

# Haier



## MRV S'' (4-6HP) Service Manual

SYJS-01-2017 REV.A    Edition: 2017-01

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## 1. General Information

### 1.1 Outdoor models and external appearance

AU042FPERA

AU052FPERA

AU062FPERA

AU04IFPERA

AU05IFPERA

AU06IFPERA



## 1.2 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

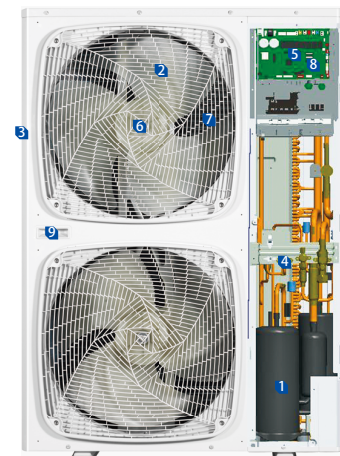
Heat exchange area rise 10%. (14kw)

#### 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			AU042FPERA	AU052FPERA	AU062FPERA
Power supply		Ph/V/Hz	1Ph,220-230V,50/60Hz		
Cooling	Rated capacity	kW	12.60	14.00	15.50
	Rated capacity	kBtu/h	42.99	47.77	52.89
	Capacity (46°C)	kW	11.2	12.6	14
	Rated power input	kW	3.11	3.51	4.31
	Power input (46°C)	kW	3.77	4.25	5.22
	Max. power input	kW	7.20	7.50	7.80
	EER		4.05	3.99	3.60
	Rated current	A	14.73	16.62	20.41
	Max. current	A	34.09	35.51	36.93
Heating	Rated capacity	kW	14.20	16.00	18.00
	Rated capacity	kBtu/h	48.45	54.59	61.42
	Rated power input	kW	3.18	3.72	4.39
	Max. power input	kW	6.9	7.2	7.5
	COP		4.47	4.30	4.10
	Rated current	A	15.06	17.61	20.79
	Max. current	A	32.67	34.09	35.51
Compressor	Brand		MITSUBISHI ELECTRIC		
	Model		MNB42FFAMC-L		
	Type		Rotary	Rotary	Rotary
	Compressor quantity		1 INV	1 INV	1 INV
	Capacity	W	13780	13780	13780
	Power Input	W	4130	4130	4130
	Rated current(RLA)	A	15.8	15.8	15.8
	Speed	rps	75	80	85
	Crankcase Heater	W	33	33	33
	Refrigerant oil brand		IDEMITSUKOSAN CO.LTD		
	Refrigerant oil type		FV50S	FV50S	FV50S
	Refrigerant oil charge	ml	1100	1100	1100
	Brand		NIDEC	NIDEC	NIDEC
Outdoor fan motor	Model		SIC-88FWJ-F1180-1		
	Voltage		310V	310V	310V
	IP Class		IP44	IP44	IP44
	Type		DC	DC	DC
	Insulation class		E	E	E
	Safe class		I	I	I
	Power Input	W	180	180	180
	Output	W	120	120	120
	Rated current	A	0.4	0.4	0.4
	Capacitor	μF	/	/	/
	Speed	rpm	900	900	900

Model			AU042FPERA	AU052FPERA	AU062FPERA
Power supply		Ph/V/Hz	1PH,220-230V,50/60Hz		
Outdoor fan	Brand		Haier	Haier	Haier
	Model		/	/	/
	Material		Plastic	Plastic	Plastic
	Type		Axial	Axial	Axial
	Diameter	mm	550	550	550
	Height	mm	200	200	200
Outdoor coil	Number of rows		2	2	2
	Tube pitch(a)x row pitch(b)	mm	21*18.186	21*18.186	21*18.186
	Fin spacing	mm	1.4	1.4	1.4
	Fin type (code)		Hydrophilic aluminium		
	Fin Coating Type	Optional	Clear lacquer	Clear lacquer	Clear lacquer
	Salt Spray Test Duration	Hour	168	168	168
	Tube outside dia. and type		Inner groove tube		
		mm	Φ7	Φ7	Φ7
	Coil length x height	mm	1077*1315	1077*1315	1077*1315
Cabinet coating	Number of circuits		7	7	7
	Coating type		Powder coating	Powder coating	Powder coating
	Salt Spray Test Duration	Hour	72	72	72
	Sheet Metal Material		Hot zinc plate	Hot zinc plate	Hot zinc plate
Control panel enclosure IP class	Sheet Metal Thickness	mm	0.8	0.8	0.8
	Control panel enclosure IP class	Standard	IP24	IP24	IP24
	Outdoor air flow	m <sup>3</sup> /h	7200	7200	7200
	Outdoor sound level(sound pressure level)	dB(A)	50	51	53
Outdoor unit	Outdoor sound level(sound power level)	dB(A)	68	69	70
	Dimension(W*H*D)	mm	950/370/1340	950/370/1340	950/370/1340
	Packing (W*H*D)	mm	1023/471/1420	1023/471/1420	1023/471/1420
	Net weight	kg	115	115	115
Refrigerant	Gross weight	kg	123	123	123
	Type		R410A	R410A	R410A
	Charged volume	kg	4	4	4
	Throttle type		EXV	EXV	EXV
Refrigerant piping	Design pressure	MPa	4.15	4.15	4.15
	Liquid pipe	mm	9.52	9.52	9.52
	Gas pipe	mm	15.88	15.88	15.88
	Total pipe length	m	300	300	300
	Max. pipe length (Equivalent/ Actual)	m	175/150	175/150	175/150
	Max. Diff. indoor/outdoor unit	m	50 (Outdoor higher than indoor) 40 (Indoor higher than outdoor)		
	Max. Diff. indoor/indoor unit	m	15	15	15
Connectable indoor unit ratio		%	50%~130%	50%~130%	50%~130%
Maximum indoor units		Piece	8	10	13
Connection wiring	Power wiring	mm <sup>2</sup>	10	10	10
	Signal wiring	mm <sup>2</sup>	Shield wire:(0.75-2)*2		
Operation Range		°C	Cooling:-15~48 Heating:-20~27		

Normal condition: indoor temperature (cooling): 27°C DB/19°C WB, indoor temperature (heating): 20°CDB/14.5°C WB.

Outdoor temperature(cooling): 35°C DB/24°C WB, outdoor temperature(heating): 7°C DB/6°C 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.

Model			AU04IFPERA	AU05IFPERA	AU06IFPERA
Power supply		Ph/V/Hz	3N,380-400V,50/60Hz		
Cooling	Rated capacity	kW	12.60	14.00	15.50
	Rated capacity	kBtu/h	42.99	47.77	52.89
	Capacity (46°C)	kW	11.2	12.6	14
	Rated power input	kW	3.11	3.51	4.31
	Power input (46°C)	kW	3.77	4.25	5.22
	Max. power input	kW	7.20	7.50	7.80
	EER		4.05	3.99	3.60
	Rated current	A	4.92	5.56	6.82
	Max. current	A	11.40	11.87	12.35
Heating	Rated capacity	kW	14.20	16.00	18.00
	Rated capacity	kBtu/h	48.45	54.59	61.42
	Rated power input	kW	3.18	3.72	4.39
	Max. power input	kW	6.9	7.2	7.5
	COP		4.47	4.30	4.10
	Rated current	A	5.03	5.89	6.95
	Max. current	A	10.92	11.40	11.87
Compressor	Brand		MITSUBISHI ELECTRIC		
	Model		MNB42FFDMC-L		
	Type		Rotary	Rotary	Rotary
	Compressor quantity		1 INV	1 INV	1 INV
	Capacity	W	13780	13780	13780
	Power Input	W	4060	4060	4060
	Rated current(RLA)	A	12.3	12.3	12.3
	Speed	rps	75	80	85
	Crankcase Heater	W	33	33	33
	Refrigerant oil brand		IDEMITSUKOSAN CO.LTD		
	Refrigerant oil type		FV50S	FV50S	FV50S
	Refrigerant oil charge	ml	1400	1400	1400
Outdoor fan motor	Brand		NIDEC	NIDEC	NIDEC
	Model		SIC-88FWJ-F1180-1		
	Voltage		310V	310V	310V
	IP Class		IP44	IP44	IP44
	Type		DC	DC	DC
	Insulation class		E	E	E
	Safe class		I	I	I
	Power Input	W	180	180	180
	Output	W	120	120	120
	Rated current	A	0.4	0.4	0.4
	Capacitor	μF	/	/	/
	Speed	rpm	900	900	900

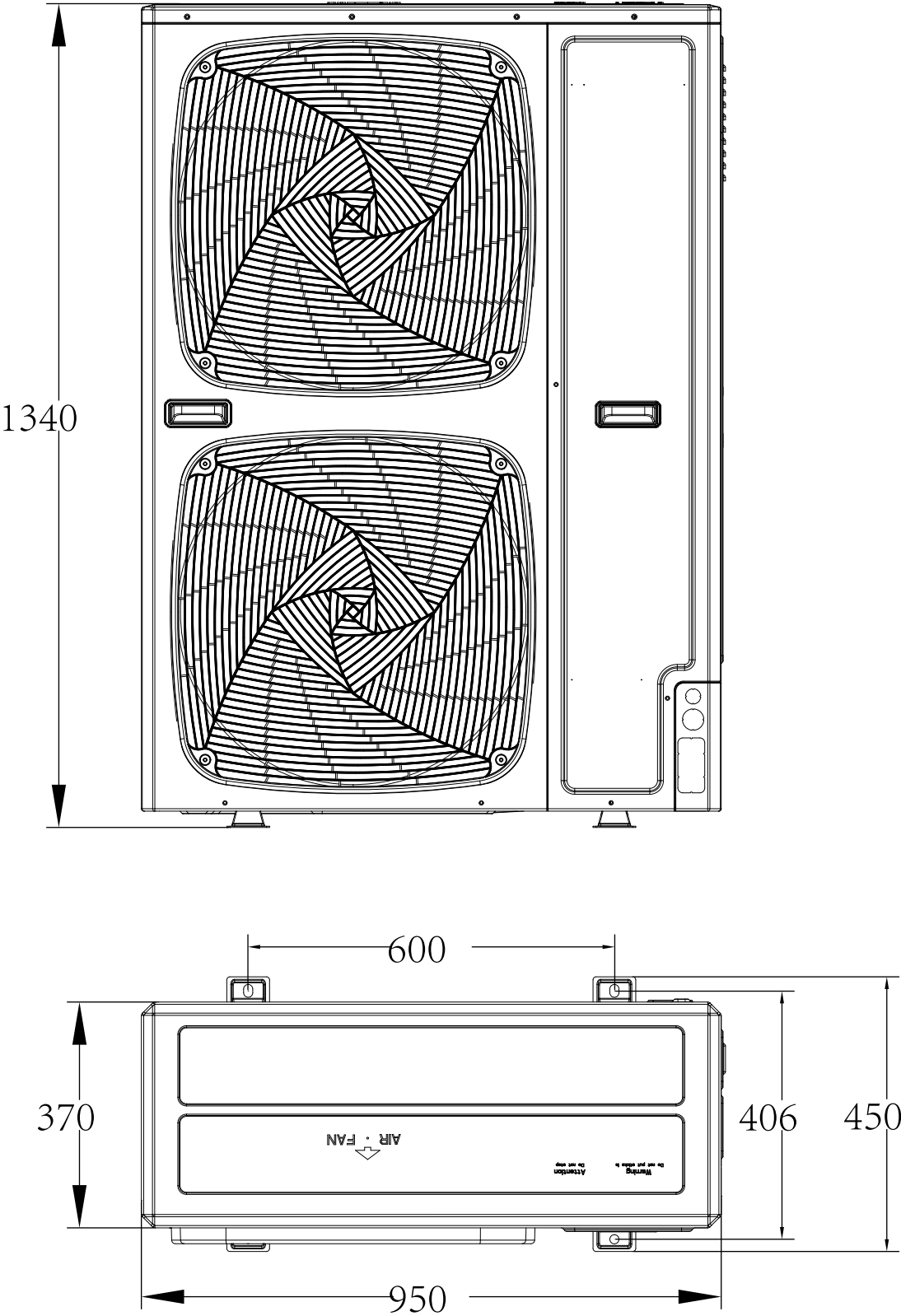
Model			AU04IFPERA	AU05IFPERA	AU06IFPERA
Power supply		Ph/V/Hz	3N,380-400V,50/60Hz		
Outdoor fan	Brand		Haier	Haier	Haier
	Model		/	/	/
	Material		Plastic	Plastic	Plastic
	Type		Axial	Axial	Axial
	Diameter	mm	550	550	550
	Height	mm	200	200	200
Outdoor coil	Number of rows		2	2	2
	Tube pitch(a)x row pitch(b)	mm	21*18.186	21*18.186	21*18.186
	Fin spacing	mm	1.4	1.4	1.4
	Fin type (code)		Hydrophilic aluminium		
	Fin Coating Type	Optional	Clear lacquer	Clear lacquer	Clear lacquer
	Salt Spray Test Duration	Hour	168	168	168
	Tube outside dia. and type		Inner groove tube		
		mm	Φ7	Φ7	Φ7
	Coil length x height	mm	1077*1315	1077*1315	1077*1315
Cabinet coating	Number of circuits		7	7	7
	Coating type		Powder coating	Powder coating	Powder coating
	Salt Spray Test Duration	Hour	72	72	72
	Sheet Metal Material		Hot zinc plate	Hot zinc plate	Hot zinc plate
	Sheet Metal Thickness	mm	0.8	0.8	0.8
	Control panel enclosure IP class	Standard	IP24	IP24	IP24
Outdoor air flow		m <sup>3</sup> /h	7200	7200	7200
Outdoor sound level(sound pressure level)		dB(A)	50	51	53
Outdoor sound level(sound power level)		dB(A)	68	69	70
Outdoor unit	Dimension(W*H*D)	mm	950/370/1340	950/370/1340	950/370/1340
	Packing (W*H*D)	mm	1023/471/1420	1023/471/1420	1023/471/1420
	Net weight	kg	115	115	115
	Gross weight	kg	123	123	123
Refrigerant	Type		R410A	R410A	R410A
	Charged volume	kg	4	4	4
Throttle type			EXV	EXV	EXV
Design pressure		MPa	4.15	4.15	4.15
Refrigerant piping	Liquid pipe	mm	9.52	9.52	9.52
	Gas pipe	mm	15.88	15.88	15.88
	Total pipe length	m	300	300	300
	Max. pipe length(Equivalent/ Actual)	m	175/150	175/150	175/150
	Max. Diff. indoor/outdoor unit	m	50 (Outdoor higher than indoor) 40 (Indoor higher than outdoor)		
	Max. Diff. indoor/indoor unit	m	15	15	15
Connectable indoor unit ratio		%	50%~130%	50%~130%	50%~130%
Maximum indoor units		Piece	8	10	13
Connection wiring	Power wiring	mm <sup>2</sup>	4	4	4
	Signal wiring	mm <sup>2</sup>	Shield wire:(0.75-2)*2		
Operation Range		°C	Cooling:-15~48 Heating:-20~27		

Normal condition: indoor temperature (cooling): 27°C DB/19°C WB, indoor temperature (heating): 20°C DB/14.5°C WB.

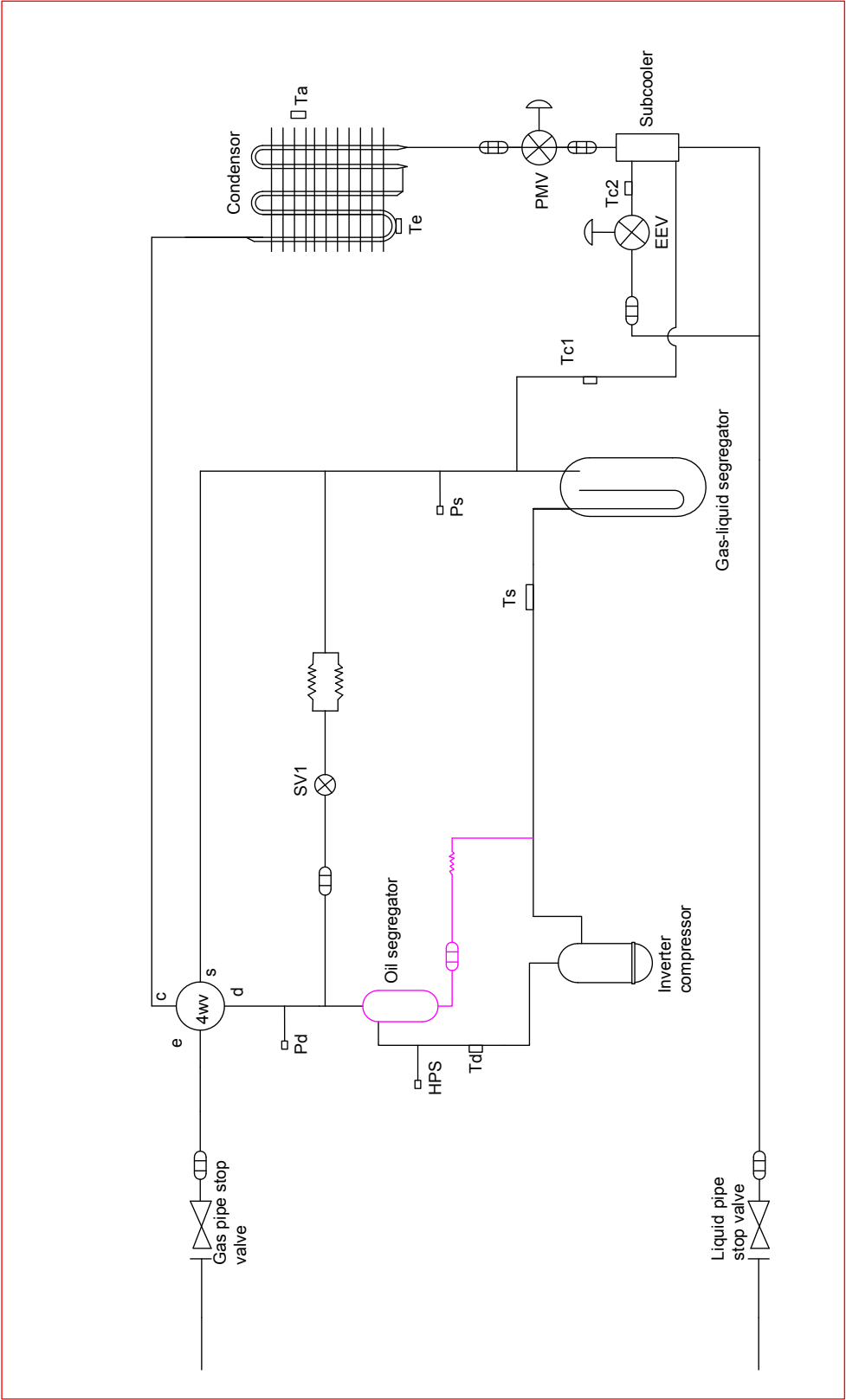
Outdoor temperature(cooling): 35°C DB/24°C WB, outdoor temperature(heating): 7°C DB/6°C WB The data is measured with 7.5m equivalent pipe and 0 m height difference.

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

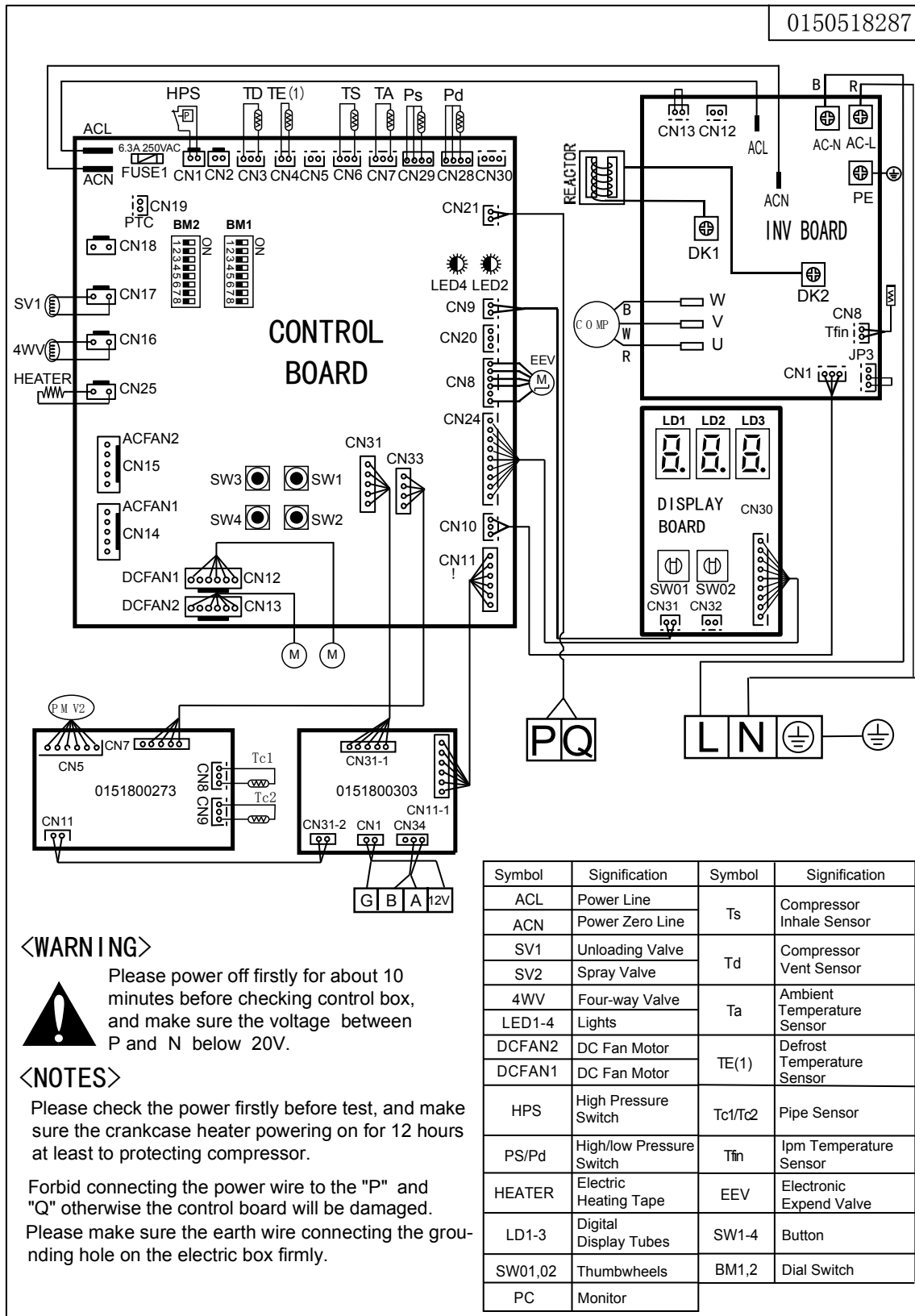




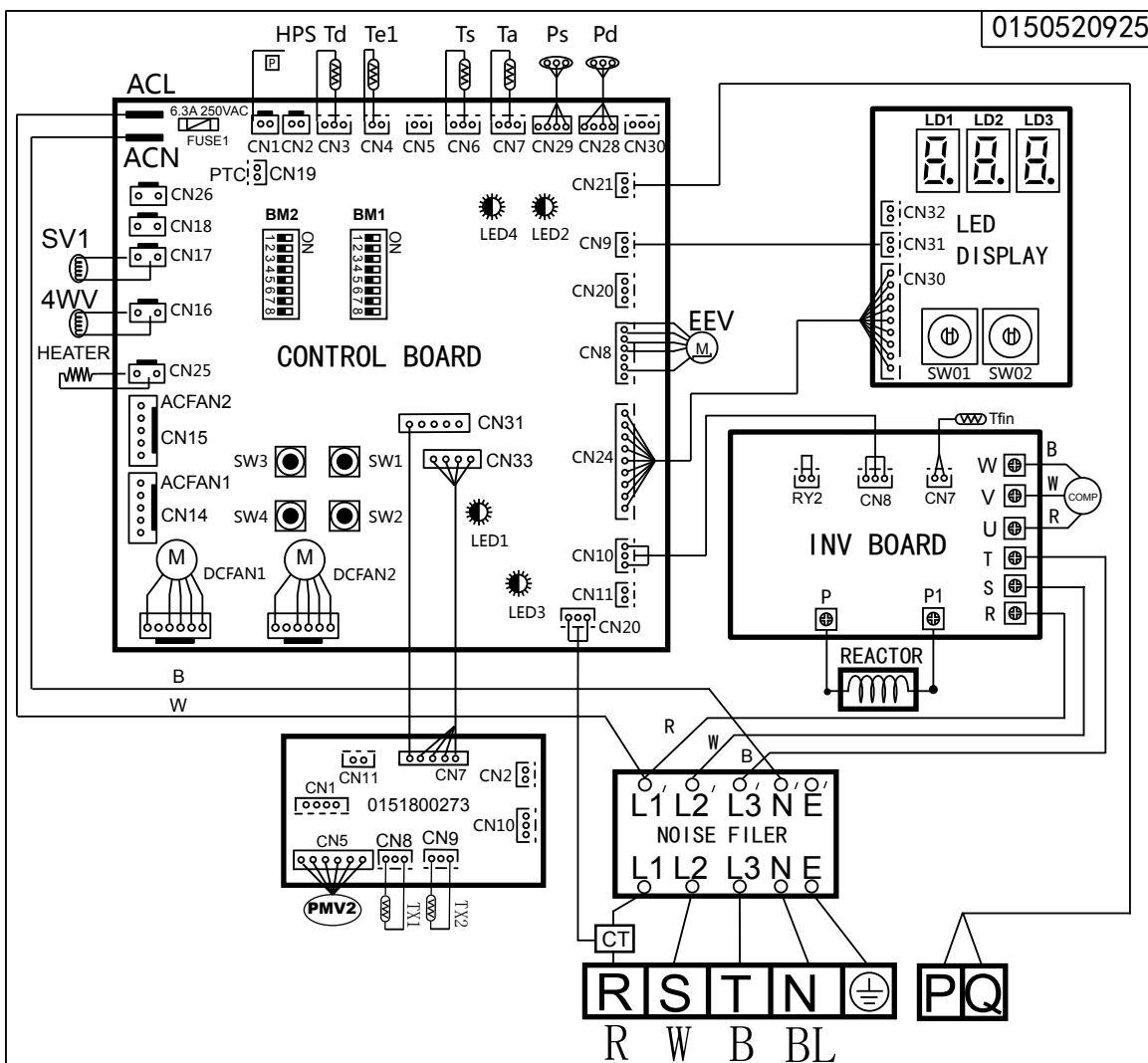
Part name	Sign	Function	Date	Note
Compressor	/	Capacity control, meet indoor load request by adjusting frequency and opening and closing fixing frequency compressor.		20℃
Pressure switch	HPS	High pressure protection	4.15Mpa, OFF	
Electronic expansion valve	EEV	In heating, refrigerant flow control	Φ3.0	
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℃)=50K B(25/80℃)=4450K	
	Ts	Detect the top suction of compressor	R(80℃)=10K B(25/80℃)=3700K	
	Ta	Detect ambient temp., set primary fan speed and control defrost condition		
	Tc1	Detect the temp. of before and after the supercooling valve to control the supercooling valve open angle.		
	Tc2			
	Te	Detect frost condition of outdoor heat exchanger		
Heater	Chi	Used to heat oil in inverter compressor	28W, 220V, one	

## 5. Wiring Diagram

AU04/05/062FPERA



AU04/05/06IFPERA



## <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.

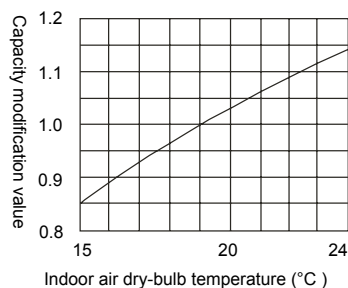
## <SYMBOL>

Symbol	Signification	Symbol	Signification
HEATER	Crankcase Heater	Pd	High Pressure Sensor
SV1	Unloading Valve	Ps	Low Pressure Sensor
4WV	Four-way Valve	EEV	Electronic Expand Valve
DCFAN1,2	DC Fan Motor	Tfin	lpm Temperature Sensor
ACFAN1,2	AC Fan Motor	PMV2	Electronic Expand Valve
HPS	High Pressure Switch	TX1	TC1 Temp Sensor of Valve Plate
Td	Compressor Vent Sensor	TX2	TC2 Temp Sensor of Valve Plate
Te1	Defrost Temperature Sensor	W	White
Ts	Compressor Inhale Sensor	BL	Blue
Ta	Ambient Temperature Sensor	B	Black
		R	Red

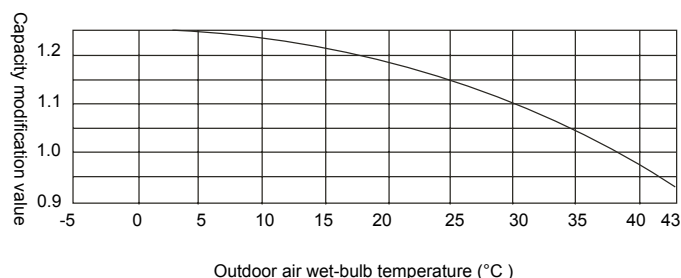
## 6. Capacity Calculation Due to Capacity Modification Coefficient

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

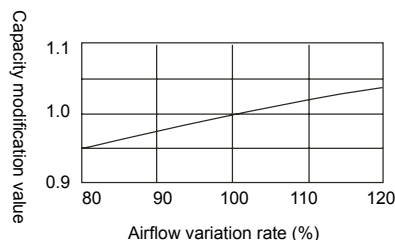
### A. Capacity compensation value of indoor air wet-bulb temperature condition



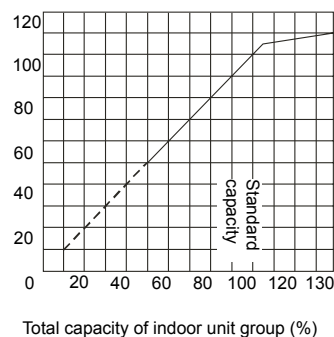
### B. Capacity compensation value of outdoor air dry-bulb temperature condition



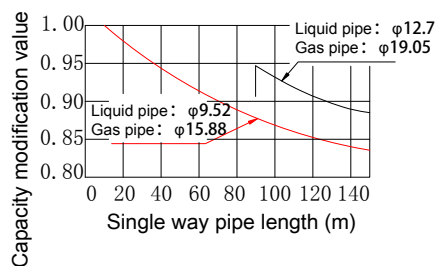
### C. Capacity modification value under airflow variation rate of indoor unit group (only for duct unit)



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



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



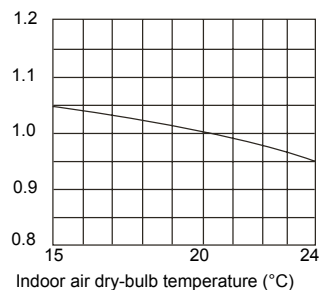
Notes for E:

- (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.

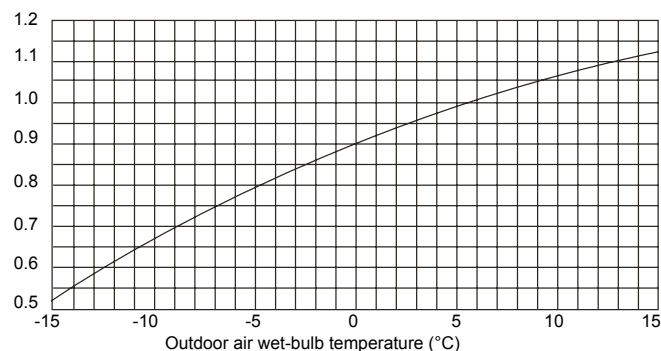
Vertical height drop between indoor and outdoor	5m	10m	15m	20m	25m	30m	35m	40m	45m	50m
Adjustment factor	0.003	0.006	0.009	0.012	0.015	0.018	0.021	0.024	0.027	0.03

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

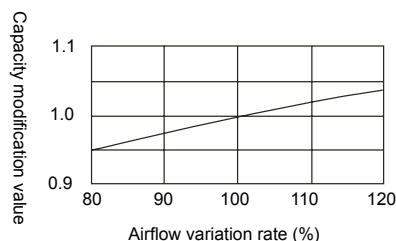
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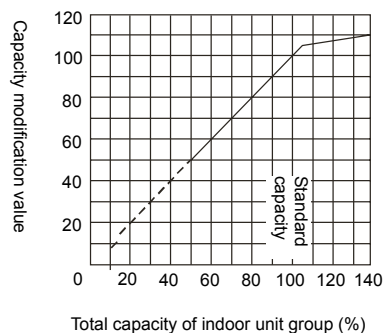
### B. Capacity compensation value of outdoor air wet-bulb temperature condition



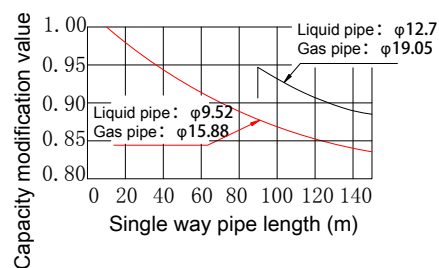
### C. Capacity modification value under airflow variation rate of indoor unit group (only for duct unit)



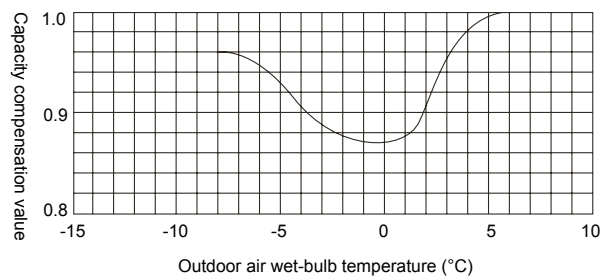
### D. Capacity compensation suitable for total capability of indoor unit group



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



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

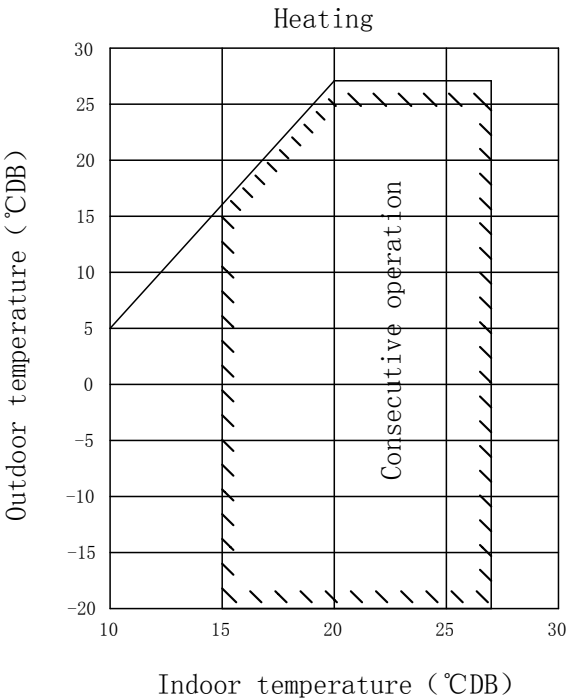
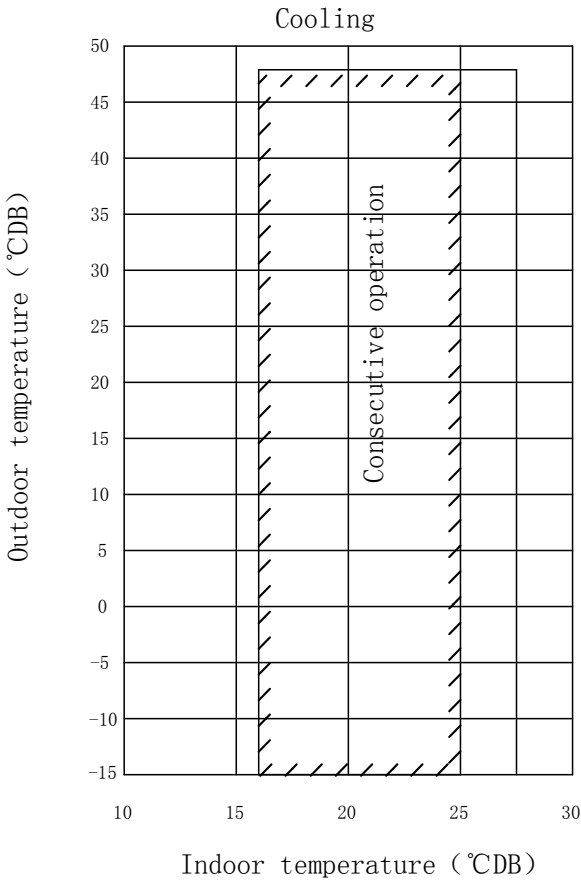


#### Notes for E:

- (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

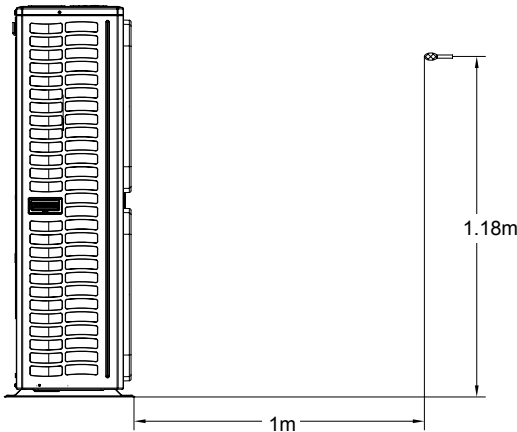
7. Operation range





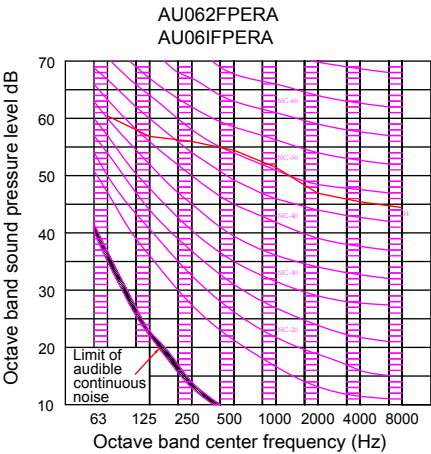
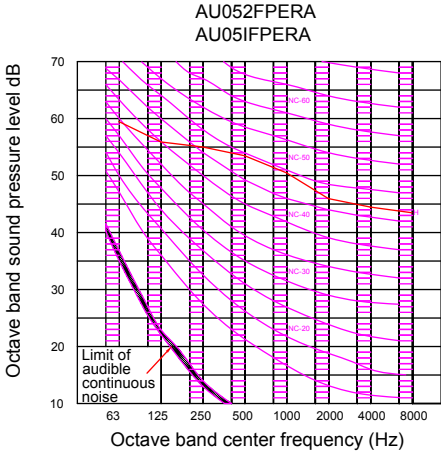
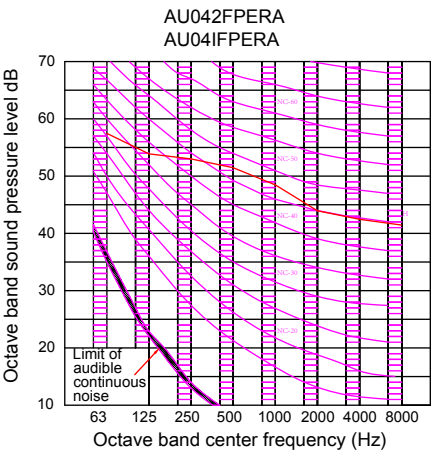
# 8. Sound Level

## (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.



## 9. Outdoor Piping Installation

### 9.1 Safety

- If the air conditioner is transferred to the others, this manual should be transferred together.
- Before installation, please read "Safety precaution" carefully to confirm the correct installation.
- The mentioned precaution includes "⚠WARNING" and "⚠CAUTION". The precaution 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 refrigerant 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.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- The appliances are not intended to be operated by means of an external timer or separate remote-control system.
- Keep the appliance and its cord out of reach of children less than 8 years.

### ⚠CAUTION

- Execute earthing for the unit. But the earthing wire can not be connected to the gas pipe, water pipe, lightning 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 section 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 consistence, 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.

## 9.2 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 horizontally 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.

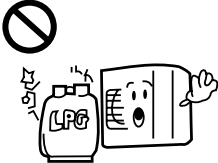
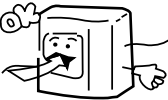

Outdoor		Indoor	
Model	Combination type	Indoor qty	Total indoor capacity (100w)
AU04	Single	1~8	63-164
AU05	Single	1~10	70-182
AU06	Single	1~13	78-201

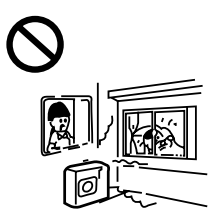
Notice:

Total capacities of indoor units being used  $\leq$  100% of rated capacities of outdoor unit.

Indoor capacity (100W)		
22	Total indoor capacity (100W)	Branch pipe (optional)
28		
36		
40		
45		
56		
71	less than 335	FQG-B335A

### (2) Installation place selection

<p>Air-conditioner can't be installed in the place with inflammable gas. Or it will cause fire hazard.</p> 	<p>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.</p>  <p>The installation space refers to the latter info.</p>	<p>The unit should be installed at the strong enough place. Or it will cause vibration and noise.</p> 
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<p>The unit should be installed at the place where the cold/hot air or noise will not interfere the neighbours.</p> 	<ul style="list-style-type: none"> <li>• The place where the water can flow fluently.</li> <li>• The place where no other heat source will affect the unit.</li> <li>• Pay attention to the snow against clogging the outdoor.</li> <li>• In installation, install the anti-vibration rubber between the unit and the bracket.</li> </ul>	<ul style="list-style-type: none"> <li>• The unit is better not be installed at the below places, or it will cause damage.</li> <li>• The place where there is corrosive gas (spa area etc).</li> <li>• The place blowing salty air (seaside etc).</li> <li>• Exists the strong coal smoke.</li> <li>• The place with high humidity.</li> <li>• The place where there is device emitting Hertzian waves.</li> <li>• The place where voltage changes greatly.</li> </ul>
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## 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. Also fix the unit with the screw.
6. When opening the electric box cover for maintenance, please fix the cover with screw firmly.

## (3) Transportation

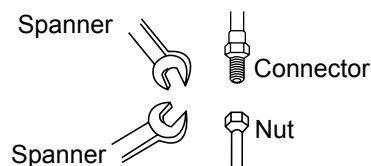
- In transportation, please don't dismantle the packaging, and move the unit to the installation location as closely as possible.
- If the packaging must be dismantled, hang up the unit with rope against damage.
- Don't hang the unit only at two points. When hanging the unit, don't sit on the unit. The unit should be upright.
- When removing the unit with the forklift, put the fork into the special hole at bottom of the unit.
- When being hanged, the rope should be 4 pieces of steel cable with over 6mm diameter.
- Put the cushion at the contact section between steel cable and the unit against the distortion or damage.

## A. 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 loosening 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 cause the deathly 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 operation instruction.
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.

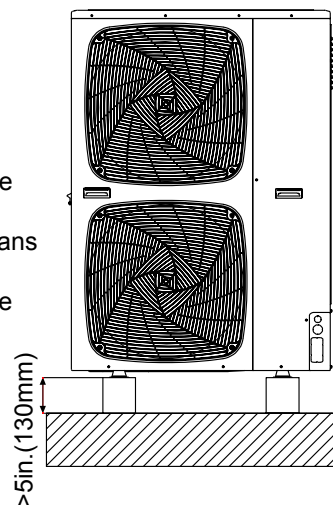
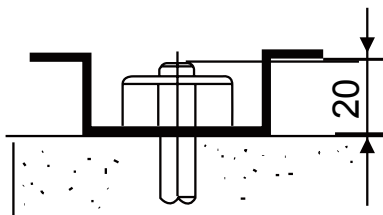
## Precautions on installation

### NOTICE

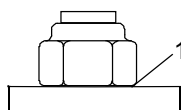
If drain holes of the outdoor unit are covered by a mounting base or by floor surface, raise the unit in order to provide a free space of more than 5in.(130mm) under the outdoor unit.

### Foundation work

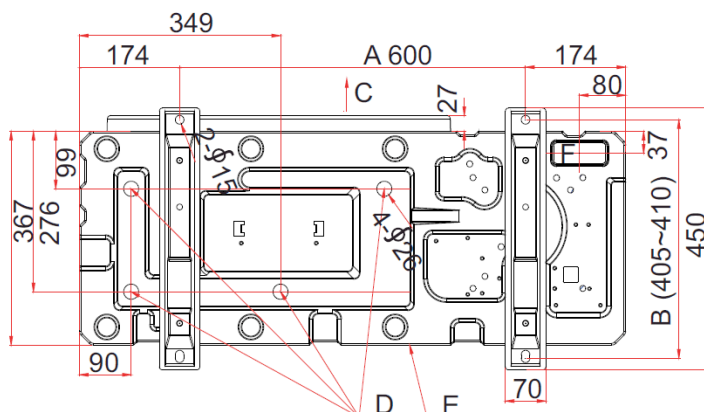
- Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise after installation.
- In accordance with the foundation drawing in the figure, fix the unit securely by means of the foundation bolts.
- It is best to screw in the foundation bolts 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 the coating on the fastening area is stripped off, the nuts rust easily.  
Dimensions (bottom view)(unit of measurement: mm)

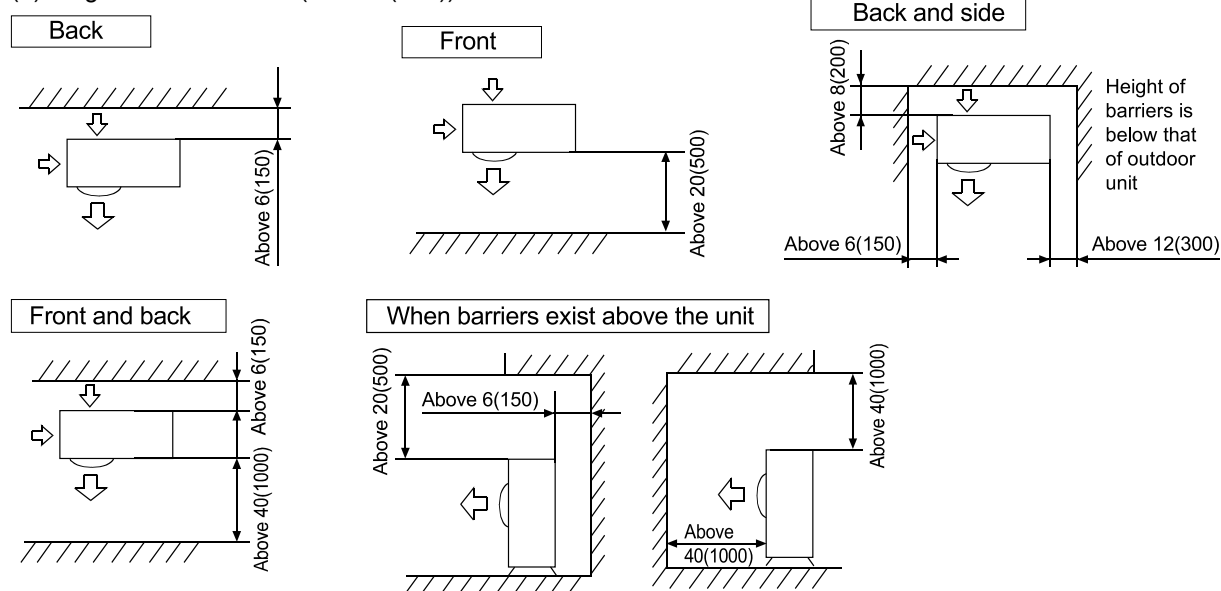


- A leg pitch1
- B leg pitch2
- C Front grill (air outlet side)
- D Drain hole
- E Bottom frame
- F Knock-out hole (for piping line)



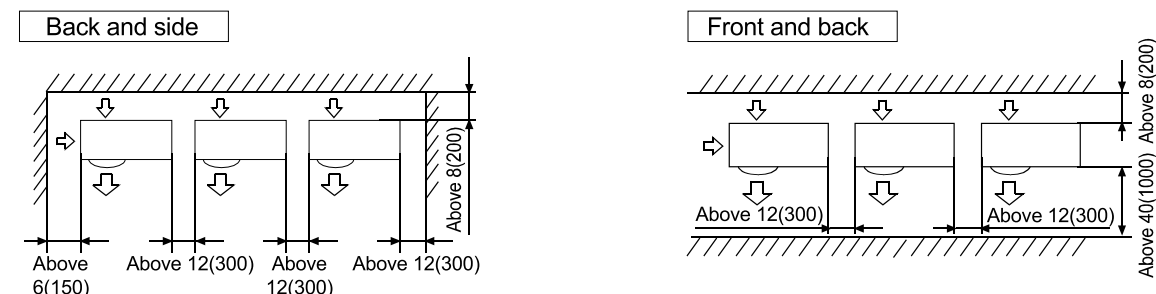
## Selection of installation location of outdoor

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



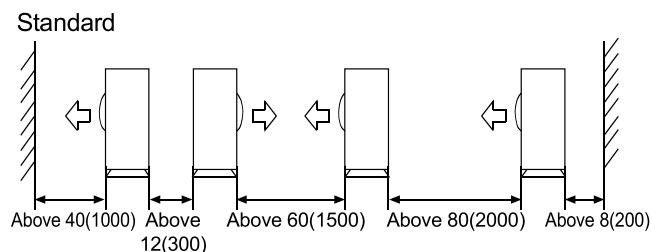
The top and two side surfaces must be exposed to open space, and barriers on at least one side of the front and back shall be lower than the outdoor unit.

### (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))



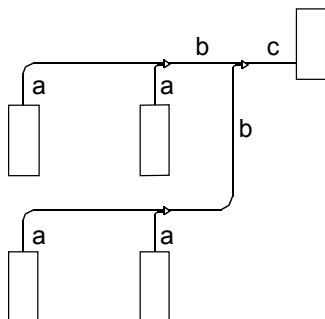
The top and two side surfaces must be exposed to open space, and barriers on at least one side of the front and back shall be lower than the outdoor unit.

- 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.

## 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)

### 1. Pipe a (indoor-branch pipe) diameter: decided by connected indoor capacity

Indoor rated capacity (x100w)	Gas pipe	Liquid pipe	Note
22~28	9.52	6.35	AS07/092MGGERA gas pipe should be 12.7 AS182MGGERA gas / liquid pipe should be 15.88 / 9.52
36~56	12.7	6.35	
71~140	15.88	9.52	
226~300	25.4	9.52	
450~600	28.58	12.7	

(1) When pipe length between indoor & nearest branch pipe  $\geq 15\text{m}$ , adjust in accordance with following criteria:

- ① If indoor rated capacity  $\leq 5.6\text{kW}$ , change gas / liquid pipe diameter to 15.88 / 9.52
- ② If  $16.8\text{kW} \geq \text{indoor rated capacity} > 5.6\text{kW}$ , change gas / liquid pipe diameter to 19.05 / 9.52
- ③ If indoor rated capacity  $> 16.8\text{kW}$ , change liquid pipe diameter to 12.7

2. Pipe "b" diameter (between branch pipes)

Total indoor capacity after the branch pipe (x100W)	Gas pipe (mm)	Liquid pipe (mm)
$X < 112$	$\varnothing 15.88$	$\varnothing 9.52$
$112 \leq X < 234$	$\varnothing 19.05$	$\varnothing 9.52$

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

Outdoor model	Standard pipe diameter		Enlarged pipe diameter	
	Gas pipe (mm)	Liquid pipe (mm)	Gas pipe (mm)	Liquid pipe (mm)
AU04	$\varnothing 15.88$	$\varnothing 9.52$	$\varnothing 19.05$	$\varnothing 12.7$
AU05	$\varnothing 15.88$	$\varnothing 9.52$	$\varnothing 19.05$	$\varnothing 12.7$
AU06	$\varnothing 15.88$	$\varnothing 9.52$	$\varnothing 19.05$	$\varnothing 12.7$

Note:

1. When the distance from outdoor to the longest indoor is over 30m, the main pipe should be the enlarged diameter.
2. If pipe b diameter is larger than main pipe c, enlarge main pipe c diameter to be the same as pipe b.

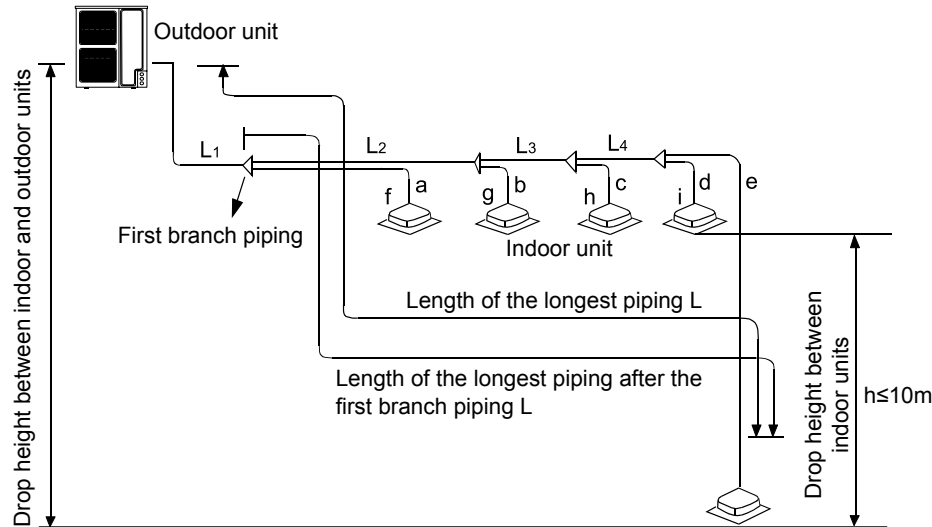
Copper pipe selection:

hardness	Softness				Half-hardness			
Outer diameter (mm)	Ø6.35	Ø9.52	Ø12.7	Ø15.88	Ø19.05	Ø22.22	Ø25.24	Ø28.58
Min. thickness (mm)	0.8	0.8	1.0	1.0	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.

Long pipe and high drop

1. Allowable pipe length and height difference



Maximal length and drop height permissible of refrigerant piping

			Permissible value	Piping part
Piping length	Total length of piping (actual length)		300m	L1+L2+L3+L4+a+b+c+d+e
	Longest piping L	Actual length	150m	L1+L2+L3+L4+e
	Piping length of indoor unit which is furthest to the first branch piping L (*)		40m	L2+L3+L4+e
Drop height	Drop height between indoor and outdoor unit H	Up outdoor	50m	—
		Under outdoor	40m	—
	Drop height between indoor units h		15m	—

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
AU04	Ø15.88	Flared joint	Ø9.52	Flared joint
AU05	Ø15.88		Ø9.52	
AU06	Ø15.88		Ø9.52	

## B. Indoor unit

Please refer to the indoor air conditioner manual.

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

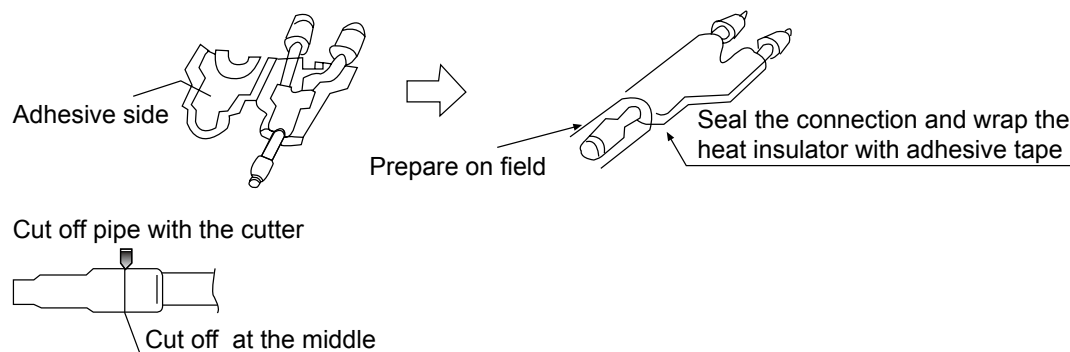
Outdoor unit type

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.



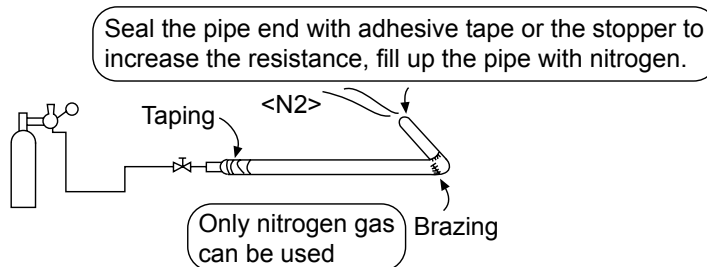
## Pipe installation

When doing the piping connection, please do the following:

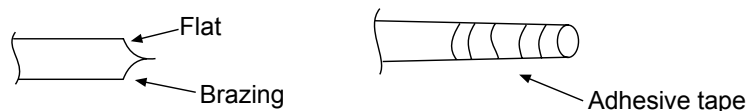
- Please don't let the pipe and the parts in the unit collide each other.
- When connecting the pipes, close the valves fully.
- Protect the pipe end against and water, impurities (welding after being flatted, or being sealed with adhesive tape).
- Bend the pipe as large semi-diameter as possible (over 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)		Projecting length of pipe to be expanded: B(mm)		
Pipe outer diameter (mm)	A	When it is hard pipe		
	0 -0.4	Special tool for R410A	The former tool	
Ø6.35	9.1	0-0.5	1.0-1.5	
Ø9.52	13.2			
Ø12.7	16.6			
Ø15.88	19.7			

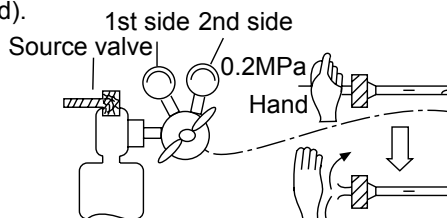
- The outdoor gas pipe and the refrigerant distributing pipe, as well the refrigerant distributing pipe and the branch pipe should be welded with hard solder.
- Weld the pipe at the same time charge the nitrogen. Or it will cause a number of impurity (a film of oxidation) to clog the capillary and the 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).



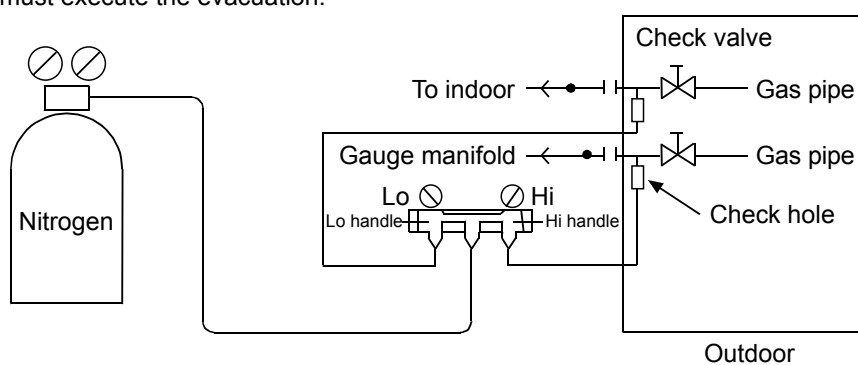
- The refrigerant pipe should be clean. The nitrogen should flow under the pressure of about 0.2MPa and when charging the nitrogen, stop up the end of the pipe by hand to enhance the pressure in the pipe, then loose the hand (meanwhile stop up the other end).



- 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.

## B. Leakage test

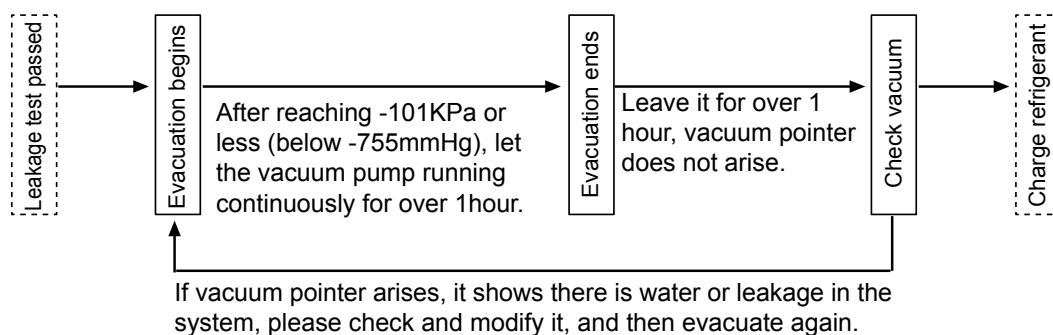
1. The outdoor unit has been executed the leakage test in the factory. After connecting the distributing pipe, execute the leakage test from the outdoor check valve and the indoor. Besides, while testing, the valves should be close.
2. Refer to the below figure to charge the nitrogen into the unit to take a test. Never use the chlorine, 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.



## C. Evacuation

Evacuate 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.

## D. Check valve 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)

### E. 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, meanwhile 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

Additional 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:

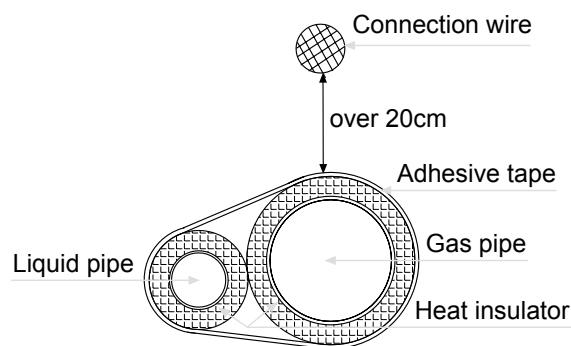
- To prevent the different oil into the pipe, please use the special tool for R410A, especially for gauge manifold and charging hose.
- Mark the refrigerant type in different colour on the tank. R410A is pink.
- Must not use the charging cylinder, because the R410A will change when transferring to the 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.

### 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.
- The 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.

## 9.3 Trial operation and the performance

### 5-minute delay function

- If starting up the unit after being powered off, the compressor will run about 5 minutes later against being damaged.

### Cooling/heating operation

- Indoor units can be controlled individually, but cannot run in cool and heat mode at the same time. If the cool mode and the heat mode are existing simultaneously, the unit set latter will be standby, and the unit set earlier will run normally. If the A/C manager sets the unit at cooling or heating mode fixedly, the unit can not run at the other modes.

### Heating mode characteristic

- In operation if outdoor temp. arises, indoor fan motor will turn to low speed or stop.

### Defrosting in heating mode

- In heating mode, outdoor defrosting will affect the heating efficiency. The unit will defrost for about 2~10 minutes automatically, at this time, the condensate will flow from outdoor, also in defrosting, the vapour will appear at outdoor, which is normal. Indoor motor will run at low speed or stop, and outdoor motor will stop.

### The unit operation condition

- To use the unit properly, please operate the unit under the allowed condition range. If operating beyond the range, the protection device will act.
- The relative humidity should be lower than 80%. If the unit runs at the humidity over 80% for a long period, the dew on the unit will drop down and the vapour will be blown from air outlet.

### Protection device (such as high pressure switch)

- High pressure switch is the device which can stop the unit automatically when the unit runs abnormally. When the high pressure switch acts, the cooling/heating mode will stop but the running LED on wired controller will be light still. The wired controller will display failure code.  
When the following cases occur, the protection device will act:  
In cooling mode, air outlet and air inlet of outdoor are clogged.  
In heating mode, indoor filter is stucked with duct; indoor air outlet is clogged.  
When protection device acts, please cut off the power source and re-start up after eliminating the trouble.

### When power failure

- When power is failure in running, all the operations will stop.
- After being electrified again, if with re-start up function, the unit can resume to the state before power off automatically; if without re-start up function, the unit needs to be switched on again.
- When abnormal occurs in running because of the thunder, the lightning, the interference of car or radio, etc, please cut off the power source, after eliminating the failure, press "ON/OFF" button to start up the unit.

### Heating capacity

- The heating mode adopts the heat pump type that absorbs outdoor heat energy and releases into indoor. So if outdoor temperature goes down, the heating capacity will decrease.

### System marks

- On the condition that multi Outdoor systems are installed, in order to confirm the relationship between outdoor and indoor, please make marks on outdoor electric control box cover to indicate the connected indoor unit. As the below figure:

Indoor model:	
Room No. e.g. Indoor A, system 1, Floor 2    2F-1A	

### **Trial operation**

- **Before trial operation:**

Before being electrified, measure the resistor between power terminal block (live wire and neutral wire) and the earthed point with a multimeter, and check if it is over 1MΩ. If not, the unit can not operate.

To protect compressor, electrify the outdoor unit for at least 12 hours before the unit runs. If the crankcase heater is not electrified for 6 hours, the compressor will not work.

Confirm the compressor bottom getting hot.

Except for the condition that there is only one master unit connected (no slave unit), under the other conditions, open fully the outdoor operating valves (gas side, liquid side). If operating the unit without opening the valves, compressor failure will occur.

Confirm all indoor units being electrified. If not, water leakage will occur.

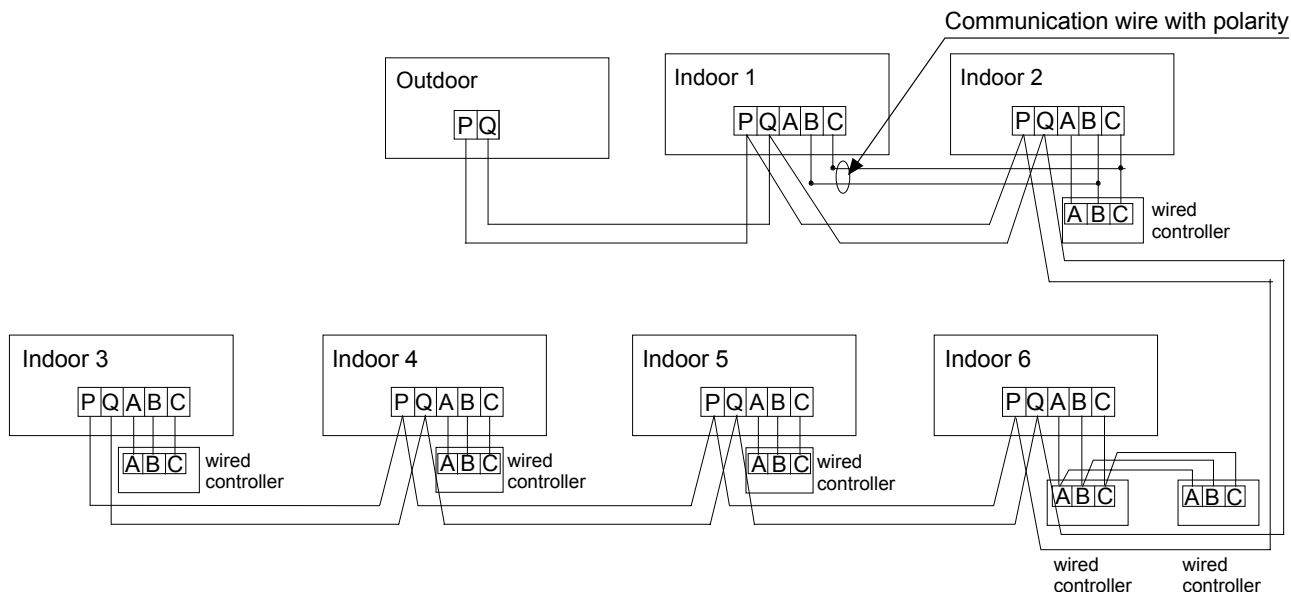
Measure the system pressure with pressure gauge, at the same time, operate the unit.

- **Trial operation**

In trial operation, refer to the information of performance section. When the unit can not start up at the room temperature, make trial operation for outdoor.

## 10. Outdoor Wiring Installation

**Communication wiring figure**



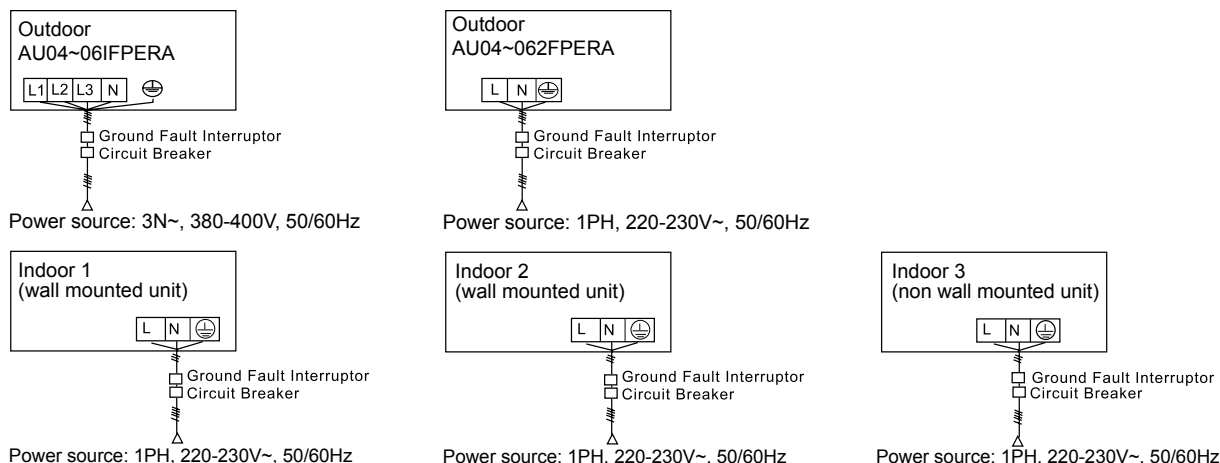
The outdoor and all indoor units are in parallel through 2 non-polar wires.

Three wiring methods between wired controller and indoor unit:

- 1 to multi (group control): one wired controller controls 2~16 indoors, as shown in above figure, indoor 1~indoor 2: indoor 2 is wired control master unit, the others are wired control slave units. Wired controller and the master indoor (directly connected to wired controller) is connected by 3 polar wires; the other indoors and the master indoors are connected by 2 polar wires.
- 1 to 1 (one wired controller controls one indoor): as shown in above figure, indoor 3~ indoor 4, indoor and wired controller are connected by 3 polar wires.
- 2 to 1 (two wired controller controls one indoor): as shown in above figure, indoor 6. Either of wired controllers can be set as master wired controller, and the other is slave wired controller. Master/slave wired controller, and master/indoor are connected by 3 polar wires.

When indoor is controlled by remote controller, refer to the "wired control master unit/wired control slave unit/remote control unit table". A, B, C on signal terminal block need not wires and not connect the wired controller.

**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 <sup>2</sup> )	Circuit breaker (A)	Rated current of residual circuit breaker (A) Ground fault interruptor (mA) response time (S)	Ground wire	
						Section (mm <sup>2</sup> )	Screw
Individual power	AU042FPERA	1PH, 220-230V~, 50/60Hz	10	50	50A 30mA below 0.1S	10	M5
	AU052FPERA		10	50	50A 30mA below 0.1S	10	M5
	AU062FPERA		10	50	50A 30mA below 0.1S	10	M5
	AU04IFPERA	3N~, 380-400V, 50/60Hz	4	20	20A 30mA below 0.1S	4	M5
	AU05IFPERA		4	20	20A 30mA below 0.1S	4	M5
	AU06IFPERA		4	20	20A 30mA below 0.1S	4	M5

- Power cable must be fixed firmly.
- Each outdoor must be earthed well.
- When power cable exceeds the range, thicken it appropriately.

### Indoor power source and communication wiring

Item Indoor total current (A)	Power cable section (mm <sup>2</sup> )	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 <sup>2</sup> )	Indoor/indoor (mm <sup>2</sup> )
<10	2	23	20	20A, 30mA, below 0.1s	2-core × (0.75-2.0mm <sup>2</sup> ) 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.

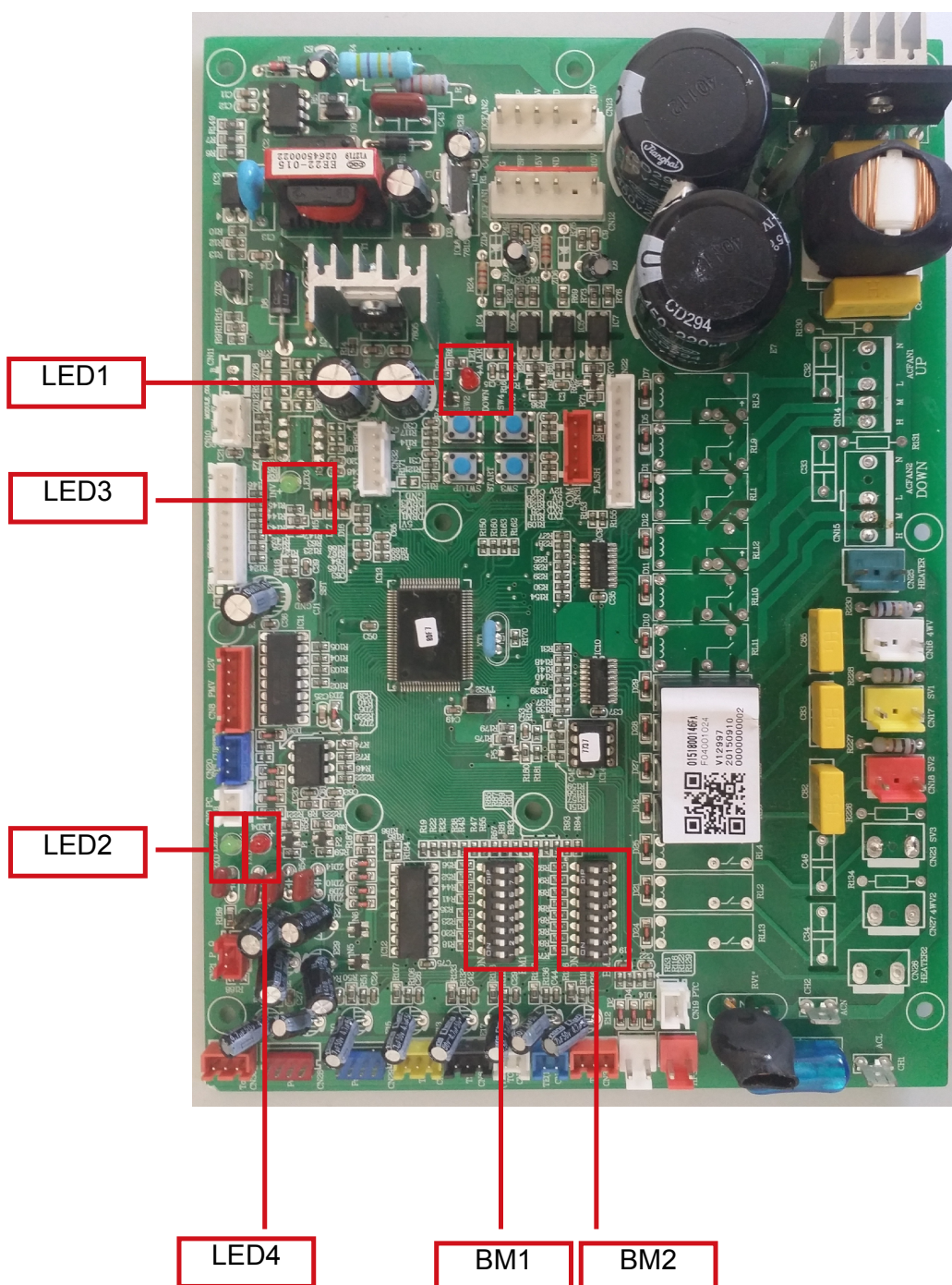
### Communication wire for wired controller

Wire length(m)	Wire spec	Wire length(m)	Wire spec
<100	0.3mm <sup>2</sup> ×(3-core) shielded wire	≥300 and <400	1.25mm <sup>2</sup> ×(3-core) shielded wire
≥100 and <200	0.5mm <sup>2</sup> ×(3-core) shielded wire	≥400 and <600	2mm <sup>2</sup> ×(3-core) shielded wire
≥200 and <300	0.75mm <sup>2</sup> ×(3-core) shielded wire		

- Shielded layer of communication wire must be grounded at one end.
- The total length cannot exceed 600m.

## 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	Two classes supercooling	OFF	Invalid
		ON	Valid (default)
BM1_3	Fan motor selection	OFF	AC motor
		ON	DC motor (default)
BM1_4	Energy saving or refrigeration effect priority	OFF	Energy saving priority
		ON	Refrigeration effect priority (default)
BM1_5	Indoor simultaneous control	OFF	Invalid (default)
		ON	Valid
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.

BM2	Definition	Introduction			
BM2-1	Cooling only or heat pump selection	OFF	Heat pump (default)		
		ON	Cooling only		
BM2_2 BM2_3 BM2_4	Outdoor model selection	ON	OFF	OFF	AU04
		ON	OFF	ON	AU05
		ON	ON	OFF	AU06
BM2-5	Power supply selection	OFF	Single phase		
		ON	3-phase		
BM2-6	Communication protocol selection	OFF	New communication protocol (default)		
		ON	Old communication protocol		
BM2-7 BM2-8	Start mode selection	BM2-7	BM2-8	Start mode selection	
		OFF	OFF	First open priority	
		OFF	ON	After opening priority	
		ON	OFF	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	
		ON	ON	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.	

## 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, 0151800227, 0151800244, 0010451751AF, 0151800141A, 0010451751AE and 151800141 are new communication protocol.

The indoor PCB 151800086 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

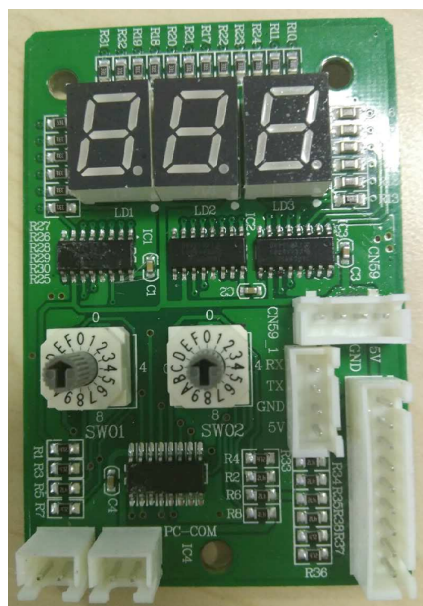
### CJ1:

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, adjuston 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	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)
	C	Actual average temp. of indoor Tc2 (unit: °C)
	D	Target degree of superheat of PMV in heating (unit: °C)
	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)
	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: °C)
	1	Ta outdoor ambient temperature (unit: °C)
	2	Ts suction temperature (unit: °C)
	3	Te defrosting temperature (unit: °C)
	4	Toil oil temperature (unit: °C)
	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)
	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)
	A	Tfin module temperature (unit: °C)
	B	Compressor current (unit: A, one decimal)
	C	Te defrosting temperature (unit: °C)
	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 heating (Press start for 5s, all the indoor units are in heating state, and press stop for 5s to quit) display "HHH", otherwise "---"
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)
9	0-F	Indoor Ta ambient temperature (unit: °C)
A	0-F	Indoor TC1 gas temperature (unit: °C)
B	0-F	Indoor TC2 liquid temperature (unit: °C)
C	0-F	Indoor units: fan speed of indoor units(0-OFF, 1-Low, 2-med, 3-high)
E	0-F	Forced cooling (press "start" for 5s for cooling operation of indoor units and press "stop" for 5s to quit) display "CCC", otherwise "---"
F	0-F	Forced heating (press "start" for 5s for heating operation of indoor units and press "stop" for 5s to quit) display "HHH", otherwise "---"

## 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  $T_a < 40^{\circ}\text{C}$ ) or 3 min at 40rps (when  $T_a \geq 40^{\circ}\text{C}$ ). In cooling mode, meet running 1min &  $(T_d - CT) \geq 20^{\circ}\text{C}$  or  $P_s \leq 0.1\text{MPa}$  (or max. running time is 3min), quite the startup control;

In heating mode, meet running 1min and  $(T_d - CT) \geq 20^{\circ}\text{C}$  or  $P_s \leq 0.1\text{MPa}$  (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 $-R^{\circ}\text{C}$	Setting value $-R^{\circ}\text{C}$	$T_a \leq 12^{\circ}\text{C}$	During running: correct the Ps according to the compression ratio
Target Ps (set by dip switch)	0	2	$12^{\circ}\text{C} < T_a < 40^{\circ}\text{C}$	
Target Ps	Setting value $+2^{\circ}\text{C}$	Setting value $+2^{\circ}\text{C}$	$T_a \geq 40^{\circ}\text{C}$	

R value setting:  $T_a < -5^{\circ}\text{C}$ , Target Ps: setting value  $-8^{\circ}\text{C}$

$-5^{\circ}\text{C} \leq T_a < 12^{\circ}\text{C}$ , Target Ps is the slope value of setting value and (setting value  $-8^{\circ}\text{C}$ )

#### 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 $+3^{\circ}\text{C}$	Setting value $+3^{\circ}\text{C}$	$T_a \geq 15^{\circ}\text{C}$	During running: correct the Pd according to the compression ratio
Target Pd	Setting value $+2^{\circ}\text{C}$	Setting value $+2^{\circ}\text{C}$	$T_a \geq 7^{\circ}\text{C}$	
Target Pd (set by dip switch)	48	46	$T_a \geq -5^{\circ}\text{C}$	
Target Pd	Setting value $-2^{\circ}\text{C}$	Setting value $-2^{\circ}\text{C}$	$T_a < -5^{\circ}\text{C}$	

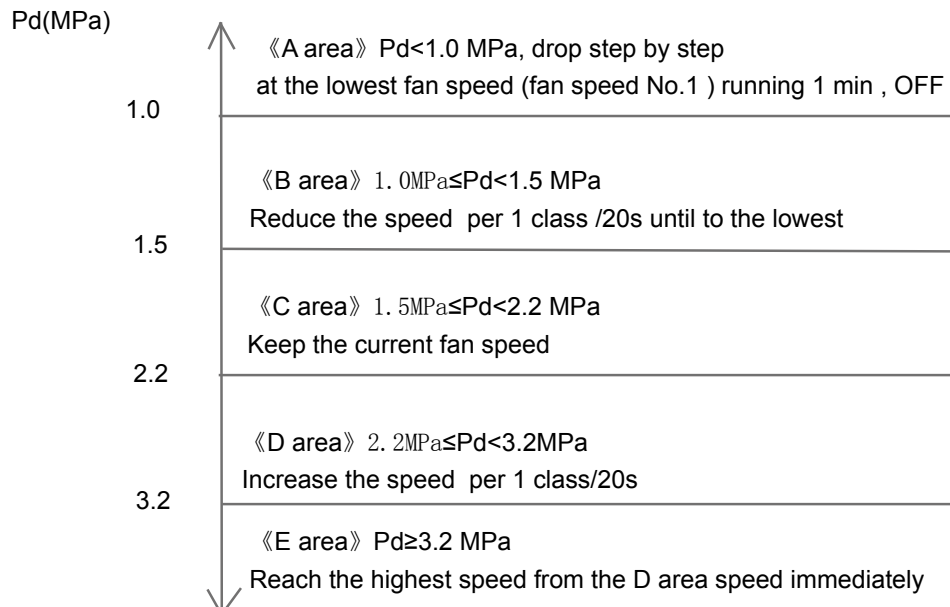
### 3. Outdoor fan motor control

#### 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.

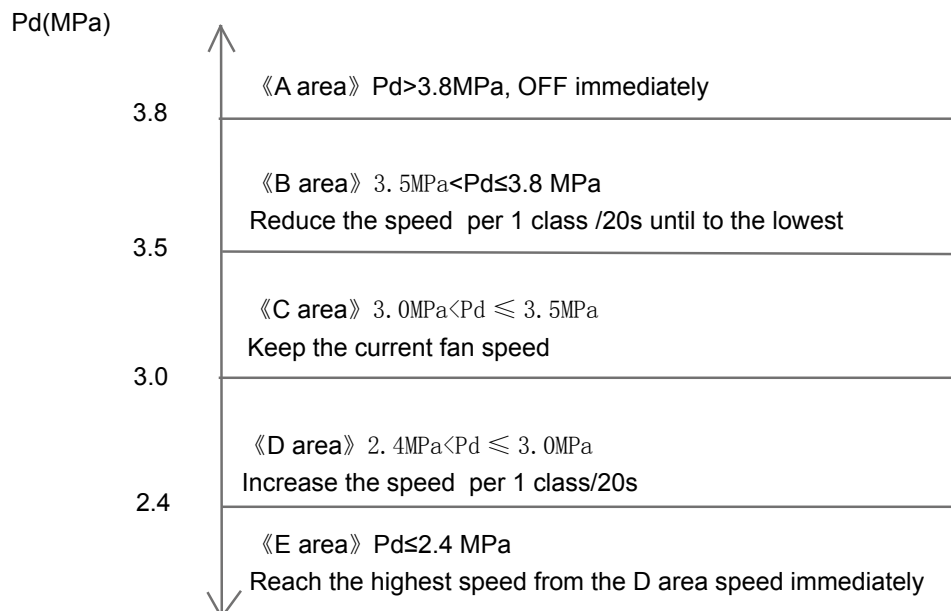
Pd is the main control standard.



When startup the fan motor speed refer to the following:

- $T_a \geq 35^\circ\text{C}$ : highest speed
- $25^\circ\text{C} \leq T_a < 35^\circ\text{C}$ : 6 speed
- $15^\circ\text{C} \leq T_a < 25^\circ\text{C}$ : 3 speed
- $T_a < 15^\circ\text{C}$ : OFF

### 3.2 In heating mode



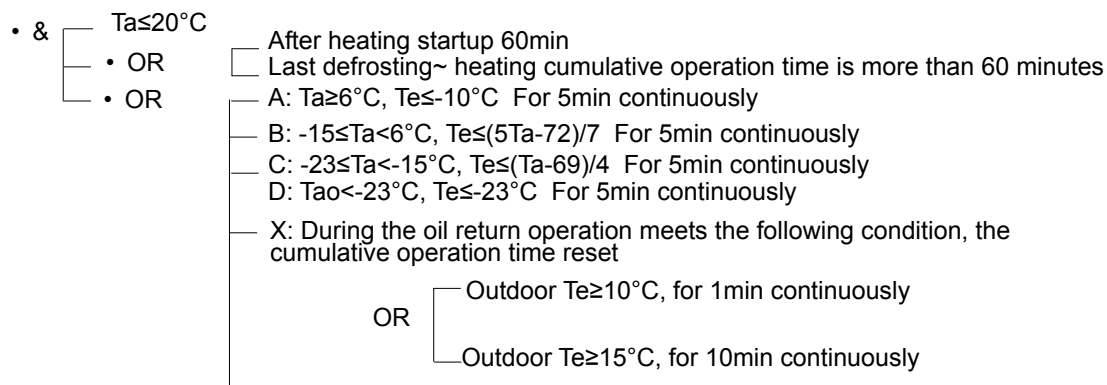
All the heating start, after the 4-way valve reversing (including defrosting, oil return and 4-way valve is electrified) the fan motor speed refer to the following:

- $T_a \leq 15^\circ\text{C}$ : highest speed
- $15^\circ\text{C} < T_a \leq 20^\circ\text{C}$ : 3 speed
- $T_a > 20^\circ\text{C}$ : 1 speed

## 4. Defrosting control

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

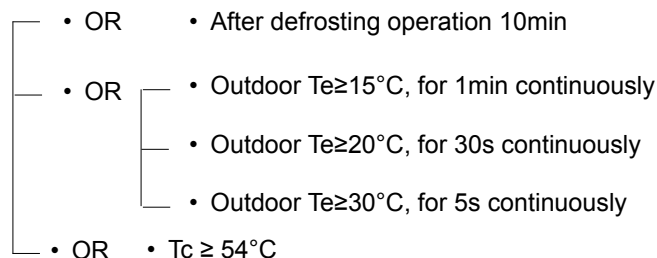
### 4.1 Entering condition:



### 4.2 Defrosting control

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

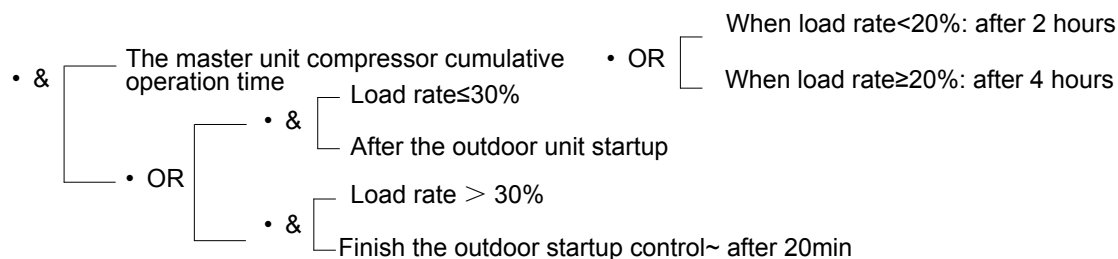
### 4.3 Quit defrosting



## 5. Oil return control

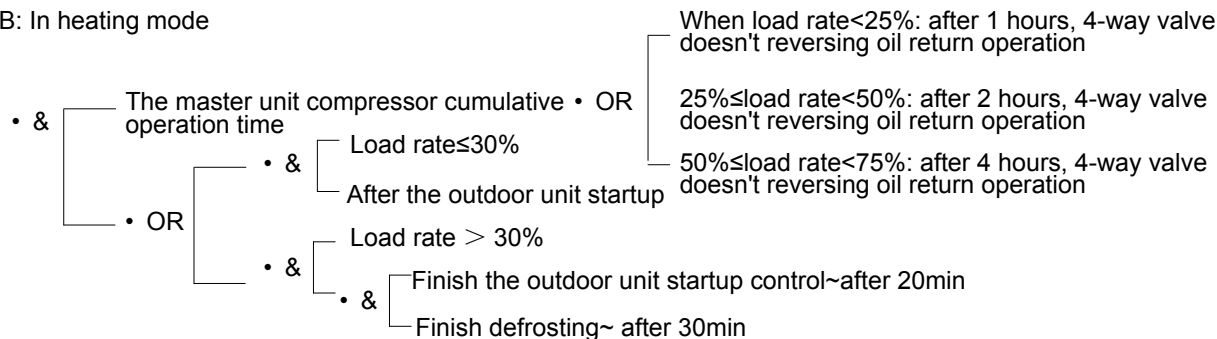
### 5.1 Entering condition:

A: In cooling mode



Note:  $\text{load rate} = \sum \text{indoor HP (Thermo ON)} / \sum \text{indoor HP} * 100\%$

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

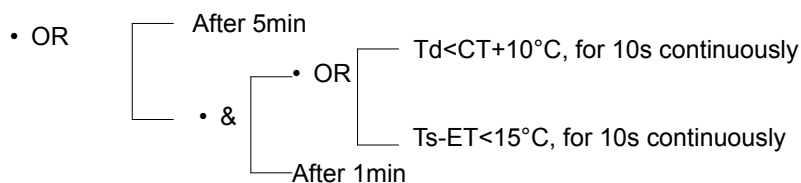
1) Oil return in cooling mode, the compressor according to the 75% of maximum frequency control, the outdoor PMV opening angle is 470 pls, the Thermo ON indoor PMV opening angle is 250 pls, the Thermo OFF indoor PMV opening angle is 125 pls.

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  $T_d > 95^\circ\text{C}$  and  $T_{dSH} > 15^\circ\text{C}$ , the indoor PMV opening angle increased 10%, max. time is 2; When  $T_d < 90^\circ\text{C}$ , return to the usually opening.

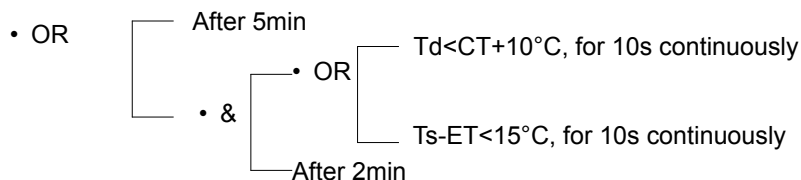
3) Oil return in heating mode (4-way valve doesn't reversing), the compressor according to the indoor units load rate and current running frequency to confirm the oil return enter frequency, the maximum frequency can't exceed 75% of the maximum frequency. the PMV of the outdoor and the Thermo ON indoor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

## 5.3 Oil return quit condition:

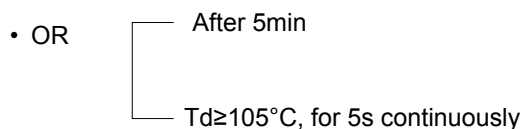
1) In cooling mode



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



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



## 15. Failure code

### Inverter outdoor unit failure code

Digital tube indication on master unit	Indication on wired controller (hex)	Failure code definition	Failure description	Remarks
20	20-0	Defrosting temp. sensor Te failure	AD value is below 11(open circuit) or over 1012(short circuit) for 60seconds, in cooling mode, if the sensor is abnormal, the unit does not deal with it, besides, in defrosting and within 3 minutes after defrosting, no alarm	Resumable
21	21	Ambient temp. sensor Ta failure	AD value is below 11(open circuit) or over 1012(short circuit) for 60seconds, in defrosting and within 3 minutes after defrosting, no alarm	Resumable
22	22	Suction temp. sensor Ts failure	AD value is below 11(open circuit) or over 1012(short circuit) for 60seconds, in defrosting and within 3 minutes after defrosting, no alarm	Resumable
23	23	Discharging temp. sensor Td failure	After compressor is running for 5 minutes, AD value is below 11(open circuit) or over 1012(short circuit) for 60seconds, in course of startup, defrosting and within 3 minutes after defrosting, no alarm	Resumable
26	26-0	Indoor communication failure	For continuous 200 cycles, can not find connected indoors	Resumable
26-1	26-1		For continuous 300seconds, the searched indoor quantity is less than the set quantity.	
26-2	26-2		For continuous 300seconds, the searched indoor quantity is more than the set quantity.	
28	28	High pressure sensor Pd failure	AD value is below 11(open circuit) or over 1012(short circuit) for 30seconds, in defrosting and within 3 minutes after defrosting, no alarm	Resumable
29	1D	Low pressure sensor Ps failure	AD value is below 11(open circuit) or over 1012(short circuit) for 30seconds, in defrosting and within 3 minutes after defrosting, no alarm	Resumable
30	30	High pressure switch HPS failure	If disconnect for 50ms continuously, alarm. If alarm 3 times in an hour, confirm the failure	Once confirmation, un-resumable
33	33	EEPROM failure	EEPROM failure	Once confirmation, un-resumable
34	34	Discharging temp. too high protection (Td)	Td≥239°F(115°C) at interval of 25msec for twice continuously, and over the set value, then stop and alarm; 3 minutes later, resume automatically. If it occurs 3 times in an hour, confirm the failure.	Once confirmation, un-resumable
35	35	4-way valve reversing failure	After 4-way valve is electrified for 3 minutes, if the below conditions can be met for continuous 10 seconds, that is conversing successfully: 1. this outdoor compressor is running normally 2. Pd-Ps≥87PSI(0.6MPa), Otherwise, the system alarms reversing failure.	Once confirmation, un-resumable
39-0	39-0	Low pressure sensor Ps too low protection	After compressor is running (except for residual operation), if in cooling, Ps<0.05Mpa; in heating, Ps<0.03Mpa; in oil return, Ps<0.03Mpa for continuous 5 minutes, alarm and stop. 2 minutes and 50 seconds later, resume automatically, 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
39-1	39-1	Compression ratio too high protection	After compressor is running, compression ratio 8. for continuous 5 minutes stop and alarm.2 minutes and 50 seconds later, resume automatically, if it occurs 3 times in an hour, confirm the failure.	Once confirmation, un-resumable
39-2	39-2	Compression ratio too low protection	In normal operation, compression ratio <1.8 for continuous 5 minutes stop and alarm.2 minutes and 1 seconds later, resume automatically, if it occurs 3 times in an hour, confirm the failure.	Once confirmation, un-resumable
40	40	High pressure sensor Pd too high protection	In normal operation, Pd $\geq$ 4.15Mpa for continuous 50ms, alarm and stop. 2 minutes and 50 seconds later, resume automatically, if it occurs 3 times in an hour, confirm the failure.	Once confirmation, un-resumable
43	43	Discharging temp. sensor Td too low protection	In normal operation, if Td<CT+50°F(10°C) for continuous 5 minutes, the unit stops and alarms.2 minutes and 50 seconds later, resume automatically. If it occurs 3 times in an hour, confirm the failure. After fixed frequency compressor alarms, inverter compressor will continue to run. If fixed frequency compressor has been locked for 3 times, the unit will stop and alarm.	Once confirmation, un-resumable
46	46	Communication with inverter board failure	No communication within 30 seconds continuously	Resumable
53	53	CT current is too low or current sensor fault	3 minutes after recovery	3 times in an hour, confirm failure; once confirmation, un-resumable
54	54	Valve plate module communication fault	Cannot receive valve plate module signal in 200 continuous rounds or receive wrong data, recover automatically when received right data.	Resumable
57	57	Communication failure between valve plate module and host computer(sending by valve plate)	Communication failure between valve plate module and host computer	Resumable
58	58	Tc1 temp sensor of valve plate error(sending by valve plate)	Tc1 temp. sensor cannot connect with valve plate module	Resumable
59	59	Tc2 temp sensor of valve plate error(sending by valve plate)	Tc2 temp. sensor cannot connect with valve plate module	Resumable
60	60	Valve plate module error(sending by valve plate)	Reserved	Resumable
61	61	Valve plate module error(sending by valve plate)	Reserved	Resumable



Digital tube indication on master unit	Indication on wired controller (hex)	Failure code definition	Failure description	Remarks
62	62	Valve plate module error(sending by valve plate)	Reserved	Resumable
63	63	Valve plate dial setting error	No valve plate module dial but the valve plate module is detected.	Once confirmation, un-resumable
64	64	CT current is too high	CT current exceeds specified value, 3 minutes after recovery	3 times in an hour, confirm failure; once confirmation, un-resumable
71-0	71-0	Upper DC motor blocked	Running at speed below 20rpm for 30s, or at speed of 70% lower than the target for 2 minutes, 2 minutes and 50 seconds later after stop, resume automatically. It occurs 3 times in an hour, confirm the failure.	Once confirmation, un-resumable
71-1	71-1	Lower DC motor blocked		
75	75-0	No pressure drop between high pressure and low pressure	In 1 minute after INV compressor starts up, Pd-Ps≤0.1MPa, then stop. 180 seconds later, resume automatically. If it occurs 3 times in an hour, confirm the failure.	Once confirmed, unresumable
75-4	75-4	Too small pressure drop between high pressure and low pressure	If Pd-Ps≤0.2MPa for 5 minutes, the outdoor unit protection stop. • 3 minutes after stopping protection, restart. If it occurs 3 times in an hour, confirm the failure.	Once confirmed, unresumable
78	78	Lack of refrigerant	Compressor running in cooling mode, Ps<0.2MPa for 30 minutes; compressor running in heating mode, Tsi - ET>20; LEV will fully open for 60 minutes, the unit will output lack of refrigerant alarm, unit will not stop.	--
81	81	IPM modular temp. too high protection	IPM modular temp.≥185°F(85°C)	3 times in an hour, confirm failure; once confirmation, un-resumable
82	82	Compressor current protection	Compressor current exceeds specified value, 3 minutes after recovery	3 times in an hour, confirm failure; once confirmation, un-resumable
83	83	Outdoor model set error	Model and the number of fans do not match	Un-resumable
108	108	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	109	Current detection circuit abnormality	Current detection circuit abnormality	3 times in an hour, confirm failure; once confirmation, un-resumable

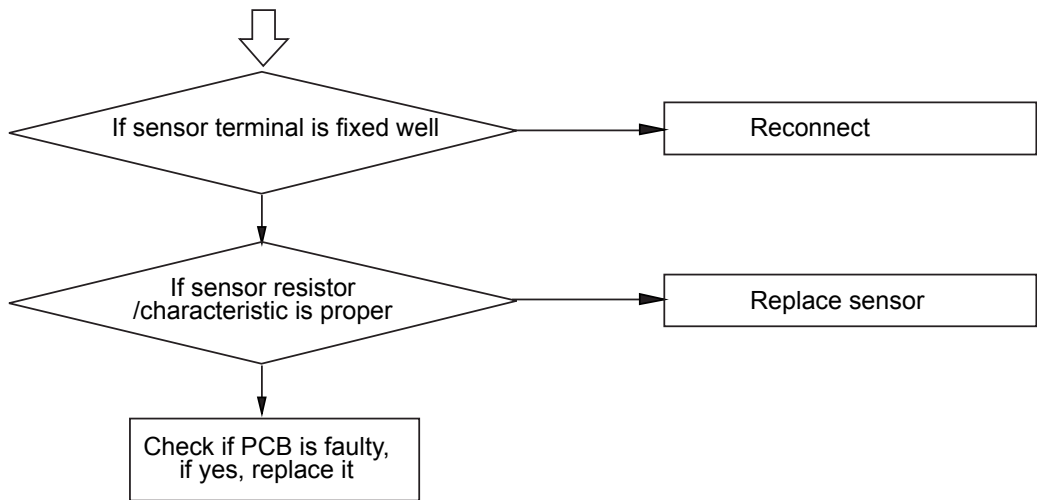
Digital tube indication on master unit	Indication on wired controller (hex)	Failure code definition	Failure description	Remarks
110	110	IPM modular protection (F0)	IPM modular over current, in short circuit, over heat, voltage too low of control circuit.	3 times in an hour, confirm failure; once confirmation, un-resumable
111	111	Compressor out of control	In the course of compressor startup or running, the unit can not detect the rotor position, or not connecting compressor.	
112	112	Radiator of transducer temp. too high	Radiator temp. too high	
113	113	Transducer overload	Output current of transducer is too high	
114	114	Voltage too low of DC bus line of transducer	Voltage of power source is too low	
115	115	Voltage too high of DC bus line of transducer	Voltage of power source is too high	
116	116	Communication abnormal between transducer and control PCB	Communication is disconnected	Resumable
117	117	Transducer over current (software)	Compressor startup fails for 5 times continuously, or compressor is running down till stops caused by over current or over heat	3 times in an hour, confirm failure; once confirmation, un-resumable
118	118	Compressor startup failure	The sensor used for current detecting of transducer is abnormal, disconnected or incorrectly connection	
119	119	Detecting circuit of transducer current is abnormal	Current detection sensor of frequency controller is abnormal or unconnected or connected wrongly.	
120	120	Power supply of transducer abnormal	Power supply of transducer is broken down instantly	
121	121	Power supply of inverter board is abnormal	Power supply of inverter board is broken down instantly	3 times in an hour, confirm failure; once confirmation, un-resumable
122	122	Radiator temp. sensor of transducer abnormal	Resistor of temp. sensor abnormal or temp. sensor disconnected	
123	123	Transient over current in 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:

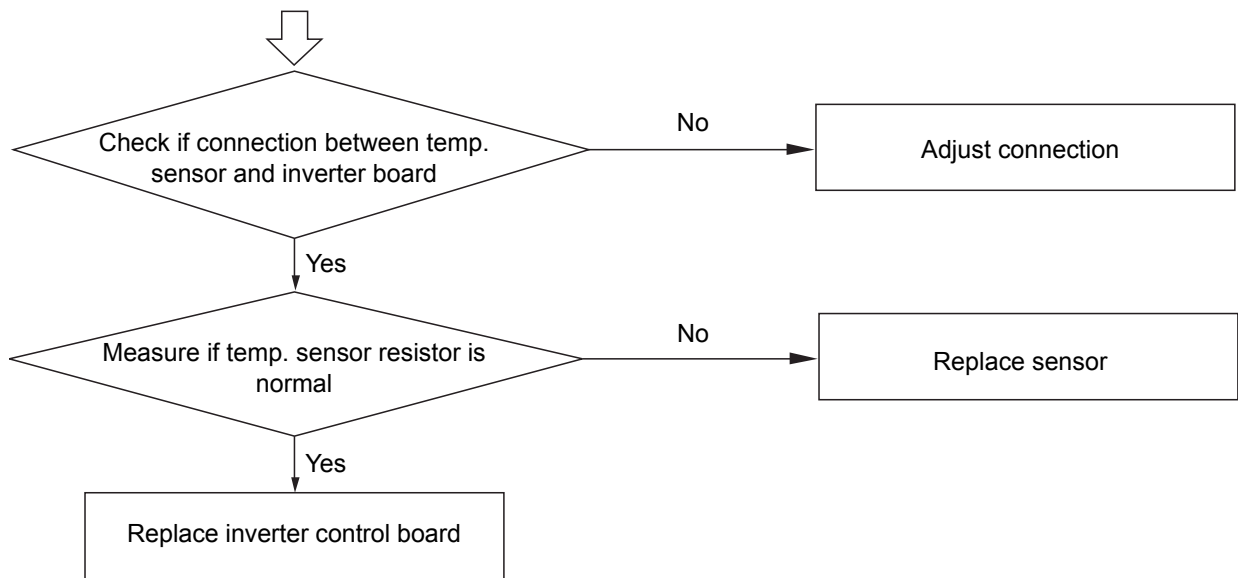
555.0	Standby state of capacity overmatch	When capacity is over 130% or lower than 50%, the system is standby.	Resumable
555.1	Outdoor ambient temperature too high (heating)	Ta>27°C, Standby	
555.3	Outdoor ambient temperature too high or too low (cooling)	Ta>54°C or Ta<-15°C, Standby	

16. Troubleshooting

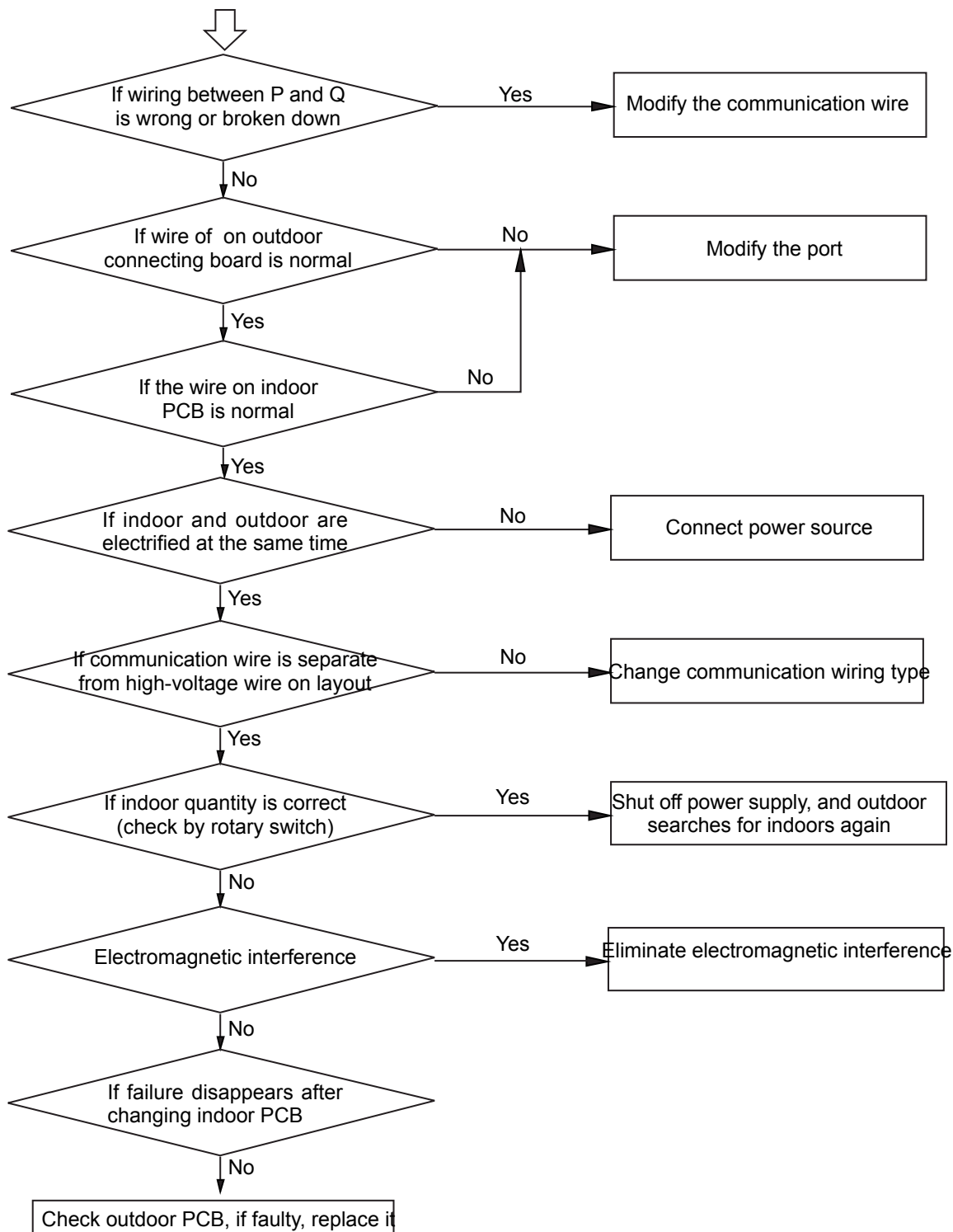
[20-23] Temperature sensor failure



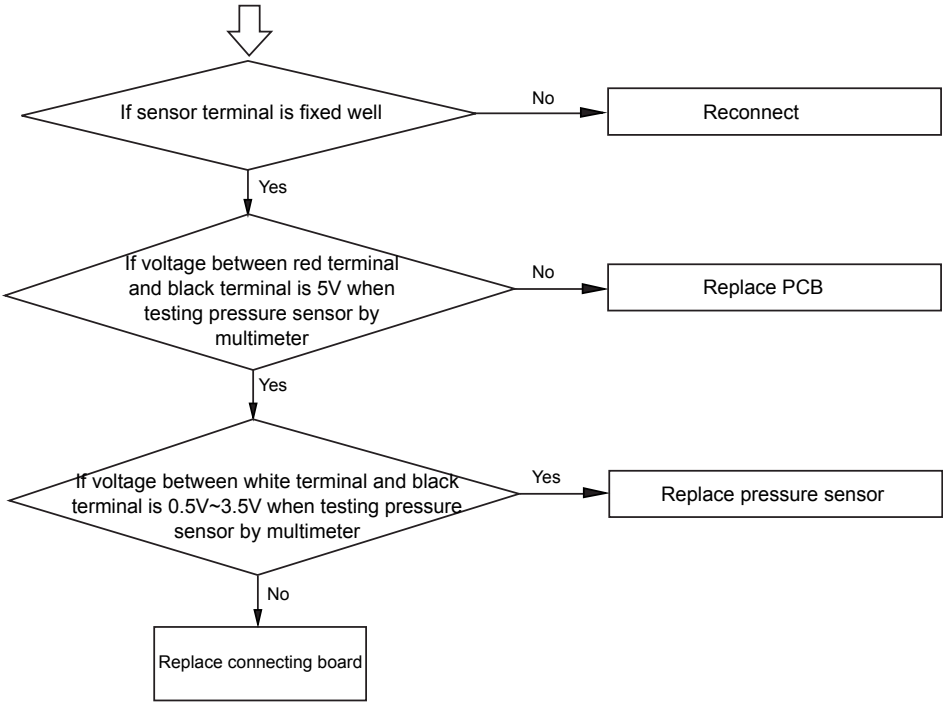
[122] Radiator temp. sensor of transducer abnormal



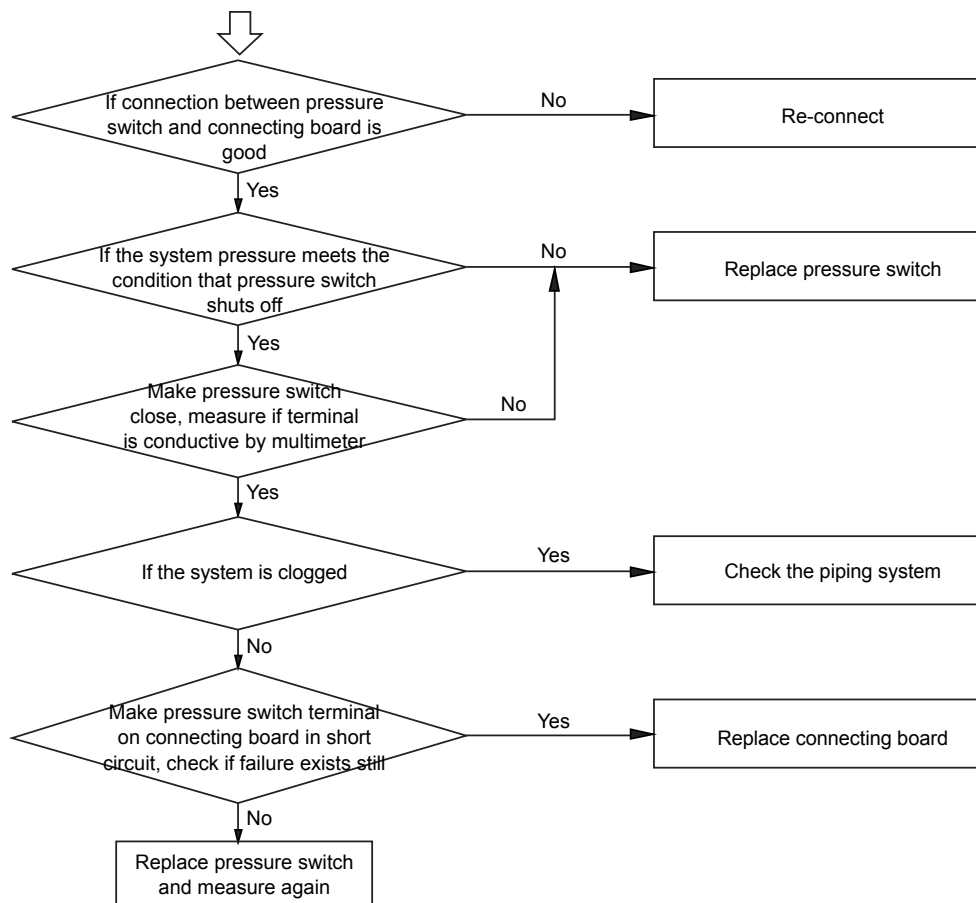
## [26-0, 26-1, 26-2] Communication circuit between indoor and outdoor



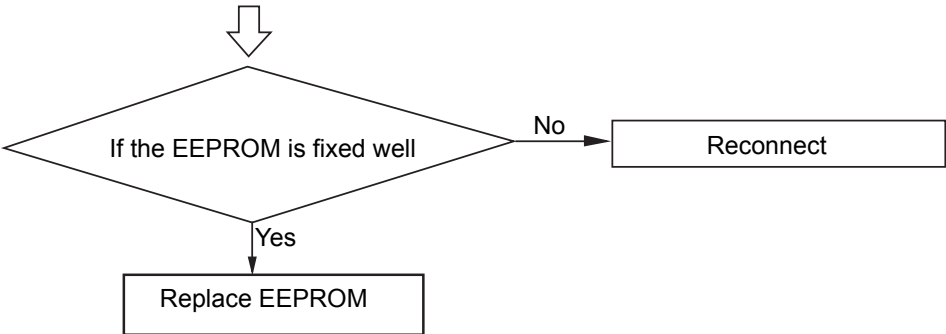
[28, 29] High/low pressure sensor failure



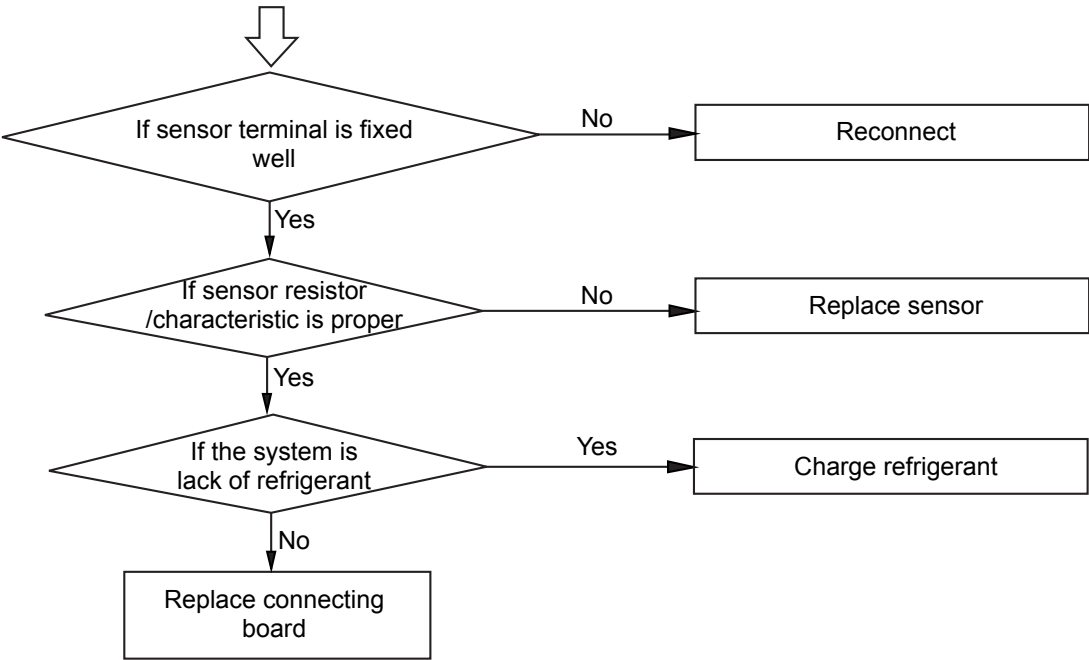
## [30] High pressure switch failure



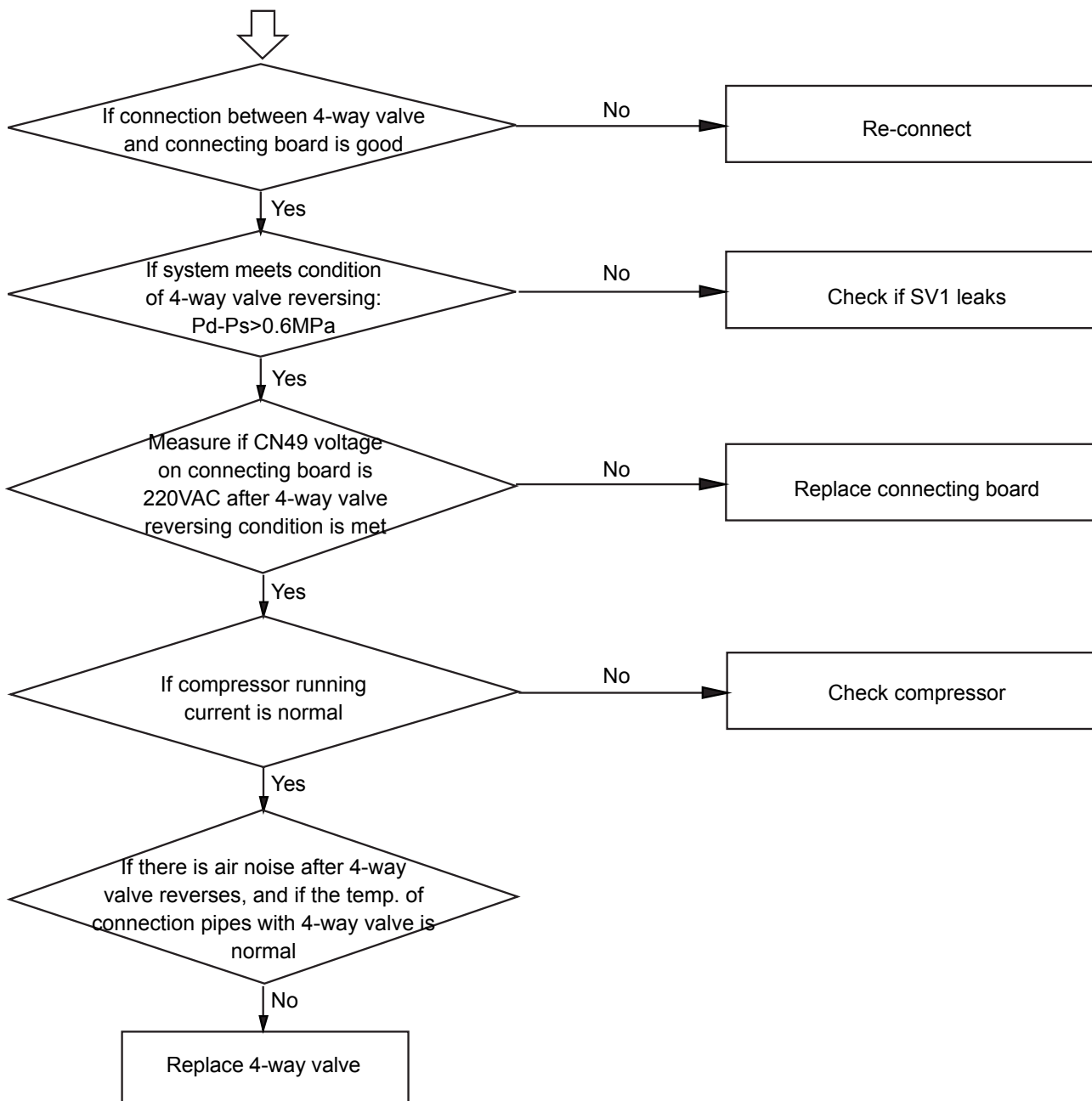
[33] Outdoor EEPROM failure



[34] Protection of discharging temp. too high

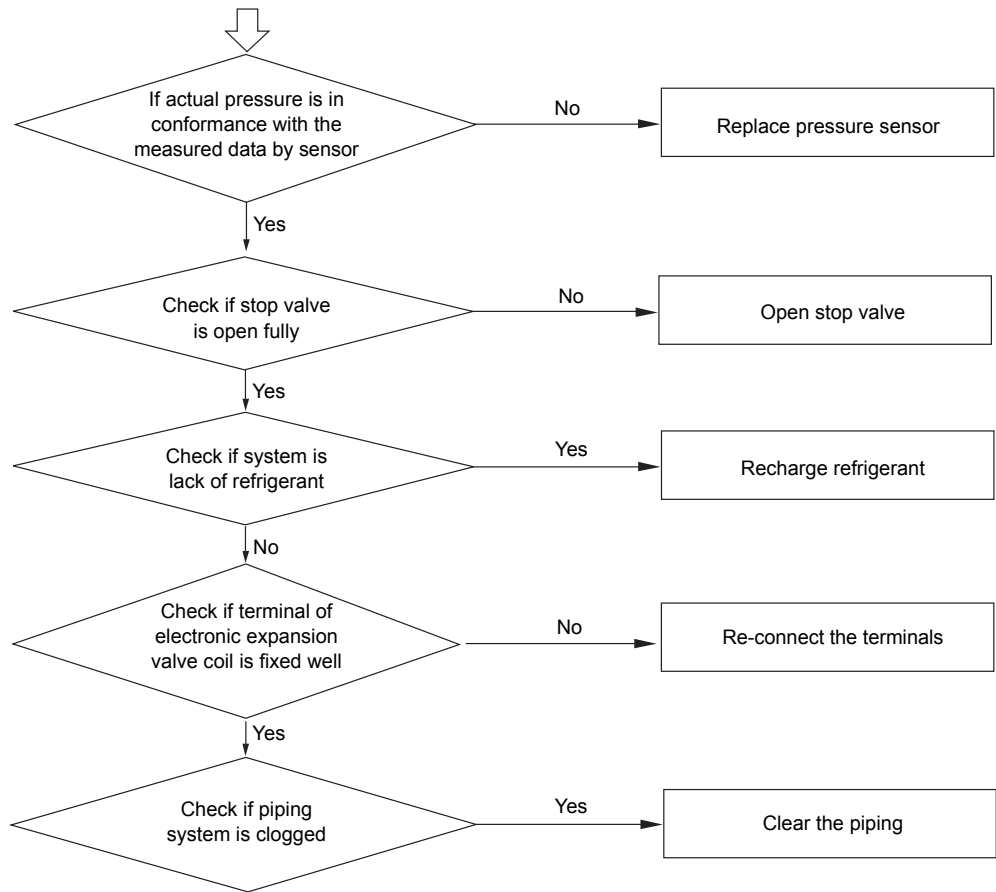


## [35] 4-way valve reversing failure

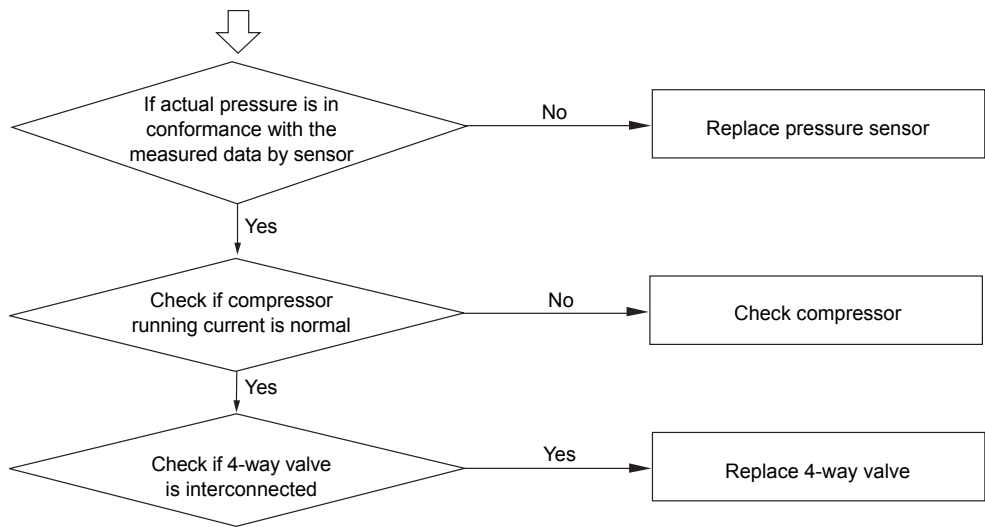




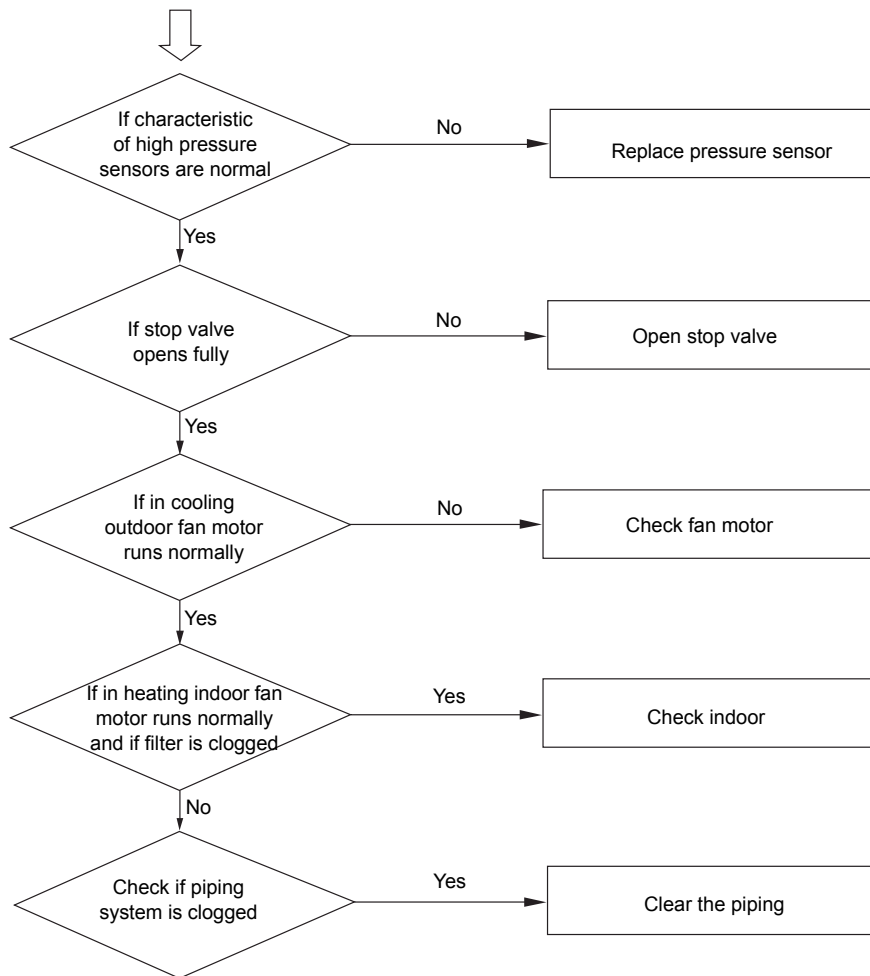
**[39-0, 39-1] Low pressure too low and compression ratio too high**



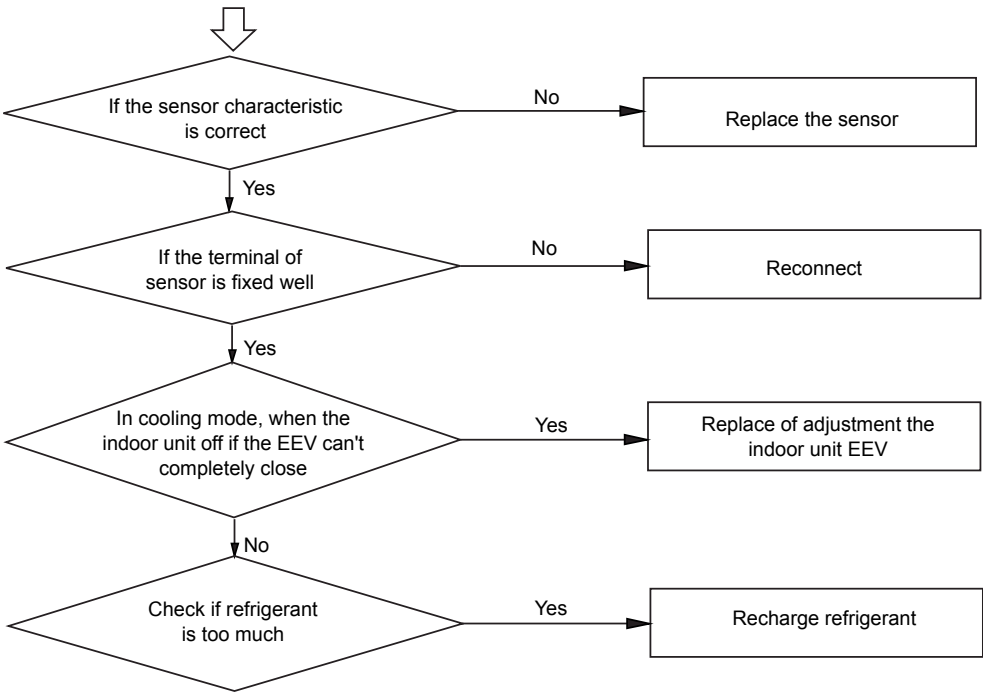
**[39-2] Compression ratio too low**



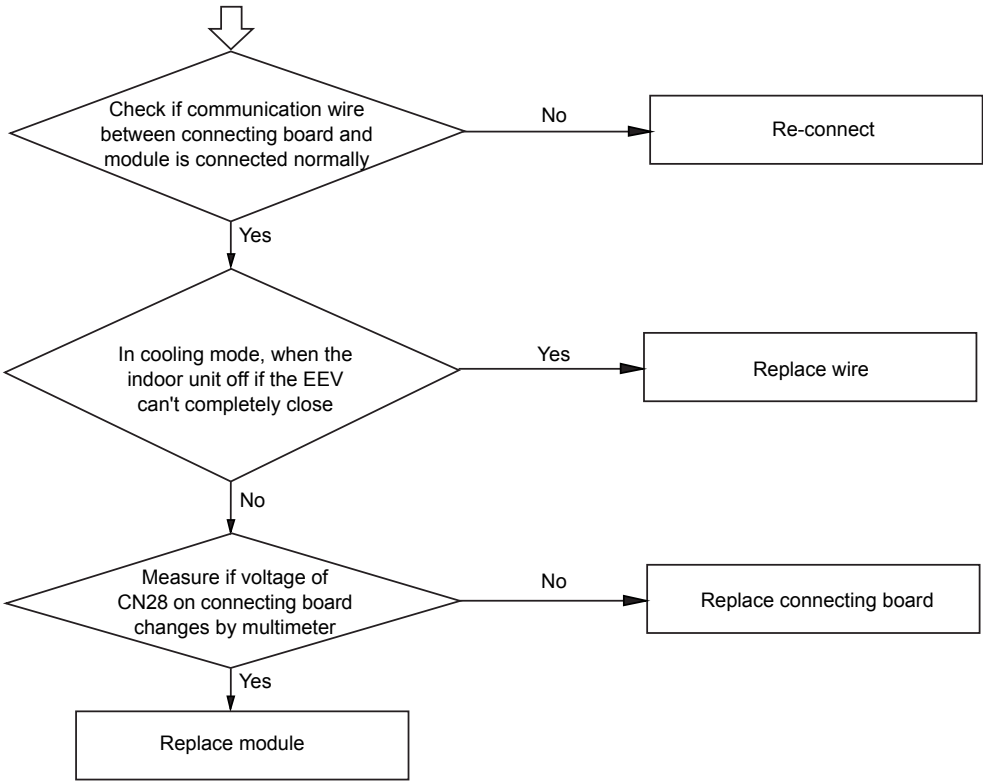
## [40] High pressure too high failure



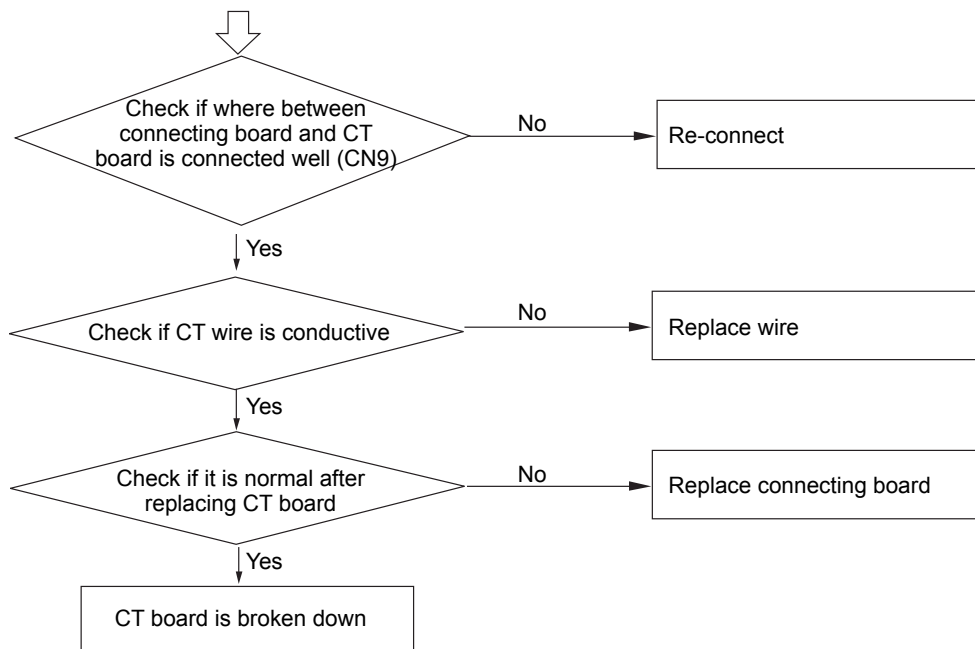
[43] Discharging temp. sensor Td too low protection



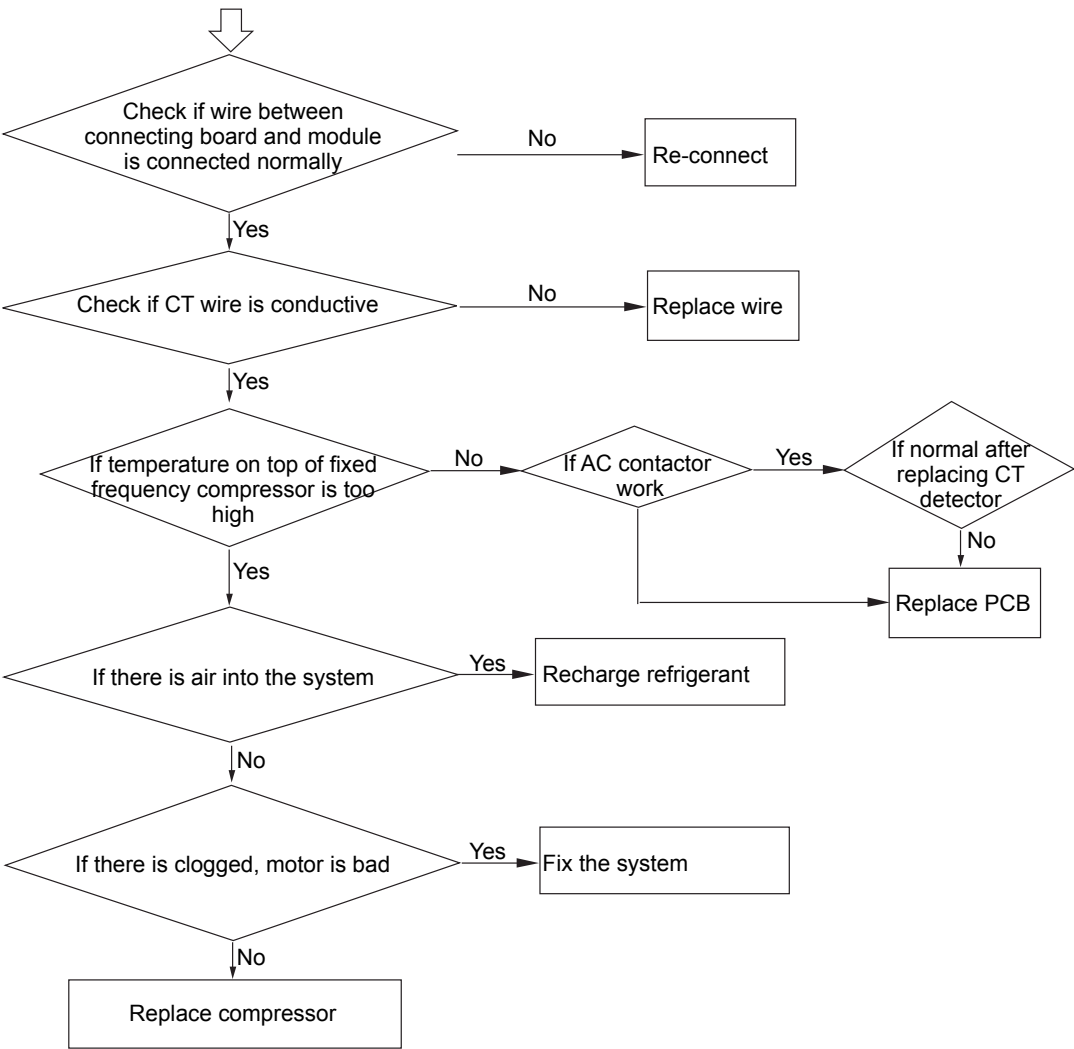
[46] Communication with inverter module failure



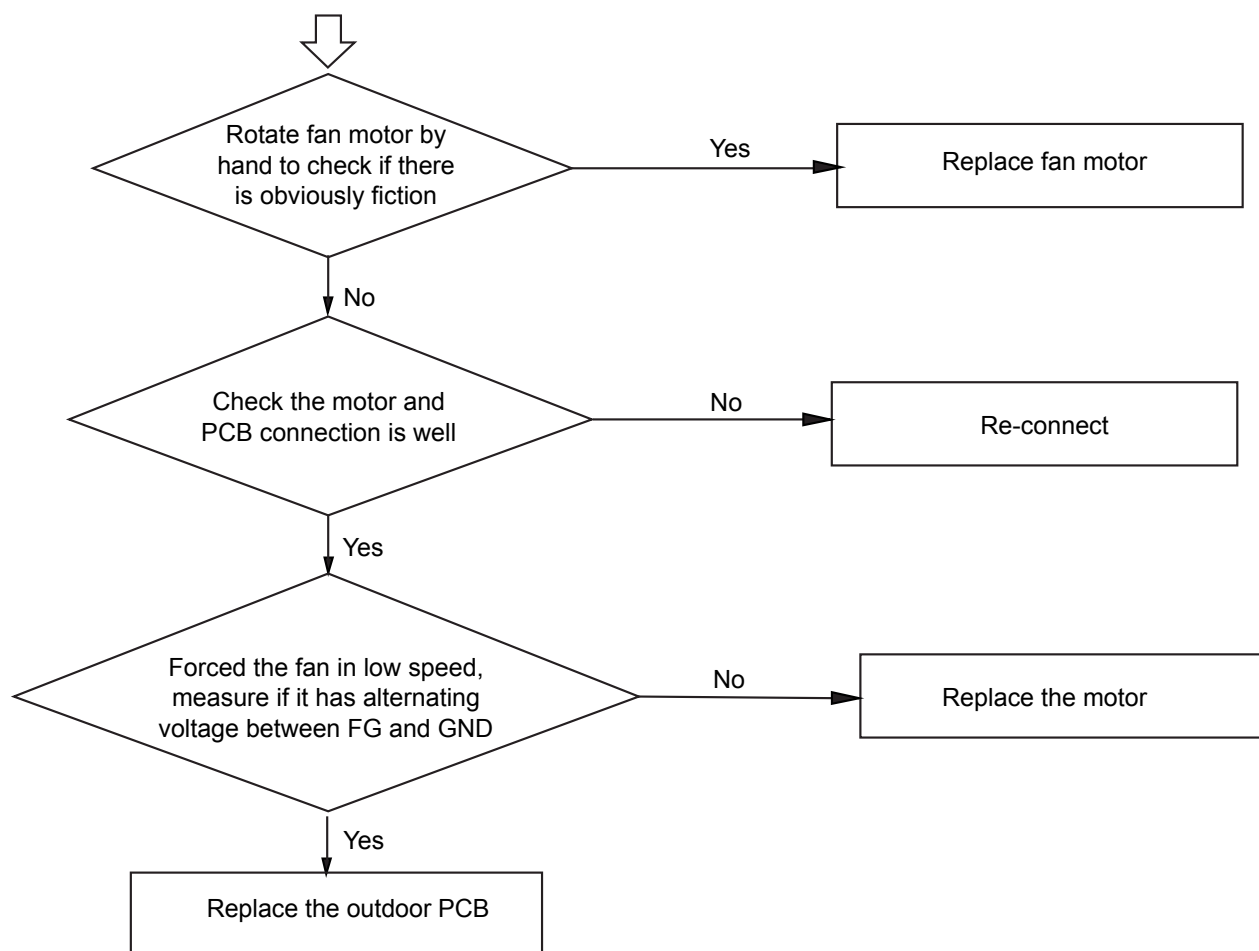
## [53] CT Current too low or current sensor failure



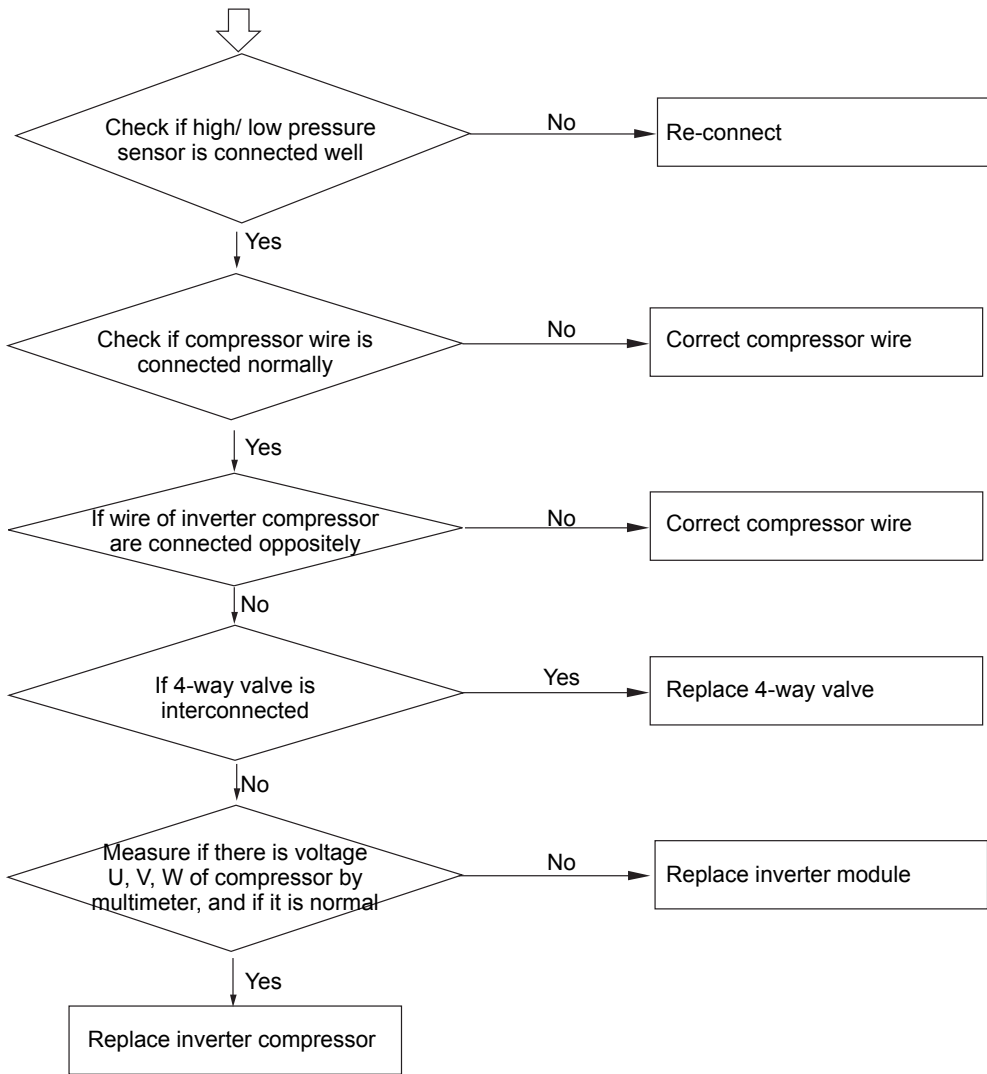
[64] CT current too high



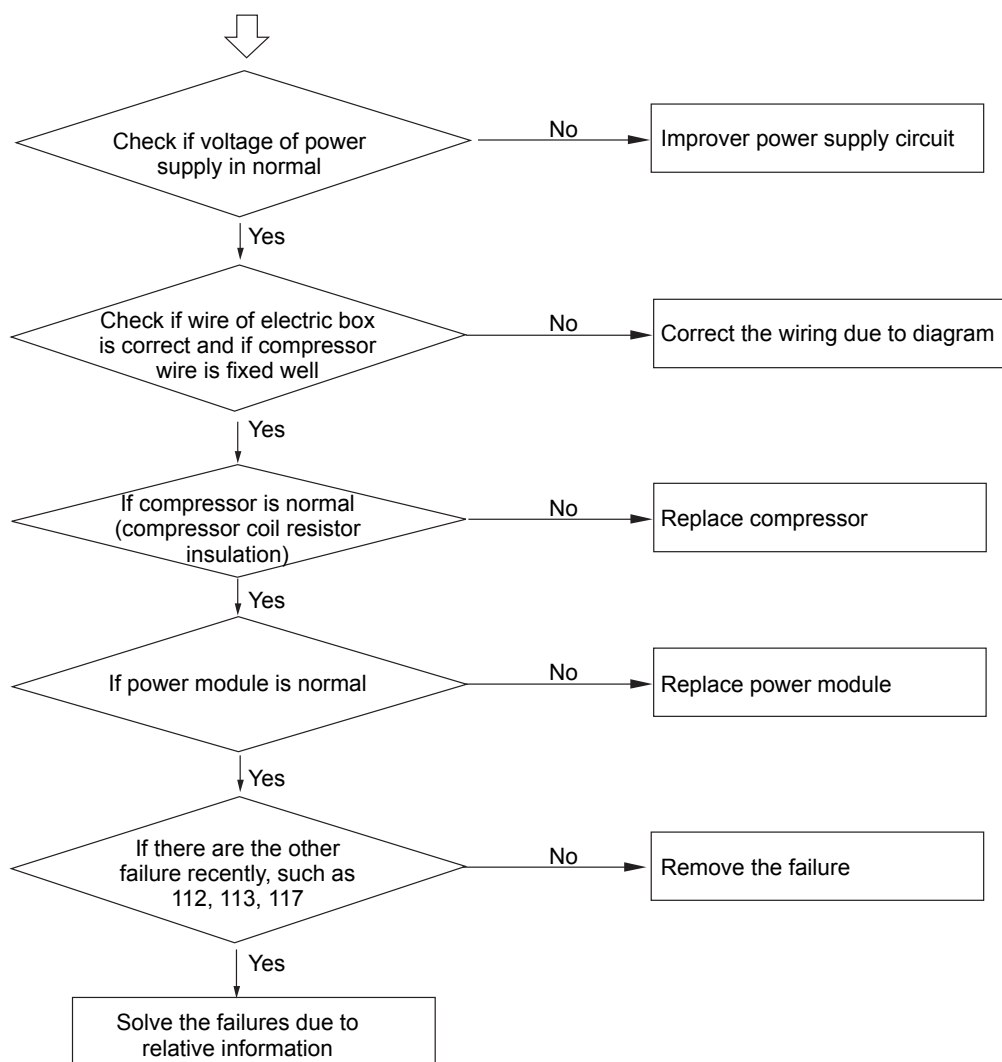
## [71-0,71-1 ] DC motor blocked



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



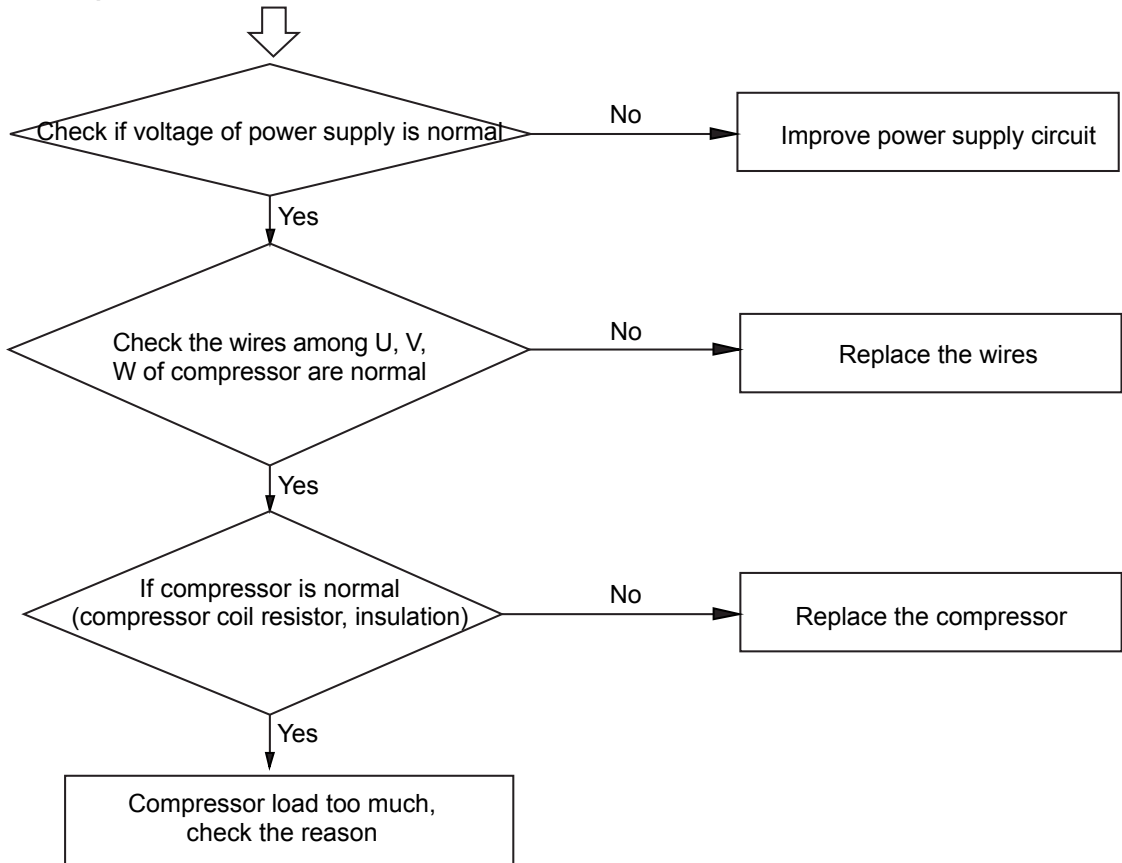
[82] Compressor current protection  
 [108] Transient over current in IPM module rectifier side software  
 [110] IPM module hardware over current  
 [123] Transient over current in IPM module rectifier side hardware



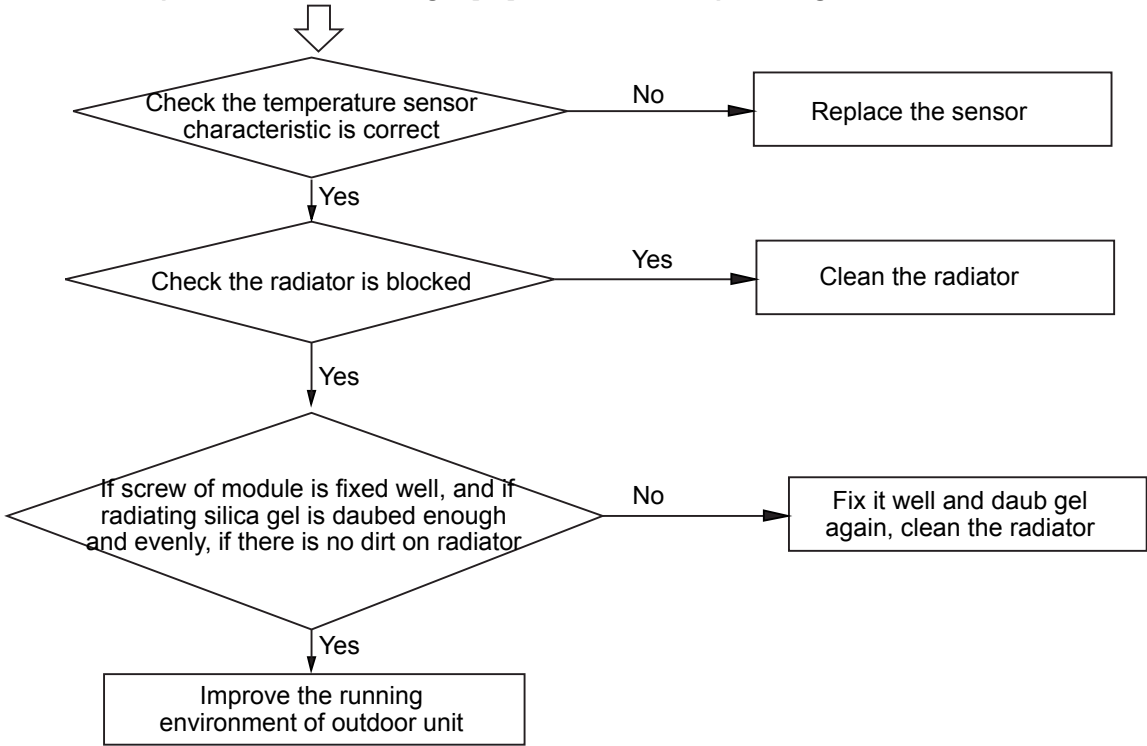


[111] Compressor out of control

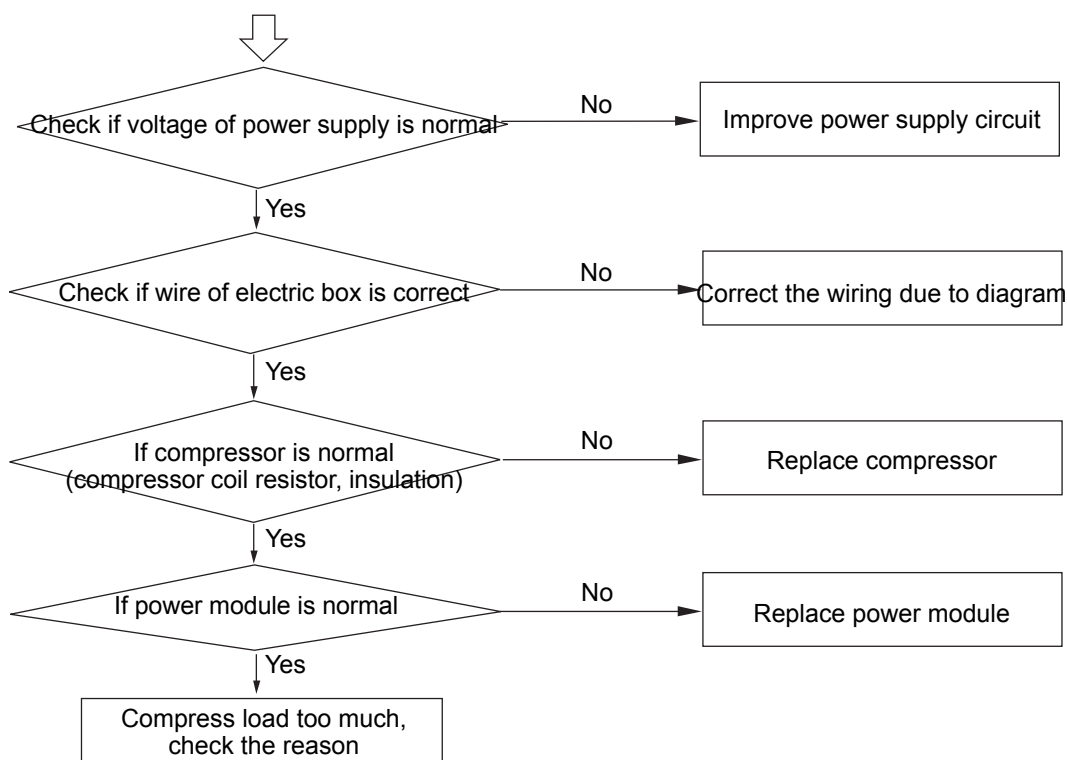
[118] the compressor start failure



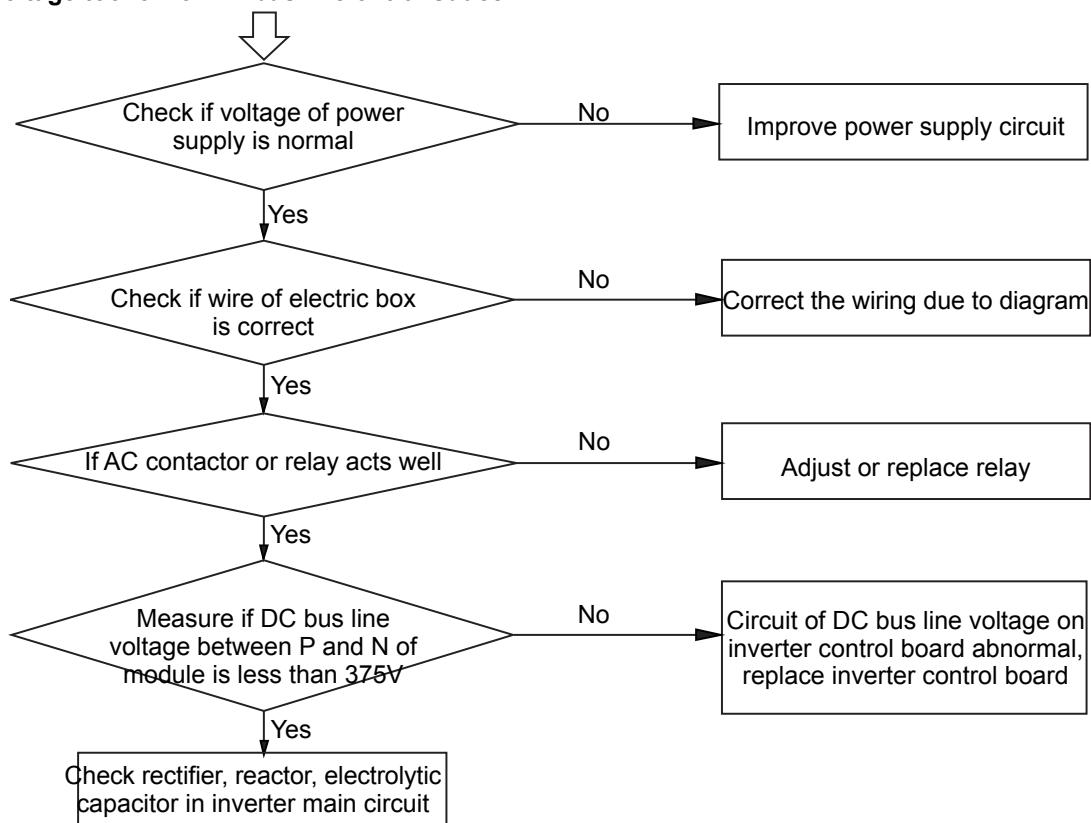
[112] Radiator temp. of transducer too high; [81] IPM module temp. too high;



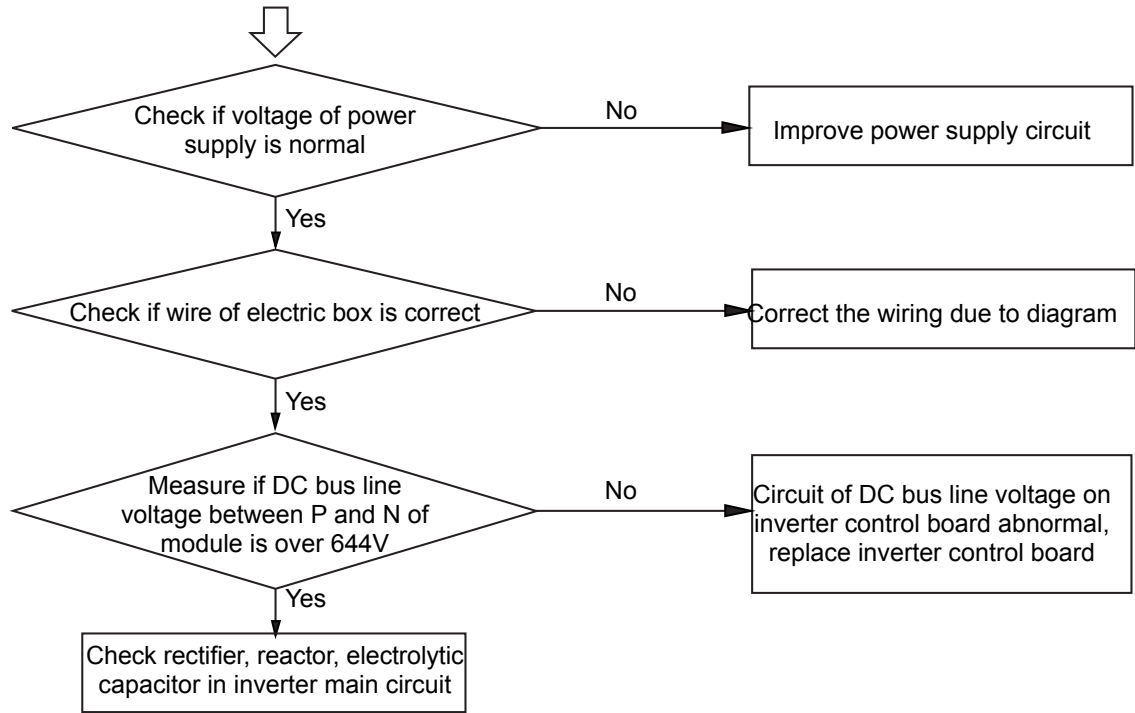
## [113] Protection of overload



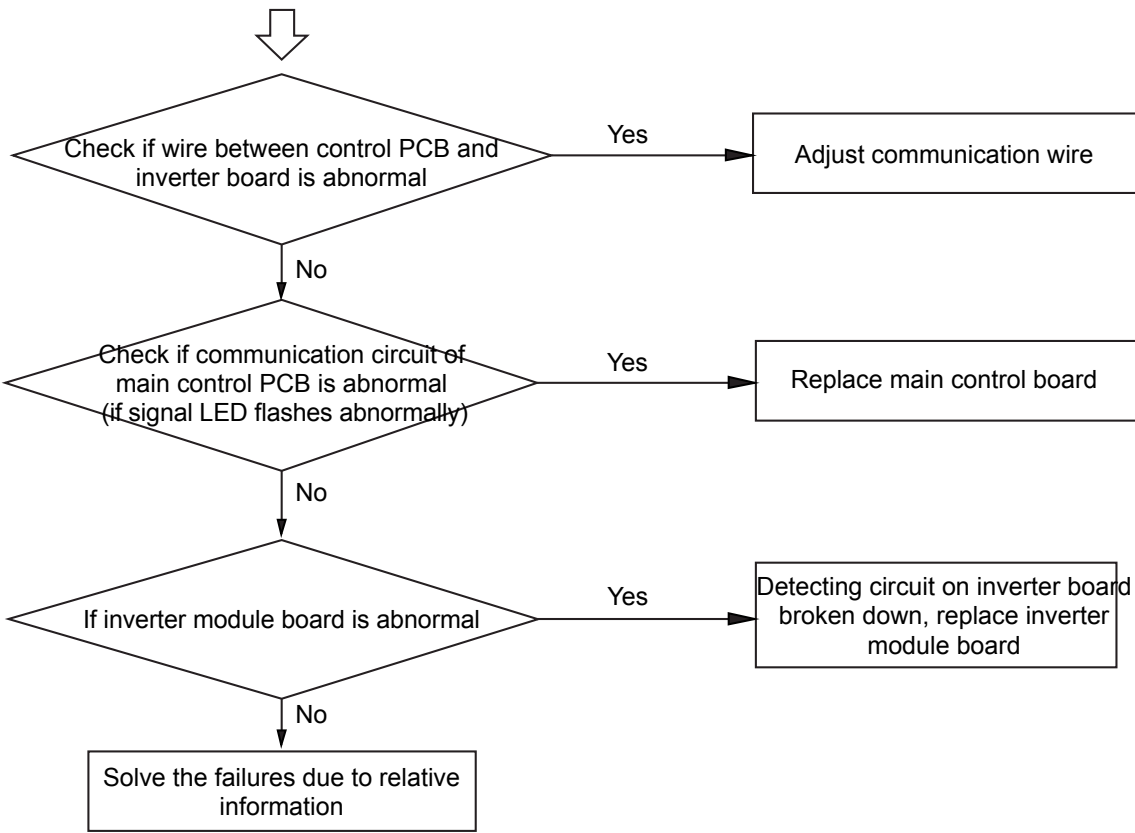
## [114] Voltage too low of DC bus line of transducer



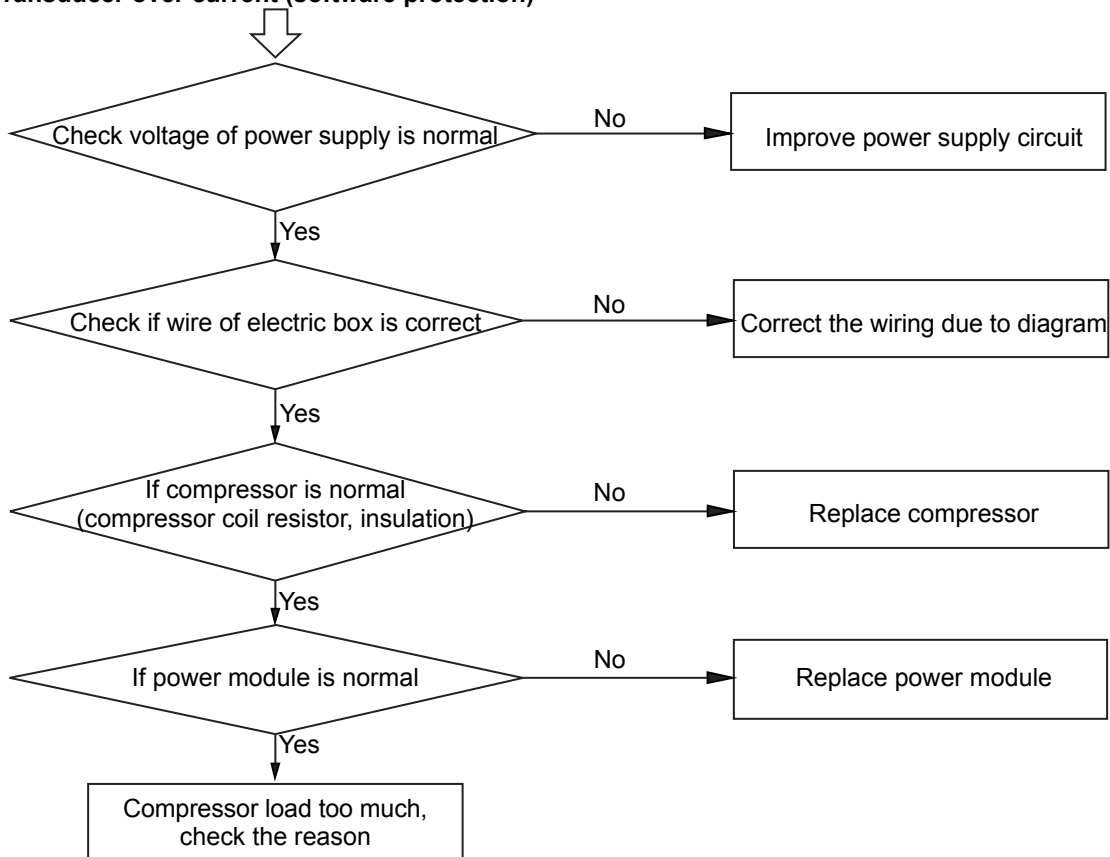
**[115] Voltage too high of DC bus line of transducer**



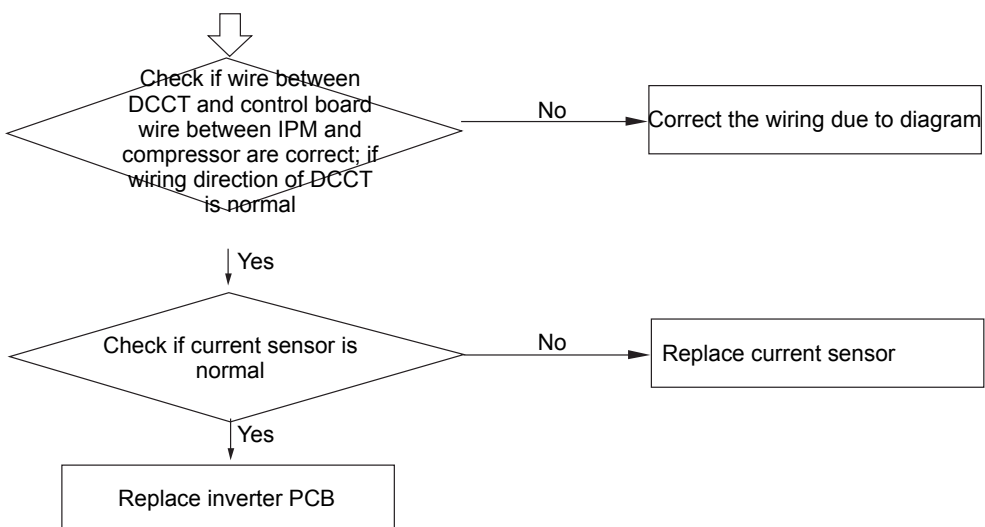
**[116] Communication abnormal between transducer (inverter module board) and control PCB**



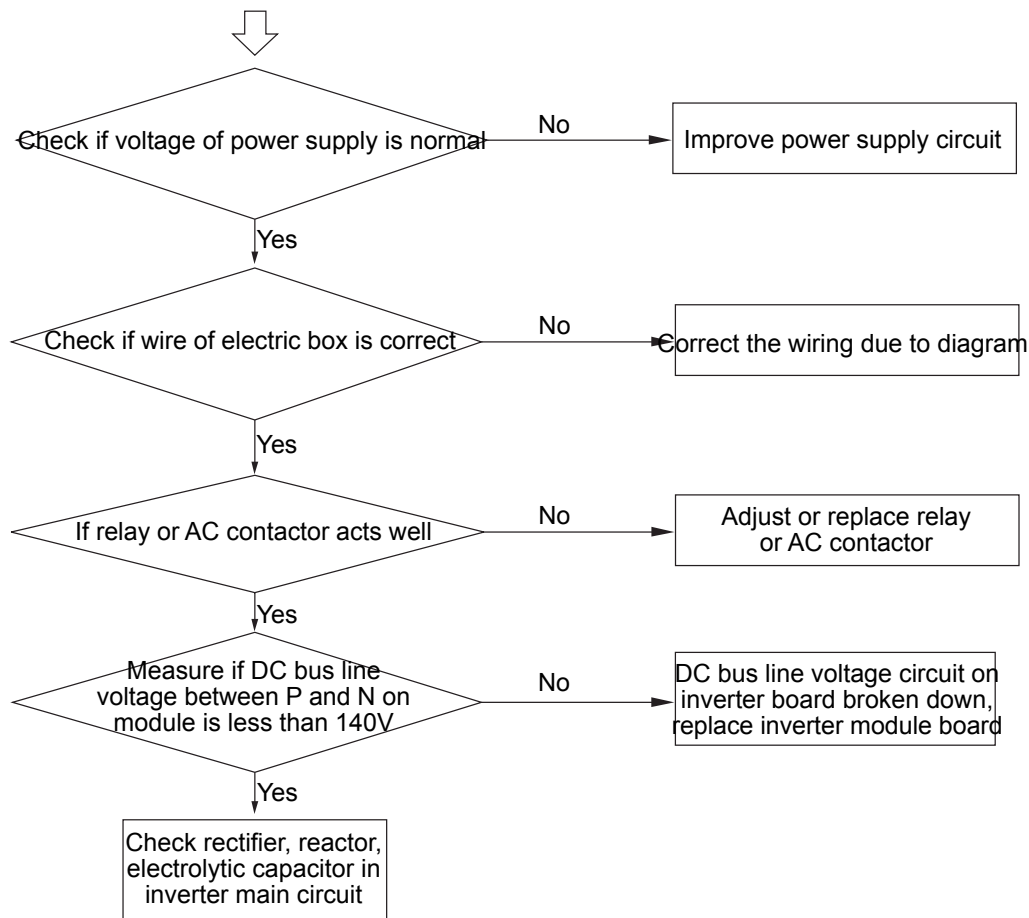
## [117] Transducer over current (software protection)



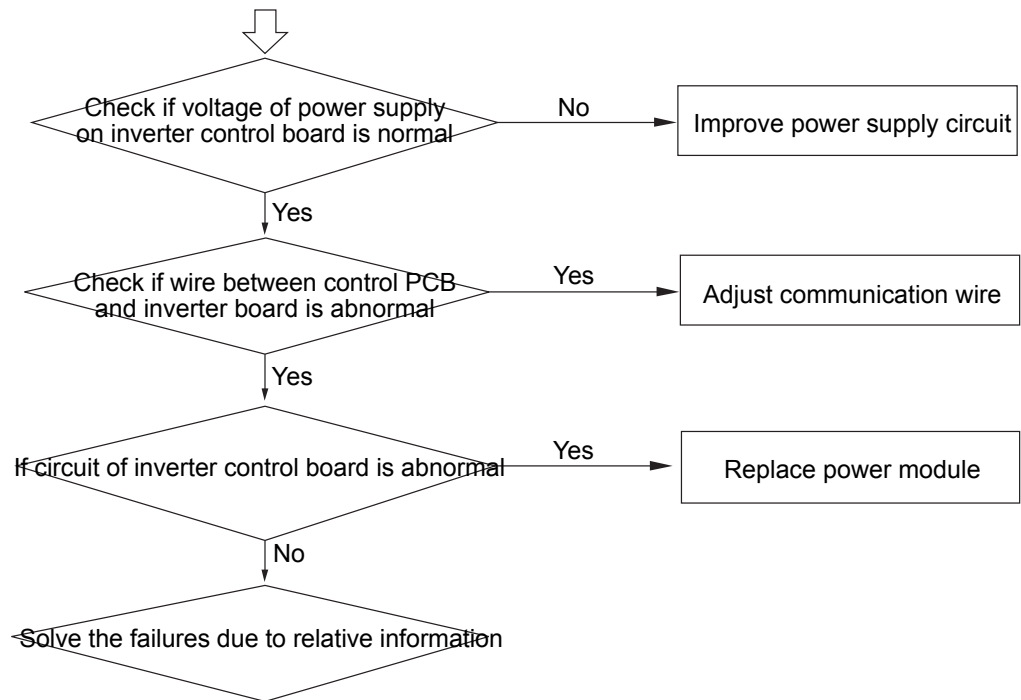
## [119] Current detection circuit of transducer is abnormal



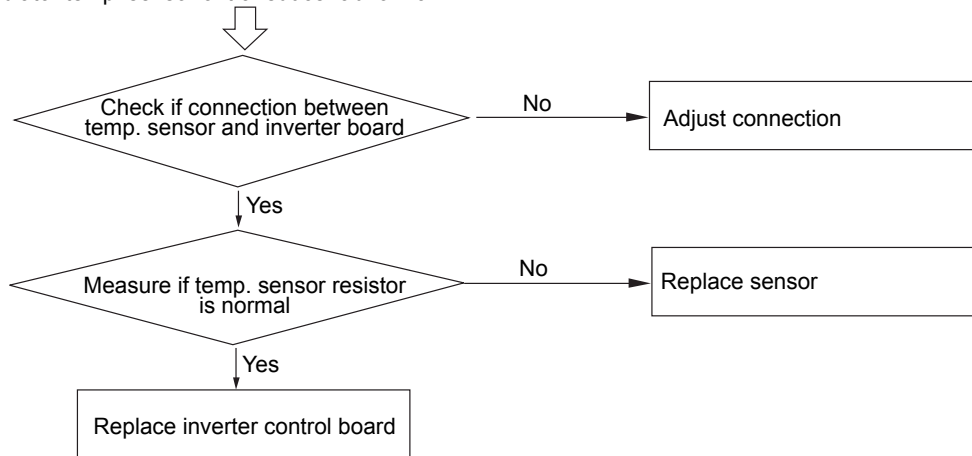
**[120] Power supply of transducer abnormal**



**[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

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

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

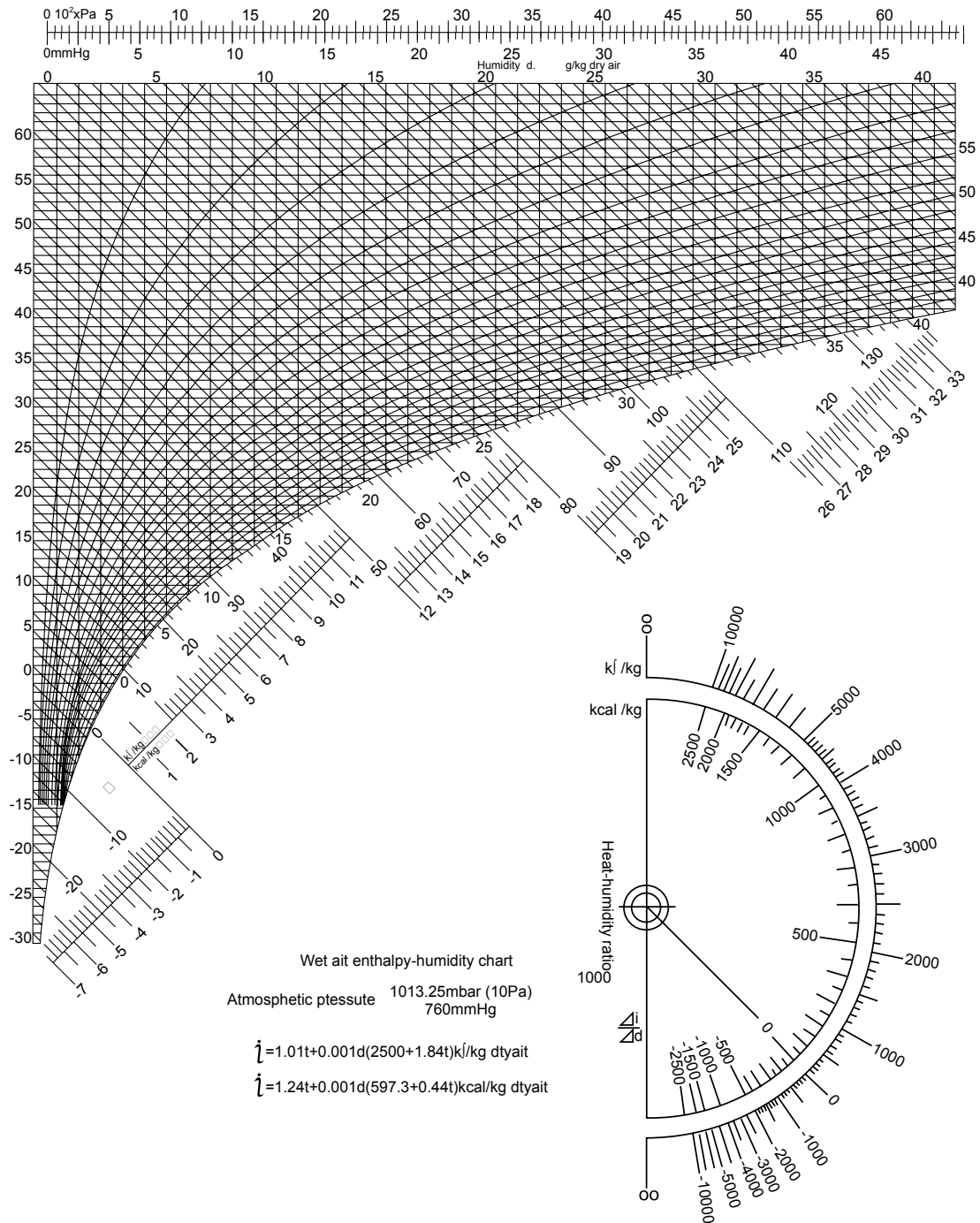
R25=10kΩ±3% B25/50=3700K±3%					
Temp	Resistance (kΩ)			% (Resist. Tol)	
(°C)	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
-30	145.82	135.02	124.22	7.00	7.00
-29	138.07	129.13	120.18	6.93	6.93
-28	131.79	123.34	114.89	6.85	6.85
-27	125.67	117.68	109.70	6.78	6.78
-26	119.71	112.18	104.65	6.71	6.71
-25	113.93	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

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

ADDRESS: No.1 Haier Road, Hi-tech Zone, Qingdao 266101 P.R.China

Web: [Http://www.haier.com](http://www.haier.com)

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