

# DIGITAL VRF SYSTEM



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TRUST AIR CONDITIONING EQUIPMENT CO.  
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# Installation

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**توجه:**

**شرکت تراست حق تغییر مشخصات دستگاه ها را در جهت بهبود و ارتقای کیفیت برای خود محفوظ می دارد.**

2013-07

## 1. Precautions

- 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.

- Install according to this installation instructions strictly.

If installation is defective, it will cause water leakage, electrical shock fire.

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.

- Use the attached accessories parts and specified parts for installation.

Otherwise, it will cause the set to fall, water leakage, and electrical shock fire.

- 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.

- The appliance shall be installed in accordance with national wiring regulations

- The appliance shall not be installed in the laundry.

- Before obtaining access to terminals, all supply circuits must be disconnected.

- The appliance must be positioned so that the plug is accessible.

- The enclosure of the appliance shall be marked by word, or by symbols, with the direction of the fluid flow.

- For electrical work, follow the local national wiring standard, regulation and these installation instructions. 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.

- 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.

- 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.

- 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.

- An all-pole disconnection device which has at least 3mm separation distance in all pole and a residual current device (RCD) with the rating of above 10mA shall be incorporated in the fixed wiring according to the national rule

- 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.

- 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.

- 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.

- The temperature of refrigerant circuit will be high, please keep the interconnection cable away from the copper tube.

- The power cord type designation is H07RN-F. Equipment complies with IEC 61000-3-12.




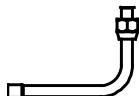
- If the refrigerant leaks during installation, ventilate the area immediately.

Toxic gas may be produced if the refrigerant comes into the place contacting with fire.

- After completing the installation work, check that the refrigerant does not leak.

Toxic gas may be produced if the refrigerant leaks into the room and comes into contact with a source of fire, such as a fan heater, stove or cooker.

## 2. Accessories

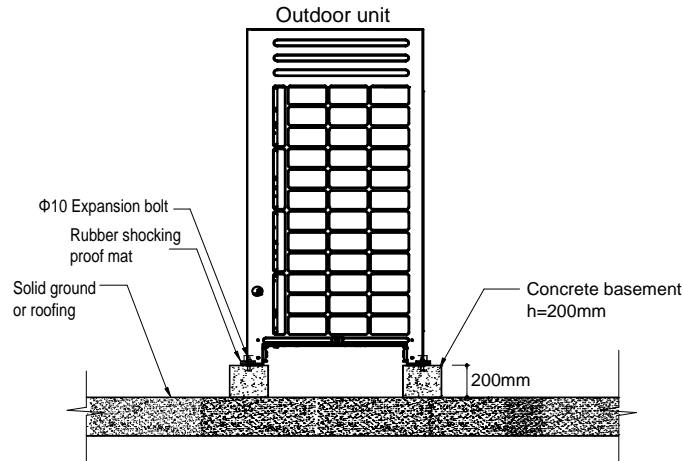
Name	Shape	Quantity	Function
Installation manual of outdoor unit		1	/
Operation manual of outdoor unit		1	/
Operation manual of indoor unit		1	/
Guideline of outdoor unit main control board		1	/
Flat head bolt	-	1	For tightening the indoor and outdoor unit
90° mouting elbow		1	For connecting pipes
Seal plug		4x2	Be used in cleaning pipe
Connection pipe		2	Be connected to liquid pipe side
Accessory bag	-	1	/

## 3. Installation position selection

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

## 4. Base for outdoor unit

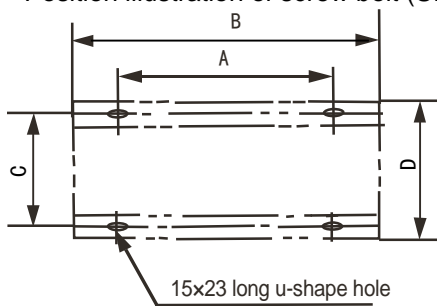
- A solid, correct base should avoid the outdoor unit from sinking and avoid the abnormal noise generated due to base.
- Base types: Steel structure base; Concrete base (see the figure below for the general making method)



**Caution: The key points to make basement:**

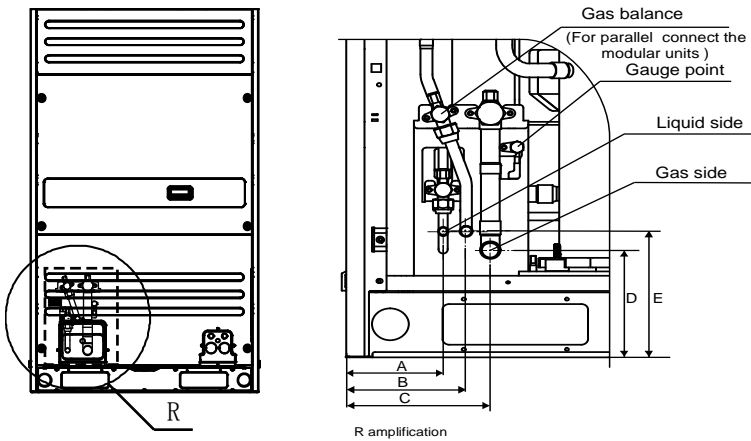
- The master unit's basement must be made on the solid concrete ground. Refer to the structure diagram to make concrete basement in detail, or make after field measurements.
- In order to ensure every point can contact equality, the basement should be on completely level.
- If the basement is placed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

● Position illustration of screw bolt (Unit: mm)



Model	8/10/12HP	14/16HP
A	830	1120
B	960	1250
C	736	736
D	765	765

● Centering position illustration of each connective pipe (Unit: mm)

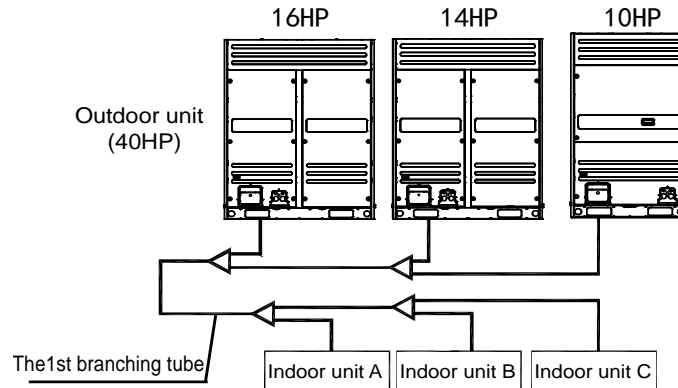


Model	8/10/12HP	14/16HP
A	130	165
B	160	195
C	195	230
D	170	170
E	200	200
Model	8/10HP	12/14/16HP
Liquid side	Φ12.7	Φ15.9
Gas side	Φ25.4	Φ31.8

### 5. Outdoor unit setting

A system, which provide with more than two outdoor units, will be set as the followings method: The outdoor units in this system should place sequentially from the large to the small capacity; the largest capacity outdoor unit must be mounted at the first branching site; and set the largest capacity outdoor unit address as the master Unit, while the other setting as the Slave Unit. Take 40HP (composed by 10HP, 14HP and 16HP) as an example:

- 1) Place the 16HP at a side of the first branching site.
- 2) Place the unit from the large capacity to the small (See the detail placement illustration)
- 3) Set 16HP as the master unit, while the 14HP and the 10HP as the slave unit.



### 6. Installation space for outdoor unit

- Ensure enough space for maintenance. The modules in the same system must be on the same height.(see the Fig.1)
- When installing the unit, leave a space for maintenance shown in Fig.2. Install the power supply at the side of the outdoor unit. For installation procedure, see the power supply device Installation manual.

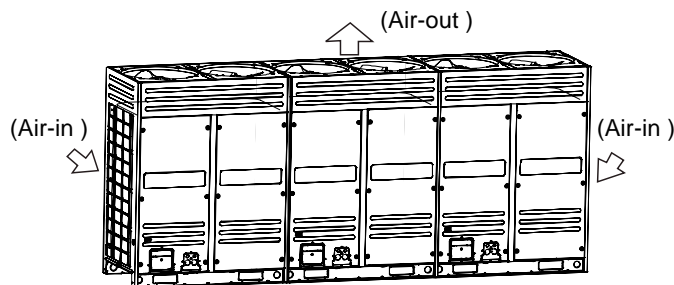


Fig.1

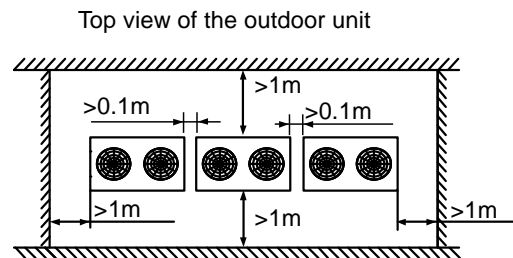
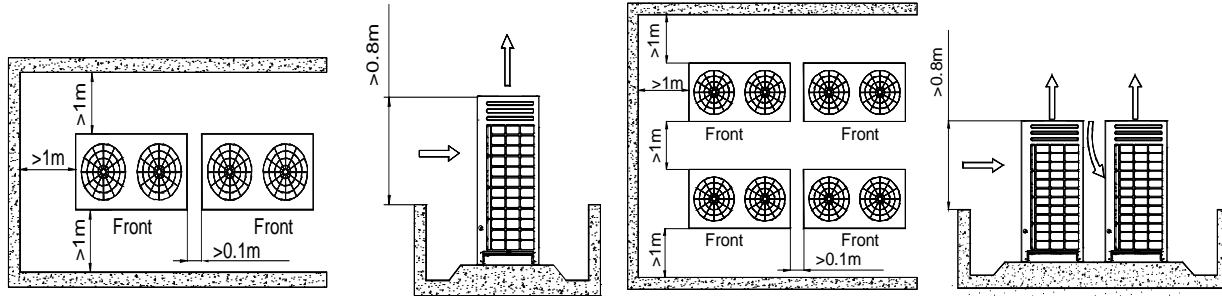


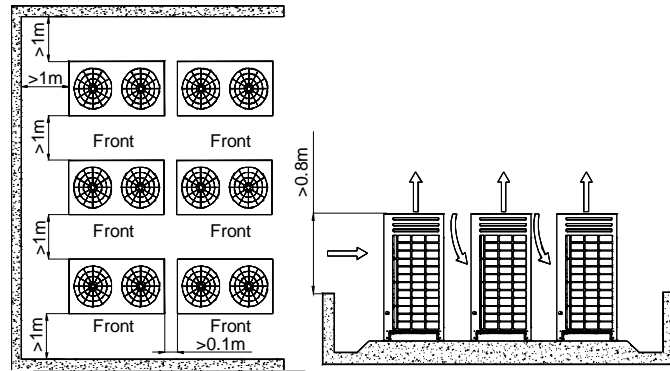
Fig.2

- When the outdoor unit is higher than the surrounding obstacle

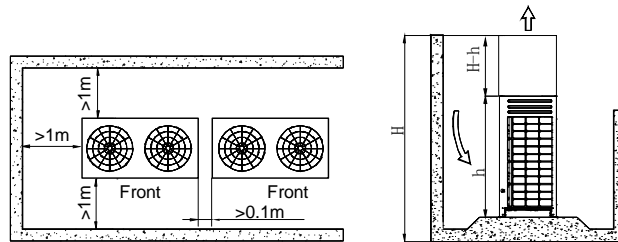
One row



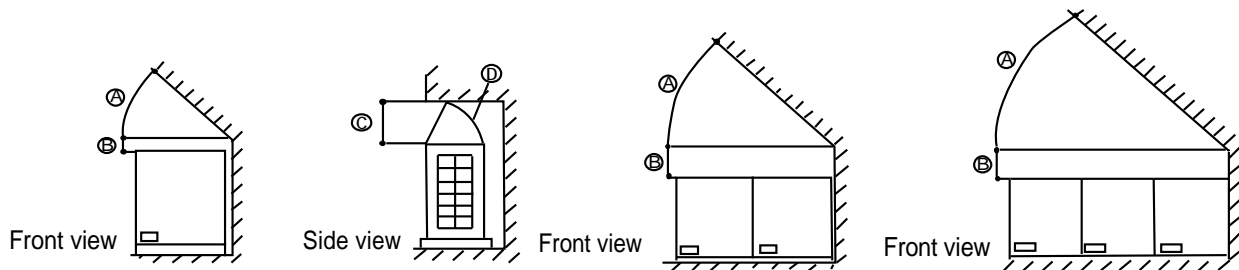
More than two rows



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



If miscellaneous articles are piled around the outdoor unit, such articles must be 800mm below the top of the outdoor unit. Otherwise, a mechanic exhaust device must be added.



(A) >45°

(B) >300mm

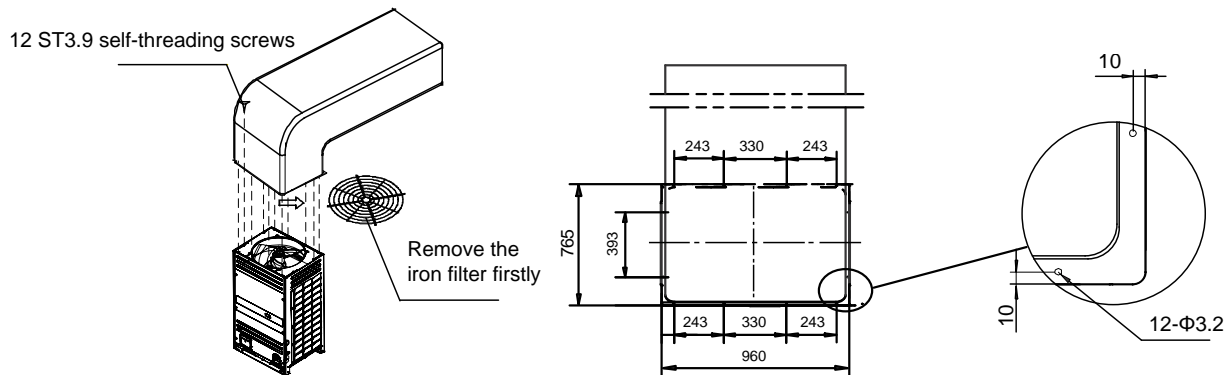
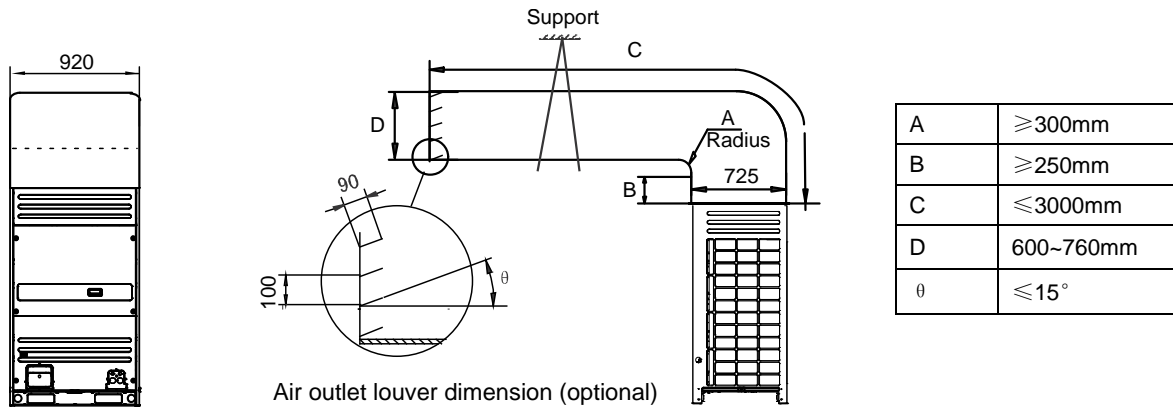
(C) >1000mm

(D) Airflow deflector

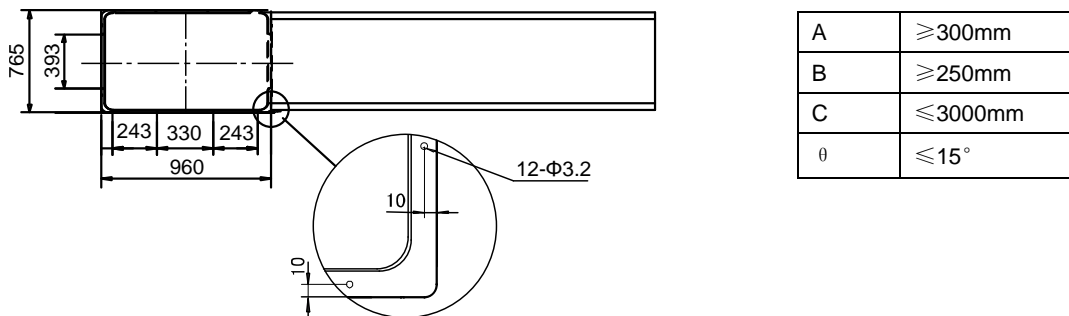
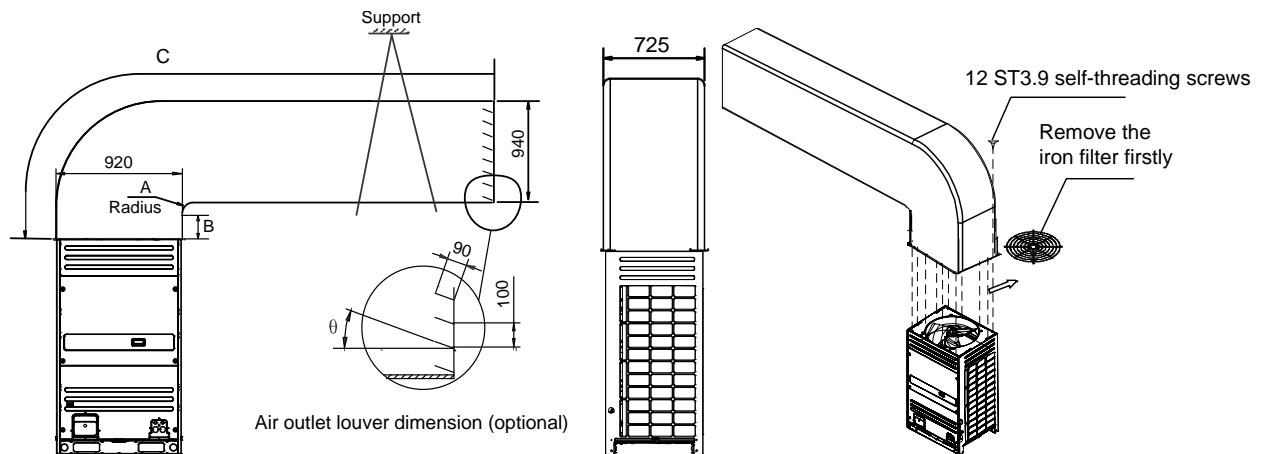
## 7. Air deflector installation (Unit: mm)

- 8HP, 10HP, 12HP Installation illustration

### Example A

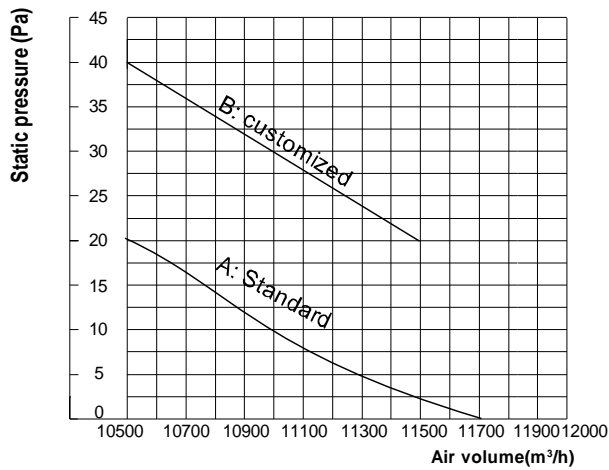


### Example B



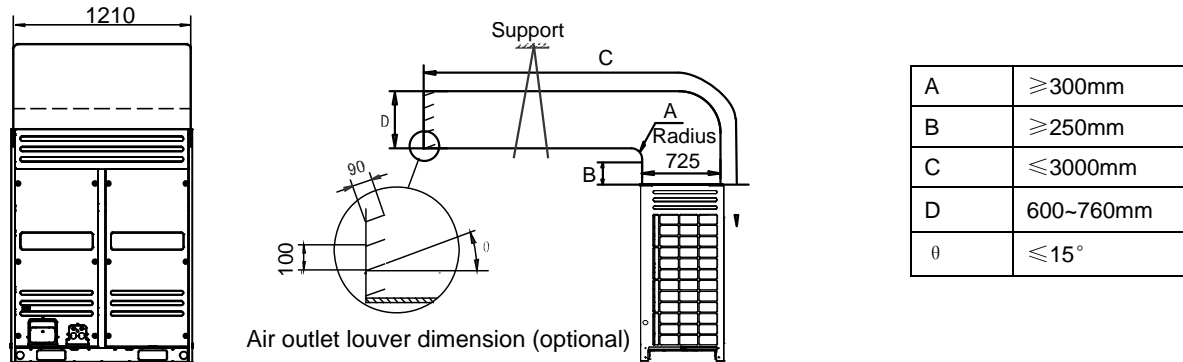


Static Pressure Graphs

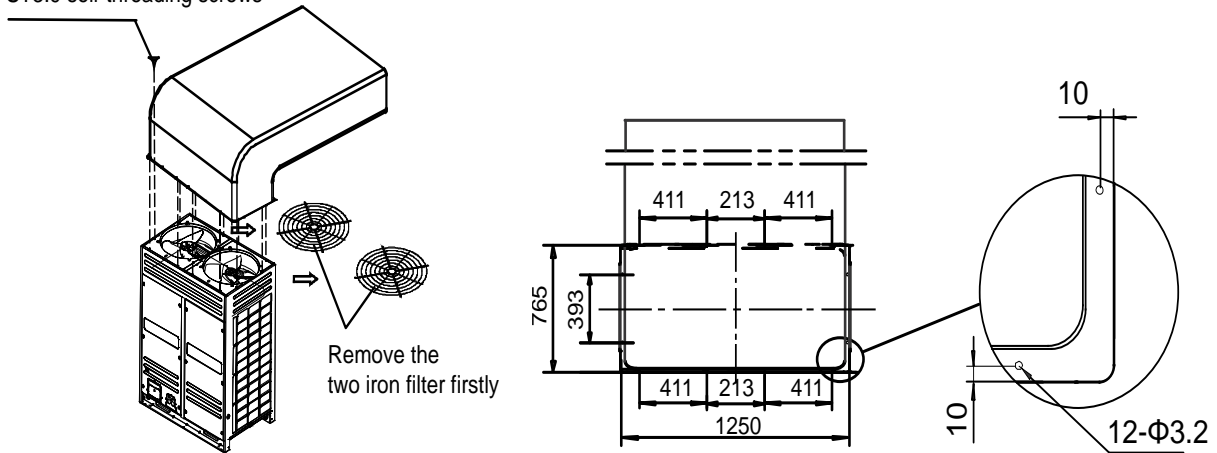


● 14HP, 16HP Installation illustration

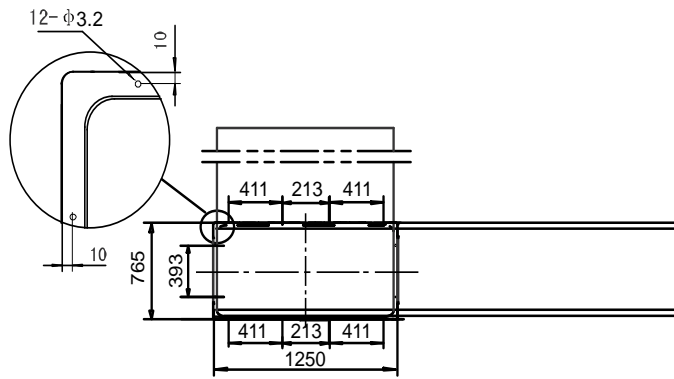
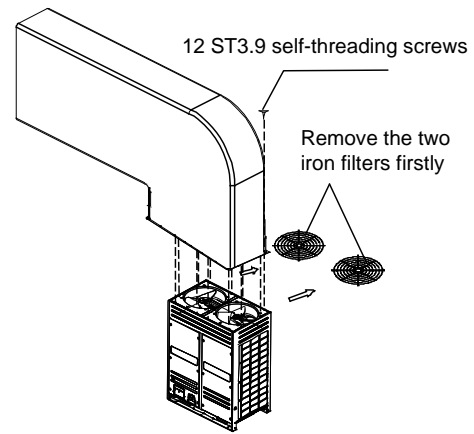
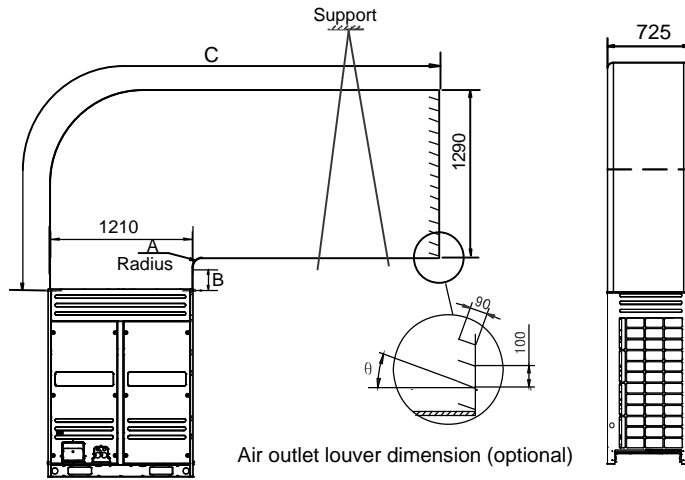
Example A



12 ST3.9 self-threading screws

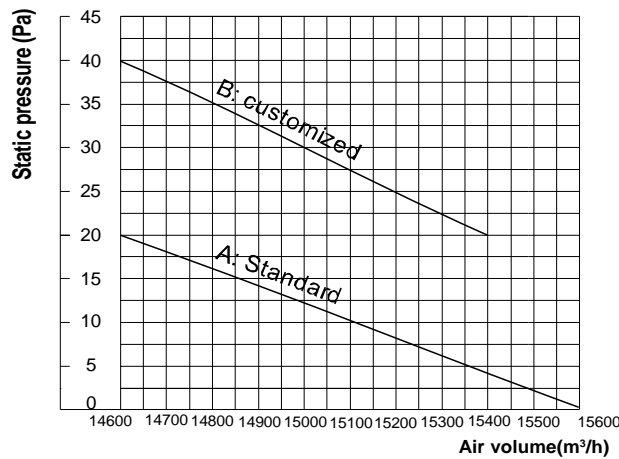


**Example B**



A	≥300mm
B	≥250mm
C	≤3000mm
θ	≤15°

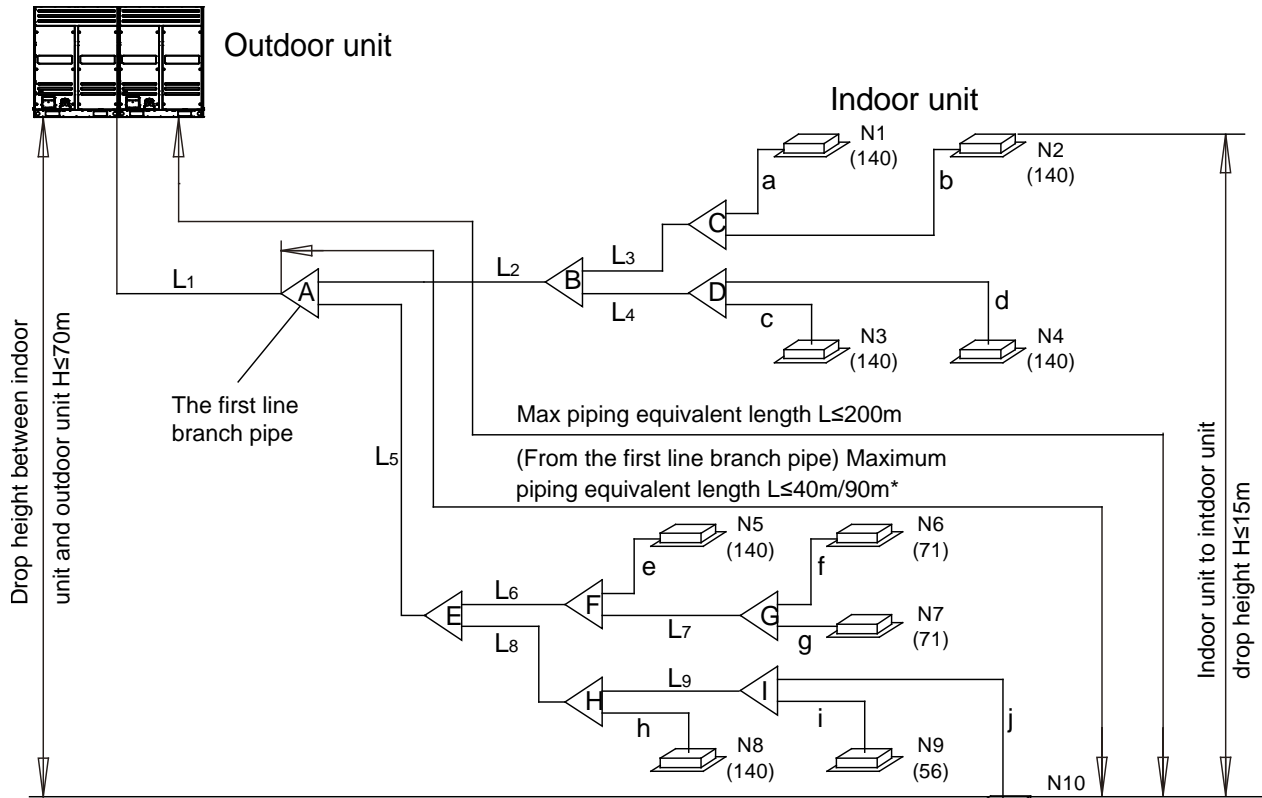
**Static Pressure Graphs**



**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 do 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 to be allowed in the air duct (see as above figure), otherwise, disoperation may led out.

## 8. Refrigerant pipe



Refrigerant pipe sketch map

● Pipe length limits

Length		Length limit (m)	Pipe	
Pipe length	Total pipe	1000 (please refer to note 1)	$L1+(L2+L3+L4+L5+L6+L7+L8+L9) \times 2+a+b+c+d+e+f+g+h+i+j$	
	Maximum pipe length of single	Actual length	175	
		Equivalent length	200 (please refer to note 2)	
	Maximum pipe length of the farthest IDU to the first branch joint	40/90 (please refer to note 3)	$L5+L8+L9+j$	
Drop height	Indoor unit to outdoor unit drop height	Outdoor unit up	50/70 (please refer to note 4)	/
		Outdoor unit down	110 (please refer to note 5)	/
	Indoor unit to indoor unit drop height	15	/	

**Note:**

1. When counting the total pipe length, the actual length of above distribution pipes must be doubled. (Expect the main pipe and the distribution pipes)

$$L1+(L2+L3+L4+L5+L6+L7+L8+L9) \times 2+a+b+c+d+e+f+g+h+i+j \leq 1000m$$

2. The reduced length of the branch joint is the 0.5m of the equivalent length.

3. 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 extended to 90m.

**Condition 1:** It needs to increase all the pipe diameters of the main distribution pipes 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 no need to be increased.

When:  $40m < L5+L8+L9+j \leq 90m$  L2,L3,L4,L5,L6,L7,L8,L9 need to increase the pipe diameter of the distribution pipe.

Increasing size as the following:

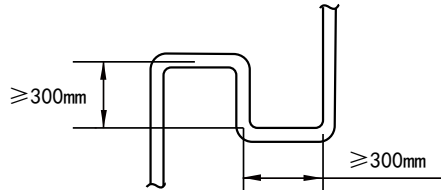
Φ9.5→Φ12.7	Φ12.7→Φ15.9	Φ15.9→Φ19.1	Φ19.1→Φ22.2	Φ22.2→Φ25.4	Φ25.4→Φ28.6
Φ28.6→Φ31.8	Φ31.8→Φ38.1	Φ38.1→Φ41.3	Φ41.3→Φ44.5	Φ44.5→Φ54.0	

**Condition 2:** The length from the indoor unit to the nearest branch joint assembly ≤40m. (a, b, c,...j ≤40m)

**Condition 3:** The length difference between (the outdoor unit to the farthest indoor unit) and (the outdoor unit to the nearest indoor unit) ≤40m.  $[(L1+L5+L8+L9+j)-(L1+L2+L3+a)] \leq 40m$

4. When outdoor unit is on upside, the drop height between indoor unit and outdoor unit 50m is standard. When the drop height is over 50m, it needs to contact to factory.

When the outdoor unit is on upside and the drop height is over 20m, it is recommended that set an oil return bend every 10m in the gas pipe of the main pipe, the specification of the oil return bend refers to below figure.



5. When the outdoor unit is on the downside and drop height is over 40m, the liquid pipe of the main pipe need to increase one size.

● Refrigerant pipe selection

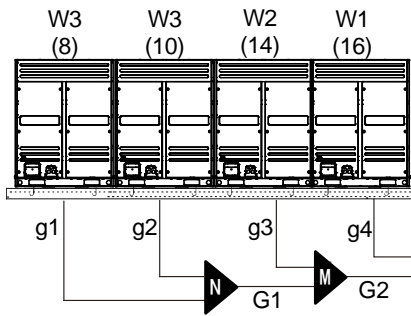
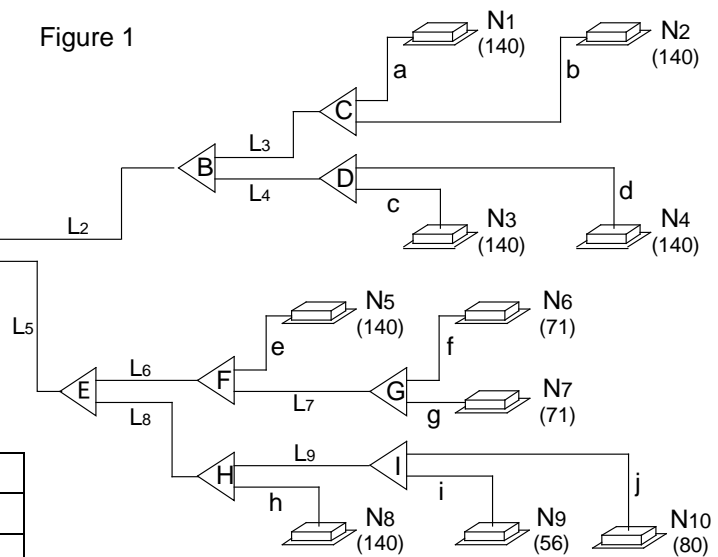


Figure 1



**Pipe name**

Main pipe	L1
Indoor unit main pipe	L2-L9
Indoor unit auxiliary pipe	a, b, c, d, e, f, g, h, i, j
Indoor unit branching pipe assembly	A, B, C, D, E, F, G, H, I
Outdoor unit branching pipe assembly	L, M, N
Outdoor unit connecting pipe	g1, g2, g3, g4, G1, G2

**Table1: Indoor unit auxiliary pipe selection (a-j)**

Capacity of indoor unit (A×100W)	Branching pipe length≤10m		Branching pipe length≥10m	
	Gas side	Liquid side	Gas side	Liquid side
A≤45	Φ12.7	Φ6.4	Φ15.9	Φ9.5
A≥56	Φ15.9	Φ9.5	Φ19.1	Φ12.7

**Table 2: Indoor unit main pipe selection (L1-L9)**

Capacity of indoor unit (A×100W)	Indoor unit main pipe (mm)		
	Gas side	Liquid side	Available branching pipe
A<166	Φ15.9	Φ9.5	TFQZHN-01D
166≤A<230	Φ19.1	Φ9.5	TFQZHN-01D
230≤A<330	Φ22.2	Φ9.5	TFQZHN-02D
330≤A<460	Φ28.6	Φ12.7	TFQZHN-03D
460≤A<660	Φ28.6	Φ15.9	TFQZHN-03D
660≤A<920	Φ31.8	Φ19.1	TFQZHN-03D
920≤A<1350	Φ38.1	Φ19.1	TFQZHN-04D
1350≤A<1800	Φ41.3	Φ22.2	TFQZHN-05D
1800≤A	Φ44.5	Φ25.4	TFQZHN-05D

E.g. refer to Fig.1, the capacity of downstream units to L2 is 140×4=560, the gas pipe for L2 is Φ28.6, liquid pipe is Φ15.9.

**Table 3: Main pipe selection (L1)**

Model	When the equivalent length of all liquid pipes < 90m		
	Gas side (mm)	Liquid side (mm)	The 1 <sup>st</sup> branching pipe
8HP	Φ22.2	Φ9.5	TFQZHN-02D
10HP	Φ22.2	Φ9.5	TFQZHN-02D
12-14HP	Φ25.4	Φ12.7	TFQZHN-03D
16HP	Φ28.6	Φ12.7	TFQZHN-03D
18-22HP	Φ28.6	Φ15.9	TFQZHN-03D
24HP	Φ28.6	Φ15.9	TFQZHN-03D
26-32HP	Φ31.8	Φ19.1	TFQZHN-03D
34-48HP	Φ38.1	Φ19.1	TFQZHN-04D
50-64HP	Φ41.3	Φ22.2	TFQZHN-05D

**Table 4: Main pipe selection (L1)**

Model	When the equivalent length of all liquid pipes ≥ 90m		
	Gas side (mm)	Liquid side (mm)	The 1 <sup>st</sup> branching pipe
8HP	Φ22.2	Φ12.7	TFQZHN-02D
10HP	Φ25.4	Φ12.7	TFQZHN-02D
12-14HP	Φ28.6	Φ15.9	TFQZHN-03D
16HP	Φ31.8	Φ15.9	TFQZHN-03D
18-22HP	Φ31.8	Φ19.1	TFQZHN-03D
24HP	Φ31.8	Φ19.1	TFQZHN-03D
26-32HP	Φ38.1	Φ22.2	TFQZHN-04D
34-48HP	Φ38.1	Φ22.2	TFQZHN-04D
50-64HP	Φ44.5	Φ25.4	TFQZHN-05D

**Note:** the main pipe L1 can be selected from table 2 or table 3 (4), the larger size should be finally selected.

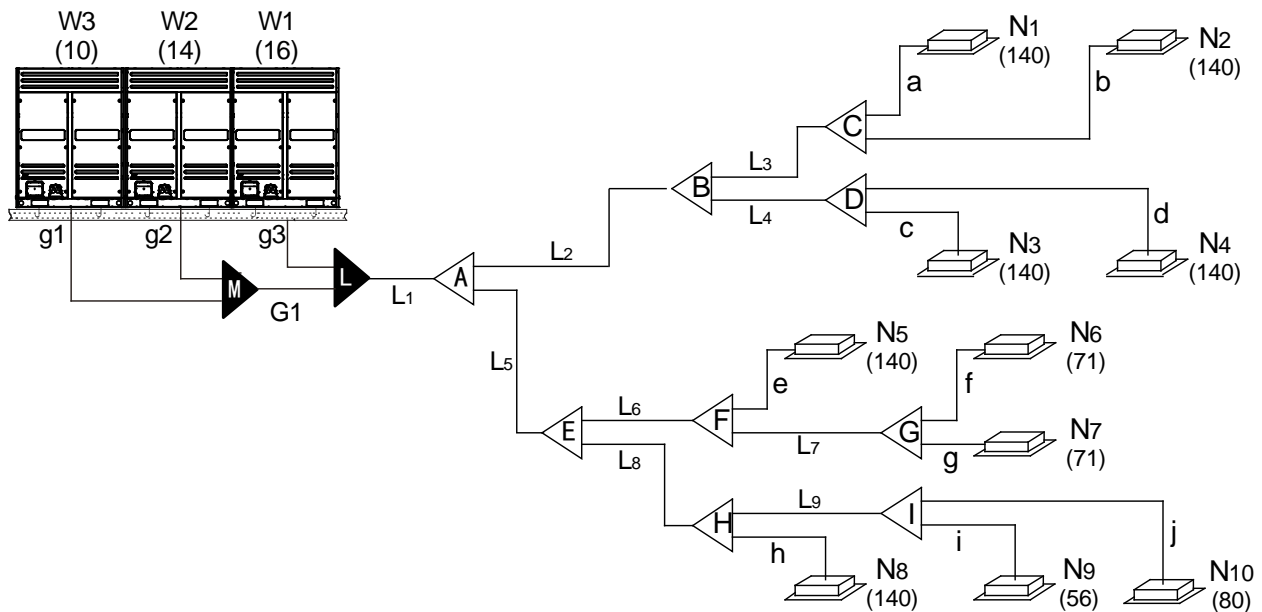
**Table 5: Outdoor unit connecting pipe selection (g1, g2, g3, g4, G1, G2)**

Pipe		Gas side (mm)	Liquid side (mm)
g1,g2, g3,g4	8/10HP	Φ25.4	Φ12.7
	12/14/16HP	Φ31.8	Φ15.9
G1		Φ38.1	Φ19.1
G2		Φ38.1	Φ22.2

**Table 6: Outdoor unit branching pipe assembly selection (L, M, N)**

Outdoor unit Quantity	Parallel connect with the branching pipes
2 units	L: TFQZHW-02N1D
3 units	L+M: TFQZHW-03N1D
4 units	L+M+N: TFQZHW-04N1D

**Example**



- 1) Take (16+14+10) HP that composed by three modules as an example to clarify the pipe selection.
- 2) Provided that the equivalent length of all pipes in this system is larger than 90m.

**I Indoor unit auxiliary pipes a~j selection (refer to table 1)**

**II Indoor unit main pipes L2~L9 selection (Refer to table 2)**

- ① The main pipe L3 with N1, N2 downstream indoor units that total capacity is  $140 \times 2 = 280$ , the pipe L3 diameter is  $\Phi 22.2 / \Phi 9.5$ , thus select TFQZHN-02D for the branching pipe C.
- ② The main pipe L4 with N3, N4 downstream indoor units that total capacity is  $140 \times 2 = 280$ , the pipe L3 diameter is  $\Phi 22.2 / \Phi 9.5$ , thus select TFQZHN-02D for the branching pipe D.
- ③ The main pipe L2 with N1~N4 downstream indoor units that total capacity is  $140 \times 4 = 560$ , the pipe L2 diameter is  $\Phi 28.6 / \Phi 15.9$ , thus select TFQZHN-03D for the branching pipe B.
- ④ The main pipe L7 with N6, N7 downstream indoor units that total capacity is  $71 \times 2 = 142$ , the pipe L7 diameter is  $\Phi 15.9 / \Phi 9.5$ , thus select TFQZHN-01D for the branching pipe G.
- ⑤ The main pipe L6 with N5~N7 downstream indoor units that total capacity is  $140 + 71 \times 2 = 282$ , the pipe L6 diameter is  $\Phi 22.2 / \Phi 9.5$ , thus select TFQZHN-02D for the branching pipe F.
- ⑥ The main pipe L9 with N9, N10 downstream indoor units that total capacity is  $56 + 80 = 136$ , the pipe L9 diameter is  $\Phi 15.9 / \Phi 9.5$ , thus select TFQZHN-01D for the branching pipe I.
- ⑦ The main pipe L8 with N8~N10 downstream indoor units that total capacity is  $140 + 56 + 80 = 276$  the pipe L8 diameter is  $\Phi 22.2 / \Phi 9.5$ , thus select TFQZHN-02D for the branching pipe H.
- ⑧ The main pipe L5 with N5~N10 downstream indoor units that total capacity is  $140 \times 2 + 56 + 71 \times 2 + 80 = 558$ , the pipe L5 diameter is  $\Phi 28.6 / \Phi 15.9$ , thus select TFQZHN-03D for the branching pipe E.
- ⑨ The main pipe A with N1~N10 downstream indoor units that total capacity is  $140 \times 6 + 56 + 71 \times 2 + 80 = 1118$ , thus select TFQZHN-05D for the branching pipe A.

### III Main pipe L1 selection (Refer to table 2, table 4):

Main pipe L1 in the Fig., which upstream outdoor units total capacity is  $10 + 14 + 16 = 40$ , based on table 4, the gas/liquid pipe diameter are  $\Phi 38.1 / \Phi 22.2$ , total capacity of the downstream indoor unit is  $140 \times 6 + 56 + 71 \times 2 + 80 = 1118$ , based on table 2, the gas/liquid pipe diameter are  $\Phi 38.1 / \Phi 19.1$ , take the large one for your selection, final confirm the main pipe diameter is: gas/liquid pipe  $\Phi 38.1 / \Phi 22.2$ .

### IV Outdoor unit connecting pipe (g1, g2, g3, g4, G1, G2) selection (refer to table 5, table 6)

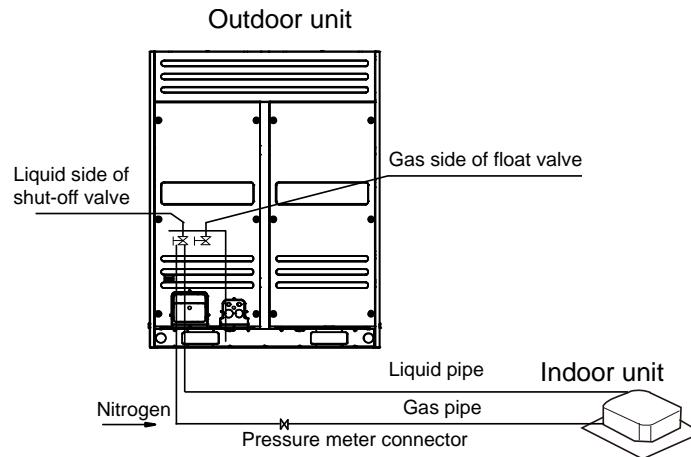
- ① The outdoor unit linked by Pipe g1 is 10HP, parallel connects with outdoor unit. The connecting pipe diameter to be selected according to its connector size is  $\Phi 25.4 / \Phi 12.7$ ;
- ② The outdoor unit linked by Pipe g2 is 14HP, parallel connects with outdoor unit. The connective pipe diameter to be selected according to its connector size is  $\Phi 31.8 / \Phi 15.9$ ;
- ③ The outdoor unit linked by Pipe g3 is 16HP, parallel connects with outdoor unit. The connective pipe diameter to be selected according to its connector size is  $\Phi 31.8 / \Phi 15.9$ ;
- ④ The upstream of G1 is the two parallel connected outdoor units, refer to Table 5 select the three parallel connected outdoor unit, the pipe diameter is  $\Phi 38.1 / \Phi 19.1$ .
- ⑤ Parallel connect the three outdoor units, refer to Table 6 should select TFQZHW-03N1C for outdoor unit connective pipes (L+M).

## 9. Remove dirt or water in the piping

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

## 10. Gas tightness test

- Upon set up the indoor unit pipeline, please connect the Hi-pressure pipe with shut-off valve firstly.
- Weld the pipe at the low pressure side to the meter connector.
- Use the vacuum pump discharging air inside the liquid side shut-off valve and meter connector, until to the  $-1 \text{ kgf/cm}^2$ .
- Close the vacuum pump, charge  $40 \text{ kgf/cm}^2$  nitrogen gas from the piston of shut-off valve and from the meter connector. Pressure inside should be maintained at there no less than 24 hrs.
- Upon the airtightness test, do a good welding between float valve and pipe at the low pressure side.



**Caution: 1. Pressurized nitrogen (3.9MPa; 40kgf/cm<sup>2</sup>) is used for airtightness test.**

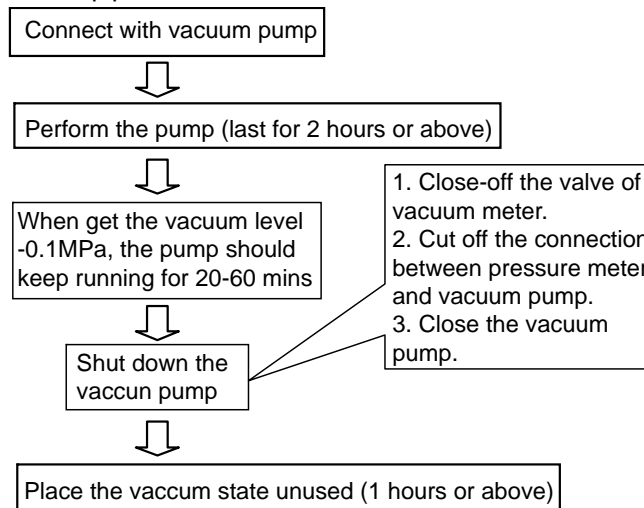
**2. It is not allowed to use oxygen, combustible gas or toxic gas to conduct the airtightness test.**

**3. When welding, please use wet cloth insulating the low pressure valve for protection.**

**4. For avoiding the equipment be damaged, the pressure maintained time should not last too long.**

## 11. Vacuum

- Use the vacuum pump which vacuum level lower than -0.1MPa and the air discharge capacity above 4L/s.
- The outdoor unit is not necessary to vacuum, don't open the outdoor unit gas and liquid pipe shut-off valves.
- Make sure the vacuum pump could result as -0.1MPa or below after 2 hours or above operation. If the pump operated 3 hours or above could not achieve to -0.1MPa or below, please check whether water mix or gas leak inside of the pipe.



Caution:

- Don't mix up the different refrigerants or abuse the tools and measurements which directly contact with refrigerants.
- Don't adopt refrigerant gas for air vacuuming.
- If vacuum level could not get to -0.1MPa, please check whether resulted by leakage and confirm the leakage site. If no leakage, please operate the vacuum pump again 1 or 2 hrs.

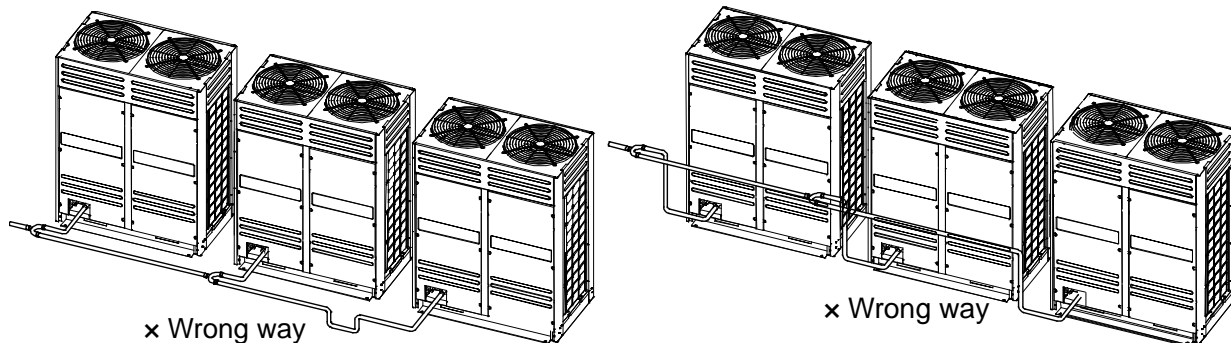
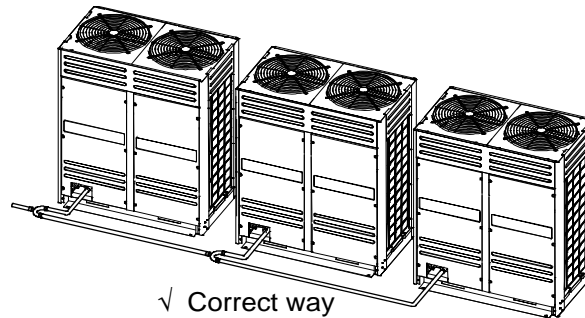
## 12. Additional refrigerant charge

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

Pipe size of liquid side	Additional refrigerant charge per meter (kg)
Φ6.4	0.022
Φ9.5	0.057
Φ12.7	0.11
Φ15.9	0.17
Φ19.1	0.26
Φ22.2	0.36
Φ25.4	0.52
Φ28.6	0.68

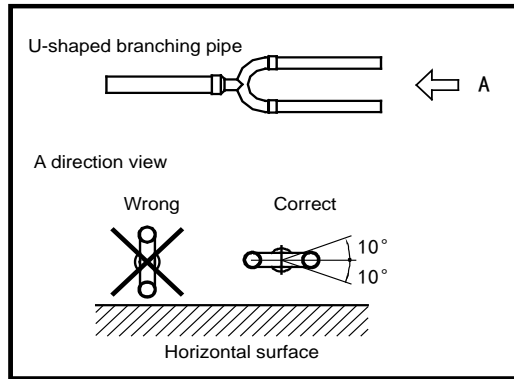
### 13. Outdoor units pipe connection

- Connect the pipes between outdoor units, the pipes should place horizontally, it is not allowed the concave at junction site.
- All connecting pipes between the outdoor units are not allowed to over than the height of every outlets of the pipes.
- For avoiding oil accumulate at the outdoor unit, please install the pipes properly.

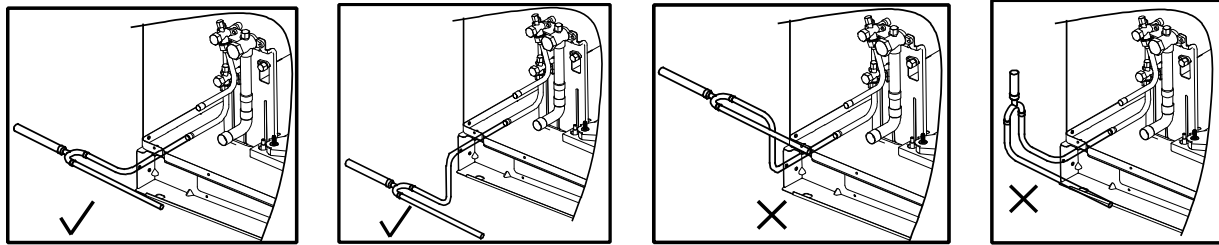


- The branching pipe must be installed horizontally, error angle of it should not large than 10°. Otherwise, malfunction will be caused.





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



## 14. Electric wiring installation

### 14.1 SW2 query instruction

Table 14-1: SW2 query instruction

Serial num.	Normal display	Display content	Note	Serial num.	Normal display	Display content	Note
1	0--	ODU address	0,1,2,3	16	5--	Discharge temp. of No. 2 fixed compressor	Actual value
2	1--	ODU capacity	8-16HP	17	6--	Current of digital scroll compressor	Actual value
3	2--	ODU quantity	Effective to main unit	18	7--	Current of No. 1 fixed compressor	Actual value
4	3--	IDU setting quantity	Effective to main unit	19	8--	Current of No. 2 fixed compressor	Actual value
5	4--	ODU total capacity	Capacity requirement	20	9--	Opening degree of EXV A	Actual value×8
6	5--	IDU capacity requirement	Effective to main unit	21	0--	Opening degree of EXV B	Actual value×8
7	6--	ODU total capacity (after correction)	Effective to main unit	22	1--	Discharge pressure	Actual value×0.1MPa
8	7--	Performance mode	0,2,3,4	23	2--	Quantity of IDU	Actual value
9	8--	ODU actual running capacity	Capacity requirement	24	3--	Quantity of running IDU	
10	9--	Fan speed	0,1,...,13	25	4--	Running mode	0,1,2,3,4
11	0--	T2/T2B-average temp.	Actual value	26	5--	Noise control mode	0,1,2
12	1--	T3-pipe temp.	Actual value	27	6--	Static pressure mode	0,1,2,3
13	2--	T4-ambient temp.	Actual value	28	7--	The last error or protection code	No problem displays 00
14	3--	Discharge temp. of digital scroll compressor	Actual value	29	8--	--	End
15	4--	Discharge temp. of No. 1 fixed compressor	Actual value				

**Note:**

- **Normal display:** In standby mode, display the quantity of indoor units which could communicate with outdoor unit. In running mode, display the output percent of the digital compressor.
- **Performance mode:** 0--OFF/FAN, 2--cooling, 3--heating, 4--constraint cooling.
- **Fan Speed:** 0-fan stop, 1~13 speed increase sequentially, 13 is the maximum fan speed.

- **Running Mode:** 0: Heating Priority, 1: Cooling priority; 2: First priority running mode is 63# indoor unit; second priority running mode is the larger capacity requirement; 3: Only respond to heating mode; 4: Only respond to cooling mode.
- **Noise control mode:** 3: None silent mode; 0: Night silent mode; 1: silent mode; 2: Super silent mode.
- **ENC1:** outdoor unit address setting switch. 0: main outdoor unit; 1-3: slave outdoor unit.
- **ENC2:** outdoor unit capacity setting switch. 0: 8HP; 1: 10HP; 2: 12HP; 3: 14HP; 4: 16HP.
- **S12 & ENC3:** indoor unit quantity setting switch.
- **ENC4:** network ADDR setting switch.
- **SW1:** constraint cooling button.
- **SW2:** query button.

## 14.2 Main board

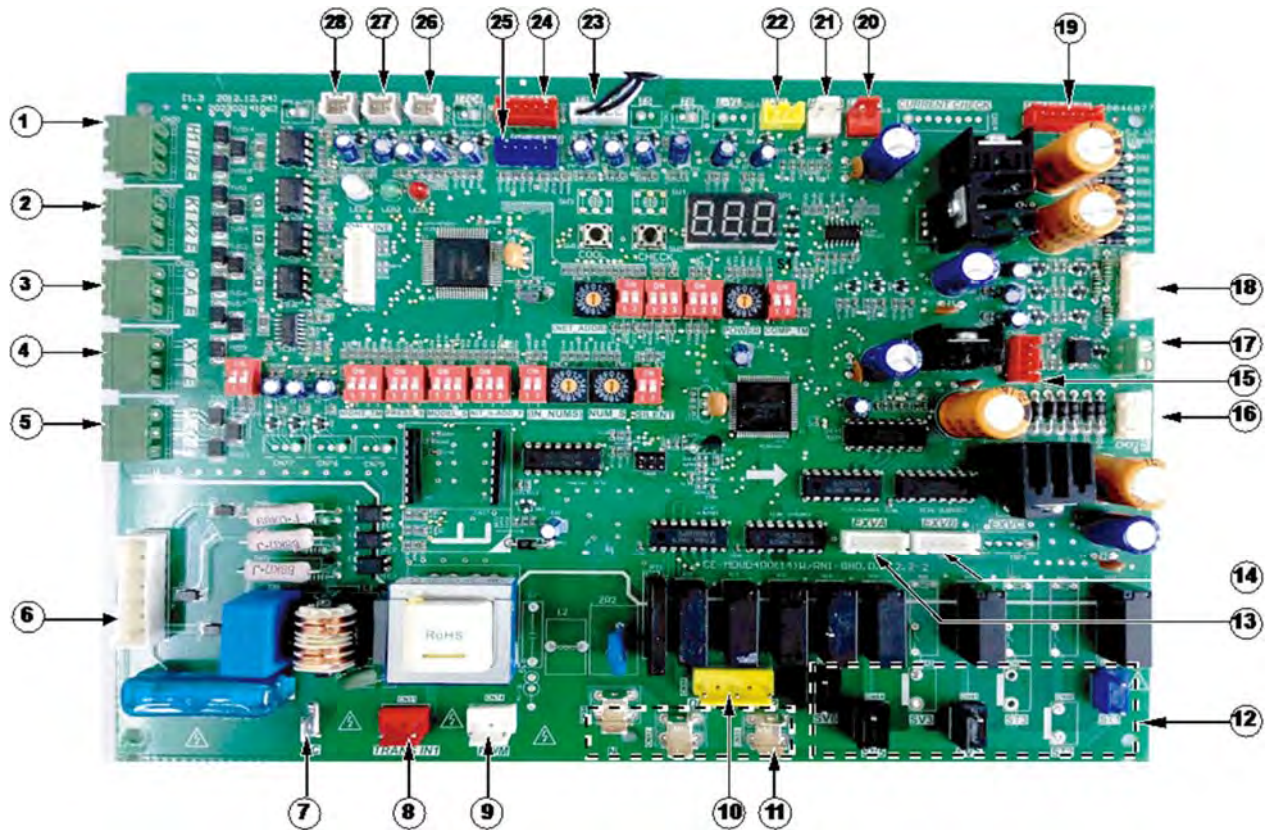


Table 14-2: main board instruction

No.	Content	Port voltage
1 CN20	Communication port among outdoor units (H1,H2,E)	2.5~2.7V DC
2 CN21	Outdoor centralized controller port(K1,K2,E)	2.5~2.7V DC
3 CN22	Digital electric ammeter port(O,A,E)	2.5~2.7V DC
4 CN23	Indoor centralized controller port(X,Y,E)	2.5~2.7V DC
5 CN24	Communication port among indoor units(P,Q,E)	2.5~2.7V DC
6 CN30	Phase sequence test port	380V AC
7 CN69	C-phase power supply	220V AC
8 CN31	Power input of NO.1 transformer	220V AC
9 CN74	Signal output port of PWM unloading valve	220V AC
10 CN56	Driver port of digital compressor, NO.1 and NO.2 fixed compressor	220V AC
11 CN53	Output port of N-phase	220V AC
12 CN47	Load output port	220V AC
13 CN70	Driver port of EXV A	12V
14 CN71	Driver port of EXV B	12V
15 CN60	Driver port of AC motor (only for DC+AC condenser fan type)	12V
16 CN32	Power output of NO.1 transformer	Yellow-Yellow: AC9V Brown-Brown: AC13.5V
17 CN29	Remote ON/OFF control port	5V
18 RN15	Current test port of digital compressor, NO.1 and NO. 2 fixed compressor	DC0~5V (in dynamic)
19 CN34	Power output of NO.2 transformer	Yellow-Yellow: AC9V Brown-Brown: AC13.5V
20 RN18	Signal input port of low pressure switch	5V
21 RN19	Signal input port of high pressure switch	5V
22 RN17	Signal input port of system pressure sensor switch	DC0~5V (in dynamic)
23 RN1	Temp. sensor port of outdoor ambient temp. and outdoor condenser pipe temp.	DC0~5V (in dynamic)
24 CN64	Driver port of DC motor A	5V
25 CN21	Driver port of DC motor B(only for DC+DC condenser fan type)	5V
26 CN6	Discharge temp. test port of NO.2 fixed compressor	DC0~5V (in dynamic)
27 CN5	Discharge temp. test port of NO.1 fixed compressor	DC0~5V (in dynamic)
28 CN4	Discharge temp. test port of digital compressor	DC0~5V (in dynamic)

### 14.3 Dial codes definition

S1	
	Starting time is 5 minutes
	Starting time is 12 minutes (default)
S2	
	Night silent time is 6h/10h (default)
	Night silent time is 6h/12h
	Night silent time is 8h/10h
	Night silent time is 8h/12h

S4	
	External static pressure is 0Pa (default)
	Low external static pressure (Reserve position, needs customize)
	Medium external static pressure (Reserve position, needs customize)
	High external static pressure (Reserve position, needs customize)

ENC1	
	Outdoor unit address setting (effective to 0-3): 0: setting for main unit 1-3: setting for slave unit
ENC2	
	Outdoor unit capacity setting (effective to 0-4): 0:8HP; 1:10HP; 2:12HP; 3:14HP; 4:16HP
ENC4	
	Network address setting (effective to 0~7) 0-7 Stand for 0~7

S3	
	Night silent mode (default)
	Silent mode
	Super silent mode
	None silent mode

ENC3&S12		
		The quantity of indoor unit is 0-15 0~9 on ENC3 refer to 0~9 indoor units; A~F on ENC3 refer to 10~15 indoor units.
		The quantity of indoor unit is 16-31 0~9 on ENC3 refer to 16~25 indoor units; A~F on ENC3 refer to 26~31 indoor units.
		The quantity of indoor unit is 32-47 0~9 on ENC3 refer to 32~41 indoor units; A~F on ENC3 refer to 42~47 indoor units.
		The quantity of indoor unit is 48-63 0~9 on ENC3 refer to 48~57 indoor units; A~F on ENC3 refer to 58~63 indoor units.

S5	
	Heating priority mode (default)
	Cooling priority mode
	First priority running mode is 63# unit; Second priority running mode is larger capacity requirement.
	Only respond to heating mode
	Only respond to cooling mode

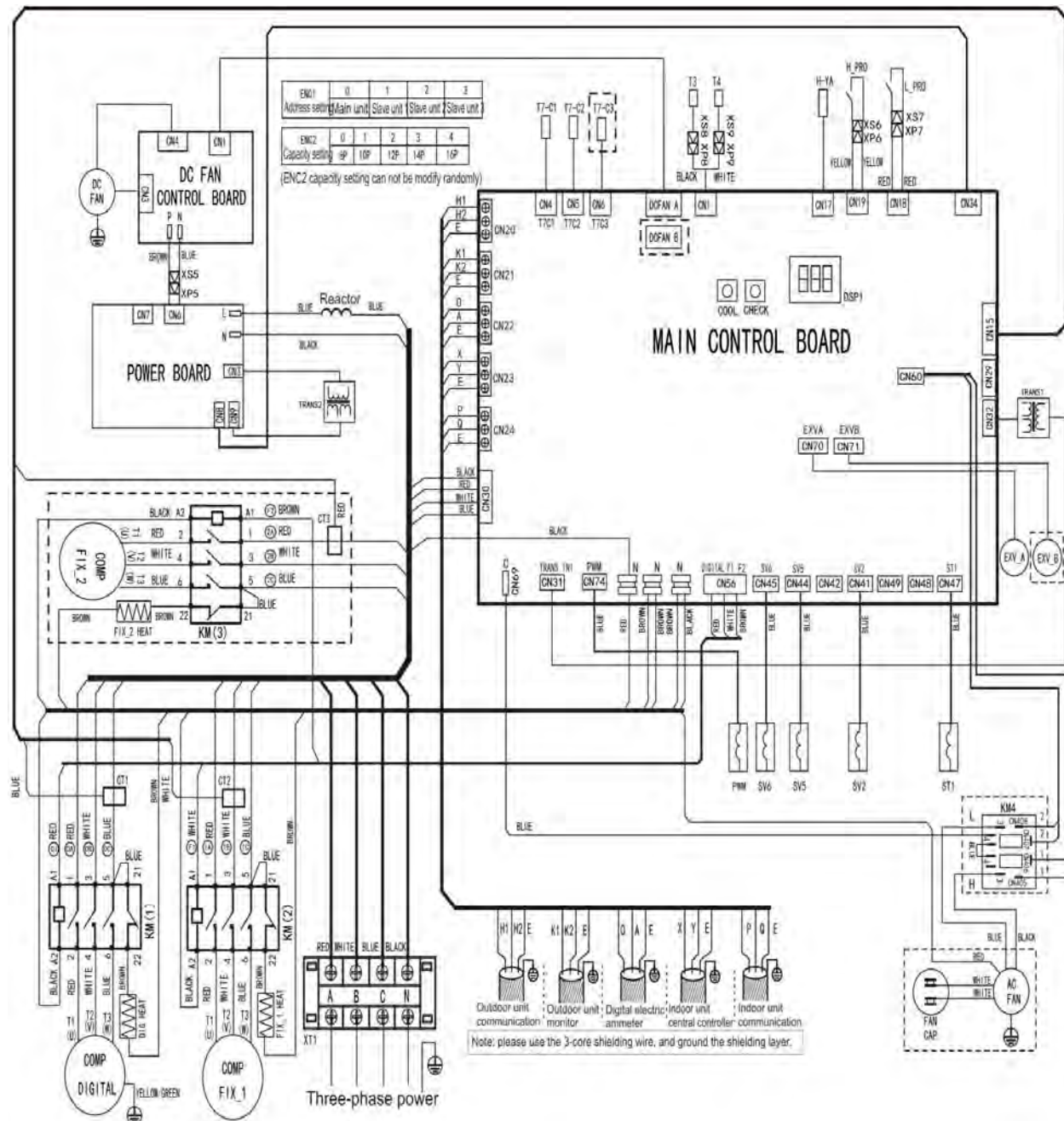


### 14.4 Electric wiring installation

**Caution:**

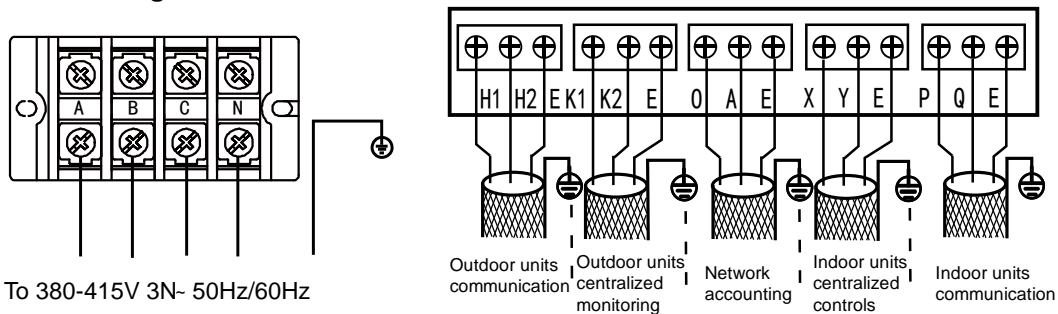
- 1) Please select power supply for indoor unit and outdoor unit separately.
- 2) The power supply should have specified branch circuit with leakage protector and manual switch.
- 3) The power supply, leakage protector and manual of all the indoor units connecting to the same outdoor unit should be universal.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

**Wiring Diagram**



Code	Name	Code	Name
COMP (DIGITAL)	Digital compressor	T4	Outdoor temperature sensor
COMP FIX_1,2	Fixed compressor	T7-C1	Discharge temperature sensor of digital compressor (external)
ST1	4-way valve	T7-C2, T7-C3	Discharge temperature sensor of fixed compressor
KM(1,2,3)	Contactors	CT1,2,3	Current inductor
KM4	Fan relay	TRANS1,2	Power transformer
L-PRO	Low voltage switch	SV2,5,6	Solenoid valve
H-PRO	Over voltage switch	HEAT (DIG 1,2)	Crankcase heater
EXV_A,B	Electronic expansion valve	PWM	PWM unloading valve
XS1-XS9	Terminal	H-YA	Pressure sensor
XP1-XP9	Terminal	XT1	Wire connector
T3	Pipe temperature sensor		

#### 14.4.1 Wiring terminals instruction



#### 14.4.2 Electric characteristics

System HP	Outdoor Unit				Power Supply			Compressor		OFM	
	Hz	Voltage	Min.	Max.	MCA	TOCA	MFA	MSC	RLA	KW	FLA
8HP	50	380~415	342	440	26.0	28	30	82.4/74.0	12.7+10.7	0.424	4.4
10HP	50	380~415	342	440	27.3	28	30	82.4/74.0	12.7+10.7	0.424	4.4
12HP	50	380~415	342	440	28.1	28	35	82.4/74.0	12.7+11.8	0.424	4.4
14HP	50	380~415	342	440	38.1	42	50	82.4/74.0/74.0	12.7+11.8x2	0.42+0.38	4.2+2.9
16HP	50	380~415	342	440	43.8	42	50	82.4/74.0/74.0	12.7+11.8x2	0.42+0.38	4.2+2.9

#### Remark:

MCA: Minimum Current Amps. (A)

TOCA: Total Over Current Amps. (A)

MFA: Maximum Fuse Amps. (A)

MSC: Maximum Starting Amps. (A)

RLA: Rated Loaded Amps. (A)

OFM: Outdoor Fan Motor.

FLA: Full Load Amps. (A)

KW: Rated Motor Output (kW)

The current value of combination unit is the total value of each basic mode (refer to units combination table in part 1)

For example: 46HP=14HP+16HP×2

Power current: MCA=38.1+43.8×2=125.7

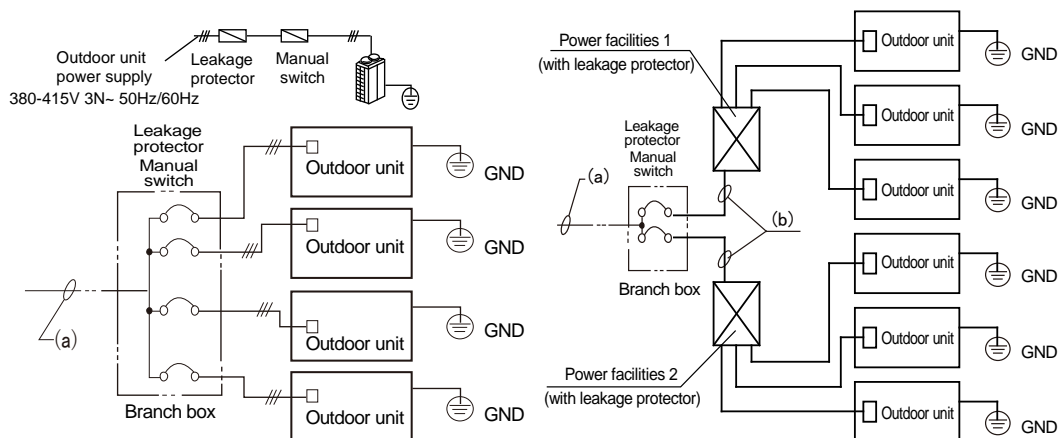
TOCA=42+42×2=126

MFA=50+50×2=150

Compressor: RLA=12.7+11.8×2+(12.7+11.8×2)×2=108.9

OFM: FLA=4.2+2.9+(4.2+2.9)×2=21.3

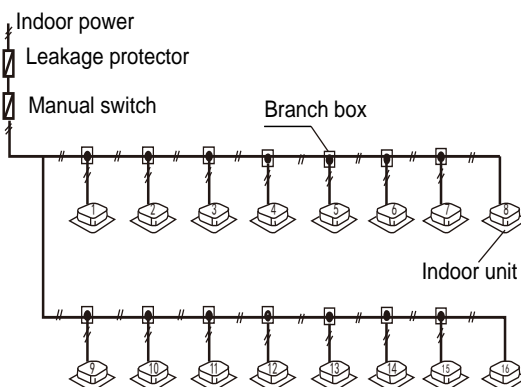
### 14.4.3 Outdoor unit powering supply wiring



**Note:**

Select power cord for the models separately according to local standard.

### 14.4.4 Indoor power supply



**Caution:**

- Set the refrigerant piping system, signal wires between indoor units, and signal wires between outdoor units into one system.
- Power supply must be unified to all indoor units in one system.
- Please do not put the signal wires and power wires in the same wire tube; keep distance between the two tubes. (Keep distance above 300mm, when current capacity of power supply less than 10A, and Keep distance above 500mm, when current capacity of power supply less than 50A)
- Make sure to set address of outdoor unit in case of parallel multi-outdoor units.

### 14.4.5 Control system and Installation

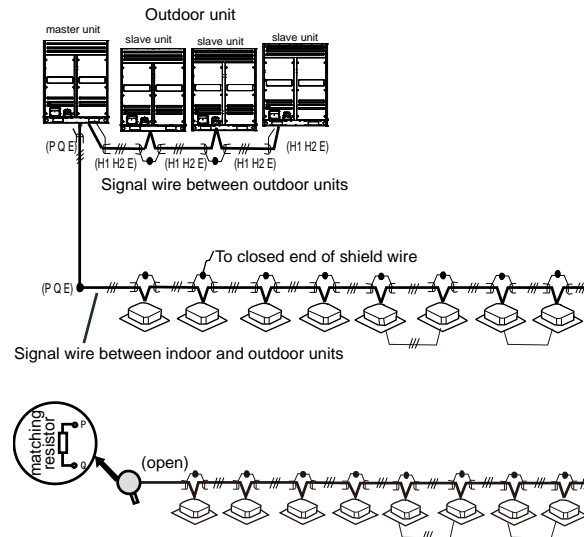
- The control line should be shielded wire. Using other wiring shall create signal interference, thus leading to error operation.
- The shielded nets at the two sides of shielded wires are either grounding, or connected with each other and jointed to the sheet metal along to the earth.

- Control wire could not be bound together with refrigerant pipe and power wire. When power wire and control wire is distributed in parallel form, keep gap between them above 300mm so as to prevent signal interference.
- Control wire could not form closed loop.
- Control wire has polarity, so be careful when connecting.

**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.

#### 14.4.6 Signal wire of indoor/outdoor units

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

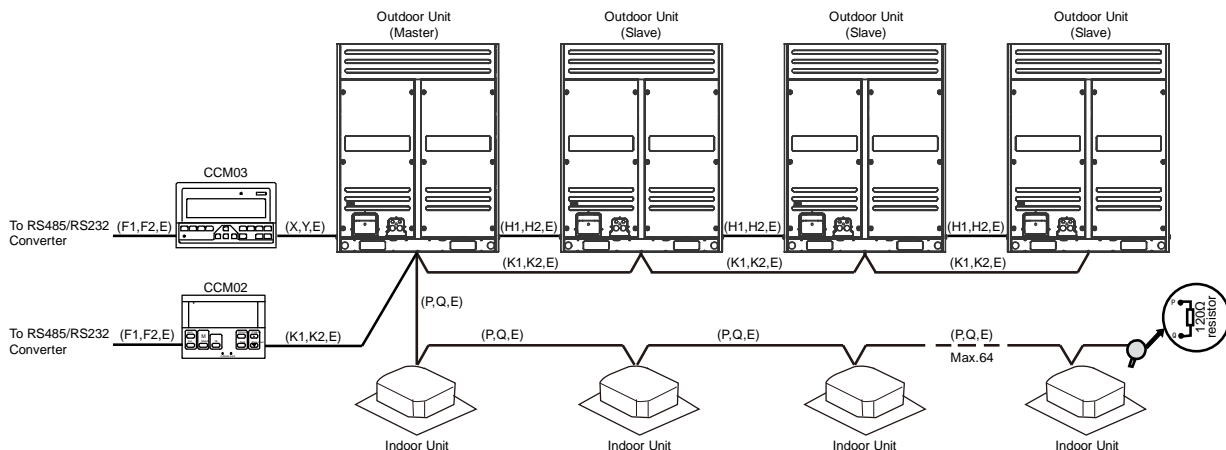


Note: The indoor unit at the end of communication system should parallel connect impedance between port P and port Q.

#### 14.4.7 Signal wire of centralized control

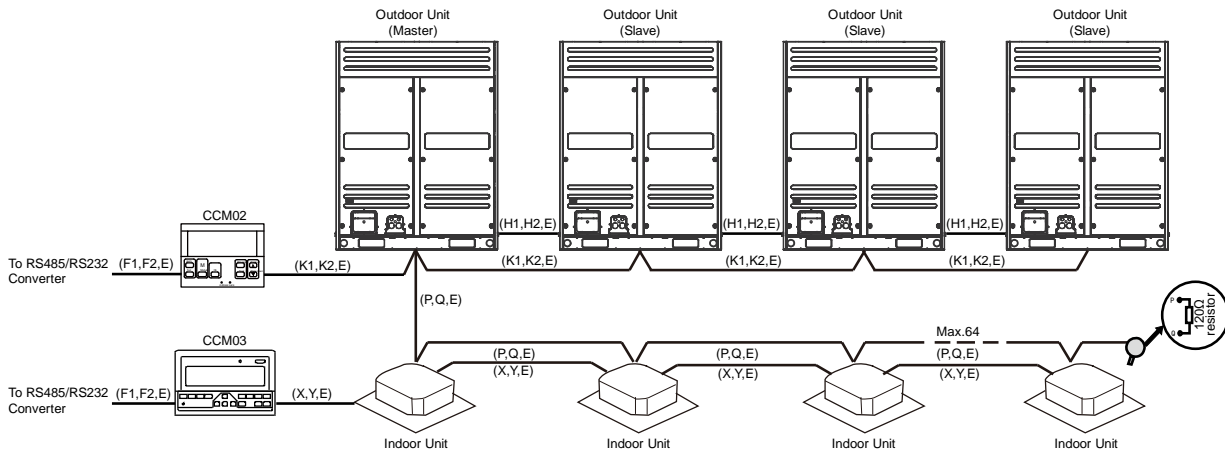
When centralized control is needed, one CCM03 (central controller of indoor unit) can only control the indoor units which are in the same refrigerant system **via the port X Y E of outdoor unit**. Outdoor unit will automatically distribute the address to indoor units without any manual setting. Remote controller can enquiry and modify every indoor unit address.

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

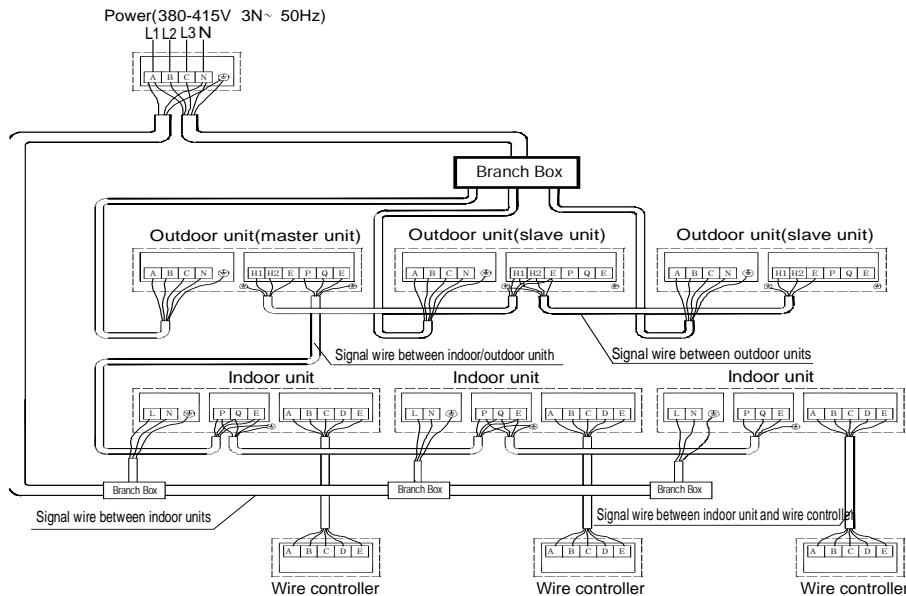




Besides, CCM03 can also connect indoor units **via the port X Y E of indoor unit**. However, one more group of wire(X Y E between indoor units) is needed; it is more complex and not suggested. Anyway, the diagram below shows the connection of signal wire in this case:



#### 14.4.8 Power wire connection



### 15. Running test

#### 15.1 Inspection and confirmation before commissioning

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

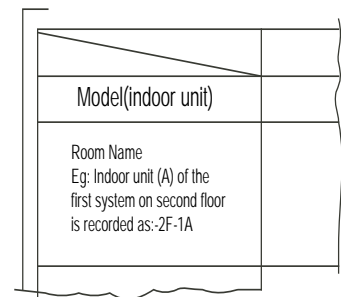
#### 15.2 Preparation before debugging

- Calculate the additional refrigerant quantity for each set of unit according to the actual length of liquid pipe.

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

### 15.3 Fill the name of connected system

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

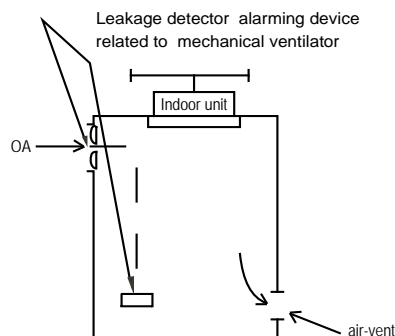


### 15.4 Caution on refrigerant leakage

- This air conditioner adopts R410A as refrigerant, which is safe and noncombustible.
- The room for air conditioner should be big enough that refrigerant leakage cannot reach the critical thickness. Besides this, you can take some action on time.
- R410A critical thickness: 0.3 [kg/m<sup>3</sup>], (Critical thickness: the max thickness of Freon without any harm to person)
- Calculate the critical thickness through following steps, and take necessary actions.
  1. Calculate the refrigerant charge (A [kg])
  2. Total refrigerant charge = delivered refrigerant charge (nameplate) + supplemental refrigerant charge
  3. Calculate the indoor volume (B [m<sup>3</sup>]) (as the minimum volume)
  4. Calculate the refrigerant thickness.

$$\frac{A \text{ kg}}{B \text{ m}^3} \leq \text{critical thickness } 0.3\text{kg/m}^3$$

- Countermeasure to over high refrigerant thickness
  5. Install mechanical ventilator to reduce the refrigerant thickness under critical level. (Ventilate regularly)
  6. Install leakage detector alarming device related to mechanical ventilator if you cannot regularly ventilate.





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