Haier

MRV S^{II} (7HP)

Service Manual

SYJS-02-2021 REV.A Edition: 2021-02

Haier

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AU07NFPEUA

1.2 Indoor units

4-WAY CASSETTE TYPE/PB-700IB

AB052MCERA
AB072MCERA
AB092MCERA
AB122MCERA
AB162MCERA
AB182MCERA(C)

4-WAY CASSETTE TYPE/PB-950JB

AB182MCERA
AB242MCERA
AB282MCERA
AB302MCERA
AB382MCERA
AB482MCERA

ROUND-WAY SMART AIR FLOW CASSETTE/ PB-950KB

AB072MRERA
AB092MRERA
AB122MRERA
AB162MRERA
AB182MRERA

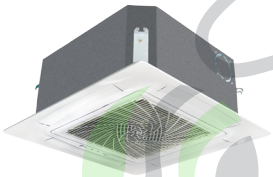
AB242MRERA
AB282MRERA

AB302MRERA
AB382MRERA

AB482MRERA
AB602MRERA

MINI 4-WAY CASSETTE TYPE/PB-620KB

AB052MCERA(M)
AB072MCERA(M)
AB092MCERA(M)
AB122MCERA(M)
AB162MCERA(M)
AB182MCERA(M)



ONE WAY CASSETTE TYPE/P1B-1050IB

AB052MAERA
AB072MAERA
AB092MAERA
AB122MAERA

2-WAY CASSETTE TYPE/ P1B-1055IB

AB072MBERA
AB092MBERA
AB122MBERA
AB162MBERA
AB182MBERA

LOW ESP DUCT TYPE

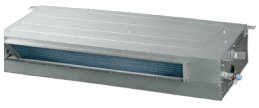
AD072MLERA
AD092MLERA
AD122MLERA

AD162MLERA
AD182MLERA
AD242MLERA

SLIM LOW ESP DUCT

AD072MSERA
AD092MSERA
AD122MSERA
AD162MSERA

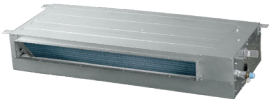
AD182MSERA
AD242MSERA



DC SLIM LOW ESP DUCT

AD072MSERA(D)
AD092MSERA(D)
AD122MSERA(D)
AD162MSERA(D)

AD182MSERA(D)
AD242MSERA(D)



MED ESP DUCT TYPE (80/120Pa)

AD182MZERA
AD242MZERA
AD282MZERA

AD302MNERA
AD382MNERA
AD482MNERA

MED ESP DUCT TYPE (50/96Pa)

AD182MMERA
AD242MMERA
AD282MMERA

AD302MMERA
AD382MMERA
AD482MMERA

MED ESP DUCT TYPE (50/100Pa)

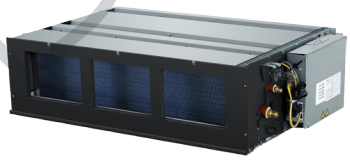
AD052MJERA
AD072MJERA
AD092MJERA
AD122MJERA
AD162MJERA

AD182MJERA
AD242MJERA
AD282MJERA

AD302MJERA
AD382MJERA
AD482MJERA

CONSTANT AIR VOLUME DUCT TYPE

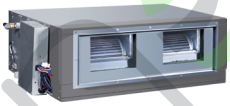
AD072MQERA
AD092MQERA
AD122MQERA
AD152MQERA
AD182MQERA
AD242MQERA
AD282MQERA
AD302MQERA



AD362MQERA
AD422MQERA
AD482MQERA
AD542MQERA

HIGH ESP DUCT TYPE

AD182MHERA
AD242MHERA
AD282MHERA



AD302MHERA
AD382MHERA
AD482MHERA

CONVERTIBLE TYPE

AC092MCERA
AC122MCERA
AC162MCERA
AC182MCERA
AC242MCERA

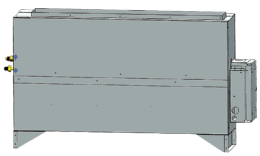
AC282MFERA
AC302MFERA
AC382MFERA
AC482MFERA

CONSOLE

AF052MAERA
AF072MAERA
AF092MAERA
AF122MAERA
AF182MAERA

BUILIT-IN FLOOR STANDING

AE072MLERA
AE092MLERA
AE122MLERA
AE162MLERA
AE182MLERA
AE242MLERA



EK HIGH WALL

AS072MGERA
AS092MGERA
AS122MGERA
AS162MGERA
AS182MGERA
AS242MGERA

NEW CONSOLE

AF052MBERA
AF072MBERA
AF092MBERA
AF122MBERA
AF182MBERA

N HIGH WALL

AS052MNERA
AS072MNERA
AS092MNERA
AS122MNERA

AS162MNERA
AS182MNERA
AS242MNERA

AS282MNERA
AS302MNERA

AS052MFERA
AS072MFERA
AS092MFERA
AS122MFERA

AS162MFERA
AS182MFERA
AS242MFERA

1.3 Feature

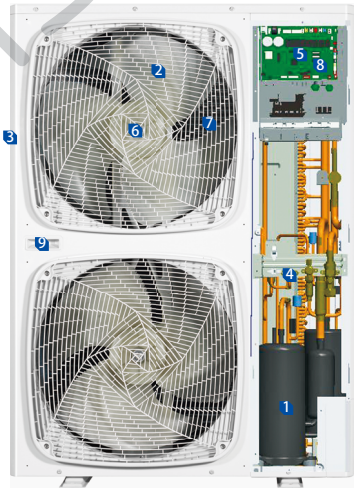
New platform, new outlook

Spiral air outlet grille
Better outlook and lower noise

Built-in charge valve
Safer and easier maintenance

Round corner
Better outlook & safer

High energy efficiency



1 DC inverter compressor
Haier takes DC INV. compressor, 5% power input lower. (14kw)

2 DC fan motor and 550mm big fan
38% power input lower and 8% airflow higher

3 Larger heat exchanger
Heat exchange area rise 10%. (14kw)

4 Charge Valve
Built-in charge valve enables safer and easier maintenance

5 Low standby power
New PCB program, reduce 20% standby power consumption

Comfort

6 New aerodynamics fan
550mm super big diameter aerospace helix fan. Lowering sound level 3 dB(A)

7 Enlarged air inlet path and spiral air outlet path
Air flow direction follows the grill direction. Lowering sound level 2-4 dB(A)

8 Automatic sound-lowering program
Night mode set by PCB, 8dB(A) lower

Convenience

9 Double side “4 ” handles
Easy to carry

10 “888” test panel
All running data & error code can be checked from "888" screen, which is easy for installers

11 “Four-way” pipe connection
4-way (front, back, left & right) pipe connection, easy to design and install

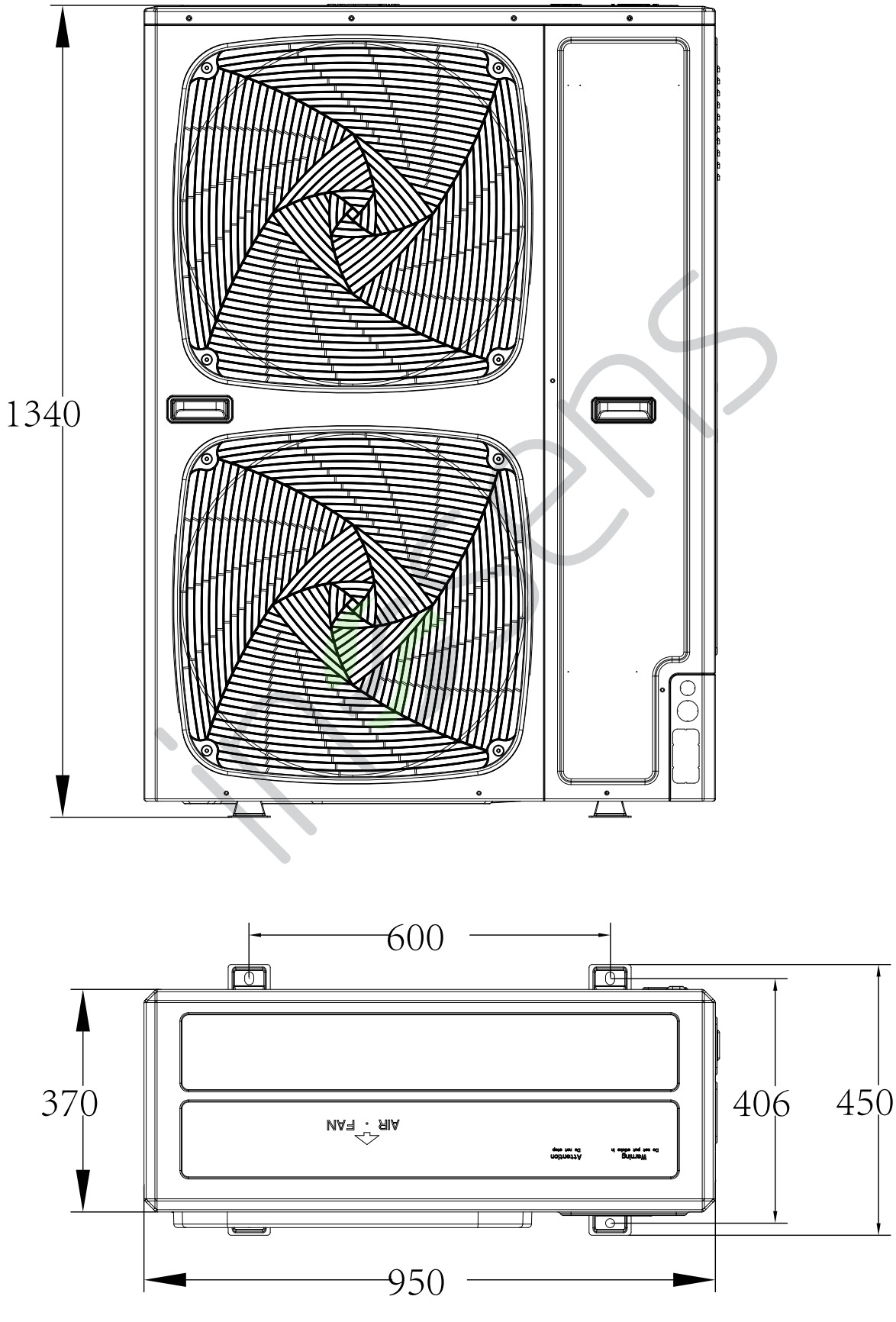
2. Specification

Model			AU07NFPEUA
Power supply		Ph/V/Hz	3/380~415/50/60
Cooling	Rated capacity	kW	18.00
	Rated capacity	kBtu/h	61.4
	Rated power input	kW	4.75
	Max. power input	kW	7.8
	EER		3.79
	Rated current	A	7.5
	Max. current	A	12.3
Heating	Rated capacity	kW	20.0
	Rated capacity	kBtu/h	68.2
	Rated power input	kW	4.56
	Max. power input	kW	7.5
	COP		4.39
	Rated current	A	7.2
	Max. current	A	11.9
Compressor	Brand		MITSUBISHI ELECTRIC
	Model		MNB42FFDMC-L
	Type		Rotary
	Compressor quantity		1 INV
	Capacity	W	13780
	Power Input	W	4060
	Rated current(RLA)	A	12.3
	Speed	rps	60
	Crankcase Heater	W	28
	Refrigerant oil brand		Itochu.,LTD.,Shanghai
	Refrigerant oil type		FV50S
	Refrigerant oil charge	ml	1400
Outdoor fan motor	Brand		NIDEC/BROAD OCEAN
	Model		SIC-88FWJ-F1180-1/ZWK511D000001
	Voltage		310V
	IP Class		IP44
	Type		DC
	Insulation class		E
	Safe class		I
	Power Input	W	225*2
	Output	W	180*2
	Rated current	A	0.40
	Capacitor	μF	/
	Speed	rpm	720
Outdoor fan	Brand		GUOEN
	Model		/
	Material		Plastic
	Type		Axial
	Diameter	mm	550
	Height	mm	200

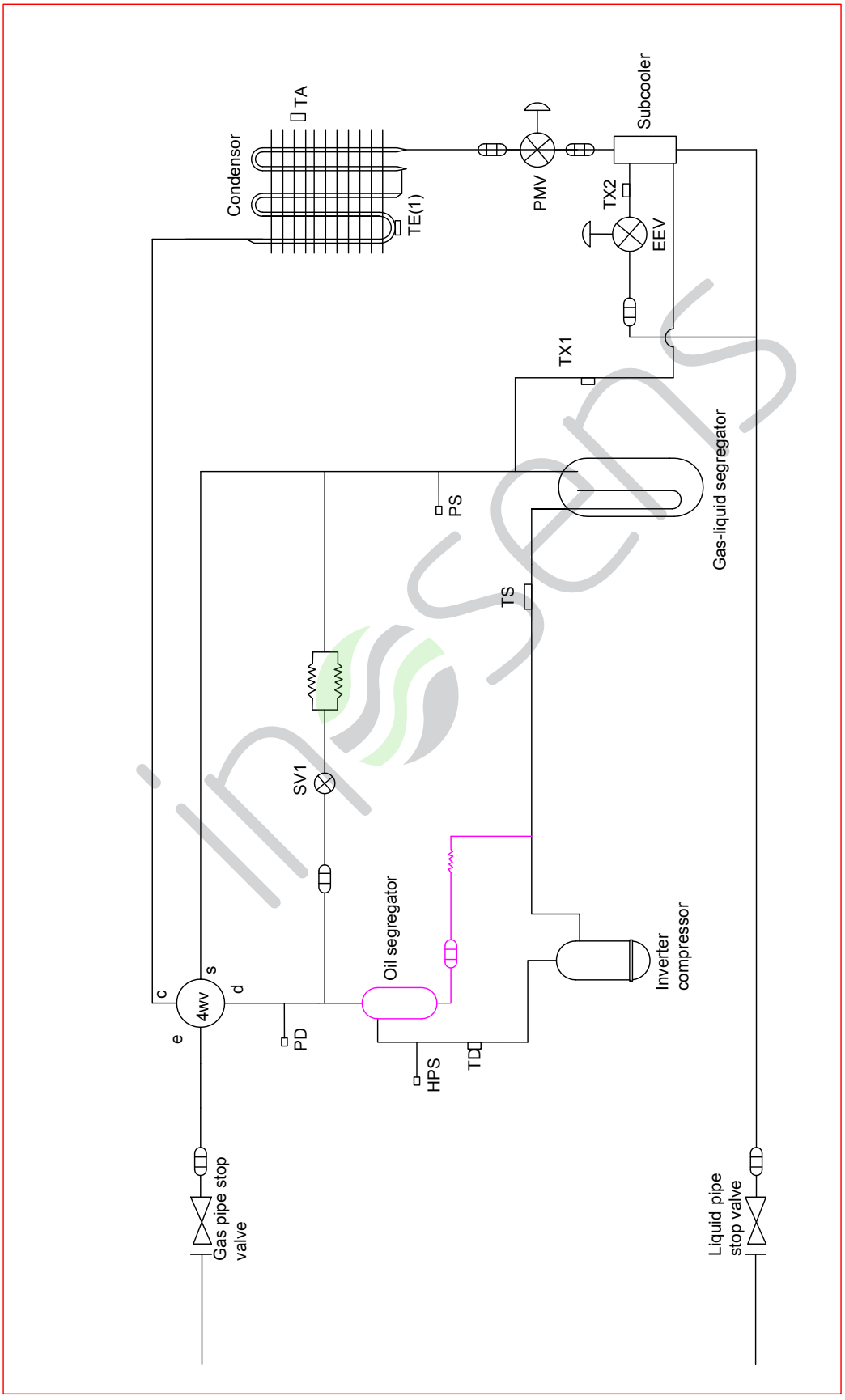
Model			AU07NFPEUA
Power supply		Ph/V/Hz	3/380~415/50/60
Outdoor coil	Number of rows		2
	Tube pitch(a)x row pitch(b)	mm	21*18.186
	Fin spacing	mm	1.40
	Fin type (code)		
	Fin Coating Type	optional	Hydrophilic aluminum
	Salt Spray Test Duration	Hour	500
	Tube outside dia.and type		Internal thread copper tube
		mm	Φ7
	Coil length x height	mm	1005*1302
	Number of circuits		10
Cabinet coating	Coating type		Powder Coating
	Salt Spray Test Duration	Hour	500
	Sheet Metal Material		Hot zinc plate
	Sheet Metal Thickness	mm	0.8
Control panel enclosure IP class		standard	IP24
Outdoor air flow		m^3/h	7200
Outdoor sound level(sound pressure level)		dB(A)	54
Outdoor sound level(sound power level)		dB(A)	65
Outdoor unit	Dimension(W*D*H)	mm	950/1340/370
	Packing (W*D*H)	mm	1023/1492/483
	Net weight	kg	108
	Gross weight	kg	123
Refrigerant	Type		R410A
	Charged volume	kg	4
Throttle type			EXV
Design pressure		MPa	4.15
Refrigerant piping	Liquid pipe	mm	Φ9.52
	Gas pipe	mm	Φ15.88
	Total pipe lenth	m	300
	Max. pipe length(Equivalent/ Actual)	m	150
	Max.Diff. indoor/ outdoor unit	m	"50 40"
	Max.Diff. indoor/ indoor unit	m	15
Connectable indoor unit ratio		%	50%~130%
Maximum indoor units		Piece	13
Connection wiring	Power wiring	mm^2	4
	Signal wiring	mm^2	Shield wire：(0.75-2）*2
Operation Range		℃	Cooling: -5~50 Heating: -20~27

Norminal condition: indoor temperature (cooling): 27℃ DB/19℃ WB, indoor temperature (heating): 20℃ DB/14.5℃ WB.
Outdoor temperature(cooling): 35℃ DB/24℃ WB, outdoor temperature(heating): 7℃ DB/6℃ WB The data is measured with 7.5m equivalent pipe and 0 m height difference.
The noise level will be measured in the third octave band limited values in the semi-anechoic chamber, using a Real Time Analyser calibrated sound intensity meter. It is a sound pressure noise level.

3. Dimension



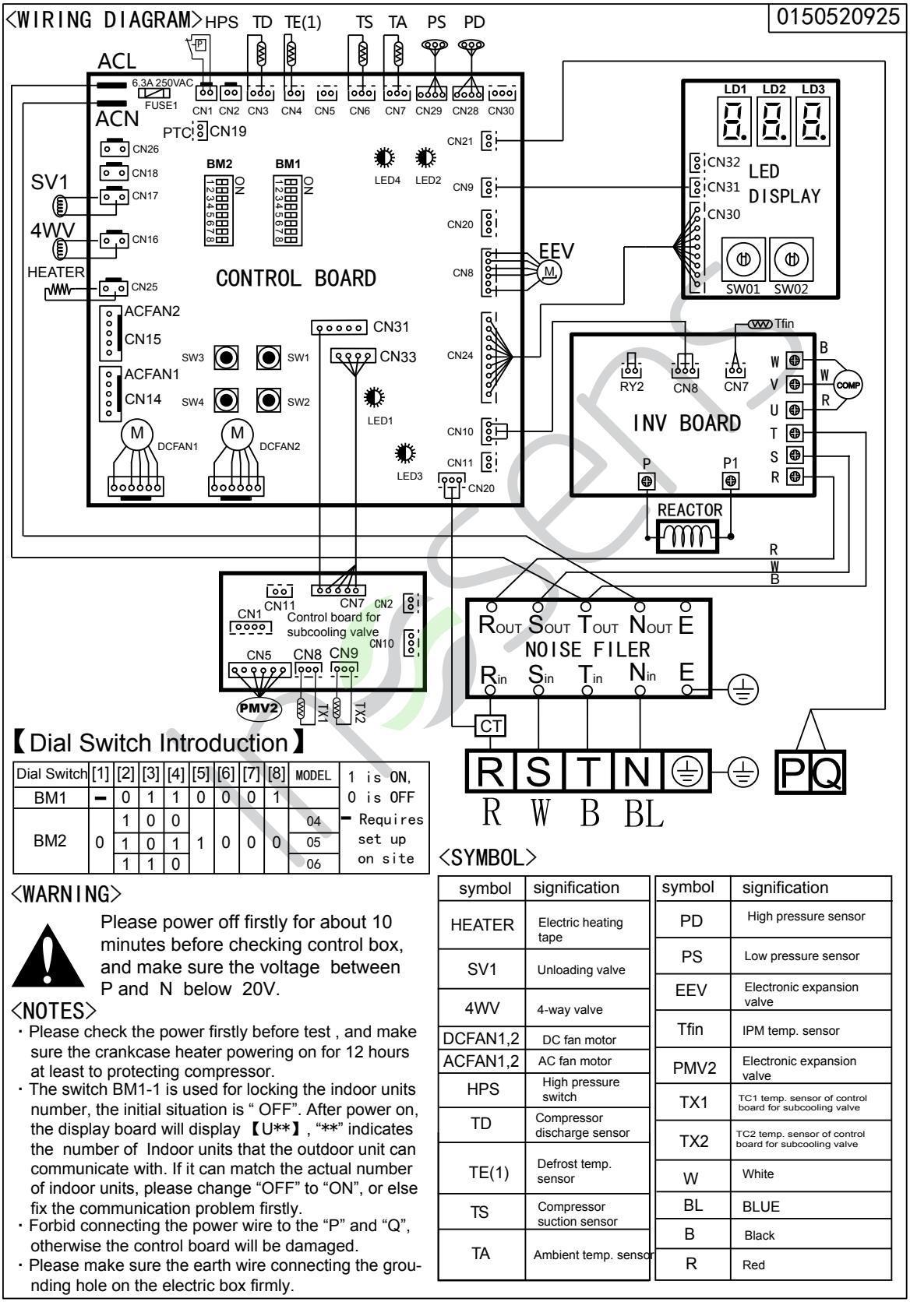
4. Piping Diagram



Part name	Sign	Function	Date	Note
Compressor	/	Capacity control, meet indoor load request by adjusting frequency and opening and closing fixing frequency compressor.		20°C
Pressure switch	HPS	High pressure protection	4.15Mpa, OFF	
Electronic expansion valve	EEV	In heating, refrigerant flow control (subcooling valve)	Φ3.0	
Solenoid valve	SV1	1. Keep balance of high/low pressure when compressor starts up and stops 2. High/low pressure protection	AC220V Open when power is on, close when power is off.	2A
4-way valve	4WV	Changing over between cooling and heating	AC220V electrified in heating; powered off in cooling or defrosting.	
Pressure sensor	PD	In heating, compressor frequency adjustment, abnormal pressure protection		
	PS	In cooling, compressor frequency adjustment, abnormal pressure protection		
Temp. sensor	TD	Detect the top temp. of compressor	R(80°C)=50K B(25/80°C)=4450K	
	TS	Detect the top suction of compressor	R(80°C)=10K B(25/80°C)=3700K	
	TA	Detect ambient temp., set primary fan speed and control defrost condition		
	TX1	Detect the temp. of before and after the supercooling valve to control the supercooling valve open angle.		
	TX2			
	TE(1)	Detect frost condition of outdoor heat exchanger		
Heater	Chi	Used to heat oil in inverter compressor	28W, 220V, one	

5. Wiring Diagram

AU07NFPEUA



【Dial Switch Introduction】

Dial Switch	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	MODEL	1 is ON, 0 is OFF
BM1	-	0	1	1	0	0	0	1		
BM2	0	1	0	0	1	0	0	0	04	- Requires set up on site
		1	0	1					05	
		1	1	0					06	

<WARNING>

Please power off firstly for about 10 minutes before checking control box, and make sure the voltage between P and N below 20V.

<NOTES>

- Please check the power firstly before test , and make sure the crankcase heater powering on for 12 hours at least to protecting compressor.
- The switch BM1-1 is used for locking the indoor units number, the initial situation is " OFF". After power on, the display board will display 【U**】, "**" indicates the number of Indoor units that the outdoor unit can communicate with. If it can match the actual number of indoor units, please change "OFF" to "ON", or else fix the communication problem firstly.
- Forbid connecting the power wire to the "P" and "Q", otherwise the control board will be damaged.
- Please make sure the earth wire connecting the grounding hole on the electric box firmly.

<SYMBOL>

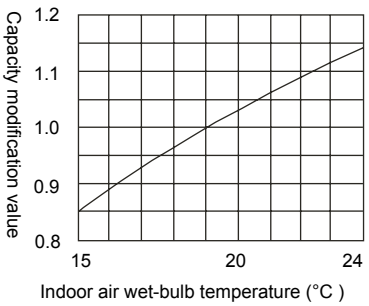
symbol	signification
HEATER	Electric heating tape
SV1	Unloading valve
4WV	4-way valve
DCFAN1,2	DC fan motor
ACFAN1,2	AC fan motor
HPS	High pressure switch
TD	Compressor discharge sensor
TE(1)	Defrost temp. sensor
TS	Compressor suction sensor
TA	Ambient temp. sensor

symbol	signification
PD	High pressure sensor
PS	Low pressure sensor
EEV	Electronic expansion valve
Tfin	IPM temp. sensor
PMV2	Electronic expansion valve
TX1	TC1 temp. sensor of control board for subcooling valve
TX2	TC2 temp. sensor of control board for subcooling valve
W	White
BL	BLUE
B	Black
R	Red

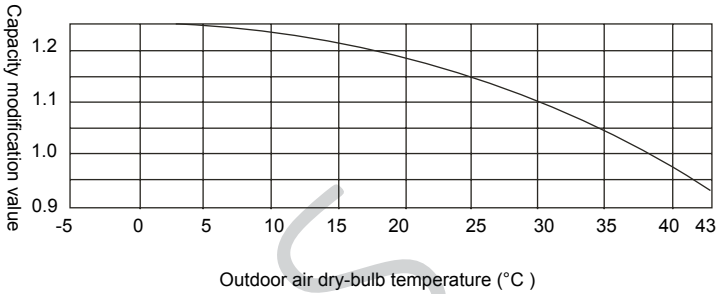
6. Capacity Calculation Due to Capacity Modification Coefficient

(1) Calculation method of refrigerating capacity----cooling capacity to be known=refrigerating capacity*(A*B*C*D*E)W

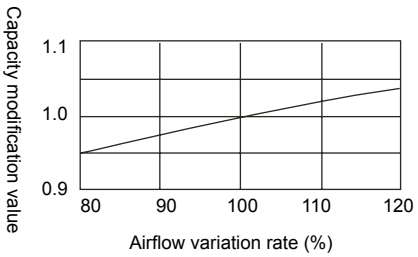
A. Capacity compensation value of indoor air wet-bulb temperature condition



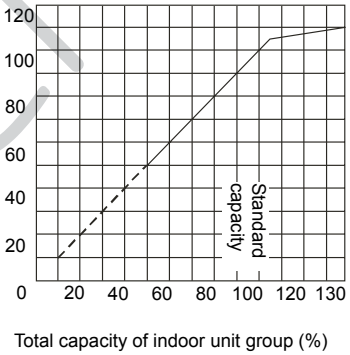
B. Capacity compensation value of outdoor air dry-bulb temperature condition



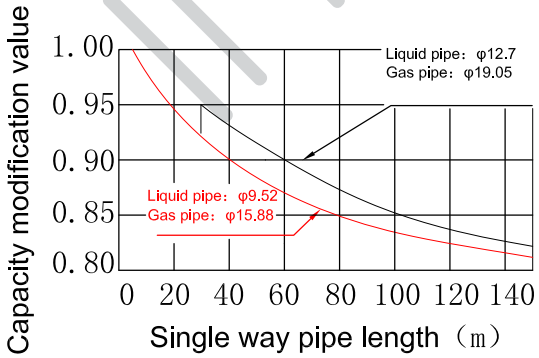
C. Capacity modification value under airflow variation rate of indoor unit group (only for duct unit)



D. Capacity compensation suitable for total capability of indoor unit group



E. Capacity compensation value of pipe length, pipe diameter and height drop



Notes for E:

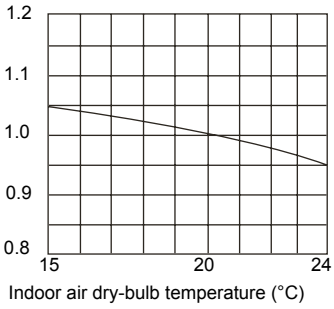
(1) The main pipe (from outdoor to the first branch pipe) diameter should be enlarged one size when the single way pipe length is over 90m.

(2) When in cooling mode, outdoor is lower than indoor; or when in heating mode, outdoor is higher than indoor, the compensation factor should be decreased the below value from figure E.

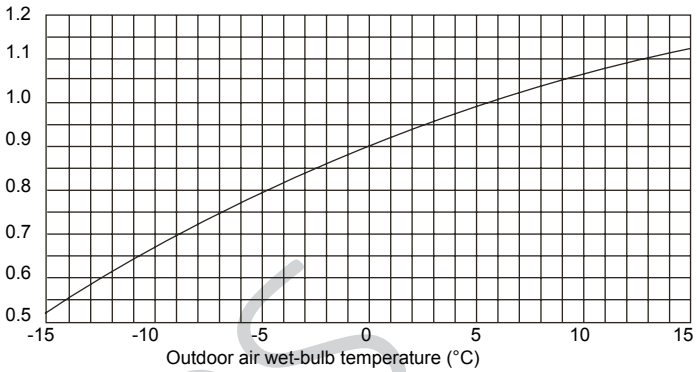
Vertical height drop between indoor and outdoor	5m	10m	15m	20m	25m	30m	35m	40m	45m	50m
Adjustment factor	0.003	0.006	0.009	0.012	0.015	0.018	0.021	0.024	0.027	0.03

(2) Calculation method of refrigerating capacity----heating capacity to be known=refrigerating capacity*(A*B*C*D*E*F)W

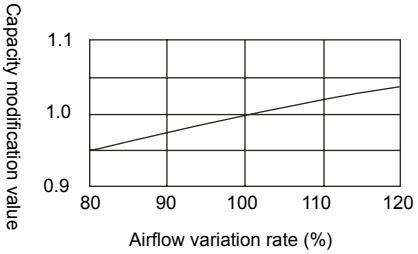
A. Capacity compensation value of indoor air dry-bulb temperature condition



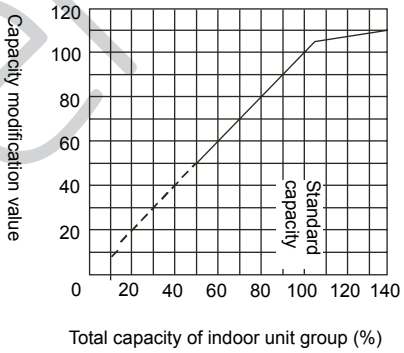
B. Capacity compensation value of outdoor air wet-bulb temperature condition



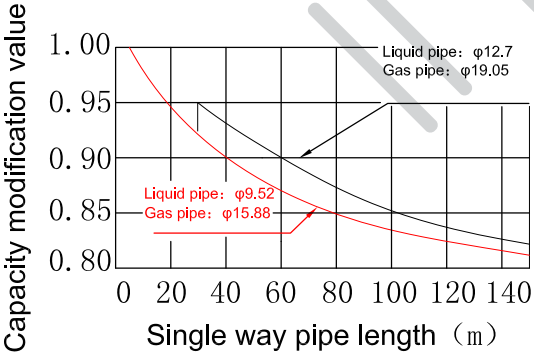
C. Capacity modification value under airflow variation rate of indoor unit group (only for duct unit)



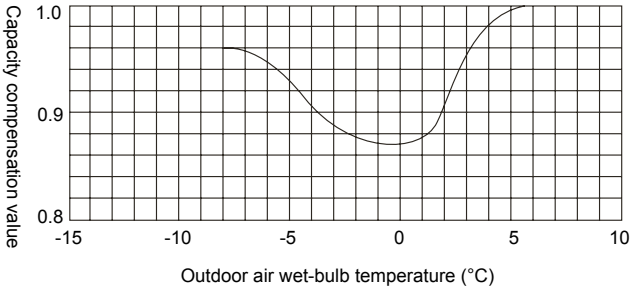
D. Capacity compensation suitable for total capability of indoor unit group



E. Capacity compensation value of pipe length, pipe diameter and height drop



F. Capacity compensation value for defrost capability of outdoor heat exchanger



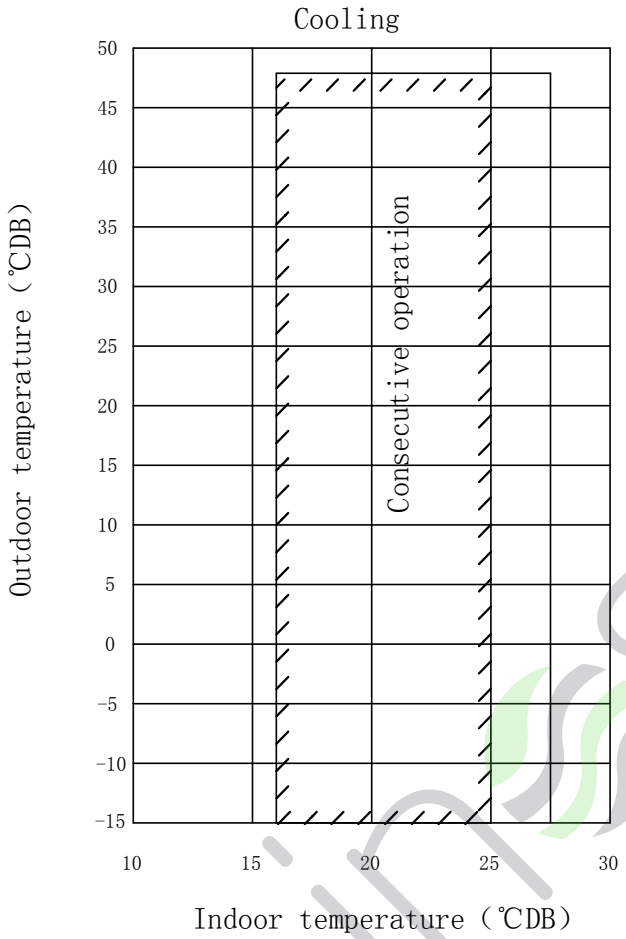
Notes for E:

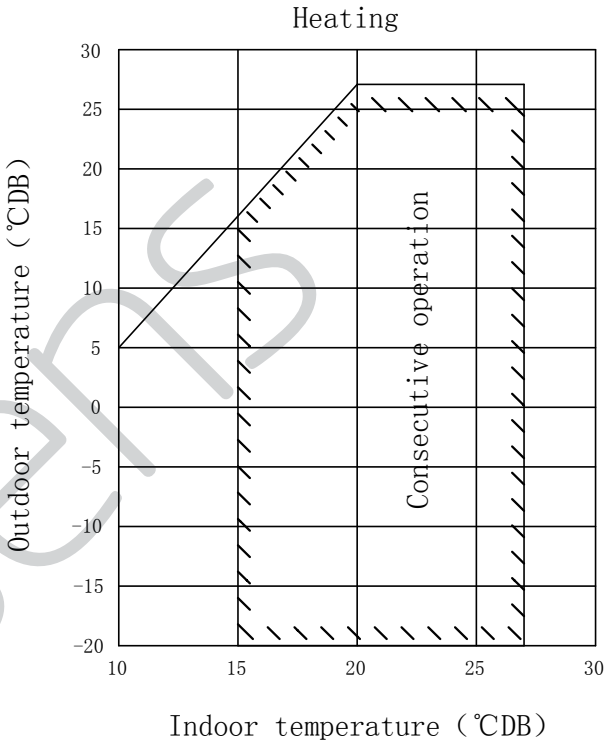
(1) The main pipe (from outdoor to the first branch pipe) diameter should be enlarged one size when the single way pipe length is over 90m.

(2) When in cooling mode, outdoor is lower than indoor; or when in heating mode, outdoor is higher than indoor, the compensation factor should be decreased the below value from figure E.

Vertical height drop between indoor and outdoor	5m	10m	15m	20m	25m	30m	35m	40m	45m	50m
Adjustment factor	0.003	0.006	0.009	0.012	0.015	0.018	0.021	0.024	0.027	0.03

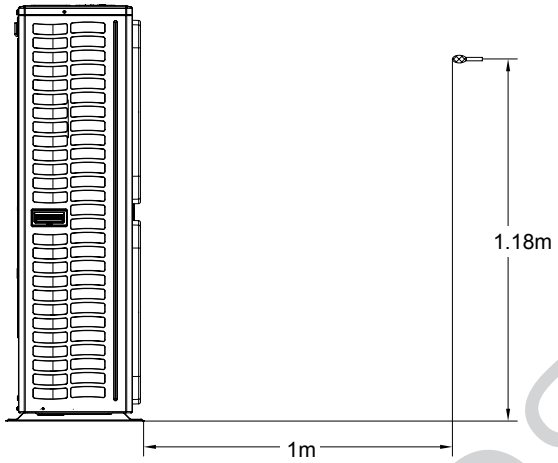
7. Operation range





8. Sound Level

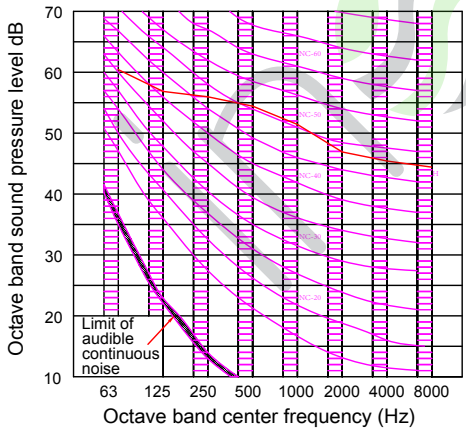
(1) Testing illustration



2) Testing condition:

a. Unit running in the nominal condition
b. Test in the semi-anechoic chamber
c. Noise level varies from the actual factors such as room structure, etc.

AU07NFPEUA



9. Outdoor Piping Installation

9.1 Product features

- The outdoor uint adopts "simultaneous control" type, all indoors should be heating or cooli.ng simultaneously.
- To protect compressor,before startup,the unit should be electrified for 12 hours.If the unit is not used for a long time, please cut off the power to save energy, or the unit will consume the power.

This manual describes the installation and installation of outdoor units. For the installation of the indoor machine, please refer to the instruction manual of the indoor machine.
Please read the installation instructions carefully before installation, according to the instructions of the installation construction.

9.2 Safety

- If the air conditioner is transferred to the others, this manual should be tranferred together.
- Before installation, please read "Safety precaution" carefully to confirm the correct installation.
- The mentioned precaustion includes "⚠WARNING" and "⚠CAUTION". The precausion caused death or heavy injury for faulty installation will be listed in "⚠WARNING". Even the cautions listed in "⚠CAUTION" also may cause serious accident. So both of them are related to the safety, and should be executed severely.
- After installation, perform a trial and confirm everything normal, then introduce the operation manual to the user. Besides, put the manual to the user and ask them to preserve it carefully.

⚠WARNING

- The installation or the maintenance should be performed by the authorized agency. Or the non-specialized operation will cause water leakage, electric shock or fire etc accidents.
- The installation should be executed as per the manual, or the faulty installation will cause water leakage, electric shock or fire etc accidents.
- Please install the unit at the space which can bear the weight. Or the unit will drop down to cause the human injury.
- The installation should defend against the typhoon, and the earthquake etc. Abnormal installation will cause the unit fall down.
- Use the correct cable and make reliable earthing. Fix the terminal firmly and the loose connection will cause heating or fire etc accident.
- The wiring should be in shape and can not be raised. Be earthed firmly and can not be clipped by the electric box cover or the other plate. The incorrect installation will cause heating or fire.
- When setting or transferring the unit, there should not be other air into the refrigerant system except for R410A. The gas mixture will cause the abnormal high pressure which will cause break or human injury etc accidents.
- When installation, please use the accessories with the unit or the special parts, or it will cause water leakage, electric shock, fire, refrigerant leakage etc accidents.
- Don't lead the water drainage pipe into the drainage groove with the poisonous gas, such as sulphur. Or the poisonous gas will enter indoor.
- In installation or after installation, please confirm if there is refriegerant leakage, please take measures for ventilation. The refrigerant will cause poisonous gas as meeting fire.
- Don't install the unit at the place where there may be flammable gas leakage. In case the gas leaks and gather around the unit, it will cause fire.
- The drainage pipe should be installed as per the manual to confirm the fluent drainage. Also take measures for heat insulation against dew drop. Incorrect water pipe installation will cause water leakage even and make the things wet.
- For the liquid pipe and the gas pipe, take measures for heat insulation too. If there is no heat insulation, the dew drop will wet the things.

⃠ PROHIBIT

- Th is system using R410A refrigerant, prohibit filling oxygen, acetylene or other flammable and toxic gases in the air or test, because these gases are very dangerous and may cause explosion. It is recommended to use compressed air, nitrogen or refrigerant for such tests.
- Indoor or outdoor machines are not allowed to water. All of these products are equipped with electrical components, which may cause serious electric shock accidents.
- Do not touch or adjust the safety device in the indoor or outdoor machine. If touching or adjusting these devices can cause serious accidents.

- The maintenance cover plate of the indoor or outdoor machine is forbidden when the main circuit power supply is not cut off.
- The leakage of refrigerant can cause the air to be thin and difficult to breathe. In case of refrigerant leakage, close the main valve, extinguish any flame and contact the local distributor immediately.
- Please use ELB (leakage protector). If not used, an electric shock or fire may occur when an accident occurs.
- The installation and Service Engineer shall ensure that the refrigerant leaks comply with local laws and regulations.

⚠CAUTION

- Execute earthing for the unit. But the earthing wire can not be connected to the gas pipe, water pipe, lightening rod or the telephone earthing wire. Improper earthing will cause electric shock.
- Don't install the unit at the place where leaks the flammable gas. Or it will cause fire.
- Execute the water drainage pipe according to the manual, improper installation will cause water leakage to wet the family things.
- The outdoor fan can not face to the flower or the other vegetable, or the blowing gas will make the flower dried up.
- Please ensure the maintenance room, if not, it will cause the maintenance person damaged.
- When installing the unit on the roof or the other high place, to prevent the person falling down, please set the fixed ladder and the railing at the passage.
- Use the two-end spanner, and fasten the nut at proper torque. Don't fasten the nut excessively against the flared setion broken. Or it will cause refrigerant leakage and lack of oxygen.
- Take measures for heat insulation to the refrigerant pipe, or there will be water leakage or dew drop to wet the family things.
- After finishing the refrigerant pipe, make leakage test by charging the nitrogen. In case the refrigerant leaks in a small room and exceeds the limited concentration, it will cause lack of oxygen.
- Don't use the other refrigerant except for R410A. The R410A pressure is 1.6 times higher than R22 pressure. The refrigerant R410A tank is marked with pink sign.
- Against charging different refrigerant, we changed the stop valve diameter of the R410A unit. To enhance the compression consistance, we also changed the flared pipe dimension. Prepare the R410A specially tools according to the below table.

	R-410A specified tools	Remarks
1	Gauge manifold	Range: HP ＞ 4.5MPa, LP ＞ 2MPa
2	Charge hose	Pressure: HP: 5.3MPa, LP: 3.5MPa
3	Electronic balance for charging R410A	Can not use the measurable charging tank
4	Torque spanner	
5	Flare tool	
6	Copper pipe gauge for adjusting projecting margin	
7	Vacuum pump adapter	Must be with reverse stop valve
8	Leakage detector	Can not use freon leakage detector, but the He detector

- When charging refrigerant, the refrigerant must be taken out as liquid state from the tank.
- When installing the power cord and the connecting line must be at least 1m from the TV or radio, so as to avoid image interference or noise.
- In the room with fluorescent lamp (reverse or fast start type), remote control signal transmission distance may not reach the predetermined value, so the indoor machine installed away from the fluorescent lamp as far as possible.
- Please use the fuse to meet the capacity requirements.
- To prevent the destruction of wires, electrical components, etc. by rats or other animals.
- Recommended room ventilation every 3 to 4 hours.

Arrival inspection

- After receiving the machine, should check whether there is transport damage. If any damage is found on the surface or inside, it shall be reported immediately to the shipping company in writing.
- Check the product model, electrical parameters (power supply, voltage, frequency) and accessories to determine whether they meet the requirements.

9.3 Transportation and lifting

Lifting

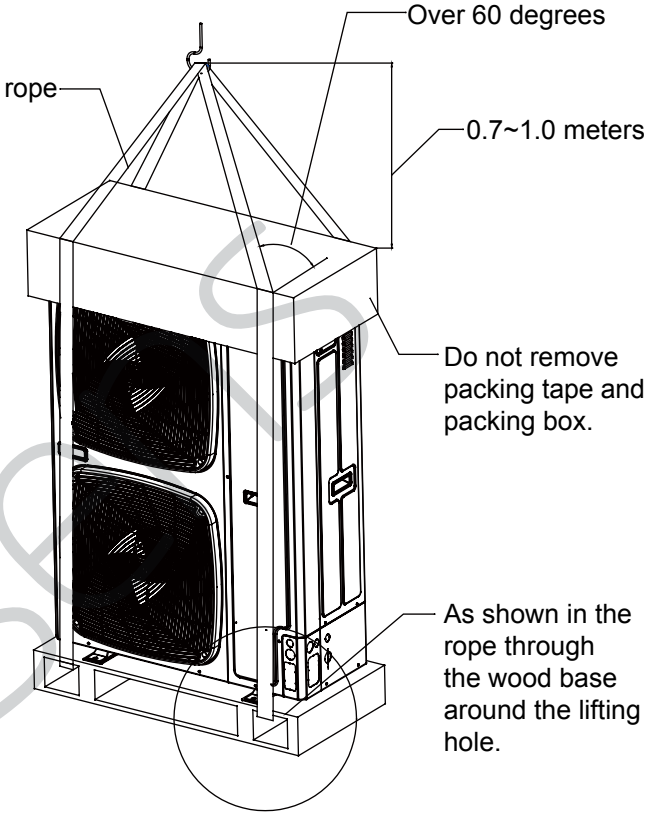
In front of the unit shipped from unpacking location as close as possible.

⚠CAUTION
• Do not place anything on the device. • Two ropes shall be used for lifting the outdoor unit.

Hoisting method

Hoisting to ensure that the level of outdoor machine, slowly lifting.
1. Removal of outer packing is strictly prohibited
2. As shown by two ropes hoist with outdoor machine packaging.

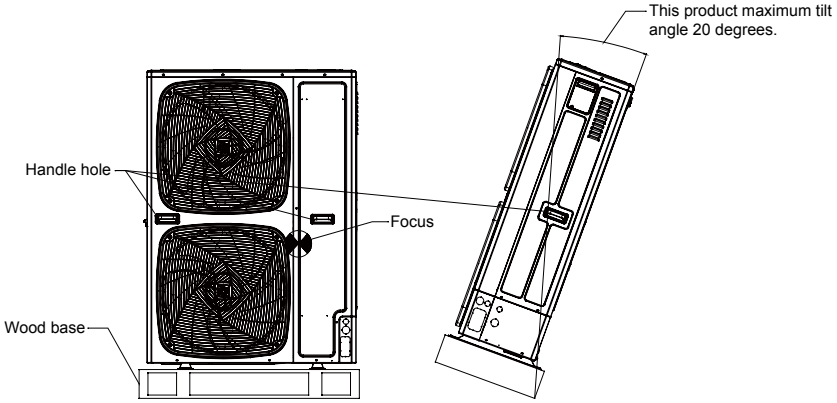
⚠CAUTION
• In order to ensure safety, maintain the level of lifting, slowly lifting. • Do not lift the elevator to the packing and outer packing of the equipment. • External protection should be used when lifting, such as cloth or cardboard.



Manual handing

⚠CAUTION
• In the installation and commissioning, the outdoor machine do not put any irrelevant material, to ensure that there is no debris inside the machine, or there may be a fire or accident.

Pay attention to the following points when handling the equipment manually:
1. No demolition wood base.
2. In order to prevent the dumping of the outdoor machine, the center of gravity of the unit should be noted as shown in the figure.
3. Two or more people to carry out the outdoor machine.



9.4 Installation instruction

In installation, please check specially the below items:

- If the connected units quantity and the total capacity is in the allowable range?
- If the refrigerant pipe length is in the limited range?
- If the pipe size is proper? And if the pipe is installed horizontally?
- If the branch pipe is installed horinzontally or vertically?
- If the additional refrigerant is counted correctly and weighed by the standard balance?
- If there is refrigerant leakage?
- If all the indoor power supplies can be on/off simultaneously?
- If the power voltage is in compliance with the data marked on the rating label?
- If the address of indoors has been set?

(1) Before installation

1) Before installation, check if the model, power supply, pipe, wires and parts purchased respectively are correct.
2) Check if the indoors and outdoors can be combined as the following.

Outdoor			Indoor	
HP	Capacity (100w)	Combination type	Indoor qty	Total indoor capacity (100W)
7	180	Single	13	90-234

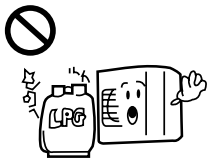
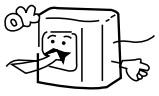
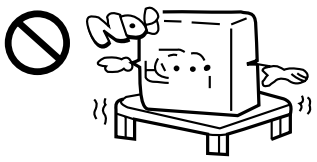
Indoor capacity (100W)
22
28
36
40
45
56
71

Total indoor capacity (100W)	Branch pipe (optional)
less than 335	FQG-B335A

Notice:

- Total capacities of indoor units being used ≤ 100% of rated capacities of outdoor unit.
- The maximum number of connections in accordance with the indoor units 2200W. At the same time in order not to affect the use of results, the maximum number of indoor machine connection recommended in accordance with 6/8/9.

(2) Installation place selection

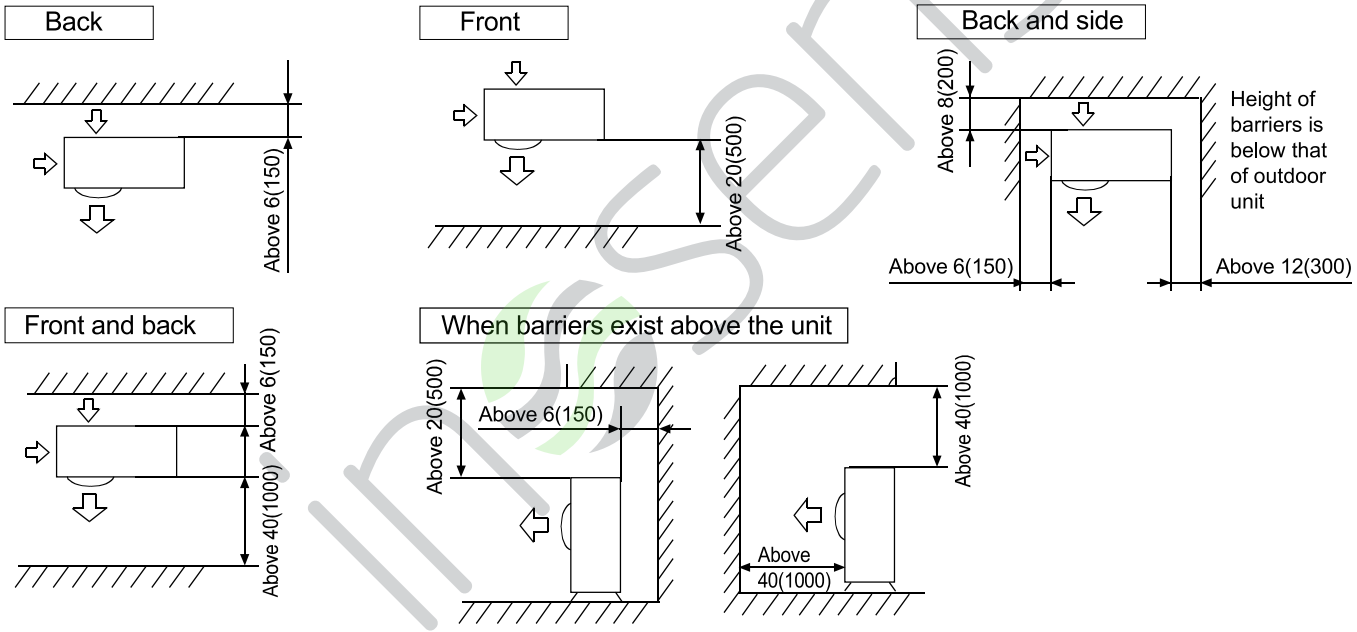
Air-conditioner can't be installed in the place with inflammable gas. Or it will cause fire hazard. 	The unit should be installed at the place with good ventilation. No obstacle at the air inlet/outlet. And no strong wind blows the unit.  The installation space refers to the latter info.	The unit should be installed at the strong enough place. Or it will cause vibration and noise. 
The unit should be installed at the place where the cold/ hot air or noise will not interfere the neighbours. 	• The place where the water can flow fluently. • The place where no other heat source will affect the unit. • Pay attention to the snow against clogging the outdoor. • In installation, install the anti-vibration rubber between the unit and the bracket.	• The unit is better not be installed at the below places, or it will cause damage. • The place where there is corrosive gas (spa area etc). • The place blowing salty air (seaside etc). • Exsits the strong coal smoke. • The place with high humidity. • The place where there is device emitting Hertzian waves. • The place where voltage changes greatly.

Note:
1. In snowy area, install the unit under the bracket or the snow-proof cover against the accumulative snow on the unit.
2. Do not install the unit at the place where the flammable gas will leak.
3. Install the unit at the strong enough place.
4. Install the unit at the flat place.
5. When being installed at the place with strong wind, set the air outlet of the unit and the wind direction vertical.
6. The installation site should be far away from the place where the noise is higher. At the same time for the noise of higher places should ensure that the outdoor machine vibration and wall insulation measures to prevent vibration caused by thin wall or acoustic noise problems.
7. Aluminum foil fin is very sharp, pay attention to prevent scratches.
8. In addition to the maintenance of the roof, or the installation of outdoor machines, other people can not contact the outdoor machine.

(3) Installation and maintenance space

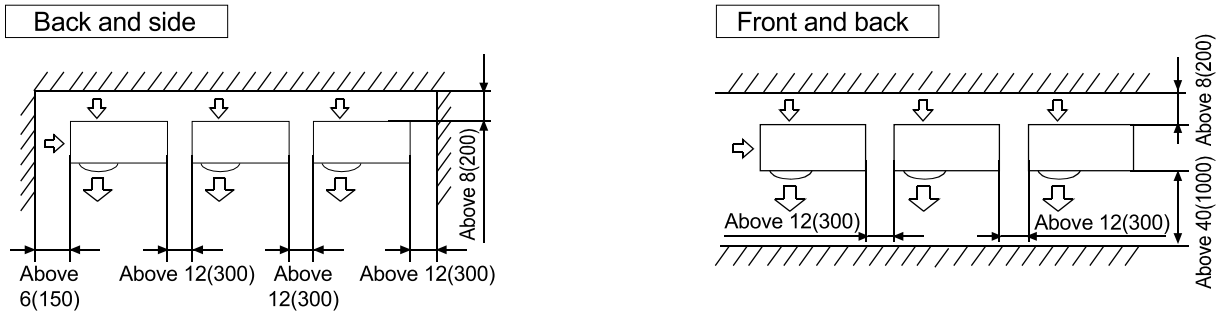
Selection of installation location of outdoor

(1) Single-unit installation (unit: in.(mm))



The top and two side surfaces must be exposed to open space, and barriers on at least one side of the front and back shall be lower than the outdoor unit.

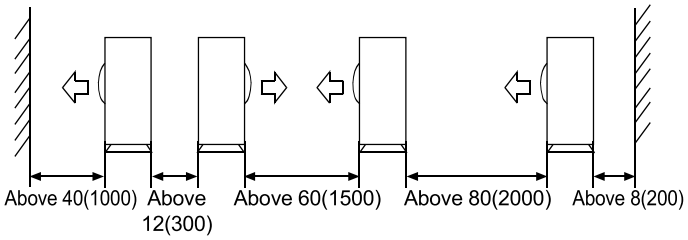
(2) Multi-unit installation (unit: in.(mm))



Height of barriers is below that of outdoor unit

(3) Multi-unit installation in front and back (unit: in.(mm))

Standard



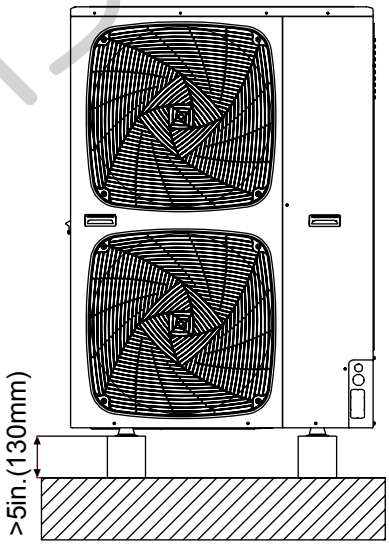
The top and two side surfaces must be exposed to open space, and barriers on at least one side of the front and back shall be lower than the outdoor unit.

- The installation service spaces shown in the illustrations are based on an air intake temperature of 95°F(35°C)(DB) for COOL operation. In regions where the air intake temperature regularly exceeds 95°F(35°C)(DB), or if the heat load of outdoor units is expected to regularly exceed the maximum operating capacity, reserve a larger space than that indicated at the air intake side of units.
- Regarding the required air outlet space, position the units with consideration to the space required for the onsite refrigerant piping work as well. Consult your dealer if the work conditions do not match those in the drawings.

(4) Precautions on installation

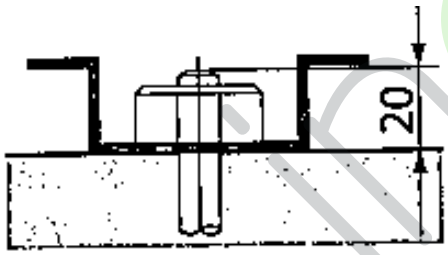
NOTICE

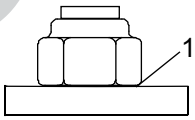
If drain holes of the outdoor unit are covered by a mounting base or by floor surface, raise the unit in order to provide a free space of more than 5in.(130mm) under the outdoor unit.



Foundation work

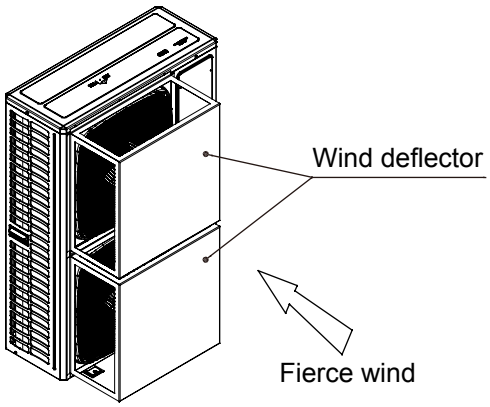
- Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise after installation.
- In accordance with the foundation drawing in the figure, fix the unit securely by means of the foundation bolts.
- It is best to screw in the foundation bolts until their length are 0.8in.(20mm) from the foundation surface.



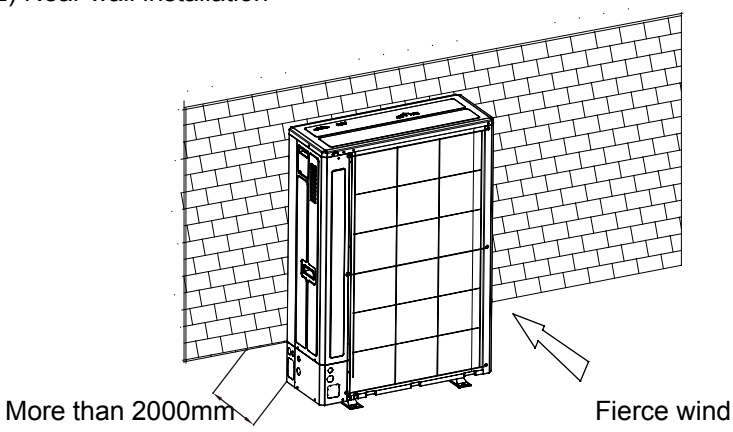


- Fix the outdoor unit to the foundation bolts using nuts with resin washers(1) as shown in the figure.
- If there is no need to install the outdoor machine in the open space of the building or the enclosure, the following two ways can be used to avoid the fan reversal or damage caused by strong wind blowing.

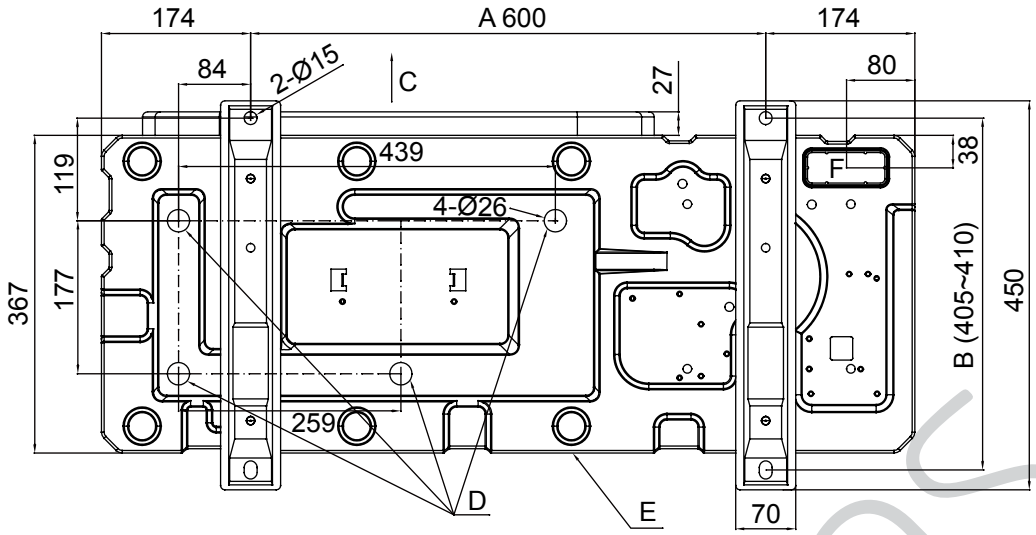
(1) Using the windshield



(2) Near wall installation



If the coating on the fastening area is stripped off, the nuts rust easily.
Dimensions (bottom view) (unit of measurement: mm)



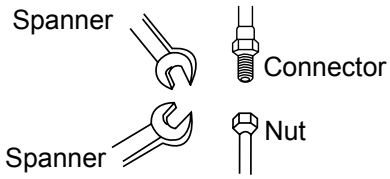
A leg pitch1
B leg pitch2
C Front grill (air outlet side)
D Drain hole
E Bottom frame
F Knock-out hole (for piping line)

(5) Refrigerant pipe connection

Pipe connection method:

- To ensure the efficiency, the pipe should be as short as possible.
- Daub the refrigerant oil on the connector and the flare nut.
- When bending the pipe, the bending semi-diameter should be as large as possible against the pipe being broken or bent.
- When connecting the pipe, aim at the center to thread the nut by hand and tighten it with the double spanners.
- Don't let the impurity such as sand, water etc into the pipe.

When fastening and loosing the nut, operate with double spanners, because only one spanner cannot execute firmly.



If threading the nut as not aiming at the center, the screw thread will be damaged, further it will cause leakage.

Cautions in piping installation:

- When welding the connector with hard solder, charge nitrogen into the pipe against oxidation. Or the oxygen film in the pipe will clog the capillary and the expansion valve, even caue the deathy accident.
- The refrigerant pipe should be clean. If the water and the other impurity enter the pipe, charge the nitrogen to clean the pipe. The nitrogen should flow under the pressure of about 0.5Mpa and when charging the nitrogen, stop up the end of the pipe by hand to enhance the pressure in the pipe, then loose the hand (meanwhile stop up the other end).
- The piping installation should be executed after the stop valves are closed.
- Before welding the valve and the pipes, use the wet cloth to cool down the valve and the pipes.
- When the connection pipe and the branch pipe need to be cut down, please use the special shears and cannot use the saw.

Pipe material and specs selection

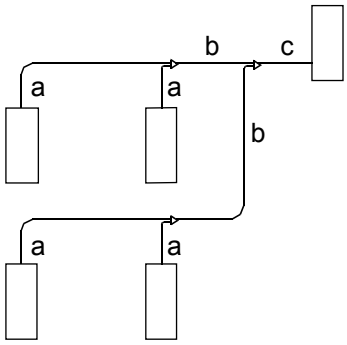
1.Please select the refrigerant pipe of the below material.
Material: the phosphoric oxidize seamless copper pipe, model: C1220T-1/2H (diameter is over 19.05); C1220T-0 (diameter is below 15.88).
2.Thickness and specs:
Confirm the pipe thickness and specs according to the pipe selection method(the unit is with R410A, if the pipe over 19.05 is 0-type, the pressure preservation will be bad, thus it must be 1/2H type and over the min. thickness.
3.The branch pipe must be from Haier.
4.When installing the stop valve, refer to the relative operationinstruction.
5.The pipe installation should be in the allowable range.
6.The installation of branch pipe and gather pipe should be performed according to the relative manual.

Drain pipe disposal

- Make sure the drain works properly.
- In regions where buildups of snow can be expected, the accumulation and freezing of snow in the space between the heat exchanger and external plate may lower operating efficiency.
- After punching the knock-out hole, the application of repair-type paint on the surface around the edge sections is recommended to prevent rust.

Pipe specification:

1. Pipe "a" diameter (between indoor and branch pipe) (depends on indoor pipe)
   Please refer to the indoor air conditioner manual.
2. Pipe "b" diameter (between branch pipes)



Total indoor capacity after the branch pipe (x100W)	Gas pipe (mm)	Liquid pipe (mm)
X<112	Ø15.88	Ø9.52
112≤X< 234	Ø19.05	Ø9.52

3. Pipe "c" diameter (outdoor pipe diameter)

Outdoor capacity (100W)	Gas pipe (mm)	Liquid pipe (mm)
180	Ø15.88	Ø9.52

Copper pipe selection:

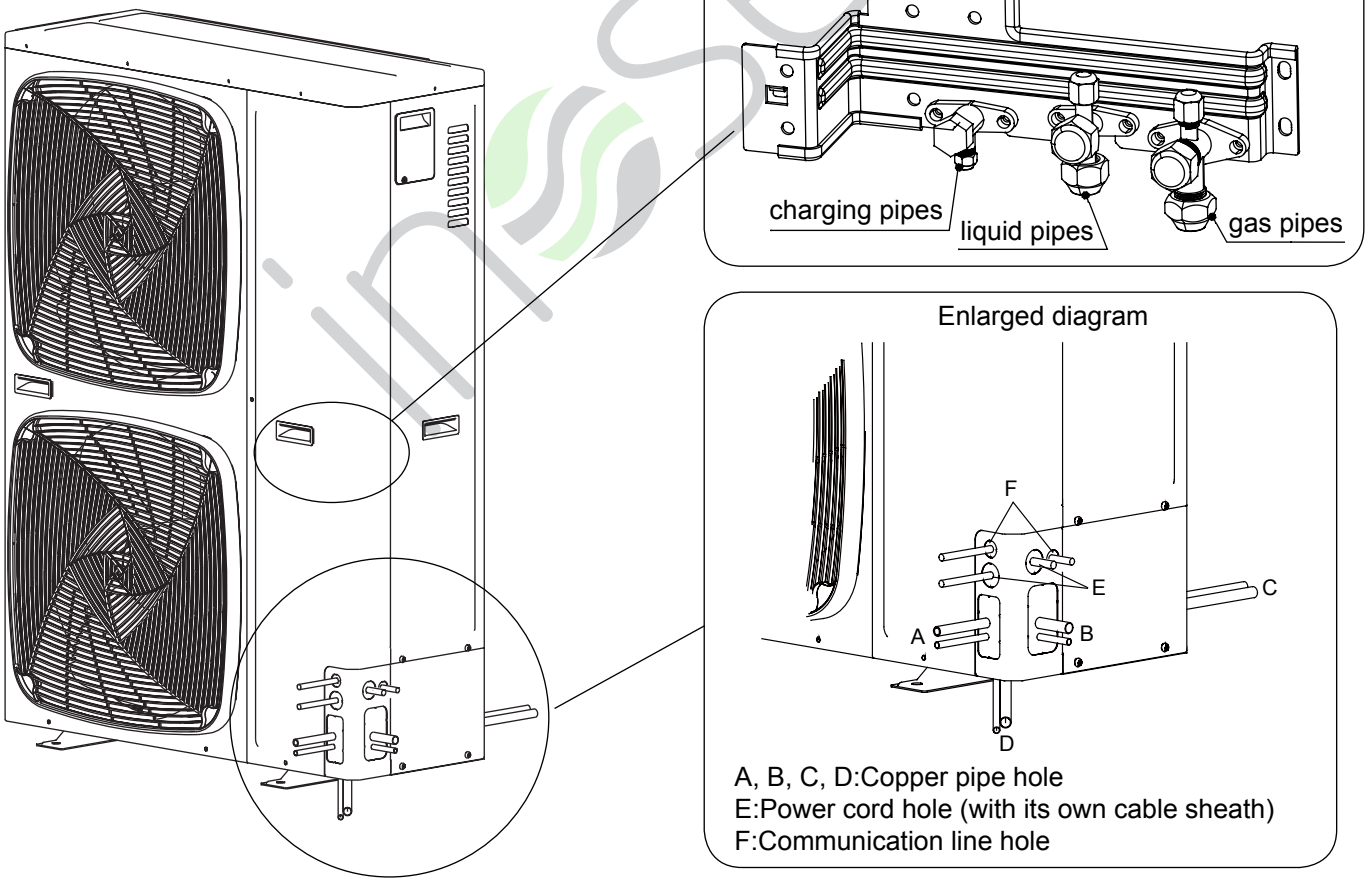
hardness	Softness			
Outer diameter (mm)	Ø6.35	Ø9.52	Ø12.7	Ø15.88
Min. thickness (mm)	0.8	0.8	1.0	1.0

hardness	Half-hardness			
Outer diameter (mm)	Ø19.05	Ø22.24	Ø25.24	Ø28.58
Min. thickness (mm)	1.0	1.1	1.2	1.4

Note: If the copper pipe with outer diameter 19.05 is coil pipe, the thickness should be over 1.1.

Piping connection method:

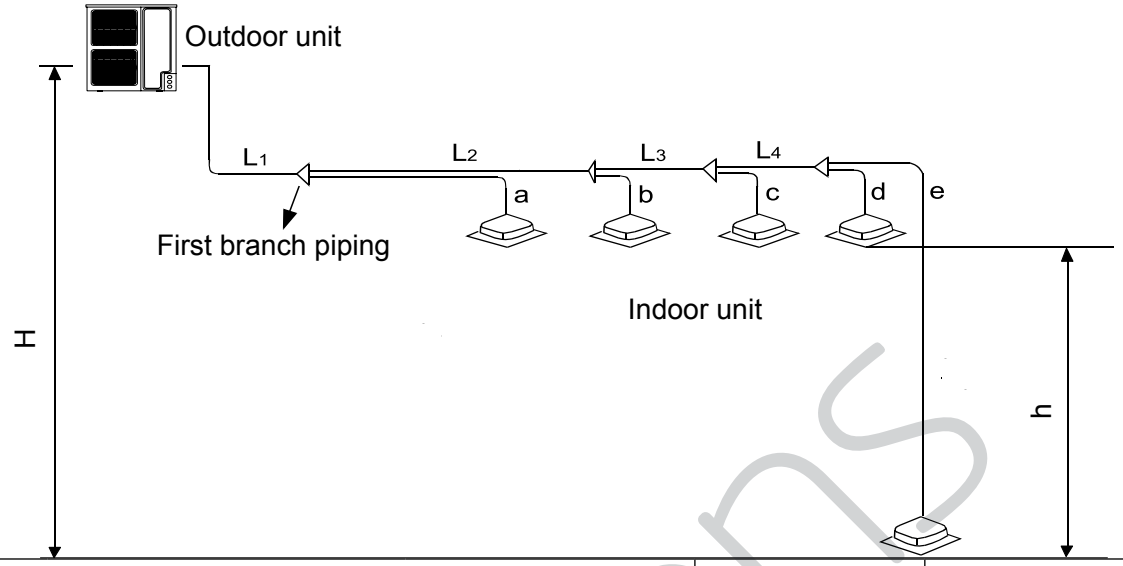
Pipes can be connected in four directions



As shown in the figure, the piping can be connected from four directions. Through the front / rear hole piping piping on the cover hole or crack directly across the floor.
From the outdoor machine unloading piping cover with a screwdriver and hammer knock off holes along the guide wire break. Then, trim the edges of the holes, and mounted on the insulating sleeve (site) to protect the piping and wiring.

Long pipe and high drop

1. Allowable pipe length and height difference



			Permissible value	Piping part
Piping length	Total length of piping (actual length)		300m	L1+L2+L3+L4+a+b+c+d+e
	Single way max. pipe length	Actual / Equivalent length	150m/175m	L1+L2+L3+L4+e
	Pipe length between outdoor and first branch pipe		110m	L1
	Pipe length after first branch pipe (length between first branch & farthest indoor)		40m	L2+L3+L4+e
	Pipe length between the indoor unit & the nearest branch length		10m	a / b / c / d / e
Height difference	Height difference between indoor and outdoor unit	Indoor below outdoor	50m	H
		Indoor above outdoor	40m	H
	Height difference between indoor units		15m	h

Note:

When the single way pipe length is over 30m, the main pipe should be the enlarged diameter.

Unit pipe spec and connection method (unit: mm)

A. Outdoor unit

Model	Gas pipe side		Liquid pipe side	
	Diameter (mm)	Connecting method	Diameter (mm)	Connecting method
AU07	Ø15.88	Flared joint	Ø9.52	Flared joint

B. Indoor unit

Please refer to the indoor air conditioner manul.

Connecting method: Flared joint

C. Pipe spec and the torque

Diameter (mm)	Thickness (mm)	Torque (N.m)
Ø6.35	0.8	16~20
Ø9.52	0.8	40~50
Ø12.7	1.0	
Ø15.88	1.0	90~120
Ø19.05	1.0	100~140
Ø22.22	1.1	——
Ø25.4	1.2	——
Not less than Ø28.58	More than 1.4	——

Note: If the copper pipe with outer diameter 19.05 is coil pipe, the thickness should be over 1.1.

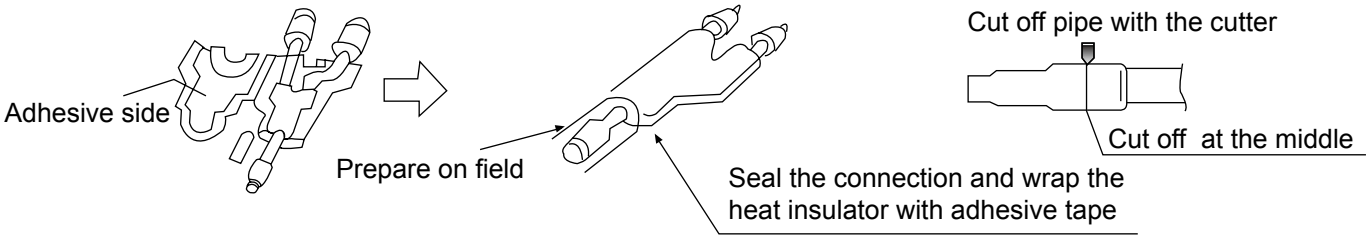
Branch pipe

Outdoor unit type

Branch pipe selection:

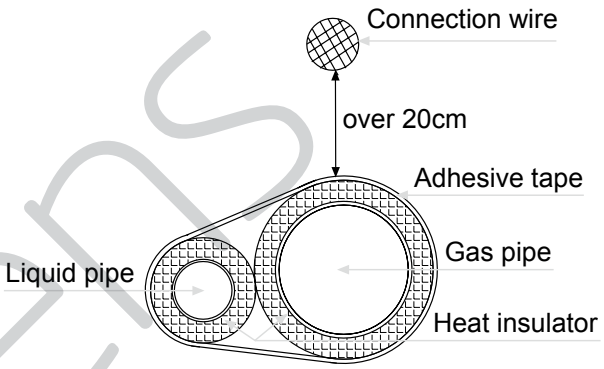
Total indoor capacity (100W)	Model (optional)
Less than 335	FQG-B335A

Note:
1. When connecting the pipe and the outdoor, please pay attention to the outdoor pipe dimension.
2. When adjusting the diameter among pipes and among the units, please must execute at the branch pipe side.
3. When welding with hard solder, please must blow nitrogen. If not, a number of oxide will be produced and cause heavy damage.Besides,to prevent water and dust into the pipe, please make the brim as outer roll.



Heat insulation

- Gas pipe and liquid pipe should be heat insulated separately.
- The material for gas pipe should endure the high temperature over 120°C.That for liquid pipe should be over 70°C.
- The material thickness should be over 10mm, when ambient temp. is 30°C, and the relative humidity is over 80%, the material thickness should be over 15mm.
- He material should cling the pipe closely without gap, then be wrapped with adhesive tape. The connection wire can not be put together with the heat insulation material and should be far at least 20cm.



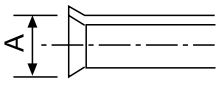
Fix the refrigerant pipe

- In operation, the pipe will vibrate and expand or shrink. If not being fixed, the refrigerant will focus on one part to cause the broken pipe.
- To prevent the central stress, fix the pipe for every 2-3m.

Pipe installation

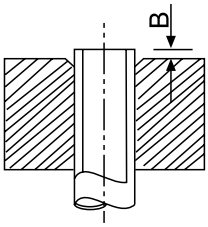
When doing the piping connection, please do the following:

- Please don't let the pipe and the parts in the unit collide each other.
- When connecting the pipes, close the valves fully.
- Protect the pipe end against and water, impurities (welding after being flatted, or being sealed with adhesive tape).
- Bend the pipe as large semi-diameter as possible(over 4 times of the pipe diameter).
- The connection between outdoor liquid pipe and the distributing pipe is flared type. Please expand the pipe with the special tool for R410A after installing the expanding nut. But if the projecting pipe length has been adjusted with the copper pipe gauge, you can use the original tool to expand the pipe.
- Since the unit is with R410A, the expanding oil is ester oil, not the mineral oil.
- When doing the flare connection, please do the following: When connecting the expanding pipe, fasten the pipes with double-spanner. The torque refers to the former info.



Expanding pipe: A(mm)

Pipe outer diameter (mm)	A $^{0}_{-0.4}$
Ø6.35	9.1
Ø9.52	13.2
Ø12.7	16.6
Ø15.88	19.7



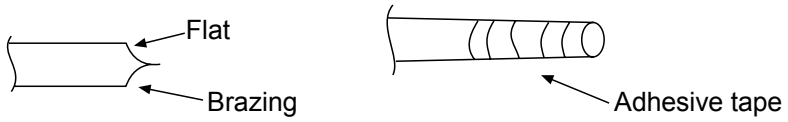
Projecting length of pipe to be expanded: B(mm)

Pipe outer diameter (mm)	When it is hard pipe	
	Special tool for R410A	The former tool
Ø6.35	0-0.5	1.0-1.5
Ø9.52		
Ø12.7		
Ø15.88		

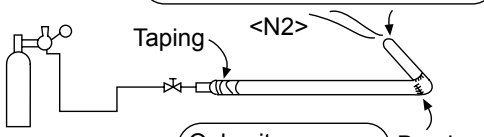
- The outdoor gas pipe and the refrigerant distributing pipe, as well the refrigerant distributing pipe and the branch pipe should be welded with hard solder.

- Weld the pipe at the same time charge the nitrogen. Or it will cause a number of impurity (a film of oxidation) to clog the capillary and the expansion valve, further cause the deadly failure.

- Protect the pipe end against the water, impurity into the pipes (welding after being flat, or being sealed with adhesive tape).

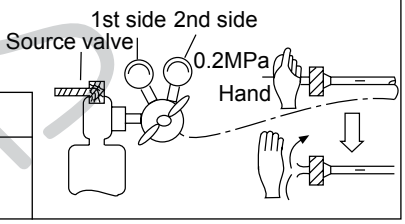


Seal the pipe end with adhesive tape or the stopper to increase the resistance, fill up the pipe with nitrogen.



Only nitrogen gas can be used

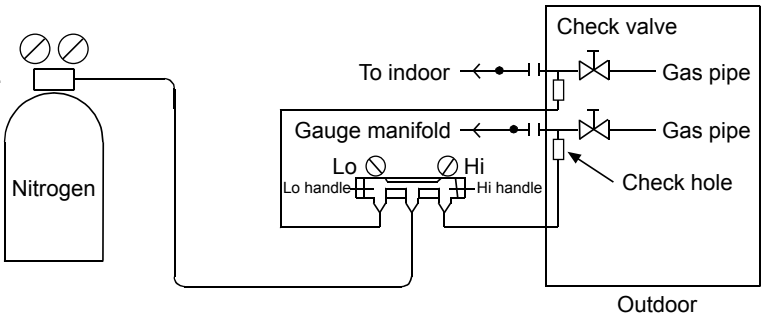
- The refrigerant pipe should be clean. The nitrogen should flow under the pressure of about 0.2Mpa and when charging the nitrogen, stop up the end of the pipe by hand to enhance the pressure in the pipe, then loose the hand (meanwhile stop up the other end).



- When connecting the pipes, close the valves fully.
- When welding the valve and the pipes, use the wet cloth to cool down the valve and the pipes.

(6) Leakage test

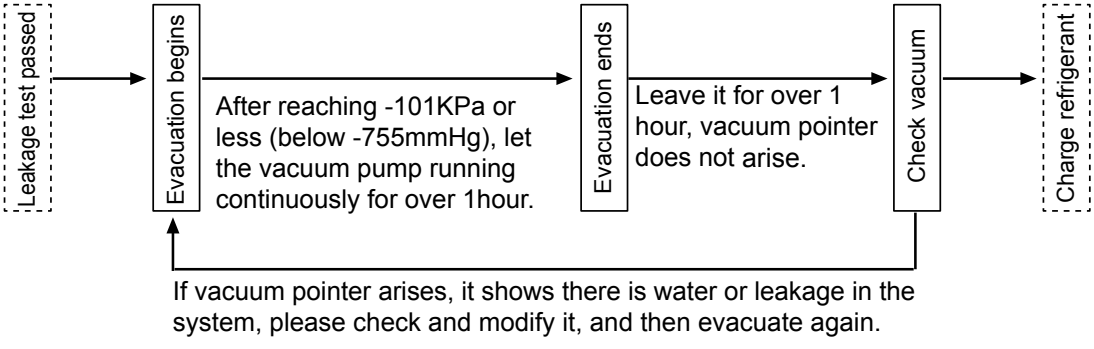
1. The outdoor unit has been executed the leakage test in the factory. After connecting the distributing pipe, execute the leakage test from the outdoor check valve and the indoor. Besides, while testing, the valves should be close.
2. Refer to the below figure to charge the nitrogen into the unit to take a test. Never use the chlorin, oxygen, flammable gas in the leakage test. Apply pressure both on the gas pipe and the liquid pipe.
3. Apply the pressure step by step to the target pressure.
   a. Apply the pressure to 0.5MPa for more than 5 minutes, confirm if pressure goes down.
   b. Apply the pressure to 1.5MPa for more than 5 minutes, confirm if pressure goes down.
   c. Apply the pressure to the target pressure (4.0MPa), record the temp. and the pressure.
   d. Leave it at 4.0MPa for over 1 day, if pressure does not go down, the test is passed. Meanwhile, when the temp. changes for 1degree, pressure will change 0.01MPa as well. Correct the pressure.
   e. After confirmation of a~d, if pressure goes down, there is leakage. Check the brazing position, flared position by laying on the soap. modify the leakage point and take another leakage test.
4. After leakage test, must execute the evacuation.



(7) Evacuation

Evacute at the check valve of liquid stop valve and both sides of the gas stop valve.

Operation procedure:



Because the unit is with refrigerant R410A, the below issues should be paid attention:
- To prevent the different oil into the pipe, please use the special tool for R410A, especially for gauge manifold and charging hose.
- To prevent the compressor oil into the refrigerant cycle, please use the anti-counter-flow adapter.

(8) Check vale operation

Open/close method:
- Take down the valve cap.
- Turn the liquid stop valve and the gas stop valve with hexangular spanner until it stops. If opening the valve strongly, the valve will be damaged.
- Tighten the valve cap.

Tighten torque as the table below:

Tighten torque N.m			
	Shaft (valve body)	Cap (cover)	T-shape nut (check joint)
For gas pipe	Less than 7	Less than 30	13
For liquid pipe	7.85 (MAX15.7)	29.4 (MAX39.2)	8.8 (MAX14.7)

(9) Additional refrigerant charging

Charge the additional refrigerant as liquid state with the gauge.
If the additional refrigerant can not be charged totally when the outdoor stops, charge it at the trial mode.
If the unit runs for a long period in the state of lack of refrigerant, compressor will occur failure.
(the charging must be finished within 30 minutes especially when the unit is running, menawhile charging the refrigerant).

A. Charging amount when out of factory excludes the refrigerant in the pipe.
B. The unit only is charged the standard volume of refrigerant (distributing pipe length is 0m). Additional charging amount=actual length of liquid pipe x additional amount per meter liquid pipe
Additional charging amount=L1×0.35+L2×0.25+L3×0.17+L4×0.11+L5×0.054+L6×0.022
L1: total length of 22.22 liquid pipe; L2: total length of 19.05 liquid pipe; L3: total length of 15.88 liquid pipe;
L4: total length of 12.7 liquid pipe; L5: total length of 9.52 liquid pipe; L6:total length of 6.35 liquid pipe;
C. Refrigerant charging and additional charging

Additonal refrigerant charging per meter(kg/m)						Charge when out of factory
Ø22.22	Ø19.05	Ø15.88	Ø12.7	Ø9.52	Ø6.35	
0.35	0.25	0.17	0.11	0.054	0.022	Refer to label

Note:
- To prevent the different oil into the pipe, please use the special tool for R410A, especially for gauge manifold and charging hose.
- Mark the refrigerant type in different colour on the tank. R410A is pink.
- Must not use the charging cylinder, because the R410A will change when transferring to the cylinder.
- When charging refrigerant, the refrigerant should be taken out from the tank as liquid state.
- Mark the counted refrigerant volume due to the distributing pipe length on the label.

GWP: 2088
The product contains fluorinated greenhouse gases and its functioning relies upon such gases.

(10) Refrigerant recovery

- Start: press the main control board of the Start and Stop keys at the same time for 5 seconds, the machine enters the refrigerant automatic recovery control: the compressor starts, the right side of the machine C0 and Ps digital tube flashing, lasted for about 3 minutes.
- Operation: when the digital tube C1 and Ps alternately flashing, manually shut off the liquid pipe valve, the refrigerant recovery.
- Off valve: when Ps < 1kg, digital tube display C2, fast manual shut-off valve, 5S after the system shut down.
- End: manual power down for program reset.

Note: heating, standby or shutdown: outdoor machine forced to refrigeration operation.

10. Outdoor Wiring Installation

⚠ WARNING
• Switch off the main power switch of the indoor and outdoor machine for more than 1 minutes before the wiring or regular inspection. • To prevent the destruction of wires and electrical components by rats or other animals. Serious, it may lead to the occurrence of fire. • To avoid damage to the wire, avoid contact with refrigerant pipes, steel edges and electrical components. Serious, it may lead to the occurrence of fire.

⚠ CAUTION
• Secure the power cord with a wire tie in the machine.

Note:
when the wiring of the outdoor machine is not using the wire, it should be fixed with the rubber ring.

⚠ CAUTION
• In the case of 3 phase 5 wire type, the power supply of the indoor machine must be connected use L1 line and N line, prohibit the use of L1-L2, L1-L3, Otherwise the electrical part will be damaged.

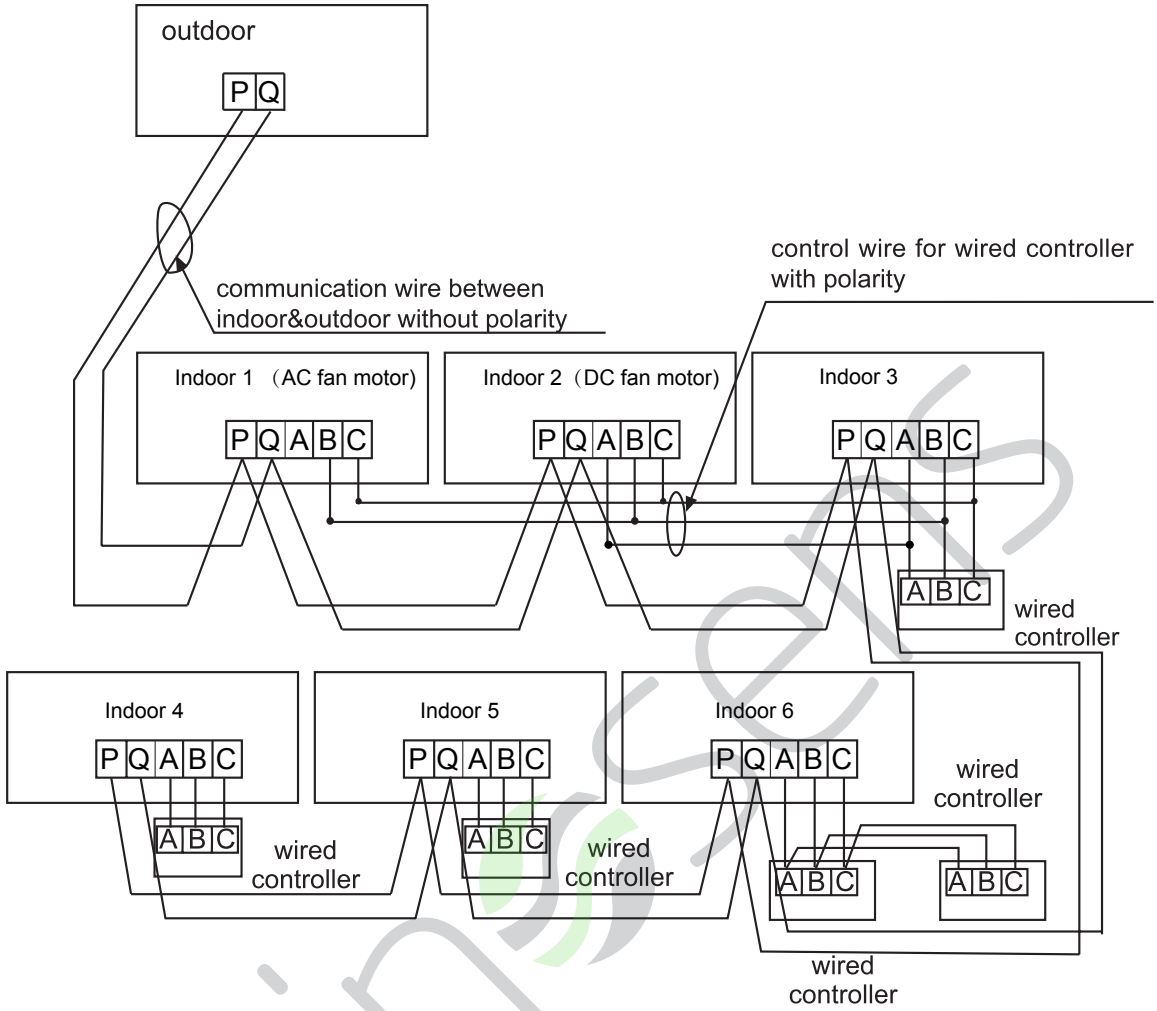
Inspect

- To ensure that the electrical equipment used on the installation site (main power switch, circuit breaker, wire, conduit and wiring terminals, etc.) have been selected according to current data, to ensure that the device in line with national standards.
- Check the power supply voltage in the range of 10% of the rated voltage and the ground wire is included in the power supply line. Otherwise, electrical parts will be damaged.
- Check whether the power supply is satisfied. Otherwise, the compressor will not start when the voltage is too low.
- By measuring the insulation resistance between the ground and the electrical device terminals, to ensure that more than 1 MΩ. Otherwise, the system can not be started until the cause of leakage and maintenance.

Connection

- Connect the power cord to the terminal of the indoor unit and the outdoor mechanical and electrical gas box, connect the ground wire to the grounding bolt of the outdoor machine and the indoor mechanical and electrical air box.
- Connect the external and internal communication lines to the 1 and the 2 terminals on the terminal. If the power cord is connected, the printed circuit board will be damaged. And the use of shielded twisted pair wire.
- Do not connect the fastening screws on the front of the cover.
- The power cord must be made of copper wire, and the power supply must be in line with IEC 60245 requirements. If the power cord length exceeds 20m, the need to increase the size.
- The power supply line is fixed with a round connection terminal with an insulating protective sleeve. Not with sheet metal contact and extrusion, in order to avoid the cut line of skin caused by fire.

Communication wiring figure

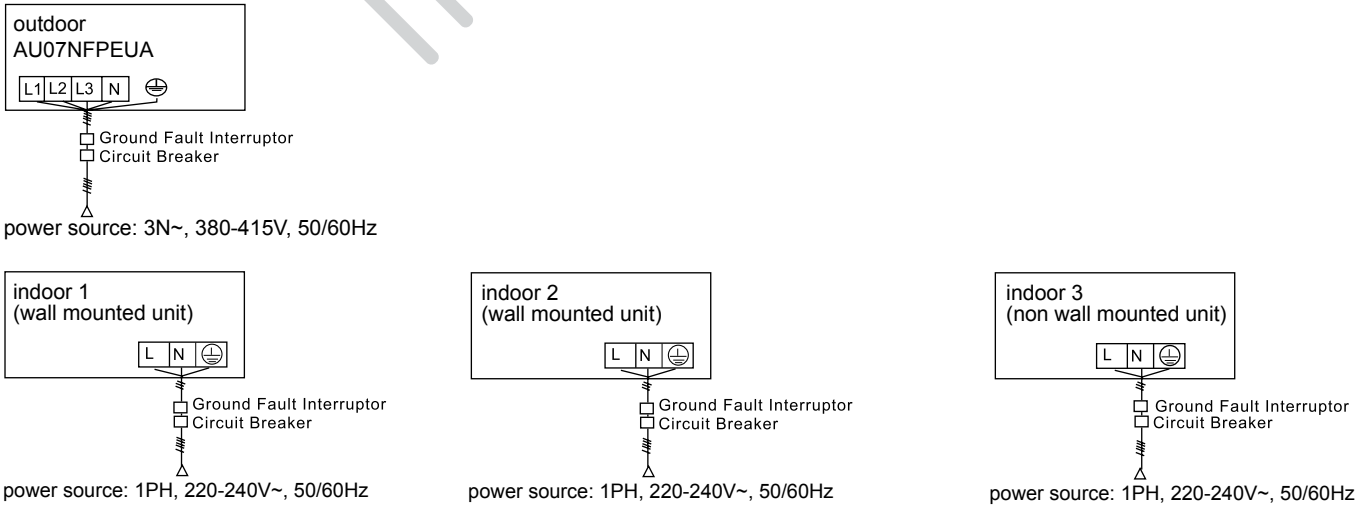


The master outdoor and all indoor units are in parallel through 2 non-polar wires.
There are three connecting ways between wired control and indoor units:
A. One wired controller controls multiple units, as shown in the above figure, (1-3 indoor units). The indoor unit 3 is the wired control master unit (directly connected to the indoor unit of wired controller) and others are the wired control slave units. indoor unit 2 is DC fan motor models, indoor unit 1 is the AC fan motor models. The wired controller is connected with the master unit and DC fan motor models through three lines with polarity. Other indoor units and the master unit are connected via two lines with polarity. SW01 on the main unit is set to 0 while SW01 on other slave units are set to 1, 2, 3 and so on in turn. (Please refer to the dip switch setting)
B. One wired controller controls one indoor unit, as shown in the above figure (indoor unit 4-5). The indoor unit and the wired controller are connected via three lines with polarity.
C. Two wired controllers control one indoor unit, as shown in the figure (indoor unit 6). Either of the wired controllers can be set to be the master wired control while the other is set to be the slave wired controller. The master wired controller, slave wired controller and indoor units are connected via three lines with polarity.

Type	Series	Model	PCB Code
AC fan motor	4-way Cassette	AB*MCERA AB*MCERA(C)	0151800113
	2-way Cassette	AB*MBERA	0151800161B
	Convertible	AC*MCERA AC*MFERA	0151800113
	Slim Low ESP Duct	AD*MSERA	0151800161C
	Low ESP Duct	AD*MLERA	0151800113
	Medium ESP Duct	AD*MZERA	0151800113
		AD*MMERA	0151800113
		AD*MNERA	0151800113
		AD*MJERA	0151800161C
	High ESP Duct	AD*MHERA	0151800113
	Fresh Air	AD*MPERA	0151800113
	Built-In Floor Standing	AE*MLERA	0151800113
DC fan motor	Round Flow 4-Way Cassette	AB*MRERA	0151800227
	Mini 4-Way Cassette	AB*MCERA(M)	0151800244BA
	One Way Cassette	AB*MAERA	0151800244BA
	Convertible type	AC*MDERA	0151800555
	DC Slim Low ESP Duct	AD*MSERA(D)	0151800244
	High ESP Duct	AD*MQERA	0151800227A 0151800244
	Console	AF*MLERA	0151800086A
	N Plate High Wall	AS*MFERA AS*MNERA	0151800244B
	EK High Wall	AS*MGERA	0010451751AF 0151800141A

Individual power

Power wiring figure



Indoor and outdoor use their individual power source. All indoors use one power source. Must install the leakage breaker and the over current breaker, or electric shock will occur.

Outdoor power source and power cable

Item / Model		Power source	Power cable section (mm^2)	Circuit breaker (A)	Rated current of residual circuit breaker (A) Ground fault interruptor (mA) response time (S)	Ground wire	
						Section (mm^2)	Screw
Individua Power	AU07NFPEUA	3N~, 380-415V, 50/60Hz	4	20	20A 30mA below 0.1S	4	M5

- Power cable must be fixed firmly.
- To avide electrical shock, make sure to disconnect the power supply 1 minute or more before servicing the electrical parts.Even after 1 minute,always measure the voltage at the terminals of main circuit capacitors or electrical parts and before touching, make sure that those voltages are 50VDC or less.
- To persons in charge of electrical wiring work: Do not oerate the unit until the refrigerant piping is complete. (Running it before the piping is ready will break the compressor)
- Each outdoor must be earthed well.

- When power cable exceeds the range, thichen it appropriately.
- The appliance shall be installed in accordance with national wiring regulations.
- All wiring must be performed by an authorized electrician.
- Be sure to install an earth leakage circuit breaker in accordance with applicable legislation.Failure to do so many cause electrical shock.

Indoor power source and communication wiring

⃠ PROHIBIT
• Power lines shall not use other wires other than copper wire. • All internal and external machines must be connected to the ground of the power supply. The earthing wire shall not be connected to the ground wire of the gas pipe, water pipe, lightning rod or telephone. If the grounding is not appropriate, may cause electric shock or fire. • Power supply must be installed leakage circuit breaker, otherwise, may cause electric shock or fire. • The operation and maintenance of electrical equipment shall be carried out under the condition that the power supply is cut off. • The indoor and outdoor units set their own independent power supply. • The signal line and the power line must be independent, non electric signal line access.

Item / Indoor total current (A)	Power cable section (mm^2)	Wire length (m)	Rated current of overcurrent breaker (A)	Rated current of residual circuit breaker(A) Ground fault interruptor(mA) response time(S)	Communication wire section	
					Outdoor/indoor (mm^2)	Indoor/indoor (mm^2)
<10	2	23	20	20A, 30mA, below 0.1s	2-core × (0.75-2.0mm^2) shielded wire	
≥10 and <15	3.5	24	30	30A, 30mA, below 0.1s		
≥15 and <22	5.5	27	40	40A, 30mA, below 0.1s		
≥22 and <27	10	42	50	50A, 30mA, below 0.1s		

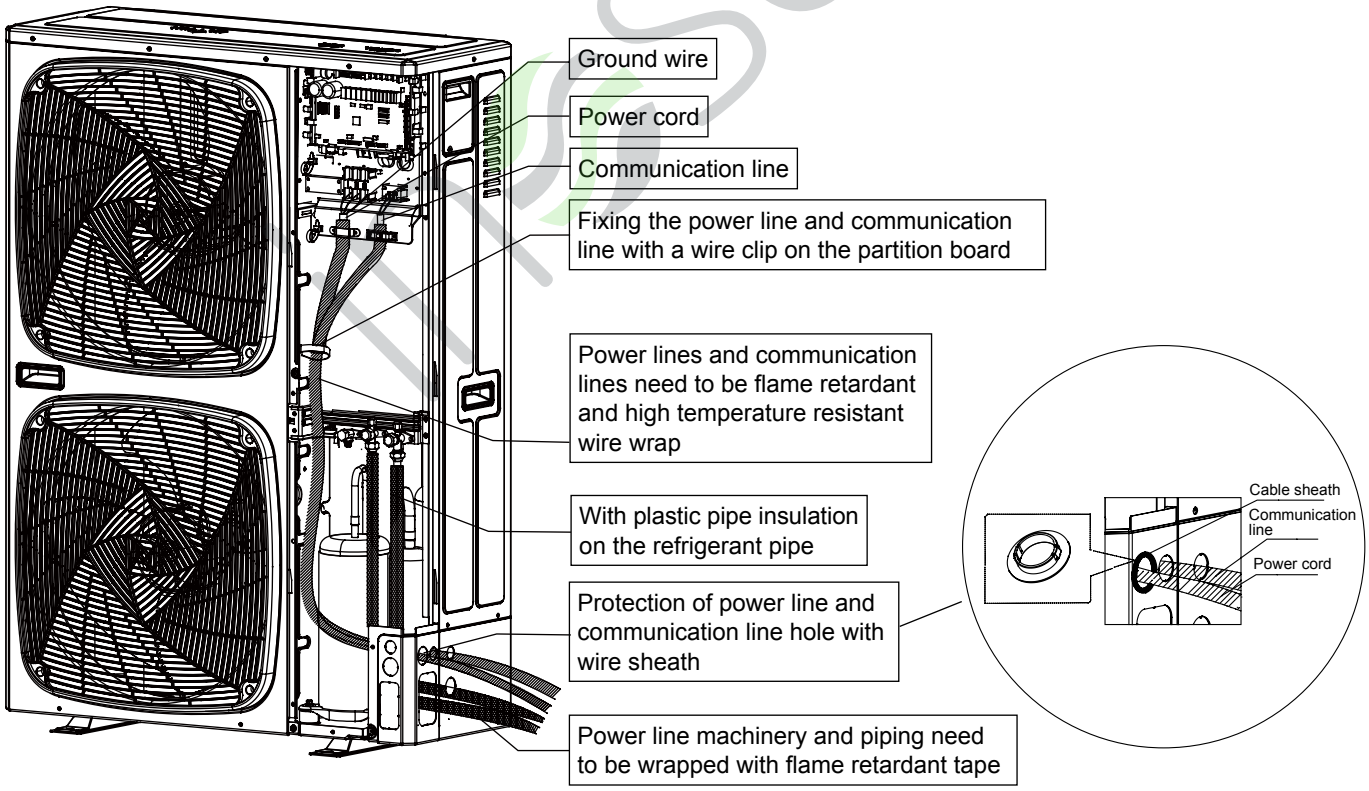
- Power cable and communication wire must be fixed firmly.
- Each indoor must be grounded well.
- When power cable exceeds the range, increase the gauge appropriately.
- Shielded layer of communication wires must be connected together and be earthed at single point.
- The total length of communication wire cannot exceed 1000m.

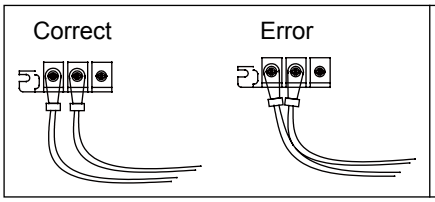
Communication wire for wired controller

Wire length(m)	Wire spec
≤ 250	0.75mm^2 ×(3-core) shielded wire

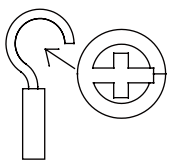
- Shielded layer of communication wire must be grounded at one end.
- The total length cannot exceed 250m.

Outdoor unit electrical wiring diagram



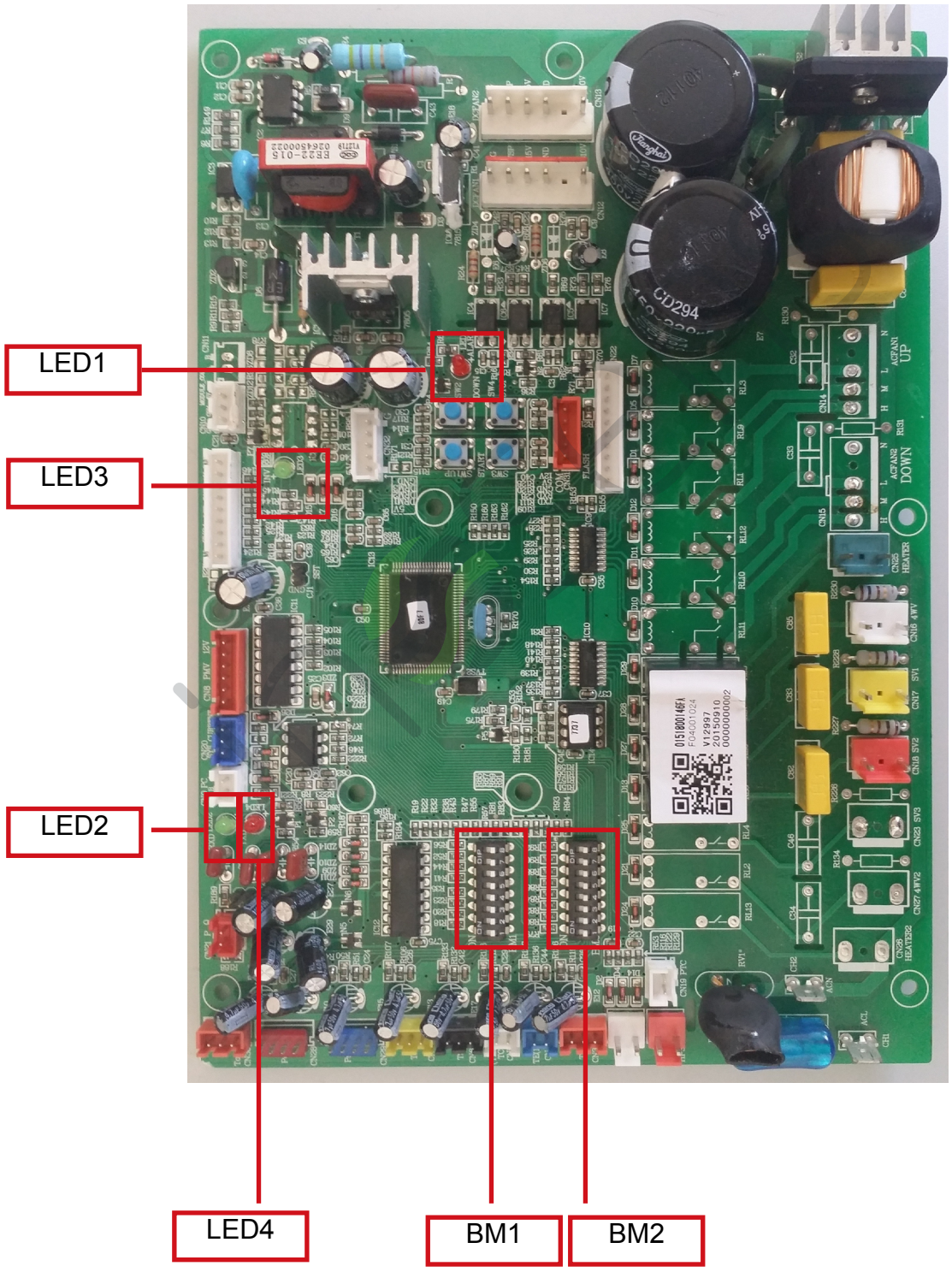


When using a single terminal without terminal, the terminal can not be directly used without flux. Otherwise, it will cause abnormal heating of terminal crimping part. If a single core wiring is used in the wiring, it can be connected directly in the manner shown in the diagram.



11. Outdoor Unit PCB

0151800146J



12. Dip Switch Setting

(1) BM1 introduction

BM1	Definition	Introduction	
BM1_1	Indoor searching after startup	OFF	Begin to search indoor
		ON	Stop searching indoor and lock the quantity
BM1_2	Celsius / Fahrenheit area selection	OFF	Celsius area
		ON	Fahrenheit area
BM1_3	Static pressure selection	OFF	30Pa
		ON	0Pa (default)
BM1_4	Priority selection for energy saving /effect	OFF	Energy saving priority
		ON	Effect priority (default)
BM1_5	Indoor ON / OFF simultaneous control	OFF	Every indoor unit can be controlled seperately (default)
		ON	All the indoor units will simultaneous ON or OFF
BM1_6	Defrosting condition selection	OFF	Not easy to frost area (default)
		ON	Easy to frost area
BM1_7	Defrosting level	OFF	Ordinary (default)
		ON	Strengthen (increase the defrosting time)
BM1_8	Quiet running function	OFF	Quiet running function is unavailable (default)
		ON	Quiet running function is available

Note:
Either the indoor unit quantity unlocked or the locked quantity is different with actual connecting number, the unit cannot running.

<table>
<tr><th>BM2</th><th colspan="2">Definition</th><th colspan="4">Introduction</th></tr>
<tr><td rowspan="2">BM2-1</td><td rowspan="2">Cooling only or heat pump selection</td><td>OFF</td><td colspan="4">Heat pump (default)</td></tr>
<tr><td>ON</td><td colspan="4">Cooling only</td></tr>
<tr><td>BM2_2
BM2_3
BM2_4</td><td colspan="2">Outdoor model selection</td><td>ON</td><td>ON</td><td>OFF</td><td>AU07NFPEUA</td></tr>
<tr><td rowspan="2">BM2-5</td><td colspan="2" rowspan="2">Power supply selection</td><td>OFF</td><td colspan="3">Single phase</td></tr>
<tr><td>ON</td><td colspan="3">3-phase</td></tr>
<tr><td rowspan="2">BM2-6</td><td colspan="2" rowspan="2">Communication protocol selection</td><td>OFF</td><td colspan="3">New communication protocol (default)</td></tr>
<tr><td>ON</td><td colspan="3">Old communication protocol</td></tr>
<tr><td rowspan="5">BM2-7
BM2-8</td><td colspan="2" rowspan="5">Start mode selection</td><td>BM2-7</td><td>BM2-8</td><td colspan="2">Start mode selection</td></tr>
<tr><td>OFF</td><td>OFF</td><td colspan="2">First on indoor unit priority</td></tr>
<tr><td>OFF</td><td>ON</td><td colspan="2">Last on indoor unit priority</td></tr>
<tr><td>ON</td><td>OFF</td><td colspan="2">Cooling priority, any one indoor unit runs in cooling mode, the outdoor unit will run in cooling mode, the indoor units running in heating mode will stop</td></tr>
<tr><td>ON</td><td>ON</td><td colspan="2">Heating priority, any one indoor unit runs in heating mode, the outdoor unit will run in heating mode, the indoor units running in cooling mode will stop.</td></tr>
</table>

Note: Either indoor unit unlocked or the locked quantity different with actual connecting number, it cannot run.

If the BM2-2, BM2-3, BM2-4 and BM2-5 setting wrong, it will cause the "63" failure

Note: communication protocol between indoor and outdoor units
The new communication protocol is faster than the old communication and its control content is more than the old one.
The indoor PCB 0151800113, 0151800161, 0151800161B, 0151800161C, 0151800227, 0151800227A, 0151800244, 0151800244B, 0151800244BA, 0151800086A, 0010451751AF, 0151800141A, 0010451751AE and 151800141 are new communication protocol.
The indoor PCB 0151800086 and 0010451181A are old communication protocol.
Old communication protocol indoor PCB can't connect with new communication protocol outdoor, so if this outdoor unit connect with old communication protocol indoor, need set the dip switch BM2-6 to ON position.

2. bridge instruction

CJ1:
Short it before power ON-- PCB check its function (used for factory production. Short it after power ON-- time short function, 60 seconds become to 1 second.
CJ2: Reserved

13. Monitor Tools

Main function instruction:
By setting the rotary switch, the digital tube will display the outdoor and indoor unit parameters (the outdoor current, discharge temp., suction temp., defrosting temp., coil temp. and outdoor ambient temp.; indoor unit coil temp. and valve open angle and so on), the data is inform of decimal integer. During the process of installation, adjustion and maintenance, the whole system's operating parameters can be tested conveniently which can help to check and solve problems quickly and correctly.

SW01	SW02	Digital tube display
0	0	Display outdoor failure code (when unlock the indoor quantity and the system is running normally, display indoor quantity, outdoor horse power and type of power supply circularly) (1) The connection machine number: display "H" + machine units. Such as "H08" means that the machine is connected to the 8 internal machine . (2) Outdoor mechanism cold capacity: such as AU05 machine display 6HP. (3) Power supply type: 220 represents a single phase 220V, and the 380 represents a three-phase 380V).
	1	Display outdoor operation mode (stop: OFF, cooling: CCC, heating: HHH)
	2	Program version (one decimal)
	3	E2 version
	4	Target frequency of compressor, (press "start" for 5s to enter the manual frequency control, "Up / Down" can adjust the frequency, press "stop" for 5s to quit. Manual control, the frequency flashing display, otherwise display normally.)
	5	Actual frequency of compressor
	6	Indoor quantity
	7	Running indoor quantity
	8	Outdoor unit horse power
	9	Outdoor fan 1 speed (unit: rpm, max. display: 999)
	A	Outdoor fan 2 speed (unit: rpm, max. display: 999)
	B	Target average temp. of indoor Tc2 (unit: ℃)
	C	Actual average temp. of indoor Tc2 (unit: ℃)
	D	Target degree of superheat of PMV in heating (unit: ℃)
	E	Outdoor special operation condition: The first position: power supply type (0-1Ph; 1- 3Ph) The second position: quiet (0-OFF; 1-ON) ; The third position: gettering operation (0-OFF; 1-ON) (101: three phase power supply, mute off, open the gas)
	F	Forced fan motor running, (press "start" for 5s to enter the manual fan motor control, "Up / Down" can adjust fan speed, press "stop" for 5s to quit) forced: flashing display "0-15", otherwise display "FAN". The outdoor failure can't affect this function.

SW01	SW02	Digital tube display
1	0	Td discharging temperature (unit: ℃)
	1	Ta outdoor ambient temperature (unit: ℃)
	2	Ts suction temperature (unit: ℃)
	3	Te defrosting temperature (unit: ℃)
	5	Pd high pressure (unit: kg, one decimal)
	6	Ps low pressure (unit: kg, one decimal)
	7	Outdoor PMV valve open angle (unit: pls, max. display: 999) (Press start for 5s to enter forced mode, all the indoor units' PMV are full open, flashing display "480" and press stop for 5s to quit and display outdoor PMV valve open angle)
	8	Valve state The first position: 4WV (0-OFF; 1-ON) The second position: SV1 (0-OFF; 1-ON) The third position: SV2 (0-OFF; 1-ON) example 101 indicates that the 4WV is turned on, the SV1 is turned off, the SV2 is turned on)
	9	The first position: high pressure switch (0-OFF; 1-ON) The second position: low pressure switch (0-OFF; 1-ON) The third position: heater (0-OFF; 1-ON) (0-disconnect,1-closed);third:heating belt(0-closed,1-open)(101:HPS LPS closed off, open the heating zone)
	A	Tfin module temperature (unit: ℃)
	B	Compressor current (unit: A, one decimal)
	D	DC voltage of module (unit: V)
	E	Outdoor CT current (unit: A, one decimal) Forced cooling alternate display "CCC", (Press start for 5s, all the indoor units are in cooling state, and press stop for 5s to quit)
	F	Forced heat alternating display "HHH" (according to Start 5 seconds to enter, all the internal mechanism of hot running, press Stop to exit for 5 seconds).
2	0-F	If the communication is normal display indoor program version (one decimal) ,otherwise "---"
3	0-F	Indoor type (0,4,5,6,7 ordinary indoor unit; 1-high wall; 2-fresh air; 3-heat recovery)
4	0-F	Display indoor failure code, if no failure display "---"
5	0-F	Indoor horse power (one decimal)
6	0-F	The first and second position: indoor unit current operation mode (00-OFF, 01-Fan, 02-Cooling, 03-Dehumidify, 04-Heating) The third position: outdoor unit capacity demand (0-no ; 1-yes)
7	0-F	Indoor PMV valve open angle (unit: pls, max. display: 999)
8	0-F	Indoor unit The first position: float switch (0-OFF; 1-ON) The second position: pump (0-OFF; 1-ON) The third position: heater (0-OFF; 1-ON) (110 float switch is closed, the water pump is opened, the electric heating off)
9	0-F	Indoor Ta ambient temperature (unit: ℃)
A	0-F	Indoor TC1 gas temperature (unit: ℃)
B	0-F	Indoor TC2 liquid temperature (unit: ℃)
C	0-F	Indoor units: fan speed of indoor units(0-OFF, 1-Low, 2-med, 3-high)

Sub-cooling valve board parameter display

SW01	SW02	Digital tube display
D	0	Sub-cooling valve board failure code (cold plate module sent)
	1	Sub-cooling valve board program version (1 decimal)
	2	Expansion valve target opening angle (unit: pls, max: 999)
	3	The expansion valve current opening angle (unit: pls, max: 99)
	4	Tc1 temperature of Sub-cooling valve board (unit: Celsius)
	5	Tc2 temperature of Sub-cooling valve board (unit: Celsius)
	6	Reserve (display "---")
	7	Reserve (display "---")
	8	Reserve (display "---")
	9	Reserve (display "---")

14. Outdoor Unit Control

1. Compressor startup control

After receiving the outdoor startup instruction, outdoor open SV1 30 seconds and then standby. When startup, the compressor will keep for 3 min at 45rps (when Ta<40°C) or 3 min at 40rps (when Ta>=40°C). In cooling mode, meet running 1min & (Td-CT)≥20°C or Ps≤0.1MPa (or max. running time is 3min),quite the startup control;
In heating mode, meet running 1min and & (Td-CT)≥20°C or Ps≤0.1MPa (or max. running time is 3min), quite the startup control;
During startup, the high pressure protection, high exhaust protection and current protection is priority and the low exhaust up frequency protection is shielded.

2. Compressor output control

Compressor Pd/Ps control, control the compressor frequency to output appropriate cooling/heating capacity.
The control at the end of the startup control.

2.1 In cooling mode:
According to the ambient temperature select target Ps automatically

Mode	Effect priority mode (default)	Energy-saving mode	Outdoor ambient temperature	Ps correction during running
Target Ps	Setting value -R°C	Setting value -R°C	Ta≤12°C	During running: correct the Ps according to the compression ratio
Target Ps (set by dip switch)	0	2	12°C<Ta<40°C	
Target Ps	Setting value +2°C	Setting value +2°C	Ta≥40°C	

R value setting: Ta<-5°C, Target Ps: setting value -8°C
-5°C≤Ta<12°C, Target Ps is the slope value of setting value and (setting value -8°C)

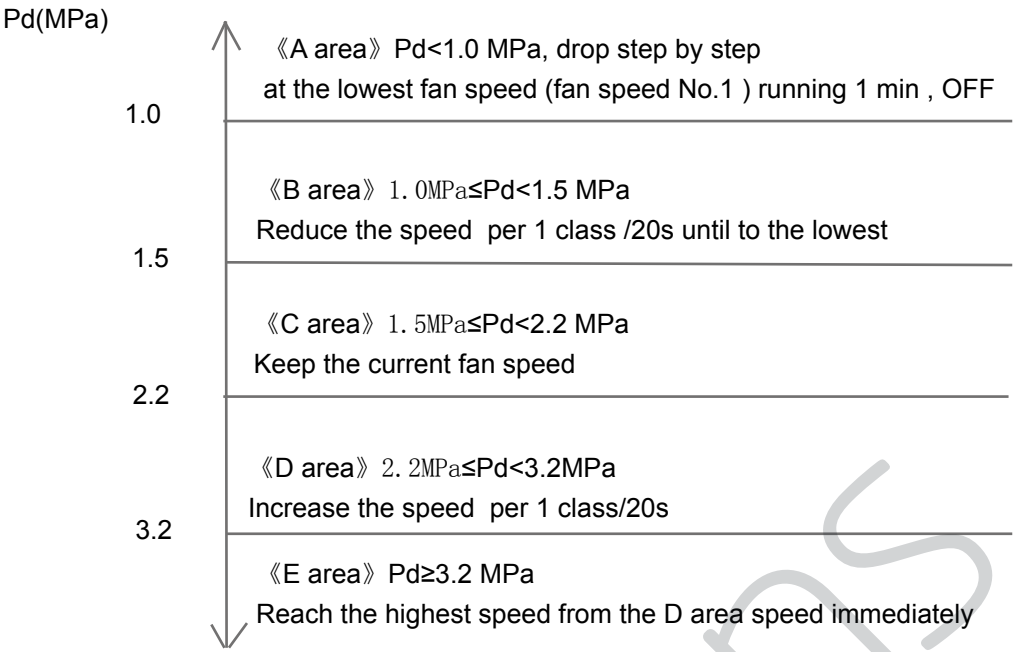
2.2 In heating mode:

According to the piping length to select target Pd and also according to the ambient temperature select target Pd automatically

Mode	Effect priority mode (default)	Energy-saving mode	Outdoor ambient temperature	Pd correction during running
Target Pd	Setting value +3°C	Setting value +3°C	Ta≥15°C	During running: correct the Pd according to the compression ratio
Target Pd	Setting value +2°C	Setting value +2°C	Ta≥7°C	
Target Pd (set by dip switch)	48	46	Ta≥-5°C	
Target Pd	Setting value -2°C	Setting value -2°C	Ta<-5°C	

3. Outdoor fan motor control

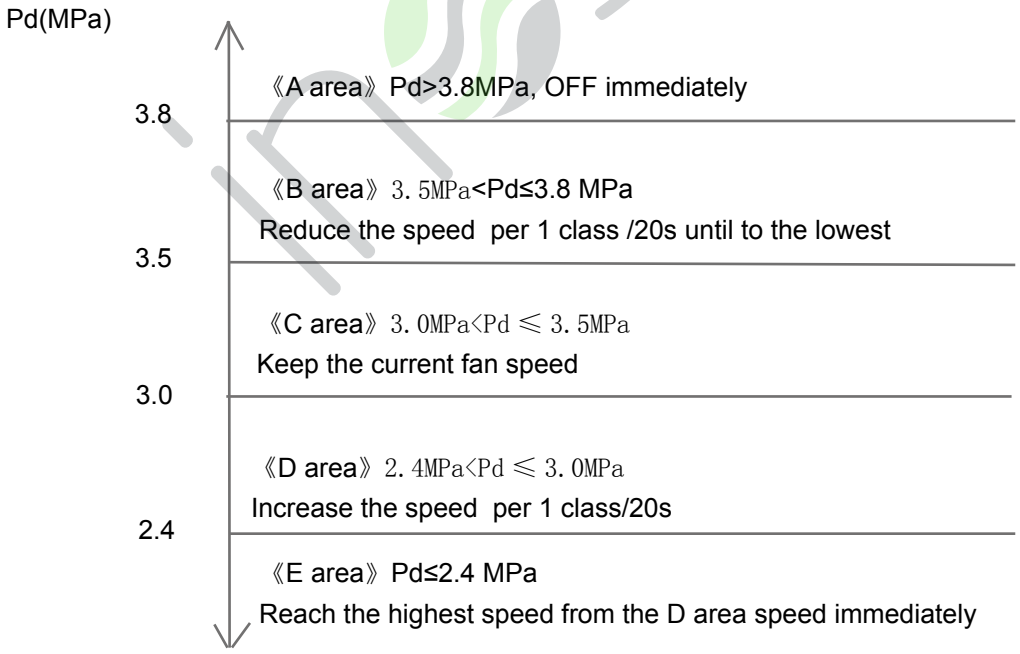
3.1 In cooling mode:
Outdoor fan motor running control during cooling mode is in high COP and 100% RPM running as much as possible.
Outdoor fan control in the operation of the refrigeration in the relation between high COP operation principle is to 100% as much as possible the RPM.
Pd is the main control standard.



When startup the fan motor speed refer to the following:

- Ta≥35°C: highest speed
- 25°C≤Ta<35°C: 6 speed
- 15°C≤Ta<25°C: 3 speed
- Ta<15°C: OFF

3.2 In heating mode



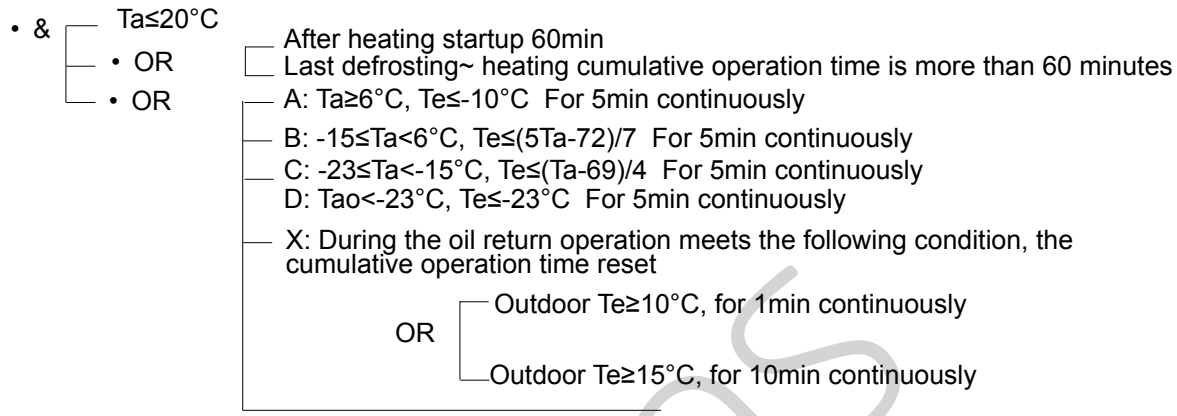
All the heating start, after the 4-way valve reversing (including defrosting, oil return and 4-way valve is electrified) the fan motor speed refer to the following:

- Ta≤15°C: highest speed
- 15°C<Ta≤20°C: 3 speed
- Ta>20°C: 1 speed

4. Defrosting control

In order to have the effect heating operation, need defrosting control.

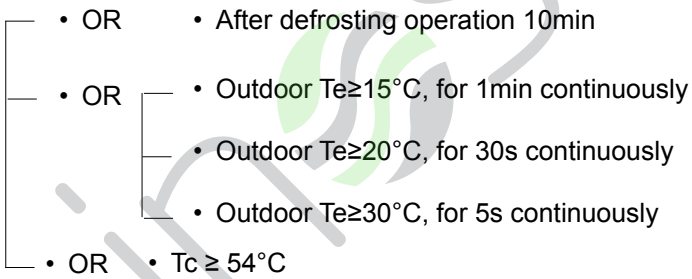
4.1 Entering condition:



4.2 Defrosting control

During defrosting, four-way valve power off, outdoor fan stop, indoor fan stop, outdoor PMV open to 470pls.

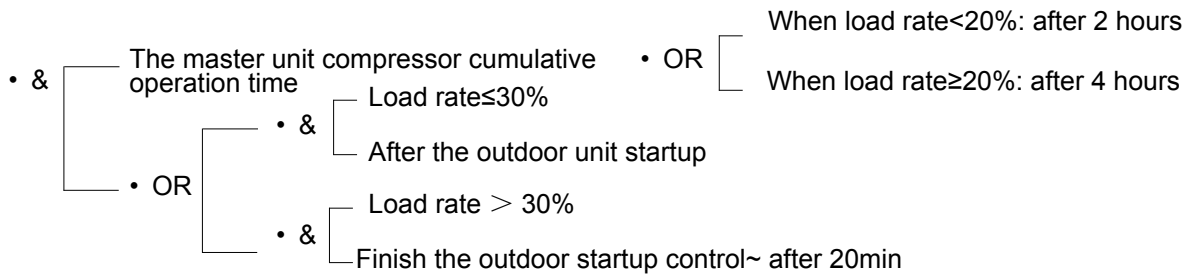
4.3 Quit defrosting



5. Oil return control

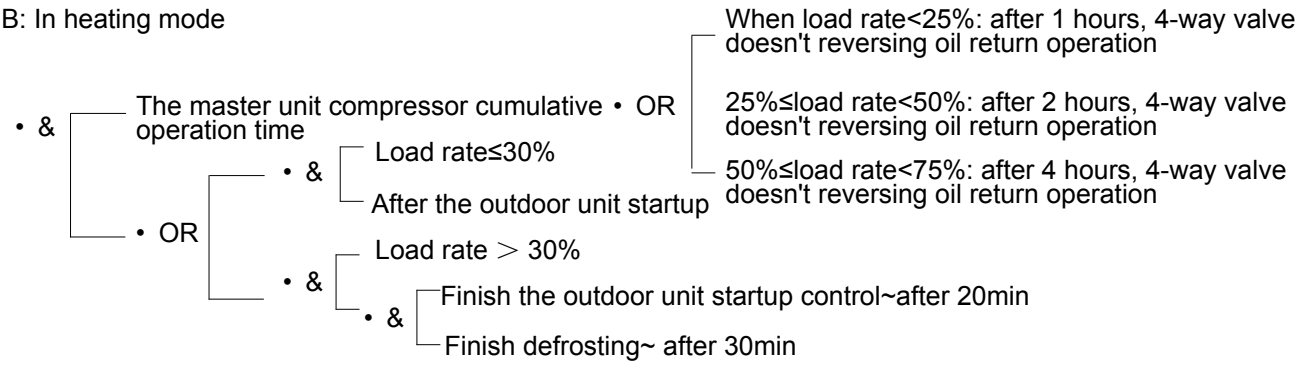
5.1 Entering condition:

A: In cooling mode



Note: *load rate=∑indoor HP(Thermo ON) / ∑indoor HP*100%*

B: In heating mode



Note: if *load rate≥75% and the outdoor unit output rate≥75% for 10 min, oil return time reset*

5.2 Oil return control

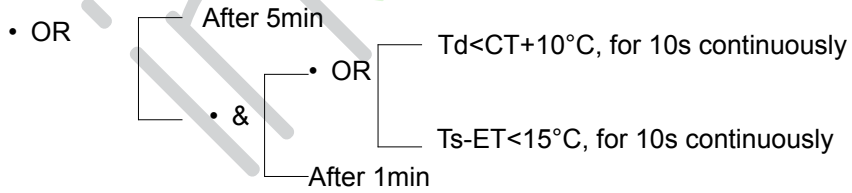
1) Oil return in cooling mode, the compressor according to the 75% of maximum frequency control, the outdoor PMV opening angle is 470 pls, the Thermo ON indoor PMV opening angle is 250 pls, the Thermo OFF indoor PMV opening angle is 125 pls.

2) Oil return in heating mode (4-way valve reversing), the compressor according to the 75% of maximum frequency control, the outdoor PMV opening angle is 470 pls, the Thermo ON and Thermo OFF indoor PMV opening angle is 125 pls. When Td > 95 °C ands TdSH > 15 °C, the indoor PMV opening angle increased 10%, max. time is 2; When Td < 90 °C, return to the usually opening.

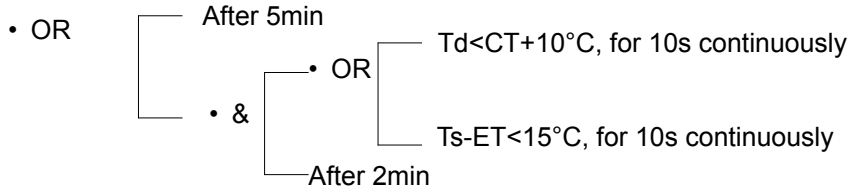
3) Oil return in heating mode (4-way valve doesn't reversing), the compressor according to the indoor units load rate and current running frequency to confirm the oil return enter frequency, the maximum frequency can't exceed 75% of the maximum frequency. the PMV of the outdoor and the Thermo ON indoor unit control automatically, Thermo OFF indoor PMV opening angle is 250 pls.

5.3 Oil return quit condition:

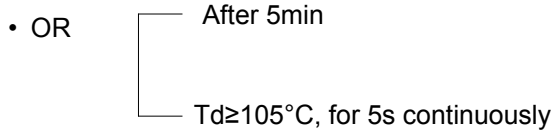
1) In cooling mode



2) In heating mode (4-way valve reversing)



3) In heating mode (4-way valve doesn't reversing)



15. Failure code

Digital tube indication on master unit	Indication on wired controller (hex)	Failure code definition	Failure description	Remarks
20	14	Defrosting temp. sensor Te failure	Open circuit or short circuit for continuous 60seconds, alarm	Resumable
21	15	Ambient temp. sensor Ta failure		Resumable
22	16	Suction temp. sensor Ts failure		Resumable
23	17	Discharging temp. sensor Td failure		Resumable
26	1A	Indoor communication failure	For continuous 200 cycles, can not find connected indoors	Resumable
26-1	1A		For continuous 300seconds, the searched indoor quantity is less than the set quantity.	
26-2	1A		For continuous 300seconds, the searched indoor quantity is more than the set quantity.	
28	1C	High pressure sensor Pd failure	Open circuit or short circuit for continuous 60seconds, alarm	Resumable
29	1D	Low pressure sensor Ps failure		Resumable
30	1E	High pressure switch HPS failure	If disconnect for continuous 50ms, alarm. If alarm 3 times in an hour, confirm the failure	Once confirmation, un-resumable
33	21	Outdoor EEPROM failure	Outdoor EEPROM failure	Un-resumable
34	22	Discharging temp. too high protection (Td)	Td≥239°F(115°C), alarm; Td ≤185°F(85°C) resume. If it occurs 3 times in an hour, confirm the failure.	Once confirmation, un-resumable
35	23	4-way valve reversing failure	After the compressor start for 10 minutes, 4-way valve can be met reversing pressure difference [6.0]kg, alarm, 3min resume,f it occurs 3 times in an hour, confirm the failure.	Once confirmation, un-resumable
39-0	27	Low pressure Ps too low protection	(1) In cooling, Ps≤[0.5]kg or Ps≤[1.0]kg for continuous 5min, alarm. Ps ≥[2.5]kg, resume (2) In heating, Ps≤[0.3]kg or Ps≤[0.5]kg for continuous 5min, alarm.Ps ≥[2.0]kg, resume if it occurs 3 times in an hour, confirm the failure.	Once confirmation, un-resumable
39-1	27	Compression ratio too high protection	Compression ratio ≥[8.0] for continuous 5min or compression ratio ≥[9.0] for continuous 1min, stop and alarm.3min later, resume automatically, if it occurs 3 times in an hour, confirm the failure.	
39-2	27	Compression ratio too low protection	Compression ratio ≤[1.8] for continuous 5min or compression ratio ≤[1.5] for continuous 1min, stop and alarm.3min later, resume automatically, if it occurs 3 times in an hour, confirm the failure.	
40	28	High pressure sensor Pd too high protection	Pd≥[41.5]kg, or Pd≥[39]kg for continuous 5min, alarm and stop. Pd≤[33]kg resume.if it occurs 3 times in an hour, confirm the failure.	
43	2B	Discharging temp. sensor Td too low protection	Td≤Pd+[10]℃ for continuous 5 minutes, the unit stops and alarms. when the oil temp. met the startup condition, resume.if it occurs 3 times in an hour, confirm the failure.	

Digital tube indication on master unit	Indication on wired controller (hex)	Failure code definition	Failure description	Remarks
46	2E	Communication with inverter board failure	No communication for 30 seconds continuously, when communication is normal, resume	Resumable
53	35	CT current is too low or current sensor fault	Compressor frequency continuous operation after 1 minute, compressor frequency ≥70Hz, current sensor for five minutes samples values less than 10, alarm. 3 minutes later recovery. If it occurs 3 times in an hour, confirm the failure.	Once confirmation, un-resumable
54	36	Control board for subcooling valve communication fault	Cannot receive the signal of control board for subcooling valve in 200 continuous cycles or receive wrong data, recover automatically when received right data.	Resumable
57	39	Communication failure between control board for subcooling valve and PCB(sending by control board for subcooling valve)	Communication failure between control board for subcooling valve and PCB	Resumable
58	3A	Tc1 temp sensor of control board for subcooling valve failure (sending by control board for subcooling valve)	Tc1 temp. sensor cannot connect with control board for subcooling valve	Resumable
59	3B	Tc2 temp sensor of Control board for subcooling valve failure (sending by control board for subcooling valve)	Tc2 temp. sensor cannot connect with control board for subcooling valve	Resumable
60	3C	Control board for subcooling valve failure (sending by valve plate)	Reserved	Resumable
61	3D	Control board for subcooling valve failure (sending by control board for subcooling valve)	Reserved	Resumable
62	3E	Control board for subcooling valve failure (sending by control board for subcooling valve)	Reserved	Resumable
63	3F	Control board for subcooling valve dip switch setting wrong	The dip switch setting there is no control board for subcooling valve, but the control board for subcooling valve is detected. (please check the dip switch setting of BM2-2, BM2-3, BM2-4, BM2-5)	Un-resumable
64	40	CT current is too high	CT current exceeds specified value for continuous 5s, 3 minutes after recovery, If it occurs 3 times in an hour, confirm the failure	Once confirmation, un-resumable

Digital tube indication on master unit	Indication on wired controller (hex)	Failure code definition	Failure description	Remarks
71-0	47	Upper DC motor failure	Running at speed below 20rpm for 40s, or running lower than 70% of target speed for 2 minutes, 3 minutes after recovery, If it occurs 3 times in an hour, confirm the failure	Once confirmation, un-resumable
71-1	47	Lower DC motor failure		
75-0	4B	No pressure difference	Within 3 minutes after the compressor starts, if Pd-Ps ≤ [1.0] kg for continuous 1 minutes, alarm; it will recovery after 3 minutes. If it occurs 3 times in an hour, confirm the failure	
75-4	4B	The pressure difference is too small	Pd-Ps ≤ [2.0] kg for continuous 5 minutes, alarm; it will recovery after 3 minutes. If it occurs 3 times in an hour, confirm the failure	
78	4E	Lack of refrigerant	Compressor running in cooling mode, Ps≤[2.0]kg for continuous 30 minutes, alarm; Ps≥[3.0]bar for continuous 30min, recovery. Compressor running in heating mode, Detect the outdoor EEV open fully for continuous [60] minutes and suction superheat Ts - Ps ≥ 20°C, alarm;Ps≥[2.0]bar for continuous 30min, recovery.	Once confirmation, un-resumable
81	51	IPM modular temp. too high protection	IPM modular temp.≥[85]°C, alarm; IPM modular temp.≤[65]°C, recovery. If it occurs 3 times in an hour, confirm the failure	Once confirmation, un-resumable
82	52	Compressor current protection	Compressor current exceeds specified value, 3 minutes after recovery, If it occurs 3 times in an hour, confirm the failure	Once confirmation, un-resumable
83	53	Outdoor model setting wrong	Model and dip swtich setting do not match	Un-resumable
108	6C	Transient over current in IPM module rectifier side software	Transient over current in IPM module rectifier side software	3 times in an hour, confirm failure; once confirmation, un-resumable
109	6D	Current of IPM module rectifier side detection circuit abnormal	Current of IPM module rectifier side detection circuit abnormal	
110	6E	Over current of IPM modular hardware	IPM modular over current,	3 times in an hour, confirm failure; once confirmation, un-resumable
111	6F	Compressor out of control	In the course of compressor startup or running, the unit can not detect the rotor position, stop for 5s and INV control board resume automatically.	
112	70	Radiator of module temp. too high	When The temp. ≥ 94°C, alarm When The temp. < 94°C, INV control board resume automatically.	
113	71	Module overload	Module overload	
114	72	Voltage too low of DC bus line of module	When power supply voltage < DC420V, alarm When power supply voltage > DC420V, INV control board resume automatically.	
115	73	Voltage too high of DC bus line of module	When power supply voltage > DC642V, alarm When power supply voltage < DC642V, INV control board resume automatically.	
116	74	Communication abnormal between module and control PCB	Communication is disconnected	Resumable

Digital tube indication on master unit	Indication on wired controller (hex)	Failure code definition	Failure description	Remarks
117	75	Module over current (software)	Module over current (software)	3 times in an hour, confirm failure; once confirmation, un-resumable
118	76	Compressor startup failure	Compressor continuously startup 5 times all failed.	
119	77	Detecting circuit of transducer current is abnormal	Current detection sensor of inverter controller is abnormal or unconnected or connected wrongly.	
120	78	Power supply of inverter controller abnormal	Power supply of inverter controller is broken down instantly	
121	79	Power supply of inverter board is abnormal	Power supply of inverter controller is broken down instantly	3 times in an hour, confirm failure; once confirmation, un-resumable
122	7A	Radiator temp.sensor of module abnormal	Resistor of temp. sensor abnormal or temp. sensor disconnected	
123	7B	Transient over current of IPM module rectifier side hardware	Transient over current in IPM module rectifier side hardware	3 times in an hour, confirm failure; once confirmation, un-resumable

When there is no failure, if the starting condition can not be met, digital tube on master unit will display stand-by code:

555.0	Standby state of capacity overmatch	When the ratio of indoor horse power and outdoor horse power is less than 50% or more than 130%, the system is in standby mode.	Resumable
555.1	Outdoor ambient temperature too high (heating)	Ta>27°C, Standby	
555.3	Outdoor ambient temperature too high or too low (cooling)	Ta>54°C or Ta<-15°C, Standby	
555.4	Oil temp. preheat	The oil temperature does not meet the system start-up conditions	

Note:

1, The data in [ ] stores in EE

2, The PCB display failure method:

A. Digital display board: if the fault is 26-0, then display [26] first, and then display [-0]. If is 555.0, the first display [555], and then display [. 0]. Failure code display is 1 second, failure display interval is 2 seconds.

B. LED light: the red light LED1 on behalf of ten digits, green light LED3 on behalf of the unit digit.

If it is 26-0, first LED1 flashes 2 times , then LED3 flashes 6 times. So circularly display.

If is 111-1, first LED1 flashes 11times, then LED3 flashes 1 time, and then LED1 normally on the LED3 flashes 1 time at the same time. So circularly display.

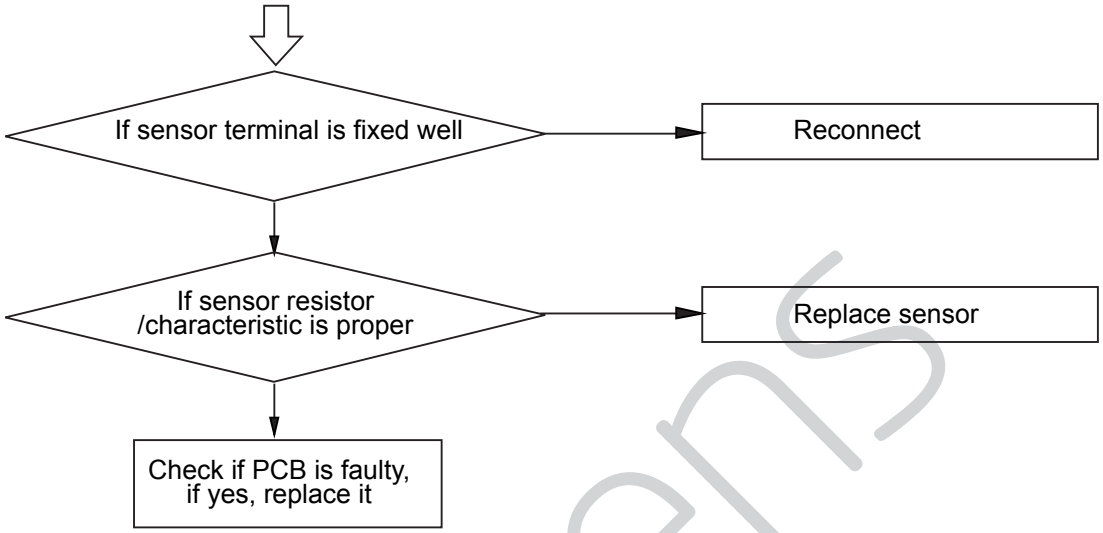
If is 555.0, the LED1 and LED3 normally on.

If is 555.4, the LED1 and LED3 flash 4 times at the same time. So circularly display.

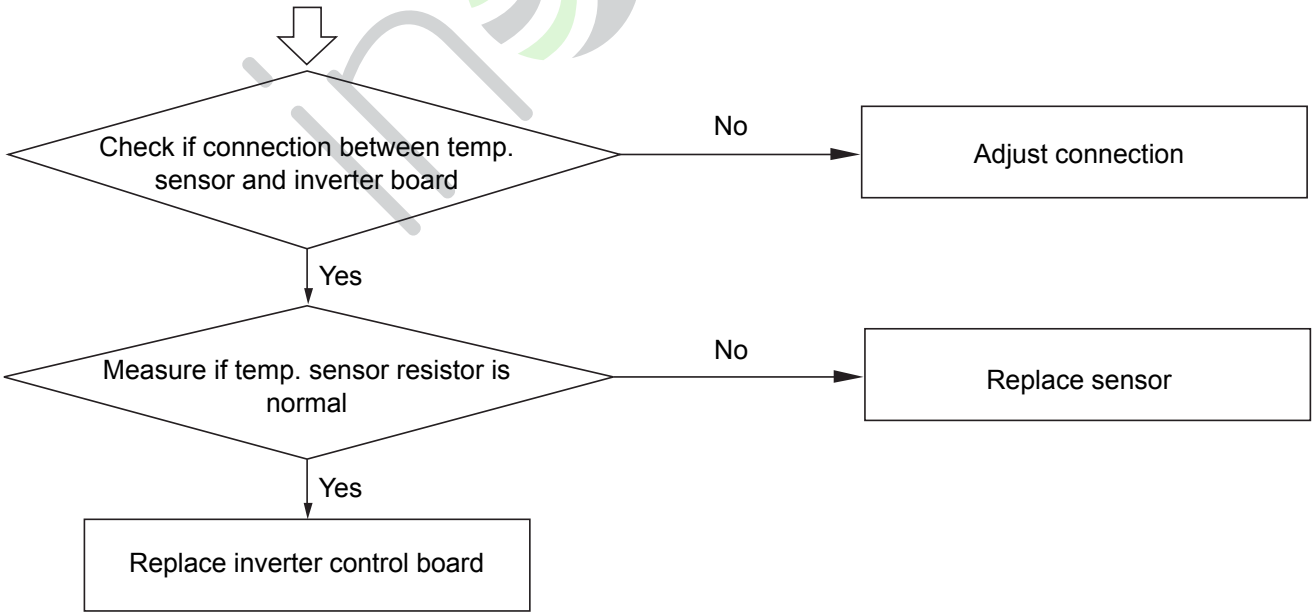
Flash frequency of LED lights is 2Hz, interval time is 2 seconds.

16. Troubleshooting

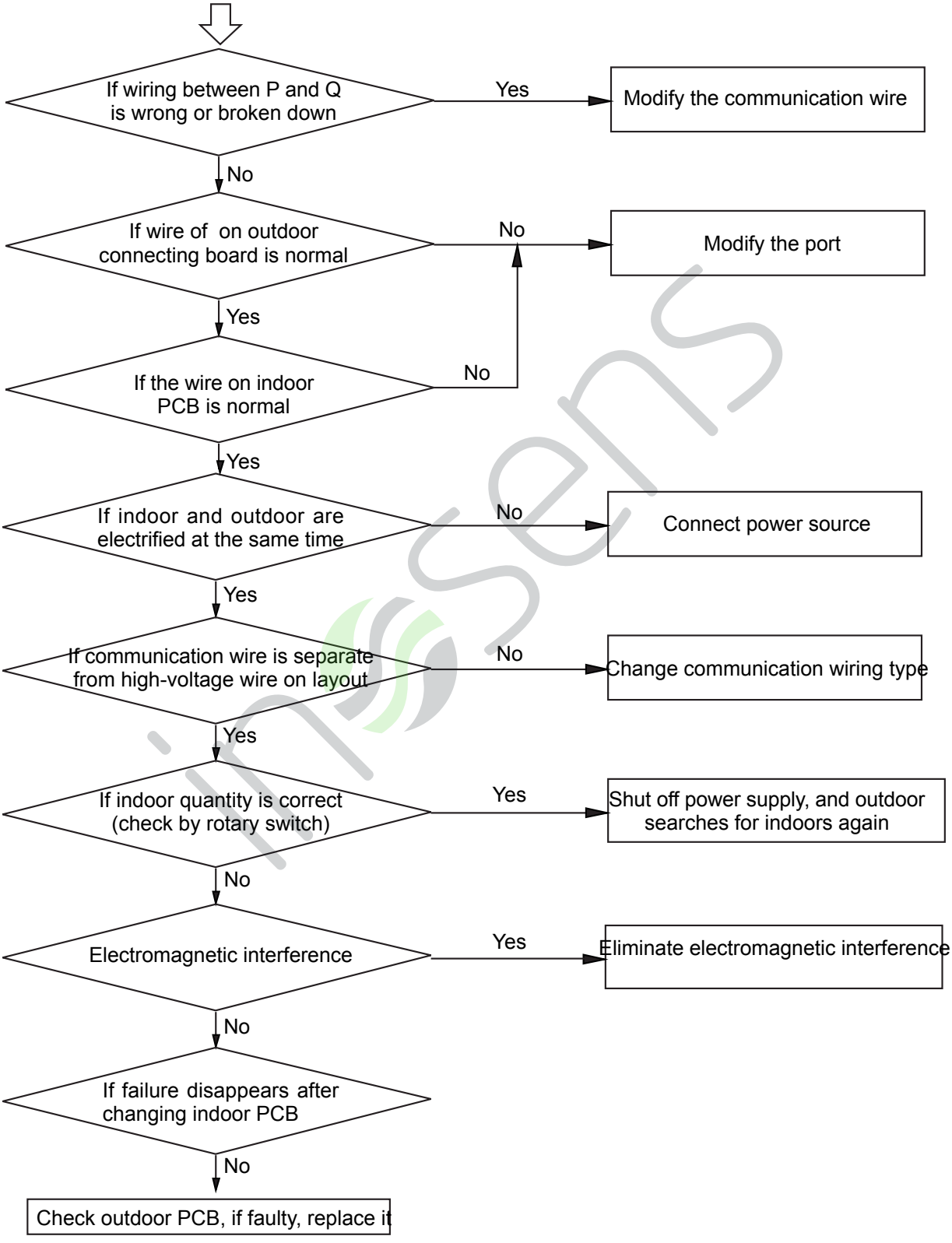
[20-23] Temperature sensor failure



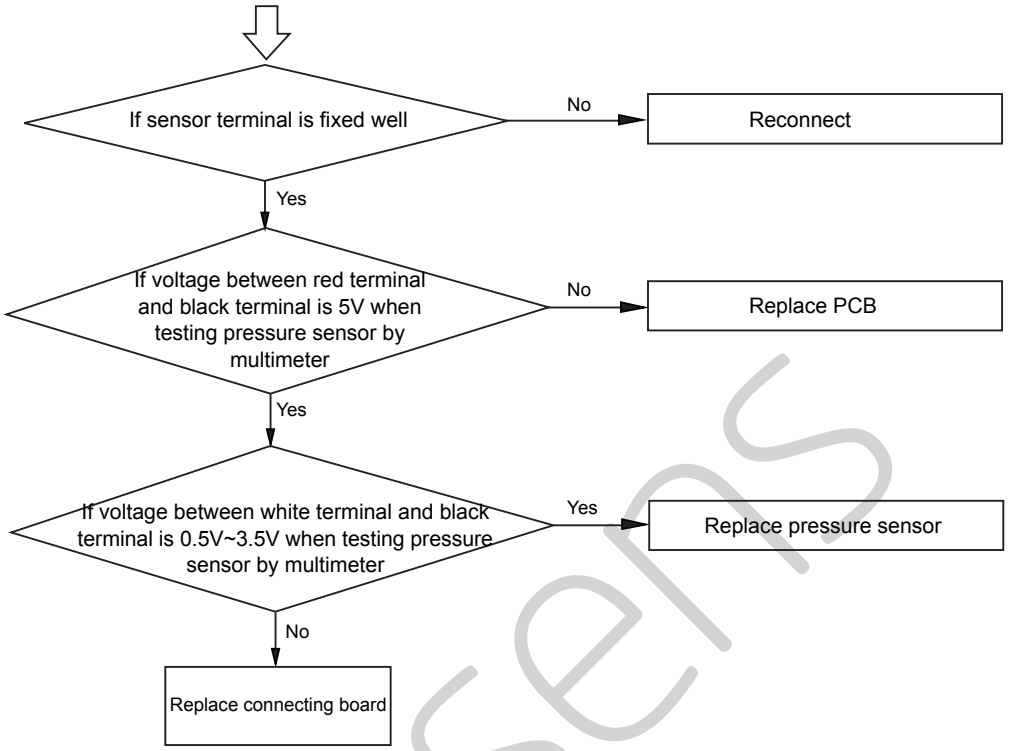
[122] Radiator temp. sensor of transducer abnormal



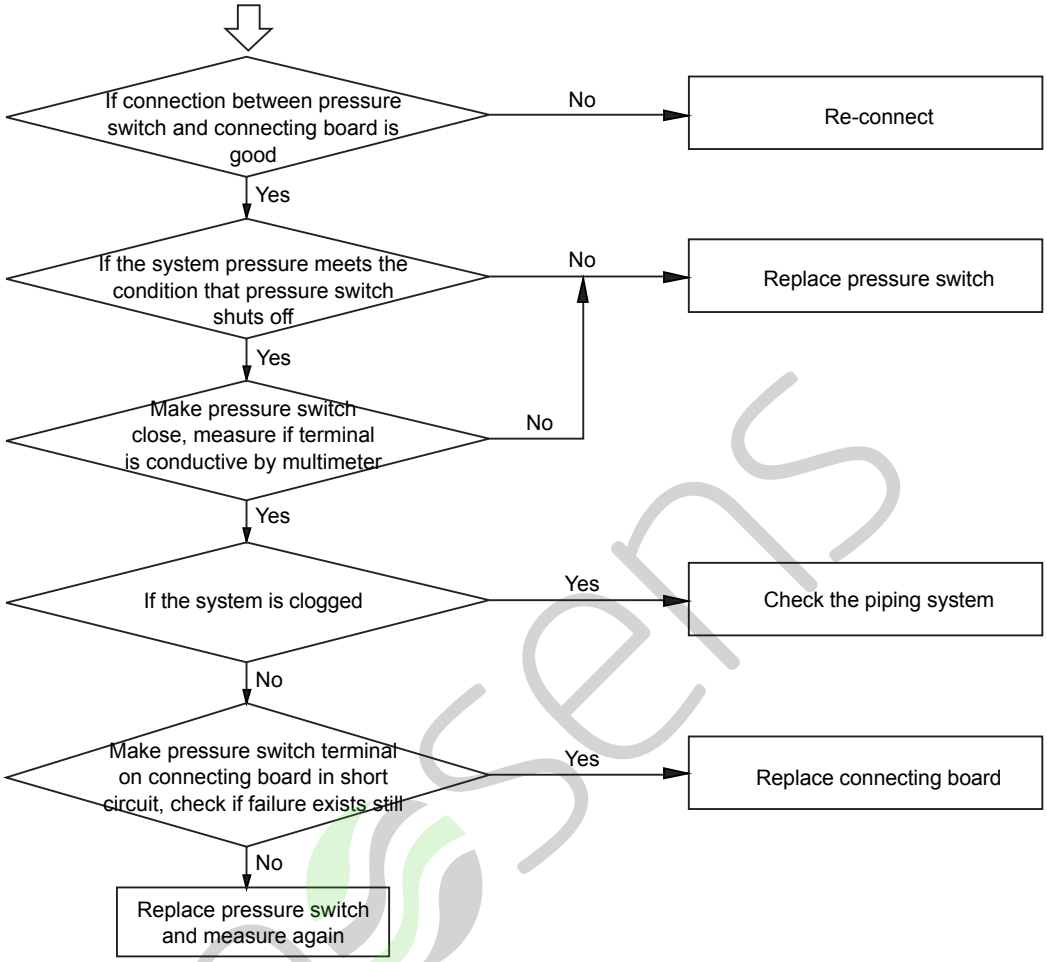
[26-0, 26-1, 26-2] Communication circuit between indoor and outdoor



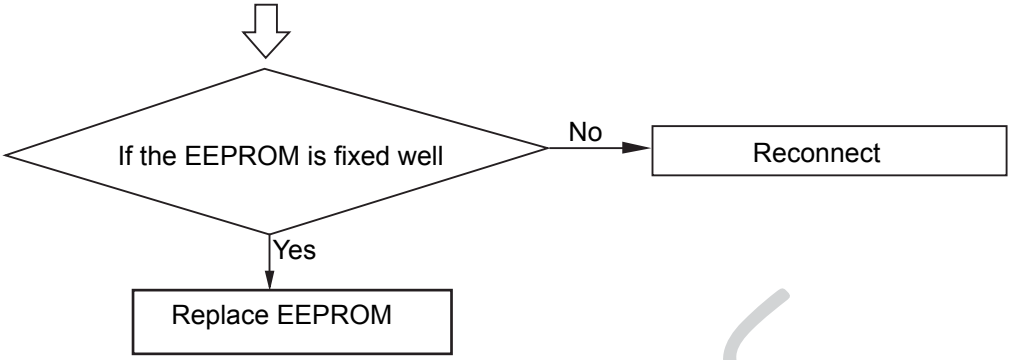
[28, 29] High/low pressure sensor failure



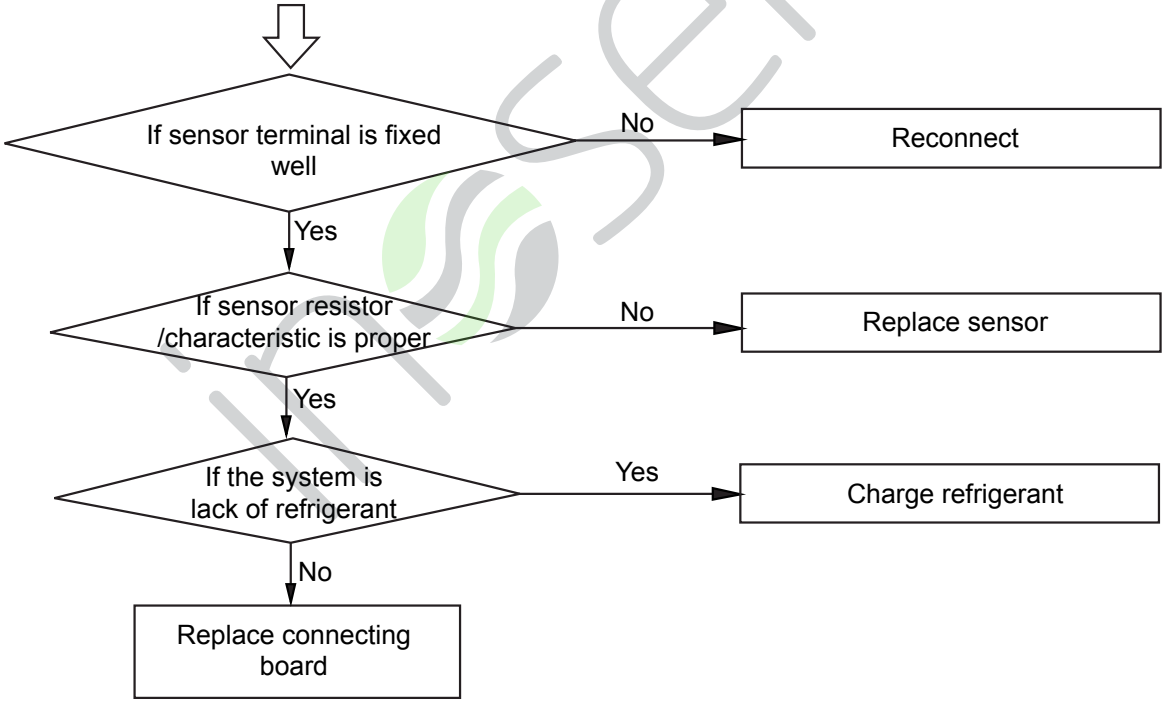
[30] High pressure switch failure



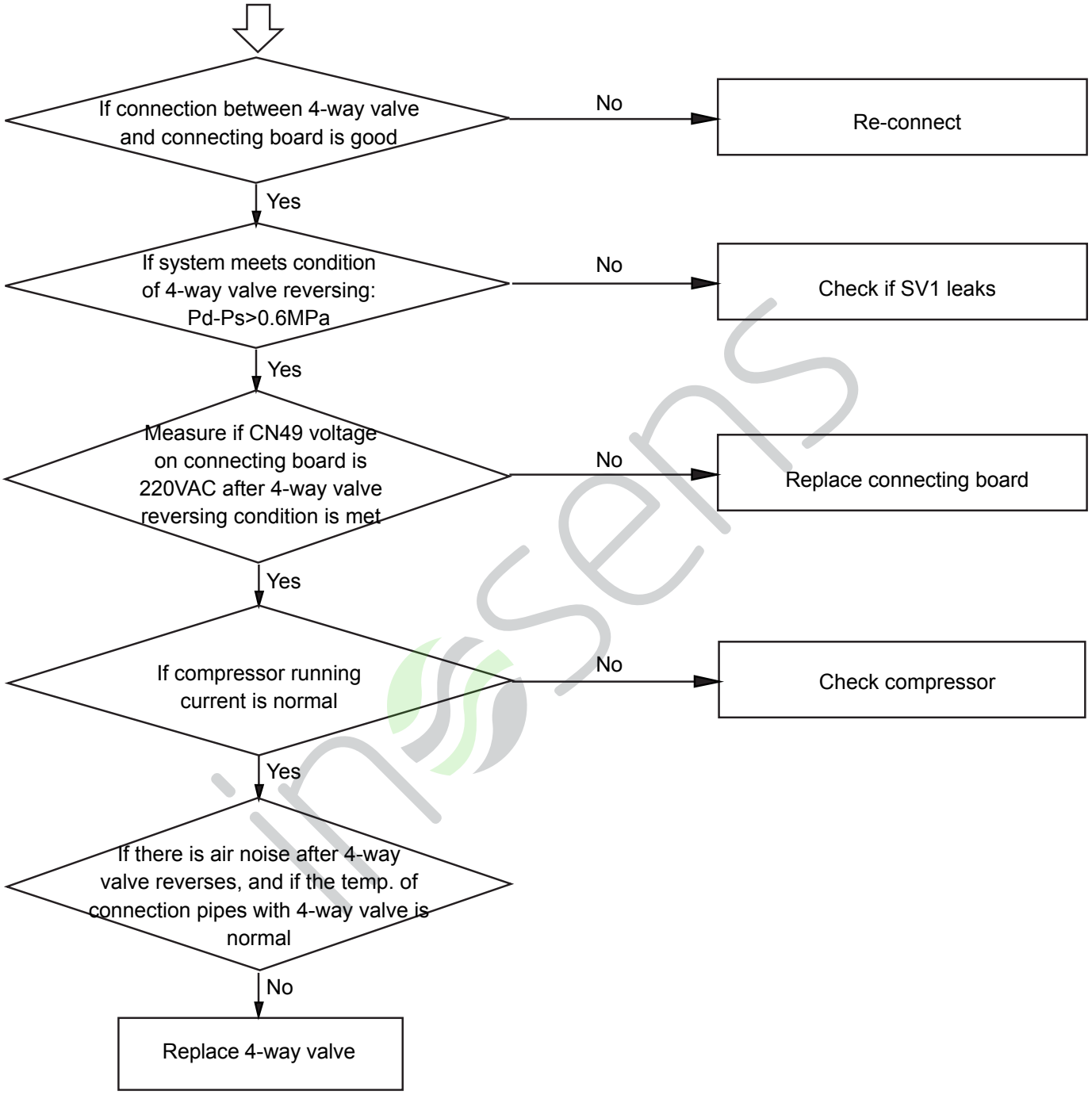
[33] Outdoor EEPROM failure



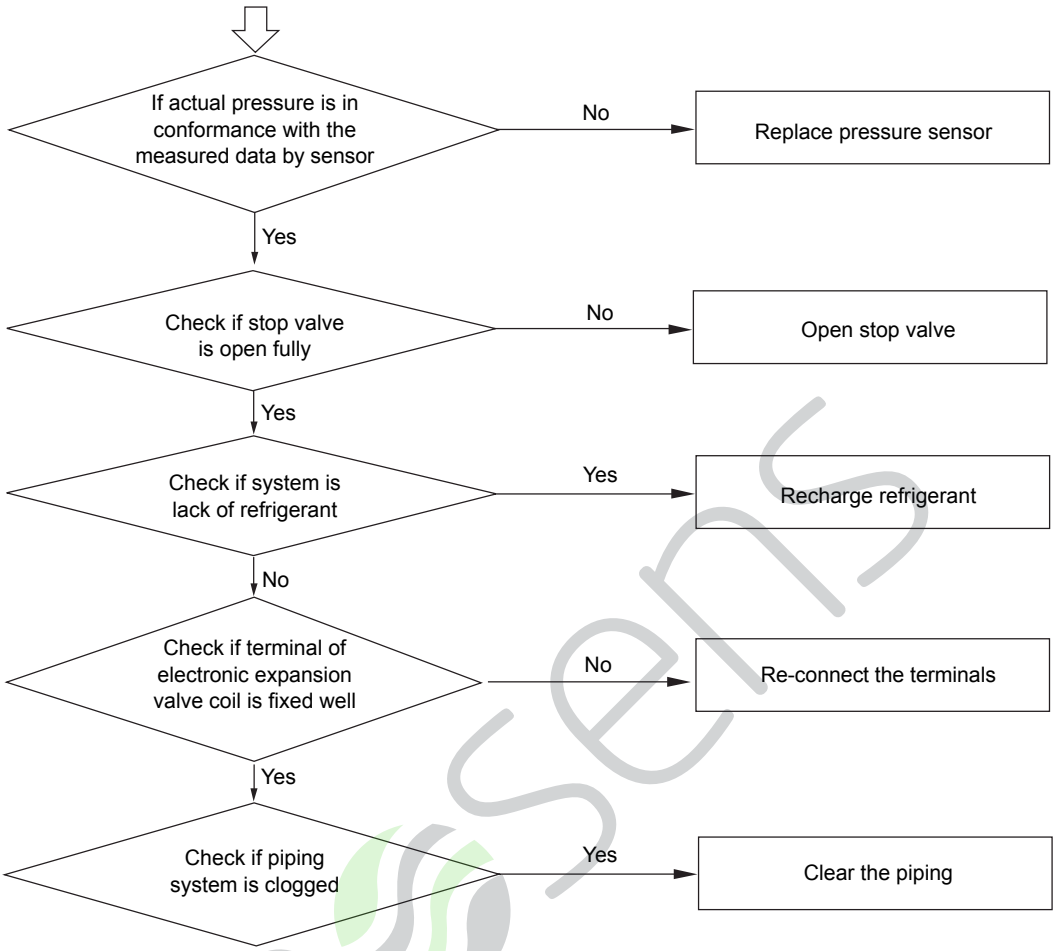
[34] Protection of discharging temp. too high



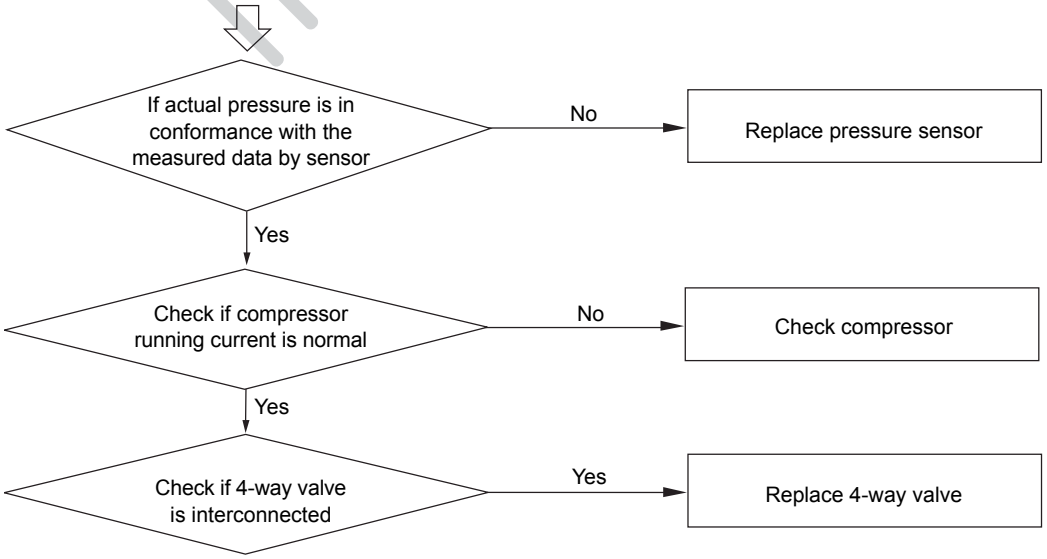
[35] 4-way valve reversing failure



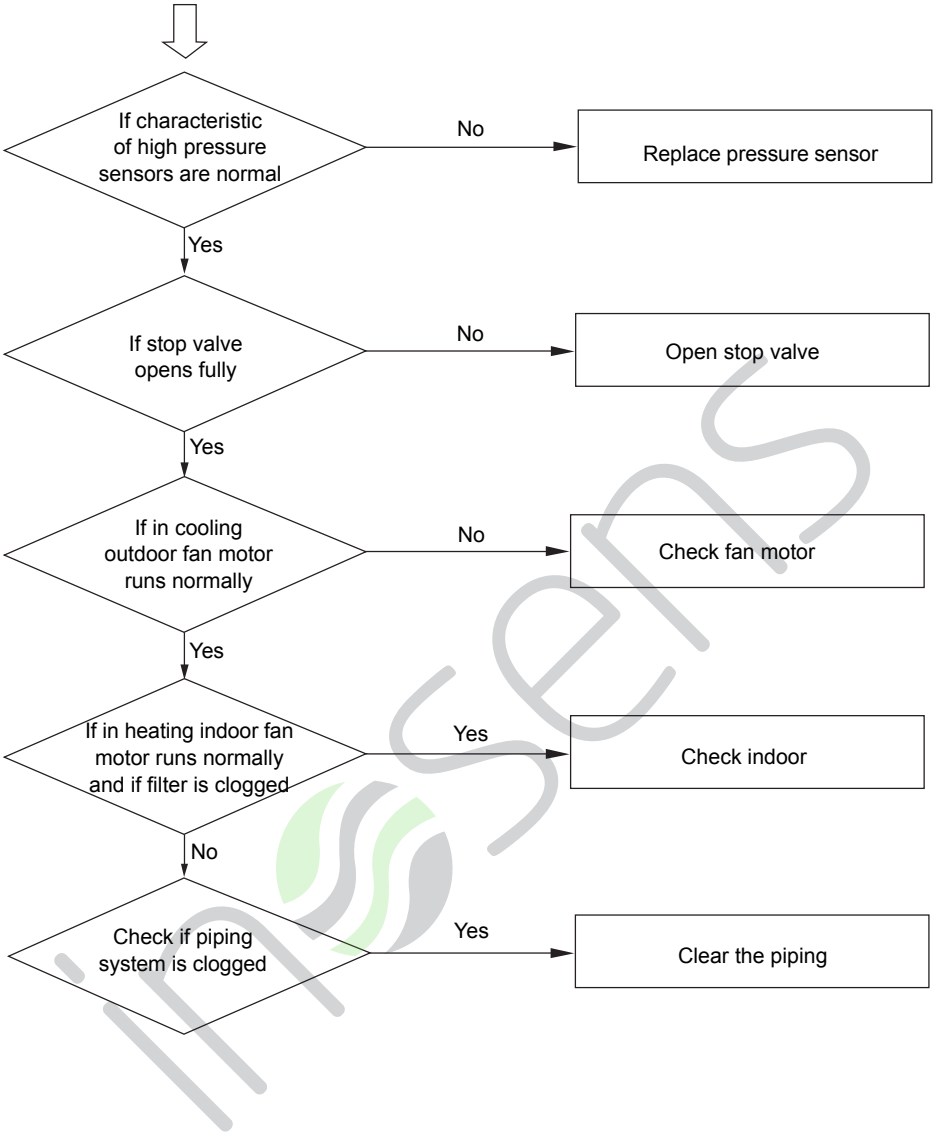
[39-0, 39-1] Low pressure too low and compression ratio too high



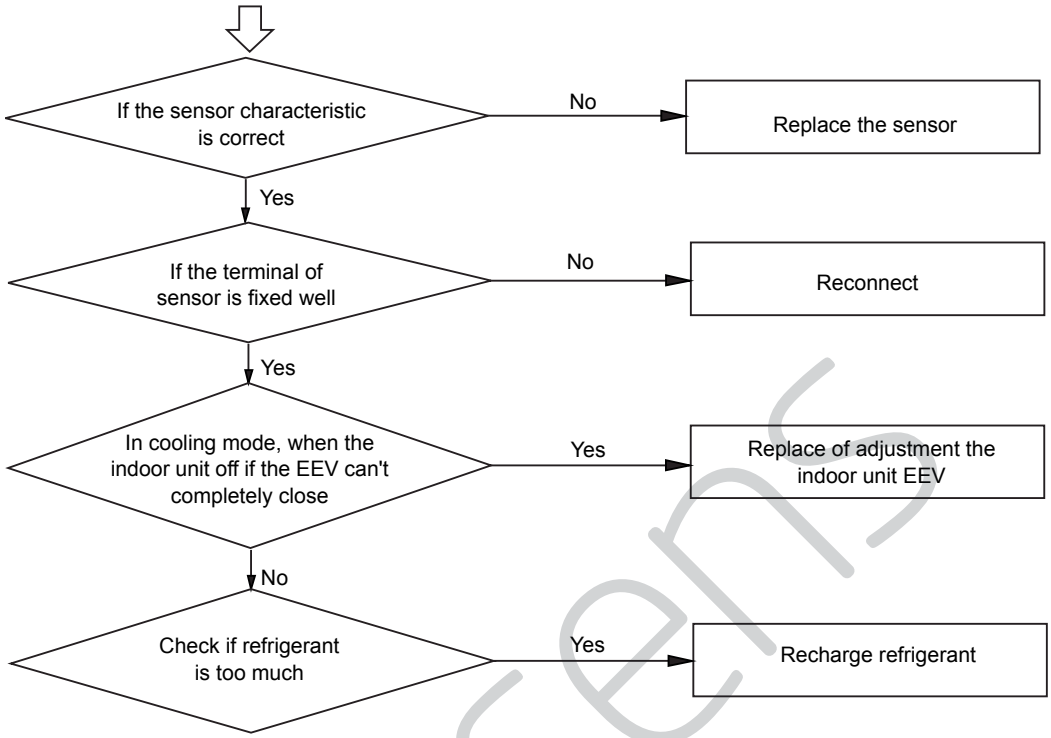
[39-2] Compression ratio too low



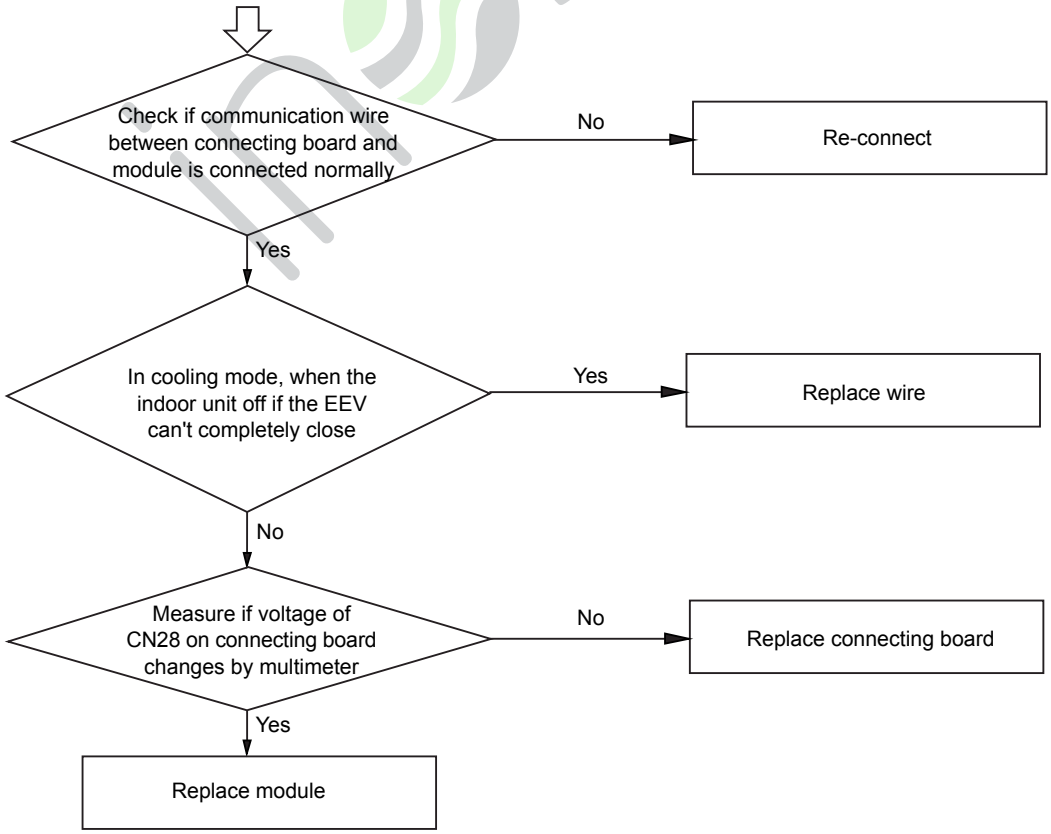
[40] High pressure too high failure



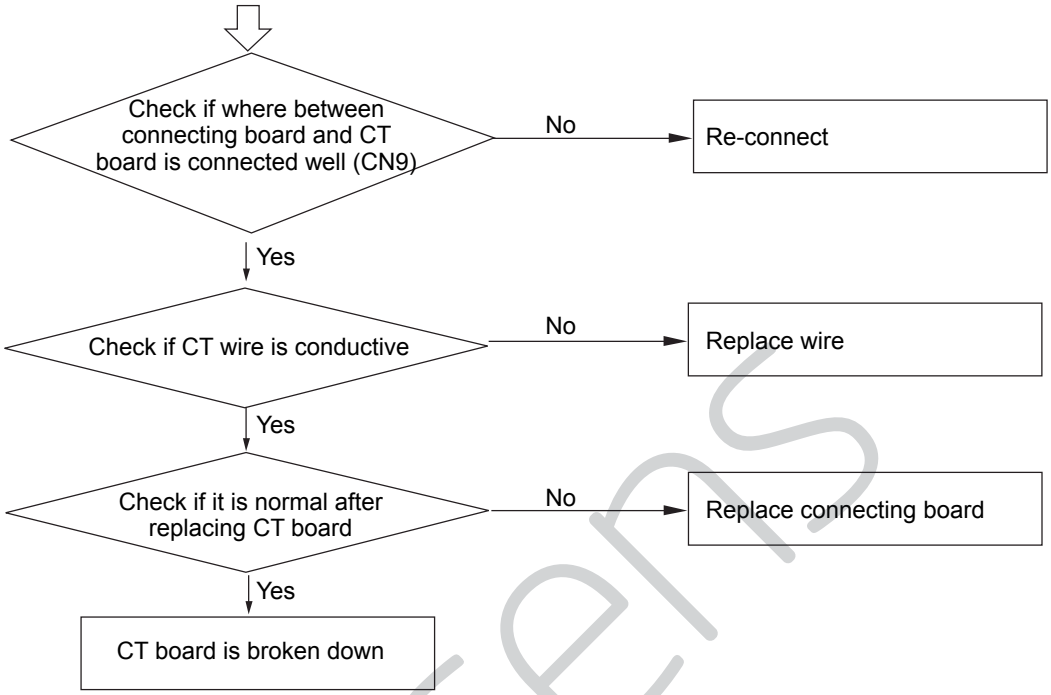
[43] Discharging temp. sensor Td too low protection



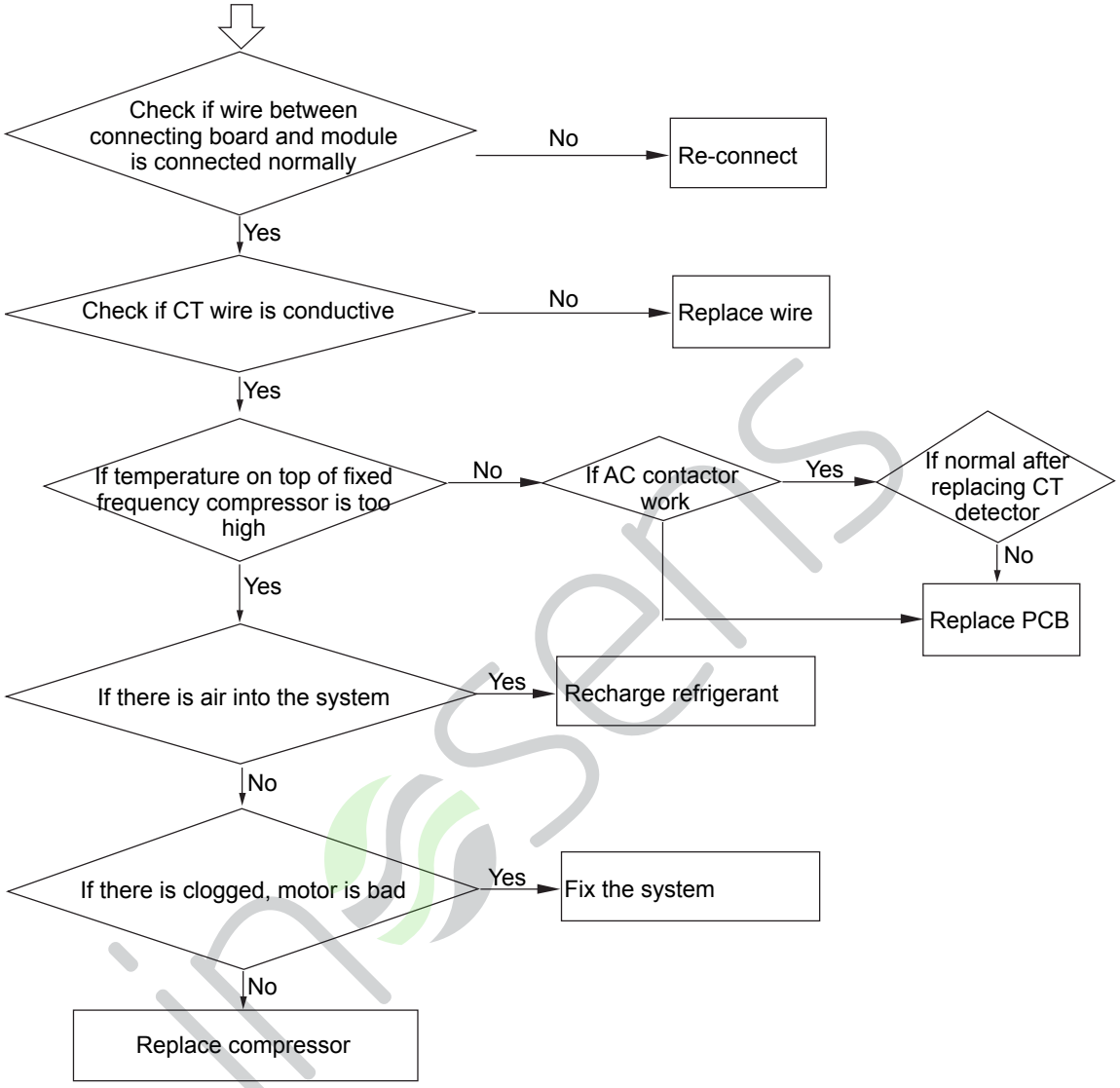
[46] Communication with inverter module failure



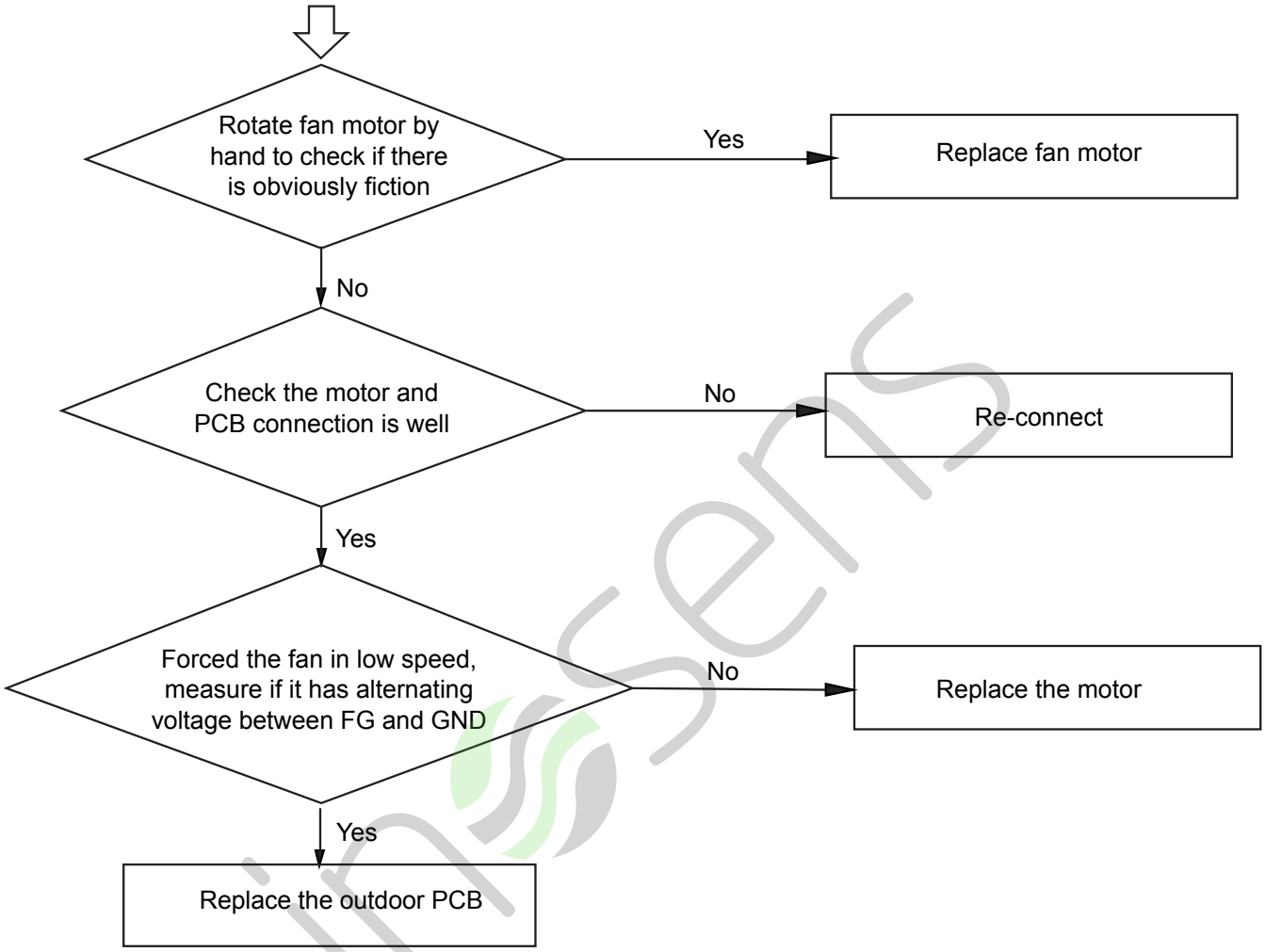
[53] CT Current too low or current sensor failure



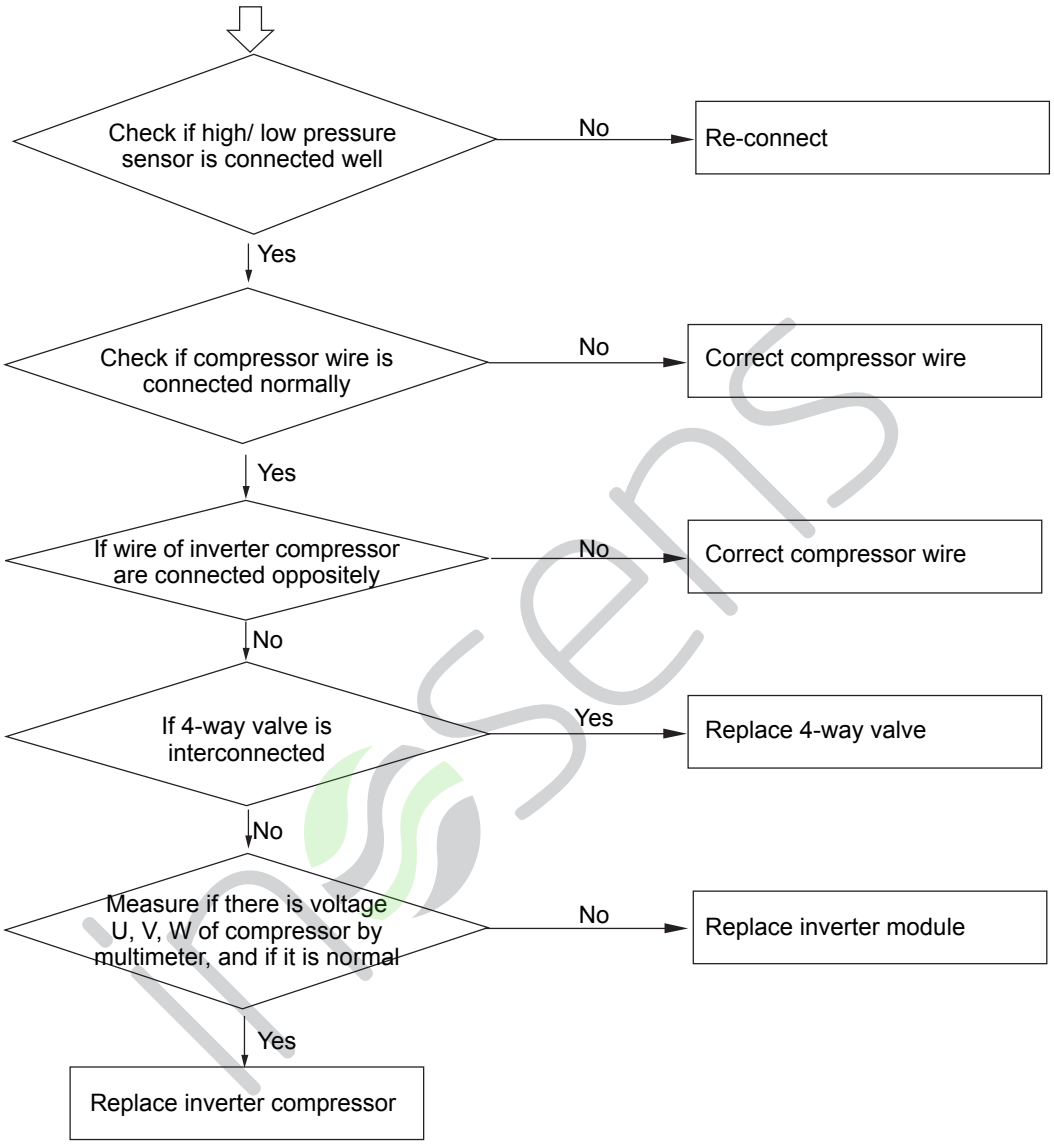
[64] CT current too high



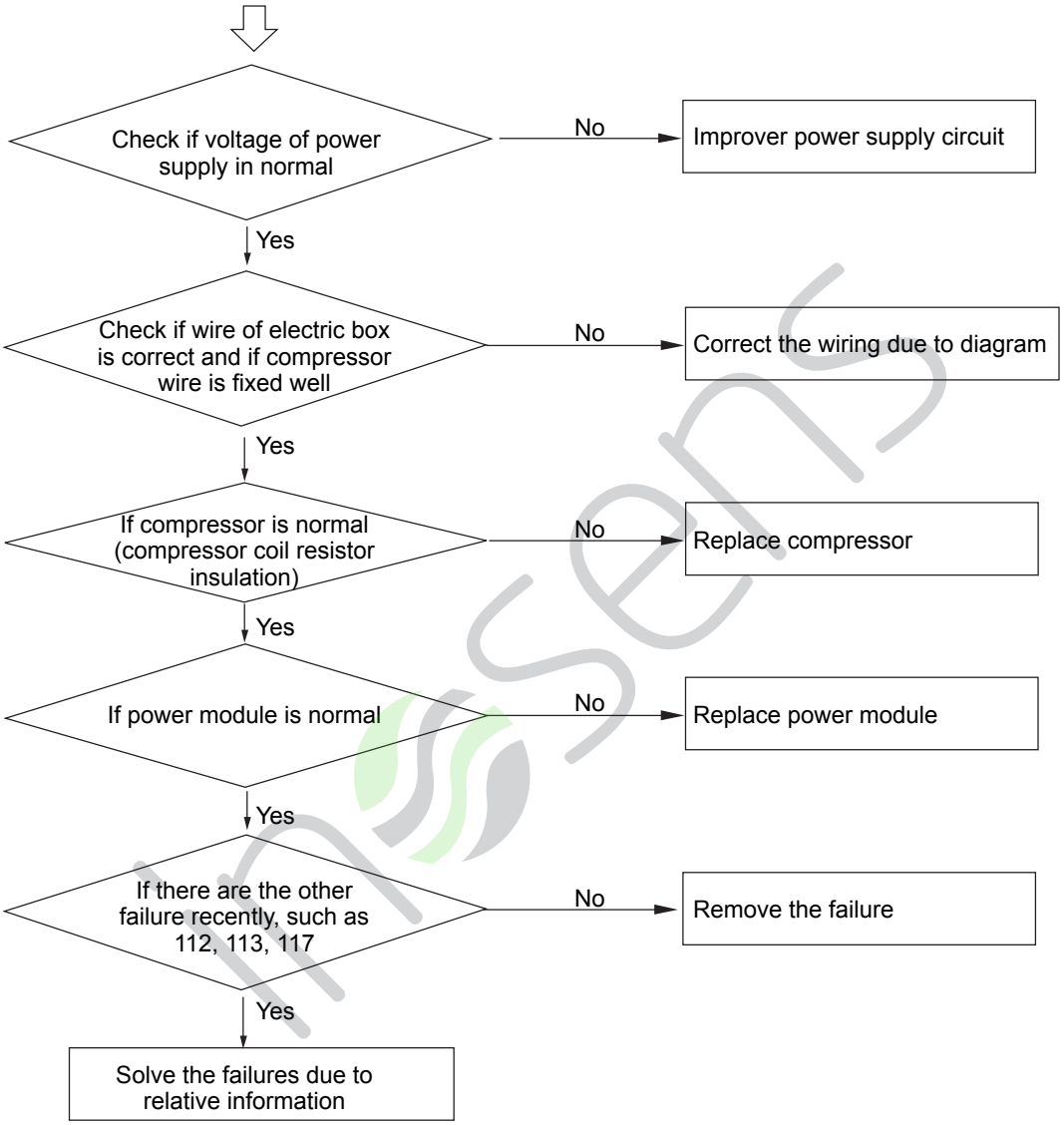
[71-0,71-1] DC motor blocked



[75-0, 75-4] Pressure difference between high pressure and low pressure is abnormal

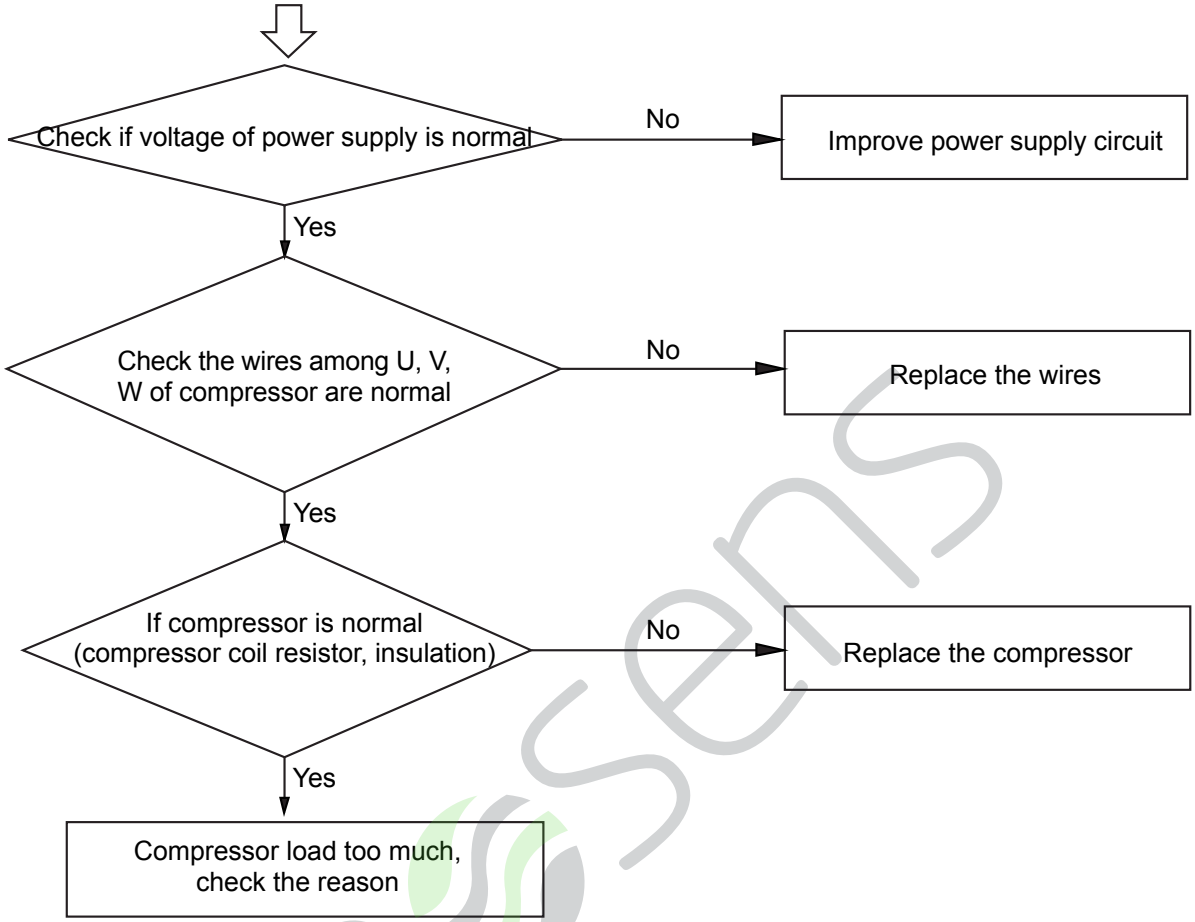


[82] Compressor current protection
[108] Transient over current in IPM module rectifier side software
[110] IPM module hardware over current
[123] Transient over current in IPM module rectifier side hardware

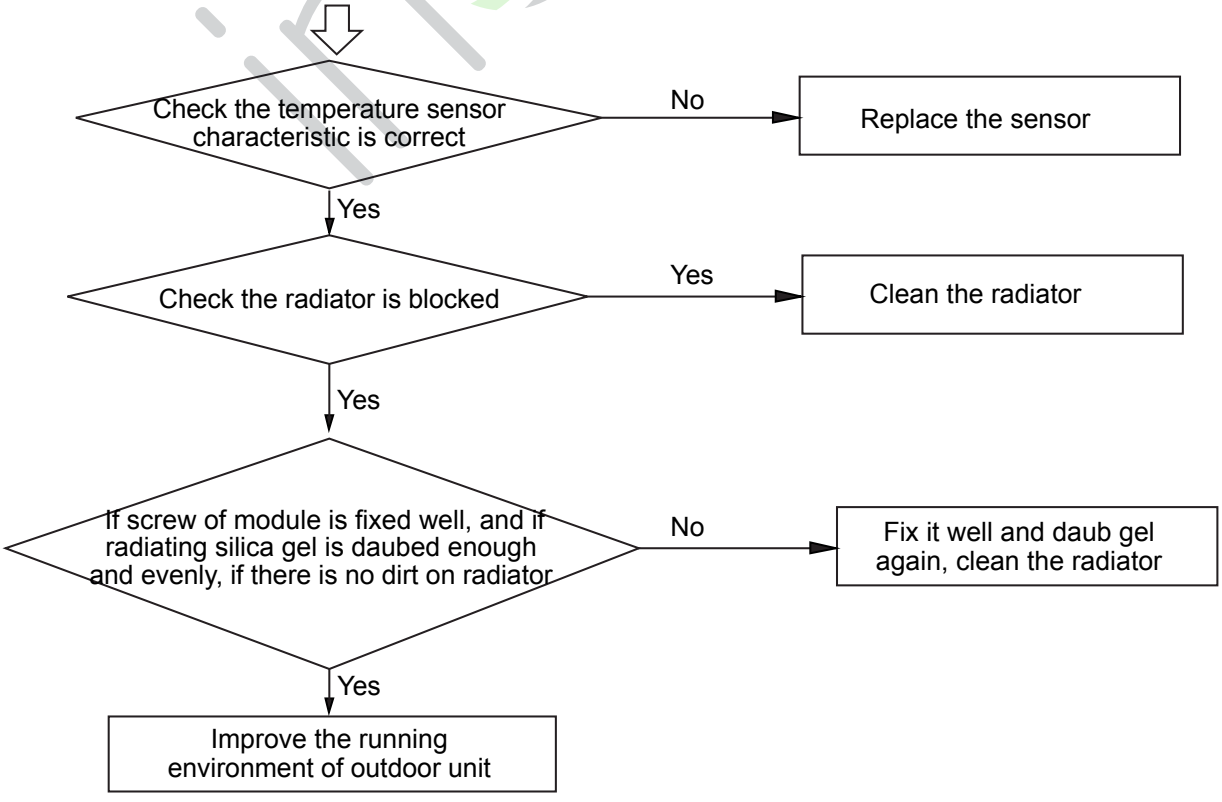


[111] Compressor out of control

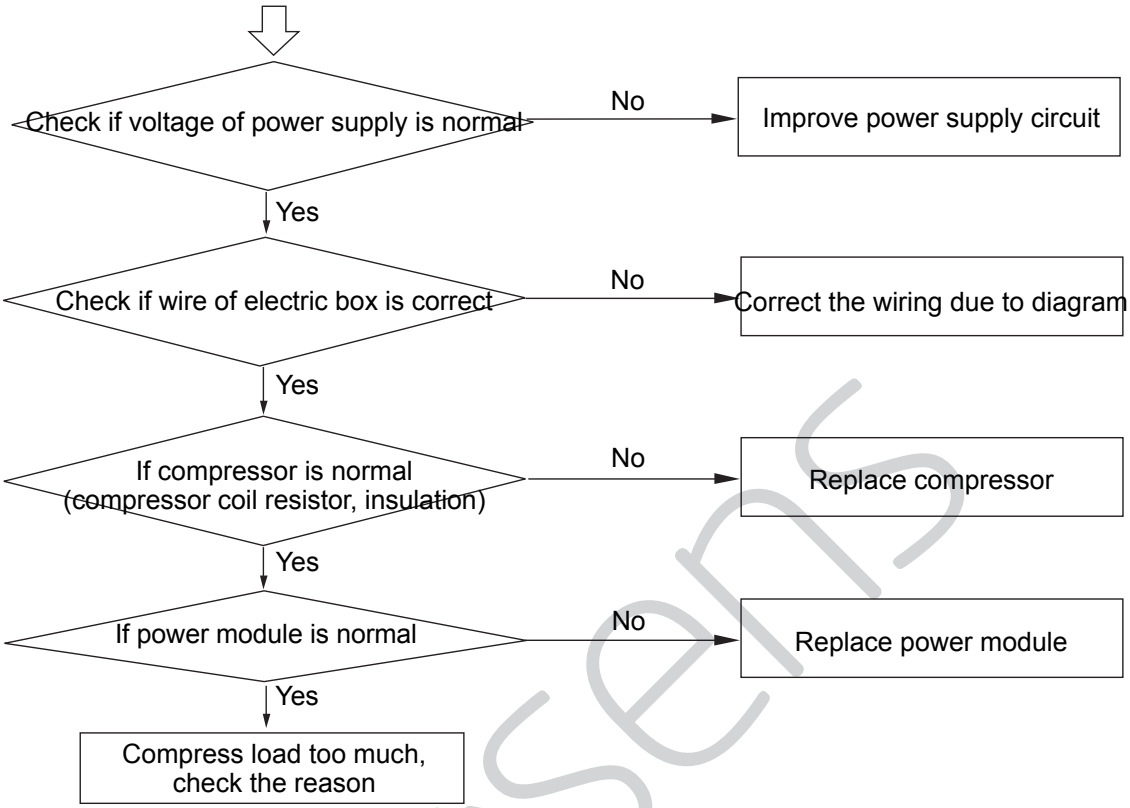
[118] the compressor start failure



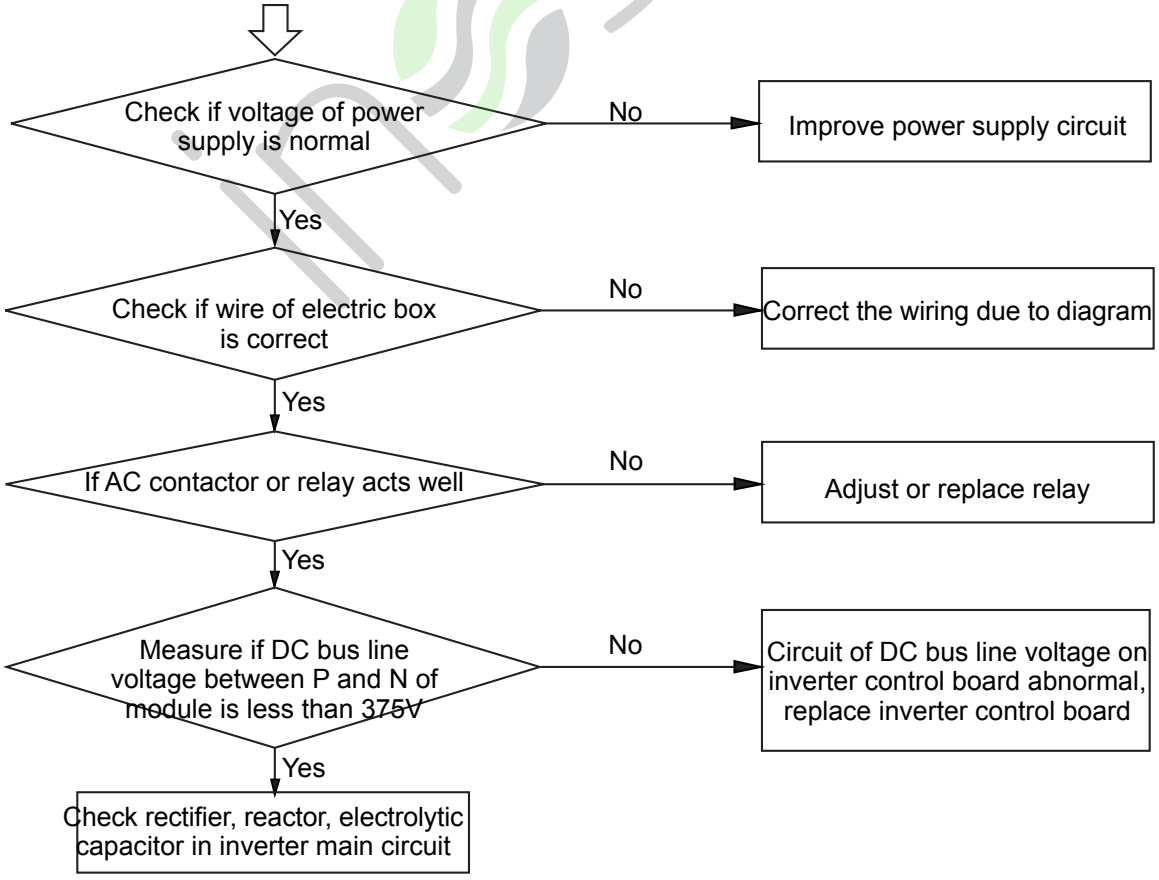
[112] Radiator temp. of transducer too high; [81] IPM module temp. too high;



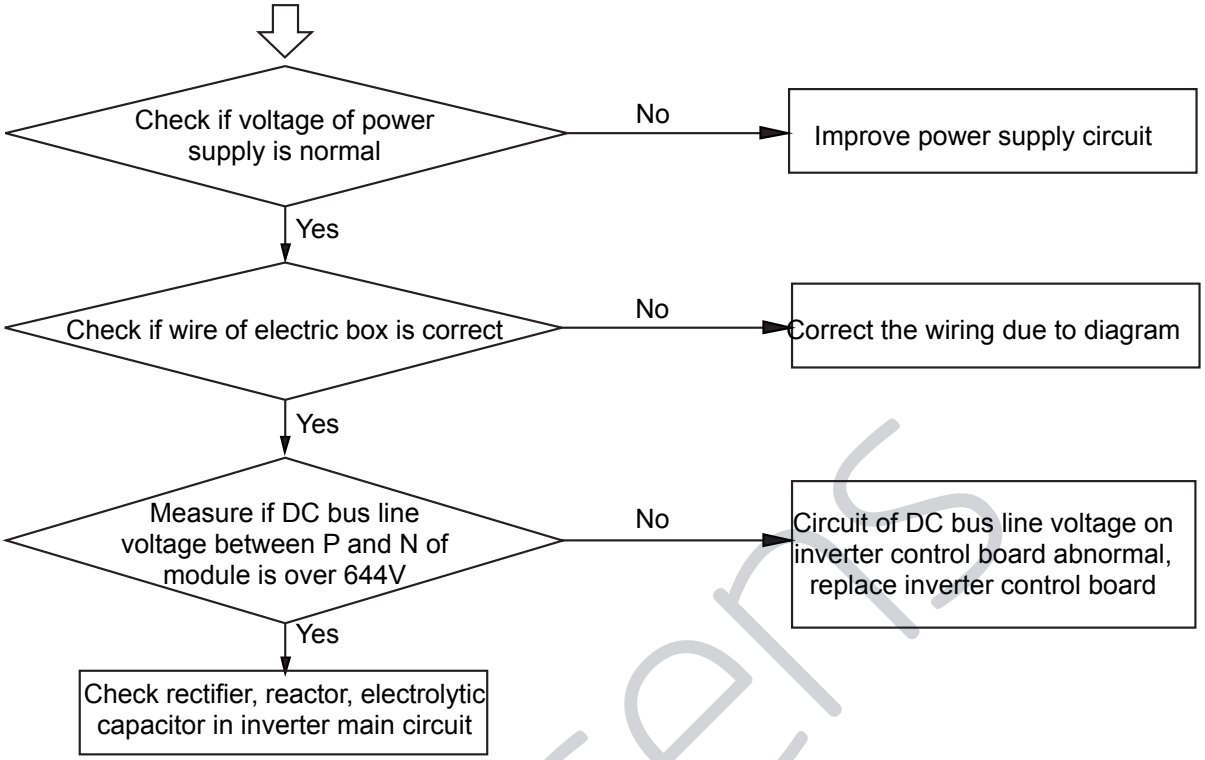
[113] Protection of overload



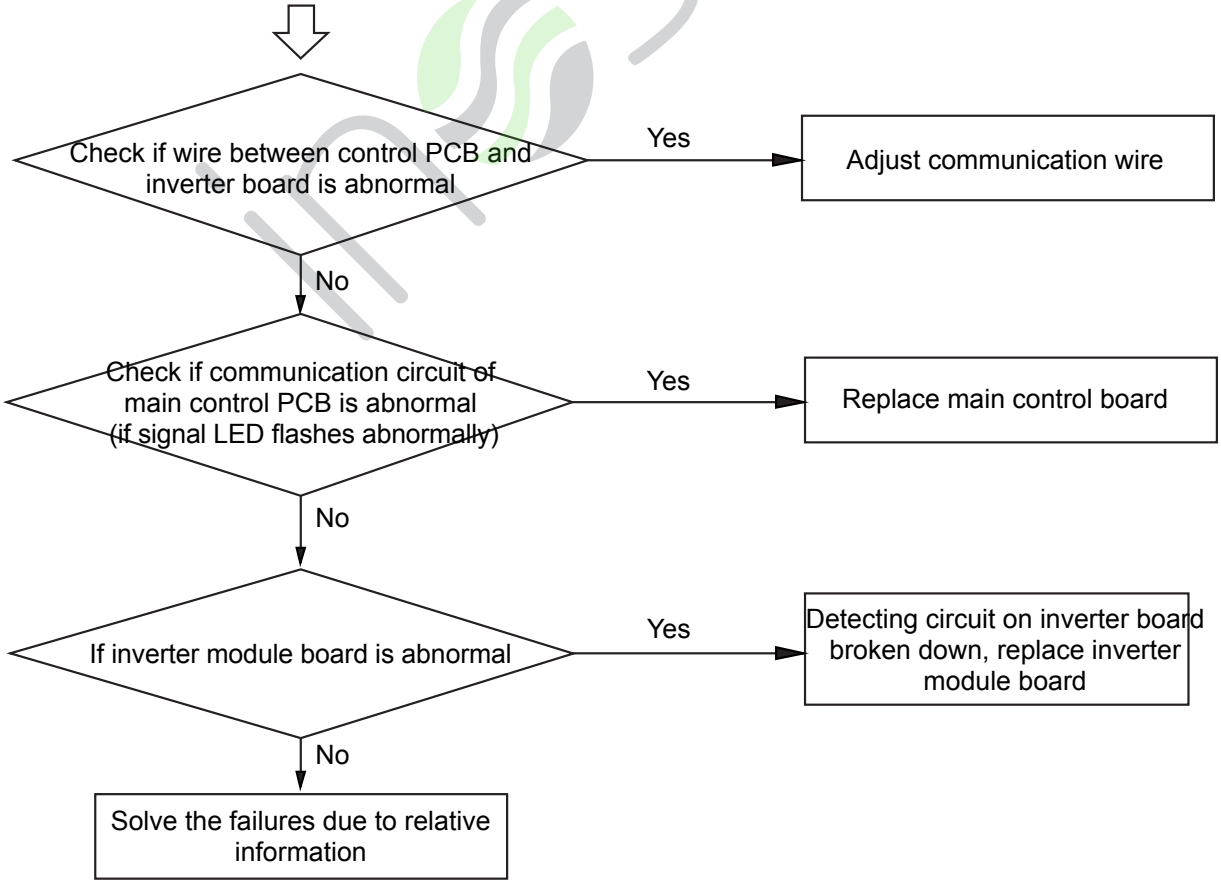
[114] Voltage too low of DC bus line of transducer



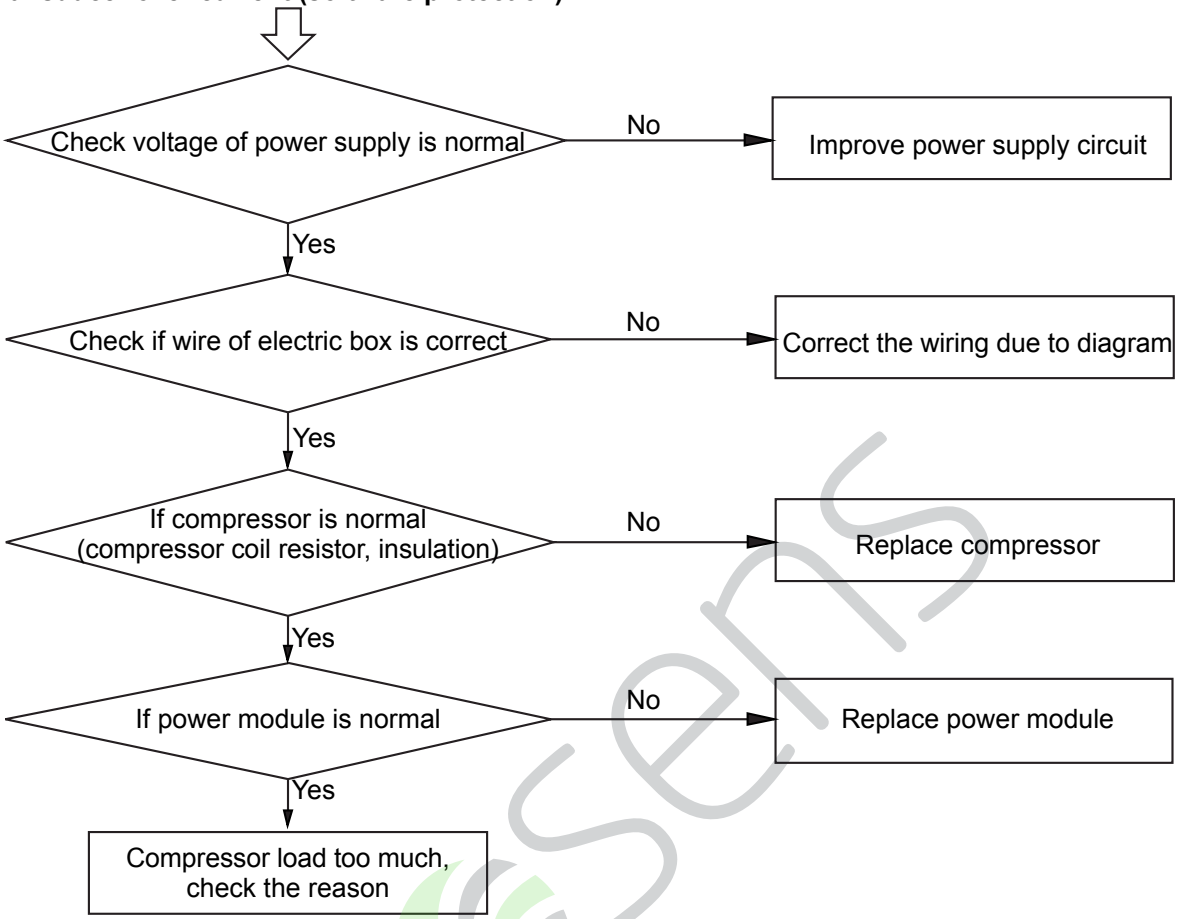
[115] Voltage too high of DC bus line of transducer



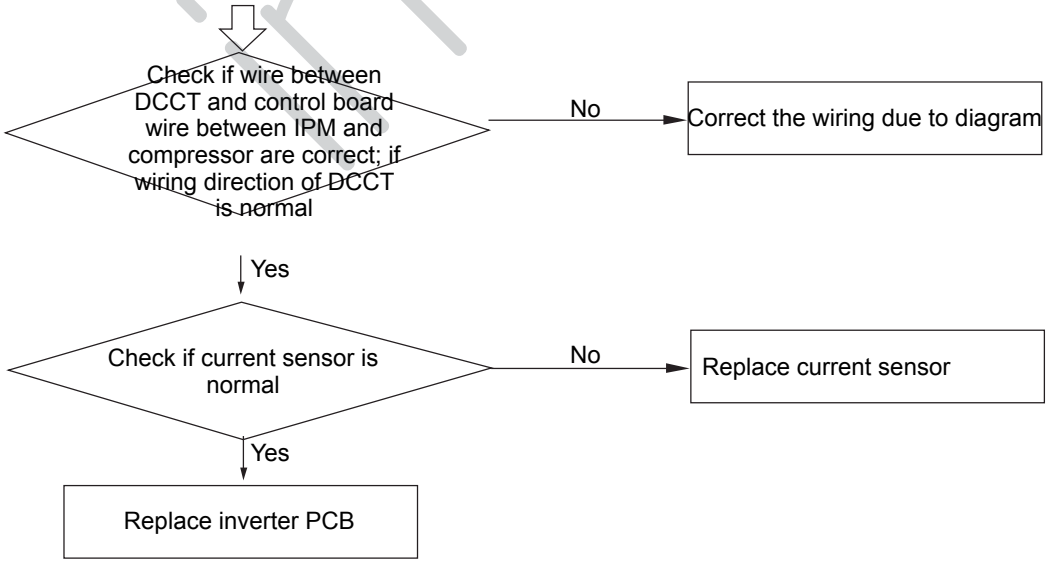
[116] Communication abnormal between transducer (inverter module board) and control PCB



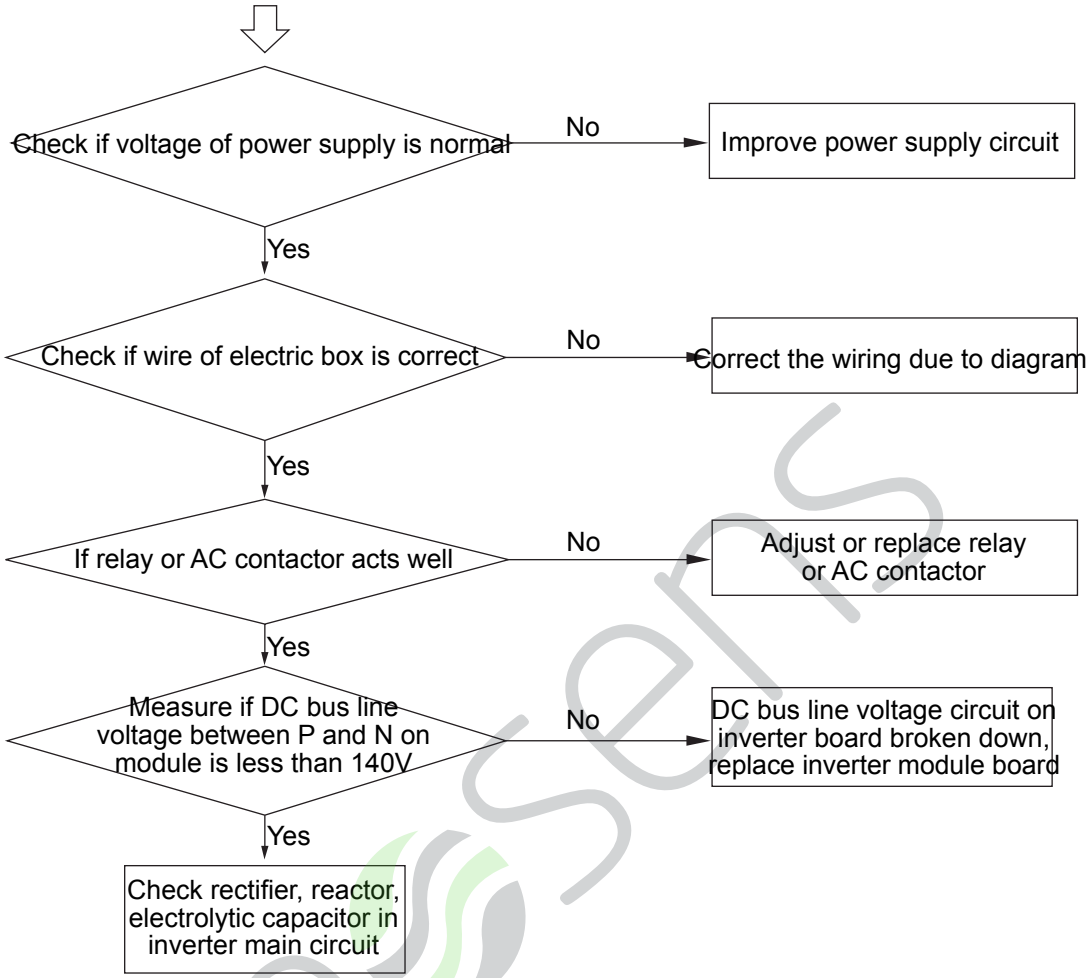
[117] Transducer over current (software protection)



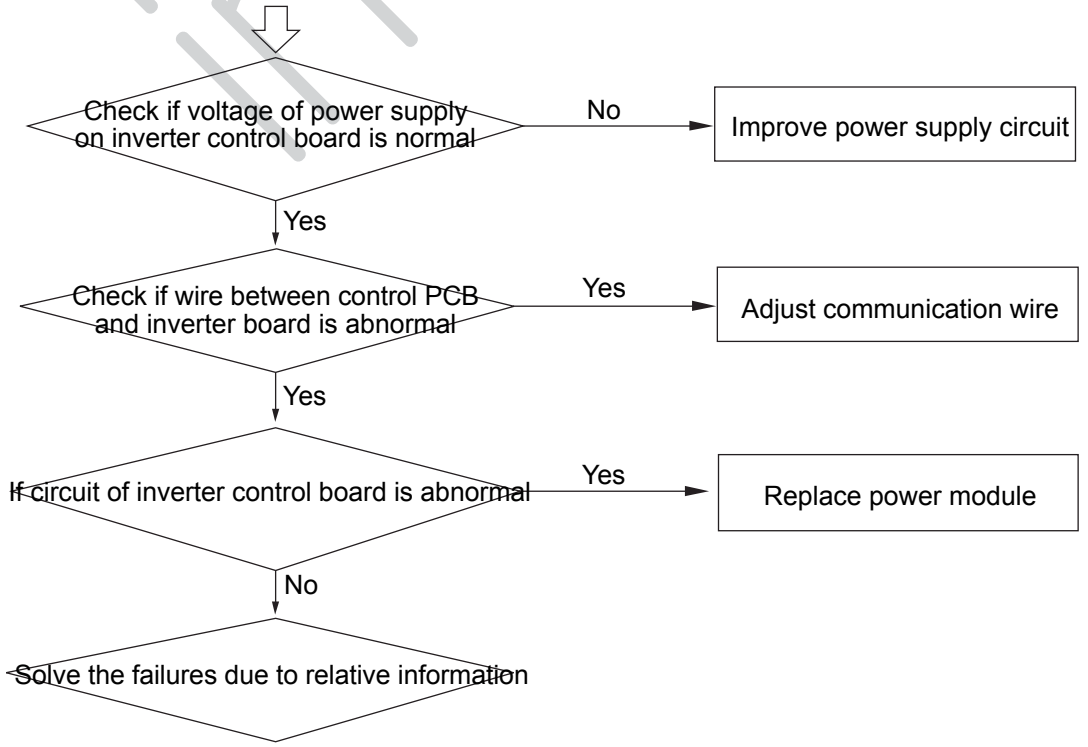
[119] Current detection circuit of transducer is abnormal



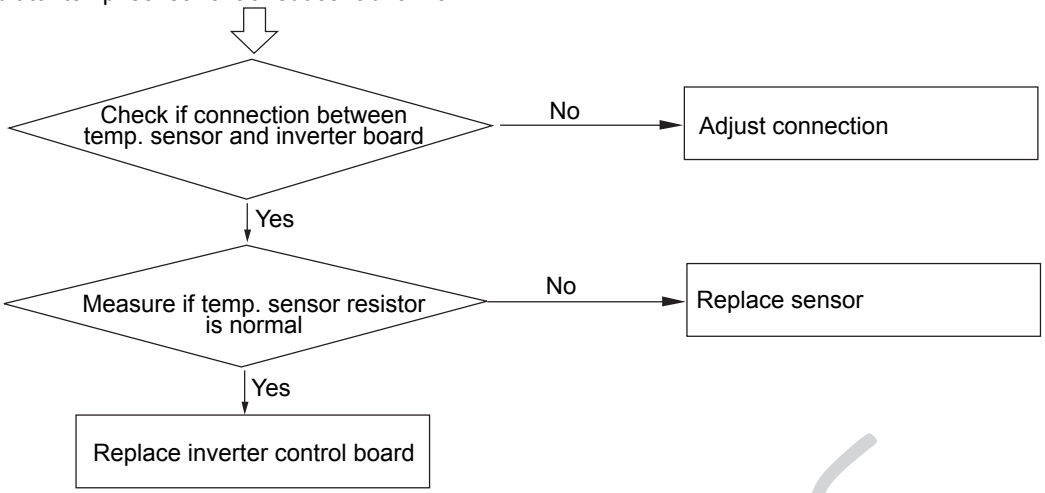
[120] Power supply of transducer abnormal



[121] Power supply of inverter board is abnormal



[122] Radiator temp. sensor of transducer abnormal



Appendix I: Sensor Resistance Table

Code	Resistance	Description
0010450192	10K	Outdoor ambient temp. sensor
0010450194	10K	Defrosting temp. sensor
0010451303	50K	Discharging temp. sensor
0010451307	10K	Suction temp. sensor

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R80=50kΩ±3% B25/80=4450K±3%					
Temp	Resistance (kΩ)			% (Resist. Tol)	
(°C)	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
0	1749.01	1921.99	2094.97	9.00	9.00
1	1651.43	1813.27	1975.10	8.93	8.93
2	1560.17	1711.65	1863.13	8.85	8.85
3	1474.74	1616.59	1758.45	8.78	8.78
4	1394.71	1527.61	1660.51	8.70	8.70
5	1319.68	1444.25	1568.82	8.63	8.63
6	1249.30	1366.10	1482.90	8.55	8.55
7	1183.21	1292.77	1402.34	8.48	8.48
8	1121.12	1223.94	1326.75	8.40	8.40
9	1062.76	1159.27	1255.77	8.33	8.33
10	1007.85	1098.47	1189.10	8.25	8.25
11	956.17	1041.29	1126.42	8.18	8.18
12	907.49	987.48	1067.46	8.10	8.10
13	861.62	936.80	1011.98	8.03	8.03
14	818.37	889.05	959.73	7.95	7.95
15	777.57	844.04	910.51	7.88	7.88
16	739.07	801.59	864.11	7.80	7.80
17	702.71	761.53	820.36	7.73	7.73
18	668.35	723.72	779.08	7.65	7.65
19	635.89	688.00	740.12	7.58	7.58
20	605.19	654.25	703.32	7.50	7.50
21	576.15	622.36	668.57	7.43	7.43
22	548.66	592.19	635.72	7.35	7.35
23	522.65	563.65	604.66	7.28	7.28
24	498.01	536.64	575.28	7.20	7.20
25	474.66	511.08	547.49	7.13	7.13
26	452.54	486.86	521.19	7.05	7.05
27	431.56	463.92	496.28	6.98	6.98
28	411.67	442.18	472.69	6.90	6.90
29	392.80	421.57	450.34	6.83	6.83
30	374.89	402.03	429.17	6.75	6.75
31	357.89	383.49	409.09	6.68	6.68
32	341.75	365.90	390.05	6.60	6.60
33	326.42	349.20	371.99	6.53	6.53
34	311.85	333.35	354.85	6.45	6.45
35	298.00	318.30	338.59	6.38	6.38
36	284.84	304.00	323.15	6.30	6.30

R80=50kΩ±3% B25/80=4450K±3%					
Temp	Resistance (kΩ)			% (Resist. Tol)	
(°C)	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
37	272.33	290.41	308.49	6.23	6.23
38	260.43	277.49	294.56	6.15	6.15
39	249.10	265.22	281.33	6.08	6.08
40	238.33	253.54	268.75	6.00	6.00
41	228.07	242.44	256.80	5.93	5.93
42	218.31	231.87	245.44	5.85	5.85
43	209.01	221.82	234.63	5.78	5.78
44	200.15	212.25	224.35	5.70	5.70
45	191.72	203.14	214.57	5.63	5.63
46	183.67	194.47	205.26	5.55	5.55
47	176.01	186.20	196.40	5.48	5.48
48	168.70	178.33	187.96	5.40	5.40
49	161.74	170.83	179.93	5.33	5.33
50	155.09	163.68	172.28	5.25	5.25
51	148.75	156.87	164.98	5.18	5.18
52	142.70	150.37	158.04	5.10	5.10
53	136.92	144.17	151.41	5.03	5.03
54	131.41	138.26	145.10	4.95	4.95
55	126.15	132.61	139.08	4.88	4.88
56	121.12	127.23	133.34	4.80	4.80
57	116.32	122.09	127.86	4.73	4.73
58	111.73	117.18	122.63	4.65	4.65
59	107.35	112.49	117.64	4.58	4.58
60	103.16	108.02	112.88	4.50	4.50
61	99.15	103.74	108.33	4.43	4.43
62	95.32	99.65	103.99	4.35	4.35
63	91.66	95.75	99.84	4.28	4.28
64	88.15	92.01	95.88	4.20	4.20
65	84.80	88.44	92.09	4.13	4.13
66	81.58	85.03	88.47	4.05	4.05
67	78.51	81.76	85.01	3.98	3.98
68	75.57	78.64	81.70	3.90	3.90
69	72.75	75.65	78.54	3.83	3.83
70	70.05	72.78	75.51	3.75	3.75
71	67.47	70.04	72.61	3.68	3.68

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R80=50kΩ±3% B25/80=4450K±3%					
Temp	Resistance (kΩ)			% (Resist. Tol)	
(°C)	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
72	64.99	67.42	69.84	3.60	3.60
73	62.61	64.90	67.19	3.53	3.53
74	60.34	62.49	64.65	3.45	3.45
75	58.15	60.19	62.22	3.38	3.38
76	56.06	57.97	59.89	3.30	3.30
77	54.05	55.85	57.65	3.23	3.23
78	52.13	53.82	55.52	3.15	3.15
79	50.28	51.87	53.47	3.08	3.08
80	48.50	50.00	51.50	3.00	3.00
81	46.73	48.21	49.68	3.07	3.07
82	45.03	46.48	47.94	3.13	3.13
83	43.40	44.83	46.27	3.20	3.20
84	41.83	43.25	44.66	3.27	3.27
85	40.33	41.72	43.11	3.33	3.33
86	38.89	40.26	41.63	3.40	3.40
87	37.51	38.86	40.20	3.47	3.47
88	36.18	37.51	38.83	3.53	3.53
89	34.91	36.21	37.51	3.60	3.60
90	33.68	34.96	36.24	3.67	3.67
91	32.50	33.76	35.03	3.73	3.73
92	31.37	32.61	33.85	3.80	3.80
93	30.29	31.50	32.72	3.87	3.87
94	29.24	30.44	31.64	3.93	3.93
95	28.24	29.41	30.59	4.00	4.00
96	27.27	28.43	29.58	4.07	4.07
97	26.34	27.48	28.61	4.13	4.13
98	25.45	26.56	27.68	4.20	4.20
99	24.59	25.69	26.78	4.27	4.27
100	23.76	24.84	25.91	4.33	4.33
101	22.97	24.02	25.08	4.40	4.40
102	22.20	23.24	24.28	4.47	4.47
103	21.46	22.48	23.50	4.53	4.53
104	20.75	21.75	22.75	4.60	4.60

R80=50kΩ±3% B25/80=4450K±3%					
Temp	Resistance (kΩ)			% (Resist. Tol)	
(°C)	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
105	20.07	21.05	22.03	4.67	4.67
106	19.41	20.37	21.34	4.73	4.73
107	18.77	19.72	20.67	4.80	4.80
108	18.16	19.09	20.02	4.87	4.87
109	17.57	18.49	19.40	4.93	4.93
110	17.01	17.90	18.80	5.00	5.00
111	16.46	17.34	18.22	5.07	5.07
112	15.93	16.79	17.66	5.13	5.13
113	15.42	16.27	17.11	5.20	5.20
114	14.93	15.76	16.59	5.27	5.27
115	14.46	15.28	16.09	5.33	5.33
116	14.01	14.80	15.60	5.40	5.40
117	13.57	14.35	15.13	5.47	5.47
118	13.14	13.91	14.68	5.53	5.53
119	12.73	13.49	14.24	5.60	5.60
120	12.34	13.08	13.82	5.67	5.67
121	11.96	12.69	13.41	5.73	5.73
122	11.59	12.31	13.02	5.80	5.80
123	11.24	11.94	12.64	5.87	5.87
124	10.90	11.58	12.27	5.93	5.93
125	10.57	11.24	11.92	6.00	6.00
126	10.25	10.91	11.57	6.07	6.07
127	9.94	10.59	11.24	6.13	6.13
128	9.65	10.29	10.92	6.20	6.20
129	9.36	9.99	10.61	6.27	6.27
130	9.09	9.70	10.32	6.33	6.33
131	8.82	9.43	10.03	6.40	6.40
132	8.57	9.16	9.75	6.47	6.47
133	8.32	8.90	9.48	6.53	6.53
134	8.08	8.65	9.22	6.60	6.60
135	7.85	8.41	8.97	6.67	6.67
136	7.63	8.18	8.73	6.73	6.73
137	7.42	7.96	8.50	6.80	6.80
138	7.21	7.74	8.27	6.87	6.87
139	7.01	7.53	8.06	6.93	6.93
140	6.82	7.33	7.85	7.00	7.00

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R25=10kΩ±3% B25/50=3700K±3%					
Temp	Resistance (kΩ)			% (Resist. Tol)	
(°C)	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
-30	145.82	135.02	124.22	7.00	7.00
-29	138.07	129.13	120.18	6.93	6.93
-28	131.79	123.34	114.89	6.85	6.85
-27	125.67	117.68	109.70	6.78	6.78
-26	119.71	112.18	104.65	6.71	6.71
-25	113.93	106.84	99.75	6.64	6.64
-24	108.36	101.69	95.01	6.56	6.56
-23	103.00	96.72	90.44	6.49	6.49
-22	97.85	91.95	86.05	6.42	6.42
-21	92.92	87.37	81.83	6.35	6.35
-20	88.20	82.99	77.79	6.27	6.27
-19	83.70	78.82	73.93	6.20	6.20
-18	79.42	74.83	70.25	6.13	6.13
-17	75.34	71.04	66.74	6.05	6.05
-16	71.47	67.44	63.40	5.98	5.98
-15	67.80	64.02	60.23	5.91	5.91
-14	64.32	60.77	57.22	5.84	5.84
-13	61.02	57.69	54.37	5.76	5.76
-12	57.90	54.78	51.66	5.69	5.69
-11	54.94	52.02	49.10	5.62	5.62
-10	52.15	49.41	46.67	5.55	5.55
-9	49.51	46.94	44.37	5.47	5.47
-8	47.02	44.61	42.20	5.40	5.40
-7	44.66	42.40	40.14	5.33	5.33
-6	42.43	40.32	38.20	5.25	5.25
-5	40.33	38.35	36.36	5.18	5.18
-4	38.35	36.48	34.62	5.11	5.11
-3	36.47	34.72	32.97	5.04	5.04
-2	34.70	33.06	31.42	4.96	4.96
-1	33.03	31.49	29.95	4.89	4.89
0	31.45	30.00	28.56	4.82	4.82
1	29.95	28.59	27.24	4.75	4.75
2	28.54	27.26	25.99	4.67	4.67
3	27.20	26.01	24.81	4.60	4.60
4	25.94	24.82	23.69	4.53	4.53

R25=10kΩ±3% B25/50=3700K±3%					
Temp	Resistance (kΩ)			% (Resist. Tol)	
(°C)	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
5	24.74	23.69	22.63	4.45	4.45
6	23.61	22.62	21.63	4.38	4.38
7	22.54	21.61	20.68	4.31	4.31
8	21.52	20.65	19.77	4.24	4.24
9	20.56	19.74	18.92	4.16	4.16
10	19.65	18.87	18.10	4.09	4.09
11	18.78	18.05	17.33	4.02	4.02
12	17.96	17.28	16.59	3.95	3.95
13	17.18	16.54	15.90	3.87	3.87
14	16.44	15.83	15.23	3.80	3.80
15	15.73	15.17	14.60	3.73	3.73
16	15.06	14.53	14.00	3.65	3.65
17	14.42	13.93	13.43	3.58	3.58
18	13.82	13.35	12.88	3.51	3.51
19	13.24	12.80	12.36	3.44	3.44
20	12.69	12.28	11.86	3.36	3.36
21	12.17	11.78	11.39	3.29	3.29
22	11.67	11.30	10.94	3.22	3.22
23	11.19	10.85	10.51	3.15	3.15
24	10.73	10.41	10.09	3.07	3.07
25	10.30	10.00	9.70	3.00	3.00
26	9.90	9.60	9.31	3.06	3.06
27	9.51	9.23	8.94	3.13	3.13
28	9.15	8.86	8.58	3.19	3.19
29	8.80	8.52	8.24	3.25	3.25
30	8.46	8.19	7.92	3.31	3.31
31	8.14	7.87	7.61	3.38	3.38
32	7.83	7.57	7.31	3.44	3.44
33	7.53	7.28	7.02	3.50	3.50
34	7.25	7.00	6.75	3.56	3.56
35	6.98	6.73	6.49	3.63	3.63
36	6.72	6.48	6.24	3.69	3.69
37	6.47	6.23	6.00	3.75	3.75
38	6.23	6.00	5.77	3.81	3.81
39	6.00	5.77	5.55	3.88	3.88
40	5.78	5.56	5.34	3.94	3.94
41	5.56	5.35	5.14	4.00	4.00

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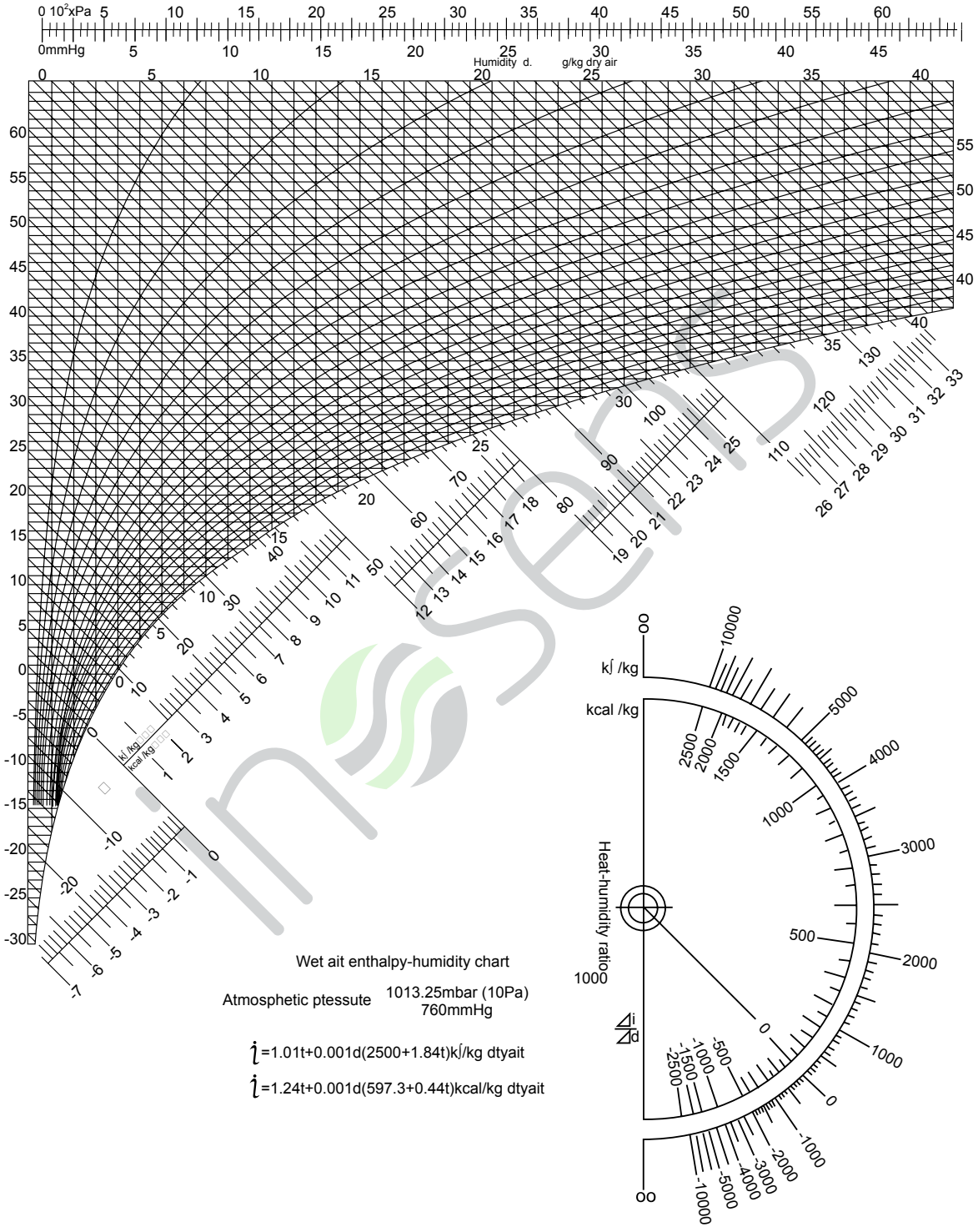
R25=10kΩ±3% B25/50=3700K±3%					
Temp	Resistance (kΩ)			% (Resist. Tol)	
(°C)	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
42	5.36	5.15	4.94	4.06	4.06
43	5.17	4.96	4.76	4.13	4.13
44	4.98	4.78	4.58	4.19	4.19
45	4.80	4.60	4.41	4.25	4.25
46	4.63	4.43	4.24	4.31	4.31
47	4.46	4.27	4.09	4.38	4.38
48	4.30	4.12	3.94	4.44	4.44
49	4.15	3.97	3.79	4.50	4.50
50	4.00	3.83	3.65	4.56	4.56
51	3.86	3.69	3.52	4.63	4.63
52	3.72	3.56	3.39	4.69	4.69
53	3.59	3.43	3.27	4.75	4.75
54	3.47	3.31	3.15	4.81	4.81
55	3.35	3.19	3.04	4.88	4.88
56	3.23	3.08	2.93	4.94	4.94
57	3.12	2.97	2.83	5.00	5.00
58	3.02	2.87	2.73	5.06	5.06
59	2.91	2.77	2.63	5.13	5.13
60	2.82	2.68	2.54	5.19	5.19
61	2.72	2.59	2.45	5.25	5.25
62	2.63	2.50	2.36	5.31	5.31
63	2.54	2.41	2.28	5.38	5.38
64	2.46	2.33	2.21	5.44	5.44
65	2.38	2.26	2.13	5.50	5.50
66	2.30	2.18	2.06	5.56	5.56
67	2.23	2.11	1.99	5.63	5.63
68	2.16	2.04	1.92	5.69	5.69
69	2.09	1.97	1.86	5.75	5.75
70	2.02	1.91	1.80	5.81	5.81
71	1.96	1.85	1.74	5.88	5.88
72	1.90	1.79	1.69	5.94	5.94
73	1.84	1.74	1.63	6.00	6.00
74	1.78	1.68	1.58	6.06	6.06
75	1.73	1.63	1.53	6.13	6.13

R25=10kΩ±3% B25/50=3700K±3%					
Temp	Resistance (kΩ)			% (Resist. Tol)	
(°C)	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
76	1.68	1.58	1.48	6.19	6.19
77	1.63	1.53	1.43	6.25	6.25
78	1.58	1.48	1.39	6.31	6.31
79	1.53	1.44	1.35	6.38	6.38
80	1.49	1.40	1.31	6.44	6.44
81	1.44	1.36	1.27	6.50	6.50
82	1.40	1.32	1.23	6.56	6.56
83	1.36	1.28	1.19	6.63	6.63
84	1.32	1.24	1.16	6.69	6.69
85	1.29	1.20	1.12	6.75	6.75
86	1.25	1.17	1.09	6.81	6.81
87	1.21	1.14	1.06	6.88	6.88
88	1.18	1.10	1.03	6.94	6.94
89	1.15	1.07	1.00	7.00	7.00
90	1.12	1.04	0.97	7.06	7.06
91	1.09	1.01	0.94	7.13	7.13
92	1.06	0.99	0.91	7.19	7.19
93	1.03	0.96	0.89	7.25	7.25
94	1.00	0.93	0.86	7.31	7.31
95	0.97	0.90	0.84	7.38	7.38
96	0.94	0.88	0.81	7.44	7.44
97	0.92	0.85	0.79	7.50	7.50
98	0.89	0.83	0.77	7.56	7.56
99	0.87	0.81	0.75	7.63	7.63
100	0.84	0.78	0.72	7.69	7.69
101	0.82	0.76	0.70	7.75	7.75
102	0.80	0.74	0.68	7.81	7.81
103	0.77	0.72	0.66	7.88	7.88
104	0.75	0.69	0.64	7.94	7.94
105	0.73	0.67	0.62	8.00	8.00

Appendix II: Enthalpy-Humidity Chart



Haier Commercial Air Condition

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