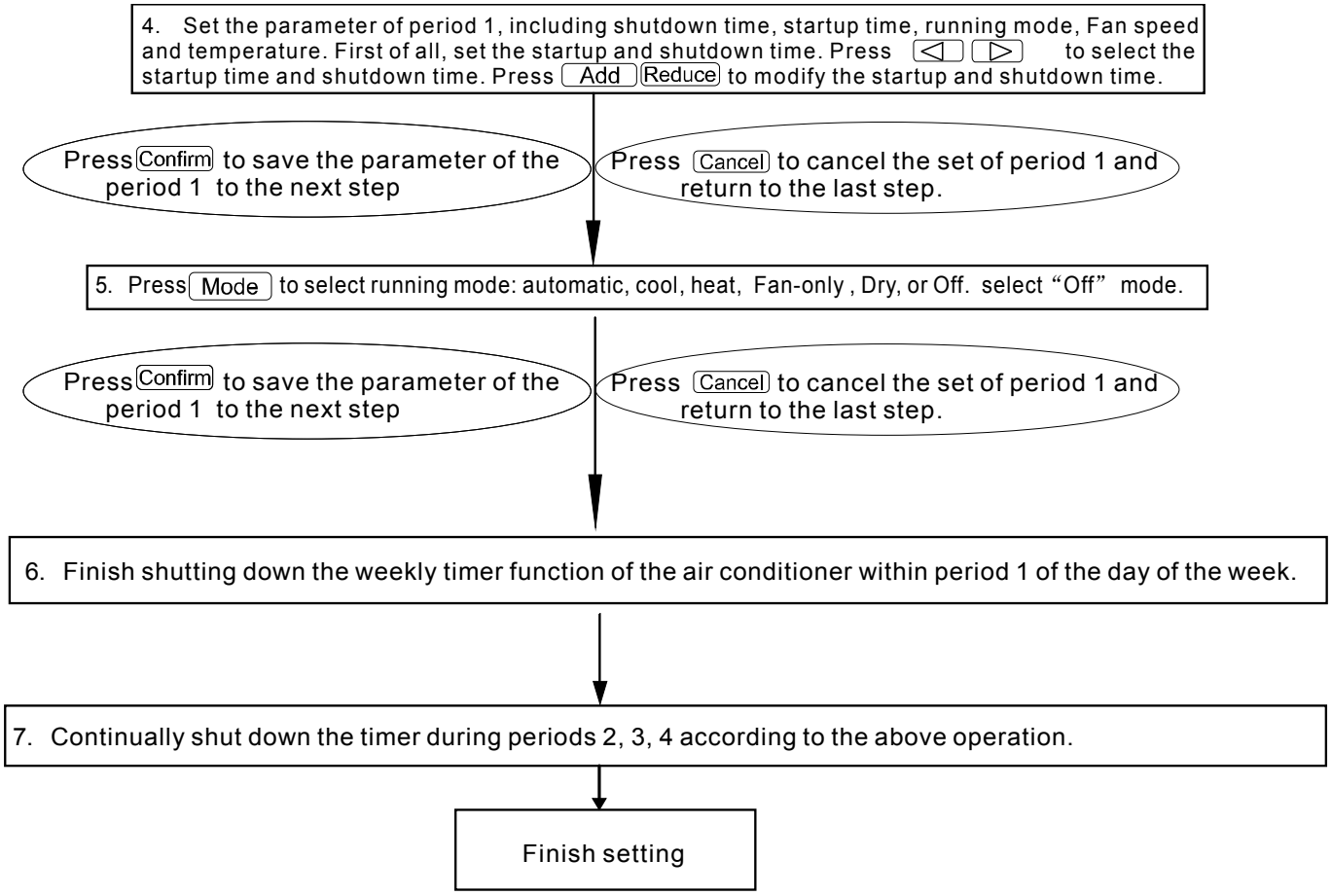


(7) How to turn off the weekly timer setting of a period of an air conditioner?

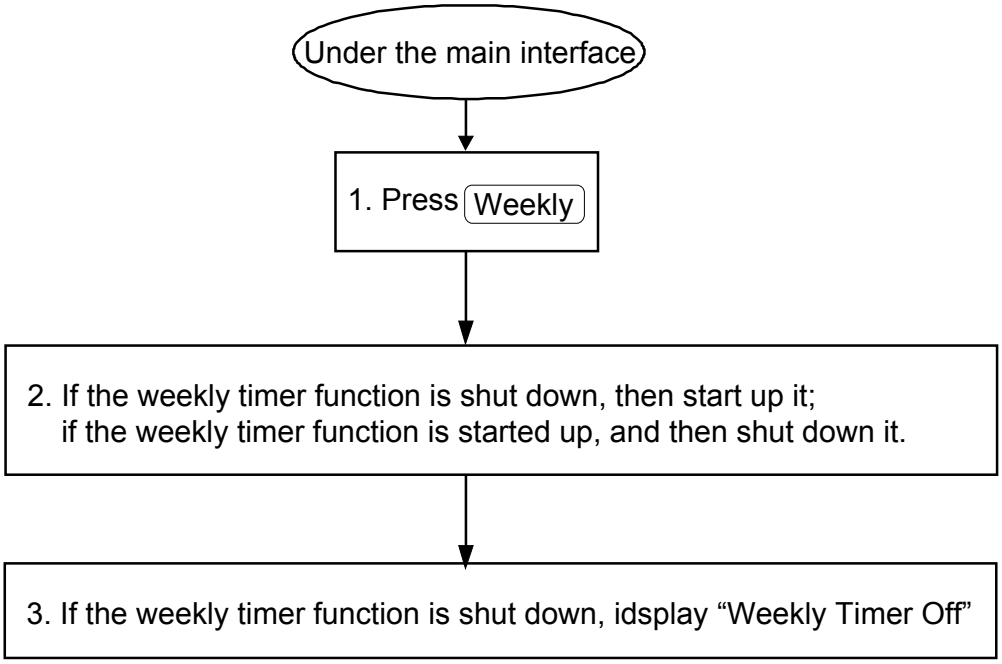




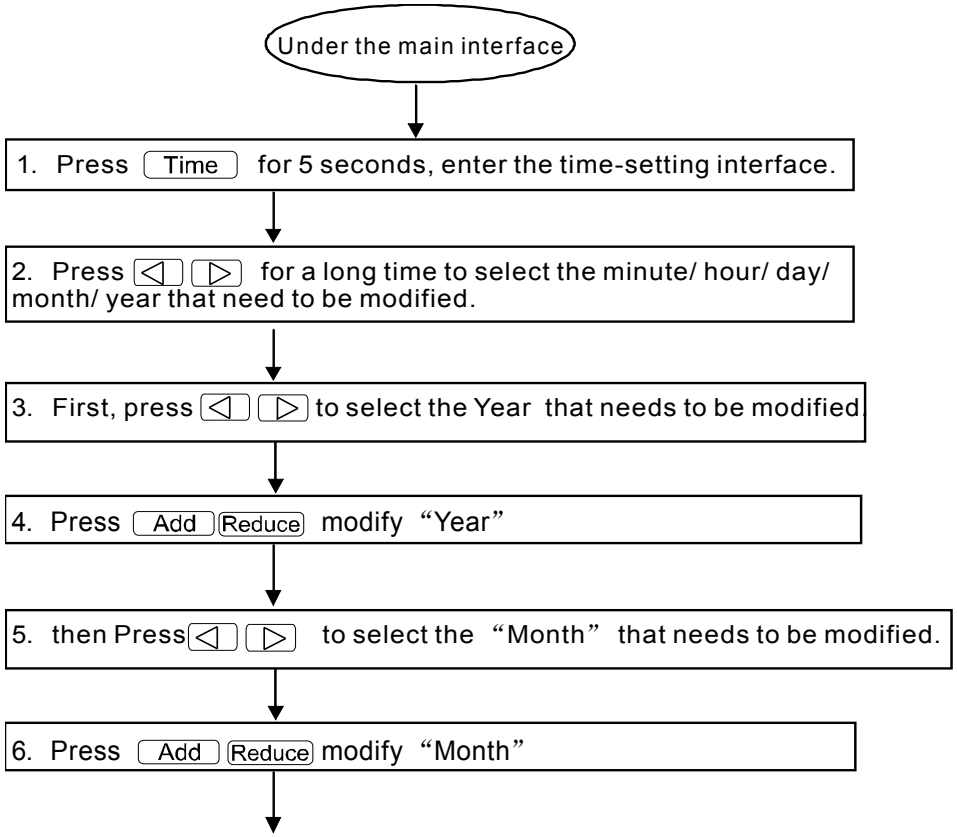
（8）How to query the weekly timer setting parameter of the air conditioner?

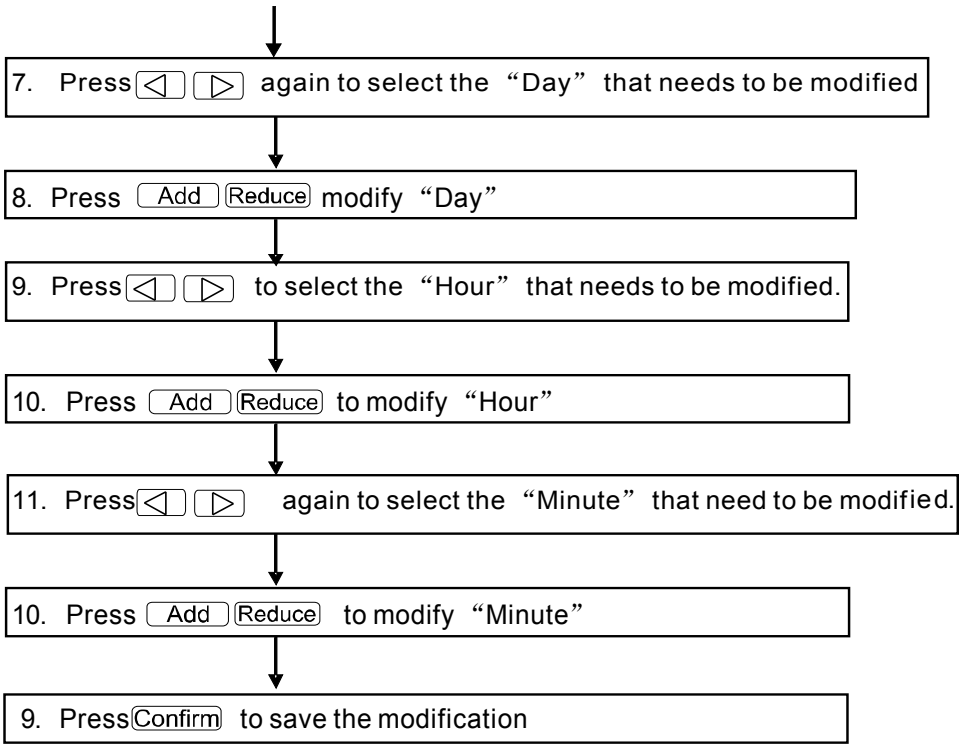


（9）How to start up or shut down the weekly timer function of all air conditioners?



（10）How to modify the system time?





3.2.6 Installation

The thickness of the central controller cable shall be adjusted according to the length of the cable. A proper cable tube shall be used to install the cable of the central controller.

Insert the flat tip screwdriver into the recess on the top panel of the case and slightly turn to open the top cover of the central controller.

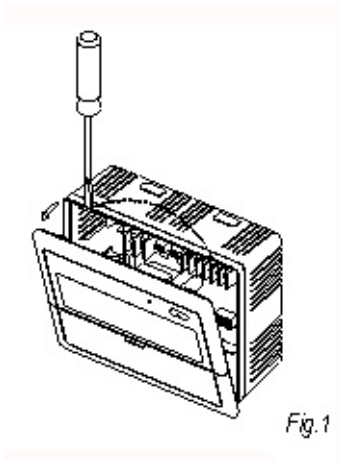


Fig.1

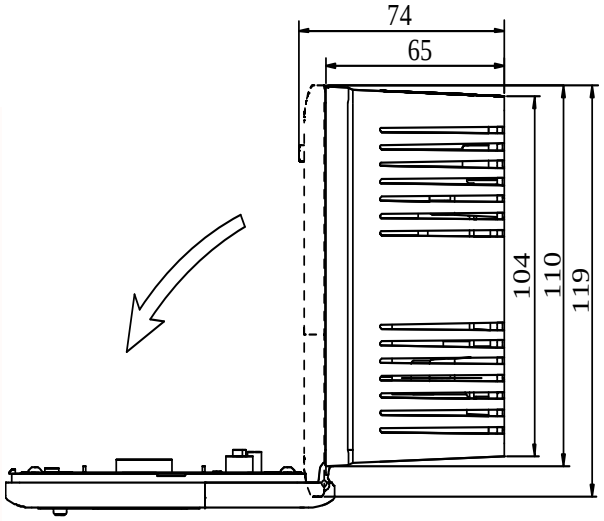


Fig.2

Note:
The installation procedure show in fig.1~Fig.5 is for MD-CCM09 (A), UL-CCM09 (A)/E and MD-CCM09/E (H)-A

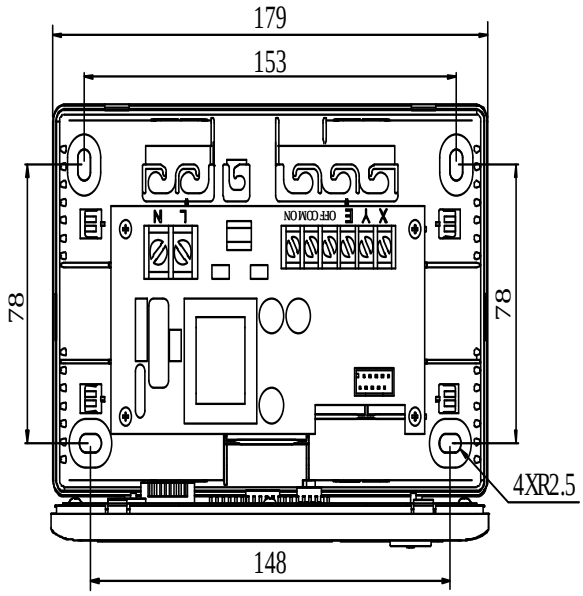


Fig.3

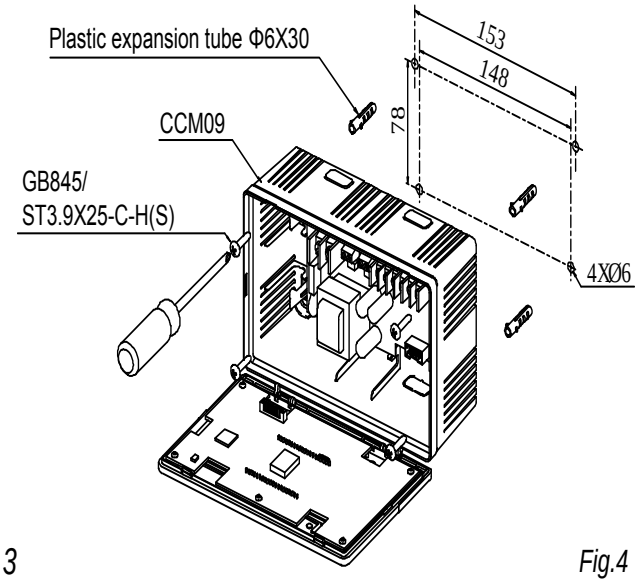


Fig.4

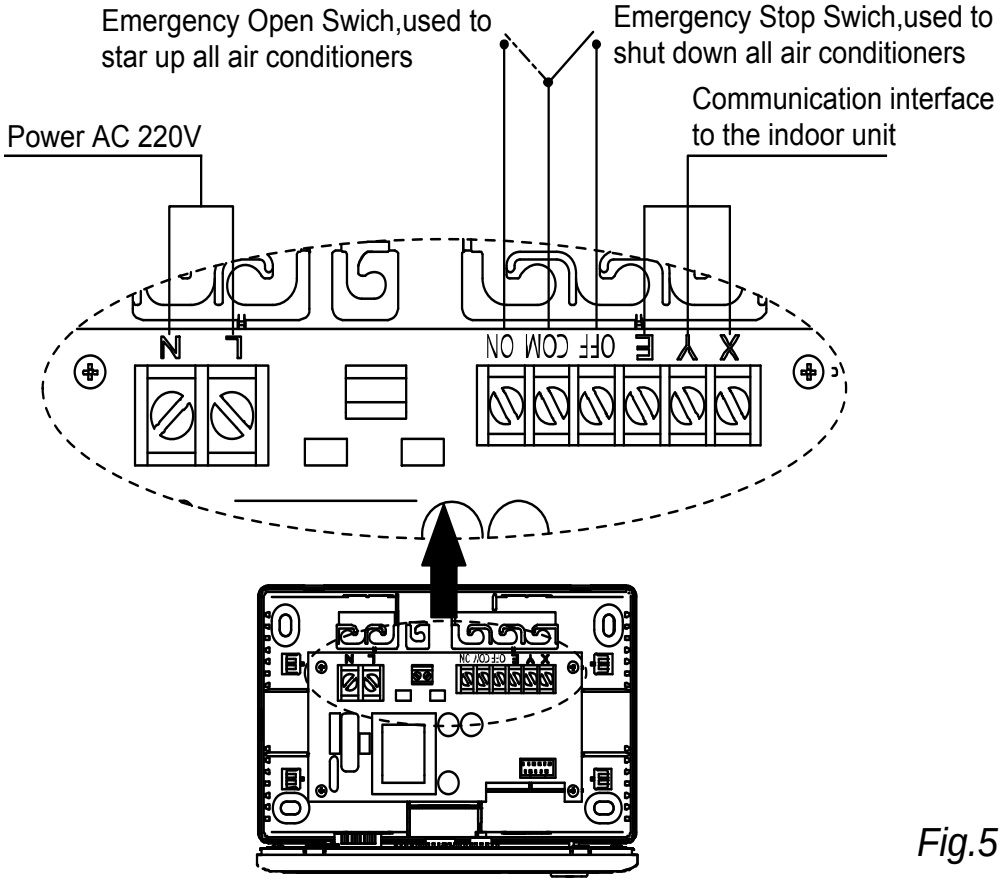


Fig.5

Note: The installation procedure show in Fig.6 ~ Fig.8 is for MD-CCM09/E and MD-CCM09/E(H)

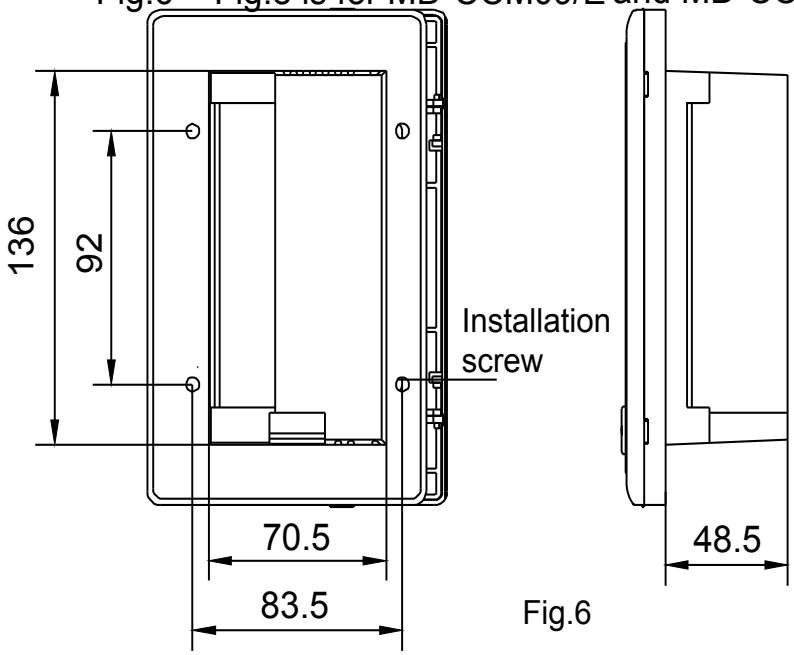


Fig.6

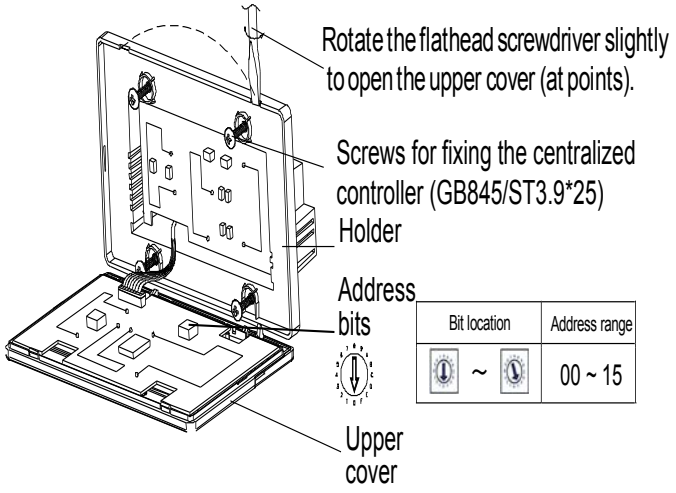
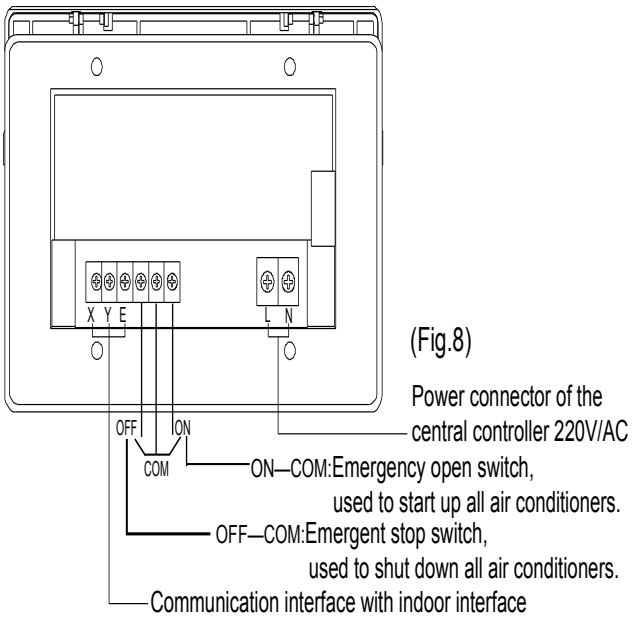
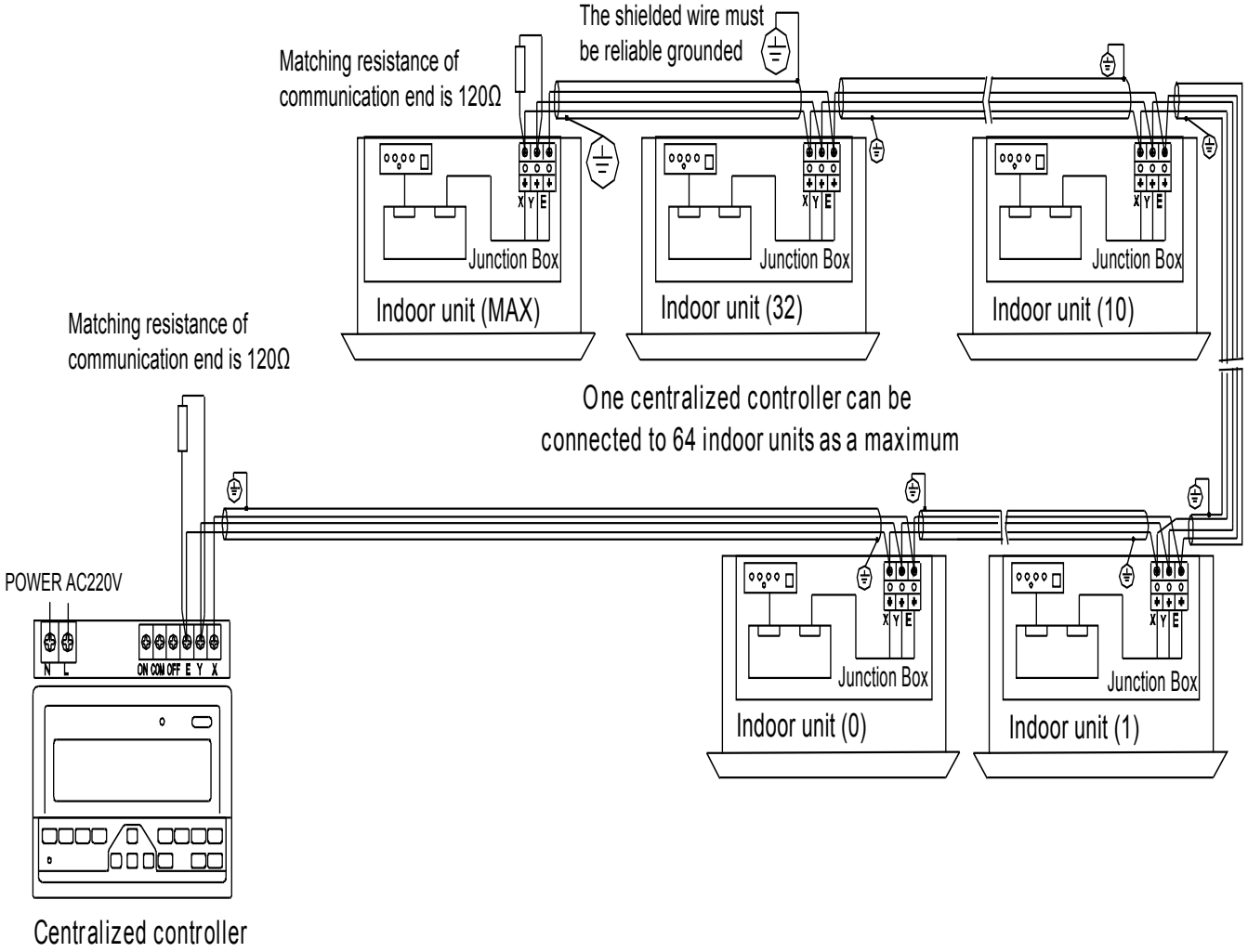


Fig.7



Connecting diagram of network-based air conditioning system

(There are two types of indoor units, namely indoor unit with external network interface module on the main control board or built-in network interface module in the main control board.)


The shielded wire must be reliable grounded
Matching resistance of communication end is 120Ω
Junction Box
Indoor unit (MAX)
Indoor unit (32)
Indoor unit (10)
Matching resistance of communication end is 120Ω
One centralized controller can be connected to 64 indoor units as a maximum
POWER AC220V
N L
ON COM OFF E Y X
Indoor unit (0)
Indoor unit (1)
Centralized controller

4. Gateway

MD-LonGW64/E

MD-CCM08/E

GateWay01/E

IMM441V4PA512

4.1 Lonworks BMS gateway: MD-LonGW64/E

The new LonWorks gateway MD-LonGW64/E has been compliance with Lonworks standard and can be connected up to 64 indoor units to the LonWorks network directly. It can connect multiple refrigeration systems and do not need to connect CCM03.For full MIV V5 system can be connected CCM03, and it must be connected from outdoor unit's XYE, the new and the old indoor units or MIV indoor units cannot be applied to this function.

MD-LonGW64 helps other LonWorks devices gathering the information from the Midea central A/C, and help setting the indoor units' working mode.

- ✧ Connect Central A/C system to LonWorks network.
- ✧ The core control module applies flash memory. Easily download the program on line.
- ✧ LonGW64 gateway applies non-polar twisted pair lines, which makes connecting to LonWorks network easily.
- ✧ Be able to bridge the indoor units to the BMS.

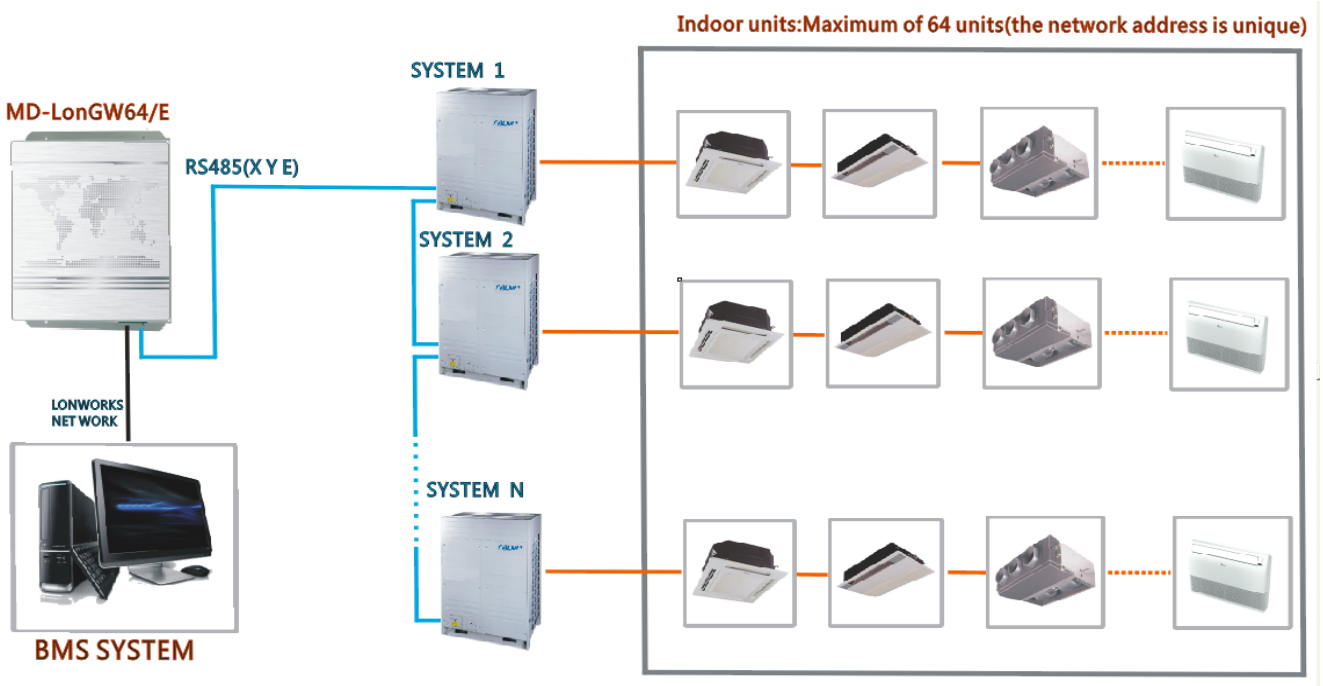
4.1.1 General Function

Monitoring	Controlling
ON/OFF status report	Mode setting for single unit
Running mode status report	Mode setting for all units
Fan speed status report	Stop setting for single
Set temp. value report	Emergency stop for single unit
Indoor temp. value repot	Fan speed setting for single unit
Error status report	Fan speed setting for all units
Online/offline status report	Temp. setting for single unit
Quality of connection status report	Temp. setting for all units

4.1.2 System configure

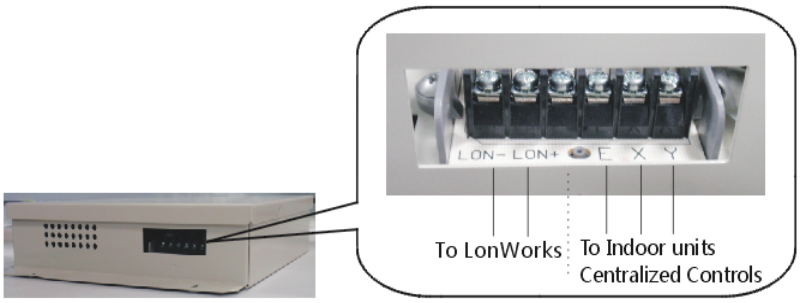
Indoor units can be connected to the MD-LonGW64 gateway, and we can gather all the units' information and control the indoor units through MD-LonGW64. As a result, the indoor units need firstly connecting to the computer to make a central monitoring system. The composition of the whole network is as follows:

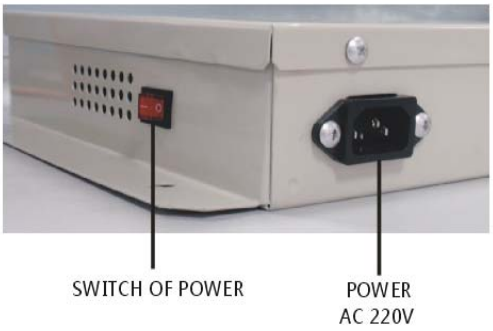
This connection method is suitable for all of the air conditioners system.



Notes: If there are a few MD-LonGW64 devices to compose a LonWorks network, the LonWorks terminals of the MD-LonGW64 are able to be connected in the hand-in-hand way. And can be connected up to 64 indoor units to the LonWorks network.

4.1.3 Connecting ports





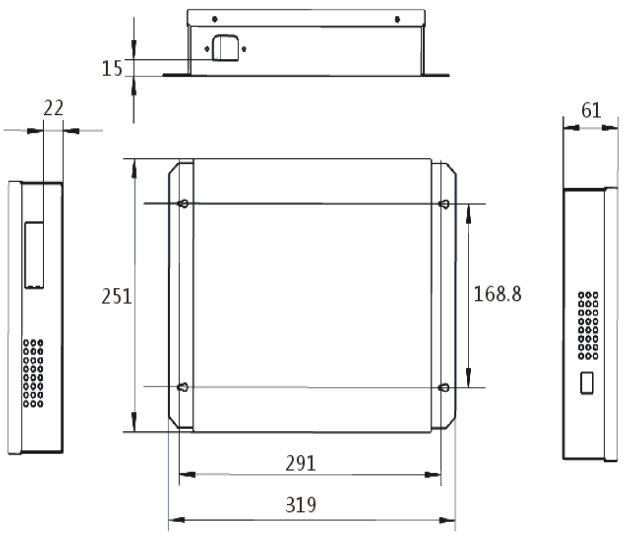
LON- and LON+ port: The ports should be connected to the computer's COM port, using the RS-232 communicative standard.

X Y E port: These ports use a removable connecting way to help user connect the LonWorks network conveniently.

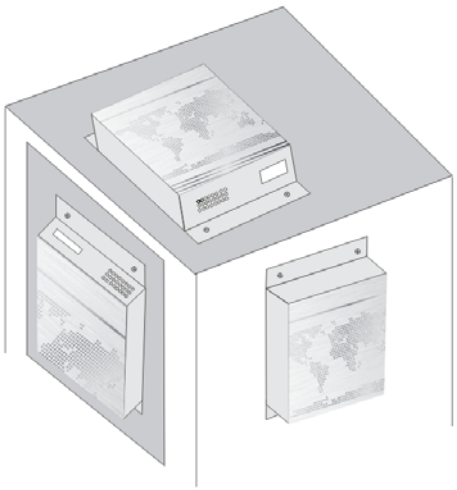
POWER: This port should be connected to the AC 220V power adaptor.

4.1.4 External View

Dimensions: 31.9*25.1*6.1



Notes: There are three installation methods as the following figure. Don't install the unit in any other orientation.



4.2 BACNET BMS gateway: MD-CCM08

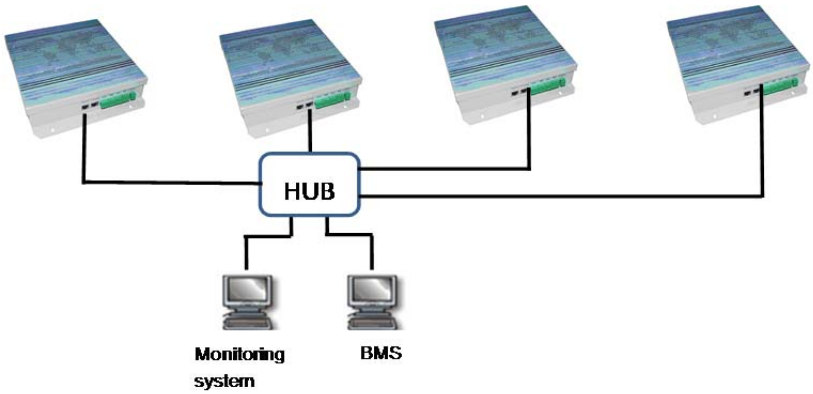
MD-CCM08/E is a gateway to connect the indoor units and outdoor units to the BACnet. BACnet stands for the Building Automation and Control Network. MD-CCM08/E gathers the information of the IDU and ODU. Besides, MD-CCM08/E is able to send the command to the units.

- ✧ Be able to bridge the indoor and outdoor units to the BACnet protocol BMS.
- ✧ Also be able to connect the indoor and outdoor units only, without the BMS.
- ✧ Contains 4 Groups of RS485 communication ports and able to connect up to 256 indoor units or 128 outdoor units instead.
- ✧ User can check the units' status and change their settings via local network.
- ✧ Compatible with Firebird.

4.2.1System configure

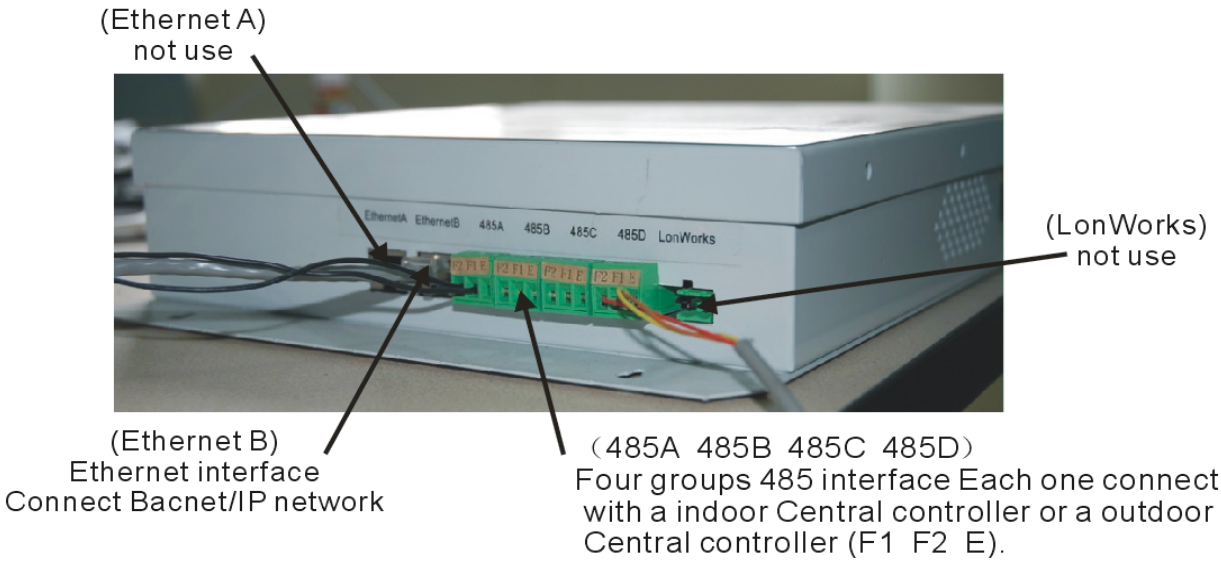
MD-CCM08 is able to connect up to 4 groups of RS-485 communicative network. Each of the RS-485 networks contains up to 64 indoor units or up to 32 outdoor units. The input of MD-CCM08/E should be directly connected to the CCM02 or CCM03.

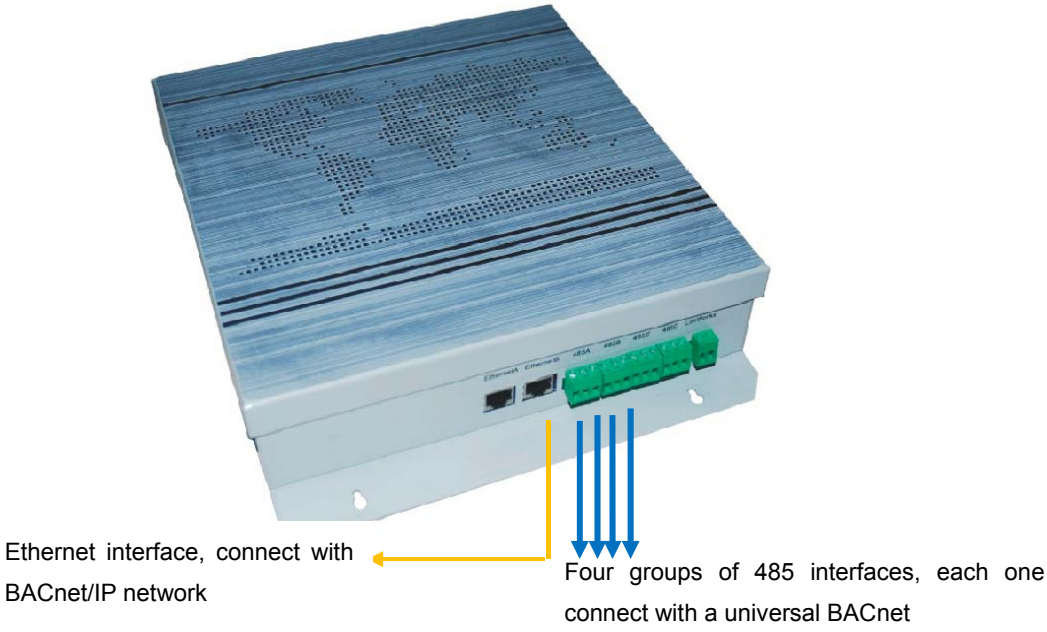
If there are a few MD-CCM08 applied in the system, the MD-CCM08 can be connected to the HUB and then connected to the monitoring system and BMS.



Notes: MD-CCM08 and the BMS computer must be at the same subnet address field. Or else, the device cannot work normally. The default address of CCM08 is set to be under the segment "192.168.*.*".

4.2.2 Connecting ports and functions



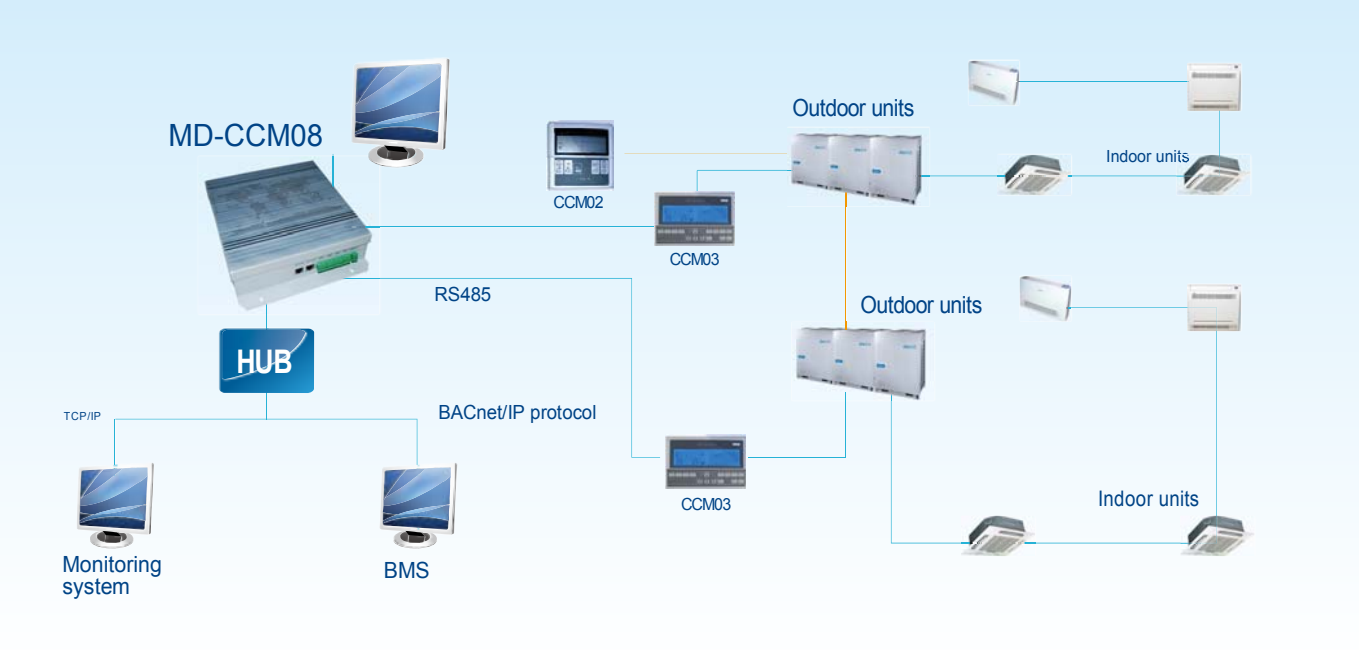


MD-CCM08 has some kinds of connecting ports. Ethernet and LonWorks ports are used for further function designed and do not function by now.

Ethernet B port is an Ethernet interface base on the BACnet network protocol. Connect this port with the BACnet HUB, then the device connect to the HUB can communicate with the MD-CCM08.

4 groups of RS-485 communicative port: Each port can be connected to a MD-CCM02 or MD-CCM03 via the “F1, F2, E” terminals.

4.2.3 Network example



4.2.4 Available BMS

	Company	BMS software	Brand
1	SIMENS	APOGEE	
2	TRANE	Tracer Summit	
3	Honeywell	Alerton	
4	Schneider	Andover	
5	Johnson	METASYS	

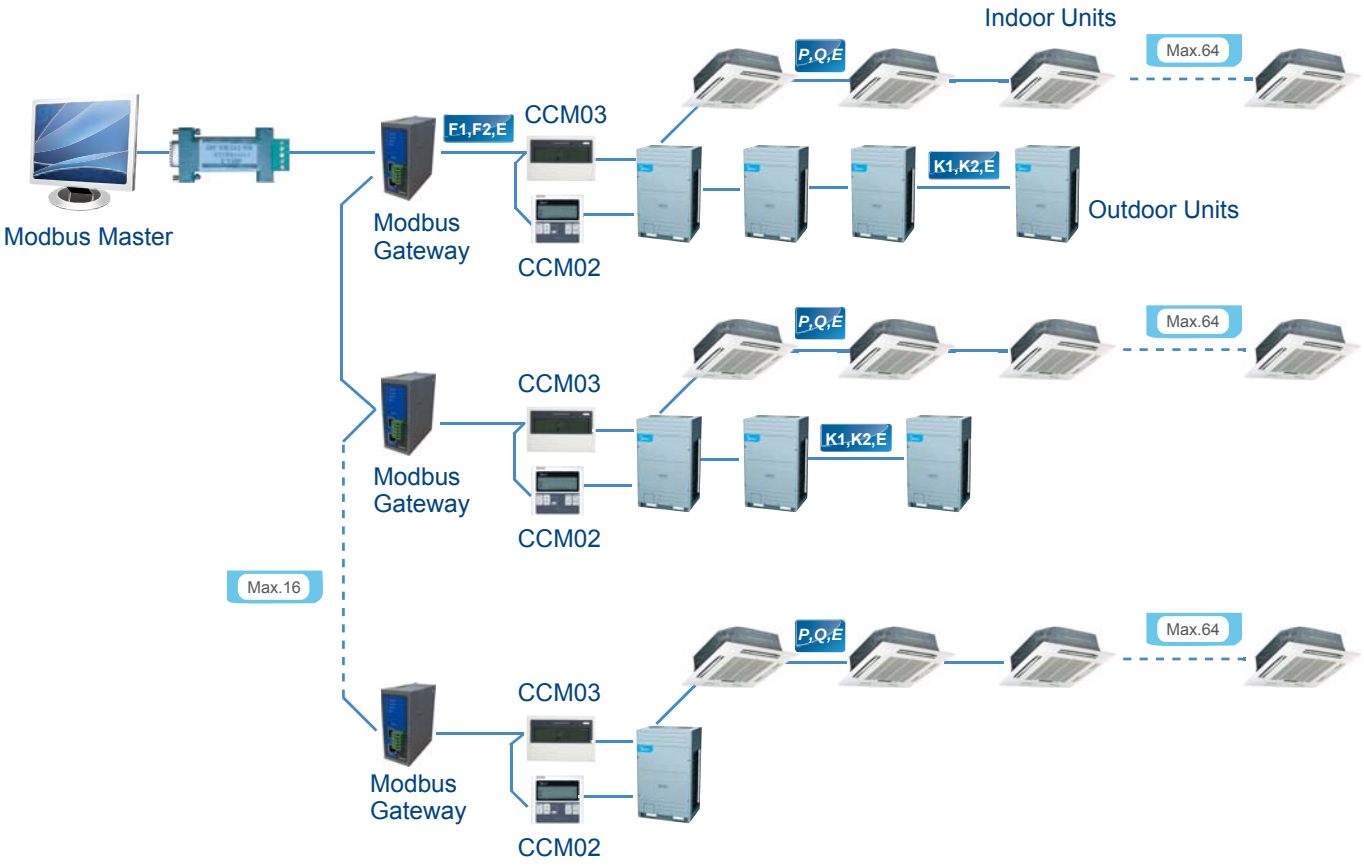
4.3 Modbus BMS gateway: GateWay01/E

GateWay01/E support the Modbus protocol network, bridge the Midea central AC system to the BMS, compose a Modbus network of up to 1024 indoor units and 64 outdoor units.

- ✧ support the Modbus protocol network
- ✧ Each GateWay01/E can connect 1 CCM02 and 1 CCM03, 64 indoor units and 4 outdoor units
- ✧ Maximum 16 GateWay01/E can be connected to one Modbus network
- ✧ One Modbus network can connect up to 1024 indoor units and 64 outdoor units.
- ✧ Transfer the information via the RTU mode
- ✧ Wide voltage 12-48V DC adaptable

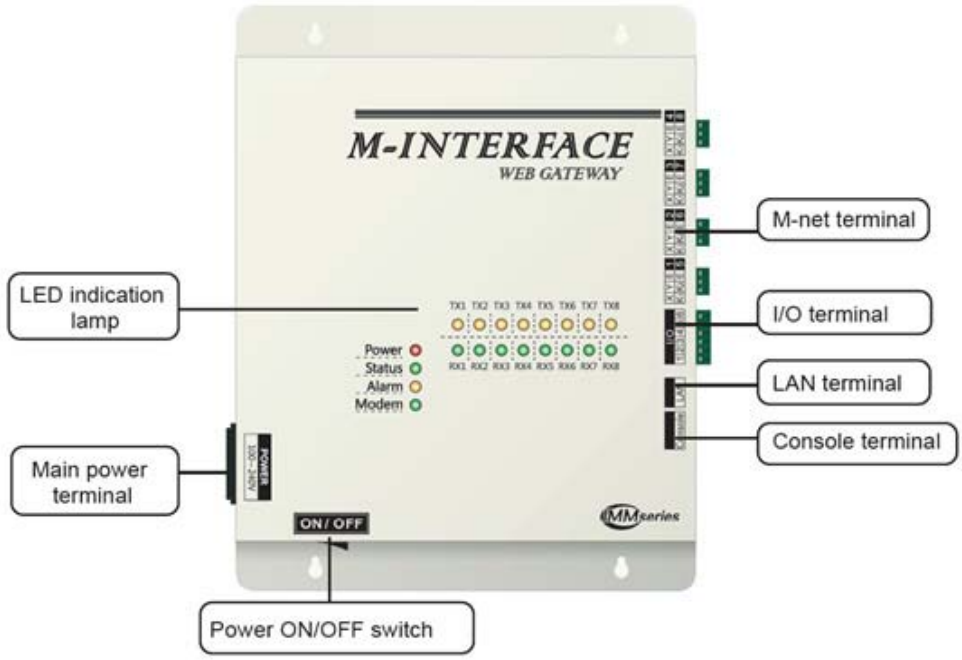
4.3.1 Network example

One Modbus gateway can bridge one refrigerant system with a PC or the Modbus master



4.4 M-interface gateway: IMM441V4PA512

M-INTERFACE gateway is used for querying and controls the air conditioning indoor unit, and transmits the status information of the indoor unit to the computer and transmits the controlling and querying orders sent by the computer to the indoor unit.

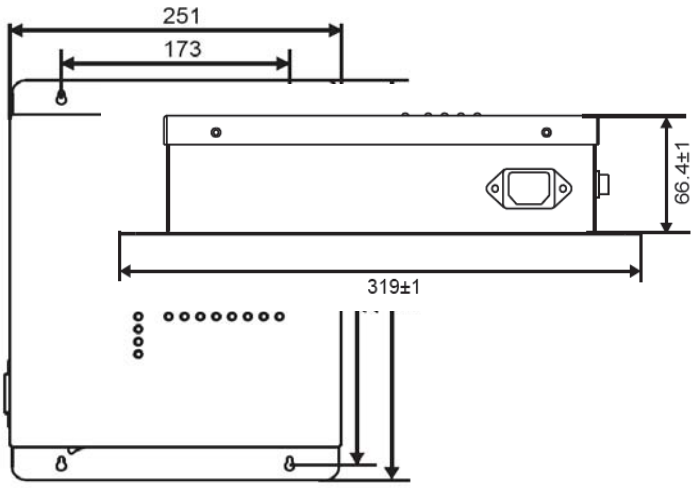


M-INTERFACE Gateway has 8 M-net terminals, 1 LAN terminal, 8 M-net terminal indication lamps, 4 status display lamps (Power, Status, Alarm, and Modem) and a power switch. Connection to the central air-conditioning system through the M-net terminal, and connects the local area network or Internet network through a LAN terminal. Computer or other similar devices can visit M-INTERFACE WEB through Brower, and then local or remote control devices.

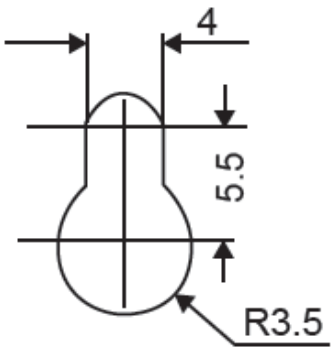
Notes: M-Interface gateway needs to be installed at the end of the XYE or K1K2E communication wire, cannot be installed in the middle of the XYE or K1K2E communication wire. Connection needs to use 0.7mm2 ~ 1.0mm2 three cores shielded wire.

4.4.1 Gateway structure

※ Dimensions: 319*251*66.4mm



※ Detailed drawing of installation holes (Unit: mm)

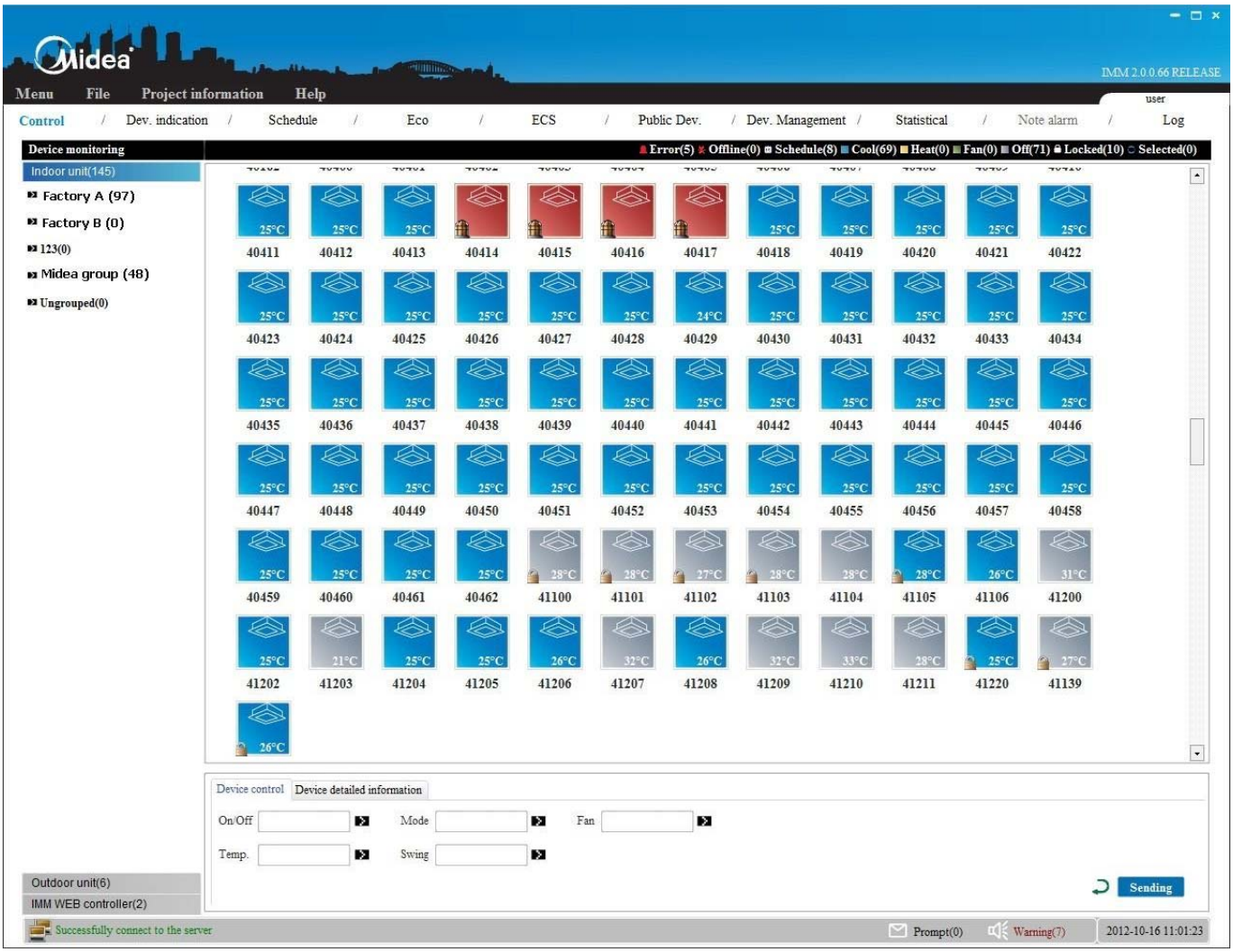


Installation precautions:

- Install at a place where should not affect by electromagnetic wave or dust;
- Avoid to install at a place where affect by sunshine or heat source device etc;
- Avoid to install at a place where has high humidity or can contact the water;
- Avoid to install at a place where will produce corrosive or flammable gas.

4.4.2 WEB home page of M-interface gateway

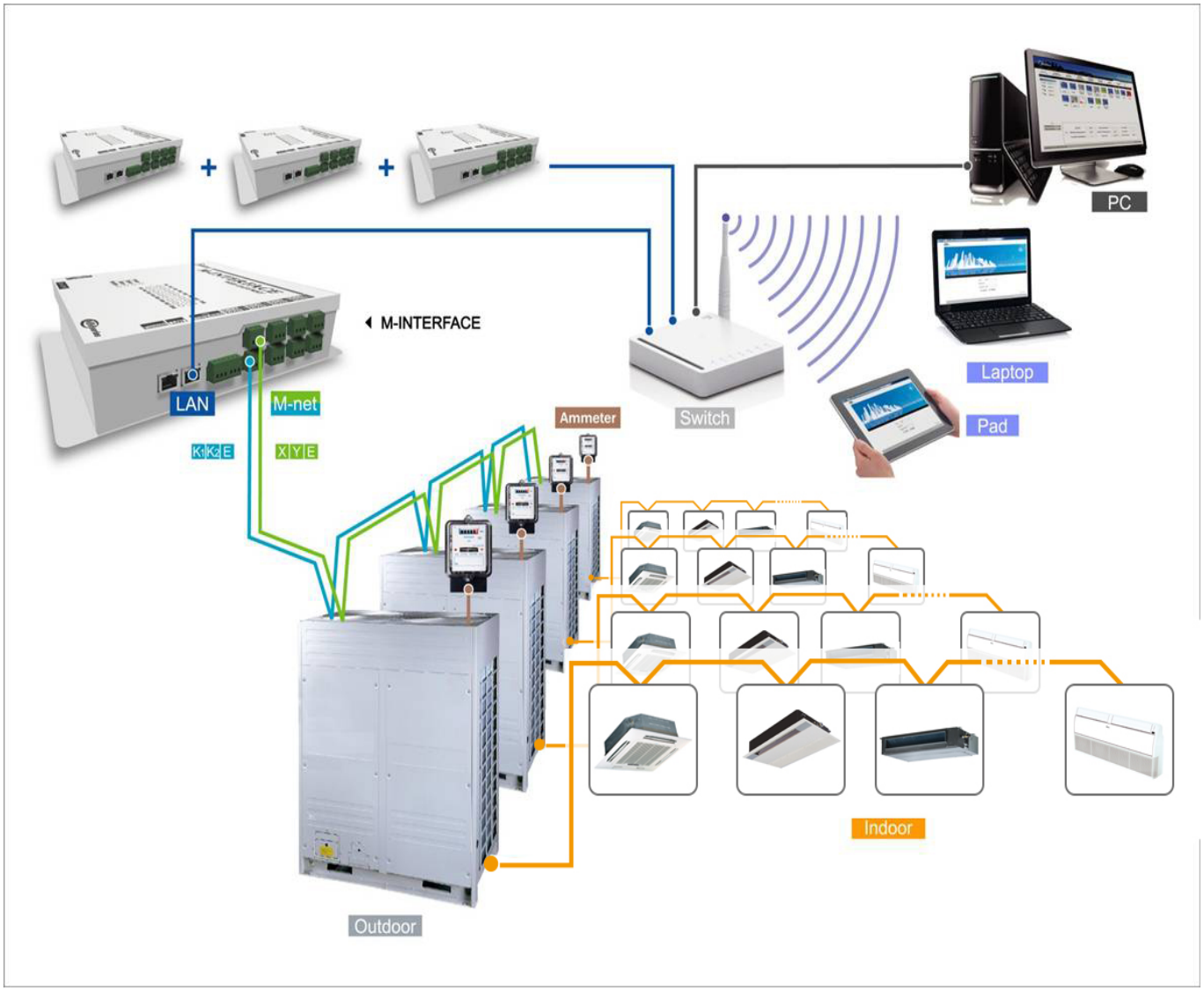
M-INTERFACE is based on WEB technology, unrelated to computer or similar devices operational systems. M-INTERFACE insert into the network then can browse the WEB page through the browser of the system platform, we suggest using IE (9.0 or above), Firefox (11.0 or above), Chrome (18.0 or above) or Safari ((5.1 or above).



4.4.3 M-INTERFACE Network

1) M-INTERFACE gateway can connect to the local area network or Internet network through a LAN terminal.

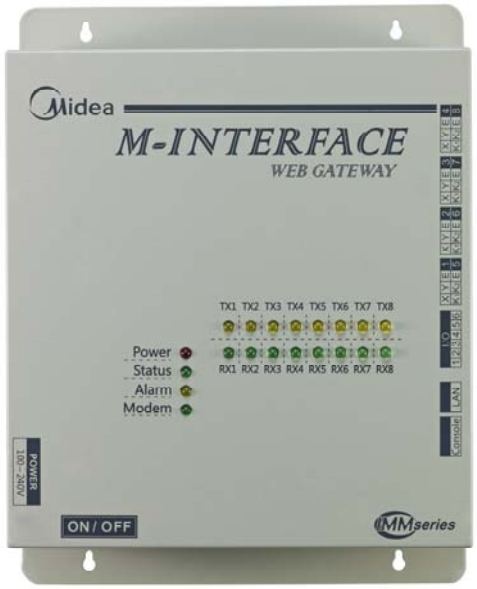
2) M-net terminals are listed to be two rows, 1 to 4 is XYE terminals, and 5 to 8 is K1, K2 and E terminals. Computer or other similar devices can visit M-INTERFACE WEB through browser, and then local or remote control devices.



5. Network monitoring system

5.1 The 4thgeneration network monitoring system IMM – Intelligent Manager of Midea

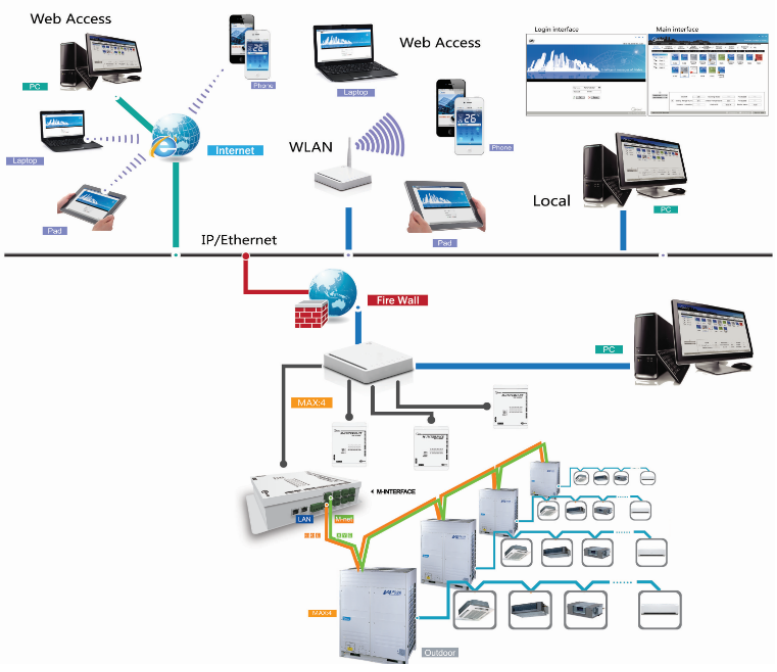
Intelligent Manager of Midea, designed specifically to control VRF systems, is based on a centralized format and dedicated to the complete control and monitoring of all the system's functions. It can be used as a flexible multi-purpose system and applied to a variety of needs, according to the scale, purpose and control method of each building.



- ✧ Connect computer and Ethernet by cables
- ✧ 16 Ethernet central controllers can be connected at most for one computer
- ✧ One Ethernet central controller can connect 4 refrigerating system
- ✧ Long-distance monitoring
- ✧ Plurilingual, multi-operating system
- ✧ User friendly Operation interfaces
- ✧ Simple electric charge output report, personalization selection mode of electrical quantity (Force apportion or on apportion)
- ✧ Find the indoor unit quickly refer to building layout
- ✧ Optional long-distance control mode
- ✧ Breakdown message service

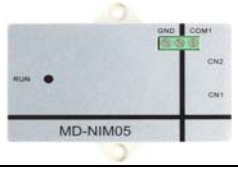
System Configuration

- AT compatible machine that runs Microsoft® windows®
- OS: XP Professional (English version)
- Windows 7 Home /Premium/Professional (Corresponds to 8 different languages.*)
- 32-bit version is supported.
- CPU: Inter® Pentium® 2.5GHz or above
- HDD:80 GB or more of free space
- Memory: 2 GB or more
- Display: 1024 x 768 dots or more
- Max.4 refrigerant systems for 1 interface. And maximum of 4 M-interfaces, 64 refrigerant systems, 1,024 indoor units, and 256 outdoor units can be controlled by one PC.



The details please refer to “M-INTERFACEUSER’S MANUAL” and “IMM OWNER’S MANUAL”

6. Accessories

Appearance	Model	Description
	DTS634	Send the electric energy data to outdoor unit for realizing network fee charge function.
	MD-NIM05/E-1	Match hotel card system to control the air conditioner.
	MD-NIM09/E	Automatically turn off and turn on the indoor unit, saving energy.
	MD-CCM02	The outdoor unit controller can monitor maximum 8 refrigerant systems and up to 32 outdoor units.
	KJR-31B/E	Be able to lock up to 64 indoor units' running mode to avoid modes conflict.
	KJR-32B/E	When outdoor unit is working abnormally, it can output the outdoor unit's fault and protection status.
	AHUKZ-01	Can be used to connect VRF outdoor units with DX AHU or other brand indoor units, but cannot connect to the heat recovery system.
	AHUKZ-02	
	AHUKZ-03	
	KJR-27B/BGE	Individually designed for the HRV-Heat Recovery Ventilator.

6.1 Digital ammeter DTS634

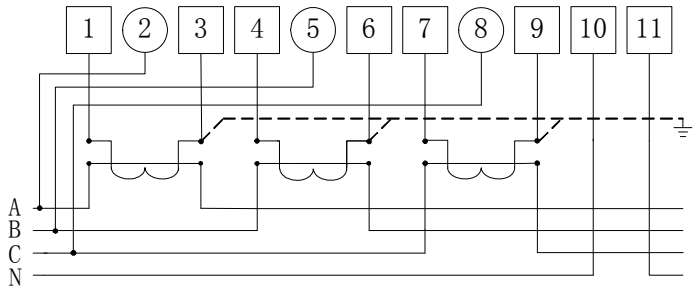
The digital ammeter DTS634 is a device to calculate the power consumption of the outdoor unit and transmit the information when it is required.

- ✧ Steadily functioning and needs no adjusting.
- ✧ Be with great precision.
- ✧ Works in wide working temperature, from -35 °C to +55°C.
- ✧ Be able to be built inside the outdoor units in our factory.

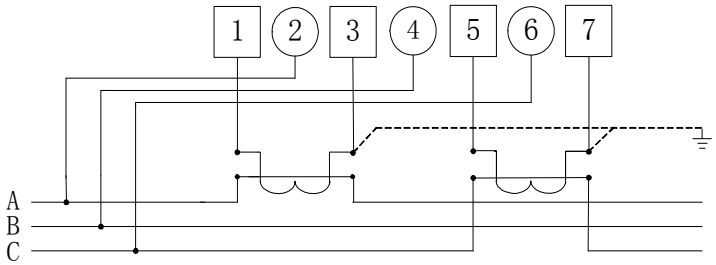
6.1.1 Digital ammeter wiring

The ammeter has two kinds of ports. One is the power port used to calculate the current flow through it. The other is the signal port O, A, E used to send the signals to the other device. Both of these two kinds of port should be connected and fastened before use.

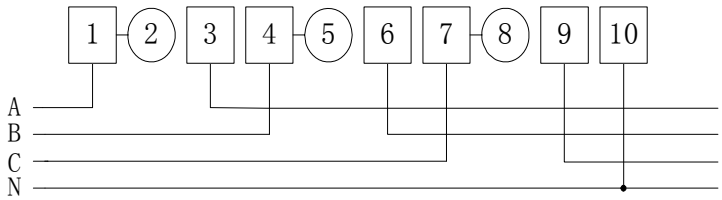
1) Three-phase four-wire system with current transformer



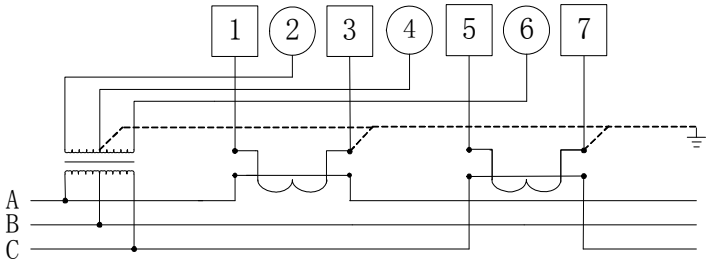
2) Three-phase three-wire system with current transformer



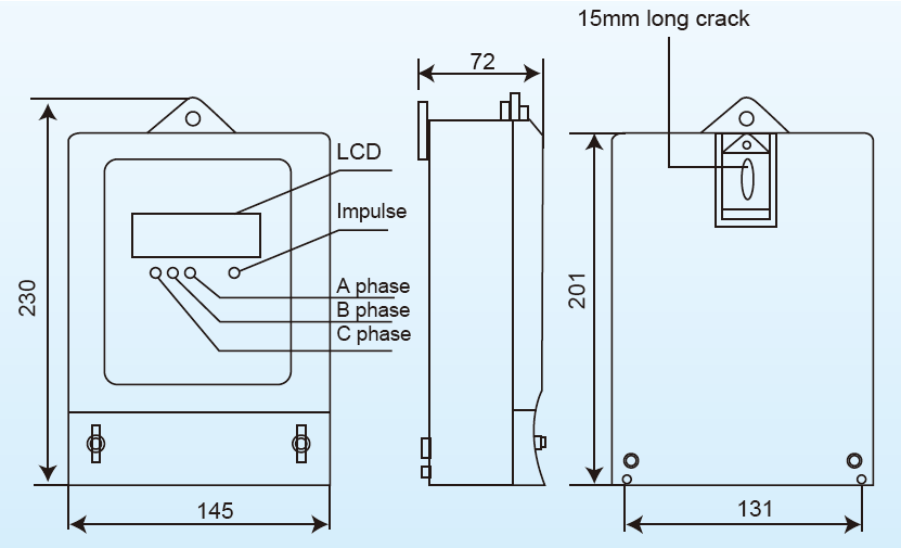
3) Three-phase four-wire system



4) Three-phase three-wire system with current transformer and voltage transformer



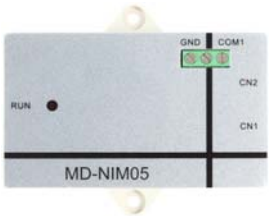
6.1.2 Installation



Notes: The ammeter device is an optional device. Without this device, the central AC system is also able to work normally. If users want to realize the network fee calculating function, this device is necessary. And each outdoor unit should equip one ammeter. Do remember to fix the power line terminals and the signal line terminals before use.

6.2 Hotel card key interface module: MD-NIM05/E-1

MD-NIM05/E-1 is mainly designed for the hotel card-insert system. It offers a smart way to save energy and manage the air conditioners.



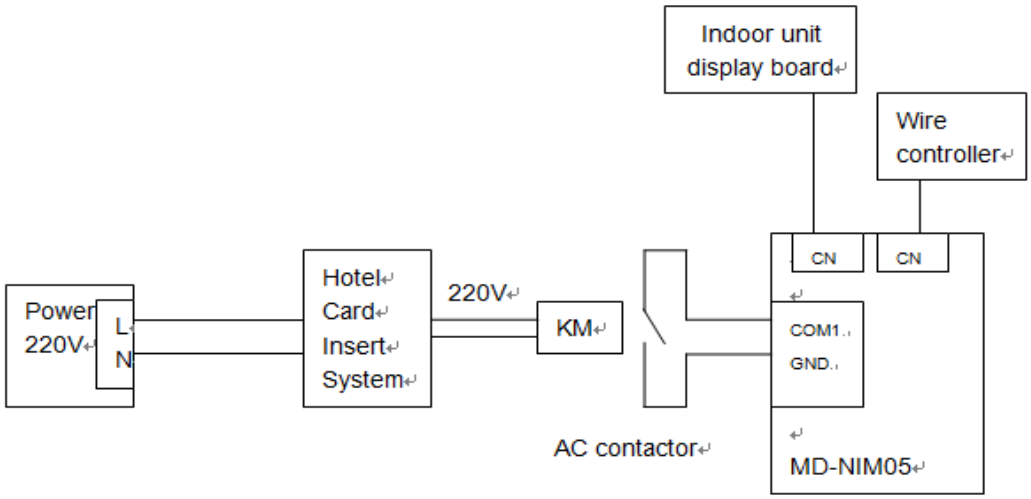
- ✧ A smart way to save energy and money.
- ✧ Cooperates with the hotel card-insert system.
- ✧ Extra power supply is unnecessary.
- ✧ Connected but insulate to the card-insert system
- ✧ Cooperate with the wired controller to automate control.
- ✧ Easy to install.

MD-NIM05/E-1 is able to record the running status after power off and recover the unit to the previous running status.

6.2.1 Wiring

When the card is inserted, to turn on the air conditioner, the terminal COM1 and GND should be connected or short. So the card-insert system should send the signal to the terminal COM1 and GND. The wiring diagram should be as follows.

Wiring diagram:



Installation example

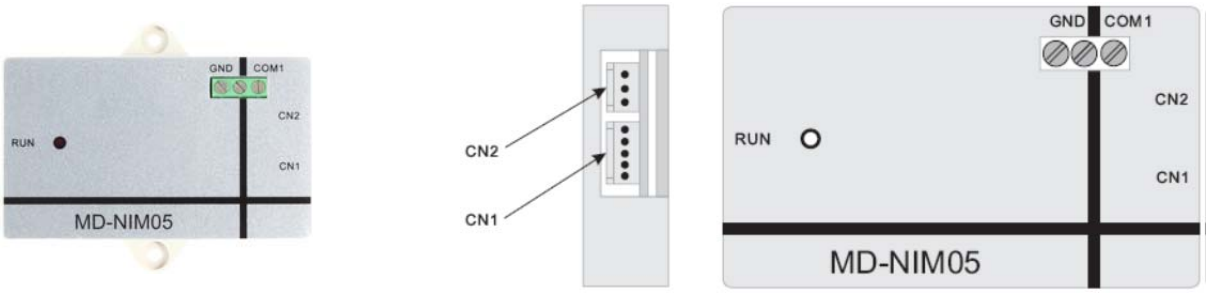
Wired controller is necessary in this card-key system.

Notes:

1) An AC contactor or a delay is necessary to transform the signal.

2) Wiring assy. 1 connects the CN1 of hotel card-insert assy. to wired controller of air conditioner.

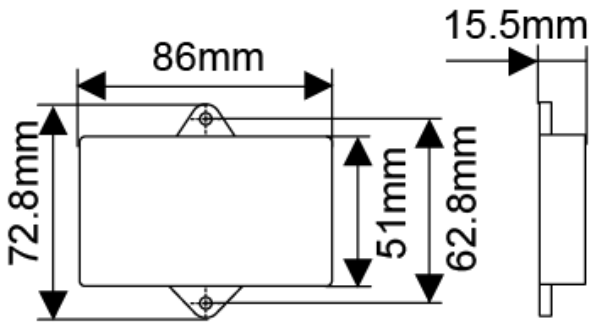
3) Wiring assy. 2 connects the CN2 of hotel card-insert assy. to display board and main control board of air conditioner indoor unit.



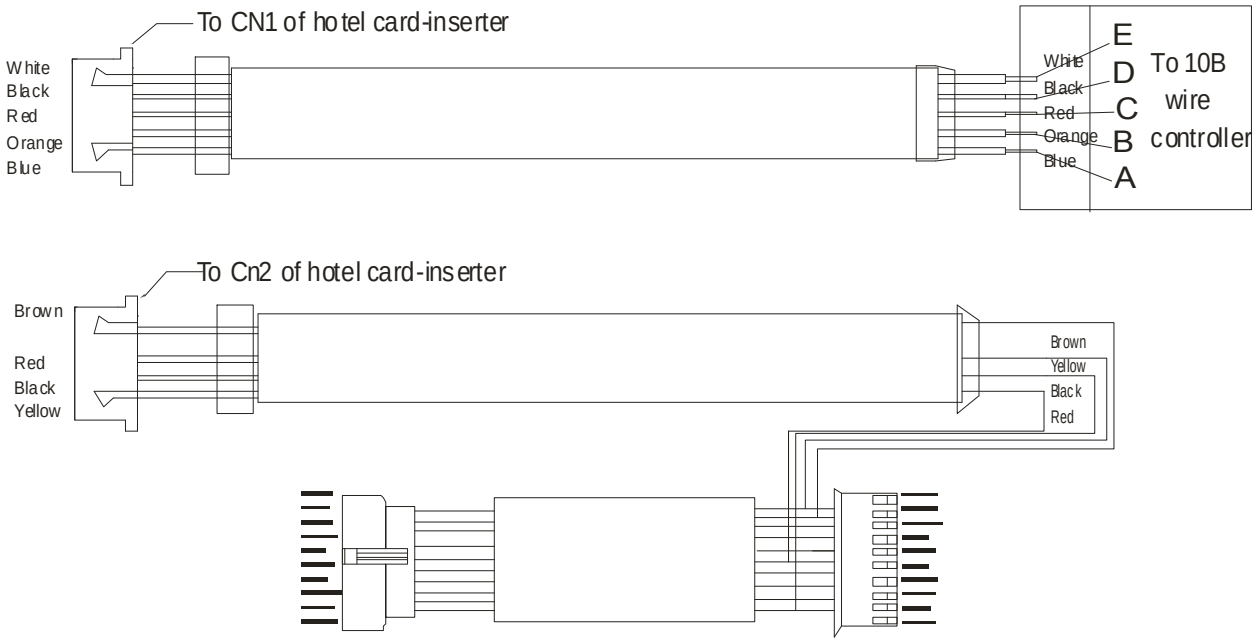
Notes: COM1 and GND terminals should be short to work and not be connected to the power. The electricity voltage over 5V will probably damage the device or get the device burnt and cause fire.

6.2.2 Installation

※ **Dimensions**



※ **Wires methods**



Selecte the corresponding wire group refer to the wire selecting instruction

6.2.3 Operation description

1) Connect 5-place terminal at fixed rated wired controller via 5 terminals: A, B, C, D, and E.

2) Connect LCD at main control panel of indoor unit via terminals REV, C, D, and E.

3) Upon wiring according to the wiring diagram in, Please power to the wired controller and switch on it. When card has been inserted between in COM1 and GND, air conditioner is turn on and its operation mode could be set, the director lamp at wired controller is light-up.

4) When no card has been inserted between in COM1 and GND (i.e. It not be short connected), the ON/OFF button of wired controller cannot start air conditioner, but two beeps of air conditioner closed down signals be giving out and no lamp is light-up at wired controller.

5) User must apply wired controller to turn on air conditioner and set operation modes every time power is input. After then, operation modes of this performance would be memorized, although took off card and then insert it on again, as long as power does not be cut off from main unit. i.e. air conditioner will turn off when card is took off, while insert it on again unit will perform as per the last setting.

Notice: the first start-up of main unit and mode setting must apply wired controller.

6) System can receives signal delivering from fixed rated wired controller (KJR-10B), and transits the signal to indoor unit; it can also memorizes the latest ON/OFF information sending by wired controller (Timing information be transited but memorized.)

7) Upon powered to card-inserter, transited signal defaults as unit shutdown. Once take off the card, system will send signal of unit shut down twice; till to the next time card is inserted, system will not start unit until 3 seconds later, because of memory information delivery.

6.3 Infrared sensor controller: MD-NIM09/E

Infrared control box

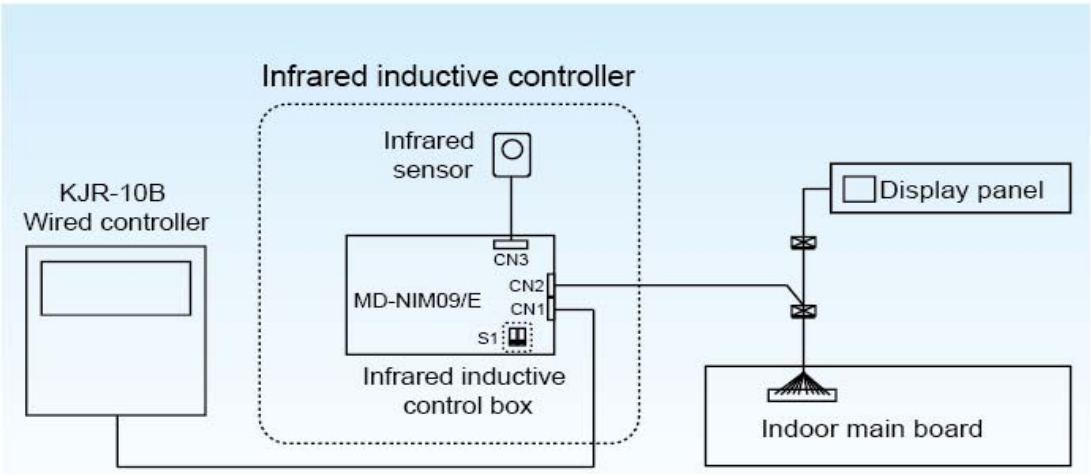
Infrared sensor module

MD-NIM09/E is an infrared sensor, which is able to detect whether there is people nearby and auto change the air conditioner back to running mode. This humanistic device helps making a comfortable environment for the users and the turning down the conditioner automatically.

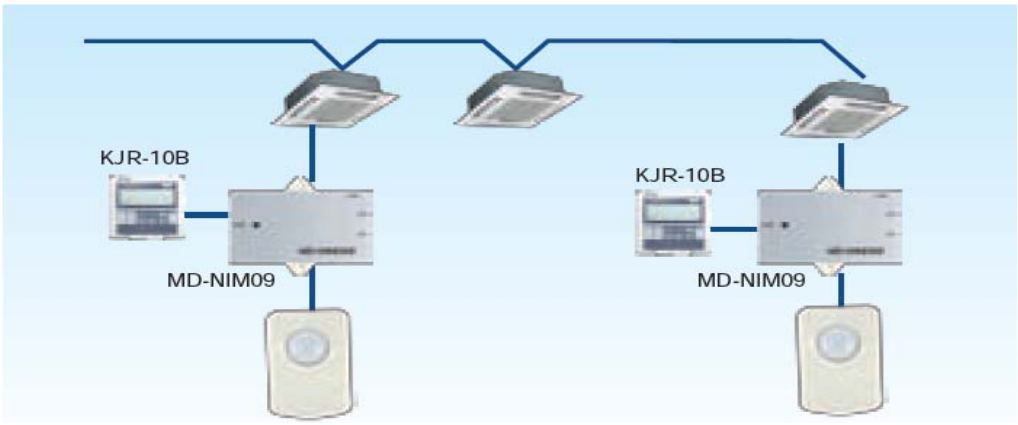
- ✧ Easy to install on the wall or ceiling.
- ✧ With a wide detective range up to 100℃.
- ✧ Detective distance is at least 4M, great sensibility.
- ✧ Optional auto-restart function.
- ✧ Automatically adjust the room environment.
- ✧ Automatically extend the shutting down time, avoiding frequent ON/OFF.
- ✧ Graceful appearance accommodates itself to different buildings.
- ✧ Be powered from the indoor unit display panel. Extra power supply is unnecessary.

6.3.1 Wiring

The infrared sensor controller MD-NIM09/E contains a sensor and a control box. The control box helps connecting the device to the wired controller and the indoor unit.



Installation example



- ✧ MD-NIM09 must be work together with the wired controller.
- ✧ As show above, the MD-NIM09/E has 3 connecting port.
- ✧ CN1 is used for connecting the wired controller.
- ✧ CN2 is used for connecting the indoor unit's display panel.
- ✧ CN3 is used for connecting the infrared sensor.

✧ The switch S1 stands for:

	Turn off the indoor units in 0.5 hour after users leave (default).
	Turn off the indoor units in 1 hour after users leave.
	With optional auto-restart function.
	Without optional auto-restart function.

6.3.2 How to use

The general function of MD-NIM09/E is turning down the indoor unit automatically. So users should run the indoor unit firstly and adjust the temperature, fan speed, etc, via the wired controller. Once set, users do not need to turn down the indoor unit. The MD-NIM09 will turn it down automatically after the users leave. Once the users come to the infrared sensor's detective area, the MD-NIM09 turns the indoor unit on and runs it at the status which is set previously.

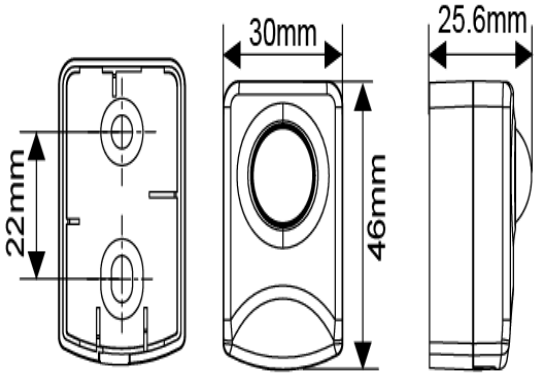
Main parameters：

Input voltage	DC +5V
Ambient temperature	-5℃~43℃
Ambient humidity	RH40%~RH90%

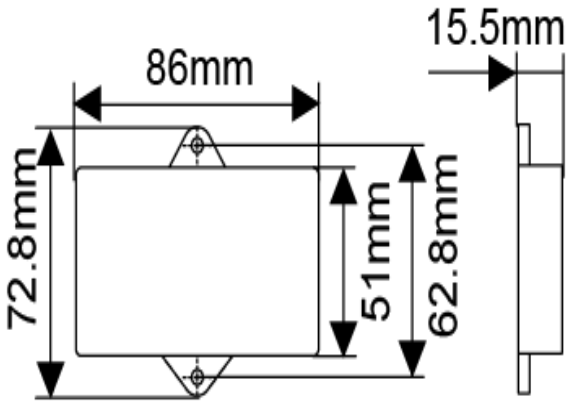
6.3.3 Installation

※ **Dimensions**

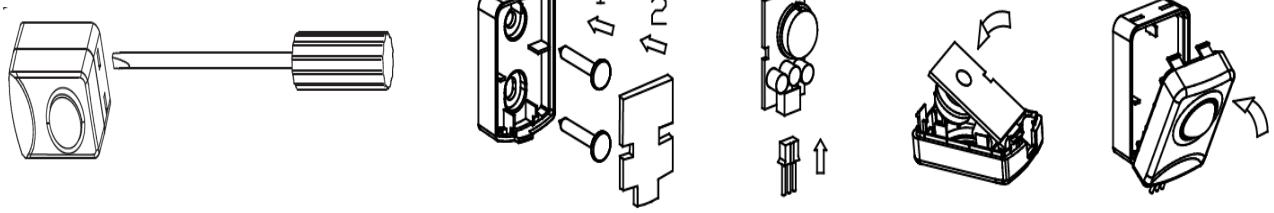
Infrared sensor



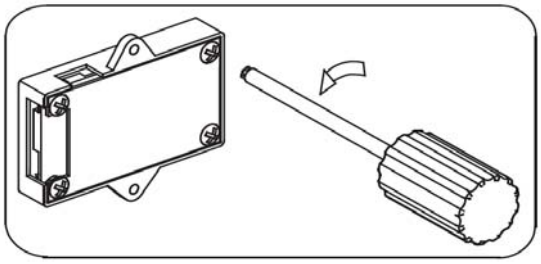
Control box

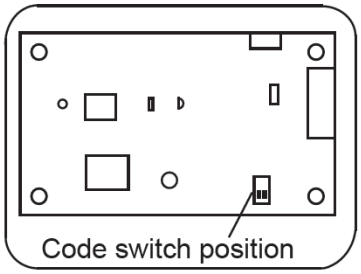


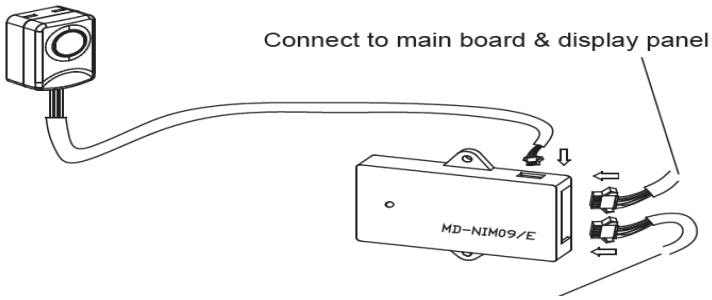
※ **Connecting and Assembly**



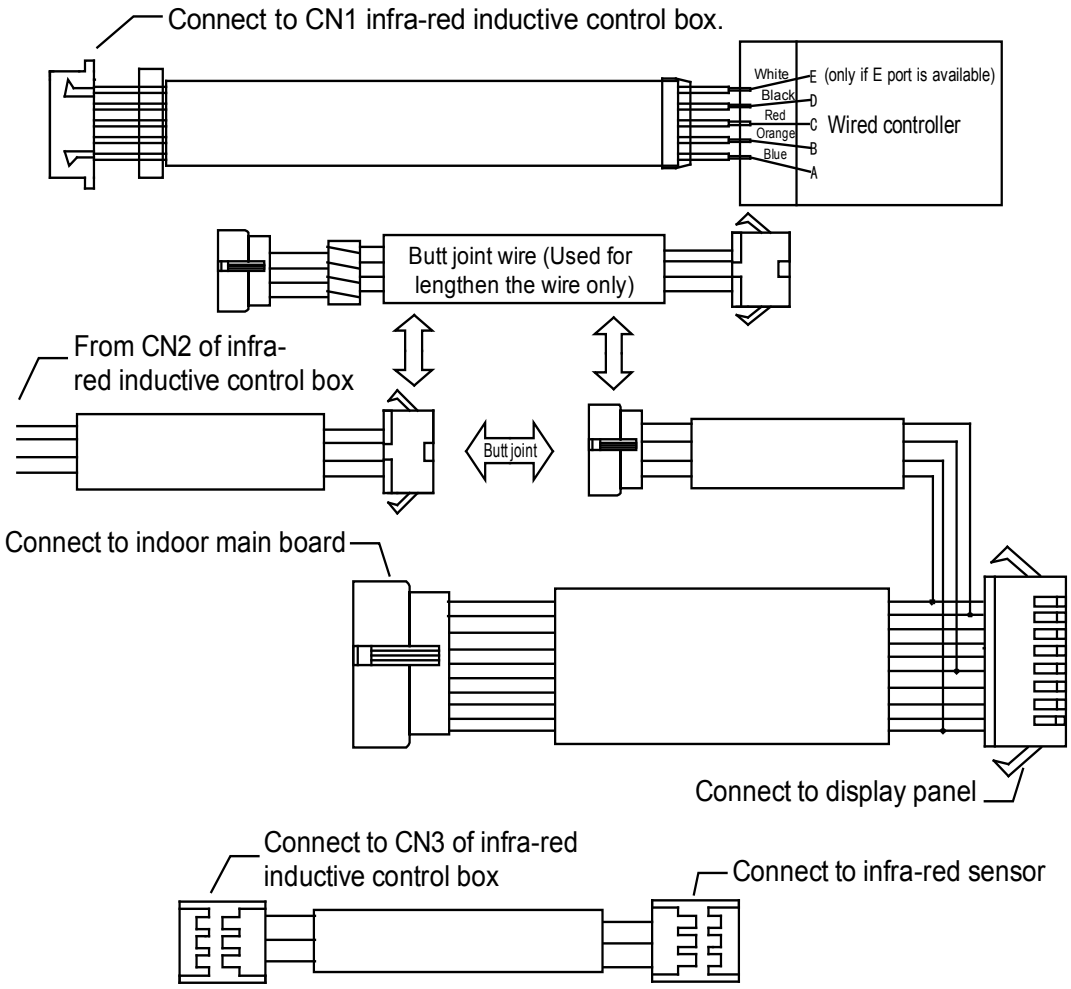
Step 1 Step 2 Step 3 Step 4 Step 5







※ **Wires methods**



Notes:

The infrared inductive controller is a low voltage device, so it's forbidden to contact with above 220V or 380V high-voltage cable directly, and it can't be placed at the same wiring pipe with the above described loop and the interval space of the wiring pipes should be at least more than 300~500mm.

6.4 Outdoor unit controller: MD-CCM02/E

- RS485 communication protocol
- Up to 8 systems, max.32 outdoor units can be connected to the Network monitoring and BMS.
- It can display the operating parameter of outdoor units
- Can display the error or protection code of outdoor units.

6.4.1 Summarize of outdoor CCM

The functional only can be realized when the system is in normal operation.

1) CCM02 can realize the central control and data query to outdoor units. One outdoor CCM can connect up to 8 systems and up to 32 outdoor units by communication ports in outdoor PCB. And it adopts wire-connecting method communication to realize central control to the outdoor units in the same network.
2) CCM can communicate with PC through RS485/RS232 converter. One PC can connect up to 16 outdoor CCM and 16 indoor CCM. And one PC can be centralized control, management and status query in the same monitoring network of all outdoor CCM, indoor CCM and indoor /outdoor units.
3) The CCM and outdoor units, PC and CCM adopt main-auxiliary communication. In the network of CCM and outdoor units, CCM is the main unit and outdoor units are the auxiliary units.

6.4.2 Operation

1) Description of Names and Functions

◆ Power on or reset

After the CCM is powered on or reset, all the segments of the LCD will be displayed and last for 3 seconds. And then disappear for 2 seconds. After this, the controller's system runs the normal display mode, in which CCM would display the main page.

◆ Network Area Address Setting

Up to 16 CCM02 can be connected to the gateway or the PC. Each CCM02 can be viewed as a secondary or sub-net of the network and distinguish themselves by their unique address. The address can be set in the key panel and it ranges from 16-31.

Address setting method:

To differentiate the CCM02 and CCM03, the addresses of CCM02 range from 16-31. Every time we press the address button of a CCM02, the corresponding CCM02's address increase by 1. When the address come to the end 31, press the key again could make the address back to the starting address 16.

◆ Indicator Display

Indicator lamp will be on when the CCM is power on.

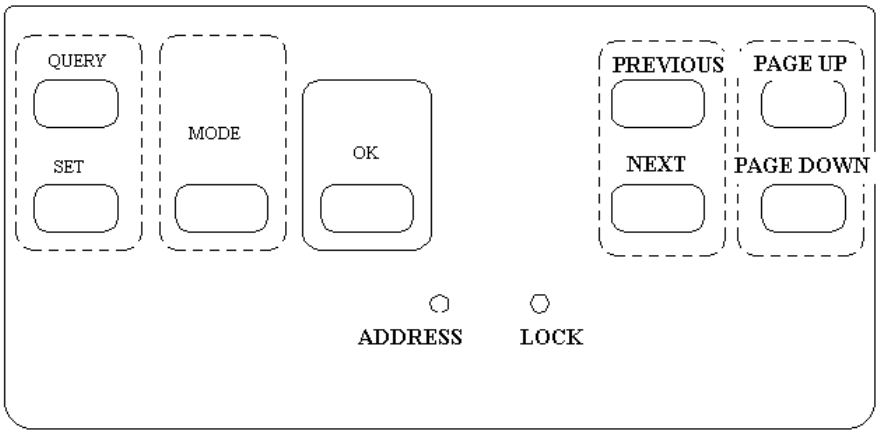
◆ CCM02 Locked

All the other buttons will not be on controlled anytime when pressing the CCM is locked. And unlock happens when receiving the lock.

◆ Electric energy consumption query

CCM02 allows user check each outdoor units' electricity consumption. To realize this function, each outdoor unit should be installed with an ammeter. The ammeter DTS634 can be purchased from Midea Company.

2) Buttons and Functions



(1) Query Button

Press it to enter into the query state.

(2) Previous Button

On the query state, Press it to query in default the running states of other online air-conditioners.

(3) Next Button

On the query state, Press it to query in default the running states of other online air-conditioners.

(4) Page up Button

Pressing the Page Up button when choosing an online air-conditioner on the query state can display the parameters in the previous page and this can be cycled.

(5) Page down Button

Pressing the Page Down button when choosing an online air-conditioner on the query state can display the parameters in the next page and this can be cycled.

(6) Set Button

Press Set button enters into Set Page.

(7) Mode Button

Pressing the OK button to enter into the Mode Set, and select circularly between Forced Cooling and OFF state.

(8) OK Button

Pressing the OK button to confirm all setting and send the corresponding air-conditioners.

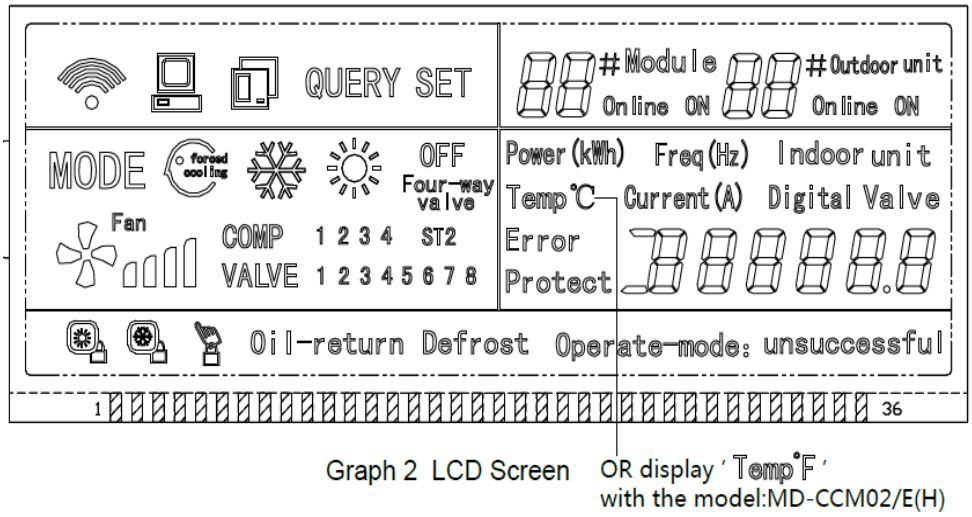
(9) Lock Button

All the other button will not be controlled anytime when Pressing the button, and unlock happens when Press it again.

(10) Address Set Button

In Set page, pressing the Set button repeatedly, the address will be increased one by one. When the address is equal 31 and you press once more, the address will restart from 16.

6.4.3 Description of LCD Screen



Graph 2 LCD Screen OR display 'Temp℉' with the model:MD-CCM02/E(H)

➢ **Common Display Data:**

- Display  means CCM is sending query order.
- Display  means CCM is in communication with a PC, and it will be off in 20 seconds with no communication.
- Display  means CCM is in communication connection with the outdoor unit, and it will be off in 20 seconds with no communication.
- Press the OK button in setting page and waiting for 4 seconds, “success” or “fail” will be shown in the operation state area.

➢ **Stand-by Page Display:**

- Display  means the total number of online modules
- Display  means the total number of online units
- Stand-by Page can display the address of CCM with the address format of “Addr XX”, here ”XX” equals the real address of CCM plus 16,and the range of “XX” is 16-31.

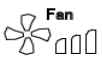
➢ **Query Page Display:**

1) Query Page Display the query icon.

2) Displaying the address of selected outdoor unit with  and 

3) Mode display:  means cooling mode,  means heating mode,  means shut off, means  locking cool mode,  means locking heat mode.

Notes: Locking cool mode and locking heating mode are reserved.

4) Fan Speed Display:  means low speed,  means middle speed,  and means high speed.

5) Compressor State Display: “COMP. 1 2 3 4 5 6”

6) Electromagnetism Valve Display: “EMV. 1 2 3 4 5 6”

7) Four-Way Valve Display

8) Defrost Display: "Defrost"

9) When Oil Return will display: "OIL RETURN"

10) Page 0 will display the consumption of electric energy icon "ELECTRIC ENERGY Kwh" and the number.

11) Page 1 will display the input power frequency with "Frequency Hz" and the number.

12) Page 2 will display the total number of indoor units.

13) Page 3 will display the icon "TEMP.℃", "T3" and the number.

14) Page 4 will display the icon "TEMP.℃", "T4" and the number.

15) Page 5 will display the icon "TEMP.℃", "T6" and the number.

16) Page 6 will display the discharge temperature of compressor 1 icon "TEMP.℃", "C1" and the number.

17) Page 7 will display the discharge temperature of compressor 2 icon "TEMP.℃", "C2" and the number.

18) Page 8 will display the discharge temperature of compressor symbol C3 with "TEMP.℃", "C3" and the number.

19) Page 9 will display the compressor current value 1 icon "CURRENT A","1" and the number.

20) Page 10 will display the compressor current value 2 icon "CURRENT A", "2" and the number.

21) Page 11 will display the compressor current value 3 icon "CURRENT A", "3" and the number.

22) Page 12 will display the digital capacity icon "DIGITAL CAPACITY" and the number.

23) Page 13 will display the openness of electromagnetism valve 1 icon with "VALVE OPENNESS","1" and the number.

24) Page 14 will display the openness of electromagnetism valve 2 icon “VALVE OPENNESS", "2" and the number.

25) Page 15 displays the most advanced malfunction icon "MALFUNCTION" and the code.

26) Page 16 will display the most advanced protection icon "PROTECTION" and the code.

Notes: The page will increase or decrease by 1 every time you press “PAGE UP” or “PAGE DOWN”.

Select the online outdoor unit by Press the “previous” or “next” freely.

- **SET PAGE DISPLAY:**

1) Set Page Displays” Set”

2) Mode display: Pressing MODE button to enter into MODE set, and select circularly between Forced Cooling  and OFF state.

3) Set page displays the address of selected outdoor units and module.

4) Press the OK button to confirm all setting and send the corresponding air-conditioners.

5) “Successful” or “Unsuccessful” shown in the operation state area indicates whether the transmission is confirmed or not.

- **Malfunction and Protection Code Table**

Error Code	Error Contents	Description	Error Code	Error Contents	Description
H3	Outdoor Adding Malfunction (Valid For Host Unit)		Pd	Oil Return	
H2	Outdoor Decreasing Malfunction (Valid For Host Unit)		PA	Defrost Protection	
H1	Net Communication Malfunction		P8	Compressor Current 3rd Protection	
EF	Other Malfunction		P7	Compressor Current 2rd Protection	
E4	T4 Temp Sensor Malfunction		P5	Condenser High Temp Protection	
E3	T3 Temp Sensor Malfunction		P4	Discharge Pipe Temp Protection	
E2	Communication Malfunction between indoor and outdoor unit		P3	Compressor Current 1st Protection	
E1	Phase Sequence Malfunction		P2	Discharge Low-Pressure	

				Protection	
E0	Outdoor unit communication Malfunction		P1	Discharge High-Pressure Protection	
PF	Other Protection		P0	Compressor High Temp Protection	
PE	Oil Balance				

6.4.4 Installation

1. Basic Requirements

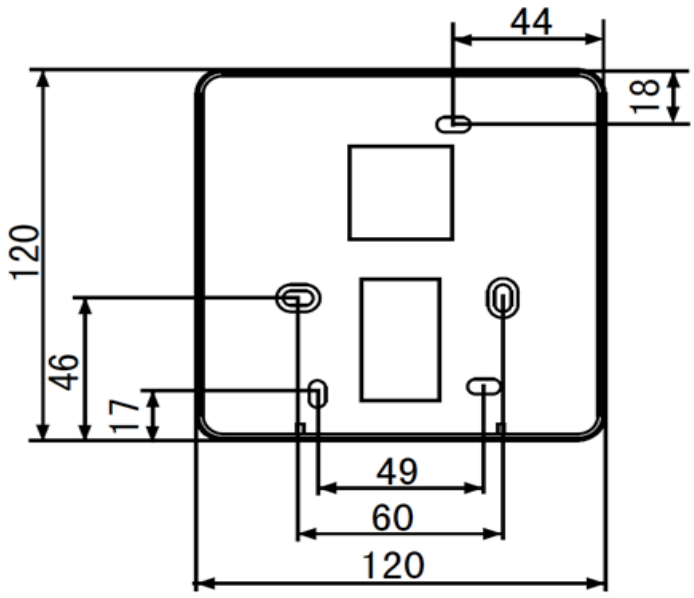
1) Applicable Power Voltage Range: Input Voltage 220~240V/AC.

2) AC Input Power Frequency: 50Hz/60Hz.

3) Working Ambient Temp.:-15°C -+43°C

4) Working Ambient Humidity: RH40%~RH90%.

2. Dimensions: 120*120*15mm

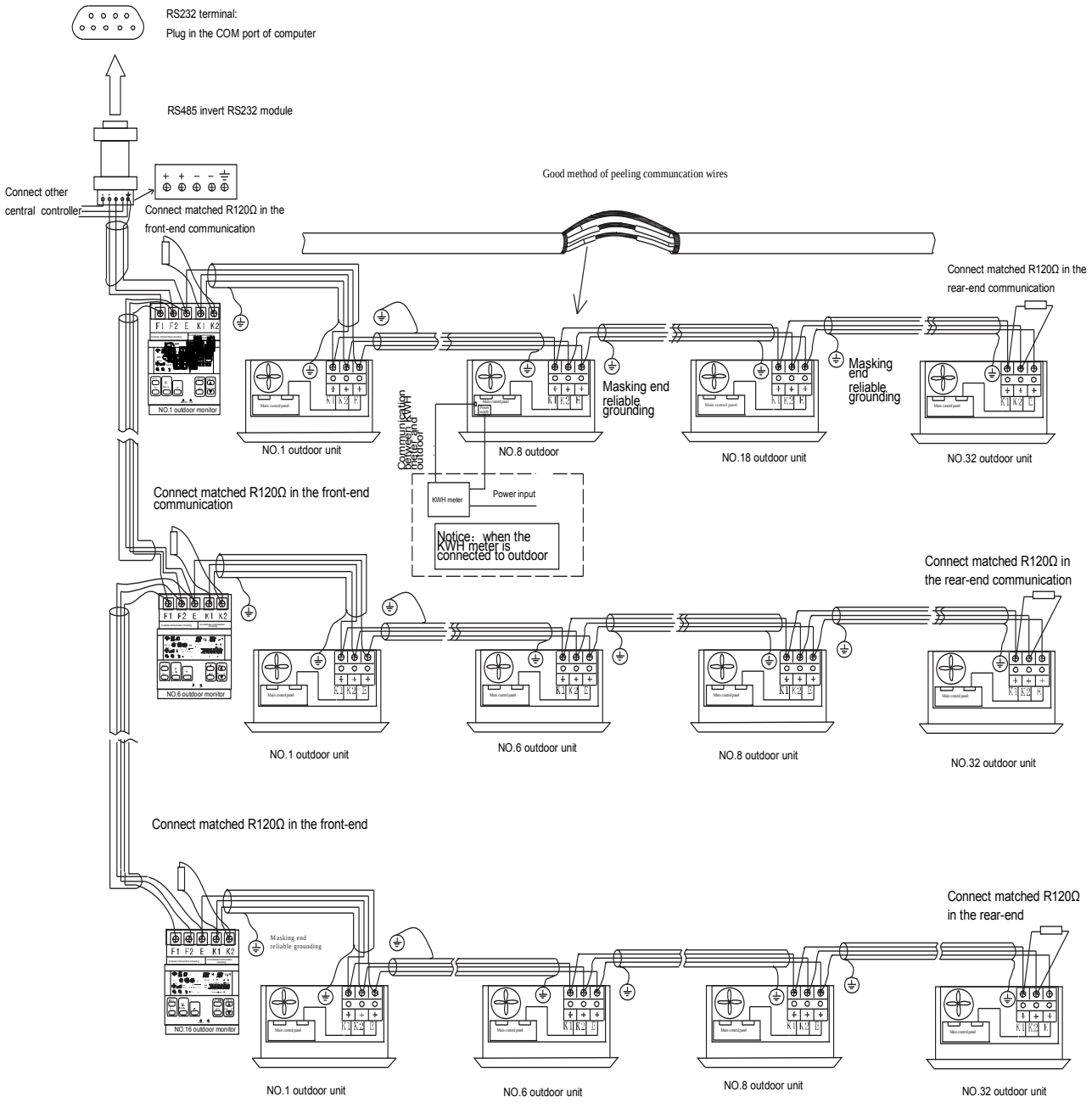


3. System configure

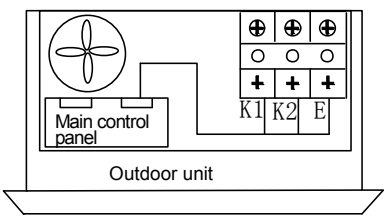
With MD-CCM02/E, we could both centrally display the outdoor units' running status and bridge up to 32 outdoor units to the PC monitoring software or BMS--Building Management System. In fact, for the purpose

of connecting the indoor units to the PC or the gateway, which makes the outdoor units visible on the display panel, MD-CCM02/E is necessary.

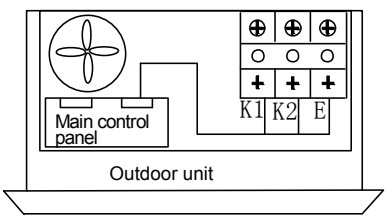
The location of CCM02 in the network is as follows.



Outdoor sample



Outdoor sample



Notes：

1. One computer can connect 16 outdoor central monitors.

2. One outdoor central monitor can connect up to 8 refrigerant systems and 32 outdoor units.

3. You need connect R120 in the front and rear of monitor system.

4. Communication wire masking end assure reliable grounding.

Remarks

(1) In the wiring, the part from Rs485 to Rs232 is only needed when connecting with PC. And one PC can connect maximum 16 outdoor MD-CCM02 and 16 indoor MD-CCM03. The addresses of MD-CCM03 ranges from 0 to 15, while the MD-CCM02 ones from 16 to 31. And the address of any two outdoor CCM can't be the same, or the system can't work normally.

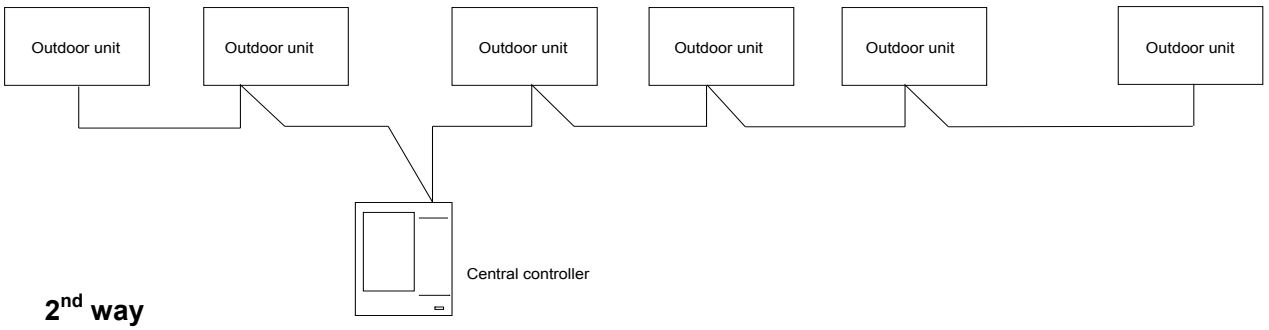
(2) One outdoor centralized monitoring MD-CCM02 can connect maximum 32 outdoor units, while one indoor MD-CCM03/E can connect maximum 64 indoor units.

(3) The address of outdoor CCM and the address of outdoor units are set by manual. Please refer to their owner's manual for setting.

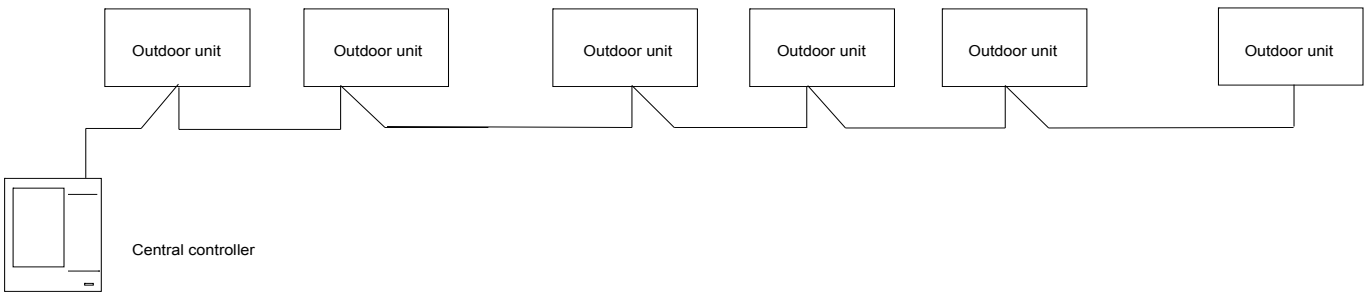
4. Wiring sketch map of MD-CCM02/E and outdoor units

These 2 ways are both available and the total number of outdoor unit must be≤32 in one controller.

1st way:

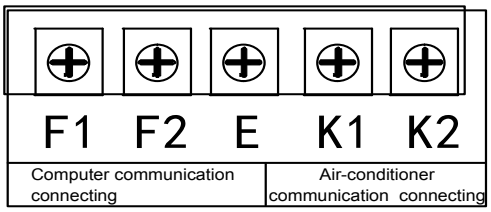


2nd way

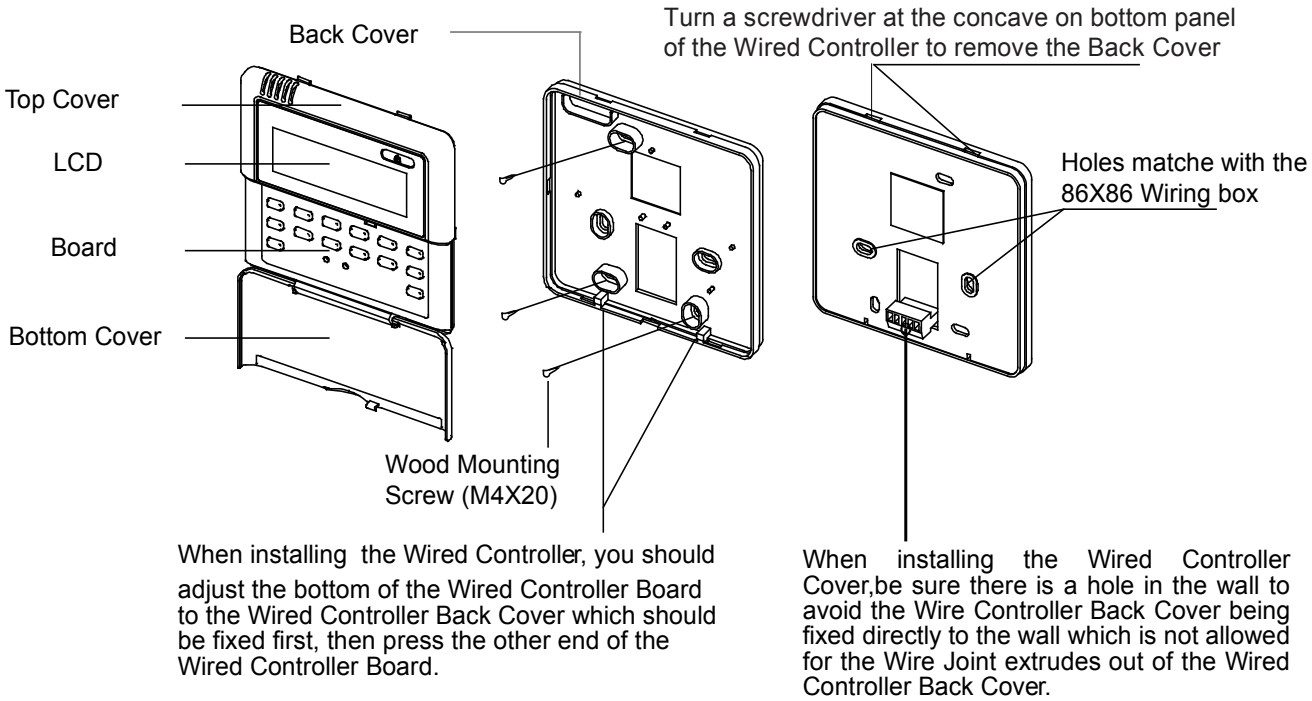


The MD-CCM02 wiring ports are as follows. F1, F2, E joints are used for PC connection. K1, K2, E joints are used for outdoor unit connections. E joint is the common terminal.

Outdoor central controller
joint sample

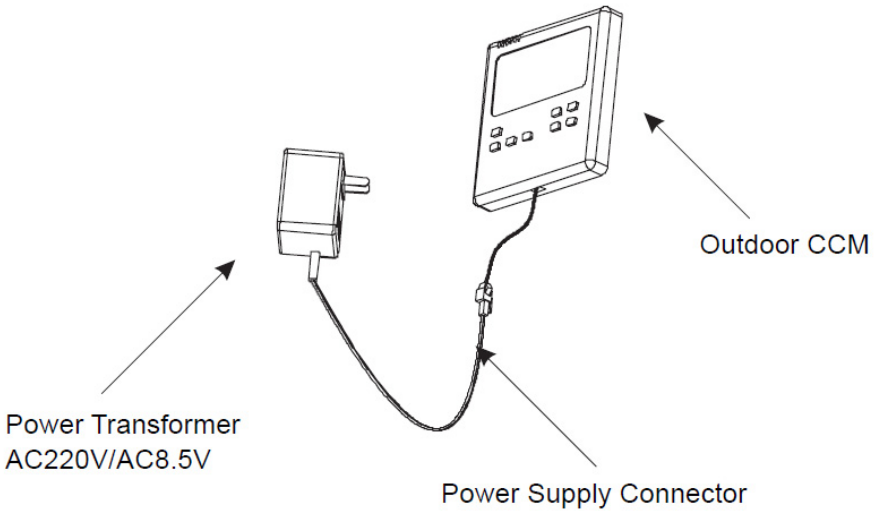


5. Structure and composition



6. Power supply

MD-CCM02 uses a power adaptor to obtain power supply from the normal AC 220V.Remenber to connect the adaptor’s connector



7. Query and error codes

Press QUERY button to start the query function. Then press the PREVOIS and NEXT button to select the outdoor units that want to check. Press PAGE UP button 15 times to display the corresponding outdoor's error code or 16 times to display the protection codes.

6.5 Mode lock controller KJR-31B/E

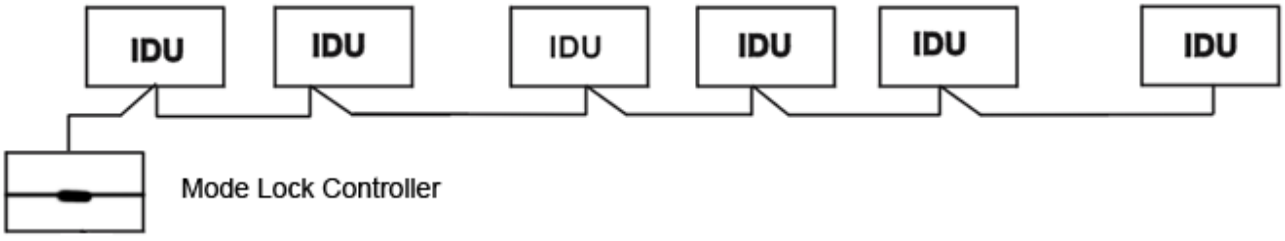
KJR-31B/E is a wired centralized mode lock controller. With this device, we could lock the mode of all the units connected to this controller to avoid mode conflict. When the mode conflict happens, e.g. some indoor units request cooling and some heating, the outdoor unit could only work in either mode. As a result, some of the indoor units could not work. By adopting this device, we could consider the environment and artificially determine whether the indoor units should work at cooling or heating mode.

- **New designed and graceful appearance**
- **Compactly functions and friendly user interface**
- **Easy networking**
- **Connected up to 64 indoor units**

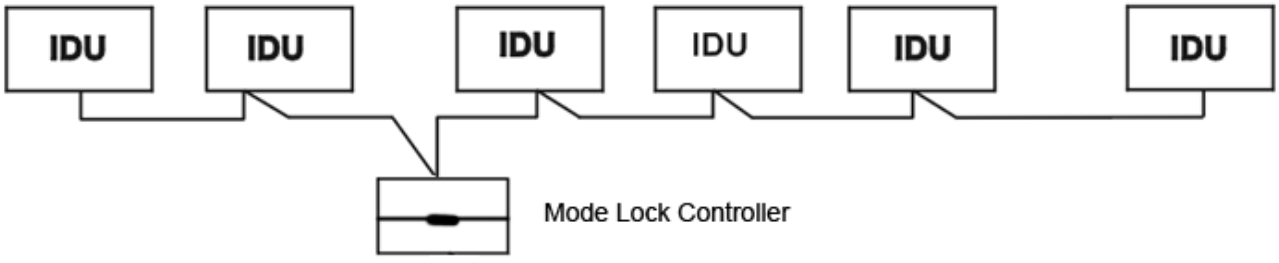
6.5.1 System configure

Mode lock controller KJR-31B/E is only a compact indoor unit centralized controller, which cannot bridge the indoor units to the PC or BMS. Its network configuration is much the same as MD-CCM09. The following 2 ways is both available.

1st:



2nd:



To establish a steady network the following should be noted

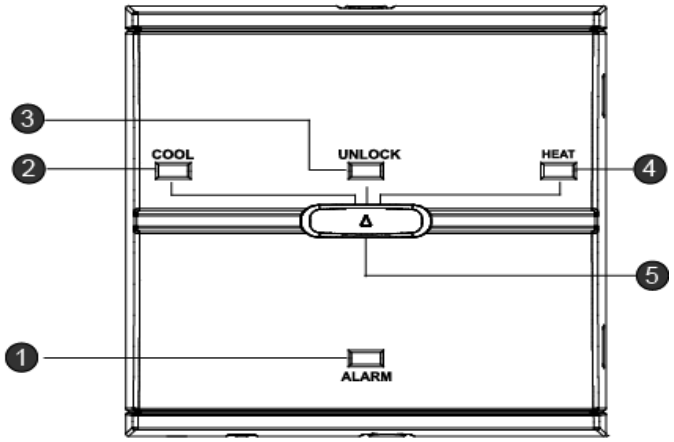
- The signal cable and power cable of the central controller cannot be contained in the same cable tube.

The distance between the signal cable tube and power cable tube shall be between 300mm -500mm at least.

- The total signal cable length of the central controller shall not exceed 1,200m.
- Make sure there is no joint in the middle of the shielded cable. If such a joint exists, use a socket to connect it.

6.5.2 Description Names and Functions

※ **Buttons and indication lights**



1. Alarm light

When the alarm lights are on, malfunctions occur on the indoor units. Please check the indoor unit and find the error code on the indoor unit's display panel. After solving the problem, the ALARM light will fade out.

2. COOL light

Press the mode switch leftwards to turn all the indoor units to cooling only mode and the COOL light will be on. This light indicates that all the indoor units are running at cooling mode. Users can only set the cooling parameter such as temperature and fan speed by other controller. If the user changes the units to the heating only mode, the indoor unit displays mode conflict error code. And then the corresponding unit turns off to prevent user's environment from being more unsatisfying.

3. UNLOCK light

Press the mode switch to the middle of the controller and the UNLOCK light will be on. In this mode, all the indoor units are freely to work at heating mode or cooling mode.

4. HEAT light

Press the mode switch leftwards to turn all the indoor units to heating only mode and the HEAT light will be on. This light indicates that all the indoor units are running at cooling mode. Users can only set the heating parameter such as temperature and fan speed by other controller. If the user changes the units to the

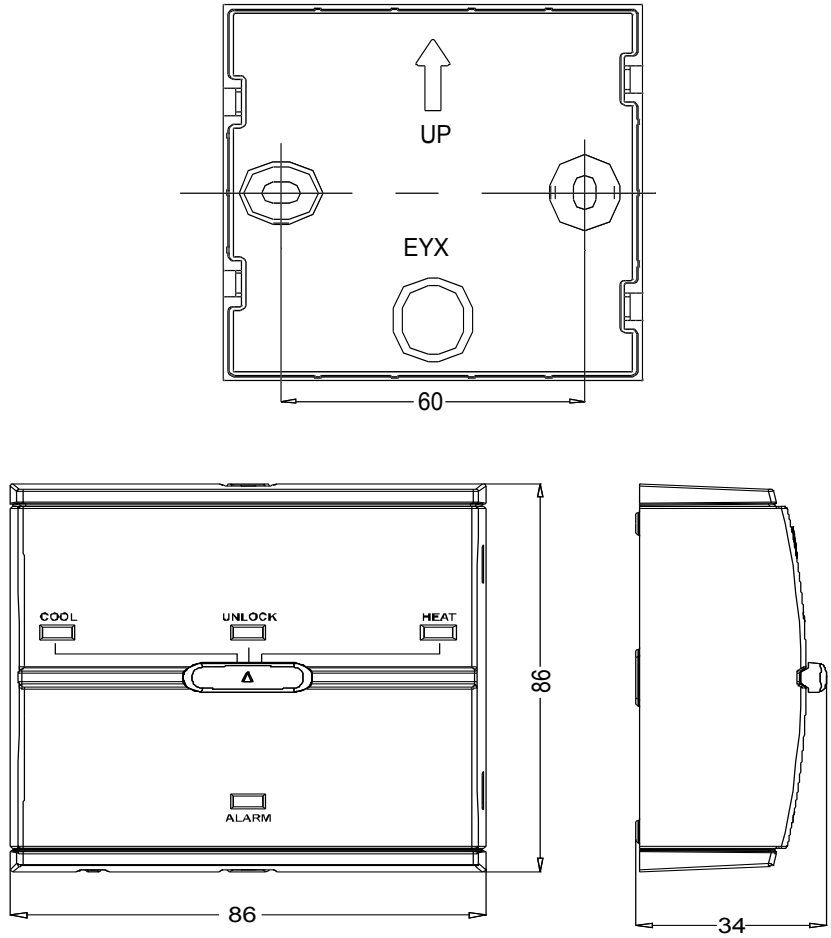
cooling only mode, the indoor unit displays mode conflict error code. And then the corresponding unit turns off to prevent user's environment from being more unsatisfying.

5. Mode switch

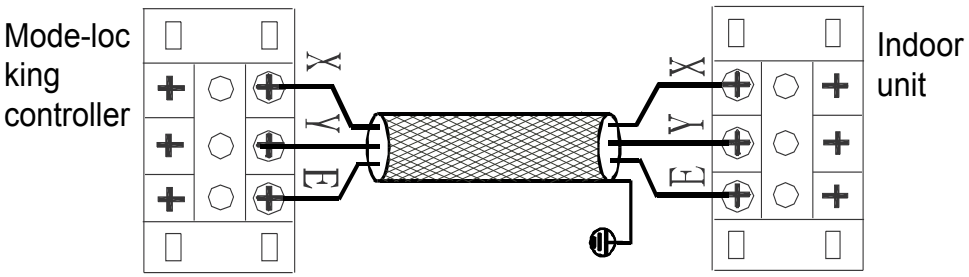
Mode switch is the only key on the controller. Slide this key and command all the indoor units to the corresponding mode to avoid mode conflict.

6.5.3 Installation

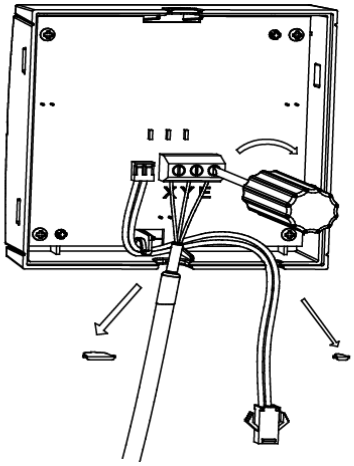
※ **Dimension**

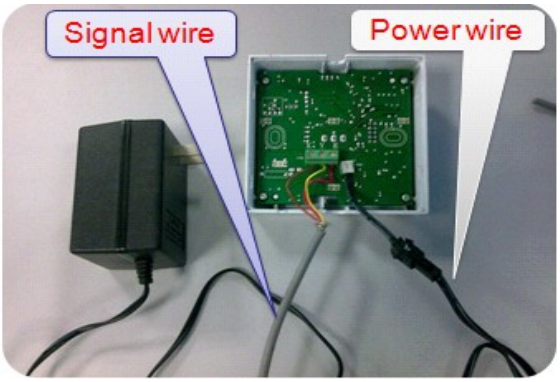


※ **Controlling wiring connection**

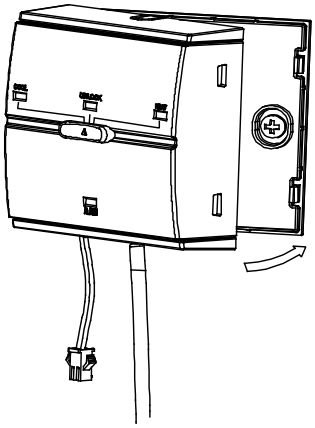


※ **Tie the screw**

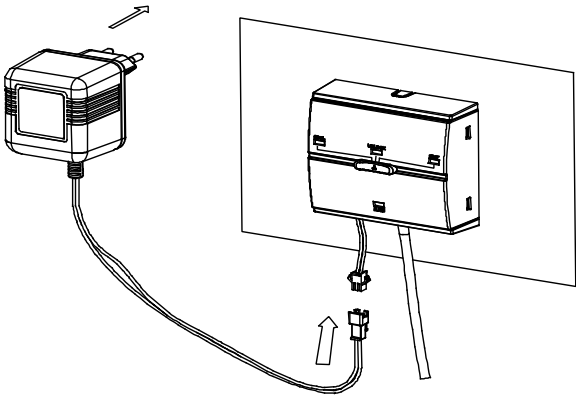




※ **Assemble the front shell to the base**



※ **Connect the power adaptor to the controller**



The power supply of the KJR-31B/E should be 220-240V 56/60Hz.

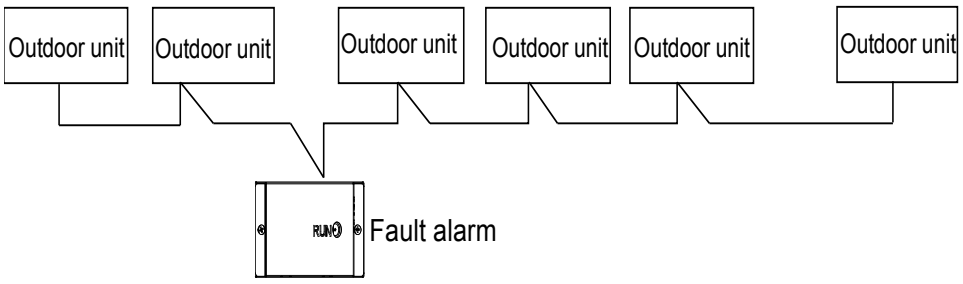
6.6 Fault alarm controller: KJR-32B/E

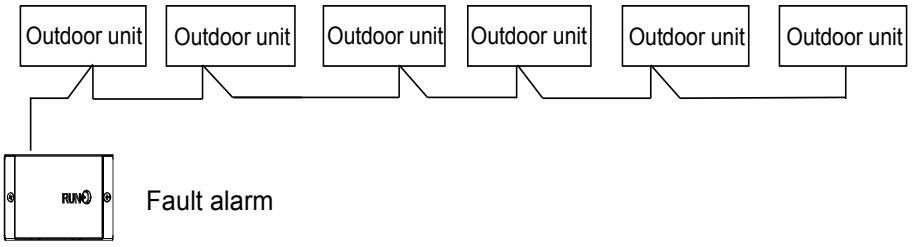
KJR-32B is specially designed for engineering applications. It does not display the outdoor unit's working parameters, but it can connect to the alarm device when outdoor unit is working abnormally, the RUN light will flash.

- ✧ Connect the outdoor unit through K1 K2 E terminals.
- ✧ Connect the RS485 shift RS232 module of Midea 3rd generation network solution by F1 F2 E, and then finally connect to the computer.
- ✧ Output and input the same power through the fault alarm output side.
- ✧ With LED indication function.

6.6.1 Wiring methods

There are two wiring methods can be connected for fault alarm controller. Each fault alarm controller can be connected up to 32 outdoor units and 8 refrigerant systems.



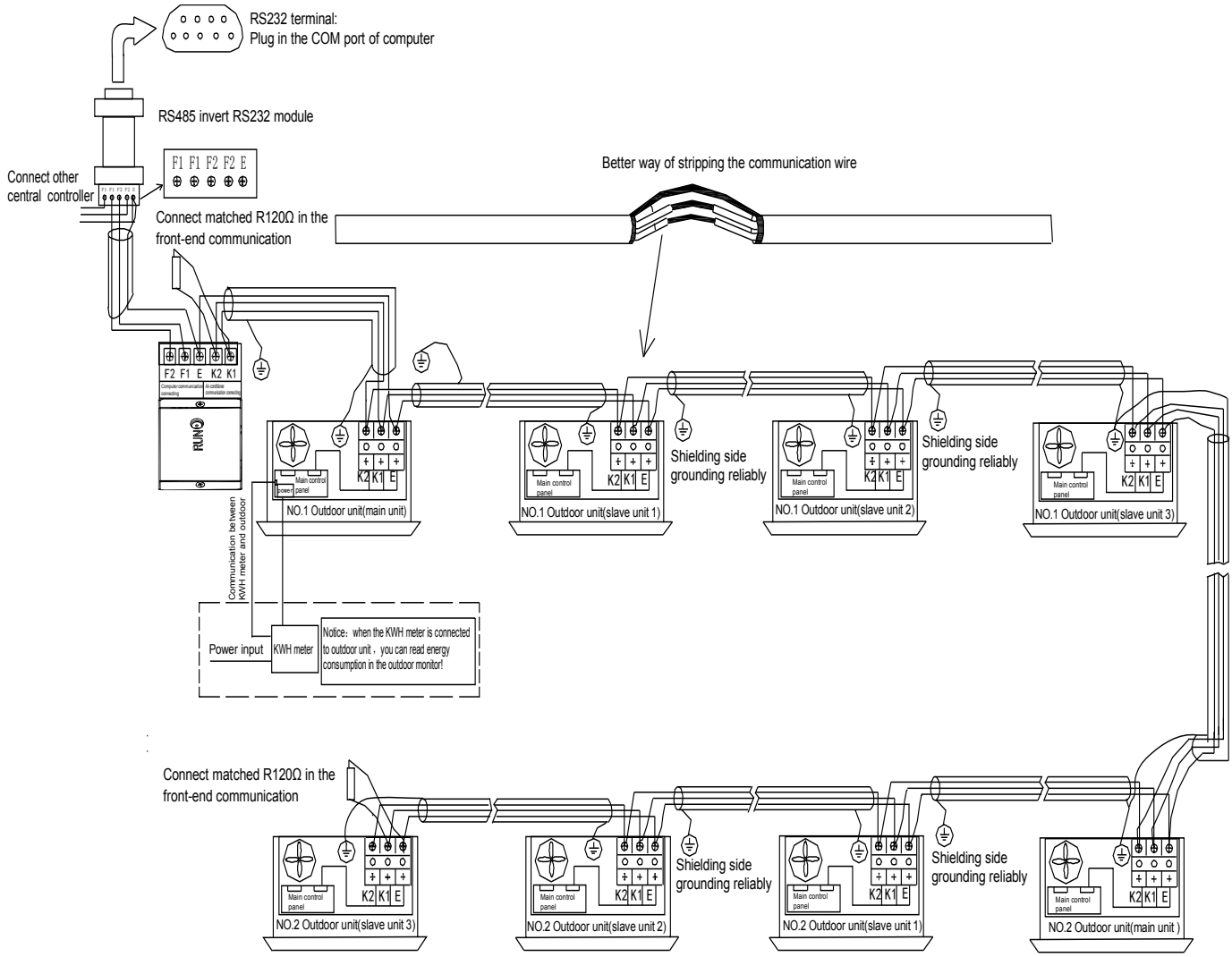


6.6.2 System wiring diagram

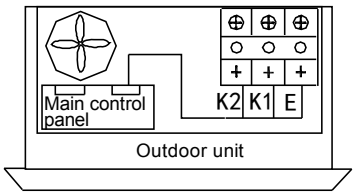
1) One computer can be connected only one fault alarm controller.

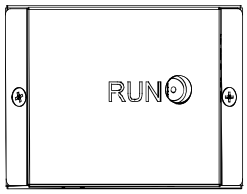
2) Must connect according to the follow system wiring method, if not it will not work normally.

3) You need to connect R120 to the front or rear of the monitoring system, and at the end of communication wire masking should be reliable ground.

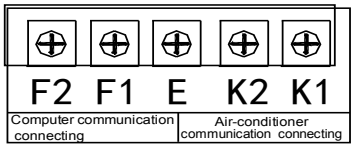


Outdoor unit system figure





Fault alarm wiring base figure



Outdoor unit system figure　　Fault alarm figure　　Fault alarm wiring base figure

Notes:

1.First install the fault alarm controller, after setting the fault protection through the outdoor main panel 2 minutes, observe the indication lamp whether be flashed or not, then judge whether the fault alarm communication with the outdoor unit.

2. When using the fault alarm controller, its output connected appliance requirements: all the AC220V appliances lower than 3.15A current can be the fault alarm controller appliance, such as miniwatt lamp.

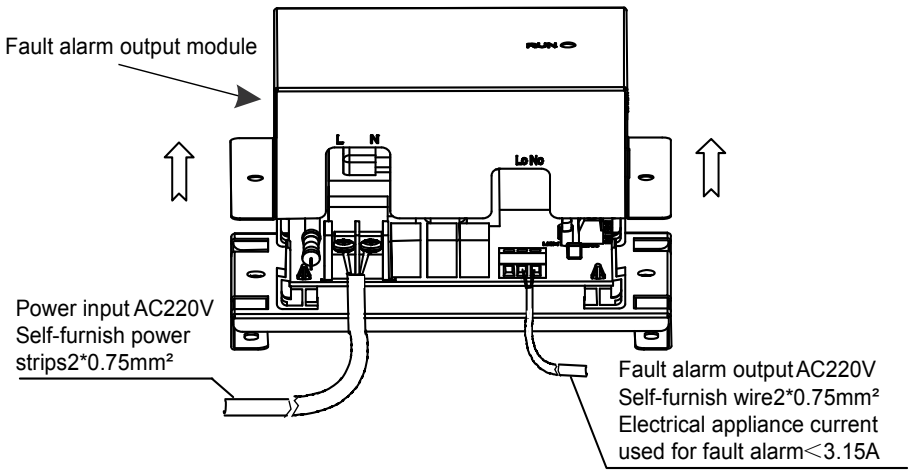
6.6.3 Installation

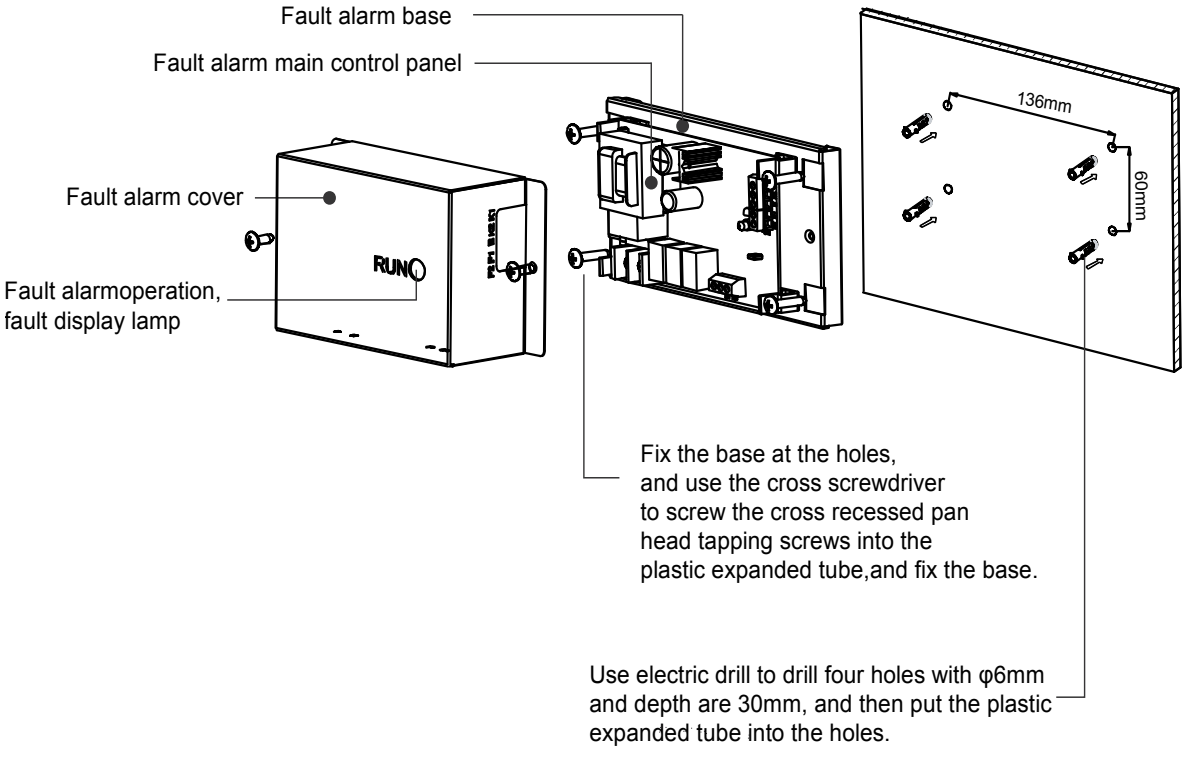
1. The RS485 shift RS232 module, connecting wire in the wiring figure can be used only when network monitoring need to connect the computer;

2. One computer cannot connect with one fault alarm and outdoor central controller at the same time, you must choose one for connection;

3. When connected to the computer with 3rd network control system, the default address of the alarm module is 16 and it cannot be changed. Outdoor unit addresses need to be set manually, please refer to the detailed set information in the outdoor installation and owner's manual. The outdoor unit addresses cannot be repetitive, or the system cannot operate normally;

4. Power part and fault output part as follows display:





6.7 AHU control box 14&28&56kW: AHUKZ-01, AHUKZ-02, AHUKZ-03

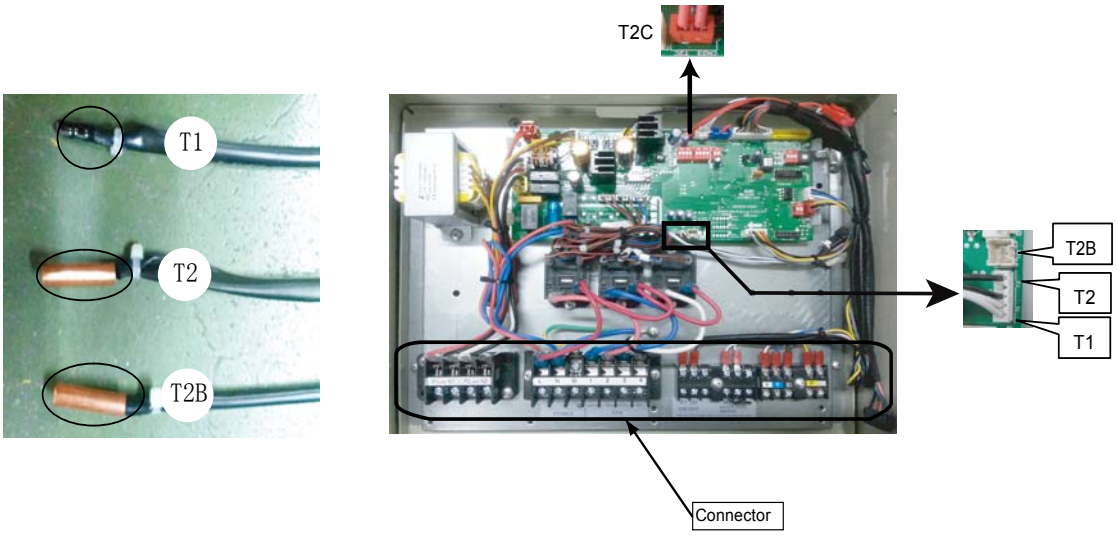
- Electrical mounting plate can be flipped, easy to install and maintain
- Can be used to connect VRF outdoor units with DX AHU or other brand indoor units, but cannot connect to the heat recovery system
- The Sheet Metal integration design
- Built-in electronic expansion valve
- One main control board
- Add the T2C indoor evaporator inlet sensor
- With failure feedback function
- Can only connect to R410A refrigerant system

The new AHU control boxes of 14 kW, 28 kW and 56 kW can be used to connect VRF outdoor units with DX AHU or other brand indoor units, but cannot connect to the heat recovery system. The EXV is controlled by superheat degree; one gas pipe and one liquid pipe, easy to install and maintain. The diameters of these three models are different, you can choose you need models

6.7.1 Electric control box wiring figure

AHUKZ-01, AHUKZ-02 and AHUKZ-03 are applied one main control board, the temperature sensor T1, T2 and T2B must be connected to the main control board before first powered on.

- T1 is indoor temperature sensor, install at the air inlet of the indoor unit.
- T2 is indoor evaporator intermediate temperature sensor, install at the intermediate of temperature evaporators.
- T2B is indoor evaporator outlet sensor, install at the outlet of the evaporator.
- T2C is indoor evaporator inlet sensor, and it has been installed before the product leaves the factory



6.7.2 Error and protection codes

When the AHU control box is working abnormally, it can display the malfunction and protection codes through the new or old display panel. At the same time, you can check the temperature parameters by the LED display panel

New display panel

Codes	Descriptions
FE	Without address when first time power on
H0	M-home not matched between MS module and control box
E0	Mode conflict
E1	Communication malfunction between indoor unit and outdoor unit
E2	T1 sensor malfunction
E3	T2 sensor malfunction
E4	T2B/T2C sensor malfunction
E7	EEPROM malfunction
Ed	Outdoor unit malfunction
EE	Water level switch malfunction

Old display panel

Definition	LED status
Without address when first time power on	Time LED and run LED flash together
M-home not matched between MS module and control box	4 LED flash together
Mode conflict	Defrost LED flashes
Communication malfunction between indoor unit and outdoor unit 5	Timer LED flashes
Indoor sensors malfunction	Run LED flashes
EEPROM malfunction	Defrost LED flash slowly
Outdoor unit malfunction	Alarm LED flashes slowly
Water level switch malfunction	Alarm LED flash

6.7.3 Query instructions

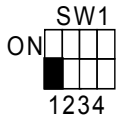
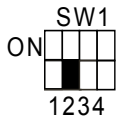
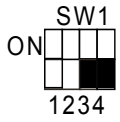
Sequence	Display contents	Remarks
0	Normal display	
1	Address of AHU control box	
2	Capacity of AHU control box	Actual address is 1~59, but check value displays 1~58.
3	Net address of AHU control box	0~63
4	Actual setting Temp.	
5	T1 actual Temp.	Minimum displays - 9 ℃
6	T1 actual Temp.	Minimum displays - 9 ℃
7	T2 actual pipe Temp.	Minimum displays - 9 ℃
8	T2B actual pipe Temp.	Minimum displays - 9 ℃
9	T2C actual pipe Temp.	Minimum displays - 9 ℃
10	Error code	
11	－－	End of check

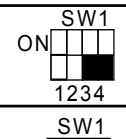
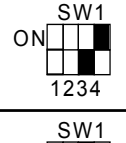
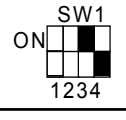
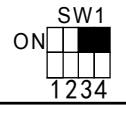
6.7.4 Basic specification

Model		AHUKZ-01	AHUKZ-02	AHUKZ-03
Power supply		220-240V~ 50Hz; 208-230V~ 60Hz		
Indoor unit capacity	kW	9~20	20.1~33	40~56
IP-class		IPX0	IPX0	IPX0
Piping size (in/out)	mm	Φ8/Φ8	Φ12.7/Φ12.7	Φ16/Φ16
Dimension	mm	375×350×150		
Packing dimension	mm	490×240×420		

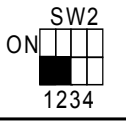
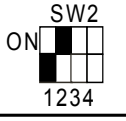
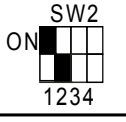
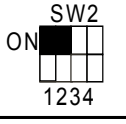
6.7.5 Dial code definition

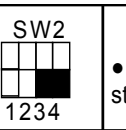
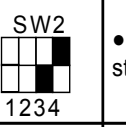
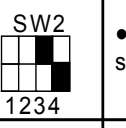
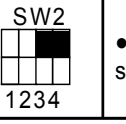
1) SW1 definition

	• 1 means the factory test mode • 0 automatic search address mode (factory default)
	• 1 means select DC fan(reserved) • 0 means select AC fan
	• 00 means DC fan static pressure selection 0 set (reserved)

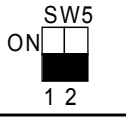
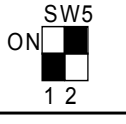
	• 00 means DC fan static pressure selection 0 set (reserved)
	• 01 means DC fan static pressure selection 1 set (reserved)
	• 10 means DC fan static pressure selection 2 set (reserved)
	• 11 means DC fan static pressure selection 3 set (reserved)

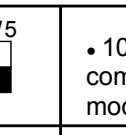
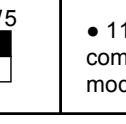
2) SW2 definition

	• 00 means temperature of shut down against cool air is 15°C
	• 01 means temperature of shut down against cool air is 20°C
	• 10 means temperature of shut down against cool air is 24°C
	• 11 means temperature of shut down against cool air is 26°C

	• 00 means the time of TERMAL stop the fan is 4 minutes
	• 01 means the time of TERMAL stop the fan is 8 minutes
	• 10 means the time of TERMAL stop the fan is 12 minutes
	• 11 means the time of TERMAL stop the fan is 16 minutes

3) SW5 definition

	• 00 means the temperature compensation under heating mode is 6°C
	• 01 means the temperature compensation under heating mode is 2°C

	• 10 means the temperature compensation under heating mode is 4°C
	• 11 means the temperature compensation under heating mode is 8°C

4) SW6 definition

SW6 ON 1 2 3	● 1 means the old display panel ● 0 means the new display panel
SW6 ON 1 2 3	●1 means automatic mode automatic fan ●0 means non-automatic mode automatic fan
SW6 ON 1 2 3	Reserved

5) SW7 definition

SW7 ON 1 2	Standard configuration
SW7 ON 1 2	The last set of the network

6) J1, J2 definition

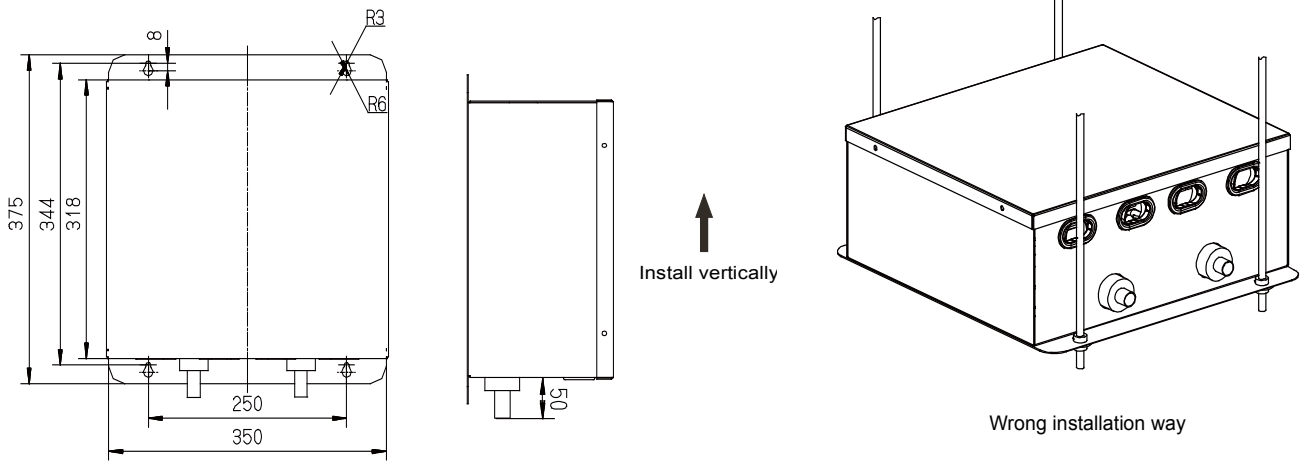
J1	J1 Jumperless for has power down memory function
J1	J1 Jumper for has no power down memory function
J2	Reserved

7) 0/1 definition

ON	Means 0
ON	Means 1

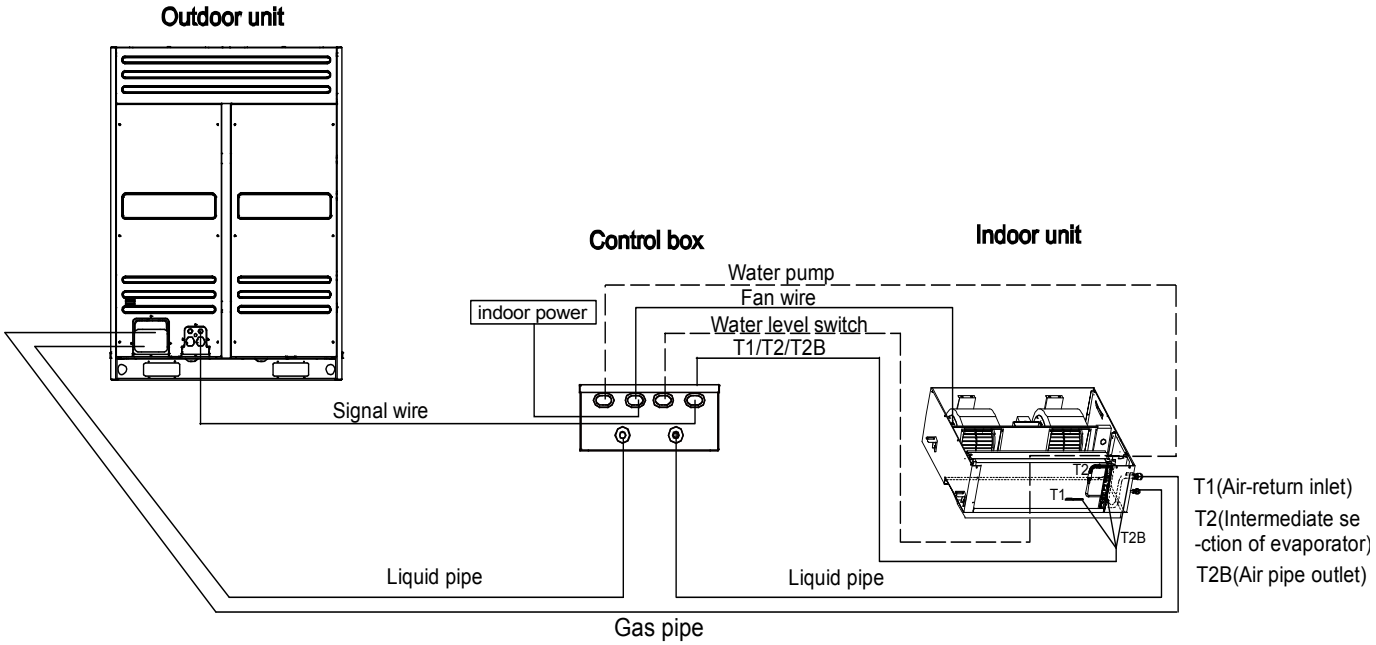
6.7.6 Installation methods

1) Installation methods for vertically, and horizontal installation is invalid



√ **Vertically** × **horizontally**

2) Wiring diagram between indoor and outdoor units



Notes: 1) If it is needed, user can select the backup function in the dotted line frame.

2) T2C has been installed before the product leaves the factory

6.8 HRV wired controller: KJR-27B/BGE

KJR-27B is individually designed for HRV—Heat Recovery Ventilator. The HRV can work in the following modes: exhaust, air supply, bypass, heat exchange, and auto.

Wired controller specifications

Model	KJR-27B/BGE
Power Supply Voltage	5.0V DC
Ambient Temperature Range	-15°C～43°C
Ambient Humidity Range	RH40%~RH90%

Performance Features

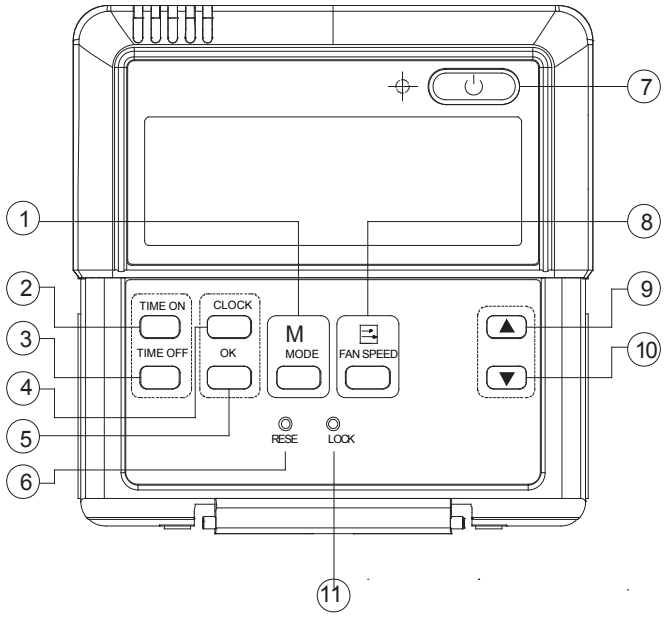
1. Operating mode: Cool, heat, dry, fan and auto.

2. Set the mode through buttons.

3. Indoor setting temperature range: 17°C ~30°C.

4. LCD (Liquid Crystal Display).

6.8.1 Parts name



(1) Mode selection button

It is used to select mode, press this button one time, then the operation modes will change in turn as follows:

AUTO→HEAT RECOVERY→EXHAUST→BYPASS→SUPPLY

(2) Timer on button

Press this button can set TIMER ON, each time press this button, the time moves forward by o.5 hours. When the set time is over 10 hours, each time press the button to the time moves forward by 1 hour. If want to cancel the TIMER ON, then adjust the time of TIMER ON as 0.0.

(3) Timer off button

Press this button can set TIMER OFF, each time press the button, the time moves forward by o.5 hours. When the set time is over 10 hours, each time you push the button the time moves forward by 1 hour. If want to cancel the TIMER OFF, then adjust the time of TIMER OFF as 0.0.

(4) CLOCK button

Normally display the clock set currently (display 12:00 for the first electrifying or resetting). When press the button for 4 seconds, the hour part on the clock display flashes every 0.5 seconds, then press button ▲ and ▼ to adjust hour; Press the button CLOCK again, the minute part flashes every 0.5 seconds, then press ▲and ▼ button to adjust minute. When set clock or alter clock setting, must push the confirm button to complete the setting.

(5) Confirm button

The button is used at the state of CLOCK adjustment. After select the time, push the button to confirm then exit, the current clock will display

(6) RESET button (hidden):

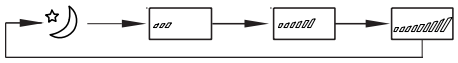
Use a small stick with a diameter of 1mm to press the RESET button can cancel the current settings and get into the condition of resetting.

(7) ON/OFF button

Press this button at the condition of OFF, the OPERATION lamp lights, and the wired controller enters into ON operation, simultaneously sends the information of operation mode set currently, temperature, fan speed, timer etc. Press the button at the condition of ON, the OPERATION lamp extinguishes simultaneously sends the OFF. If having set TIMER ON or TIMER OFF, the wired controller will cancel these settings before entering into OFF, close the concern indicator, and then send the OFF information.

(8) Fan speed selection button

Can select anyone fan speed from "", "LOW"," MED", and "HIGH". Each time press the button, the fan speed will change in turn as follow.



(9) Adjustment button

The button only for time adjustment, and press the ▲ button, time increases.

(10) Adjustment button

The button only for time adjustment, press the ▼ button, time decreases.

(11) LOCK button (hidden)

Use a small stick with the diameter of 1mm to press the LOCK button can lock the current setting, press the button again then cancel the setting.

6.8.2 Using the wired controller

(1) Automatic operation

Insert the power supply, operation lamp of HRV flashes.

1. Press MODE to select AUTO

2. Press ON/OFF button, the operation lamp of HRV unit lights, the HRV start operating at the auto mode, the fan speed is controlled automatically, wired controller display screen display "AUTO" the fan speed is un-adjustable. Press the button ON/OFF again, and then the HRV stops operating.

(2) The operation of heat recovery/bypass/supply

1. Press the MODE button to select any one of "HEAT RECOVERY", "BYPASS", or "SUPPLY “mode.

2. Press the button FAN SPEED to select any one of " ", "LOW", "MIDDLE", or "HIGH" fan speed modes.

3. Press the button ON/OFF, the operation lamp on HRV lights, the HRV operates according to the mode selected. Press the button ON/OFF again, stop the HRV.

(3) Exhaust operation

1. Press MODE to select EXHAUST mode.

2. Press the ON/OFF button, the operation lamp of indoor unit lights, and the air conditioner will start to EXHAUST mode. Press the button ON/OFF again, stop the 3. The button FAN SPEED is invalid in the mode EXHAUST.

(4) Timer setting

1. Button TIMER ON can set the starting time.

2. Button TIMER OFF can set the stopping time.

(5) Only setting timer on

1. Press TIMER ON button, the wired controller displays SETTING, the icons of HOUR and ON display on the timer setting area. The wired controller enters into the setting of the timer on.

2. Press the TIMER ON button again, and then adjust the time of the timer on as you desired.

3. Continuously press adjusts up button. The time of the timer will increase 0.5 hours per time. After the time of timer reaches to 10 hours, the time will increase 1hour each time.

4. 0.5 seconds later, after finishing the adjustment, the wired conditioner sends the information of time on, the timer on the setting is completed.

(6) Only setting timer off

1. Press the TIMER OFF button, the wired controller display SETTING, the icons of HOUR and OFF display on the timer setting area. The wired controller enters into the setting of the timer off.

2. Press the TIMER OFF button again, and then adjust the time of time off as you desired.

3. Continuously presses adjust up button. The time of the timer will increase 0.5 hours per time. After the time of timer reaches to 10 hours, the time will increase 1hour each time.

4. 0.5 seconds later, after finishing the adjustment, the wired conditioner sends the information of time off. The timer off setting is completed.

(7) Setting time on and time off simultaneously

1. Refer to step 1 and step 2 of TIMER ON to set the TIMER ON.

2. Refer to step 1 and step 2 of TIMER OFF to set the TIMER OFF.

3. When set the TIMER ON and TIMER OFF simultaneously, if the set times of TIMER ON and TIMER OFF are all over 10 hours, then TIMER OFF is always later 1 hour than TIMER ON.

4. 0.5 seconds later, after finishing the adjustment, the wired conditioner sends the information of time on/off, the timer off and timer on setting are completed.

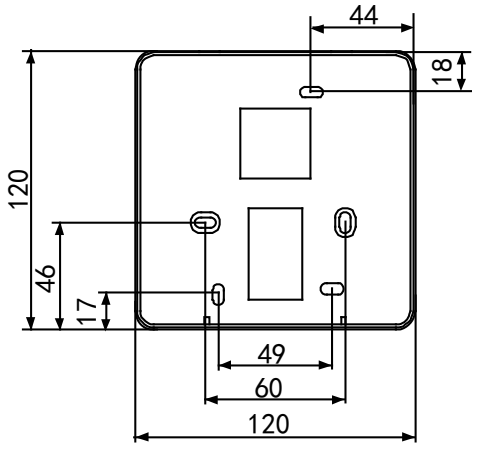
Alter the timer, to alter the time of TIMER ON of 1. Refer to step 1 and step 2 of TIMER ON to set the TIMER ON.

Remark:

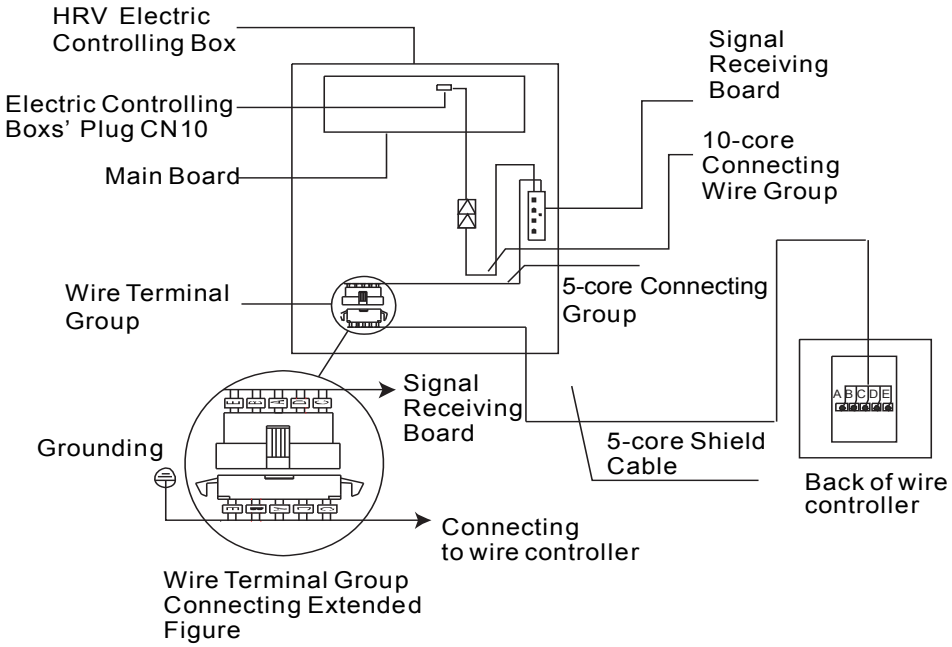
Time of TIMER ON is the relative time; it is relative to standard time of operating wired controller. If having setting the TIMER ON or TIMER OFF, then the clock cannot be adjusted.

6.8.3 Installation

(1) Dimensions: 120*120*15mm



(2) Wiring principle sketch



(3) Wiring principle