Haier

inosens

MRV SI

Service Manual

SYJS-03-2021 REV.A Edition: 2021-03

Haier

CONTENTS

1. General Information

1.1 Indoor units lineup

4-WAY CASSETTE TYPE/PB-700IB

AB052MCERA
AB072MCERA
AB092MCERA
AB122MCERA
AB162MCERA
AB182MCERA(C)

4-WAY CASSETTE TYPE/PB-950JB

AB182MCERA
AB242MCERA
AB282MCERA

AB302MCERA
AB382MCERA
AB482MCERA

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

AB072MRERA
AB092MRERA
AB122MRERA
AB162MRERA
AB182MRERA

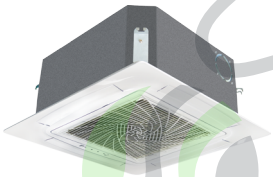
AB242MRERA
AB282MRERA

AB302MRERA
AB382MRERA

AB482MRERA
AB602MRERA

MINI 4-WAY CASSETTE TYPE/PB-620KB

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

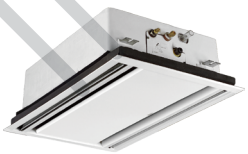


ONE WAY CASSETTE TYPE/P1B-1050IB

AB052MAERA
AB072MAERA
AB092MAERA
AB122MAERA

2-WAY CASSETTE TYPE/ P1B-1055IB

AB072MBERA
AB092MBERA
AB122MBERA
AB162MBERA
AB182MBERA



LOW ESP DUCT TYPE

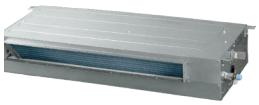
AD072MLERA
AD092MLERA
AD122MLERA

AD162MLERA
AD182MLERA
AD242MLERA

SLIM LOW ESP DUCT

AD072MSERA
AD092MSERA
AD122MSERA
AD162MSERA

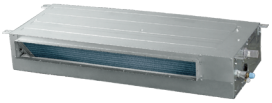
AD182MSERA
AD242MSERA



DC SLIM LOW ESP DUCT

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

AD182MSERA(D)
AD242MSERA(D)



Haier

MED ESP DUCT TYPE (80/120Pa)

AD182MZERA
AD242MZERA
AD282MZERA

AD302MNERA
AD382MNERA
AD482MNERA

MED ESP DUCT TYPE (50/96Pa)

AD182MMERA
AD242MMERA
AD282MMERA

AD302MMERA
AD382MMERA
AD482MMERA

MED ESP DUCT TYPE (50/100Pa)

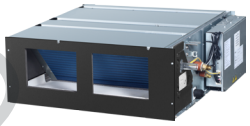
AD052MJERA
AD072MJERA
AD092MJERA
AD122MJERA
AD162MJERA

AD182MJERA
AD242MJERA
AD282MJERA

AD302MJERA
AD382MJERA
AD482MJERA

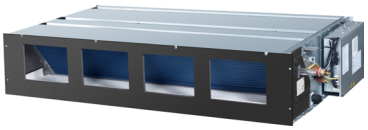
CONSTANT AIR VOLUME DUCT TYPE

AD072MQERA
AD092MQERA
AD122MQERA
AD152MQERA
AD182MQERA



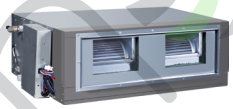
AD242MQERA
AD282MQERA
AD302MQERA

AD362MQERA
AD422MQERA
AD482MQERA
AD542MQERA



HIGH ESP DUCT TYPE

AD182MHERA
AD242MHERA
AD282MHERA



AD302MHERA
AD382MHERA
AD482MHERA

CONVERTIBLE TYPE

AC092MCERA
AC122MCERA
AC162MCERA
AC182MCERA
AC242MCERA

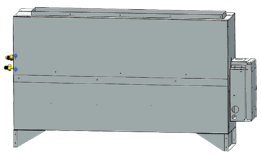
AC282MFERA
AC302MFERA
AC382MFERA
AC482MFERA

EK HIGH WALL

AS072MGERA
AS092MGERA
AS122MGERA
AS162MGERA
AS182MGERA
AS242MGERA

BUILIT-IN FLOOR STANDING

AE072MLERA
AE092MLERA
AE122MLERA
AE162MLERA
AE182MLERA
AE242MLERA



N HIGH WALL

AS052MNERA
AS072MNERA
AS092MNERA
AS122MNERA

AS162MNERA
AS182MNERA
AS242MNERA

AS282MNERA
AS302MNERA

AS052MFERA
AS072MFERA
AS092MFERA
AS122MFERA

AS162MFERA
AS182MFERA
AS242MFERA

CONSOLE

AF052MAERA
AF072MAERA
AF092MAERA
AF122MAERA
AF182MAERA

NEW CONSOLE

AF052MBERA
AF072MBERA
AF092MBERA
AF122MBERA
AF182MBERA

CONVERTIBLE TYPE(New)

AC092MDERA
AC122MDERA
AC162MDERA
AC182MDERA
AC242MDERA

AC282MDERA
AC302MDERA
AC382MDERA
AC482MDERA

2. Specification

Model			AU032FSEUA
Power supply		Ph/V/Hz	1/220~240/50/60
Cooling	Rated capacity	kW	8.00
	Rated capacity	kBtu/h	27.3
	Rated power input	kW	2.20
	Max. power input	kW	3.5
	EER		3.64
	Rated current	A	10.5
	Max. current	A	16.7
Heating	Rated capacity	kW	9.5
	Rated capacity	kBtu/h	32.4
	Rated power input	kW	2.20
	Max. power input	kW	3.40
	COP		4.32
	Rated current	A	10.5
	Max. current	A	16.3
Compressor	Brand		Mitsubishi
	Model		SNB200FKMMC-L1
	Type		Rotary
	Compressor quantity		1
	Capacity	W	6175
	Power Input	W	1960
	Rated current(RLA)	A	6.7
	Speed	rps	60
	Crankcase Heater	W	28.0
	Refrigerant oil brand		Itochu.,LTD.,Shanghai
	Refrigerant oil type		FV50S
	Refrigerant oil charge	ml	700
Outdoor fan motor	Brand		NIDEC
	Model		SIC-71FW-F190-2
	Voltage		310
	IP Class		IP44
	Type		DC
	Insulation class		E
	Safe class		I
	Power Input	W	112
	Output	W	90
	Rated current	A	0.4
	Capacitor	μF	/
	Speed	rpm	950
Outdoor fan	Brand		SHUNWEI
	Model		/
	Material		Plastic
	Type		Axial
	Diameter	mm	550
	Height	mm	155

Model			AU032FSEUA
Outdoor coil	Number of rows		1
	Tube pitch(a)x row pitch(b)	mm	21*18.186
	Fin spacing	mm	1.40
	Fin type (code)		Corrugated
	Fin Coating Type	optional	Hydrophilic aluminum
	Salt Spray Test Duration	Hour	500
	Tube outside dia.and type		Internal thread copper tube
		mm	Φ7
	Coil length x height	mm	1010*714
	Number of circuits		6
Cabinet coating	Coating type		Powder Coating
	Salt Spray Test Duration	Hour	500
	Sheet Metal Material		Hot zinc plate
	Sheet Metal Thickness	mm	0.8
Control panel enclosure IP class		standard	IP24
Outdoor air flow		m3/h	4500
Outdoor sound level(sound pressure level)		dB(A)	50
Outdoor sound level(sound power level)		dB(A)	61
Outdoor unit	Dimension(W*H*D)	mm	920×756×372
	Packing (W*H*D)	mm	1036×820×478
	Net weight	kg	61
	Gross weight	kg	67
Refrigerant	Type		R410A
	Charged volume	kg	2.1
Throttle type			EEV
Design pressure		MPa	4.15
Refrigerant piping	Liquid pipe	mm	Φ9.52
	Gas pipe	mm	Φ15.88
	Total pipe lenth	m	120
	Max. pipe length(Equivalent/ Actual)	m	70
	Max.Diff. indoor/outdoor unit	m	"30 20"
	Max.Diff. indoor/indoor unit	m	10
Connectable indoor unit ratio		%	50-130
Maximum indoor units		Piece	4
Connection wiring	Power wiring	mm^2	4
	Signal wiring	mm^2	shield wire：(0.75-2）*2
Operation Range		°C	Cooling: -5~50 Heating: -20~27

Nominal condition:
Indoor temperature (cooling): 27 DB(°C)/19 WB(°C), indoor temperature (heating): 20 DB(°C)/14.5 WB(°C).
Outdoor temperature (cooling): 35 DB(°C)/24 WB(°C), outdoor temperature (heating): 7 DB(°C)/6 WB(°C).
The data is measured with 7.5m equivalent pipe and 0m 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			AU052FPEUA
Power supply		Ph/V/Hz	1/220~240/50/60
Cooling	Rated capacity	kW	14.00
	Rated capacity	kBtu/h	47.8
	Rated power input	kW	3.70
	Max. power input	kW	6.1
	EER		3.78
	Rated current	A	17.7
	Max. current	A	29.2
Heating	Rated capacity	kW	16
	Rated capacity	kBtu/h	54.6
	Rated power input	kW	3.73
	Max. power input	kW	5.90
	COP		4.29
	Rated current	A	17.8
	Max. current	A	28.2
Compressor	Brand		Mitsubishi
	Model		MNB40FMLMC-L
	Type		Rotary
	Compressor quantity		1
	Capacity	W	12900
	Power Input	W	4020
	Rated current(RLA)	A	15.0
	Speed	rps	60
	Crankcase Heater	W	28.0
	Refrigerant oil brand		Itochu.,LTD.,Shanghai
	Refrigerant oil type		FV50S
	Refrigerant oil charge	ml	1100
Outdoor fan motor	Brand		BROAD OCEAN
	Model		ZWK511C51505
	Voltage		310
	IP Class		IP44
	Type		DC
	Insulation class		E
	Safe class		I
	Power Input	W	200
	Output	W	160
	Rated current	A	0.72
	Capacitor	μF	/
	Speed	rpm	900
Outdoor fan	Brand		SHUNWEI
	Model		/
	Material		Plastic
	Type		Axial x2
	Diameter	mm	550
	Height	mm	200

Model			AU052FPEUA
Outdoor coil	Number of rows		2
	Tube pitch(a)x row pitch(b)	mm	21*18.186
	Fin spacing	mm	1.40
	Fin type (code)		Corrugated
	Fin Coating Type	optional	Hydrophilic aluminum
	Salt Spray Test Duration	Hour	500
	Tube outside dia.and type		Internal thread copper tube
		mm	Φ7
	Coil length x height	mm	1005*1302
	Number of circuits		7
Cabinet coating	Coating type		Powder Coating
	Salt Spray Test Duration	Hour	500
	Sheet Metal Material		Hot zinc plate
	Sheet Metal Thickness	mm	0.8
Control panel enclosure IP class		standard	IP24
Outdoor air flow		m3/h	7200
Outdoor sound level(sound pressure level)		dB(A)	52
Outdoor sound level(sound power level)		dB(A)	63
Outdoor unit	Dimension(W*H*D)	mm	920×756×372
	Packing (W*H*D)	mm	1036×820×478
	Net weight	kg	108
	Gross weight	kg	123
Refrigerant	Type		R410A
	Charged volume	kg	4
Throttle type			EEV
Design pressure		MPa	4.15
Refrigerant piping	Liquid pipe	mm	Φ9.52
	Gas pipe	mm	Φ19.05
	Total pipe lenth	m	150
	Max. pipe length(Equivalent/ Actual)	m	70
	Max.Diff. indoor/outdoor unit	m	"30 20"
	Max.Diff. indoor/indoor unit	m	10
Connectable indoor unit ratio		%	50-130
Maximum indoor units		Piece	8
Connection wiring	Power wiring	mm^2	10
	Signal wiring	mm^2	shield wire：(0.75-2）*2
Operation Range		°C	Cooling: -5~50 Heating: -20~27

Nominal condition:
Indoor temperature (cooling): 27 DB(°C)/19 WB(°C), indoor temperature (heating): 20 DB(°C)/14.5 WB(°C).
Outdoor temperature (cooling): 35 DB(°C)/24 WB(°C), outdoor temperature (heating): 7 DB(°C)/6 WB(°C).
The data is measured with 7.5m equivalent pipe and 0m 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.

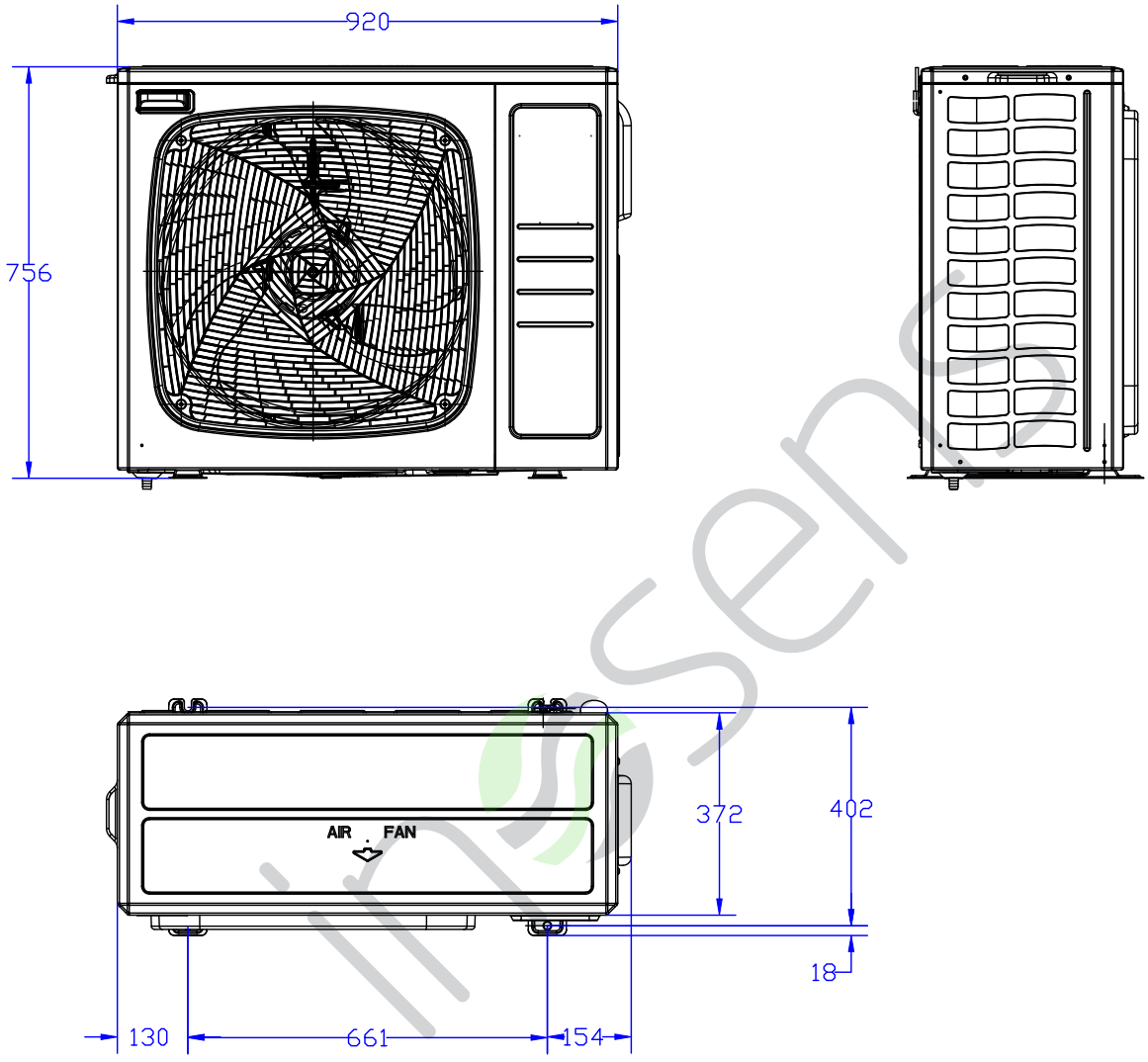
Model			AU072FPEUA
Power supply		Ph/V/Hz	1/220~240/50/60
Cooling	Rated capacity	kW	18.00
	Rated capacity	kBtu/h	61.4
	Rated power input	kW	4.75
	Max. power input	kW	7.8
	EER		3.79
	Rated current	A	22.7
	Max. current	A	37.3
Heating	Rated capacity	kW	20.0
	Rated capacity	kBtu/h	68.2
	Rated power input	kW	4.56
	Max. power input	kW	7.60
	COP		4.39
	Rated current	A	21.8
	Max. current	A	36.4
Compressor	Brand		Mitsubishi
	Model		MNB40FMLMC-L
	Type		Rotary
	Compressor quantity		1
	Capacity	W	12900
	Power Input	W	4020
	Rated current(RLA)	A	15.0
	Speed	rps	60
	Crankcase Heater	W	28.0
	Refrigerant oil brand		Itochu.,LTD.,Shanghai
	Refrigerant oil type		FV50S
	Refrigerant oil charge	ml	1100
Outdoor fan motor	Brand		BROAD OCEAN
	Model		ZWK511C51505
	Voltage		310
	IP Class		IP44
	Type		DC
	Insulation class		E
	Safe class		I
	Power Input	W	200
	Output	W	160
	Rated current	A	0.72
	Capacitor	μF	/
	Speed	rpm	900
Outdoor fan	Brand		SHUNWEI
	Model		/
	Material		Plastic
	Type		Axial x2
	Diameter	mm	550
	Height	mm	200

Model			AU072FPEUA
Outdoor coil	Number of rows		2
	Tube pitch(a)x row pitch(b)	mm	21*18.186
	Fin spacing	mm	1.40
	Fin type (code)		Corrugated
	Fin Coating Type	optional	Hydrophilic aluminum
	Salt Spray Test Duration	Hour	500
	Tube outside dia.and type		Internal thread copper tube
		mm	Φ7
	Coil length x height	mm	1005*1302
	Number of circuits		7
Cabinet coating	Coating type		Powder Coating
	Salt Spray Test Duration	Hour	500
	Sheet Metal Material		Hot zinc plate
	Sheet Metal Thickness	mm	0.8
Control panel enclosure IP class		standard	IP24
Outdoor air flow		m3/h	7200
Outdoor sound level(sound pressure level)		dB(A)	54
Outdoor sound level(sound power level)		dB(A)	65
Outdoor unit	Dimension(W*H*D)	mm	920×756×372
	Packing (W*H*D)	mm	1036×820×478
	Net weight	kg	108
	Gross weight	kg	123
Refrigerant	Type		R410A
	Charged volume	kg	4
Throttle type			EEV
Design pressure		MPa	4.15
Refrigerant piping	Liquid pipe	mm	Φ9.52
	Gas pipe	mm	Φ19.05
	Total pipe lenth	m	150
	Max. pipe length(Equivalent/ Actual)	m	70
	Max.Diff. indoor/outdoor unit	m	"30 20"
	Max.Diff. indoor/indoor unit	m	10
Connectable indoor unit ratio		%	50-130
Maximum indoor units		Piece	9
Connection wiring	Power wiring	mm^2	10
	Signal wiring	mm^2	shield wire：(0.75-2）*2
Operation Range		°C	Cooling: -5~50 Heating: -20~27

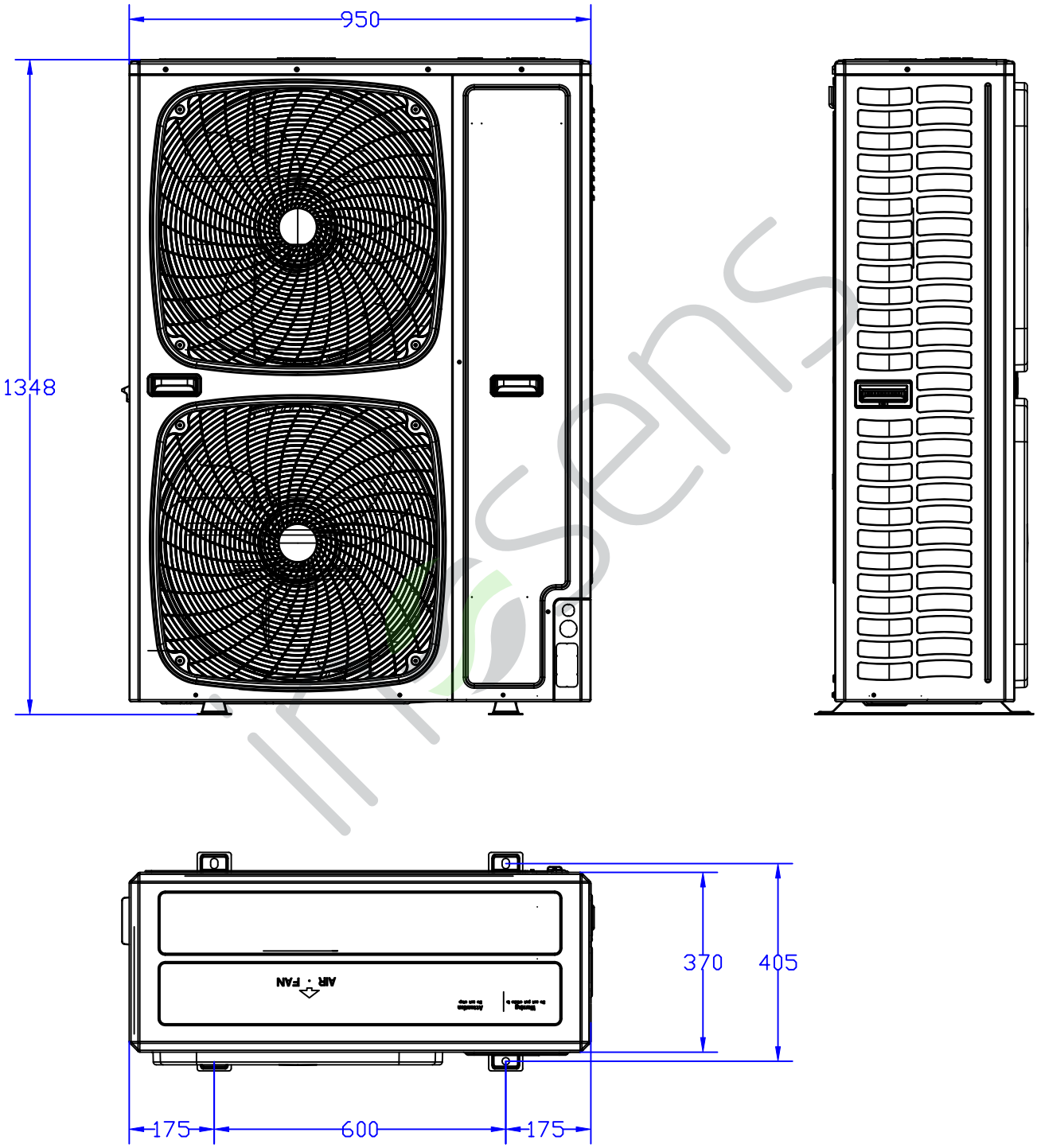
Nominal condition:
Indoor temperature (cooling): 27 DB(°C)/19 WB(°C), indoor temperature (heating): 20 DB(°C)/14.5 WB(°C).
Outdoor temperature (cooling): 35 DB(°C)/24 WB(°C), outdoor temperature (heating): 7 DB(°C)/6 WB(°C).
The data is measured with 7.5m equivalent pipe and 0m height difference.
The 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

AU032FSEUA

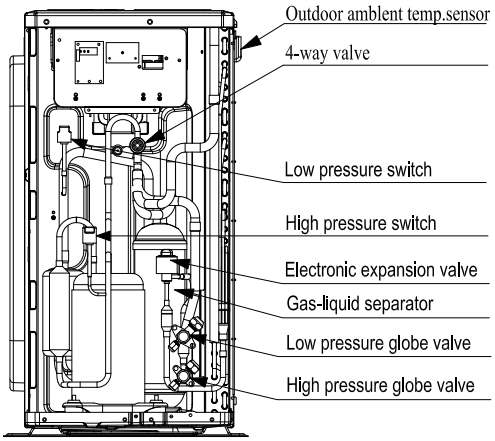


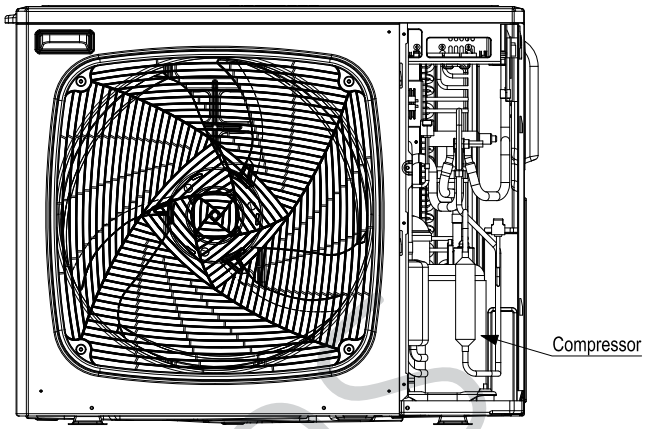
AU052FPEUA AU072FPEUA

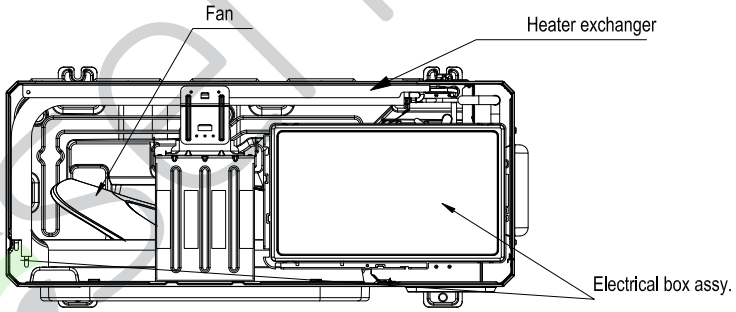


4. Function Parts layout

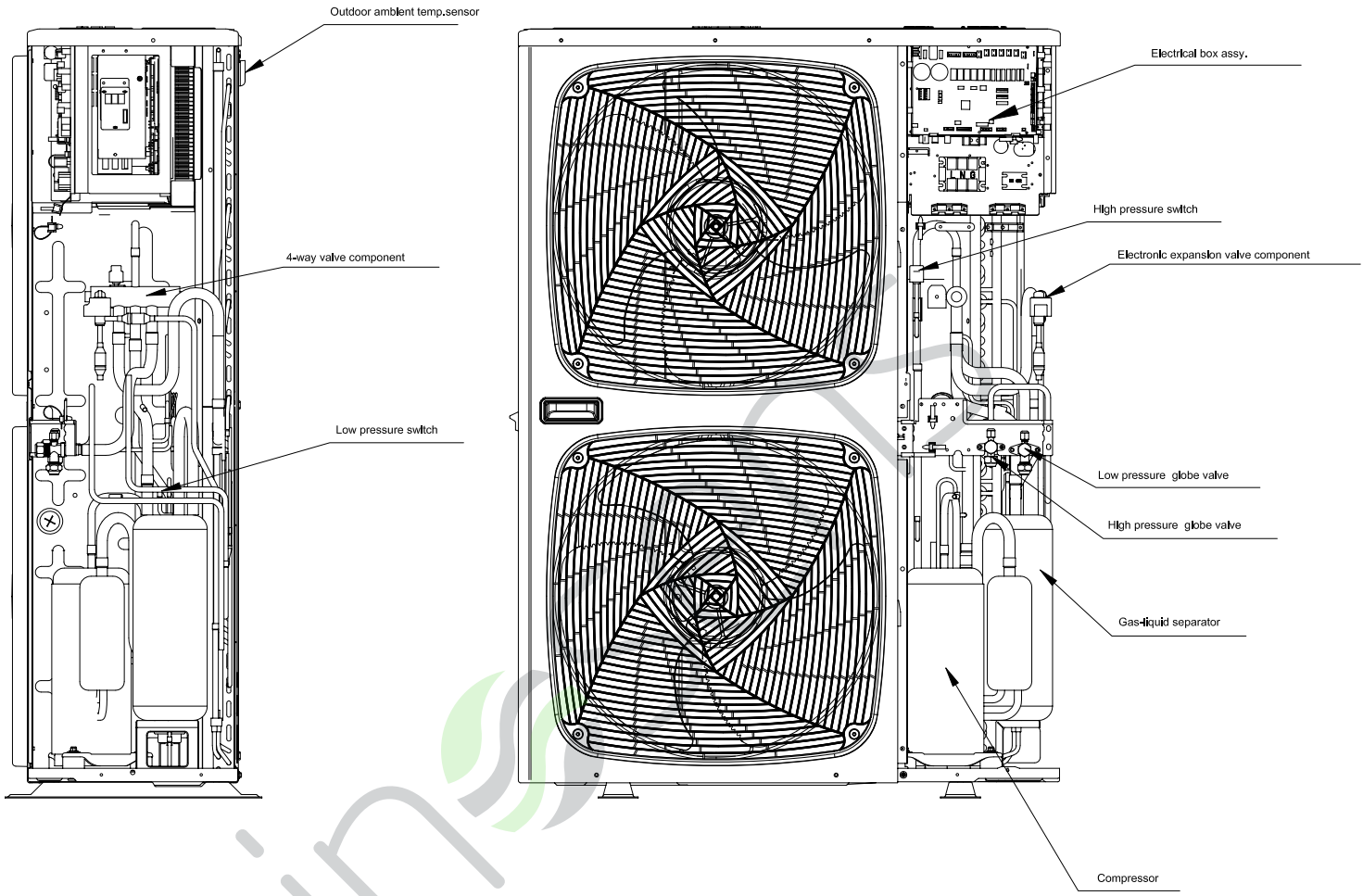
AU032FSEUA

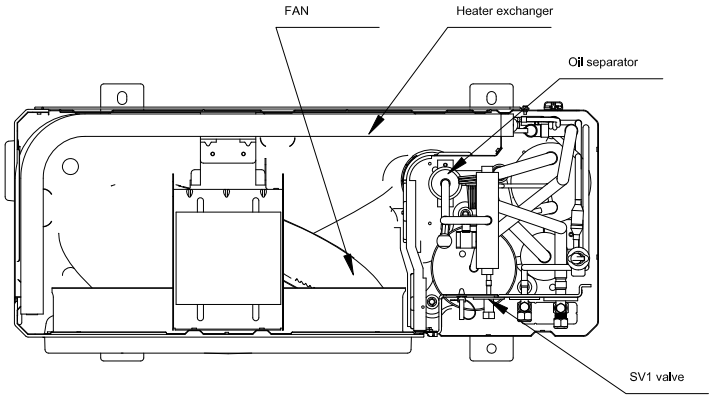






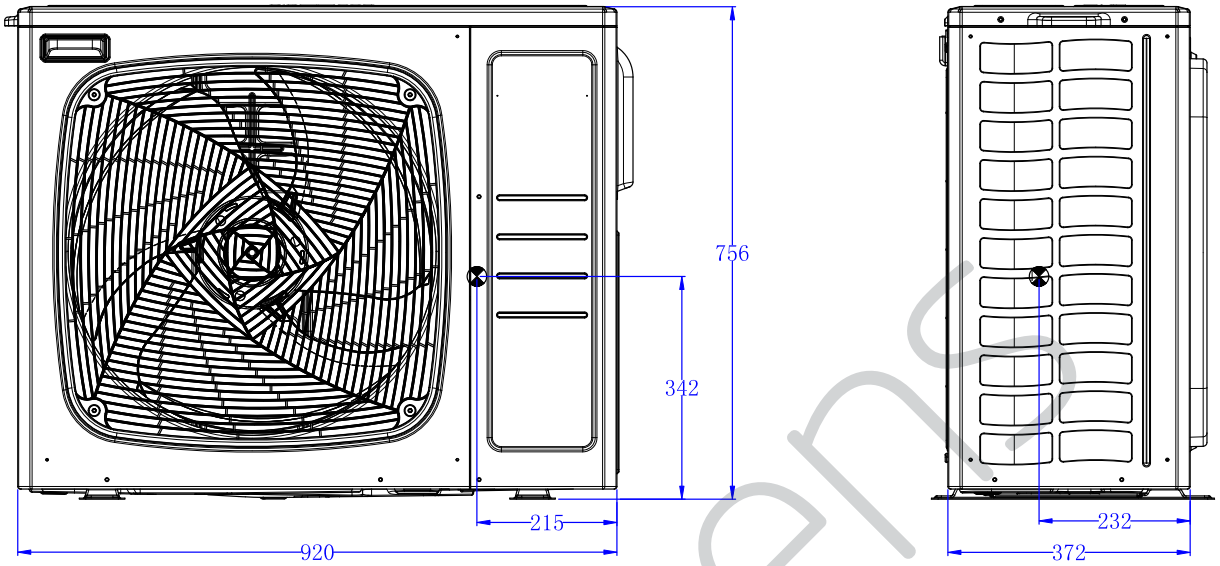
AU052FPEUA AU072FPEUA



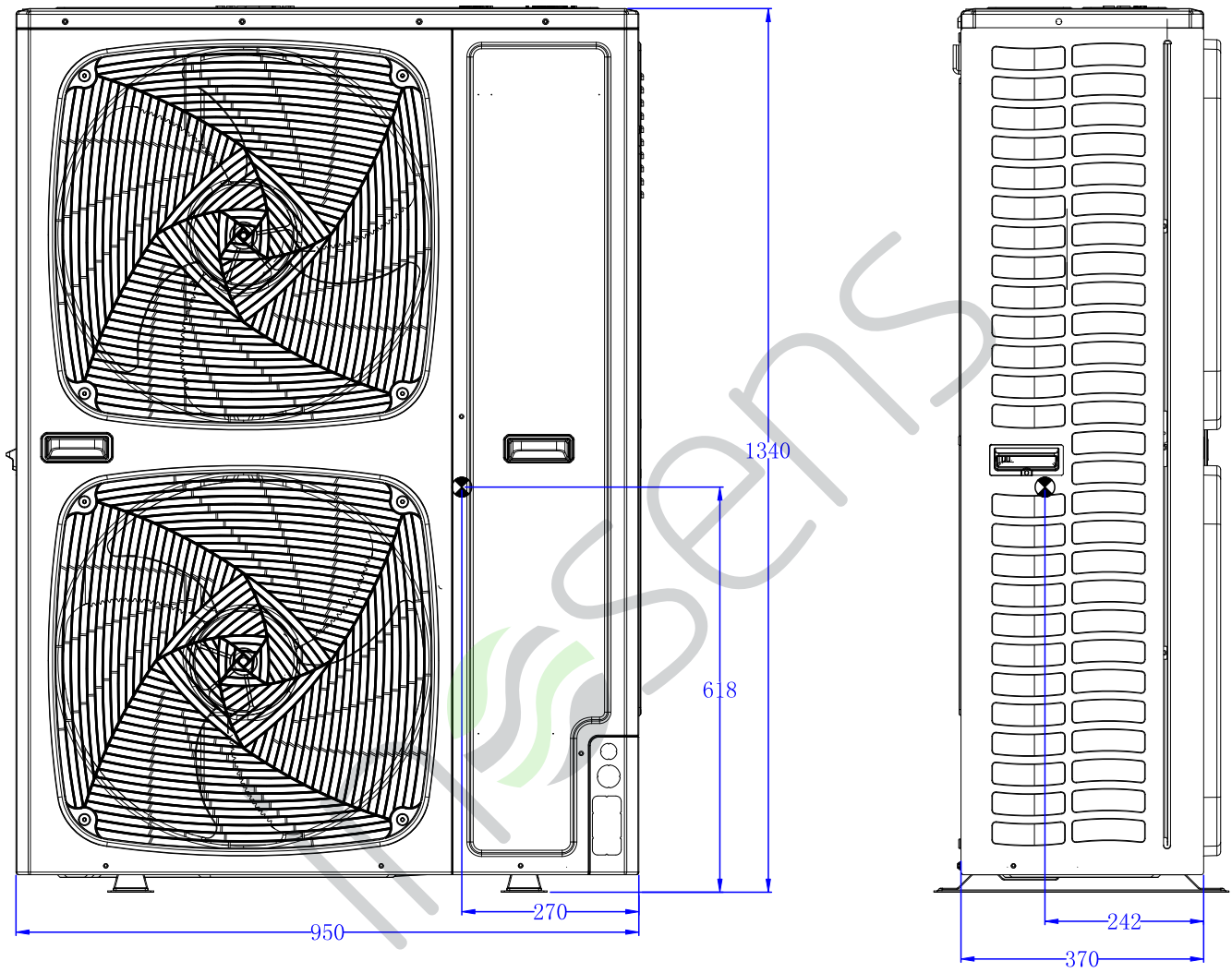


5. Center of gravity

AU032FSEUA

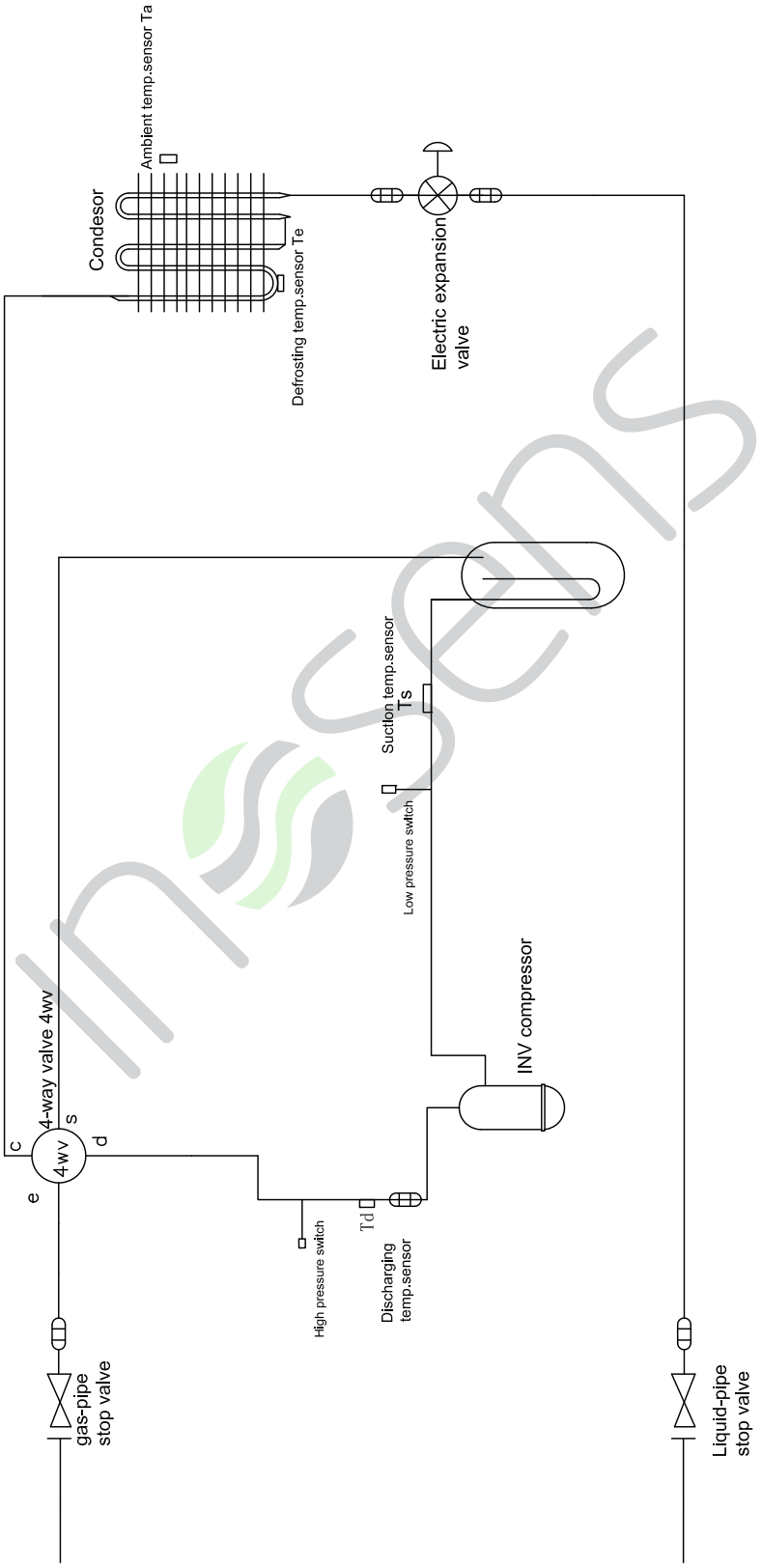


AU052FPEUA AU072FPEUA

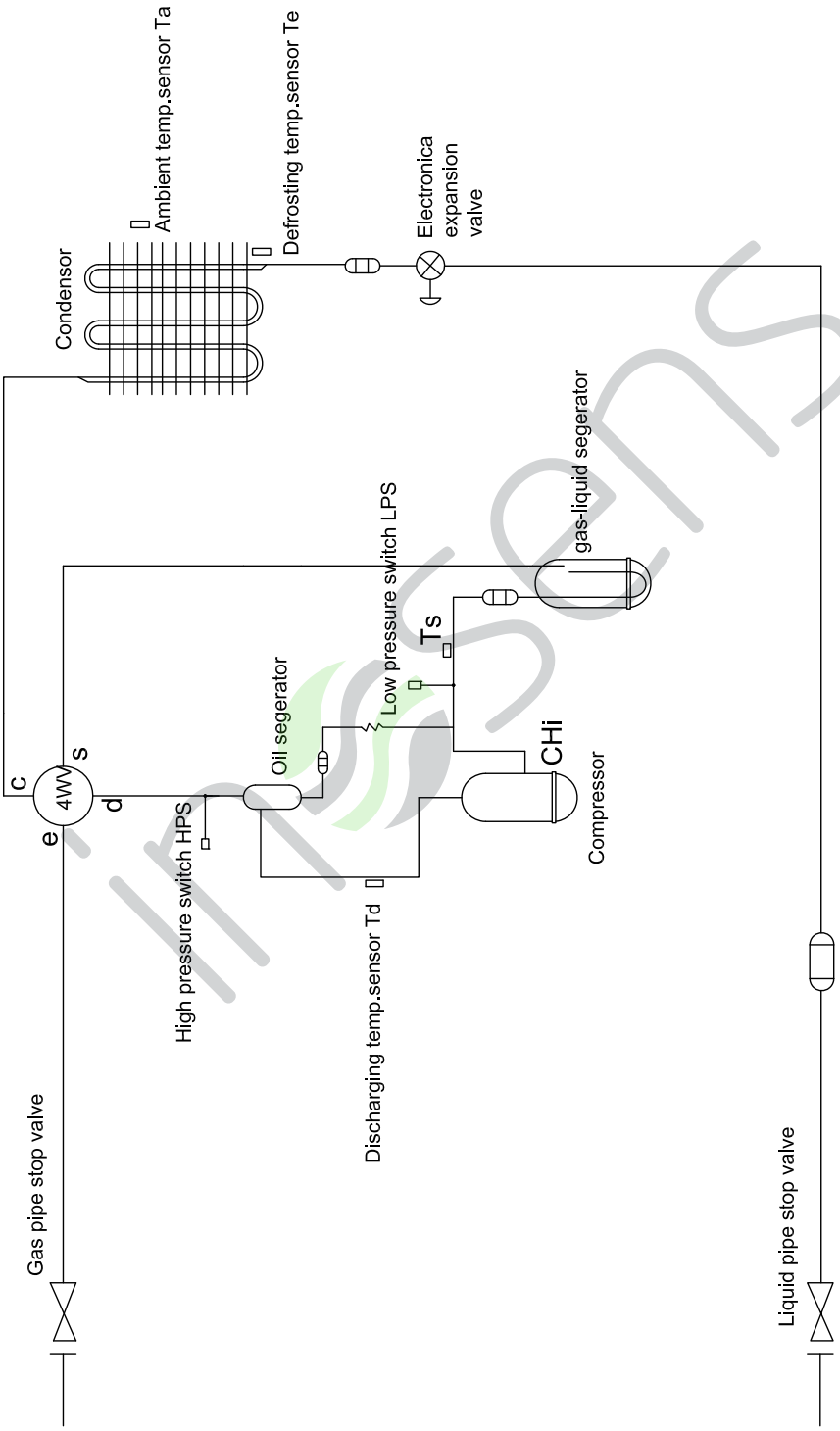


6. Refrigerant Circuit

AU032FSEUA



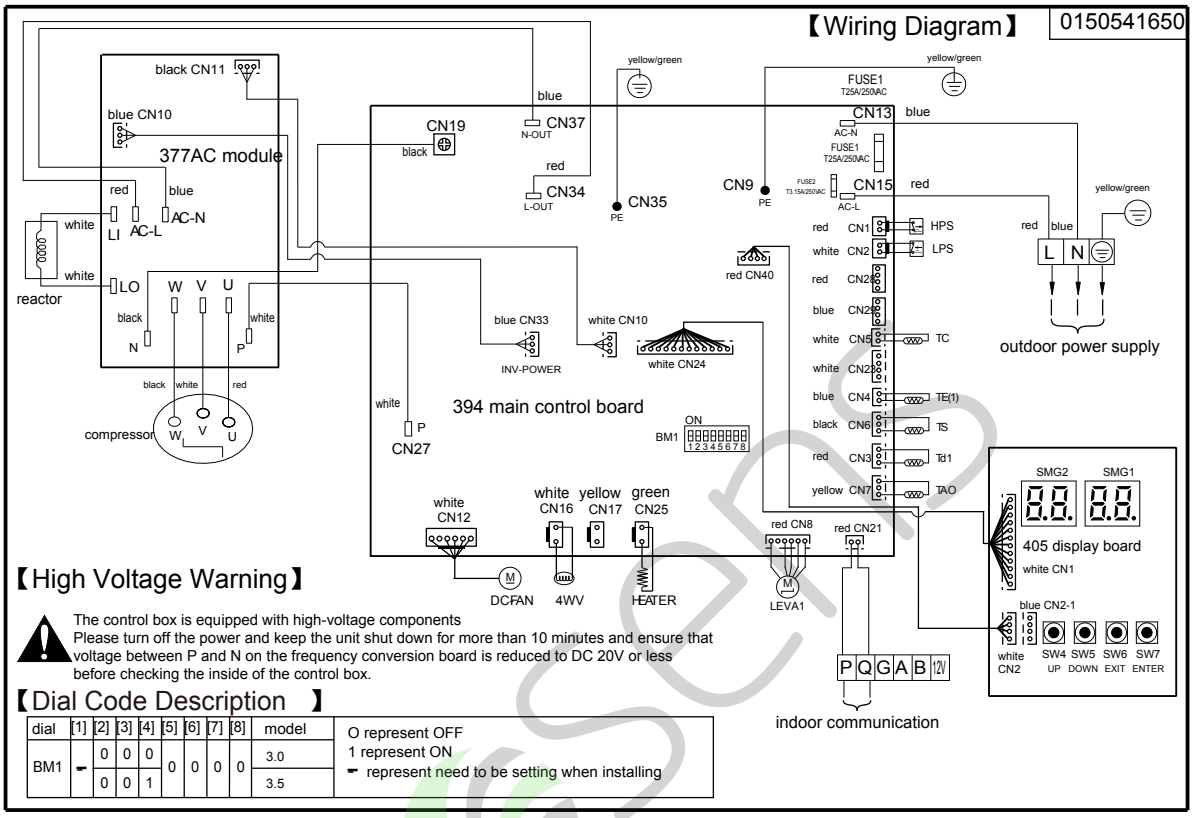
AU052FPEUA AU072FPEUA



Part name	Sign	Function	Date	Note
Compressor	/	Capacity control, meet indoor load request by adjusting frequency and opening and closing fixing frequency compressor.		20°C
Pressure switch	HPS	High pressure protection	4.15Mpa, OFF	
	LPS	In cooling, compressor frequency adjustment and protection control for abnormal pressure.	0~1.7MPa	
Electronic expansion valve	EEV	In heating, refrigerant flow control (subcooling valve)	Φ3.0	
Solenoid valve	SV1	1. Keep balance of high/low pressure when compressor starts up and stops 2. High/low pressure protection	AC220V Open when power is on, close when power is off.	2A
4-way valve	4WV	Changing over between cooling and heating	AC220V electrified in heating; powered off in cooling or defrosting.	
Temp. sensor	Td	Detect the top temp. of compressor	R(80°C)=50K B(25/80°C)=4450K	
	Ts	Detect the top suction of compressor	R(80°C)=10K B(25/80°C)=3700K	
	Tao	Detect ambient temp., set primary fan speed and control defrost condition		
	Tdef	Detect frost condition of outdoor heat exchanger		

7. Wiring Diagram

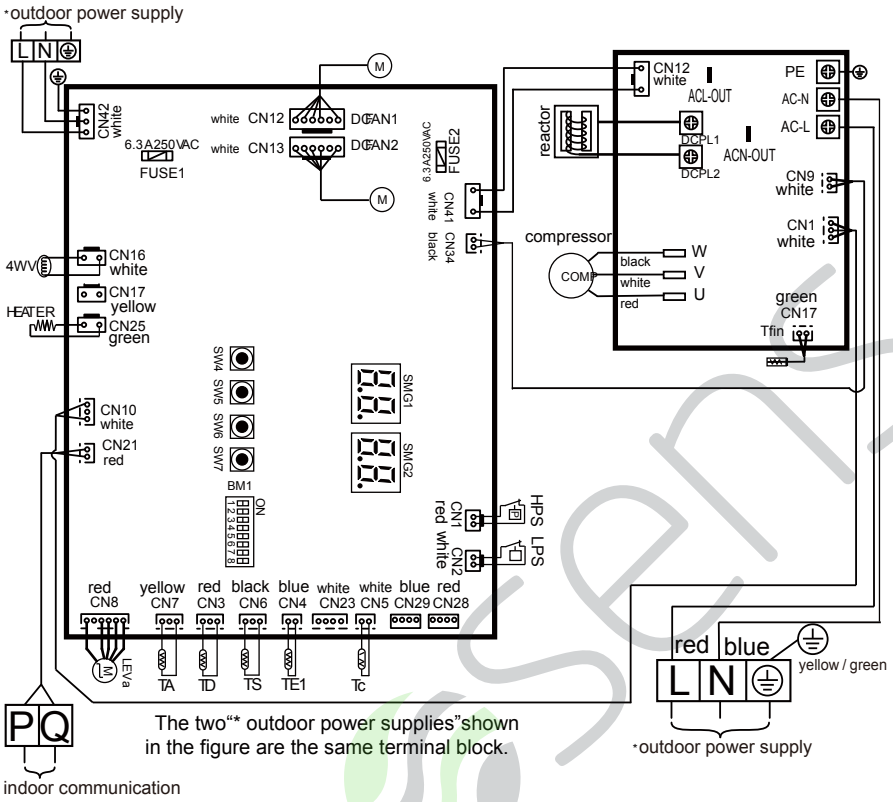
AU032FSEUA



AU052FPEUA AU072FPEUA

【Wiring Diagram】

0150541651



【High Voltage Warning】

The control box is equipped with high-voltage components
Please turn off the power and keep the unit shut down for more than 10 minutes and ensure that voltage between P and N on the frequency conversion board is reduced to DC 20V or less before checking the inside of the control box.

【Precautions Before Operation】

·It is not allowed to connect the power line to the P and Q terminals. These terminals are used to connect the control signal lines.After connection, the printed circuit board will be burned.

·After the initial installation, please confirm that the power supply voltage of the indoor unit and outdoor unit is normal. Before trial operation, ensure that the outdoor unit is powered on for more than 12 hours to fully warm up the compressor.

·When the outdoor unit leaves the factory, the dial code BM1_1 is set to the OFF state by default.
The commissioning personnel shall confirm that the number of indoor unit displayed on the display board is consistent with the number of indoor unit actually connected and the type of power supply and outdoor unit capacity are consistent with the parameters marked on the outdoor unit nameplate, then this dial is set to the ON state;If it is inconsistent, the outdoor unit cannot detect some indoor unit or the dial setting of the outdoor unit is wrong. At this time, do not force the dial to ON, which will cause the unit to malfunction or damage.

【Dial Code Description 】

dial	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	model
BM1	-	1	0	0	0	0	0	0	5.0
		1	1	0					7.0

O represent OFF
1 represent ON
- represent need to be setting when installing

【Symbol Description 】

symbol	description
ACL	Live line
ACN	Neutral line
HEATER	Compressor heating belt
SV1	Unloading solenoid valve
Pd/Ps	High /low pressure sensor
Tc	Gas/liquid tube sensor
Tfin	Module temperature sensor
DCFAN1/2	DC fan
4WV	Four-way valve

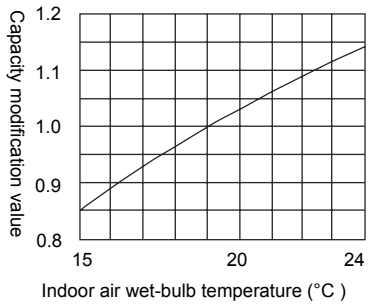
symbol	description
HPS	High pressure switch
LEVa	Electronic expansion valve
TD	Exhaust temperature sensor
TE1	Defrost temperature sensor
TS	Intake temperature sensor
TA	outdoor temperature sensor
LEVb	Electronic expansion valve
PC	PC connection tooling

8. Performance Curves

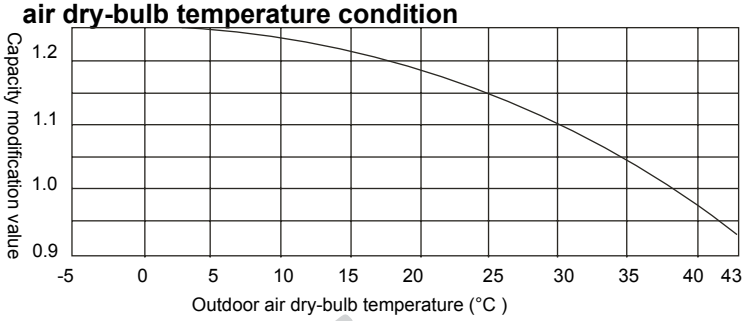
(1) Calculation method of cooling capacity

----cooling capacity to be known = cooling capacity*(A*B*C*D*E) W

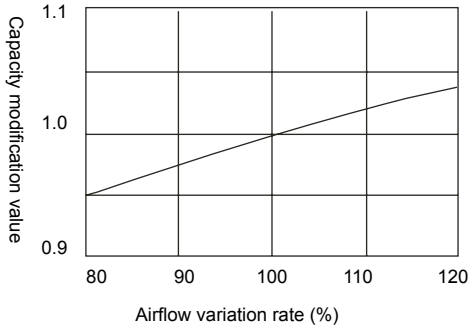
A. Capacity compensation value of indoor air wet-bulb temperature condition



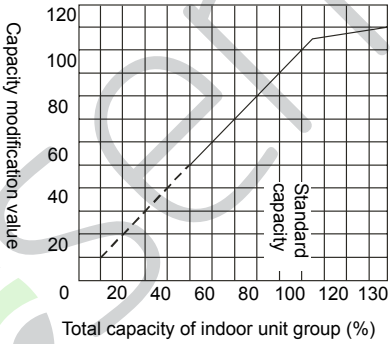
B. Capacity compensation value of outdoor air dry-bulb temperature condition



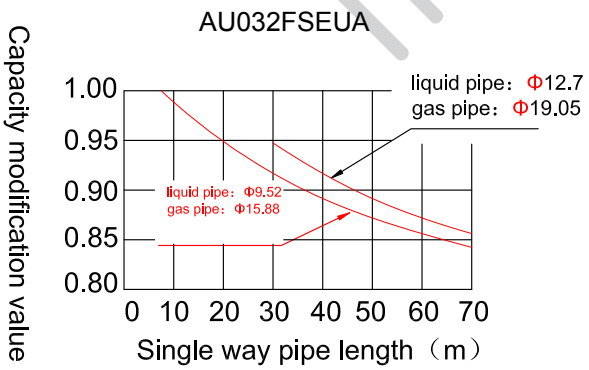
C. Capacity modification value under airflow ariation rate of indoor unit group (only for duct unit)

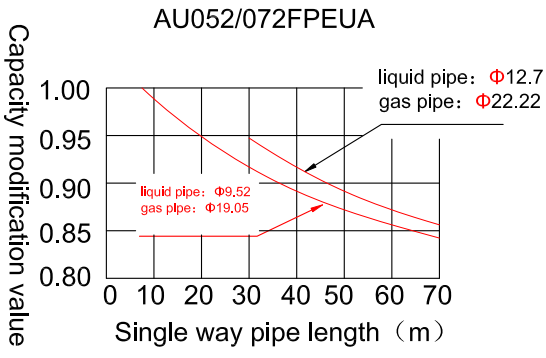


D. Capacity compensation suitable for total capability of indoor unit group



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





Notes for E:

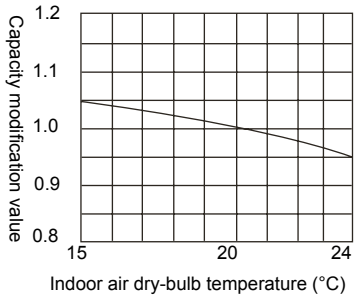
(1) The main pipe (from outdoor to the first branch pipe) diameter should be enlarged one size when the single way pipe length is over 90m.

(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.

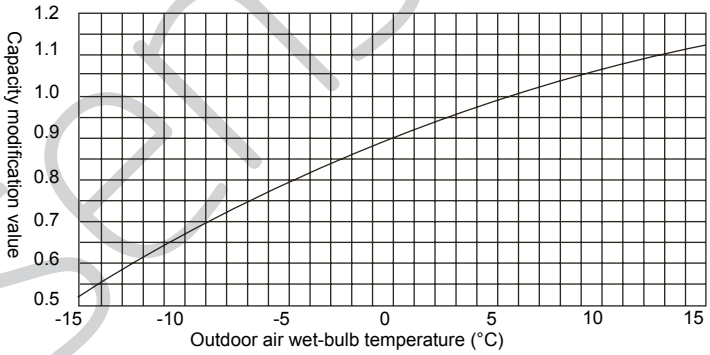
Vertical height drop between indoor and outdoor	5m	10m	15m	20m	25m	30m
Adjustment factor	0.003	0.006	0.009	0.012	0.015	0.018

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

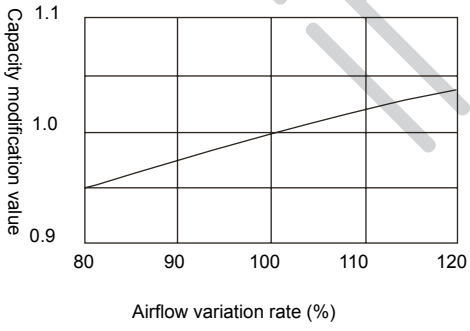
A. Capacity compensation value of indoor air dry-bulb temperature condition



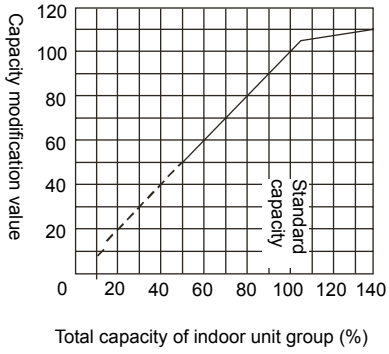
B. Capacity compensation value of outdoor air wet-bulb temperature condition



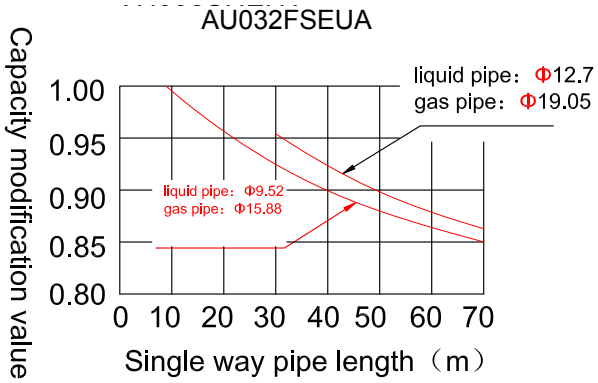
C. Capacity modification value under airflow variation rate of indoor unit group (only for duct unit)

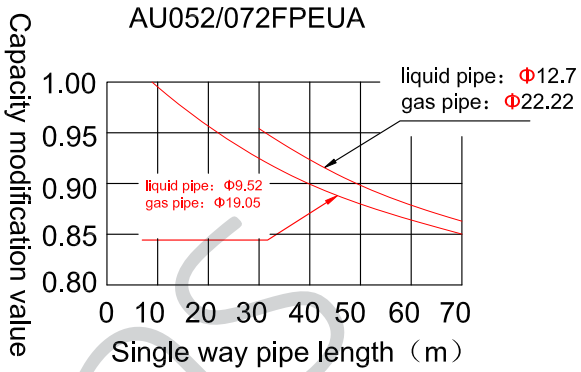


D. Capacity compensation suitable for total capability of indoor unit group

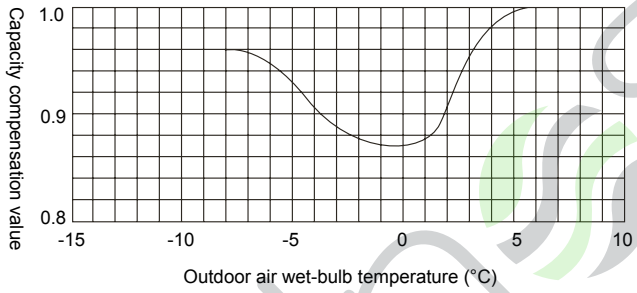


E. Capacity compensation value of pipe length, pipe diameter and height drop





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



Notes for E:

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

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

Vertical height drop between indoor and outdoor	5m	10m	15m	20m	25m	30m
Adjustment factor	0.003	0.006	0.009	0.012	0.015	0.018

(1) Correction factor for pipe length and drop.

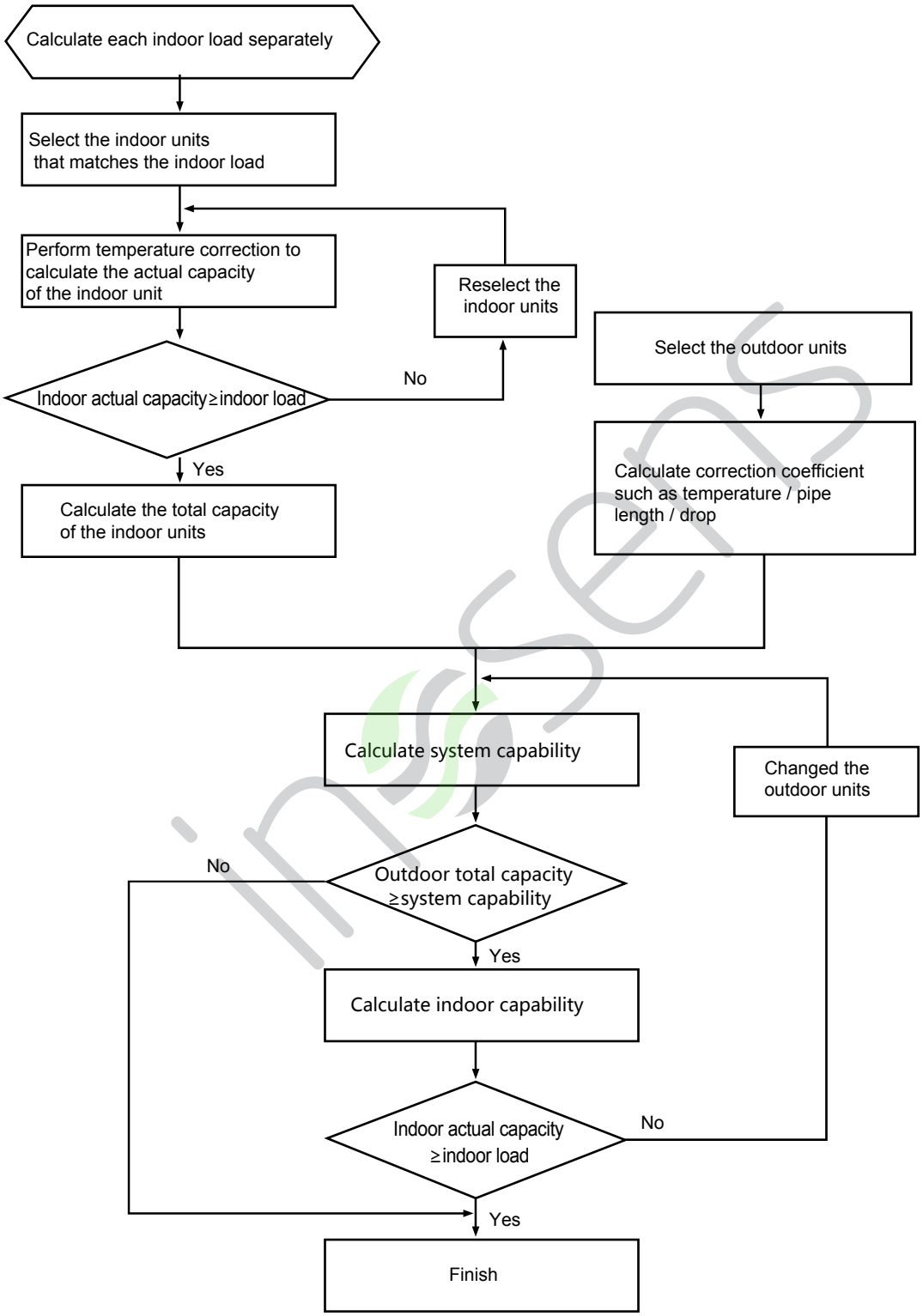
In cooling

Drop (m)	Single pipe length from the farthest outdoor unit to the farthest indoor unit(m)							
	0	10	20	30	40	50	60	70
30.0	0	0	0	0.92	0.89	0.872	0.861	0.84
20.0	0	0	0.947	0.92	0.89	0.872	0.861	0.84
10.0	0	0.98	0.947	0.92	0.89	0.872	0.861	0.84
0.0	1	0.98	0.947	0.92	0.89	0.872	0.861	0.84
-10.0	0	0.972	0.935	0.912	0.881	0.868	0.855	0.832
-20.0	0	0	0.93	0.908	0.875	0.862	0.851	0.83

In heating

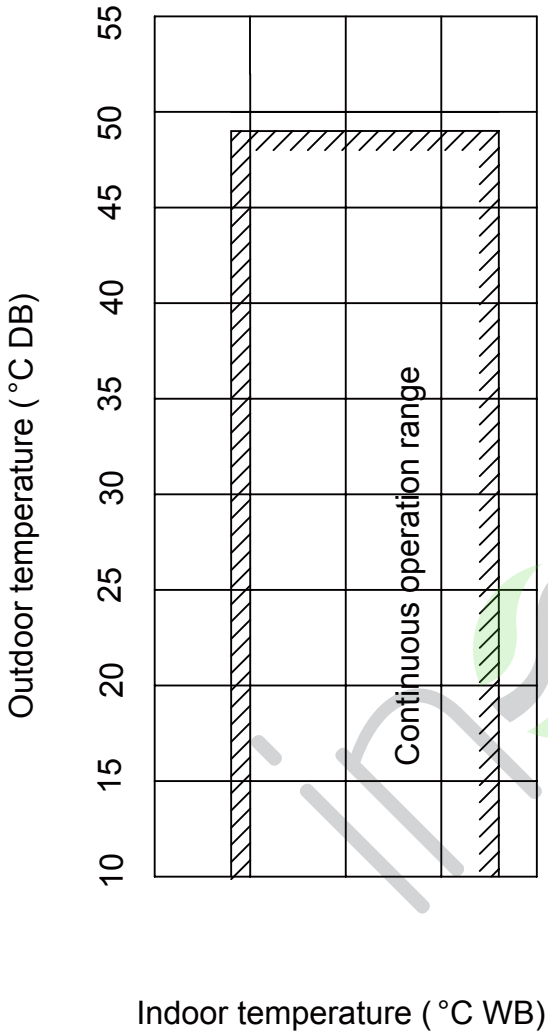
Drop (m)	Single pipe length from the farthest outdoor unit to the farthest indoor unit(m)							
	0	0	0	0.910	0.885	0.878	0.861	0.847
30.0	0	0	0.935	0.917	0.890	0.882	0.864	0.849
20.0	0	0.994	0.945	0.923	0.895	0.886	0.867	0.852
10.0	1.0	0.995	0.955	0.930	0.900	0.890	0.870	0.855
0.0	0	0.995	0.955	0.930	0.900	0.890	0.870	0.855
-10.0	0	0	0.955	0.930	0.900	0.890	0.870	0.855
-20.0	0	0	0.93	0.908	0.875	0.862	0.851	0.83

9. Selection Procedure

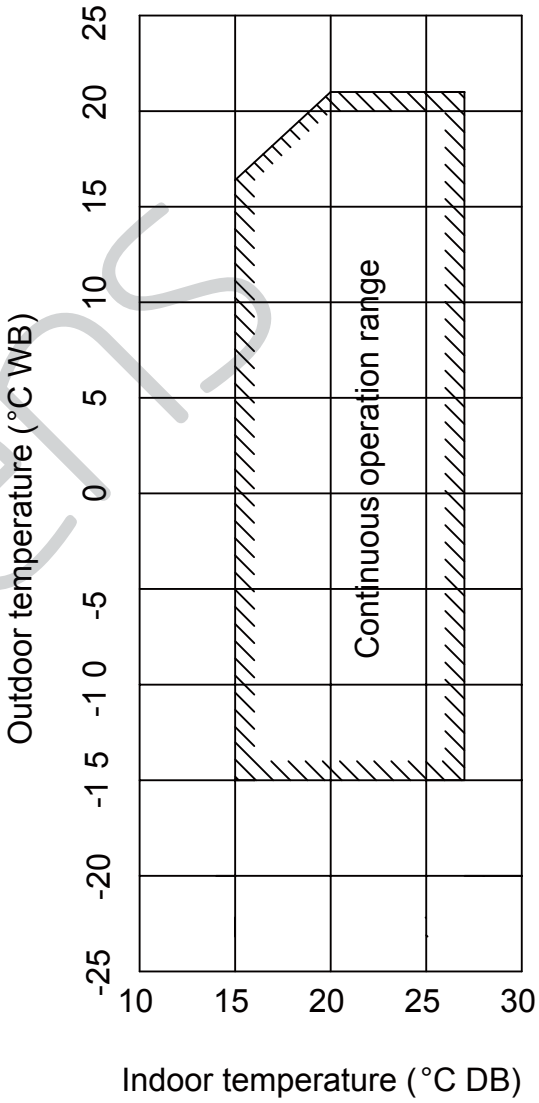


10. Operation Range

Cooling

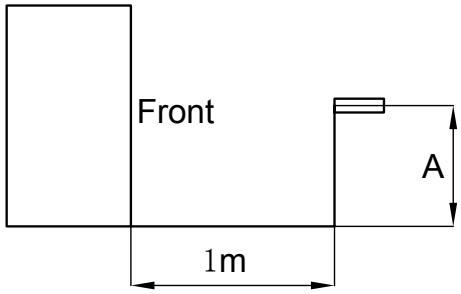


Heating



11. Noise Level

(1) Testing illustration



(2) Testing condition:

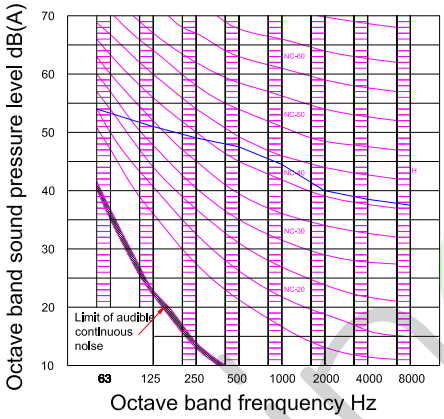
a. Unit running in the nominal condition

b. Test in the semi-anechoic chamber

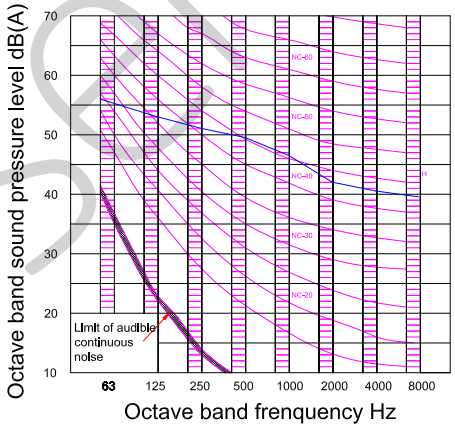
c. Noise level varies from the actual factors such as room structure, etc.

(3) Octave band level

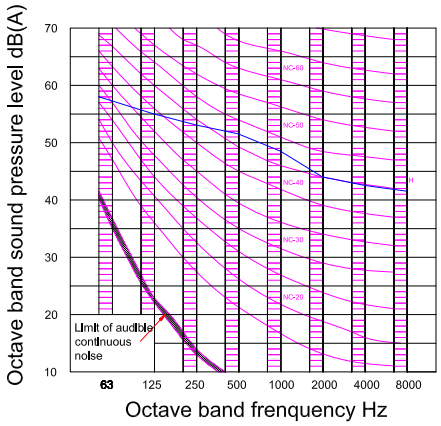
AU032FSEUA



AU052FPEUA



AU072FPEUA



12. Outdoor Installation

12.1 Safety

The outdoor uint adopts "simultaneous control" type, all indoors should be heating or cooling simultaneously.

To protect compressor, before startup, the unit should be electrified for over 12 hours. If the unit is not used for a long time, please cut off the power to save energy, or the unit will consume the power.

⚠WARNING

- 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.

- 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, lightening rod or the telephone earthing wire. Improper earthing will cause electric shock.
- Don't install the unit at the place where leaks the flammable gas. Or it will cause fire.
- Execute the water drainage pipe according to the manual, improper installation will cause water leakage to wet the family things.
- The outdoor fan can not face to the flower or the other vegetable, or the blowing gas will make the flower dried up.
- Please ensure the maintenance room, if not, it will cause the maintenance person damaged.
- When installing the unit on the roof or the other high place, to prevent the person falling down, please set the fixed ladder and the railing at the passage.
- Use the two-end spanner, and fasten the nut at proper torque. Don't fasten the nut excessively against the flared 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.

12.2 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	
Capacity (100w)	Combination type	Indoor qty	Total indoor capacity (100w)
80	Single	4	40-104
140	Single	8	70-182
180	Single	9	90-234

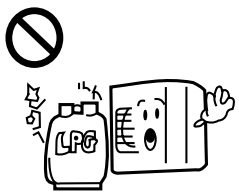
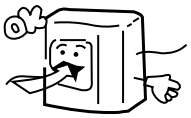
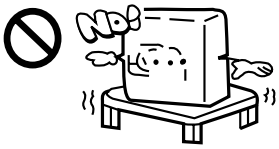
indoor capacity (100W)
22
28
36
40
45
56
71

total indoor capacity (100W)	branch pipe (optional)
less than 335	FQG-B335A

Notice:

- Total capacities of indoor units being used ≤ 100% of rated capacities of outdoor unit.
- The maximum number and total capacity of indoor units are shown in the table above.If the total capacity of the indoor units is greater than the rated capacity of the outdoor unit, the actual cooling or heating effect of each indoor units may not reach its rated capacity.

(2) Installation place selection

Air-conditioner can't be installed in the place with inflammable gas. Or it will cause fire hazard. 	The unit should be installed at the place with good ventilation. No obstacle at the air inlet/outlet. And no strong wind blows the unit.  The installation space refers to the latter info.	The unit should be installed at the strong enough place. Or it will cause vibration and noise. 

The unit should be installed at the place where the cold/hot air or noise will not interfere the neighbours. 	■ The place where the water can flow fluently. ■ The place where no other heat source will affect the unit. ■ Pay attention to the snow against clogging the outdoor. ■ In installation, install the anti-vibration rubber between the unit and the bracket.	■ The unit is better not be installed at the below places, or it will cause damage. ■ The place where there is corrosive gas (spa area etc). ■ The place blowing salty air (seaside etc). ■ Exists the strong coal smoke. ■ The place with high humidity. ■ The place where there is device emitting Hertzian waves. ■ The place where voltage changes greatly.

(3) Transportation

Lifting

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

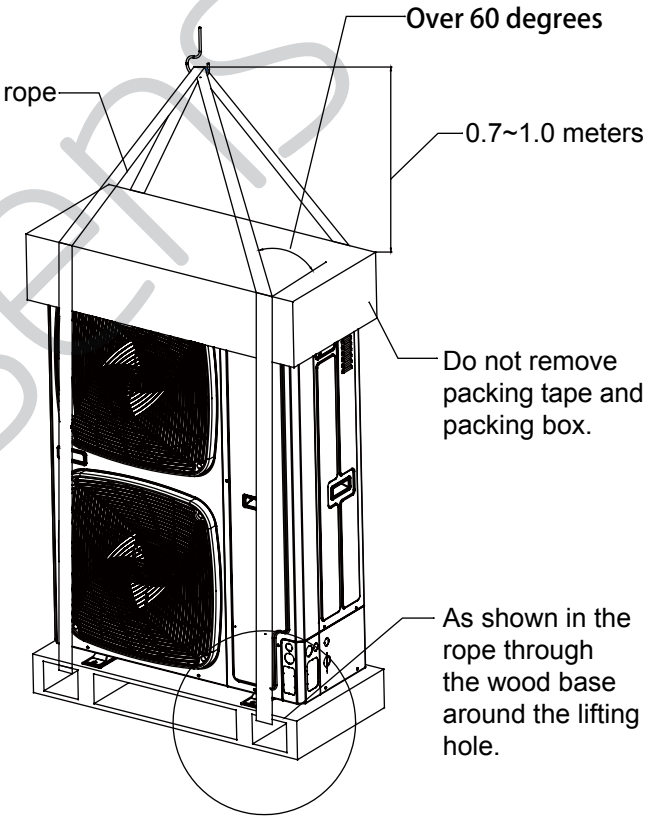
⚠CAUTION
■ Do not place anything on the device. ■ Two ropes shall be used for lifting the outdoor unit.

Hoisting method

Hoisting to ensure that the level of outdoor machine, slowly lifting.

1. Removal of outer packing is strictly prohibited
2. As shown by two ropes hoist with outdoor machine packaging.

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

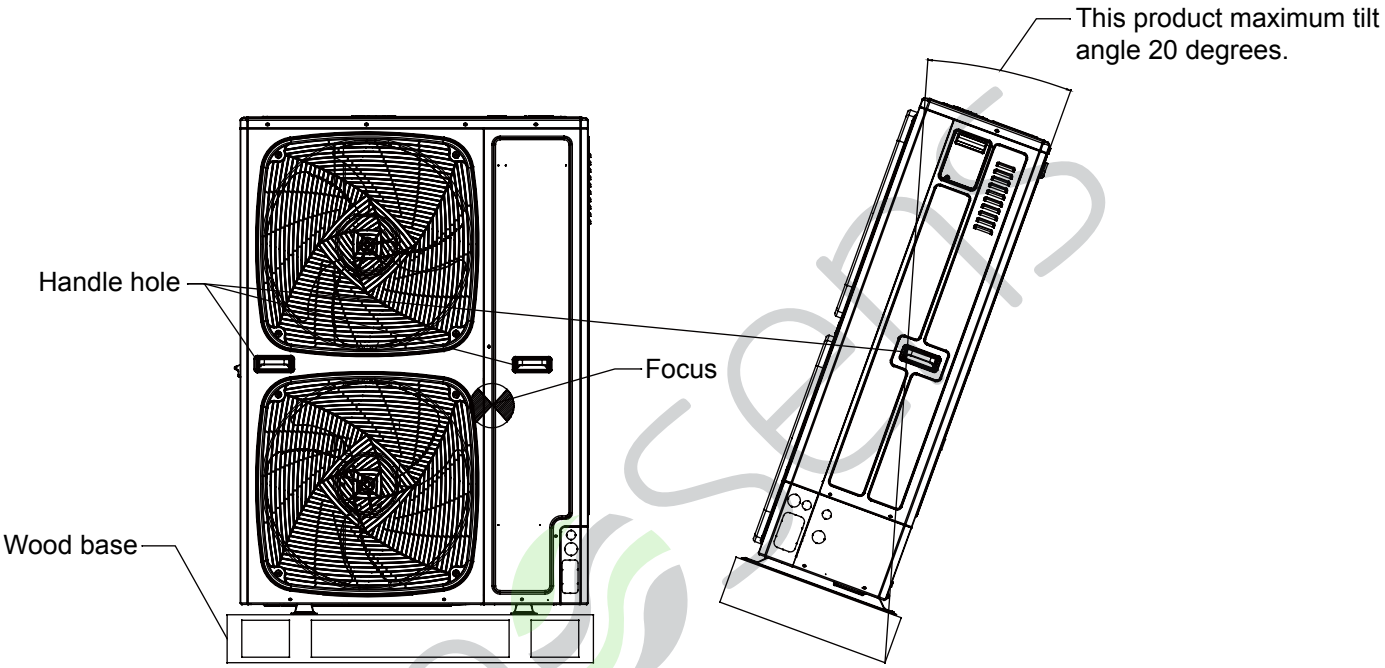


Manual handling

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

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

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



Outdoor Installation

Installation location

Note:

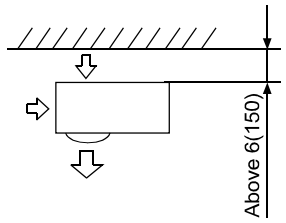
1. In snowy area, install the unit under the bracket or the snow-proof cover against the accumulative snow on the unit.
2. Do not install the unit at the place where the flammable gas will leak.
3. Install the unit at the strong enough place.
4. Install the unit at the flat place.
5. When being installed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

(3) Installation and maintenance space

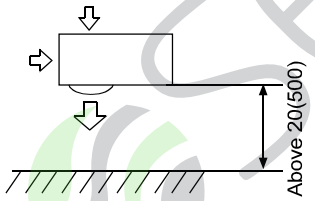
Selection of installation location of outdoor

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

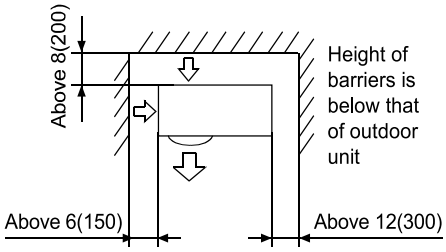
Back



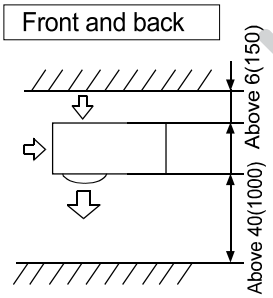
Front



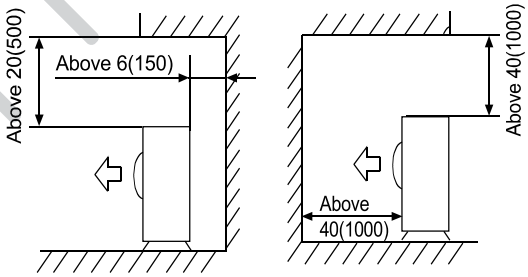
Back and side



Front and back



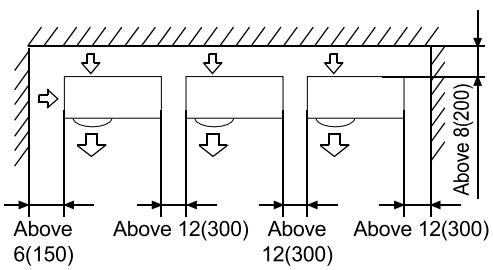
When barriers exist above the unit



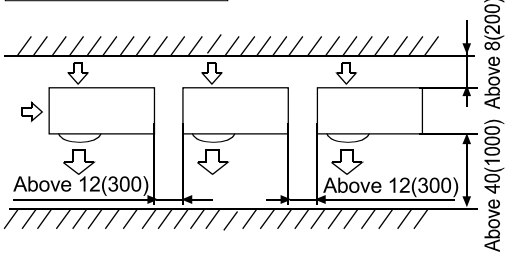
The top and two side surfaces must be exposed to open space, and barriers on at least one side of the front and back shall be lower than the outdoor unit.

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

Back and side



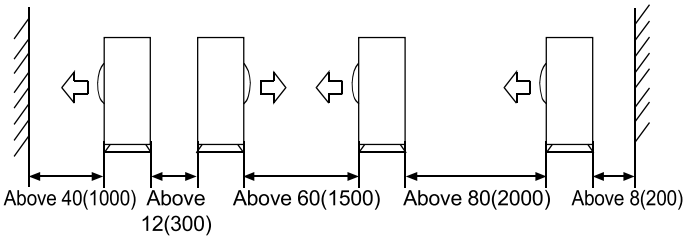
Front and back



Height of barriers is below that of outdoor unit

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

Standard



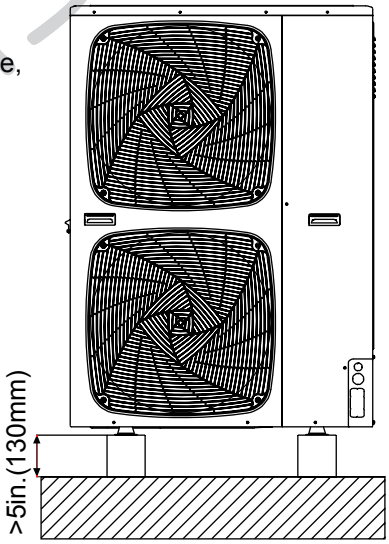
The top and two side surfaces must be exposed to open space, and barriers on at least one side of the front and back shall be lower than the outdoor unit.

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

(4) Precautions on installation

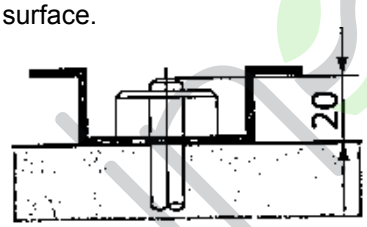
NOTICE

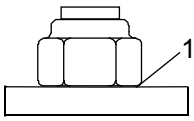
If drain holes of the outdoor unit are covered by a mounting base or by floor surface, raise the unit in order to provide a free space of more than 5in.(130mm) under the outdoor unit.



Foundation work

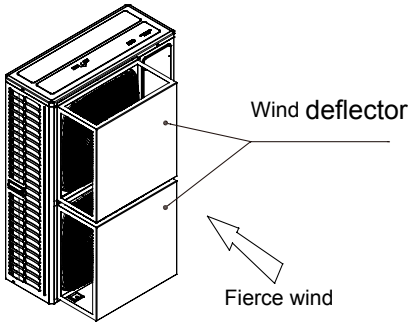
- Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise after installation.
- In accordance with the foundation drawing in the figure, fix the unit securely by means of the foundation bolts.
- It is best to screw in the foundation bolts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



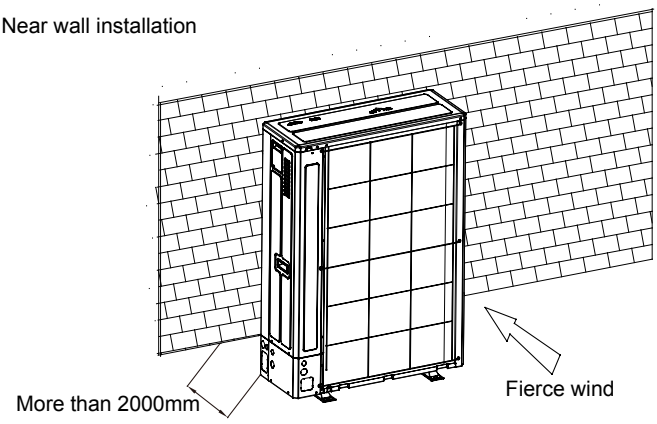


- Fix the outdoor unit to the foundation bolts using nuts with resin washers(1) as shown in the figure.
- If there is no need to install the outdoor machine in the open space of the building or the enclosure, the following two ways can be used to avoid the fan reversal or damage caused by strong wind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

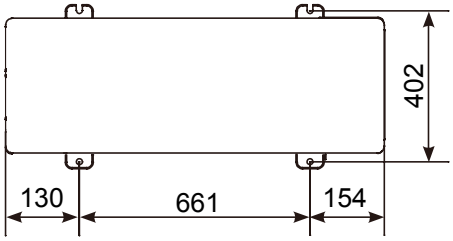
(1) Using the windshield



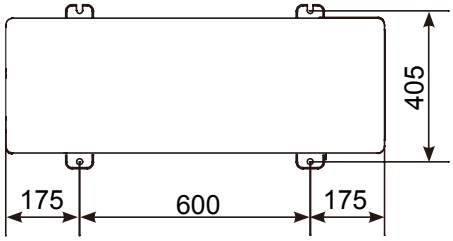
(2) Near wall installation



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



AU032FSEUA



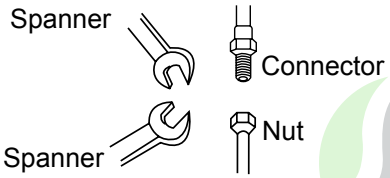
AU052FPEUA
AU072FPEUA

(5) Refrigerant pipe connection

Pipe connection method:

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

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



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

Cautions in piping installation:

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

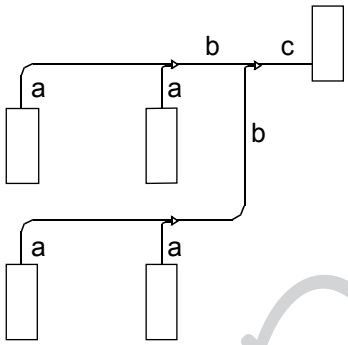
Pipe material and specs selection

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

Drain pipe disposal

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

Pipe specification:



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

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

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

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

Outdoor capacity (100W)	Gas pipe (mm)	Liquid pipe (mm)
80	Ø15.88	Ø9.52
140	Ø19.05	Ø9.52
180	Ø19.05	Ø9.52

Note:
When the distance from outdoor to the longest indoor is over 30m, the main pipe should be the enlarged diameter.

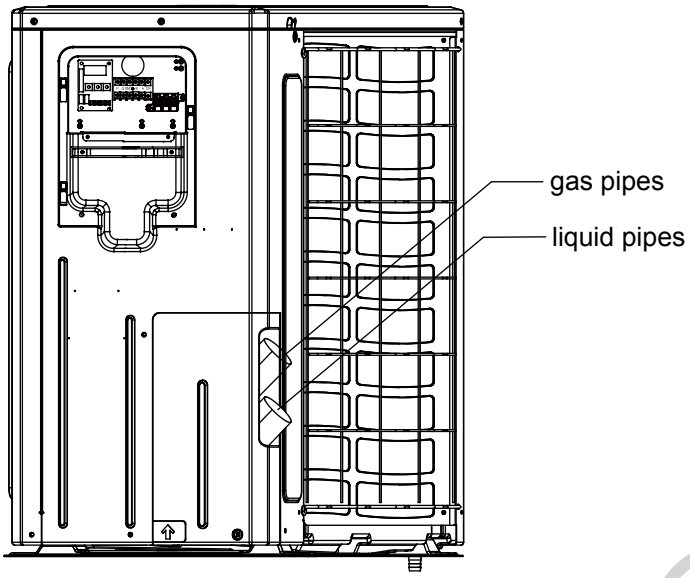
Copper pipe selection:

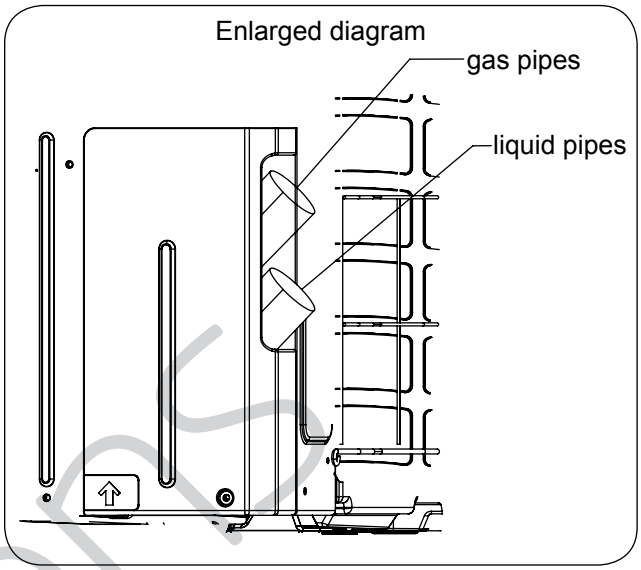
hardness	softness				Half-hardness			
Outer diameter (mm)	Ø6.35	Ø9.52	Ø12.7	Ø15.88	Ø19.05	Ø22.22	Ø25.24	Ø28.58
Min. thickness (mm)	0.8	0.8	1.0	1.0	1.0	1.1	1.2	1.4

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

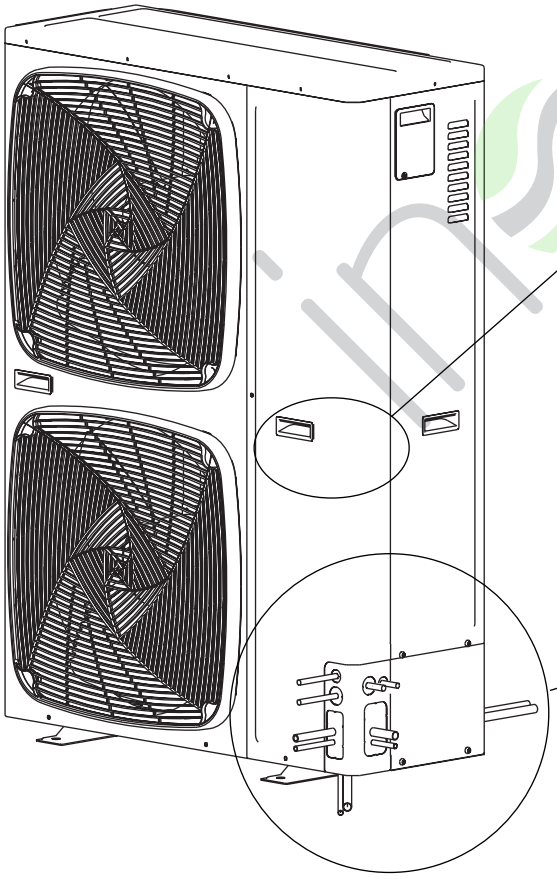
Piping connection method:

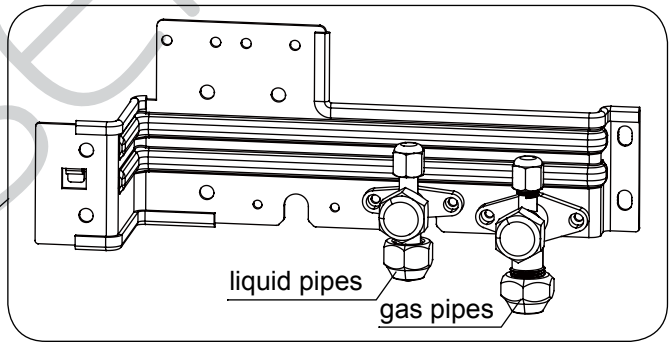
Outdoor uint with single fan piping connection method

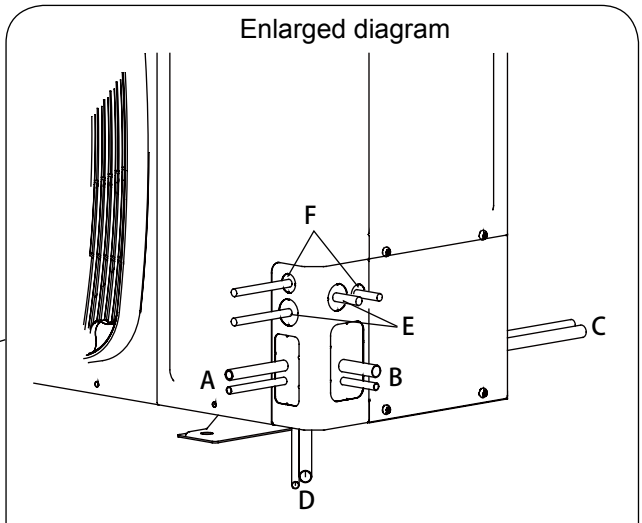




Outdoor uint with double fan piping connection method
Pipes can be connected in four directions





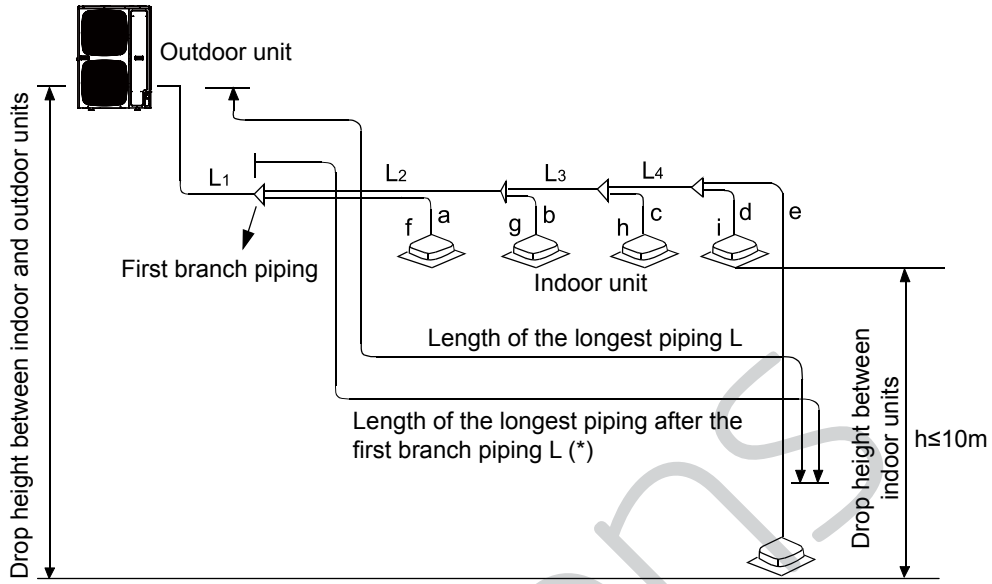


A, B, C, D:Copper pipe hole
E:Power cord hole (with its own cable sheath)
F:Communication line hole

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

Long pipe and high drop

1. Allowable pipe length and height difference



Maximal length and drop height permissible of refrigerant piping

			Permissible value		Piping part
Piping length	Total length of piping (actual length)		80	120m	L1+L2+L3+L4+a+b+c+d+e
			140/180	150m	
	Longest piping L	Actual / Equivalent length	60/70m		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		10m		——

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
AU03	Ø15.88	Flared joint	Ø9.52	Flared joint
AU05	Ø19.05		Ø9.52	
AU07	Ø19.05		Ø9.52	

B. Indoor unit
Please refer to the indoor air conditioner manul.
Connecting method: Flared joint

C. Pipe spec and the torque

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

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

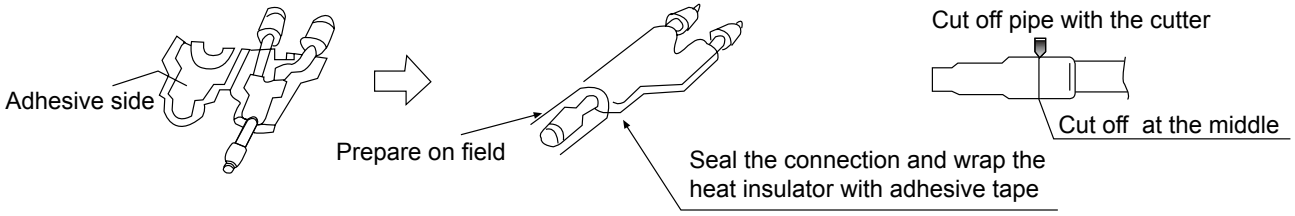
Branch pipe

Outdoor unit type
Branch pipe selection:

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

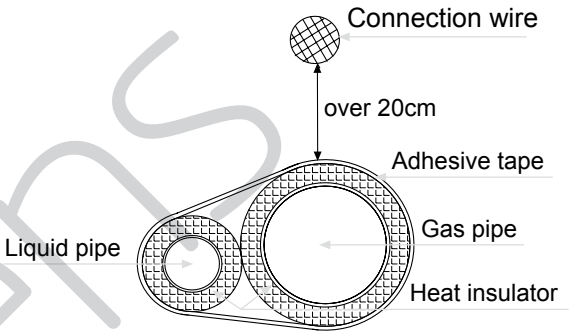
Note:

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



Heat insulation

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



Fix the refrigerant pipe

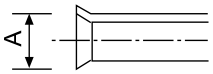
- In operation, the pipe will vibrate and expand or shrink. If not being fixed, the refrigerant will focus on one part to cause the broken pipe.
- To prevent the central stress, fix the pipe for every 2-3m.

Pipe installation

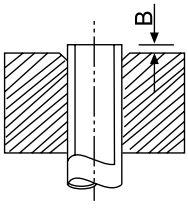
When doing the piping connection, please do the following:

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

Expanding pipe: A(mm)



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



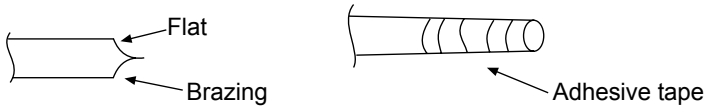
Projecting length of pipe to be expanded: B(mm)

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

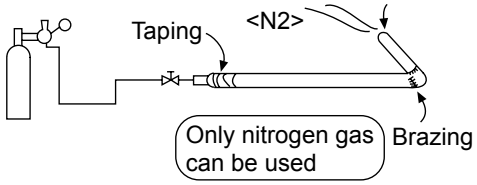
- The outdoor gas pipe and the refrigerant distributing pipe, as well the refrigerant distributing pipe and the branch pipe should be welded with hard solder.

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

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

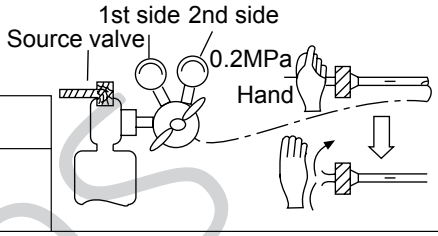


Seal the pipe end with adhesive tape or the stopper to increase the resistance, fill up the pipe with nitrogen.



Only nitrogen gas can be used

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

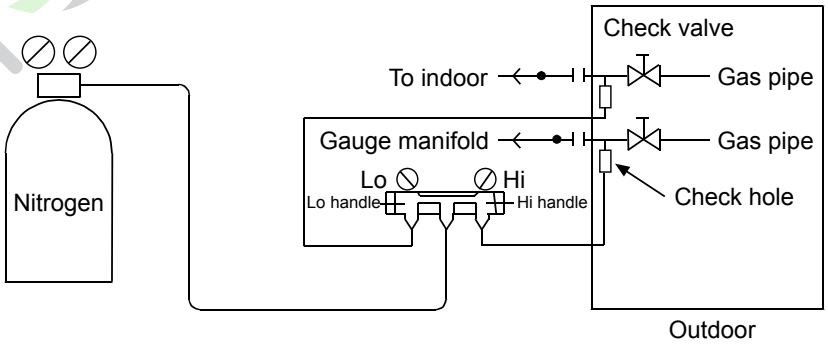


■ When connecting the pipes, close the valves fully.

■ When welding the valve and the pipes, use the wet cloth to cool down the valve and the pipes.

(6) Leakage test

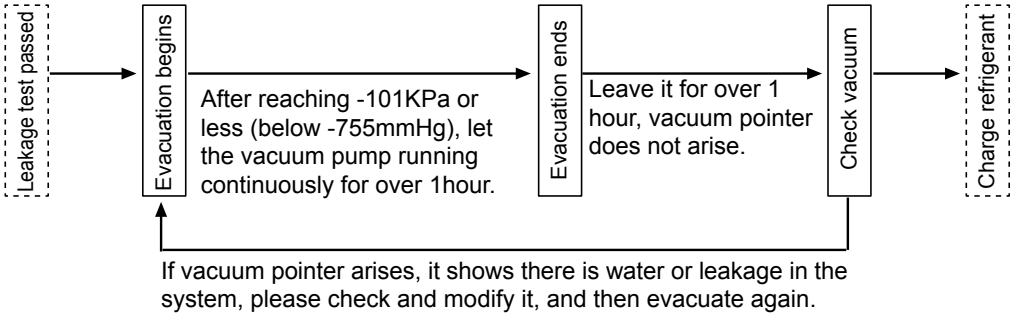
1. The outdoor unit has been executed the leakage test in the factory. After connecting the distributing pipe, execute the leakage test from the outdoor check valve and the indoor. Besides, while testing, the valves should be close.
2. Refer to the below figure to charge the nitrogen into the unit to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



(7) Evacuation

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

Operation procedure:



Because the unit is with refrigerant R410A, the below issues should be paid attention:

- To prevent the different oil into the pipe, please use the special tool for R410A, especially for gauge manifold and charging hose.
- To prevent the compressor oil into the refrigerant cycle, please use the anti-counter-flow adapter.

(8) Check vale operation

Open/close method:

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

Tighten torque as the table below:

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

(9) Additional refrigerant charging

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

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

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

Note:

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

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

⚠ WARNING

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

⚠ CAUTION

- Secure the power cord with a wire tie in the machine.

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

⚠ CAUTION

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

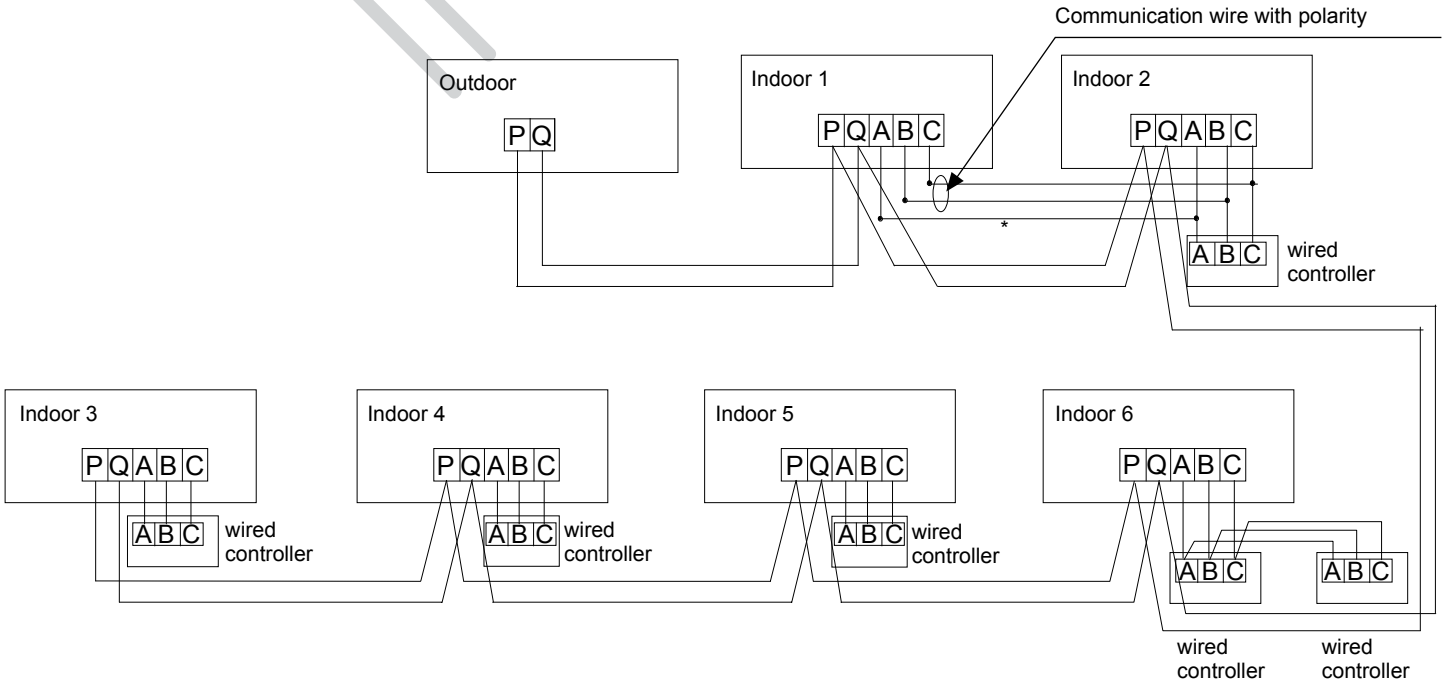
Inspect

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

Connection

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

Communication wiring figure



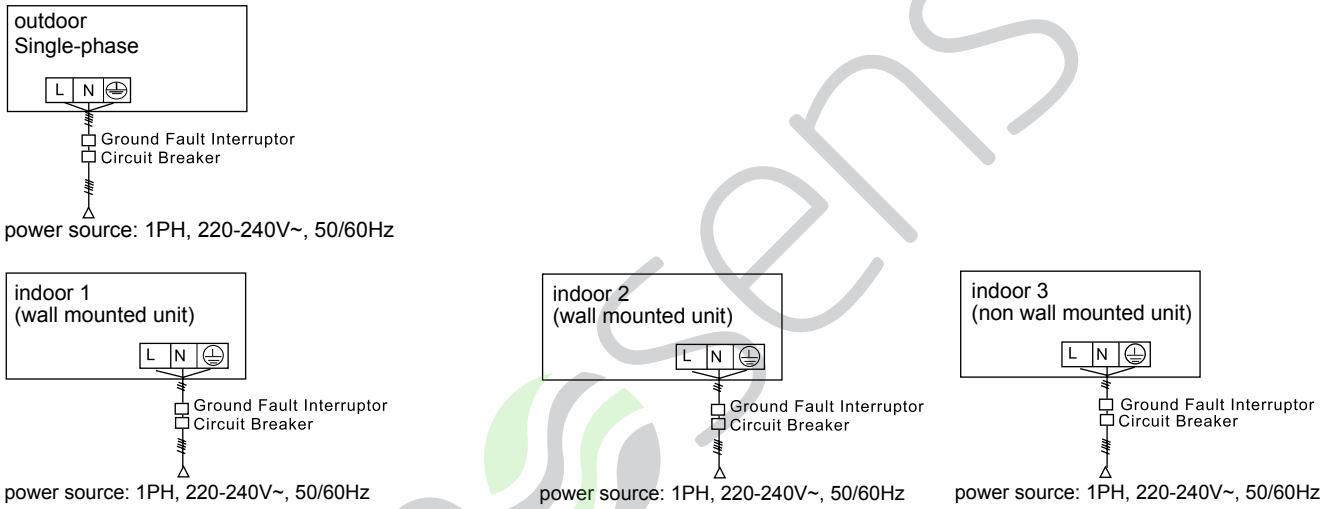
The outdoor and all indoor units are in parallel through 2 non-polar wires.
Three wiring methods between wired controller and indoor unit:

A. 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 or 3 polar wires, AC indoors wired "B" "C" polar wires, DC indoors wired "A" "B" "C" polar wires*.

B. 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.

C. 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^2)	Circuit breaker (A)	Rated current of residual circuit breaker (A) Ground fault interruptor (mA) response time (S)	Ground wire	
						Section (mm^2)	Screw
Individual power	AU032FSEUA	1PH, 220-240V~, 50/60Hz	4	20	20A 30mA below 0.1S	4	M5
	AU052FPEUA		10	40	40A 30mA below 0.1S	10	M5
	AU072FPEUA		10	40	40A 30mA below 0.1S	10	M5

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

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

Indoor power source and communication wiring

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

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

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

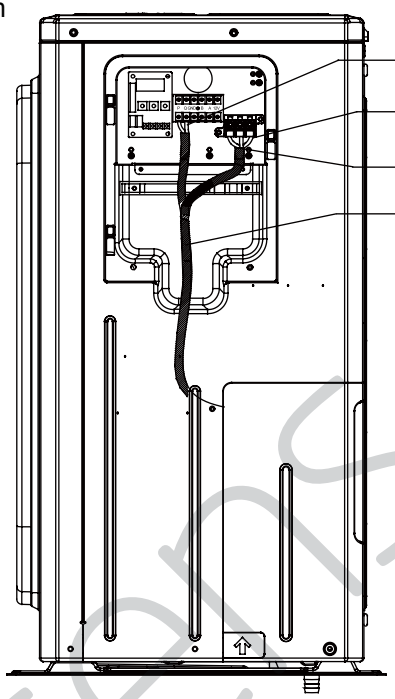
Communication wire for wired controller

Length of Signal Line (m)	Wiring Dimensions
≤250	0.75mm^2 × 3 core shielding line

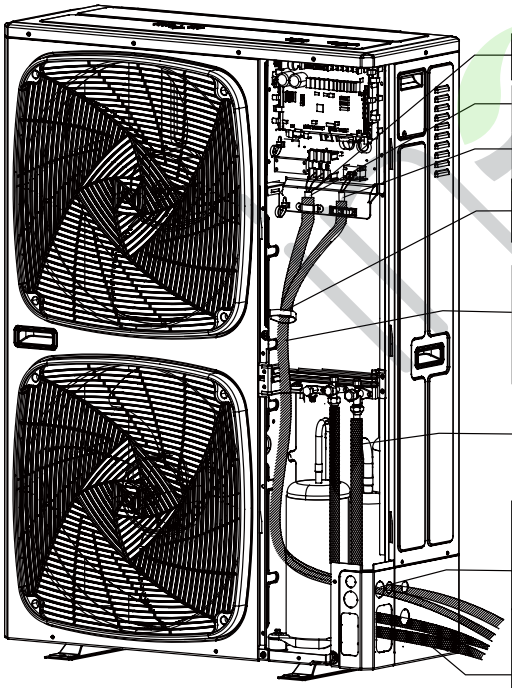
■ The shielding lay of the signal line must be grounded at one end.
■ The total length of the signal line shall not be more than 250m.

Outdoor unit electrical wiring diagram

Outdoor uint with single fan electrical wiring diagram



Outdoor uint with double fan electrical wiring diagram



Ground wire

Power cord

Communication line

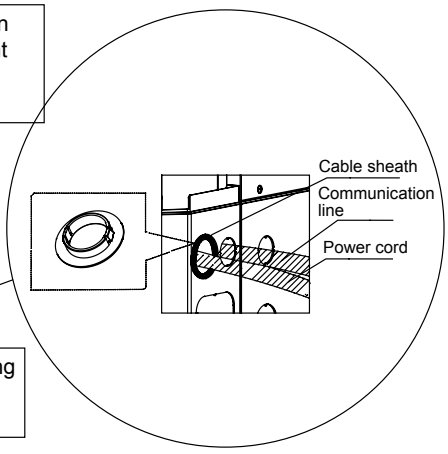
Fixing the power line and communication line with a wire clip on the partition board

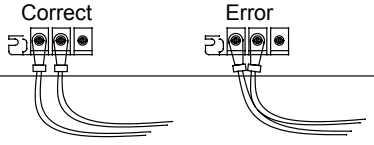
Power lines and communication lines need to be flame retardant and high temperature resistant wire wrap

With plastic pipe insulation on the refrigerant pipe

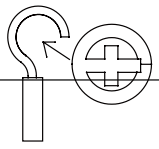
Protection of power line and communication line hole with wire sheath

Power line machinery and piping need to be wrapped with flame retardant tape



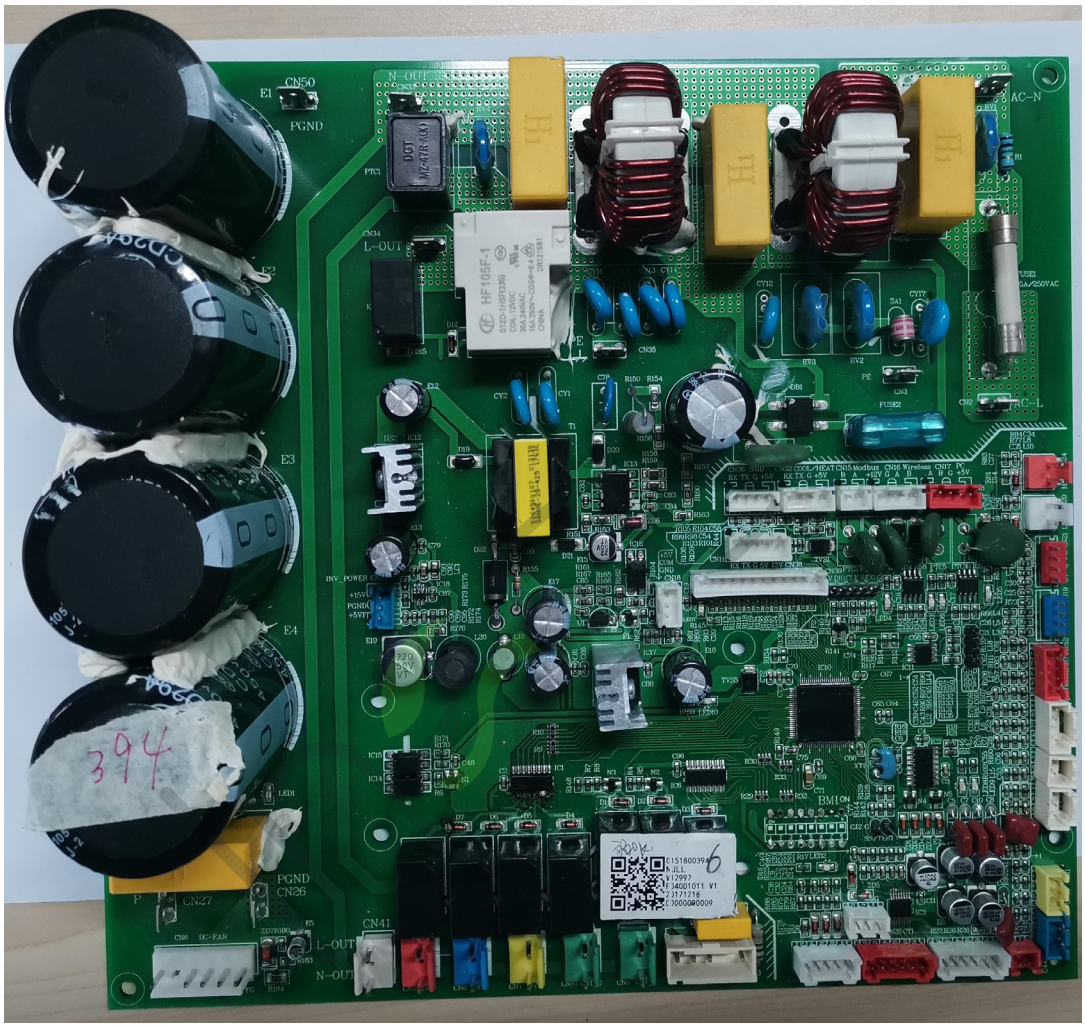


When using a single terminal without terminal, the terminal can not be directly used without flux. Otherwise, it will cause abnormal heating of terminal crimping part. If a single core wiring is used in the wiring, it can be connected directly in the manner shown in the diagram.

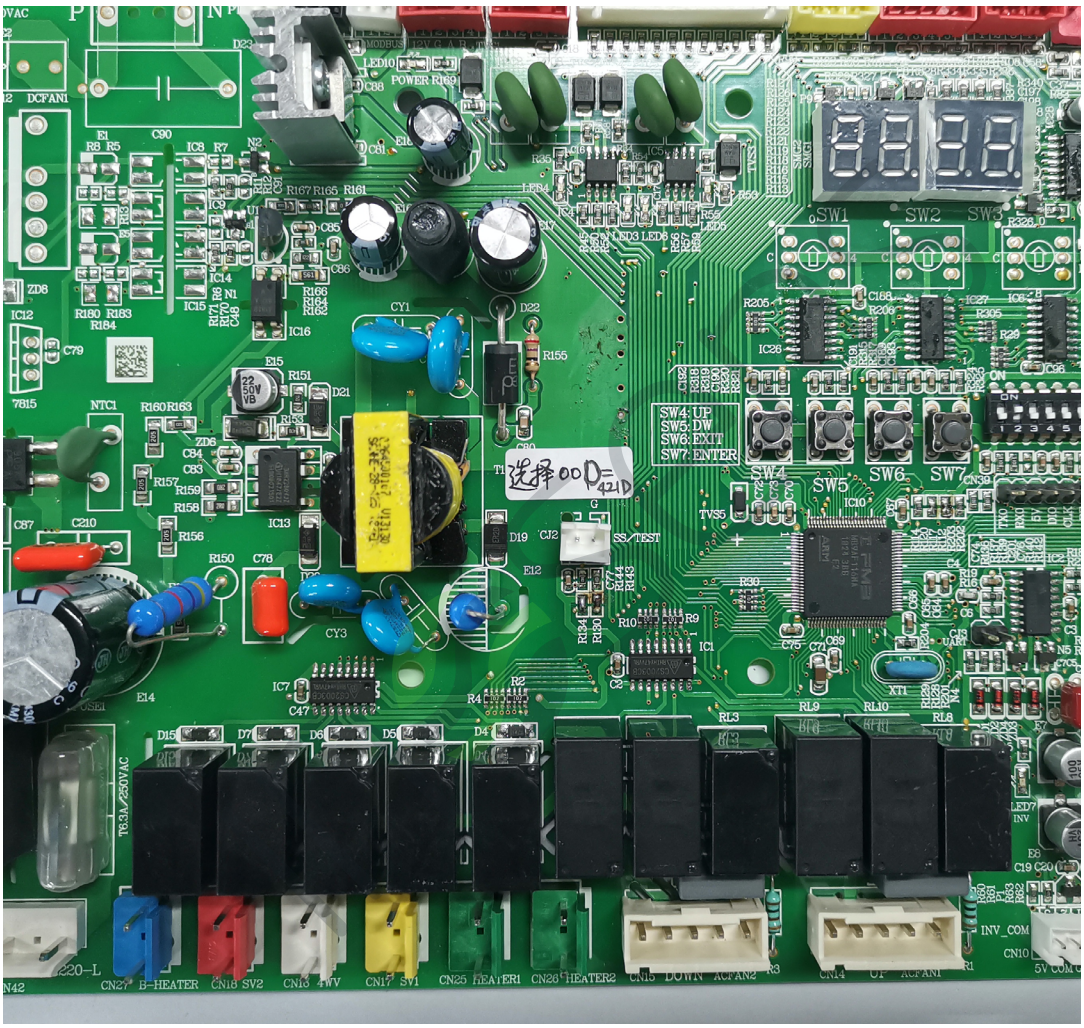


13. PCB Photo

AU032FSEUA
PCB code: 0151800394



AU052FPEUA AU072FPEUA
PCB code: 0151800421



14. Dip Switch Setting

① BM1 introduction

BM1 introduction

<table>
<tr><td rowspan="2">BM1_1</td><td rowspan="2">Indoor unit quantity lock</td><td>0</td><td colspan="3">Start to search indoor unit（Default）</td></tr>
<tr><td>1</td><td colspan="3">Stop searching indoor unit and lock the quantity</td></tr>
<tr><td rowspan="4">BM1_2
BM1_3
BM1_4</td><td rowspan="4">Capacity selection</td><td>BM1_2</td><td>BM1_3</td><td>BM1_4</td><td>Capacity selection</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>3HP</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>5HP</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>7HP</td></tr>
<tr><td rowspan="2">BM1_5</td><td rowspan="2">Power supply selection</td><td>0</td><td colspan="3">Single phase （Default）</td></tr>
<tr><td>1</td><td colspan="3">Three phases</td></tr>
<tr><td rowspan="2">BM1_6</td><td rowspan="2">Indoor ON/OFF simultaneous control</td><td>0</td><td colspan="3">Indoor units ON/OFF simultaneous controll unavailable （Default）</td></tr>
<tr><td>1</td><td colspan="3">Indoor units ON/OFF simultaneous controll available</td></tr>
<tr><td rowspan="2">BM1_7</td><td rowspan="2">Defrosting level</td><td>0</td><td colspan="3">Ordinary (Default)</td></tr>
<tr><td>1</td><td colspan="3">Strengthen defrosting</td></tr>
<tr><td rowspan="2">BM1_8</td><td rowspan="2">Quiet running function</td><td>0</td><td colspan="3">Quiet running function is invalid (Default)</td></tr>
<tr><td>1</td><td colspan="3">Quiet running function is valid</td></tr>
</table>

Note:

System can not operate without locking, and cannot operate when the locking number is not in accordance with the actual quantity

15. Outdoor digital tube display setting

- Long press ENTER (SW7) 3 seconds to enter dial parameter selection, short press ENTER (SW7) switch edit , short press EXIT (SW6) exit :
- key part: long press ENTER (SW7)3 seconds to enter parameter view or modify, short press UP (SW4) data increase, short press DOWN (SW5) data decrease, short press SW6 exit parameter view or modify
- Display parts: LD1, LD2, LD3, LD4:4 digital tube from left to right.dial code list display mode, LD1 display "_"; parameter display mode, LD1 display "="

① Indoor unit parameter view

You can view the indoor machine 128 sets of parameters: SW1 and SW2 represent the indoor unit address, SW3 range is 3-14 can view the indoor unit parameters.

SW1	SW2	System Address
0	0-F	1 to 16 (PCB address 0#~15#)
1		17 to 32 (PCB address 16#~31#)
2		33 to 48 (PCB address 32#~47#)
3		49to 64 (PCB address 48#~63#)
7		65 to 80 (PCB address 64#~79#)
8		81 to 96 (PCB address 80#~95#)
9		97 to 112(PCB address 96#~111#)
A		113 to 128(PCB address 112~127#)

SW3	Function	Digital tube LD1 ~ 4 display
3	Indoor unit communication check and program version	Communication normal display indoor unit program version (1 decimal), the communication interrupted normal display “0000” (5 consecutive round of no communication success), communication has been abnormal display “---- ---- -””. For example: 3.9, means the indoor unit version is V3.9
4	Indoor unit failure	Display indoor failure code; no failure, display 0
5	Indoor unit capacity	The indoor unit capacity (unit: HP, one decimal), 1.5 HP displays 1.5
6	Indoor EEV open angle	Electronic expansion valve (EEV) open angle (Unit: Pls)
7	Indoor ambient temp. Tai	Ambient temperature (Unit: °C)
8	Indoor gas temperature Tc1	Gas pipe temperature (Unit: °C)
9	Indoor liquid temperature Tc2	Liquid pipe temperature (Unit: °C)
10（A）	Indoor startup mode, actual fan speed and SCODE code	LD2 indicates startup mode (O: Stop C: cooling H: Heating) LD3 indicates actual fan speed of indoor unit (0 - stop, 1 - low speed, 2 - medium speed and 3 - high speed) LD4 indicate SCODE code (0~15(F)). For example, C3B indicates cooling running at high wind, and the SCODE is 11.
11（B）	Indoor set temperature Tset	Indoor set temperature (Unit: °C)
12（C）	Reserve	--
13（D）	Reserve	--
14（E）	Forced indoor cooling / heating / stop	(1) press ENTER (SW7) for 3 seconds, to enter setting state, the instruction value is flashing displayed (2) press UP (SW4) or DOWN (SW7) to adjust instruction (COOL/HEAT/ OFF). (3) after finish the adjustment, press ENTER (SW7) for 3 seconds, execute the setting instruction and stop flashing

0~3 of SW1 is used to select the outdoor number. SW3 range of 0, 1, 15, observe the outdoor unit parameters. (the master unit can display the parameters of the other outdoor unit and the indoor units, while the slave outdoor only displays its own parameters).

SW1	SW2	SW3	Function	Digital tube LD2 ~ 4 display
Outdoor unit address 0-3	0	0	Display outdoor unit failure code and Display special running code	Outdoor unit fault code (when the number of indoor units is not locked, Cycle in turn shows "number of indoor units, number of outdoor units, type of power supply ". (1) Number of indoor units :" U16" means that the outdoor unit is connected to 16 indoor units. (2) Number of outdoor units :5.5 P. for 150 model. (3) Power type :220 for single phase 220 V, 380 for 3~380 V. Special operating code: DRM1 mode: flashing display d1"; DRM2 mode: cycle display in turn "d2, compressor frequency "; DRM3 mode: cycle display "d3, compressor frequency" Self-cleaning mode: in cooling display "CLC"," in Heat flashing CLH"
	2	0	Display operation mode	LD2-LD4 means Stop: OFF, Cooling: CCC Heating: HHH, Cooling only : C--- Heat pump: H--
	3	0	Outdoor fan 1 speed	345 representation 345rpm • Press ENTER (SW7) for 3s continuously, display 1111, then to set: flashing. Press UP (SW4) once, fan speed will go up 1 level; press DOWN (SW7) once, fan speed will decrease 1 level. • Press EXIT (SW6) for 3s continuously, display 0000, then quit the setting condition, and stop flashing.
	4	0	Outdoor fan 2 speed	
	5	0	Frequency converter INV1 current frequency	110 representation 110.0Hz • Press ENTER (SW7) for 3 seconds, display 1111, enter the set state: flashing display, each according to the 1 UP (SW4) frequency rise 1Hz, every 1 times DOWN (SW5) frequency drop 1Hz; Long press UP (SW4) or DOWN (SW5) can quickly adjust the frequency. • Press EXIT(SW6) for 3 seconds, display 0000, quit the set state, stop flashing display; （When the system is faulty, the compressor is forbidden to start.）
	7	0	Outdoor unit LEVa1 open degree	Press ENTER (SW7) for 3 seconds, 1111, enter the setting state: flashing, press UP (SW4) valve fully open, press DOWN (SW7) the valve is fully closed; press DOWN (SW7) once, fan speed will decrease 1 level. Press EXIT (SW6) for 3s continuously, display 0000, then quit the setting condition, and stop flashing.
	B	0	Outdoor unit solenoid valve output	LD2： 4WV ： 1 ON 0 OFF LD3： SV1 ： 1 ON 0 OFF LD4： SV2： 1 ON 0 OFF
	C	0	High voltage switch input	LD2: HPS 1 ON 0 OFF LD3: LPS 1 ON 0 OFF LD4: reserved, display "-"

SW1	SW2	SW3	Function	Digital tube LD2 ~ 4 display
Outdoor unit address 0-3	E	0	Heater output	LD2： CH1： 1 ON 0 OFF LD3： BH： 1 ON 0 OFF LD4：Reserved，Display “-”
	F	0	Program version	1 means Ver1.0

SW1	SW2	SW3	Function	Digital tube LD2 ~ 4 display
0	0	1	Pd	Unit: kg, 2 decimal
0	2	1	Ps	
0	3	1	Td	Unit: ℃
0	5	1	Tdef	
0	9	1	Tc	
0	1E	1	Ts	

SW1	SW2	SW3	Function	Digital tube LD1 ~ 4 display
0	0	15（F）	Reserved	
0	1	15（F）	Tao	Unit: °C
0	2	15（F）	Pd_temp	
0	4	15（F）	Ps_temp	
0	8	15（F）	Inverter compressor INV1 ON/OFF time	Unit: Min
0	10（A）	15（F）	Inverter compressor INV1 current Tm	Unit: A, 1 decimal
0	11（B）	15（F）	Unit current input	Unit: A, 1 decimal
0	12（C）	15（F）	Inverter compressor INV1 DC voltage	Unit: V
0	13（E）	15（F）	Inverter compressor INV1 temperature	Unit: °C

System status display and control (master unit)

SW1	SW2	SW3	Function	Digital tube LD1 ~ 4 display
0	0	2	Refrigerant type	410A means 410A refrigerant
0	1	2	The outdoor units total capacity in one system	Total outdoor unit capacity (unit: HP) For example: 5.0 means total capacity is 5HP
0	2	2	Total indoor unit capacity	50 means 50HP
0	3	2	The indoor units quantity in one system	For example: 64
0	4	2	Running indoor QTY	Thermostat ON indicates indoor running
0	5	2	Indoor QTY whose operation modes are as the same as that of outdoor	E.g.: 13 indoors
0	6	2	Cooling /Heatingtarget temperature	Unit: °C
0	7	2	Actual average Tc2 temperature	
0	8	2	Automatic recovery of refrigerant Note: after recovery must cancel the setting or re-power on)	Press ENTER (SW7) for 3 seconds, into refrigerant recovery, digital tube display "C0" and" low pressure data" alternately flashing,indicate enter the refrigerant recovery operation, Forced cooling mode, all indoor units open, Do not judge superheat, oil temperature conditions. after 3 mins, Digital tube shows "C1" and" low pressure data "flashing alternately, indicate manual close the liquid pipe stop valve. When Ps≤1 kg(0.1MPa） , Digital Display C2", indicate manual close the gas pipe stop valve. After 5s, the system stops automatically, Digital Display C3", Power off

SW1	SW2	SW3	Function	Digital tube LD1 ~ 4 display
0	12（C）	2	Indoor unit expansion valve fully open	Press ENTER (SW7) for 3 seconds, display 1111, indoor valve fully open Press EXIT (SW6) for 3 seconds, display ----, cancel the forced control of the indoor unit expansion valve.
0	13（D）	2	All the indoor unit in cooling	Press ENTER (SW7) for 3 seconds, display 1111, open; Press EXIT (SW6) for 3 seconds, ----, close
0	14（E）	2	All the indoor unit in heating	
0	15（F）	2	Cancel all manual control (running class)	Press ENTER (SW7) for 3 seconds, display 1111 cancel; or press EXIT (SW6) for 3 seconds, display 0000, cancel Remove all manual control (part), all indoor unit close.

E2 control parameters display and setting

Each need to be set separately, setting method:
(1)Press ENTER (SW7) for 3 seconds, enter the setting state, flashing display the current value
(2) Press UP (SW4) or DOWN (SW5) to adjust parameters
(3)After the adjustment is completed
A> In the current state of the code, press the ENTER (SW7) for 3 seconds within the effective setting time, save the current setting value and exit the setting state, stop the flicker display, wait for 5 seconds and then power up again.
<B> In the current state of the code, not press ENTER (SW7) or change the dip switch selection, do not save the current set value, exit the setting state, stop flashing display

SW1	SW2	SW3	Function	Digital tube LD1 ~ 4 display
15（F）	0	2	Remark of indoor unit adjusting valve when heating standby	0-unavaiable 1-available
15（F）	1	2	Oil return mode select	0- long piping unavailable 1-long piping available
15（F）	2	2	Area selection	0- Ameracan unavailable 1- Ameracan available
15（F）	3	2	Start mode priority	0- first open is priority; 1- last open is priority 2- cooling priority; 3- heating priority
15（F）	4	2	Capacity over match selection	1- forbidden
15（F）	5	2	ECO and normal operaion selsction	0- ECO 1- Normal operaion
15（F）	6	2	Cooling only or heat pump selection	0- Cooling only 1-heat pump
15（F）	7	2	New and old protoco selection	96-new protoco 24-old protoco
15（F）	8	2	Fan mode selsction	0-normal 1-Energy efficiency testing 2-High ESP
15（F）	9	2	Modus protocol selection	0-Modus protoco 1-Central wired controller protoco
15（F）	10 (A)	2	Expansion valve LEV fault shield selection	0- not shielded, normal detection 1- shielded
15（F）	11（B）	2	Snow-proof operation setting	0-without snow-proof operation, 1-snow-proof operation

SW1	SW2	SW3	Function	Digital tube LD1 ~ 4 display
15（F）	12（C）	2	Power restrain operation control mode selection	0-unavaiable 1-available
15（F）	13 (D)	2	ModeBus Fahrenheit unit selection	0- °C 1- °F
15（F）	14 (E)	2	Allow access to factory automation test mode mark (for factory testing)	0- forbidden 1- allow(default)
15（F）	15（F）	2	Allow access to self-cleaning	0- forbidden 1- allow(default)

Outdoor unit valve control

SW1	SW2	SW3	Functions	Operation methods
6	15 (F)	2	Cancel all the manual controls (component type)	• Press ENTER (SW7) for 3 seconds, display 1111, then to quit, or press EXIT (SW6) for 3 seconds, display 0000, then quit the set. • Cancel items: Movable component control by hand such as compressor, motor, electronic expansion valve (LEV), solenoid valve (SV) and so on (including evacuation and charging; excluding rated operation, compulsory operation, indoor run/stop, etc.)

Examination of local EE data

SW1	SW2	SW3	Function	Display with digital tube LD1~4
12 (C)	0	0	The EE data of address 000H (Version E2)	000H-0FFH address EE data display Address calculation: addr=SW2*10H +SW3 Data display: hexadecimal display, H represents hexadecimal number
	0	1	The EE data of address 001H	
	…	…	…	
	0	F	The EE data of address 00FH	
	1	0	The EE data of address 010H	
	…	…	…	
	1	F	The EE data of address 01FH	
	…	…	…	
	F	F	The EE data of address 0FFH	
13 (D)	0	0	The EE data of address 100H	100H-13FH address EE data display Location: addr=100 H SW2*10H +SW3 Data display: hexadecimal display, H represents hexadecimal number
	0	1	The EE data of address 101H	
	……	……	……	
	3	F	The EE data of address 13FH	
	4	0	The EE data of address 140H	140H-1FFH address is fault information area
	……	……	……	
	F	F	The EE data of address 1FFH	

16. Outdoor Unit Control

16.1 Compressor startup control

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

16.2 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.

16.2.1 In cooling mode:

According to the ambient temperature select target Ps automatically

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

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

16.2.2 In heating mode:

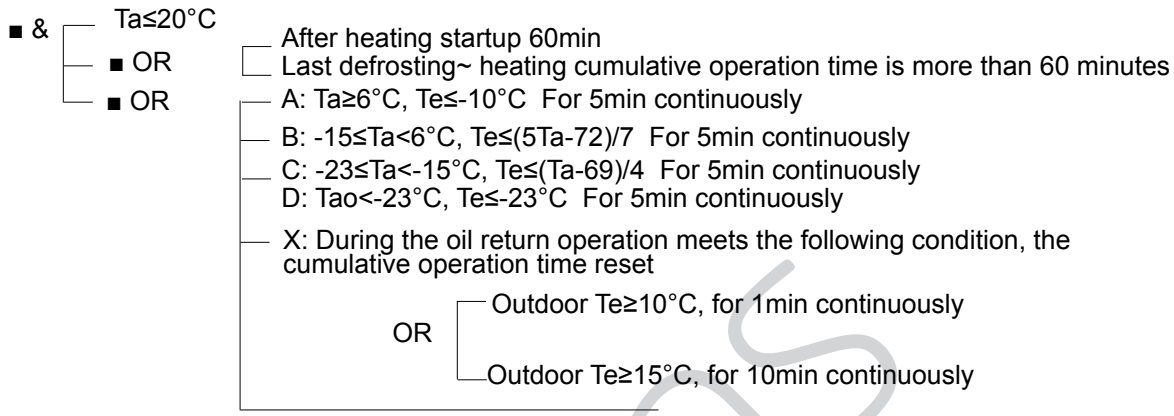
According to the piping length to select target Pd and also according to the ambient temperature select target Pd automatically

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

16.3 Defrosting control

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

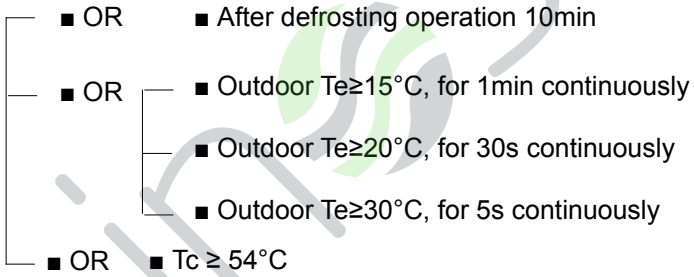
16.3.1 Entering condition:



16.3.2 Defrosting control

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

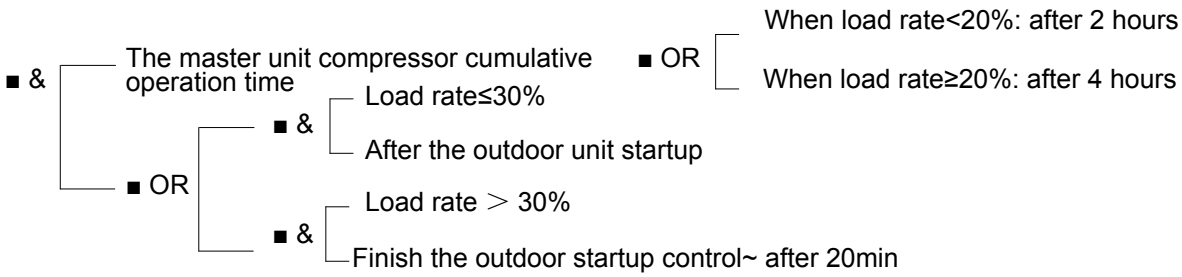
3.3 Quit defrosting



16.4 Oil return control

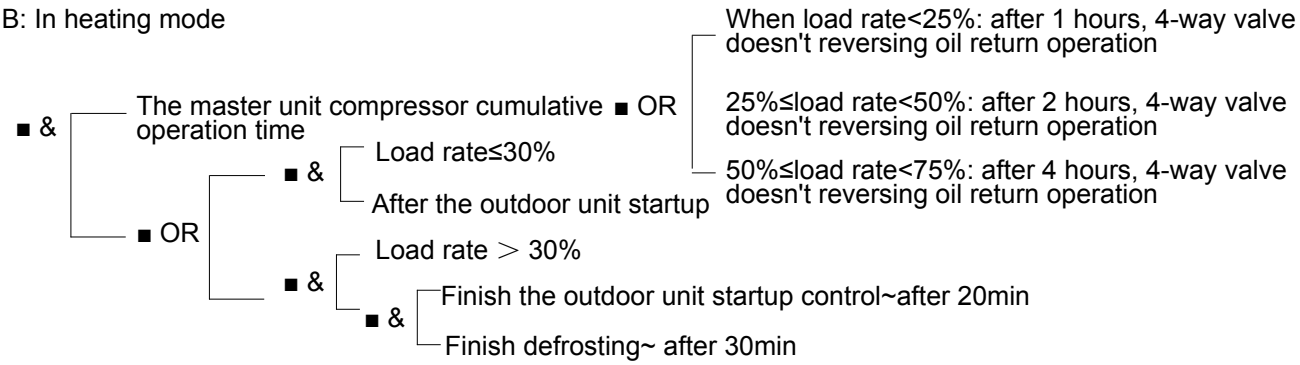
16.4.1 Entering condition:

A: In cooling mode



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

B: In heating mode



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

16.4.2 Oil return control

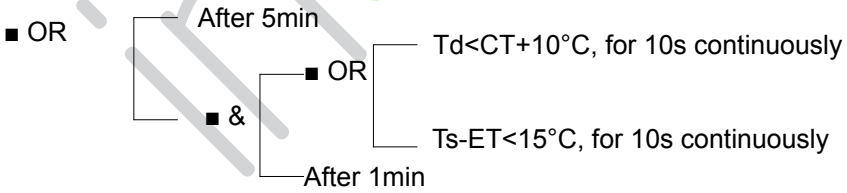
1) Oil return in cooling mode, the compressor according to the 75% of maximum frequency control, the outdoor PMV opening angle is 470 pls, the Thermo ON indoor PMV opening angle is 250 pls, the Thermo OFF indoor PMV opening angle is 125 pls.

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

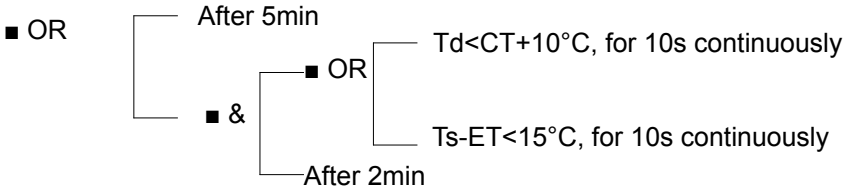
3) Oil return in heating mode (4-way valve doesn't reversing), the compressor according to the indoor units load rate and current running frequency to confirm the oil return enter frequency, the maximum frequency can't exceed 75% of the maximum frequency. the PMV of the outdoor and the Thermo ON indoor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

16.4.3 Oil return quit condition:

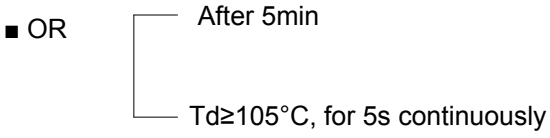
1) In cooling mode



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



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



17. 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
20-1	20-1	Defrosting temp. sensor Tc failure		
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	29	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 continous 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

Digital tube indication on master unit	Indication on wired controller (hex)	Failure code definition	Failure description	Remarks
43	43	Discharging temp. sensor Td too low protection	In normal operation, if Td<CT+50°F (10℃) 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
49	49	"Low pressure switch LPS failure"	If disconnect for 50ms continuously,alarm.If alarm 3 times in an hour,confirm the failure	"Once confirmation, un-resumable"
51-0	51-0	LEVa current is too high	LEV driver chip detection	Resumable
51-2	51-2	LEVb current is too high	LEV driver chip detection	Resumable
52-0	52-0	LEVa broken line fault	LEV driver chip detection	Resumable
52-2	52-2	LEVb broken line fault	LEV driver chip detection	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
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
59	3B	Sub-cooling temp. sensorTliqsc temp. sensor failure	Continuous disconnect for 60 seconds or short circuit, failure alarm.	Resumable

Digital tube indication on master unit	Indication on wired controller (hex)	Failure code definition	Failure description	Remarks
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		
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	
83	83	Outdoor model set error	Model and the number of fans do not match	Un-resumable
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	
114	114	Voltage too low of DC bus line of transducer	Voltage of power source is too low	
116	116	Communication abnormal between transducer and control PCB	Communication is disconnected	Resumable

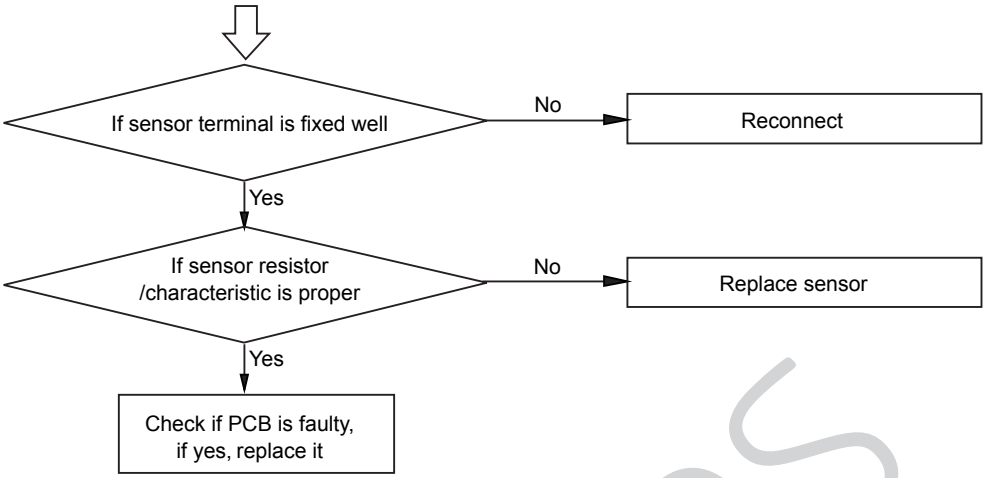
Digital tube indication on master unit	Indication on wired controller (hex)	Failure code definition	Failure description	Remarks
117	117	Transducer over current (software)	Compressor startup fails for 5 times continuously, or compressor is running down till stops caused by over current or over heat	3 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.	
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	
124	7C	Inverter module power supply failure	inverter power supply failure	Resumable

In case of no failure, if the starting conditions of the system are not met, the digital tube of the outdoor unit will display the standby code of the air conditioner:

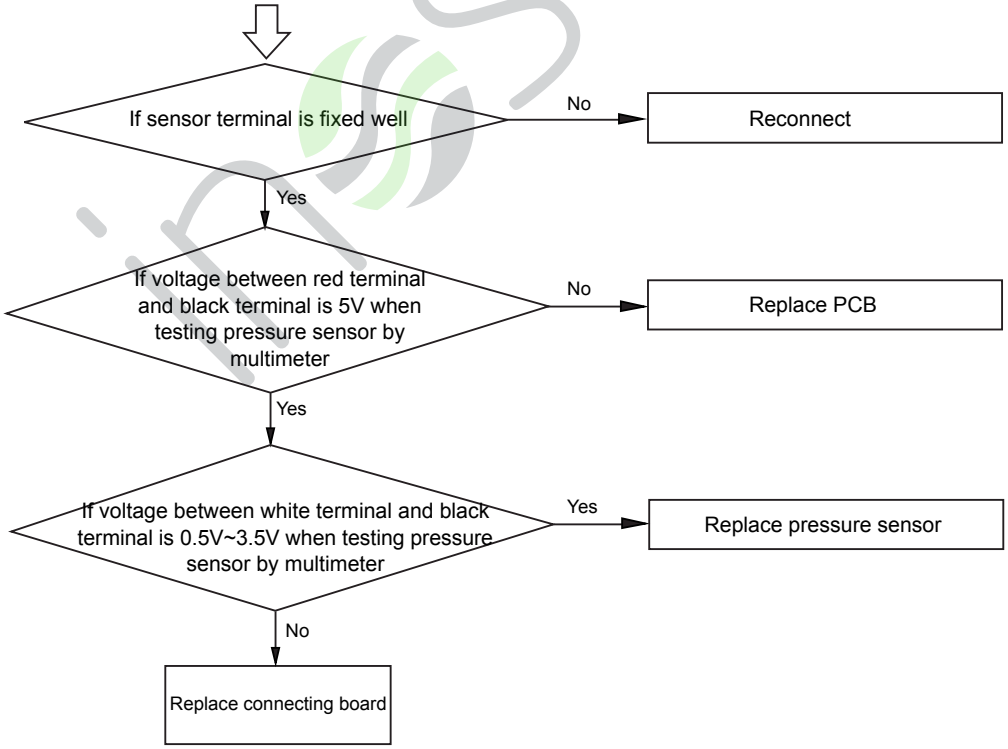
555.0	Standby state of capacity over-matched	The ratio of indoor capacity to out-door capacity is over 130%.	Resumable
555.1	Heating at high ambient temp.	Ta>27°C, the indoor units standby when they are running in heatling mode.	
555.3	Cooling at ambient temp. too high or too low	Ta>54°C or Ta<-10°C, the indoor units standby when they are running in cooling mode.	
555.b	The running mode of outdoor unit does not match with the indoor units.	The outdoor unit maybe setted to cooling only or heating only.	

18. Troubleshooting

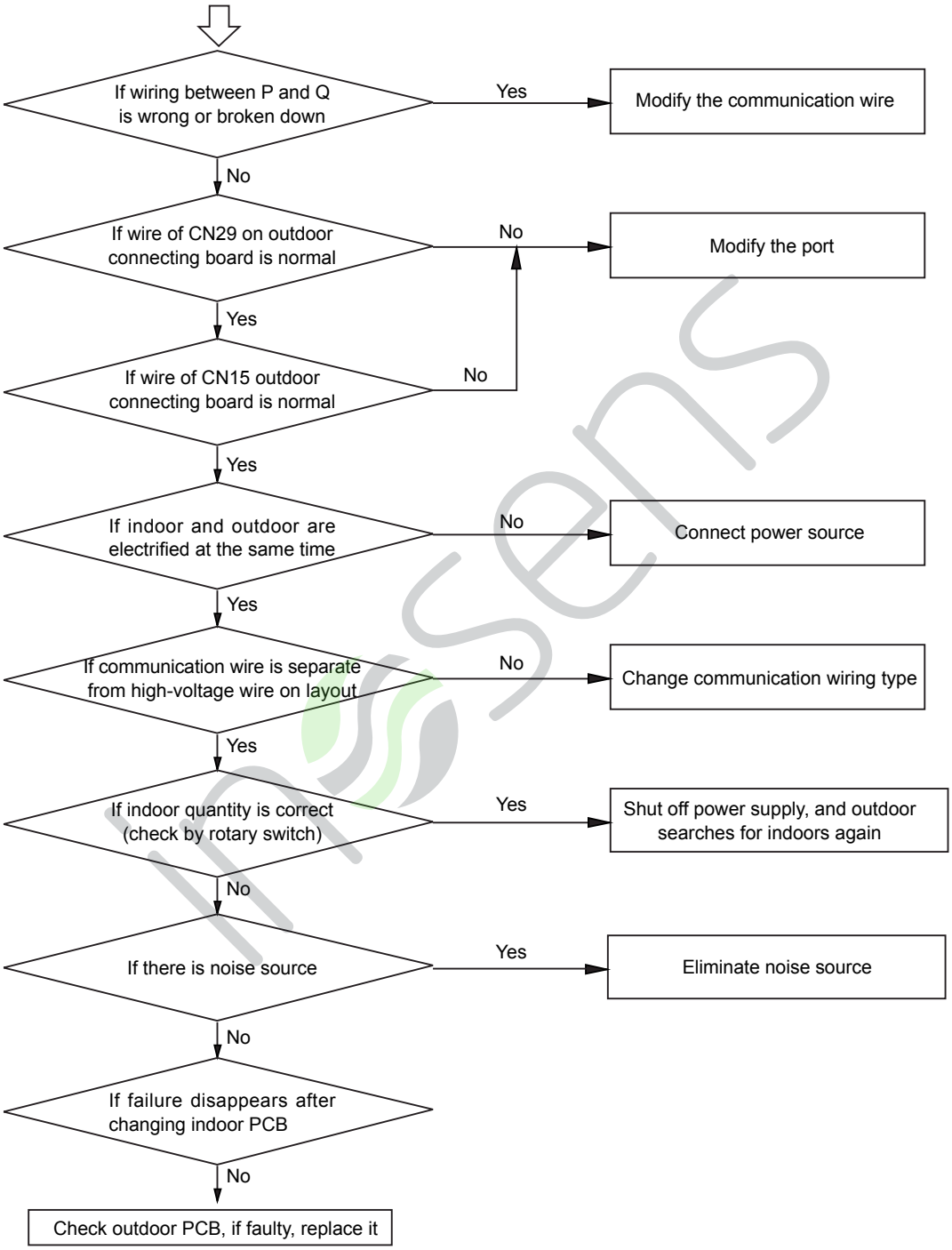
[20~24] Temperature sensor failure



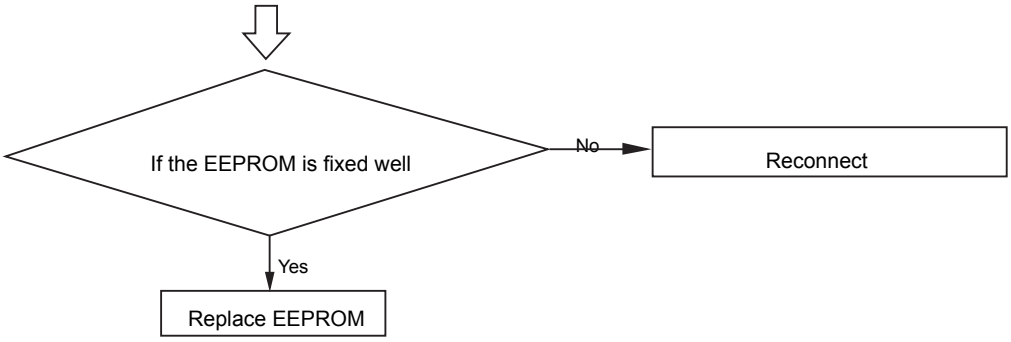
[28, 29] High/low pressure sensor failure



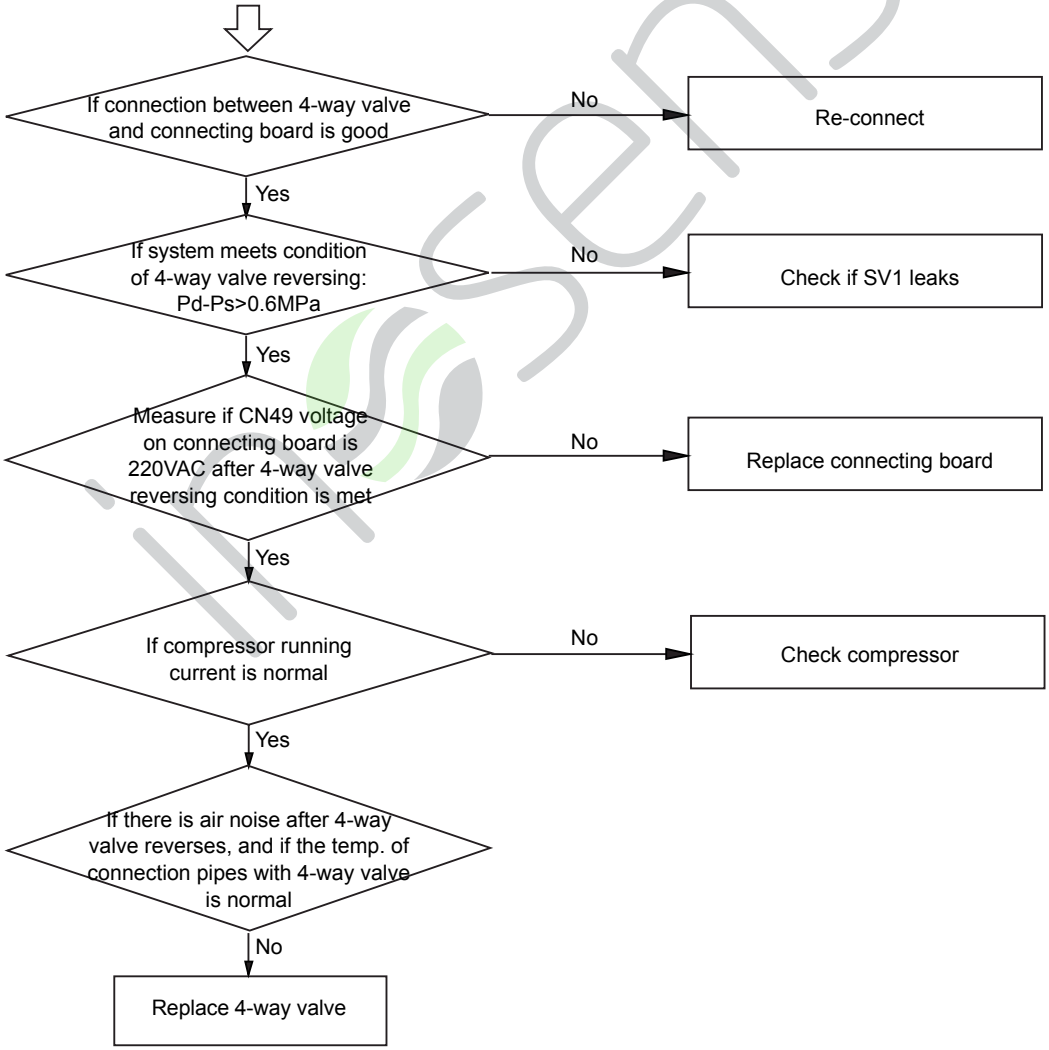
[26-0, 26-1, 26-2] Communication circuit between indoor and outdoor



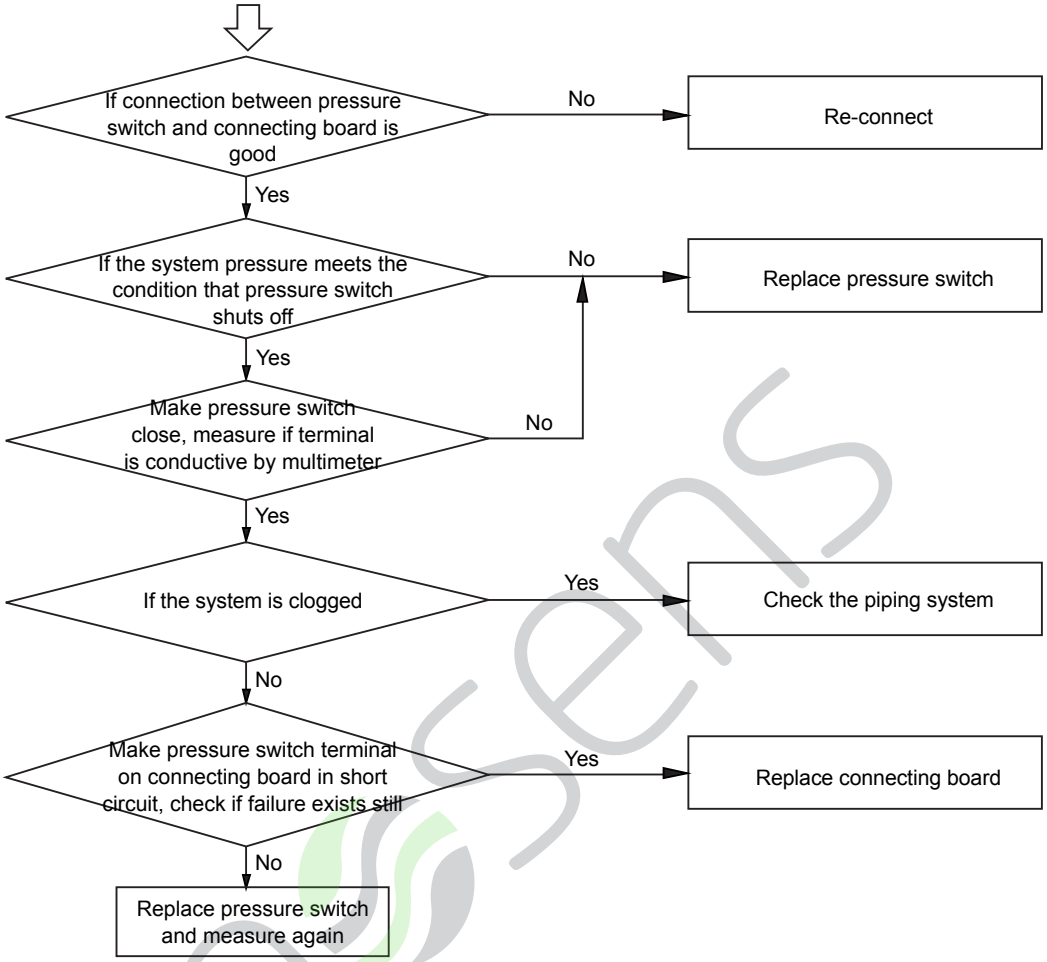
[33] Outdoor EEPROM failure



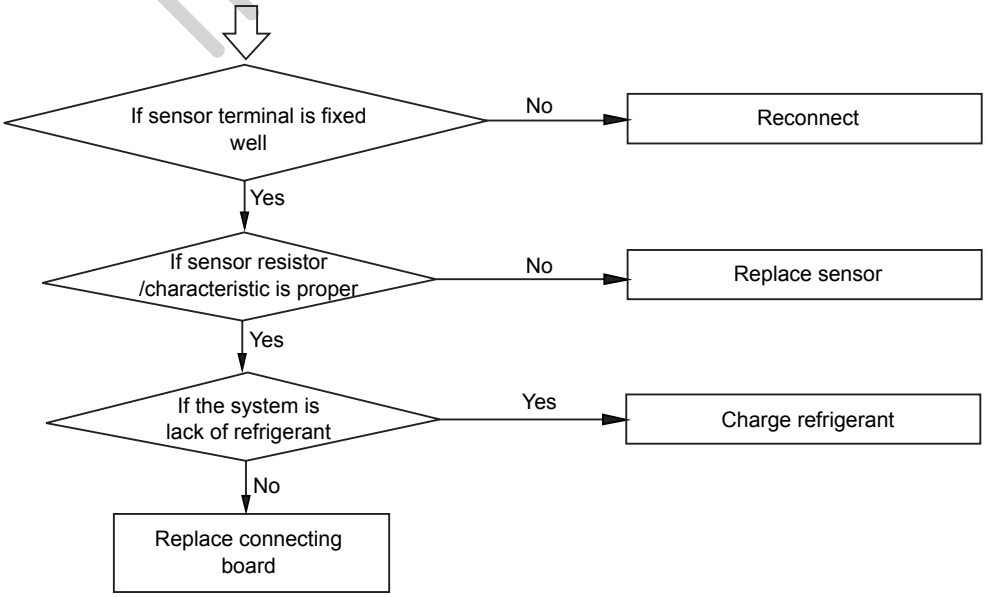
[35] 4-way valve reversing failure



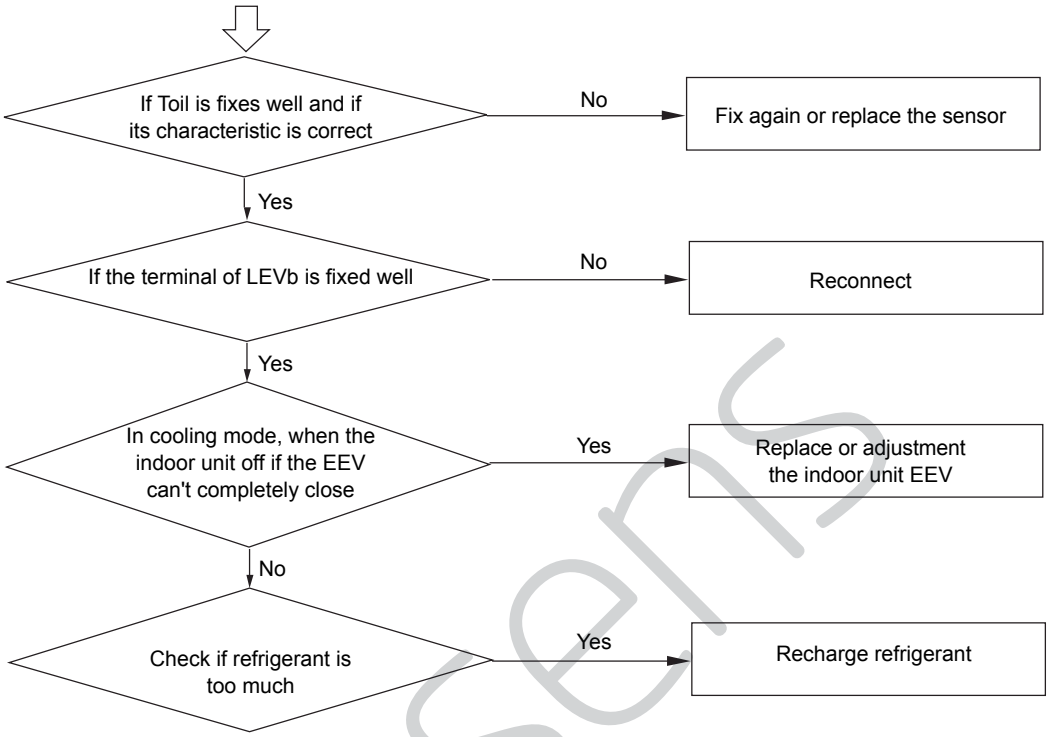
[30] High pressure switch shutoff failure



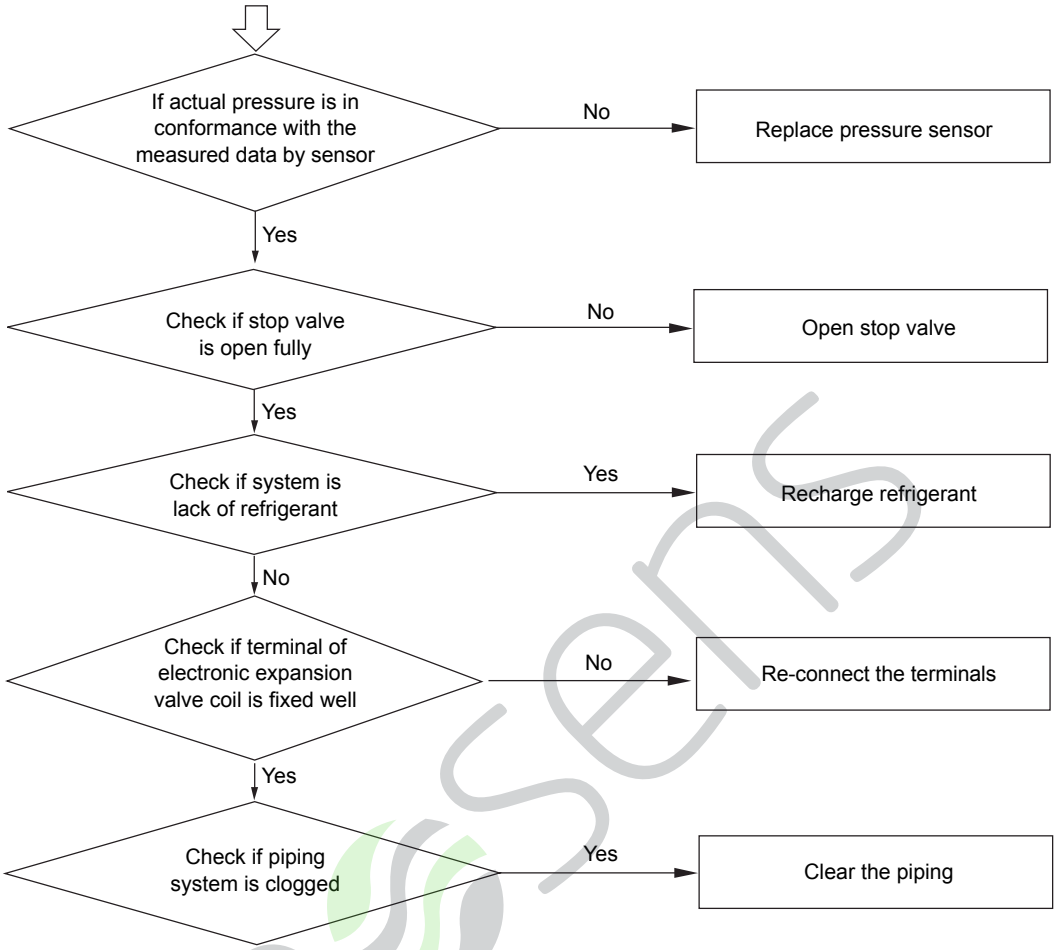
[34] Protection of discharging temp. too high



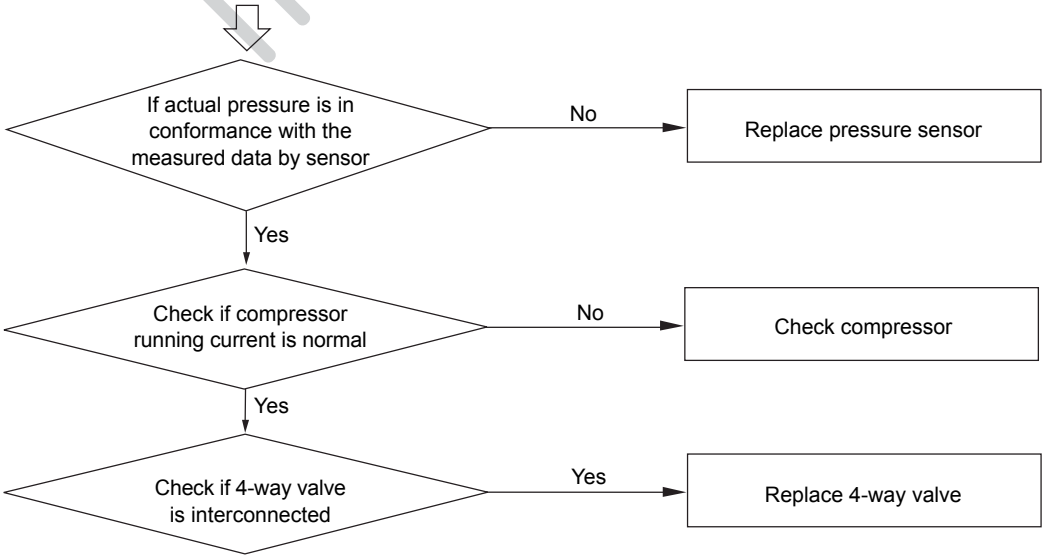
[36] Protection of oil temperature too low



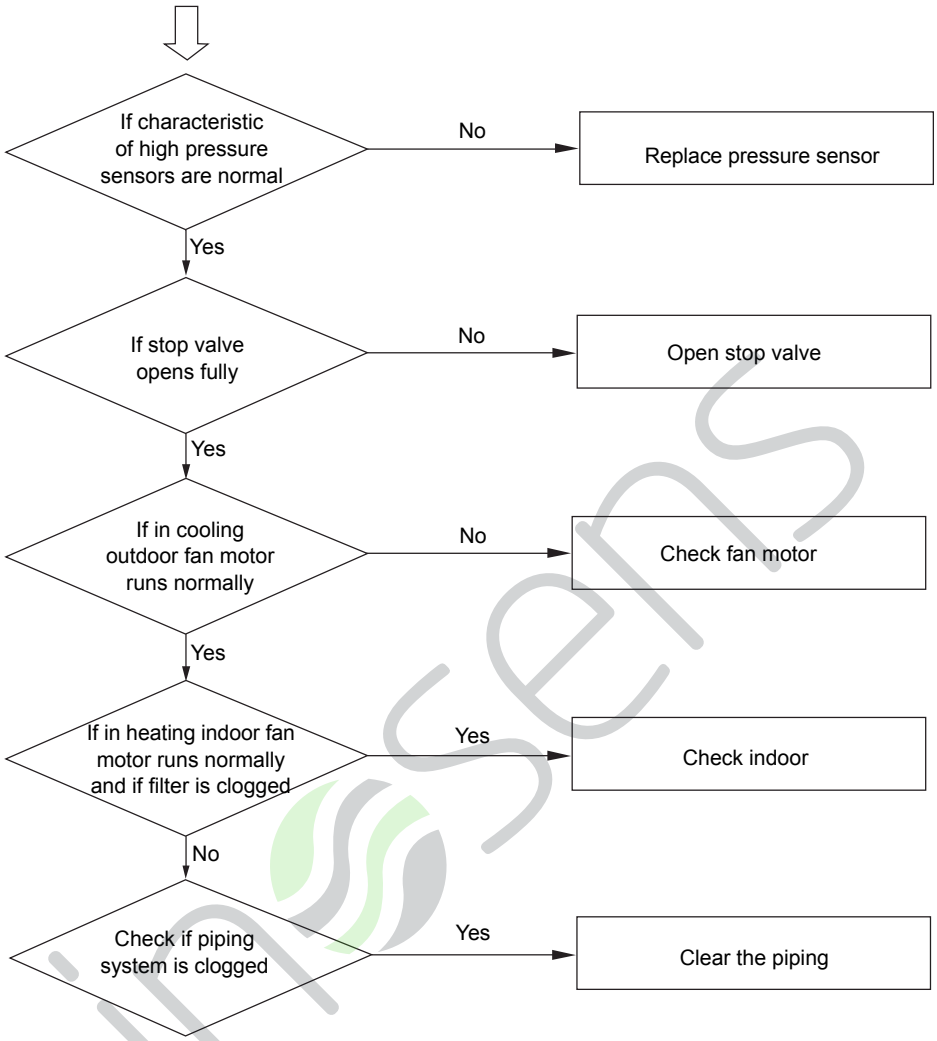
[39-0, 39-1] Low pressure too low and compression ratio too high



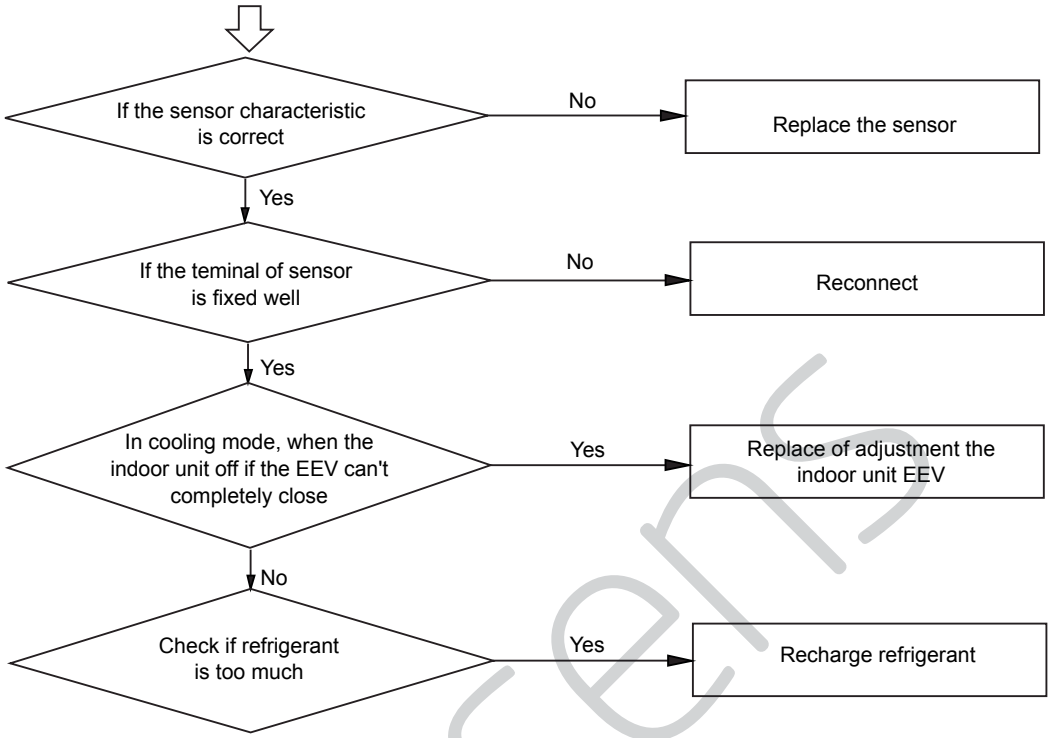
[39-2] Compression ratio too low



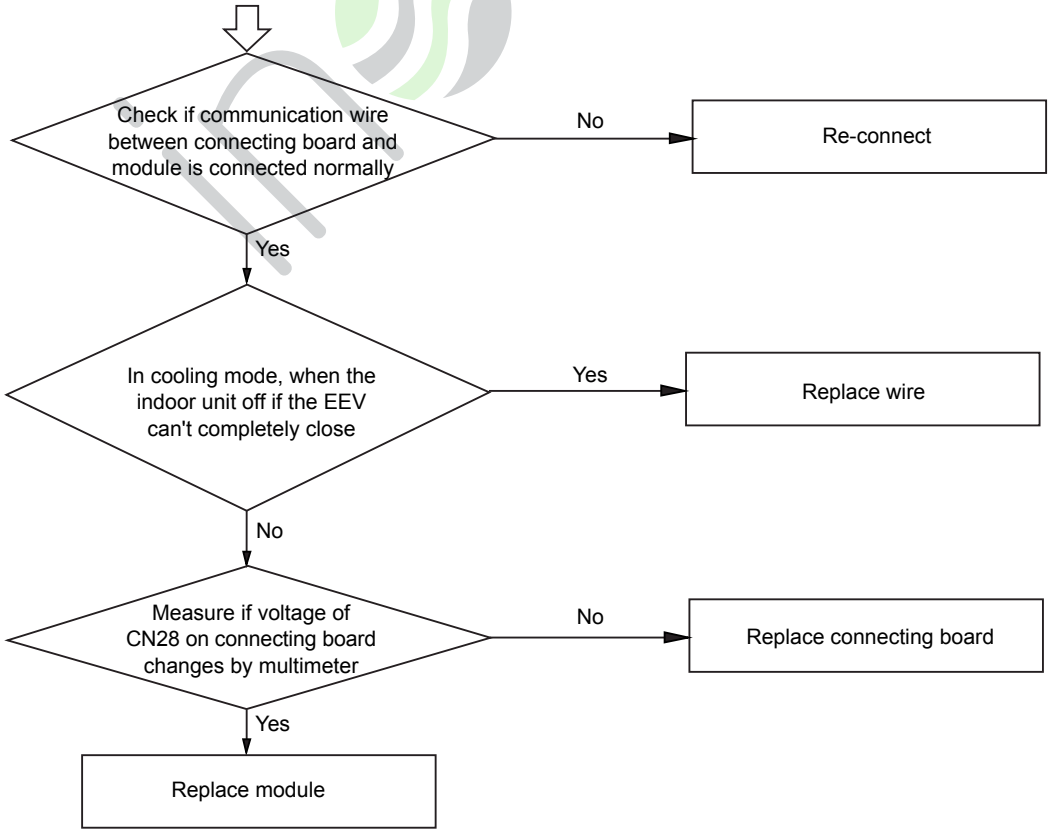
[40] High pressure protection



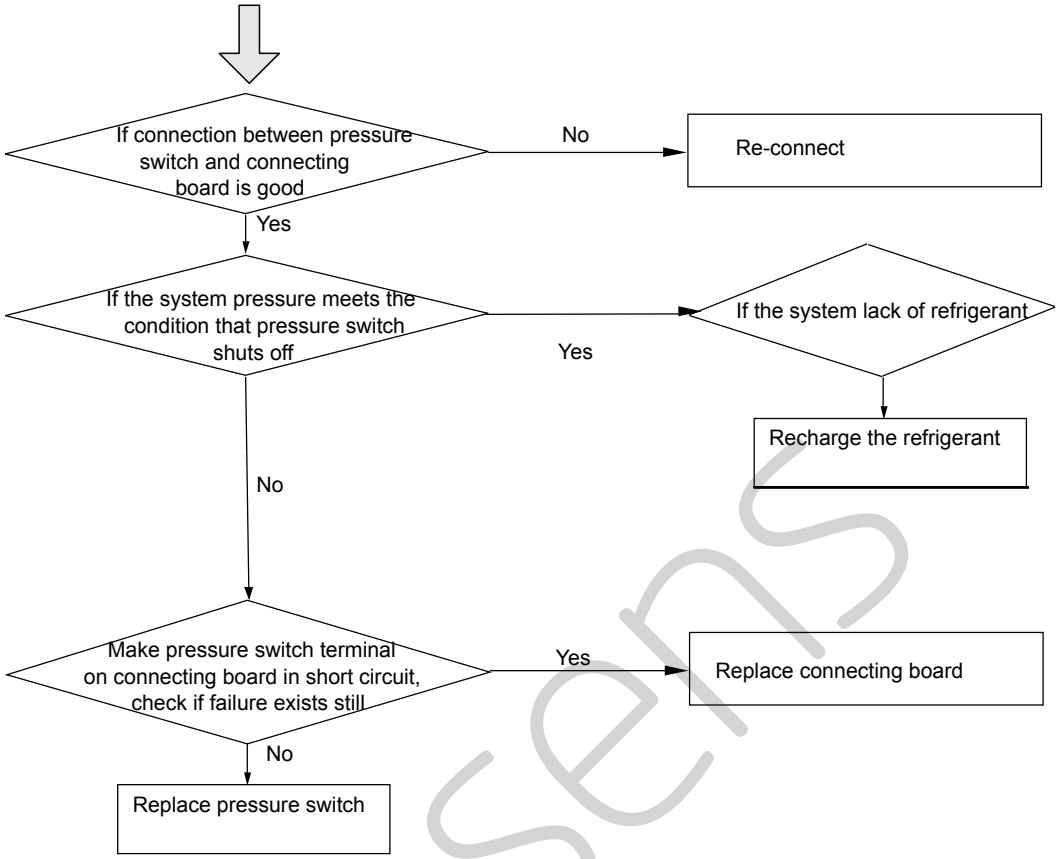
[43] Discharging temp. sensor Td too low protection



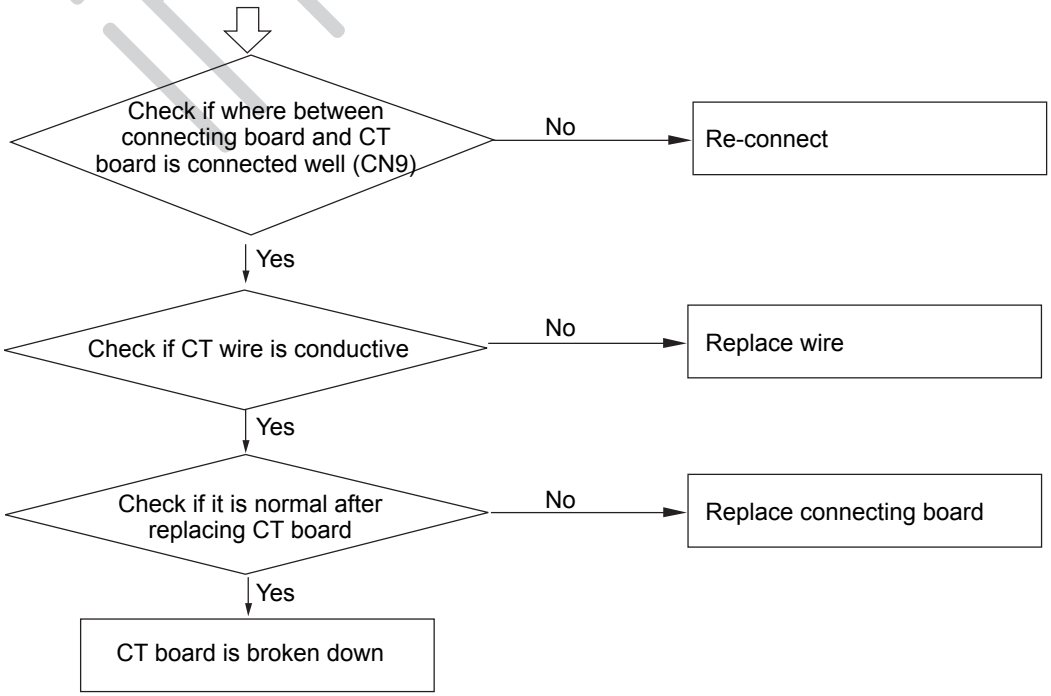
[46] Communication with inverter module failure



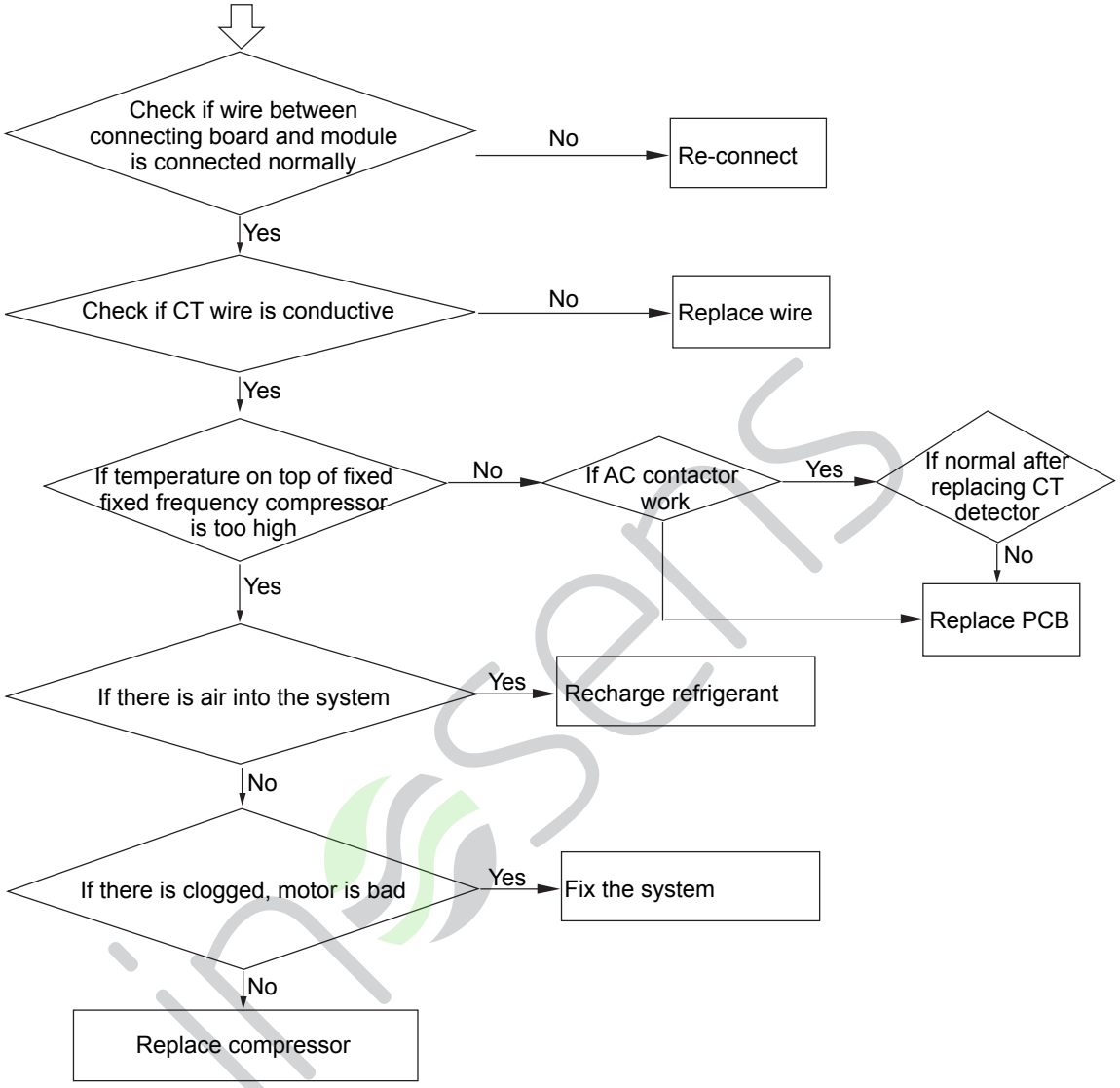
[49] Low pressure switch failure



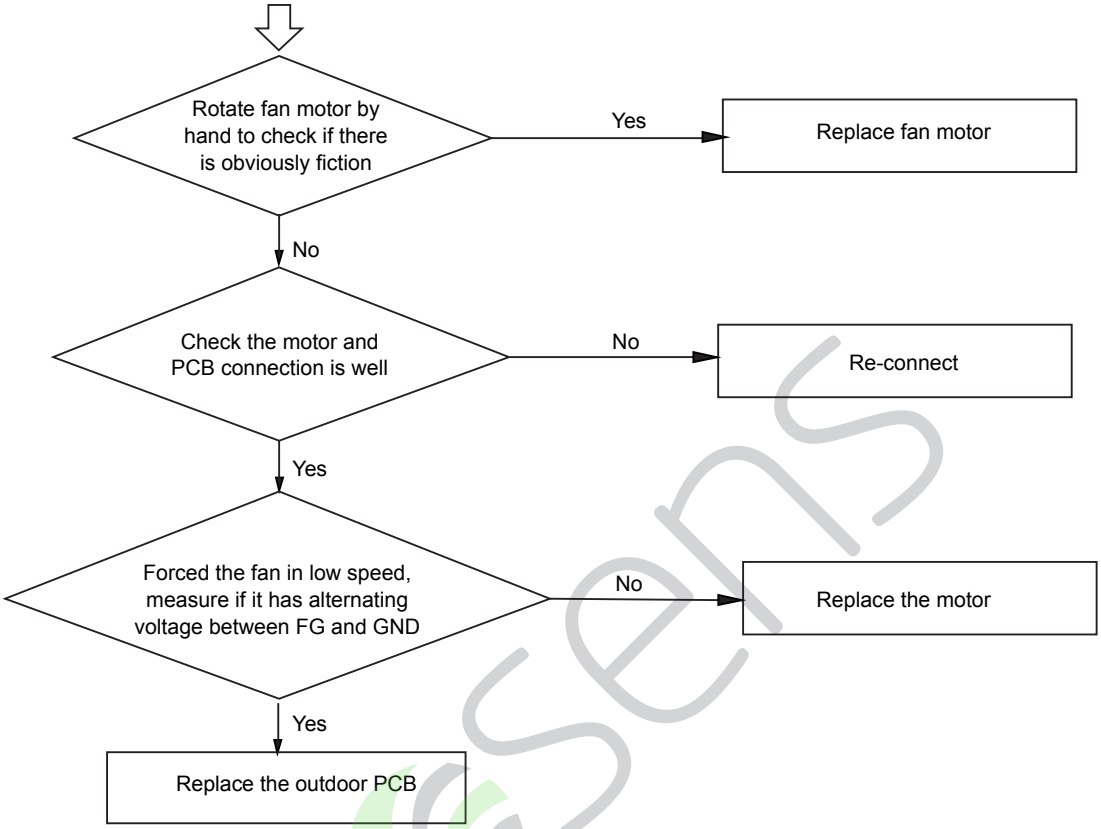
[53] Current sensor failure



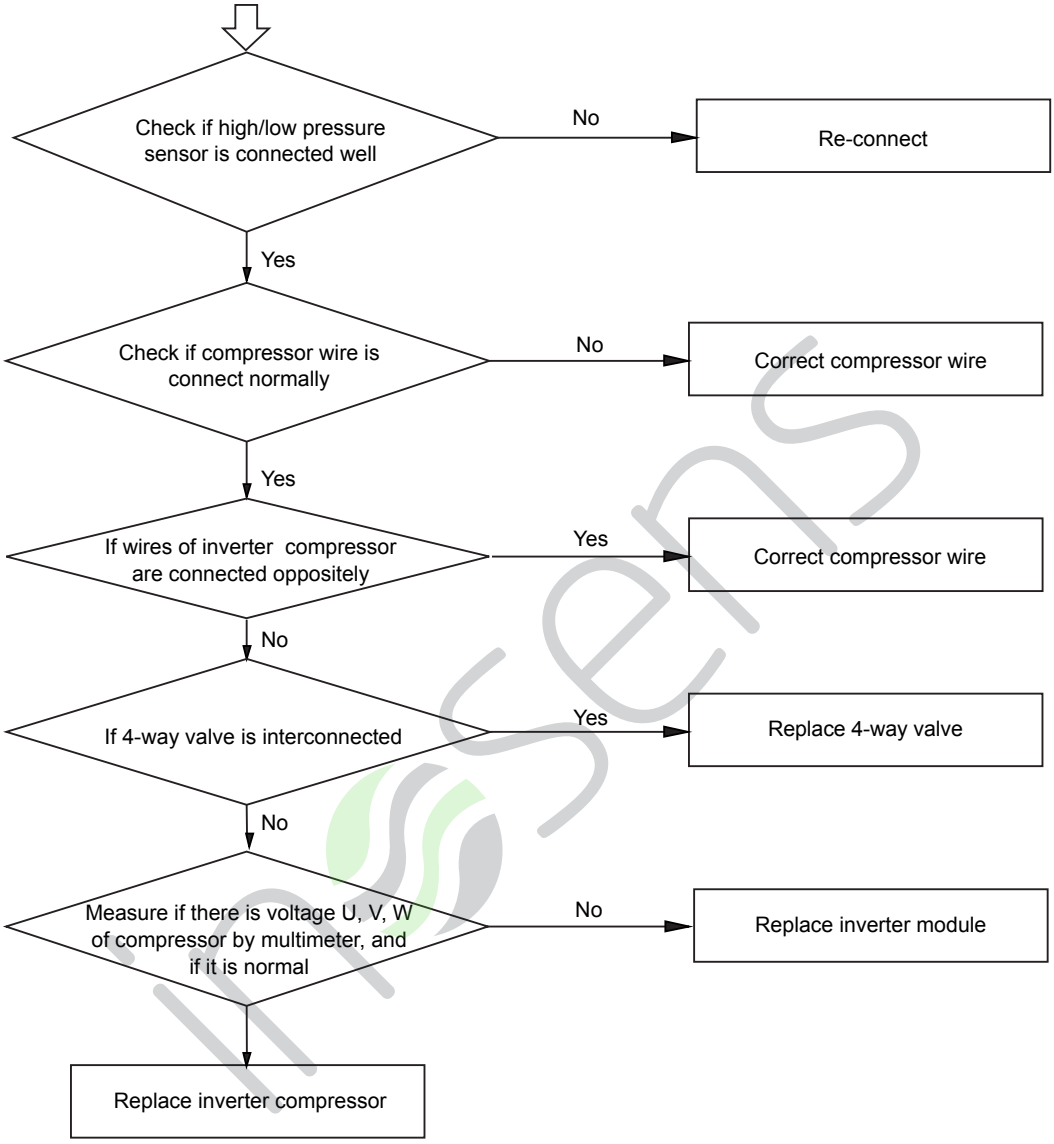
[64] CT over current



[71] DC motor blocked



[75] No pressure drop between high pressure and low one

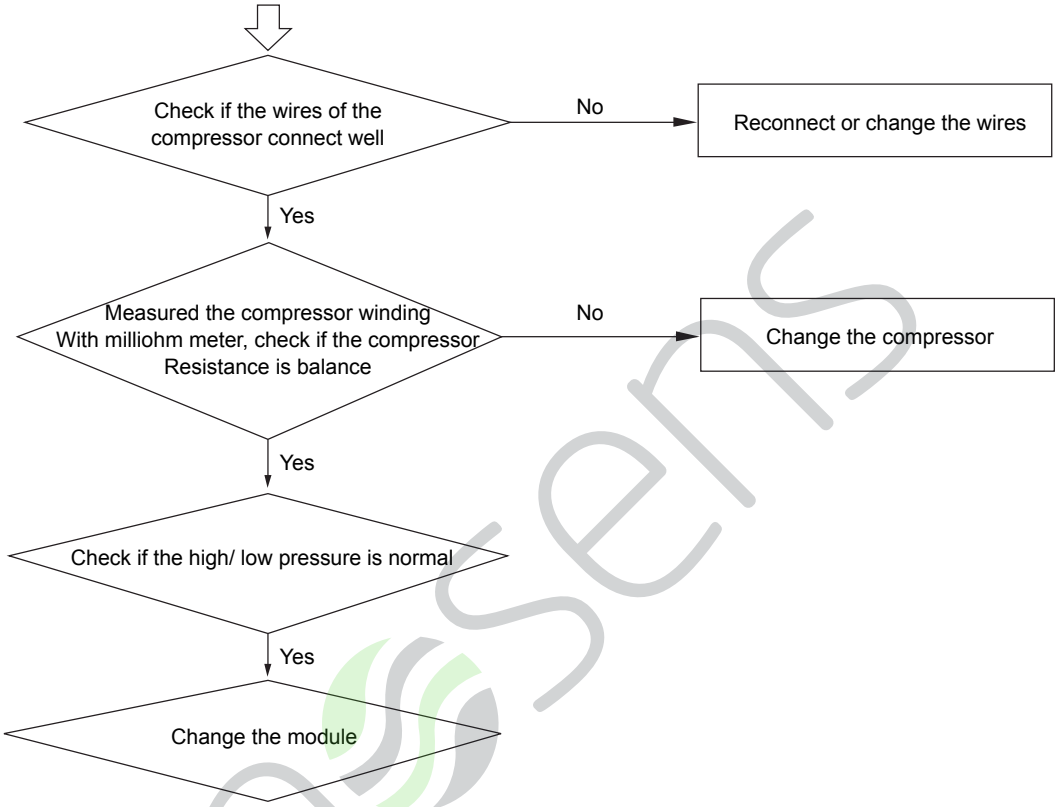


[82] Compressor current protection

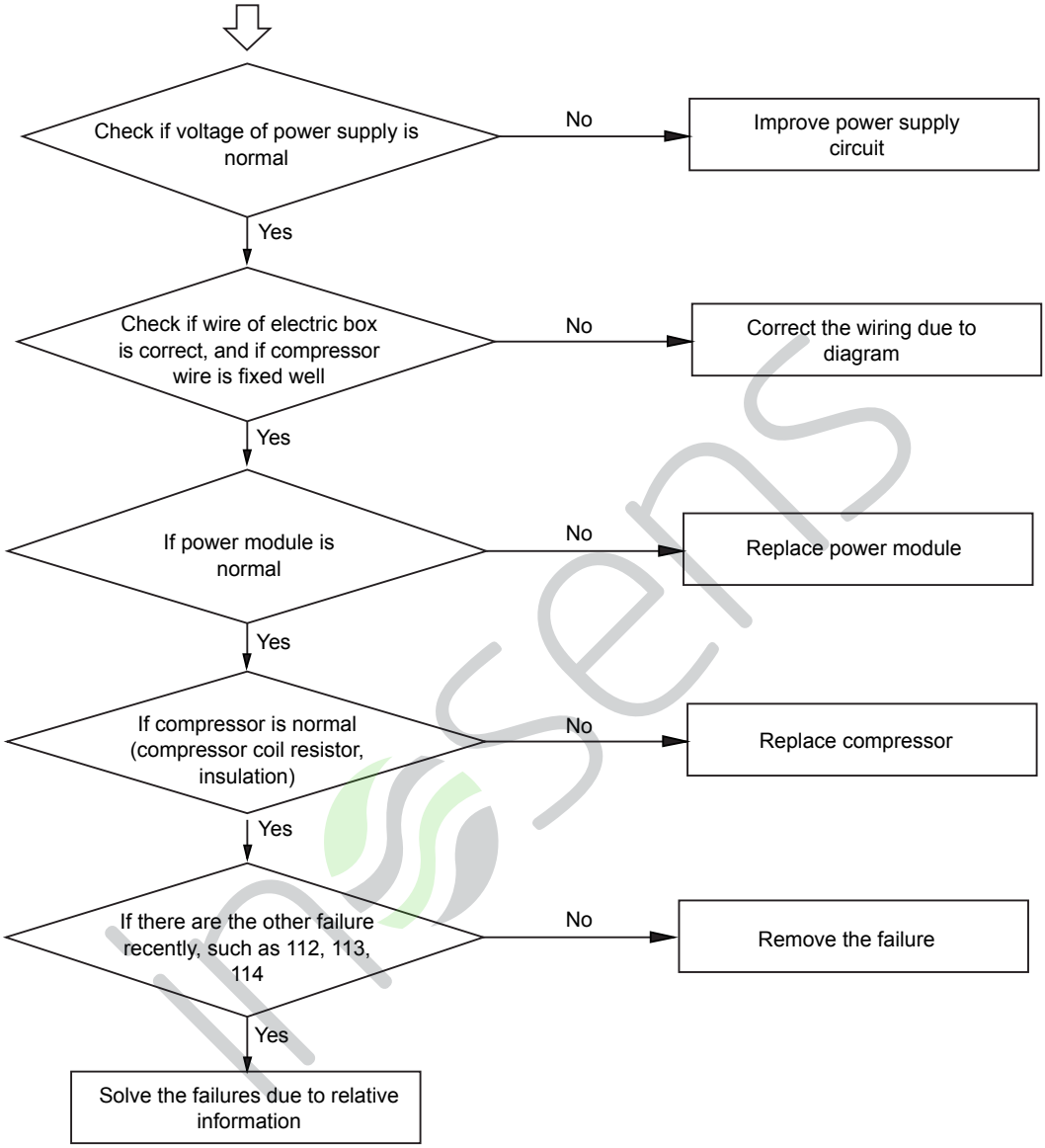
[108] Transient over current in IPM module rectifier side software

[109 Current detection circuit abnormality

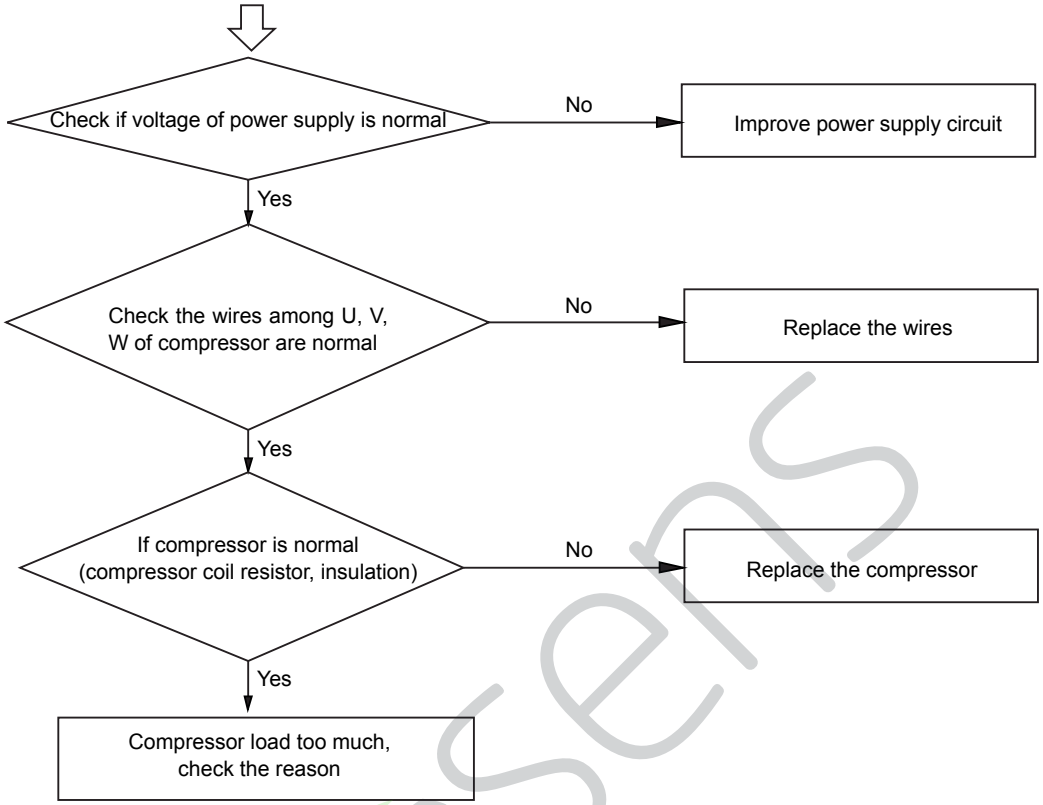
[123] Transient over current in IPM module rectifier side hardware



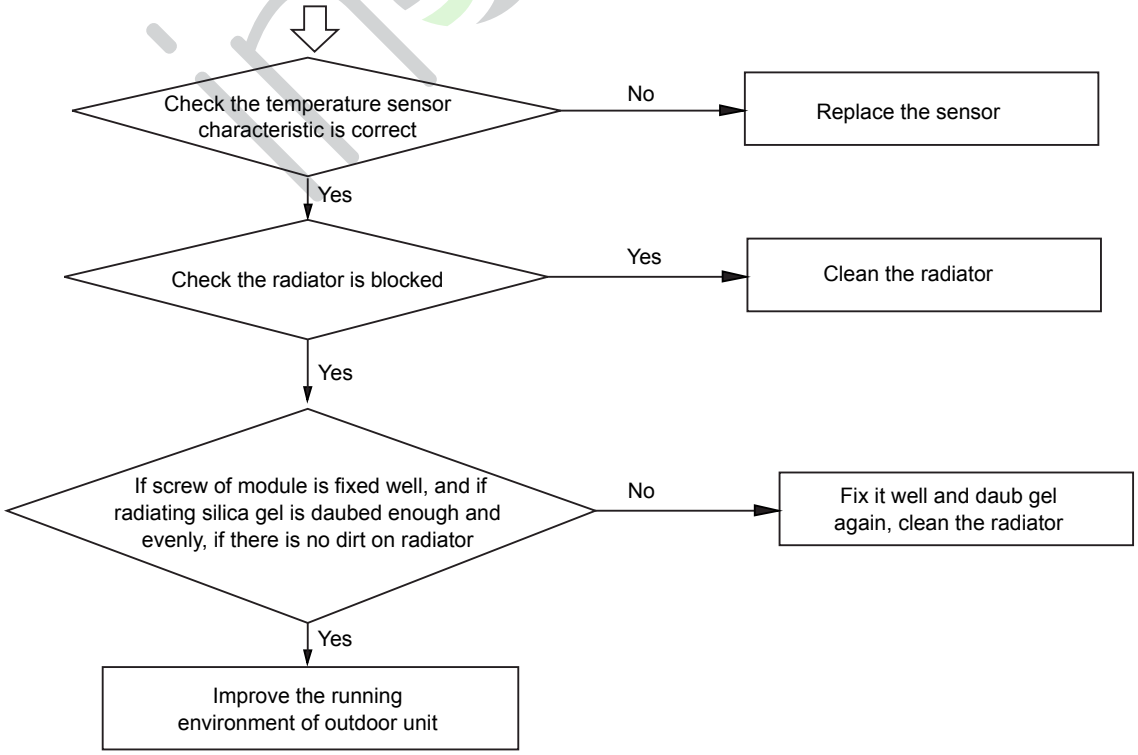
[110] Power module overcurrent



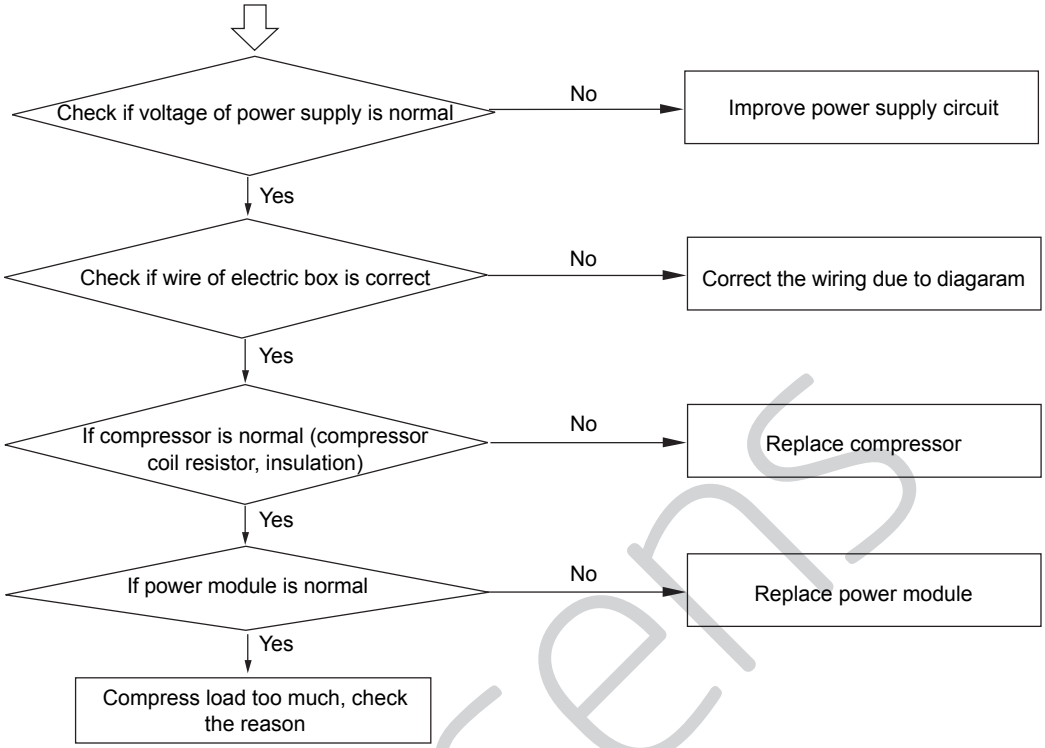
[111] Compressor out of control



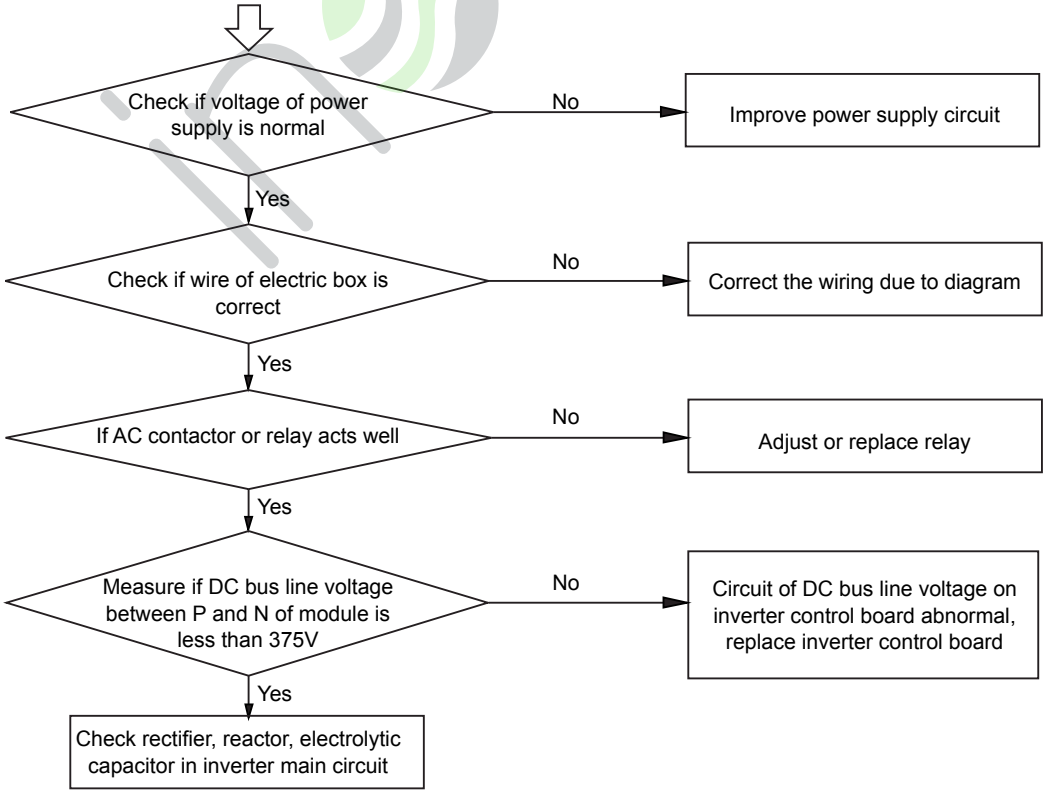
[81] IPM modular temp. too high protection
[112] Radiator of transducer temp. too high



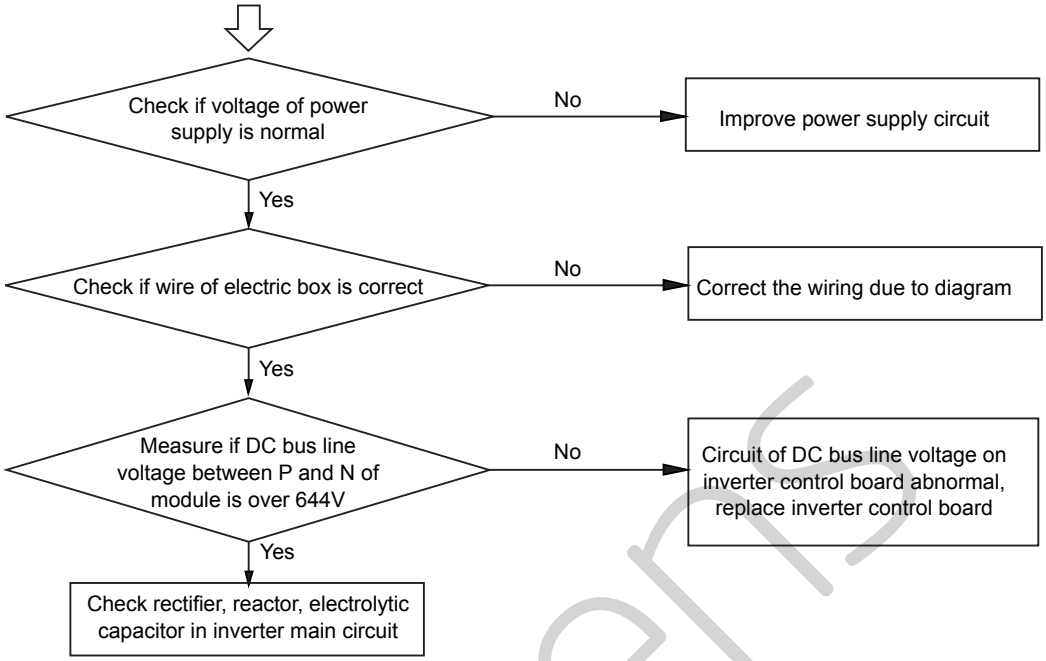
[113] Protection of overload



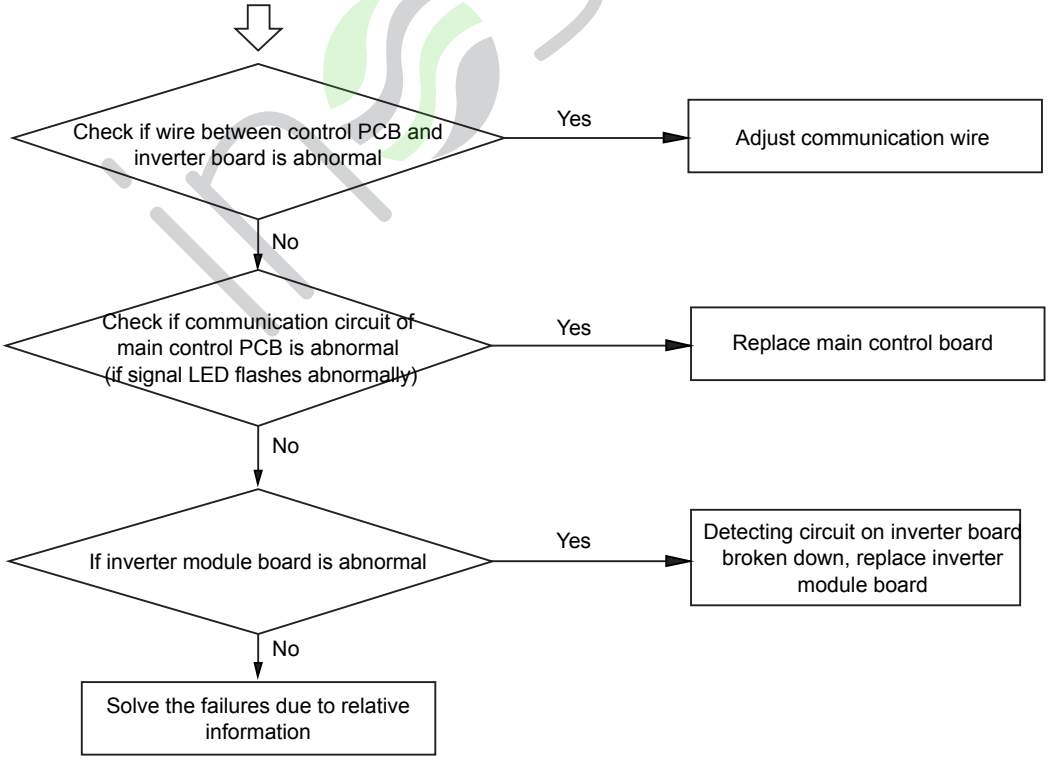
[114] Voltage too low of DC bus line of transducer



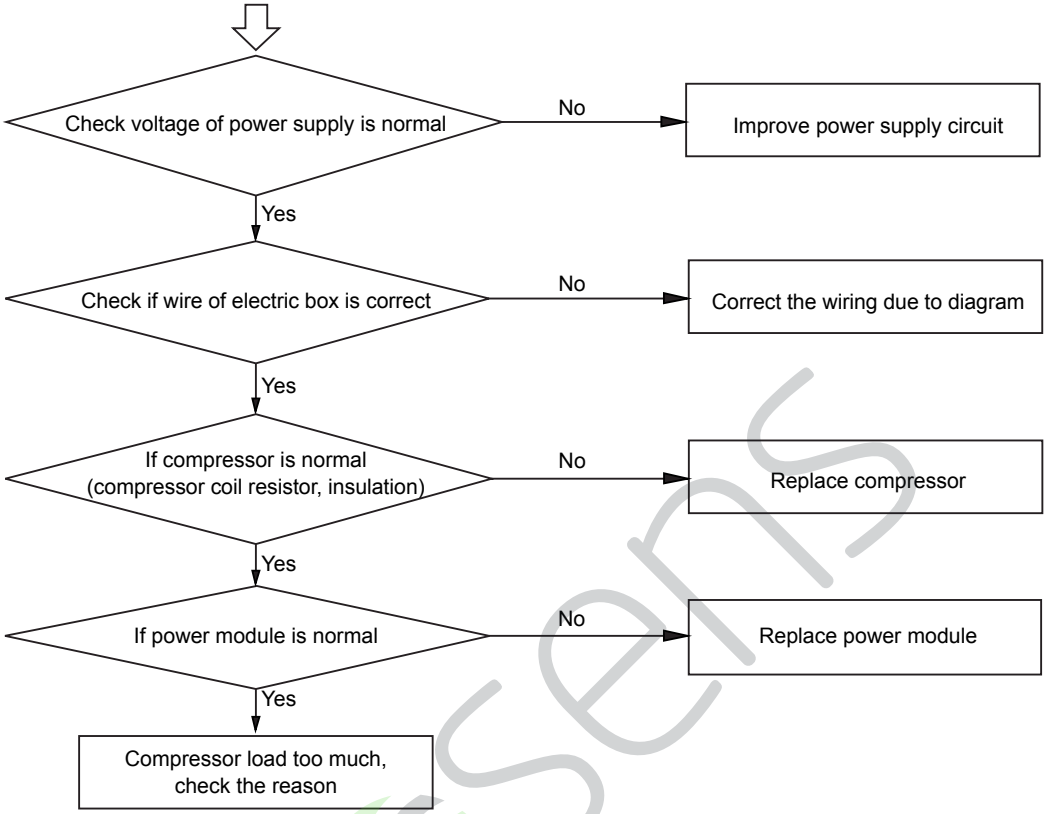
[115] Voltage too high of DC bus line of transducer



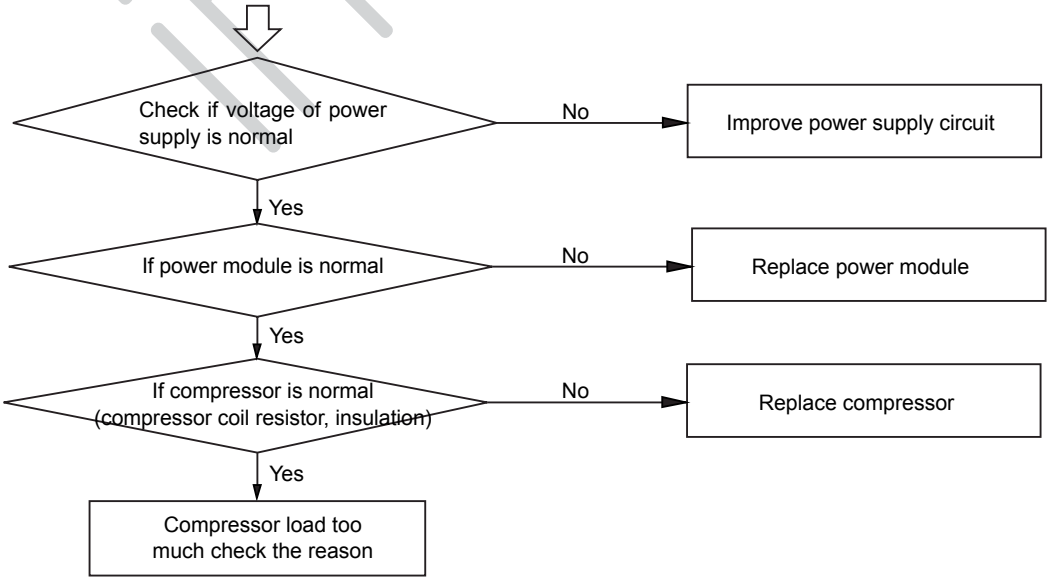
[116] Communication abnormal between transducer (inverter module board) and control PCB



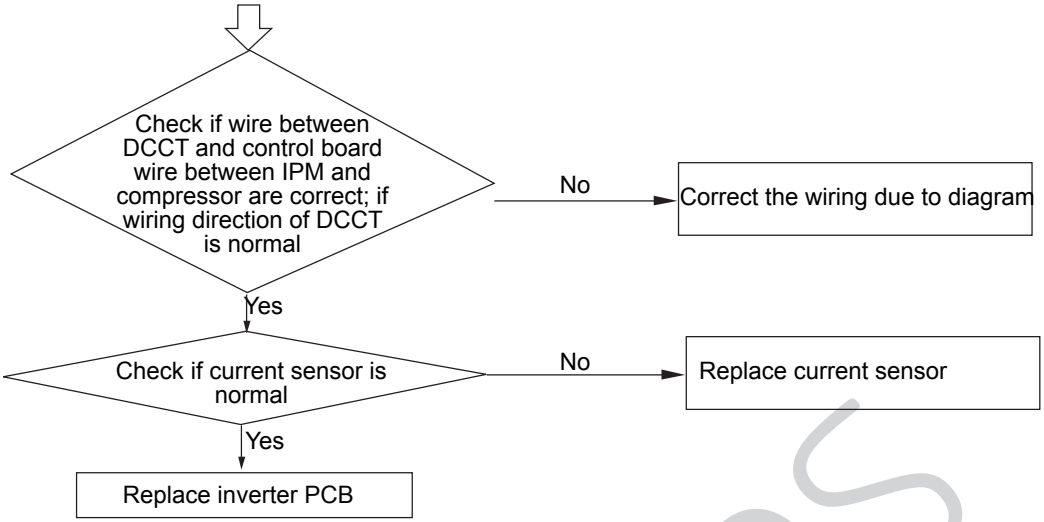
[117] Transducer over current (software protection)



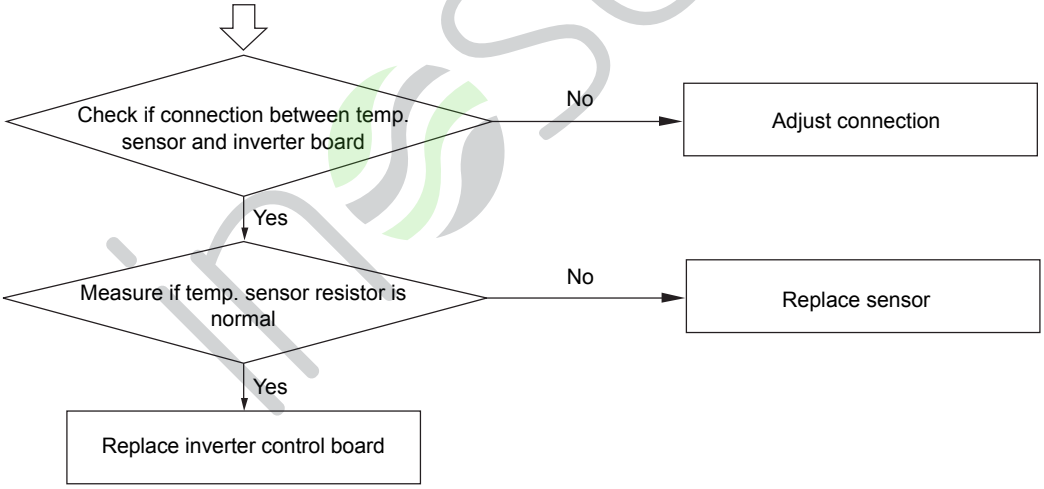
[118] Compressor startup failure



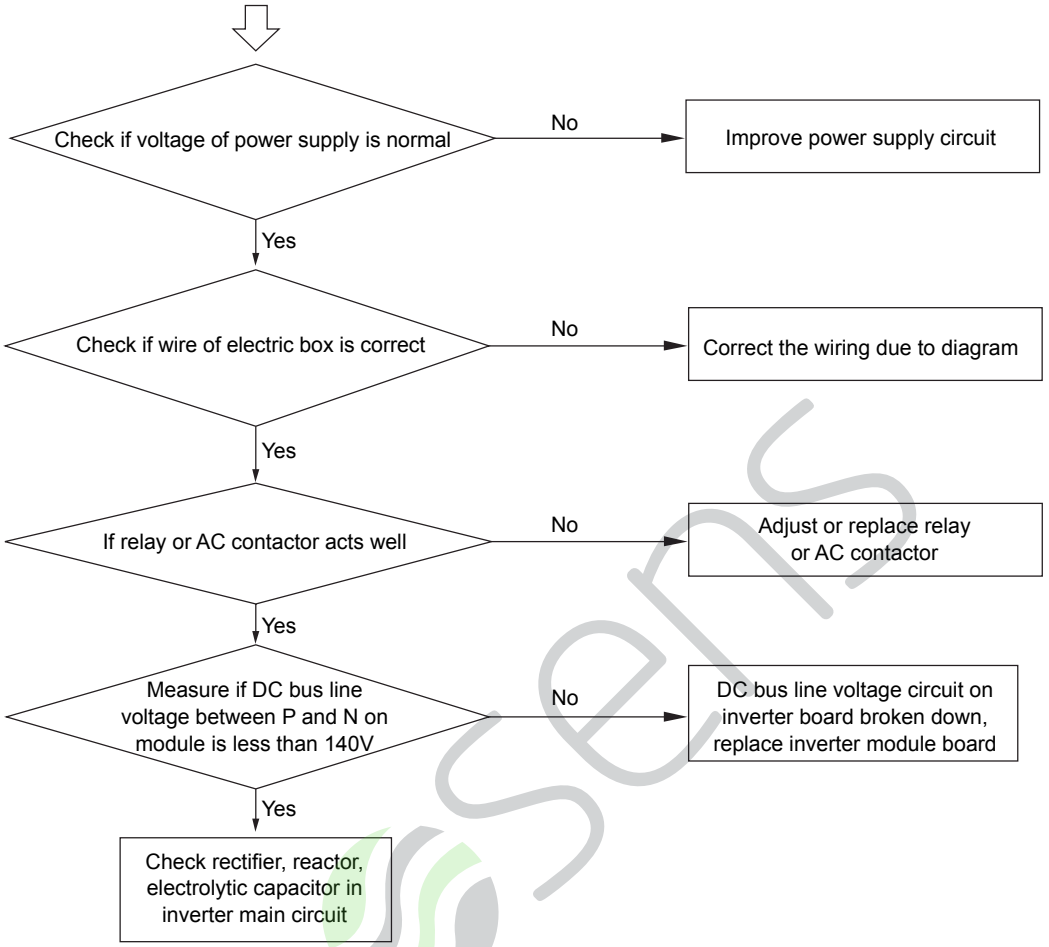
[119] Current detecting circuit abnormal of transducer



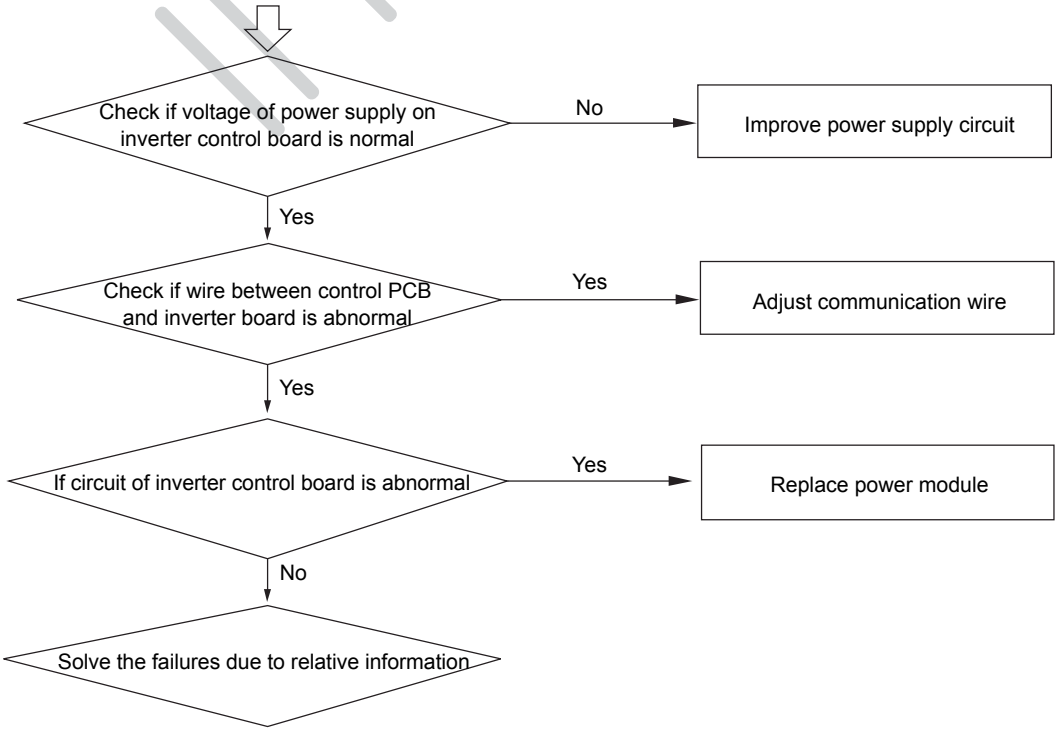
[122] Radiator temp. sensor of transducer abnormal



[120] Power supply of transducer abnormal



[121] Power supply of inverter board is abnormal



APPENDIX

Sensor characteristic

Temp. sensor characteristic

No.	Sensor type	Characteristic
1	Indoor coil/outdoor suction/oil temp./defrost/ambient temp. sensor	R (25°C)=10KΩ B (25°C/50°C)=3700K
2	Wired controller ambient temp./indoor ambient temp. sensor	R (25°C)=23KΩ B (25°C/50°C)=4200K
3	Outdoor discharging temp. sensor	R (80°C)=50KΩ B (25°C/80°C)=4450K

Herein, the sensor typical resistor is as follows:

(1) R (25°C)=10KΩ B (25°C/50°C)=3700K

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
5	24.74	23.69	22.63	4.45	4.45
6	23.61	22.62	21.63	4.38	4.38

Haier

R25=10KΩ±3% B25/50=3700K±3%					
Temp	Resistance (KΩ)			% (Resist. tol)	
(°C)	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
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
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

R25=10KΩ±3% B25/50=3700K±3%					
Temp	Resistance (KΩ)			% (Resist. tol)	
(°C)	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
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
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

(2) R (25°C)=23KΩ B (25°C/50°C)=4200K

R25=23KΩ±3% B25/50=4200K±3%					
Temp	Resistance (KΩ)			% (Resist. tol)	
°C	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
-30	538.77	513.12	487.46	5.00	5.00
-29	502.58	478.89	455.21	4.95	4.95
-28	469.29	447.41	425.53	4.89	4.89
-27	438.61	418.38	398.15	4.84	4.84
-26	410.29	391.56	372.84	4.78	4.78
-25	384.09	366.75	349.41	4.73	4.73
-24	359.82	343.75	327.69	4.67	4.67
-23	337.30	322.41	307.52	4.62	4.62
-22	316.38	302.57	288.76	4.56	4.56
-21	296.92	284.11	271.29	4.51	4.51
-20	278.79	266.91	255.02	4.45	4.45
-19	261.90	250.87	239.83	4.40	4.40
-18	246.15	235.90	225.64	4.35	4.35
-17	231.43	221.91	212.39	4.29	4.29
-16	217.69	208.84	199.99	4.24	4.24
-15	204.83	196.61	188.39	4.18	4.18
-14	192.81	185.16	177.52	4.13	4.13
-13	181.55	174.44	167.34	4.07	4.07
-12	171.01	164.40	157.79	4.02	4.02
-11	161.13	154.98	148.84	3.96	3.96
-10	151.87	146.15	140.44	3.91	3.91
-9	143.18	137.87	132.56	3.85	3.85
-8	135.04	130.10	125.15	3.80	3.80
-7	127.40	122.80	118.20	3.75	3.75
-6	120.23	115.95	111.67	3.69	3.69
-5	113.49	109.51	105.53	3.64	3.64
-4	107.17	103.46	99.76	3.58	3.58
-3	101.23	97.78	94.33	3.53	3.53
-2	95.65	92.44	89.23	3.47	3.47
-1	90.40	87.42	84.43	3.42	3.42
0	85.47	82.69	79.91	3.36	3.36
1	80.84	78.25	75.66	3.31	3.31
2	76.48	74.07	71.66	3.25	3.25
3	72.38	70.13	67.89	3.20	3.20
4	68.52	66.43	64.34	3.15	3.15
5	64.89	62.94	61.00	3.09	3.09
6	61.47	59.66	57.85	3.04	3.04
7	58.25	56.57	54.88	2.98	2.98
8	55.22	53.65	52.08	2.93	2.93
9	52.37	50.90	49.44	2.87	2.87
10	49.68	48.31	46.95	2.82	2.82
11	47.14	45.87	44.60	2.76	2.76
12	44.75	43.57	42.39	2.71	2.71
13	42.49	41.40	40.30	2.65	2.65
14	40.37	39.34	38.32	2.60	2.60
15	38.36	37.41	36.45	2.55	2.55
16	36.46	35.58	34.69	2.49	2.49
17	34.67	33.85	33.02	2.44	2.44

R25=23KΩ±3% B25/50=4200K±3%					
Temp	Resistance (KΩ)			% (Resist. tol)	
°C	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
18	32.98	32.22	31.45	2.38	2.38
19	31.39	30.67	29.96	2.33	2.33
20	29.87	29.21	28.55	2.27	2.27
21	28.45	27.83	27.21	2.22	2.22
22	27.10	26.52	25.95	2.16	2.16
23	25.82	25.28	24.75	2.11	2.11
24	24.61	24.11	23.62	2.05	2.05
25	23.46	23.00	22.54	2.00	2.00
26	22.40	21.95	21.50	2.04	2.04
27	21.39	20.95	20.51	2.09	2.09
28	20.43	20.00	19.58	2.13	2.13
29	19.52	19.10	18.69	2.18	2.18
30	18.66	18.25	17.85	2.22	2.22
31	17.84	17.44	17.05	2.26	2.26
32	17.06	16.67	16.29	2.31	2.31
33	16.32	15.94	15.57	2.35	2.35
34	15.61	15.25	14.88	2.39	2.39
35	14.94	14.59	14.23	2.44	2.44
36	14.31	13.96	13.61	2.48	2.48
37	13.70	13.36	13.03	2.53	2.53
38	13.12	12.79	12.47	2.57	2.57
39	12.57	12.25	11.93	2.61	2.61
40	12.05	11.74	11.42	2.66	2.66
41	11.55	11.24	10.94	2.70	2.70
42	11.07	10.78	10.48	2.74	2.74
43	10.62	10.33	10.04	2.79	2.79
44	10.18	9.90	9.62	2.83	2.83
45	9.77	9.50	9.22	2.88	2.88
46	9.38	9.11	8.84	2.92	2.92
47	9.00	8.74	8.48	2.96	2.96
48	8.64	8.39	8.14	3.01	3.01
49	8.30	8.05	7.80	3.05	3.05
50	7.97	7.73	7.49	3.09	3.09
51	7.65	7.42	7.19	3.14	3.14
52	7.35	7.13	6.90	3.18	3.18
53	7.07	6.85	6.63	3.23	3.23
54	6.79	6.58	6.36	3.27	3.27
55	6.53	6.32	6.11	3.31	3.31
56	6.28	6.08	5.87	3.36	3.36
57	6.04	5.84	5.64	3.40	3.40
58	5.81	5.62	5.43	3.44	3.44
59	5.59	5.40	5.22	3.49	3.49
60	5.38	5.20	5.02	3.53	3.53
61	5.18	5.00	4.82	3.58	3.58
62	4.99	4.82	4.64	3.62	3.62
63	4.81	4.64	4.47	3.66	3.66
64	4.63	4.46	4.30	3.71	3.71
65	4.46	4.30	4.14	3.75	3.75
66	4.30	4.14	3.99	3.79	3.79

R25=23KΩ±3% B25/50=4200K±3%					
Temp	Resistance (KΩ)			% (Resist. tol)	
°C	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
67	4.15	3.99	3.84	3.84	3.84
68	4.00	3.85	3.70	3.88	3.88
69	3.86	3.71	3.56	3.93	3.93
70	3.72	3.58	3.44	3.97	3.97
71	3.59	3.45	3.31	4.01	4.01
72	3.47	3.33	3.20	4.06	4.06
73	3.35	3.22	3.08	4.10	4.10
74	3.23	3.10	2.98	4.14	4.14
75	3.12	3.00	2.87	4.19	4.19
76	3.02	2.90	2.77	4.23	4.23
77	2.92	2.80	2.68	4.28	4.28
78	2.82	2.70	2.59	4.32	4.32
79	2.73	2.61	2.50	4.36	4.36
80	2.64	2.53	2.42	4.41	4.41
81	2.56	2.45	2.34	4.45	4.45
82	2.47	2.37	2.26	4.49	4.49
83	2.39	2.29	2.19	4.54	4.54
84	2.32	2.22	2.12	4.58	4.58
85	2.25	2.15	2.05	4.63	4.63
86	2.18	2.08	1.98	4.67	4.67
87	2.11	2.02	1.92	4.71	4.71
88	2.05	1.95	1.86	4.76	4.76
89	1.98	1.89	1.80	4.80	4.80
90	1.92	1.83	1.75	4.84	4.84
91	1.87	1.78	1.69	4.89	4.89
92	1.81	1.72	1.64	4.93	4.93
93	1.76	1.67	1.59	4.98	4.98
94	1.70	1.62	1.54	5.02	5.02
95	1.65	1.57	1.49	5.06	5.06
96	1.60	1.52	1.45	5.11	5.11
97	1.55	1.48	1.40	5.15	5.15
98	1.51	1.43	1.36	5.19	5.19
99	1.46	1.39	1.32	5.24	5.24
100	1.42	1.35	1.28	5.28	5.28
101	1.37	1.31	1.24	5.33	5.33
102	1.33	1.26	1.20	5.37	5.37
103	1.29	1.22	1.16	5.41	5.41
104	1.25	1.18	1.12	5.46	5.46
105	1.21	1.15	1.08	5.50	5.50

(3) R (80°C)=50KΩ B (25°C/80°C)=4450K

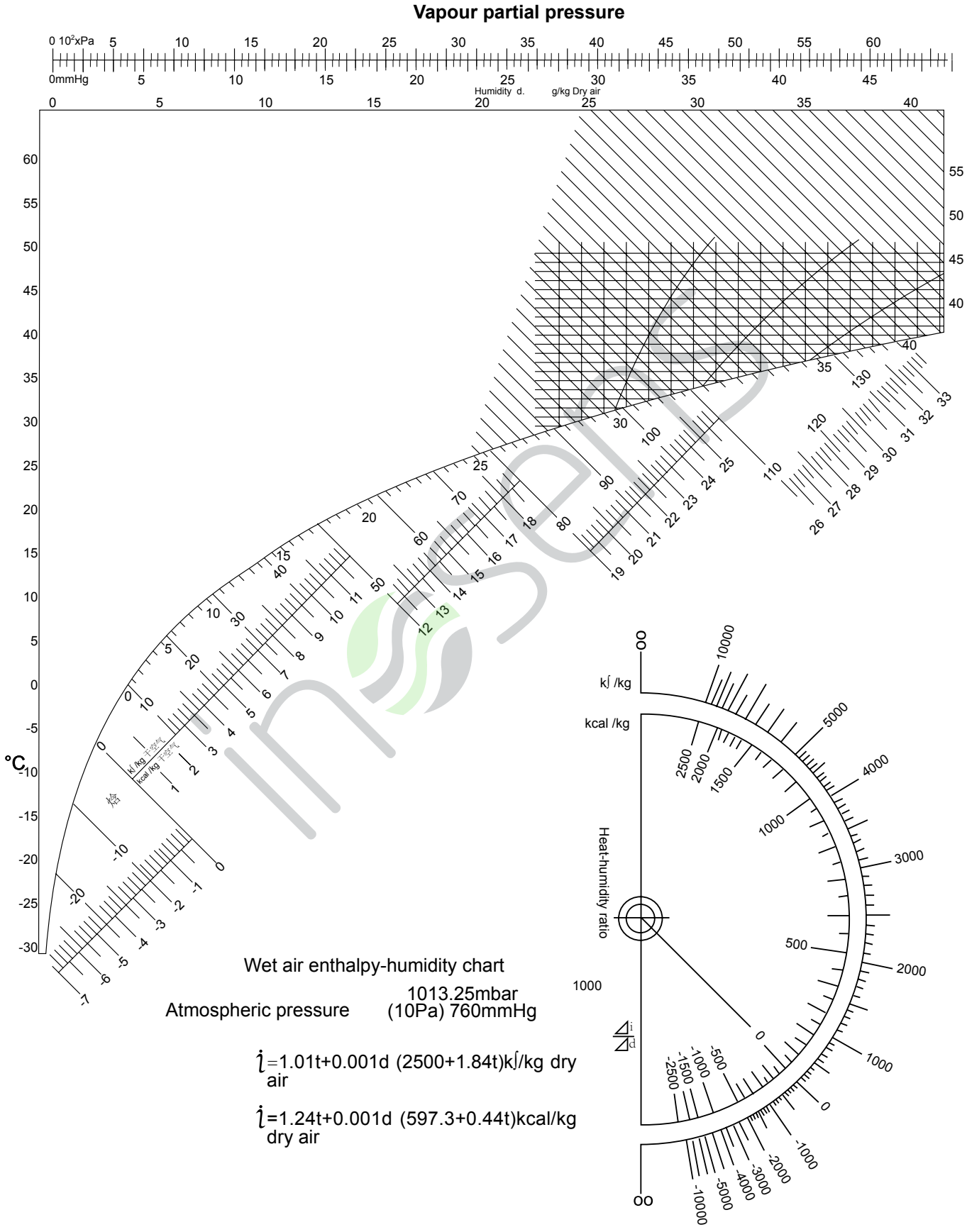
R80=50KΩ±3% B25/80=4450K±3%					
Temp	Resistance (KΩ)			% (Resist.tol)	
°C	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
0	1749.01	1921.99	2094.97	9.00	9.00
1	1651.43	1813.27	1975.10	8.93	8.93
2	1560.17	1711.65	1863.13	8.85	8.85
3	1474.74	1616.59	1758.45	8.78	8.78
4	1394.71	1527.61	1660.51	8.70	8.70
5	1319.68	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
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

Haier

R80=50KΩ±3% B25/80=4450K±3%					
Temp	Resistance (KΩ)			% (Resist.tol)	
°C	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
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
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

R80=50KΩ±3% B25/80=4450K±3%					
Temp	Resistance (KΩ)			% (Resist.tol)	
°C	Rmax	R (t) Normal	Rmin	MAX (+)	MIN (-)
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
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

Enthalpy-humidity chart



Wet air enthalpy-humidity chart

Atmospheric pressure 1013.25mbar (10Pa) 760mmHg

i=1.01t+0.001d (2500+1.84t)kJ/kg dry air

i=1.24t+0.001d (597.3+0.44t)kcal/kg dry air

Haier Commercial Air Condition

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

Web: Http://www.haier.com