

# **TROPICAL DIGITAL VRF SYSTEM**



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## Installation

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## 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	Quantity	Appearance	Function
Outdoor unit installation manual	1		Installation guide
Outdoor unit owner's manual	1		Outdoor unit introduction
Indoor unit owner's manual	1		Indoor unit introduction
Toggling flathead screw	1		For toggling of indoor and outdoor units
90° mouthing elbow	1		For pipe connecting
Seal plug	8		For pipe cleaning
Connective pipe accessory	2		Connect to the side of liquid pipe and gas balance
Bag	1		Service

## 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 Φ10 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.

## **OTRUST**

- 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
А	830	1120
В	960	1250
С	736	736
D	765	765

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



## 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.



• 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.



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

• 8HP, 10HP, 12HP Installation illustration

## Example A





## Example B





А	≥300mm
В	≥250mm
С	≪3000mm
D	600~760mm
θ	≪15°



12 ST3.9 self-threading screws





Example B





#### Static Pressure Graphs





А	≥300mm
В	≥250mm
С	≪3000mm
θ	≪15°

#### Note:

725

- 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 allowanced 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
	<b>T</b> (11)			L1+(L2+L3+L4+L5+L6+L7+L8+
	iotai pipe		rood (please relef to hote T)	L9) $\times$ 2+a+b+c+d+e+f+g+h+i+j
Pipe	Maximum pipe	Actual length	175	
length	length of single Equivalent length		200 (please refer to note 2)	L1+L0+L0+L9+J
	Maximum pipe length of the farthest IDU to the first branch joint		40/90 (please refer to note 3)	
				L0+L0+L9+J
Dran	Indoor unit to outdoor	Outdoor unit up	50/70 (please refer to note 4)	1
Drop	unit drop height	Outdoor unit down	110 (please refer to note 5)	/
neight	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)

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

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 meted, 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:

## GTRUST

Ф9.5→Ф12.7	Ф12.7→Ф15.9	Ф15.9→Ф19.1	Ф19.1→Ф22.2	Ф22.2→Ф25.4	Ф25.4→Ф28.6
Ф28.6→Ф31.8	Ф31.8→Ф38.1	Ф38.1→Ф41.3	Ф41.3→Ф44.5	Ф44.5→Ф54.0	

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)] ≤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.



#### Pipe name

Main pipe	L1
Indoor unit main pipe	L2~L9
Indoor unit aux. pipe	a, b, c, d, e, f, g, h, i, j
Indoor unit branching pipe	A, B, C, D, E, F, G, H,
assembly	1
Outdoor unit branching pipe	
assembly	L, IVI,IN
Outdoor unit connecting	
nino	g1, g2, g3, g4, G1, G2

Table1: Indoo	r unit aux.	pipe selection	(a~j)
---------------	-------------	----------------	-------

O an a situ of	Branching pipe		Branching pipe	
capacity of	length≤10m		length≥10m	
	Gas	Liquid	Gas	Liquid
(A × 100VV)	side	side	side	side
A≤45	Ф12.7	Ф6.4	Ф15.9	Ф9.5
A≥56	Ф15.9	Ф9.5	Ф19.1	Φ12.7

(140) Table 2: Indoor unit main pipe selection (L1~L9)

N8

h

Capacity of	Indoor unit main pipe (mm)		
indoor unit	One side	Linuid side	Available
(A×100W)	Gas side		branching pipe
A<166	Ф15.9	Ф9.5	FQZHN-01C
166≪A<230	Ф19.1	Ф9.5	FQZHN-01C
230≪A<330	Ф22.2	Ф9.5	FQZHN-02C
330≪A<460	Ф28.6	Φ12.7	FQZHN-03C
460≪A<660	Ф28.6	Ф15.9	FQZHN-03C
660≪A<920	Ф31.8	Ф19.1	FQZHN-03C
920≪A<1350	Ф38.1	Ф19.1	FQZHN-04C
1350≤A<1800	Ф41.3	Ф22.2	FQZHN-05C
1800≪A	Ф44.5	Ф25.4	FQZHN-05C

N9

(56)

N10

(80)

E.g. refer to Fig.1, the capacity of downstream units to L2 is 140×4=560, the gas pipe for L2 is  $\Phi$ 28.6, liquid pipe is  $\Phi$ 15.9.



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

	When the equivalent length of all liquid				
Madal	pipes < 90m				
WOUEI	Gas side	Liquid side	The 1 <sup>st</sup>		
	(mm)	(mm)	branching pipe		
8HP	Ф22.2	Ф9.5	FQZHN-02C		
10HP	Ф22.2	Ф9.5	FQZHN-02C		
12-14HP	Ф25.4	Φ12.7	FQZHN-03C		
16HP	Ф28.6	Φ12.7	FQZHN-03C		
18-22HP	Ф28.6	Ф15.9	FQZHN-03C		
24HP	Ф28.6	Ф15.9	FQZHN-03C		
26-32HP	Ф31.8	Ф19.1	FQZHN-03C		
34-48HP	Ф38.1	Ф19.1	FQZHN-04C		
50-64HP	Ф41.3	Ф22.2	FQZHN-05C		

#### 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	Ф22.2	Ф12.7	FQZHN-02C				
10HP	Ф25.4	Ф12.7	FQZHN-02C				
12-14HP	Ф28.6	Ф15.9	FQZHN-03C				
16HP	Ф31.8	Ф15.9	FQZHN-03C				
18-22HP	Ф31.8	Ф19.1	FQZHN-03C				
24HP	Ф31.8	Ф19.1	FQZHN-03C				
26-32HP	Ф38.1	Ф22.2	FQZHN-04C				
34-48HP	Ф38.1	Ф22.2	FQZHN-04C				

Note: the main pipe L1 can be selected form table2 or table3 (4), the larger size should be finally selected.

#### Table 5: Outdoor unit connecting pipe selection

(g1, g2, g3, g4, G1, G2)

Example

Pipe		Gas side (mm)	Liquid side (mm)	
g1,g2,	8/10HP	Ф25.4	Ф12.7	
g3,g4	12/14/16HP	Ф31.8	Ф15.9	
G1		Ф38.1	Ф19.1	
00		<b>#004</b>	<b>#00.0</b>	

#### Table 6: Outdoor unit branching pipe assembly

#### selection (L, M, N)

Outdoor unit	Parallel connect with the branching			
Quantity	pipes			
2 units	L: FQZHW-02N1C			
3 units	L+M: FQZHW-03N1C			
4 units	L+M+N: FQZHW-04N1C			

#### W3 W2 W1 **N**1 N2 (10)(14)(16)(140)(140)а **C**A 0a П d 4 С g1 g2 g3 N3 (140) N4 2 (140) A M Lı G1 N5 N6 (140)L (71) е E N7 17 (71)L8 g I۵ h N8 (140) N9 **N**10 (56)(80)

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 aux. pipes a~j selection (refer to table 1)

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

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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 FQZHN-02C 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 FQZHN-02C 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 FQZHN-03C for the branching pipe B.

(4) The main pipe L7 with N6, N7 downstream indoor units that total capacity is  $71\times2=142$ , the pipe L7 diameter is $\Phi15.9/\Phi9.5$ , thus select FQZHN-01C for the branching pipe G.

(5) The main pipe L6 with N5 $\sim$ N7 downstream indoor units that total capacity is 140+71×2=282, the pipe L6 diameter is  $\Phi$ 22.2/ $\Phi$ 9.5, thus select FQZHN-02C for the branching pipe F.

<sup>6</sup> The main pipe L9 with N9, N10 downstream indoor units that total capacity is 56+80=136, the pipe L9 diameter isΦ15.9/Φ9.5, thus select FQZHN-01C for the branching pipe I.

 $\bigcirc$  The main pipe L8 with N8 $\sim$ 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 FQZHN-02C for the branching pipe H.

 $\otimes$  The main pipe L5 with N5 $\sim$ N10 downstream indoor units that total capacity is

140×2+56+71×2+80=558, the pipe L5 diameter isΦ28.6/Φ15.9, thus select FQZHN-03C for the branching pipe E.

0 The main pipe A with N1 $\sim$ N10 downstream indoor units that total capacity is 140×6+56+71×2+80=

1118, thus select FQZHN-05C 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

 $140\times6+56+71\times2+80=1118$ , 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.

## IVOutdoor 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 FQZHW-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 connecter, until to the -1kgf/cm<sup>2</sup>.
- Close the vacuum pump, charge 40kgf/cm<sup>2</sup> 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/cm2) 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 40L/min.
- The outdoor unit is not necessary to vacuum, don't open the outdoor unit gas and liquid pipe shut-off valves.
- Make sure the vacuum pump could result as -0.1MPa 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
Ф15.9	0.17
Φ19.1	0.26
Φ22.2	0.36
Φ25.4	0.52
Ф28.6	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 PCB board



#### Table 14-2: main board instruction

No.	Content	Port voltage
1 CN20	Communication port among outdoor units (H1、H2、E)	2.7V
2 CN21	Outdoor centralized controller port(K1、K2、E)	2.7V
3 CN22	Digital electric ammeter port(O、A、E)	2.7V
4 CN23	Indoor centralized controller port(X $\$ Y $\$ E)	2.7V
5 CN24	Communication port among indoor units( $P_{x} Q_{x} E$ )	2.7V
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	12V AC
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	12V AC
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	
S1 ON 1 2	Starting time is 5 minutes
S1 ON 1 2	Starting time is 12 minutes (default)
S2	
S2 ON 1 2 3	Night silent time is 6h/10h (default)
S2 ON 1 2 3	Night silent time is 6h/12h
S2 ON 1 2 3	Night silent time is 8h/10h
S2 ON 1 2 3	Night silent time is 8h/12h
S4	
S4 ON 1 2 3	External static pressure is 0Pa (default)
S4 ON 1 2 3	Low external static pressure (Reserve position, needs customize)
S4 ON 1 2 3	Medium external static pressure (Reserve position, needs customize)
S4 ON 1 2 3	High external static pressure (Reserve position, needs customize)
ENC1	
ENC1	Outdoor unit address setting (effective to 0-3): 0: setting for main unit 1-3: setting for slave unit
ENC2	
ENC2	Outdoor unit capacity setting (effective to 0-4): 0:8HP; 1:10HP; 2:12HP; 3:14HP; 4:16HP
ENC4	
ENC4	Network address setting (effective to 0~7) 0-7 Stand for 0~7

<b>S</b> 3	
S3 ON 1 2	Night silent mode (default)
S3 ON 1 2	Silent mode
S3 ON 1 2	Super silent mode
S3 ON 1 2	None silent mode

ENC3&S	ENC3&S12					
ENC3	S12 ON	Setting the numbers of indoor unit to be 0-15				
ENC3	S12 ON	Setting the numbers of indoor unit to be 16-31				
ENC3	S12 ON	Setting the numbers of indoor unit to be 32-47				
ENC3	S12 ON	Setting the numbers of indoor unit to be 48-63				

S5	
S5 ON 1 2 3	Heating priority mode (default)
S5 0N 1 2 3	Cooling priority mode
S5 ON 1 2 3	First priority running mode is 63# unit; Second priority running mode is larger capacity requirement.
S5 ON 1 2 3	Only respond to heating mode
S5 ON 1 2 3	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)
QT1	4 way yalvo		T7-C2, T7-	Discharge temperature sensor of fixed
511	4-way valve		C3	compressor
KM(1,2,3)	Contactor		CT1,2,3	Current inductor
KM4	Fan relay		TRANS1,2	Power transformer
L-PRO	Low voltage switch		SV2,5,6	Solenoid valve
			HEAT (DIG	Crankanan hantar
п-РКО	Over voltage switch		1,2)	Crankcase neater
EXV_A,B	Electronic expansion valve		PWM	PWM unloading valve
XS1-XS9	Terminal		H-YA	Pressure sensor
XP1-XP9	Terminal		XT1	Wire connector
Т3	Pipe temperature sensor	1		

## 14.4.1 Outdoor unit power wiring

#### Table 15-3: outdoor unit power wiring

Model	Power supply	Minimum power wire diameter		Manual switch (A)		Leakage
MODEI	r ower suppry	Size (pipe length)	Ground wire	capacity	Fuse	protector
8/10/12HP		4×10 mm <sup>2</sup> (<20 m)	1×10 mm <sup>2</sup>	30	25	
	280 4151//201/5011-	4×16 mm² (<50 m)				100mA
14/16HP	300-413V/3N/30HZ	4×16 mm <sup>2</sup> (<20 m)	1×16 mm <sup>2</sup>	40	35	0.1sec or less
		4×25 mm² (<50 m)				

Note:

- Select power cord for the five models separately according to relevant standard.
- 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.

## 14.4.2 Wiring connection of power facilities



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## 14.4.3 Select the wire diameter

- Power wiring refers 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.
- Diameter of main wire (a)
   It depends on the total horsepower of outdoor unit and the table 15-4.
   E.g. In a system, the outdoor units are: (8Hp×1unit+8Hp×1unit+10Hp×1unit)
   Total HP=26Hp→(Table.15-4)→size of wire=35mm<sup>2</sup> (within 50m)
- Diameter of wiring (b)

It depends on the number of combined outdoor unit. If fewer than 5, the diameter is the same as the 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 table 15-4.

Total HP	<20m	<50m	Total HP	<20m	<50m
8	10	16	38	35	50
10	10	16	40	35	50
12	10	16	42	50	70
14	16	25	44	50	70
16	16	25	46	50	70
18	16	25	48	50	70
20	16	25	50	70	95
22	16	25	52	70	95
24	25	35	54	70	95
26	25	35	56	70	95
28	25	35	58	70	95
30	35	50	60	70	95
32	35	50	62	70	95
34	35	50	64	70	95
36	35	50			

Table 14-4: wire diameter selection ( $\geq$ ) (unit: mm<sup>2</sup>)

## 14.4.4 Select the capacity of manual switch and fuse of the branch box.

See table 14-3 when there is no power facilities, depends on the outdoor unit it connecting to.

See table 14-5 below when there is power facility, depends on the total horsepower.

#### Table 14-5: capacity of manual switch and fuse

Total HP	Manual switch (A)	Fuse (A)
10-14	40	35
15-18	63	45
19-28	80	65
29-36	80	75
37-47	120	100
48-50	150	120
51-64	200	175



#### 14.4.5 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.

#### 14.4.6 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.



## 14.4.7 Signal wire of indoor/outdoor units

Signal wire of indoor/outdoor unit adopts 3-core shielded wire ( $\geq 0.75$ mm<sup>2</sup>) 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.

#### 14.4.8 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 ±10% rated voltage.
- Check and confirm that the power wire and control wire are correctly connected.
- Check whether wire controller is properly connected.
- Before powering on, confirm there is no short circuit to each line.
- Check whether all units have passed nitrogen pressure-keeping test for 24 hours with R410A: 40kg/cm<sup>2</sup>.
- 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.

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## 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.

Model(indoor unit)	(
Room Name Eg: Indoor unit (A) of the first system on second floor is recorded as:-2F-1A	

## 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.

$$\frac{A \text{ kg}}{B \text{ m3}} \leq \text{critical thickness } 0.3 \text{kg/m3}$$

- 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.





## Air Conditioning Systems

Cooling & Heating

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