Haier

Commercial Air Conditioning

SERVICE MANUAL

Models

AB122ACERA

AC122ACERA

AD122ALERA

AU122AEERA

Features

- High energy efficiency
- Can be connected with the universal outdoor unit AU122AEERA
- Infrared control type or wired control type
- Low ambient cooling kit (optional) and low ambient heating kit (optional)
- New friendly refrigerant R410a, environment protection
- Advanced technology, DC inverter control function
- Weekly timer (standard)
- Group control function
- Auto restart function
- Room card function

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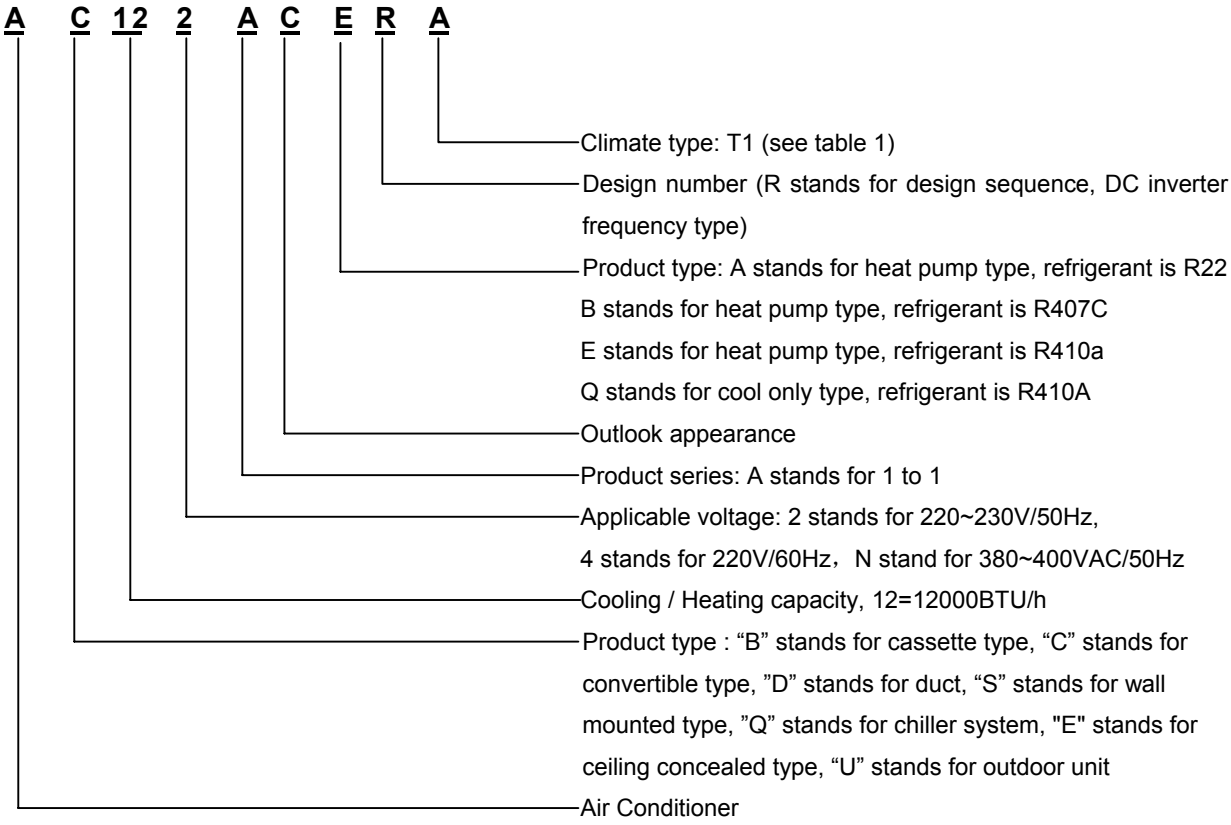
1.1. Products code explanation



1.2 Brief Introduction for T1、T2、T3 working condition

Type of Air Conditioner	Climate type		
	T1	T2	T3
Cooling Only	18 ℃~43℃	10℃~35℃	21℃~52℃
Heat pump	-7℃~43℃	-7℃~35℃	-7℃~52℃
Electricity Heating	~43℃	~35℃	~52℃

1.3 Operating Range of Air Conditioners

Temp. / Mode			Rated	Maximum	Minimum
Cooling	Indoor	DB ℃	27	32	15
		WB ℃	19	23	14
	Outdoor	DB ℃	35	43	-5
		WB ℃	24	26	6
Heating	Indoor	DB ℃	20	27	10
		WB ℃	14.5	---	--
	Outdoor	DB ℃	7	23	-10
		WB ℃	6	18	---

1.4 Product features

Adopt the much friendlier refrigerant R410a

The air conditioner system adopts the greatly friendly refrigerant R410a, which is protective for the ozone layer and is good to avoid the earth getting warmer. Benefit for the environment.

Adopt the advanced DC inverter technology

The system adopts the advanced DC inverter technology, which can consume less power energy to realize the equal efficiency, saving money for you.

Smart newly designed infrared remote controller

The cassette and convertible unit can be controlled by the infrared remote controller YR-H71, the remote controller can be fixed with a remote controller holder.

Auto–restart function (optional)

All indoor units have auto-restart function. When the power supply cut off suddenly, the unit will automatically recover the previous running mode once the power supply is on.

Long-life& high efficiency air purify filter

Low temperature cooling realized, super low temperature heating realized.

Low ambient cooling kit (optional)

Group control function (with a group controller YR-E12)

Central control function, if connected with a central controller YCZ-A001

Weekly timing function, if connected with a weekly timer YCS-A001

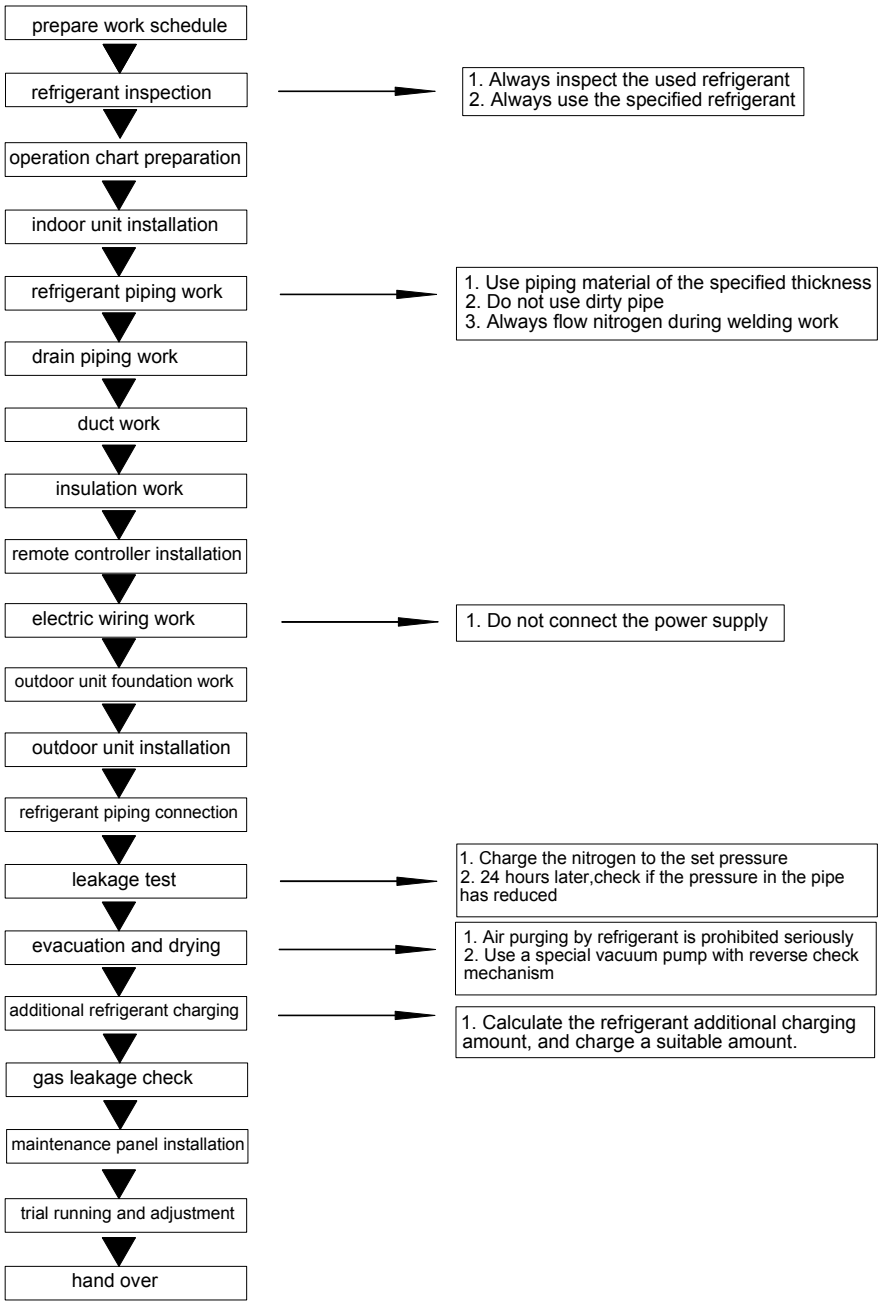
1.5 New friendly refrigerant R410A introduction:

■R410A

The working pressure of R410A is approximately 1.6 times higher than R22. Because the oil in the refrigerant is different, please do not mix them.

Refrigerant	R22 (single)	R410A (mixed)	R407C (mixed)
Oil	Mineral oil (SONTEX 200LT)	Synthetic oil (POE oil)	Synthetic oil (POE oil)
Pressure ratio	1	Approx. 1.6	Approx. 1.1

■Operation flow



■Piping material

1. Use the correct refrigerant piping and materials for R410A
2. For the pipe wall thickness, see the table below:

Pipe diameter	Φ6.35	Φ9.52	Φ12.7	Φ15.88	Φ19.1
Pipe wall thickness	0.8	0.8	0.8	1.0	1.2

Note: Always observe and comply with the local regulations when installing the refrigerant piping.

■Tools

R410A work requires a number of special tools (* symbol). Since the tools used in R22 work cannot be used for R410A, provide the tools separately.

Tool name	Process and application	
Pipe cutter	Piping cutting	Refrigerant piping work
*Flaring tool	Pipe flaring work	
*Torque wrench	Flare nut connection	
Expander	Expansion at pipe connection	
Pipe bender	Pipe bending work	
Nitrogen gas	Pipe oxidation prevention	Air tightness test
Welder	Pipe brazing	
*Gauge manifold	Vacuum evacuation and refrigerant charging operation check	Air tightness test Refrigerant additional charging
*Charging hose		
*Vacuum pump (with adapter)		Vacuum drying
Electronic scale		Refrigerant additional charging
Gas leakage detector	Gas leakage test	

■Work precautions

Refrigerant check: Before work, check the used refrigerant and prepare materials matched to the refrigerant.

Refrigerant piping: Observe the basics of refrigerant piping to avoid the unnecessary problems. In addition, when performing the welding work, seal in the nitrogen gas to the pipes, and prevent it from the oxidation.

Leak pressure detection: Perform seal detection and make sure there is no refrigerant leakage.

Vacuum drying: If the vacuum pump has not the reverse flow check mechanism, use the pump together with a reverse flow check adapter.

Additional refrigerant: Charge a suitable amount of refrigerant with a special R410A gauge manifold and charging hose.

2. SPECIFICATION

item				Mod	AB122ACERA	
Function					cooling	heating
Capacity				kW	3.52(0.9--4.4)	4.4(1.0---4.8)
Sensible heat ratio					0.71	
Total power input				W	1250(280---1650)	1210(280--1650)
Max. power input				W	1650	1650
EER or COP				W/W	2.81（C）	3.64（A）
ENERGY CLASS					1.6	
Dehumidifying capacity				10 - ³×m³/h	1.5	
Power cable					3×2.5	
Power source				N, V, Hz	1, 220--230, 50	
Running				A / A	6.0(1.4--8.0)A/8A	6.0(1.4--8.0)A/8A
Start Current				A	3	3
Circuit breaker				A	13	13
Indoor unit	Unit model (color)				AB122ACERA(BLACK)	
	Fan	Type × Number			Centrifugal fan*1	
		Speed(H-M-L)		r/min	795/690/550±50	
		Fan motor output power		kW	0.065	
		Air-flow(H-M-L)		m³/h	700/620/520	
	Heat exchanger	Type / Diameter		mm	inner grooved pipe/ Φ7	
		Total Area		m²	0.272	
		Temp. scope		℃	2-7	
	Dimension	External	（L×W×H）	mm×mm×mm	570×570×260mm	
		Package	（L×W×H）	mm×mm×mm	718×680×380mm	
	Drainage pipe (material , I.D./O.D.)			mm	PVC 26/32	
	Control type (Remote /wired)				Remote	
	Fresh air hole dimension			mm	95	
	Noise level (H-M-L)			dB(A)	45/40/32	
	Weight (Net / Shipping)			kg / kg	18.5/23	
Panel	Dimension	External	（L×W×H）	mm×mm×mm	700×700×60mm	
		Package	（L×W×H）	mm×mm×mm	740×750×115mm	
	Weight (Net / Shipping)			kg / kg	3.5/4.5	

Item				Model	AC122ACERA	
Function					cooling	heating
Capacity				kW	4.1(0.9--4.6)	4.4(1.0---5.1)
Sensible heat ratio					0.71	
Total power input				W	1270(280---1650)	1210(280--1650)
Max. power input				W	1650	1650
EER or COP				W/W	3.23（A）	3.64（A）
Dehumidifying capacity				10 - ³×m³/h	1.6	
Power cable					3×2.5	
Power source				N, V, Hz	1, 220--230, 50	
Running				A / A	6.0(1.4--8.0)A/8A	6.0(1.4--8.0)A/8A
Start Current				A	3	3
Circuit breaker				A	13	13
Indoor unit	Unit model (color)				AC122ACERA(WHITE)	
	Fan	Type × Number			Centrifugal fan*2	
		Speed(H-M-L)		r/min	1200/1080/880	
		Fan motor output power		kW	0.09	
		Air-flow(H-M-L)		m³/h	750/650/550	
	Heat exchanger	Type / Diameter		mm	inner grooved pipe/ Φ7	
		Total Area		m²	0.20	
		Temp. scope		℃	2-7	
	Dimension	External	（L×W×H）	mm×mm×mm	1090×655×199	
		Package	（L×W×H）	mm×mm×mm	1150×750×300	
	Drainage pipe (material , I.D./O.D.)			mm	PVC 18/20	
	Control type (Remote /wired)				Remote	
	Noise level (H-M-L)			dB(A)	46/44/42	
	Weight (Net / Shipping)			kg / kg	28.3/34.3	

Item				Model	AD122ALERA	
Function					cooling	heating
Capacity				kW	3.8(0.9--4.4)	4.1(1.0---4.8)
Sensible heat ratio					0.71	
Total power input				W	1260(280--1650)	1260(280--1650)
Max. power input				W	1650	1650
EER or COP				W/W	3.02（B）	3.25（C）
Dehumidifying capacity				10 - ³×m³/h	1.6	
Power cable					3×2.5	
Power source				N, V, Hz	1, 220--230, 50	
Running				A / A	6.0(1.4--8.0)A/8A	6.0(1.4--8.0)A/8A
Start Current				A	3	3
Circuit breaker				A	13	13
Indoor unit	Unit model (color)				AD122ALERA(GREY)	
	Fan	Type × Number			Centrifugal fan*1	
		Speed(H-M-L)		r/min	1000/900/800±50	
		Fan motor output power		kW	0.05	
		Air-flow(H-M-L)		m³/h	550/450/400	
	Heat exchanger	Type / Diameter		mm	inner grooved pipe/ φ7	
		Total Area		m²	0.11	
		Temp. scope		℃	2-7	
	Dimension	External	（L×W×H）	mm×mm×mm	610×483×220	
		Package	（L×W×H）	mm×mm×mm	695×536×265	
	Drainage pipe (material , I.D./O.D.)			mm	20/18	
	Control type (Remote /wired)				wired	
	Noise level (H-M-L)			dB(A)	35/32/30	
	Weight (Net / Shipping)			kg / kg	14/16	

Item				Mod	AU122AEERA
Power cable					3×2.5
Power source				N, V, Hz	1, 220-230, 50
Start Current				A	3
Outdoor unit	Unit model (color)				AU122AEERA（WHITE）
	Compressor	Model / Manufacture			C-6RZ092H1A
		Type			twin rotary
	Fan	Type × Number			axial*1
		Speed		r/min	840r/min±50
		Fan motor output power		kW	0.06
		Air-flow(H-M-L)		m³/h	2500/-/-
	Heat exchanger	Type / Diameter		mm	TP2M/Φ9.52
		Total area		m²	0.374
		Temp. scope		℃	43-60
	Dimension	External	（L×W×H）	mm×mm×mm	775x640x245
		Package	（L×W×H）	mm×mm×mm	901x341x712
	Refrigerant control method			mm/mm	Capillary tube: main φ3×φ1.8×920，assistant φ3×φ1.8×780
	Defrosting				auto
	Noise level			dB(A)	55
	Type of Four way valve				SHF-4-10A
	material of reduce noise				XPE
	crankcase heater power			W	37
	Weight(Net / Shipping)			kg / kg	39/43
PIPING	Refrigerant	Type / Charge		g	R410A 1300
		Recharge quantity		g/m	30
	Pipe	Liquid		mm	6.35
		Gas		mm	12.7
	Connecting Method				flared
	Between I.D &O.	MAX.Drop		m	10
		MAX.Piping length		m	20

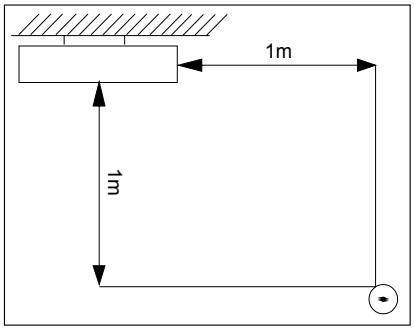
Norminal condition: indoor temperature (cooling): 27℃DB/19℃WB, indoor temperature (heating): 20℃DB/14.5℃WB
Outdoor temperature(cooling): 35℃DB/24℃WB, outdoor temperature(heating): 7℃DB/6℃WB
The noise level will be measured in the third octave band limited values, using a Real Time Analyser calibrated sound intensity meter. It is a sound pressure noise level.

Norminal condition: indoor temperature (cooling): 27℃DB/19℃WB, indoor temperature (heating): 20℃DB
Outdoor temperature(cooling): 35℃DB/24℃WB, outdoor temperature(heating): 7℃DB/6℃WB
The noise level will be measured in the third octave band limited values, using a Real Time Analyser calibrated sound intensity meter.
It is a sound pressure noise level. The detailed method please refer to the following information:

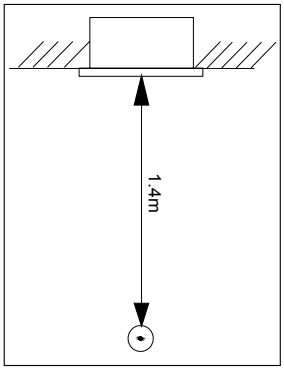
Installation state: the unit should be placed on the flat floor or be mounted in horizontal direction.

Testing method:

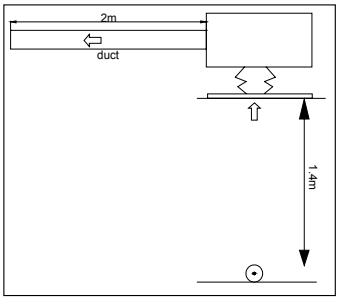
mounting-on-ceiling unit:



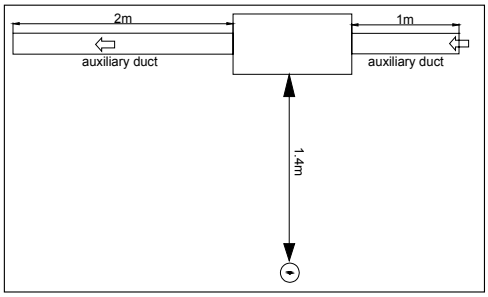
built-in-ceiling unit:



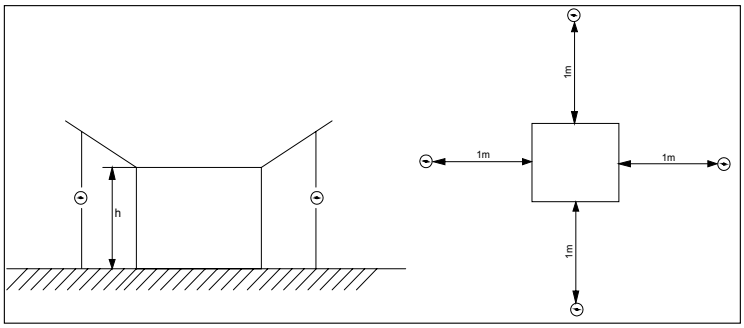
duct unit without auxiliary duct:



duct unit with auxiliary duct:



outdoor unit:
1.air outlet from side: the noise level is the average sound pressure level measured from front, left, right directions.
2.air outlet from top: the noise level is the average sound pressure level measured from front, back, left, right directions.
measured point:
H (height to the ground) = (h (unit height) + 1m) /2
and, it is 1m to each side.



Note: ⊙ is the real time analyser

3. Safety precaution

Carefully read the following information in order to operate the airconditioner correctly.

Below are listed three kinds of Safety Cautions and Suggestions.

WARNING! Incorrect operations may result in severe consequences of death or serious injuries.

CAUTION! Incorrect operations may result in injuries or machine damages; in some cases may cause serious consequences.

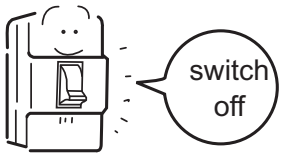
INSTRUCTIONS: These information can ensure the correct operation of the machine.

Be sure to conform with the following important Safety Cautions.
The Safety Cautions should be at hand so that they can be checked at any time when needed.
If the conditioner is transferred to the new user, this manual should be as well transferred to the new user.

WARNING!

- If any abnormal phenomena is found (e. g.smell of firing), please cut off the power supply immediately, and contact the dealer to find out the handling method.

  In such case, to continue using the conditioner will damage the conditioner, and may cause electrical shock or fire hazard.



- After the unit being used for a long time, the base should be checked for any damages.

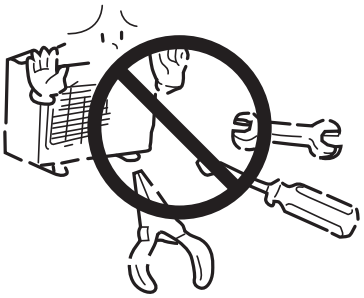
  If the damaged base is not repaired, the unit may fall down and cause accidents.

- Don't dismantle the outlet of the outdoor unit.

  The exposed fan is very dangerous which may harm human beings.

- When the unit needs maintenance and repairment, please call dealer to handle it.

  Incorrect maintenance and repairment may cause water leak, electrical shock and fire hazard.



WARNING!

- Installed electrical-leaking circuit breaker.

  It easily cause electrical shock without circuit breaker.

- Air-conditioner can't be installed in the environment with inflammable gases because the inflammable gases near to air-conditioner may cause fire hazard.

- Please let the dealer be responsible for installing the conditioner.

  Incorrect installation may cause water leak, electrical shock and fire hazard.

- Call the dealer to take measures to prevent the refrigerant from leaking.

  If conditioner is installed in a small room be sure to take every measure in order to prevent suffocation accident even in case of refrigerant leakage.

- When conditioner is removed or reinstalled, dealer should be responsible for them.

  Incorrect installation may cause water leaking, electrical shock and fire hazard.

- Connect earthing wire.

  Earthing wire should not be connected to the gas pipe, water pipe, lightning rod or phone line, in-correct earthing may cause shock.

Earthing

- Nothing or nobody is permitted to placed on or stand on outdoor unit.

  The falling of goods and people may cause accidents.

- Don't operate the air-conditioner with damp hands.

  Otherwise will be shocked.

- Only use correctly-typed fuse.

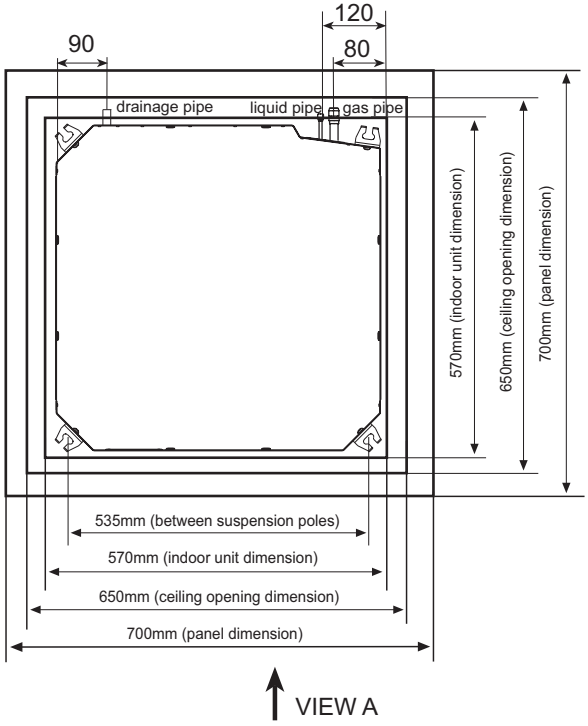
  May not use wire or any other materials replacing fuse, other-wise may cause faults or fire accidents.

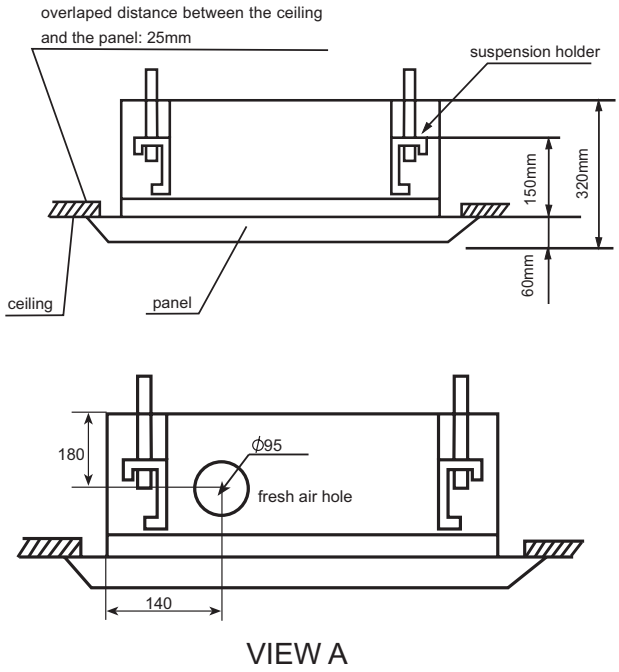
- Use discharge pipe correctly to ensure efficient discharge.

  Incorrect pipe use may cause water leaking.

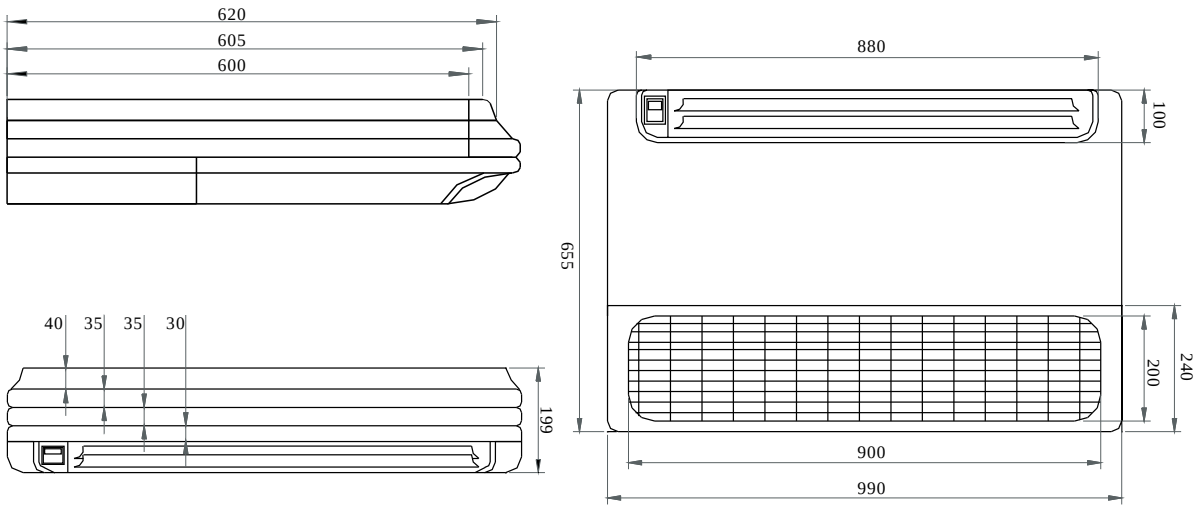
4. Net dimension

4.1 AB122ACERA

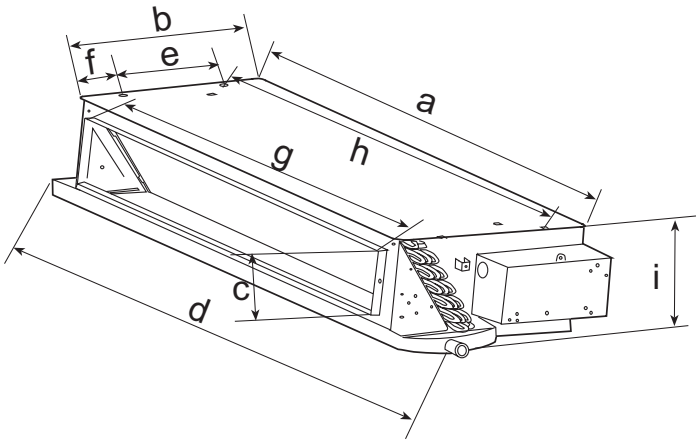




4.2 AC122ACERA

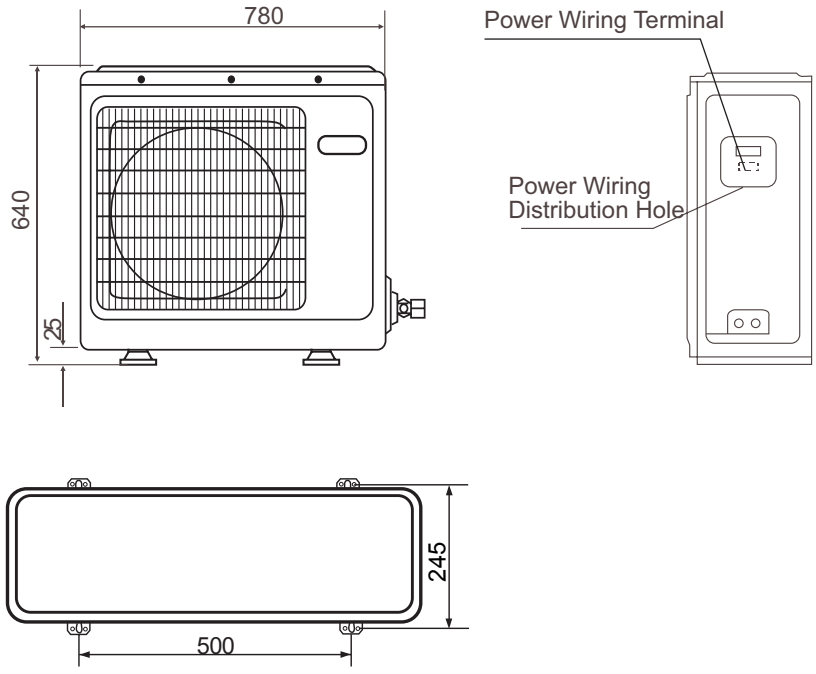


4.3 AD122ALERA



Unit model	a	b	c	d	e	f	g	h	i
AD122ALERA	538	483.5	131	610	255	105	418	508	220

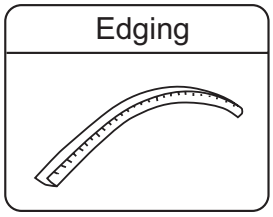
4.4 AU122AEERA



5. Installation Instructions

1. Accessories

"Edging" for protection of electric wires from an opening edge.

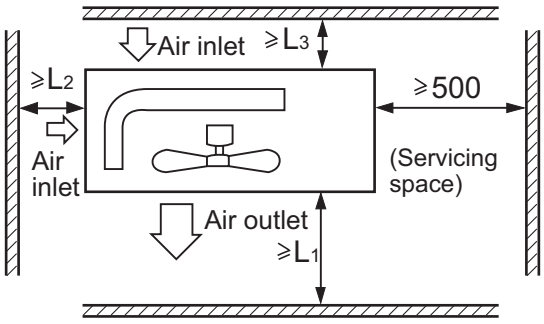


2. Selection of the place of installation

Select the place of installation satisfying the following conditions and, at the same time, obtain a consent from the client or user.

- Place where air circulates.
- Place free from heat radiation from other heat sources.
- Place where drain water may be discharged.
- Place where noise and hot air may not disturb the neighborhood.
- Place where there is not heavy snowfall in the winter time.
- Place where obstacles do not exist near the air inlet and air outlet .
- Place where the air outlet may not be exposed to a strong wind.
- Place surrounded at four sides are not suitable for installation. A 1m or more of overhead space is needed for the unit.
- Mount guide-louvers to place where short-circuit is a possibility.
- When installing several units, secure sufficient suction space to avoid short circuiting.

(1) Open space requirement around the unit



Note :

(1) Fix the parts with screws

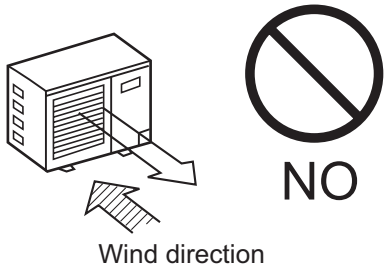
(2) Don't intake the strong wind directly to the outlet air-flow hole.

(3) A one meter distance should be kept from the unit top

(4) Don't block the surroundings of the unit with sundries

Unit: mm

Case / Distance	I	II	III
L_1	open	open	500
L_2	300	0	open
L_3	150	300	150



(2) Installation where the area with strong winds.

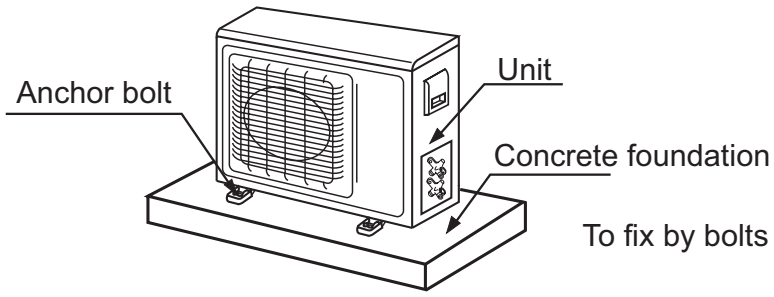
Install the unit so that the air outlet section of the unit must NOT be faced toward wind direction.

5.1 Installation of outdoor unit

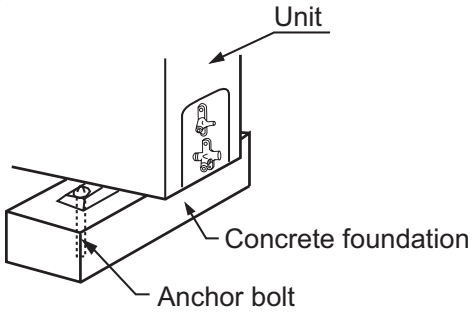
Installation

Fix the unit in a proper way according to the condition of a place where it is installed by referring to the following .

(a) Concrete foundation

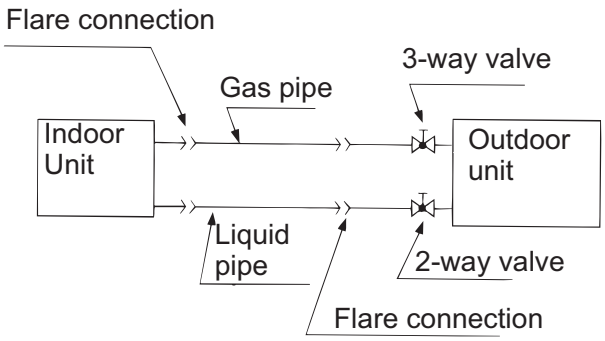


(b) Foundation anchor



- Install the unit so that the angle of inclination must be less than 3 degrees.

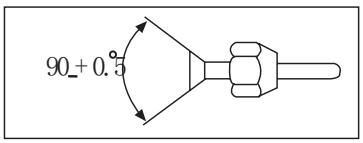
Piping Connection



(1) Dimension of connecting pipe

Gas pipe	∅12.7mm
Liquid pipe	∅6.35mm

- Fit the nut on and fasten

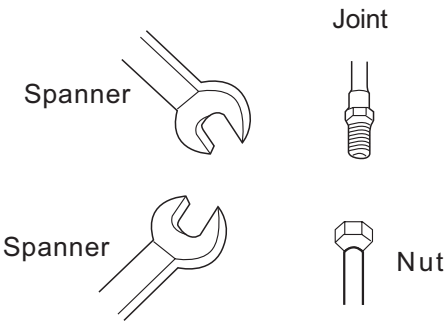


(2) The maximum length and drop height of connecting pipe

- The maximum length is 20m
- The maximum drop height is 15m
- To ensure the efficiency ,Pipes shall be as short as possible.

Cautions for piping connection

- Do not twist or deform the connecting pipe.
- Do not mix dusts.
- The bending radius shall be as large as possible.
- Both gas pipe and liquid pipe shall be heat insulation.
- No leakage in the flare.



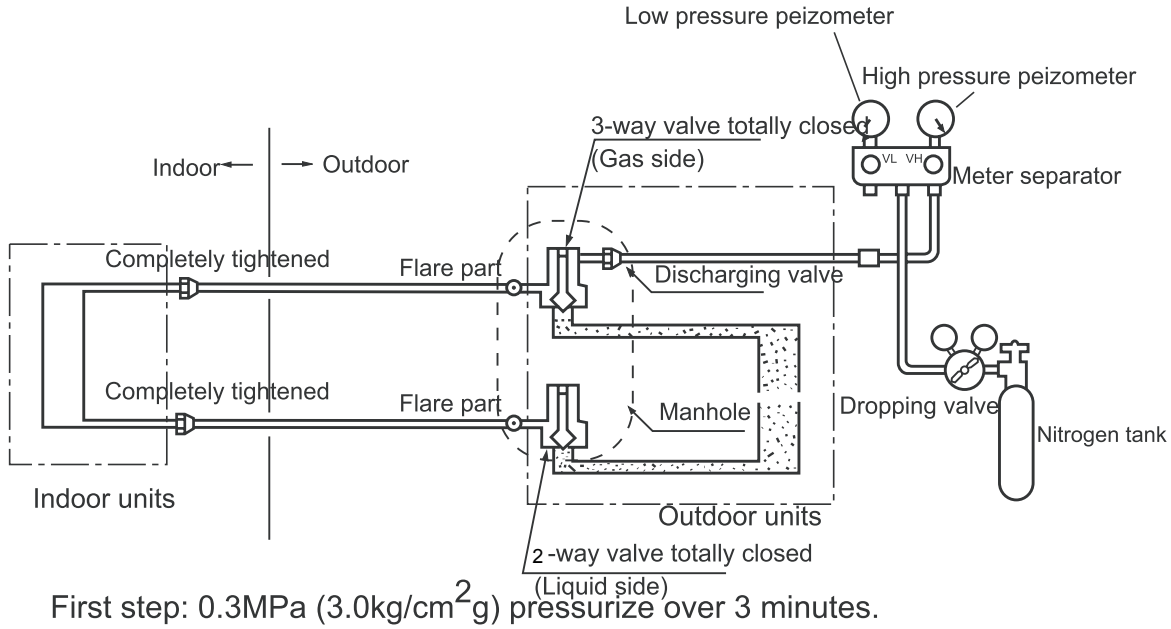
Forced fastening without centering may damage the threads and cause a gas leakage.

Pipe dia	Fastening torque
Liquid pipe 6.35mm	14.2-17.2N·m
Liquid pipe 9.52mm	32.7-39.9N·m
Gas pipe 12.7mm	49.5-60.3N·m
Gas pipe 15.88mm	61.8-75.4N·m

Air discharging method

After finishing connection of refrigerant pipe, it shall perform air tightness test.

- The air tightness test adopts nitrogen tank to give pressure according to the pipe connection mode as the following figure shown.
  The gas and liquid valve are all in close state. In order to prevent the nitrogen entering the circulation system of outdoor unit, tighten the valve rod before giving pressure (both gas and liquid valve rods).



First step: 0.3MPa (3.0kg/cm^{2}g) pressurize over 3 minutes.

Second step: 1.5Mpa (15kg/cm^{2}g) pressurize over 3 minutes. Large leakage will be found.

Third step: 3.0 MPa (30kg/cm^{2}g) pressurize about 24 hours. Little leakage will be found.

- Check if the pressure drops
  The pressure does not drop-passed
  The pressure drops-check the leaking point.

  From pressurizing to 24 hours later, each 1¡ difference of ambient temperature will make 0.01MPa(0.1kg/cm^{2}g) pressure change. It shall be corrected during test.

Checking the leaking point

- In the first to third test steps, if the pressure drops, check the leakage in each joint use sense of hearing, feeling and soap water, etc. methods to find the leaking point. After confirming the leaking point, welding it again or tighten the nut tightly again.

Electric wiring

WARNING!

DANGER OF BODILY INJURY OR DEATH
TURN OFF ELECTRIC POWER AT CIRCUIT BREAKER OR POWER SOURCE BEFORE MAKING ANY ELECTRIC CONNECTIONS.
GROUND CONNECTIONS MUST BE COMPLETED BEFORE MAKING LINE VOLTAGE CONNECTIONS.

(1) Selection of size of power supply and interconnecting wires.

Precautions for Electric wiring

- Electric wiring work should be conducted only by authorized personnel.
- Do not connect more than three wires to the terminal block. Always use round type crimped terminal lugs with insulated grip on the ends of the wires.
- Use copper conductor only.

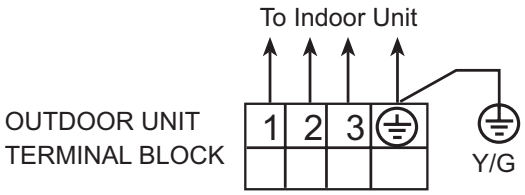
Select wire sizes and circuit protection from table below. (This table shows 20 m length wires with less than 2% voltage drop.)

Item / Model	Phase	Circuit breaker		Power source wire size	Earth leakage breaker	
		Switch breaker (A)	Overcurrent protector		Switch break	Leak curren
AU122AEERA	1	40	26	2.5mm^2	40A	30mA

(2) Wiring connection

Make wiring to supply power to the outdoor unit, so that the power for the indoor unit is supplied by terminals.

For the detailed wiring connection with the indoor units, see the corresponding indoor operation and instruction manual.



WARNING!

INTERCONNECTING WIRES MUST BE WIRED ACCORDING TO FIG.1
INCORRECT WIRING MAY CAUSE EQUIPMENT DAMAGE.

5.2 Indoor unit ins allation

5.2.1 AB122ACERA

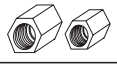
Installation tools

The installation tools listed in the following sheet can be used as required.

1. Screw driver
2. Hacksaw
3. Drill with a diameter of 60mm
4. Inner hexagon spanner,shifting spanner
5. Spanner (14, 17, 19,24,27mm)
6. Pipe cutter
7. Pipe expander
8. Knife
9. Pincers
10. Leakage detector or soapy water
11. Band tape
12. Scraper
13. Refrigerant oil

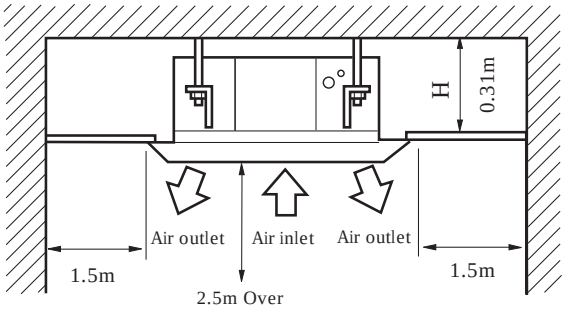
Standard accessories

The following parts mentioned in this manual are the installation accessories we prepared.

No.	Accessory parts	Qty.
①	 Remote controller	1
②	 Battery	2
③	 Wire clamp	4
④	 Heat preservation sleeve	1+1
⑤	 Screw	2+4
⑥	 Screw cap	1+1
⑦	 Remote controller bracket	1

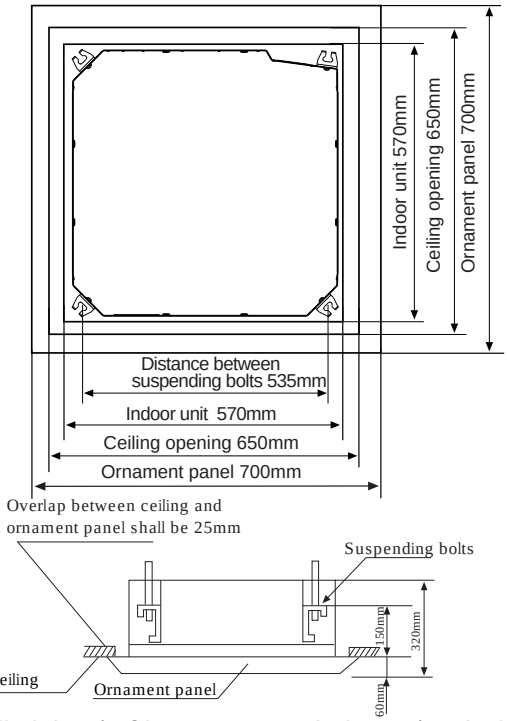
1.Selection of Installation Place

(1) Place above the ceiling where have enough space to arrange the unit.
(2) Place where the drainage pipe can be arranged well.
(3) Place where inlet and outlet air of indoor and outdoor unit will not be blocked.
(4) Do not expose the unit to the place with heavy oil or moisture (e.g.kitchen and workshop).
(5) Do not set the unit in the place where destructive gas (such as sulfuric acid gas) or pungent gas (thinner and gasoline) concentrates and retains.
(6) Place strong enough to support the unit weight.
(7) No expensive articles such as television and piano below indoor unit.
(8) Enough space for maintenance.
(9) Place more than 1m away from television and radio to avoid disturbing television and radio.
(10) Easy for maintenance.



2.Installation Preparation

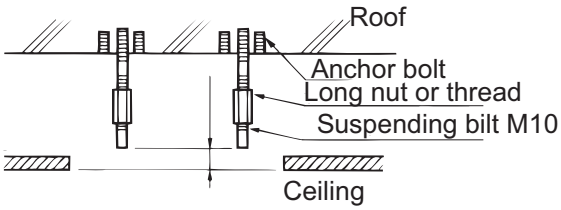
(1) Position of ceiling opening between unit and suspending bolt (front view of unit).



(2) Prepare all piping (refrigerant,water drainage)and wires (connection wire of remote controller, indoor unit connection wires) to the indoor unit before installation in order to connect indoor unit immediately after installation.

(3) Install a suspending bolt

To support the unit weight ,anchor bolt should be used in the case of already exists ceiling. Fow new ceiling, use flush-in type bolt, built-in type bolt or parts pretared in the field.
Before going on installing, adjust space to ceiling.



Note: All the above mentioned parts shall be prepared in feild, the diameter of suspending bolt is M10

<Installation Example>

3. Installation of indoor unit

In case of no ceiling

Install unit temporarily

Put suspending bracket on the suspending bolt to hang the unit up. Be sure to use nut and washer at both end of the breaket to secure firmly.

After installation on the ceiling

(1) Adjust unit to its right position (Refer to preparation for installation-(1))

(2)Check that unit is horzontal.

Water pump and floating switch is installed inside indoor unit,check four corners of the unit for its lever using horizontal comparator or PVC tube with water.(If unit is tilting against the direction of water drainage,problem may occur on floating water leakage.)

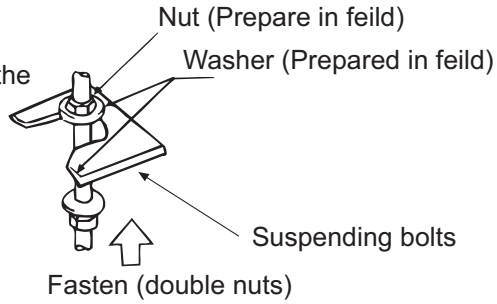
In the case of ceiling already exists

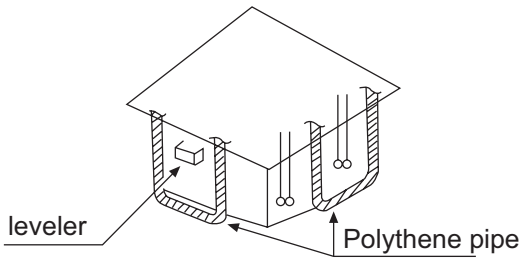
(1)Install unit temporally

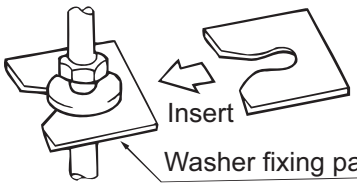
Put suspending bracket on the suspending bolt to hang the unit up.Be sure to use nut and washer at both end of the bracket to secure it firmly.

(2)Adjust the height and position of the unit.

(3)Proceed with procedure (4) of " In the case of no ceiling "







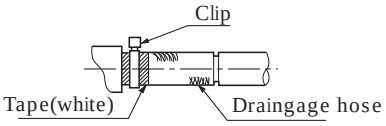
[secure the washer firmly]

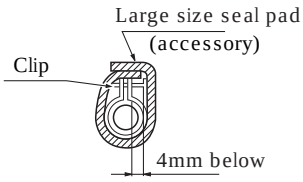
4. Installation of water drainage pipe

(1) Install water drainage pipe

- Pipe diameter shall be equal or larger than that of connecting pipe (Pipe of polythene; size: 25mm; O.D.: 32mm)
- Drainpipe should be short, with a downward slope at least 1/100 to prevent air bag from forming.
- If downward slope of drainpipe cannot be made,lifting pipe shall be installed.
- Keep a distance of 1-1.5m between suspending bolts, to make water hose straight.

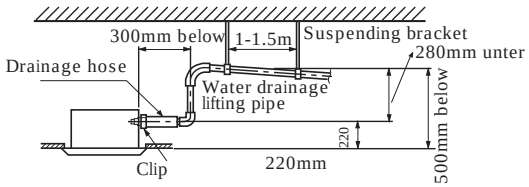
- Use the drainage hose and clip provided with unit.
  Insert water pipe into water plug until it reaches the white tape.
  Tighten the clip until head of the screw is less than 4mm from hose.
- Wind the drainage hose to the clip using seal pad for heat insulation.
- Insulate drainage hose in the room.

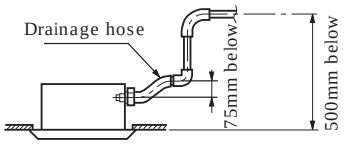




5. Cautions for the water drainage lifting pipe

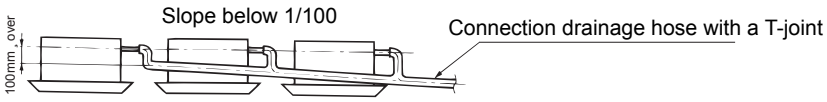
- Installation height of water drainage lifting pipe shall be less than 280mm
- There should be a right angle with unit ,300mm from unit.





< Note >

- The slope of water drainage hose shall be within 75mm , make the drainage plug not to bear excessive force.
- If several water hoses join together, of as per following procedures.



Specifications of the selected drainage hoses shall meet the requirements for the unit running

6. Installation of Ornament Panel

Install ornament panel on indoor unit

(1) Check whether indoor unit is horizontal with leveler or polythene pipe filled with water , and check that the dimension of the ceiling opening is correct. Take off the lever gauge before installing the ornament panel.

(2) Fasten the screws to make the height difference between the two sides of indoor unit less than 5mm.

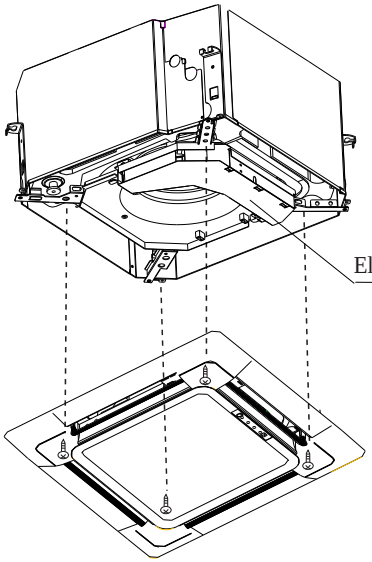
(3) Firstly fix it with screws temporarily.

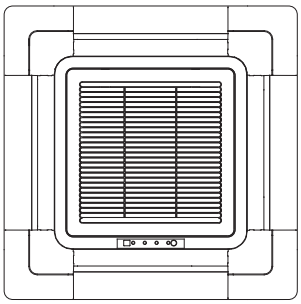
(4) Fasten the two temporarily fixing screws and other two, and tighten the four screws.

(5) Connect the wires of synchro-motor.

(6) Connect the wire of signal.

(7) If no response of remote controller,check whether the wiring is correct,restart remote controller 10 seconds after shut off power supply.





Panel limitation board installation

(1)Install the panel board in the direction shown in the figure.
(2)The incorrect direction will result in water leakage,meanwhile swing and signal receiving are displayed that cannot be connected.

5.2.2 AC122ACERA

INSTALLATION PROCEDURE

Install the room air conditioning unit as follows:

PREPARING INDOOR UNIT INSTALLATION

FIRST REMOVE THE INTAKE GRILL

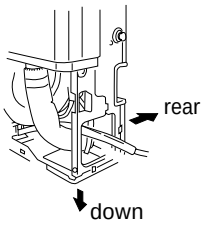
A. FLOOR MOUNTING

(AC36/42 only suitable for exposed ceiling mounting)

1. DRILLING FOR PIPING

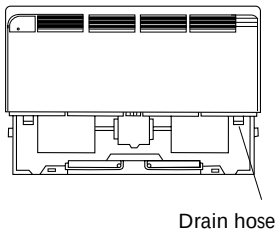
The piping and drain can exit the unit in two directions as shown below in (Fig. 2)

(Fig. 2)



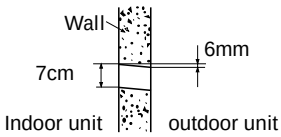
The drain hose must be connected to the right side as shown in (Fig.3).

(Fig. 3)



After the piping and drainage exit has been selected, drill a 7 cm dia. hole through the wall so that the hole is slanting downward toward the outside to ensure good drainage. When the pipe is led out from the rear, make a hole as Fig.4, at the position shown.

(Fig. 4)

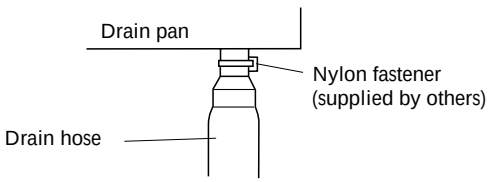


2. INSTALLING DRAIN HOSE

The drain hose must be connected to the right side of the unit (Fig.3)

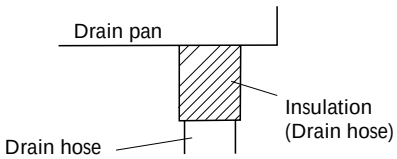
Insert the drain hose into the drain pan, then secure the drain hose with a nylon fastener. (Fig.5)

(Fig. 5)



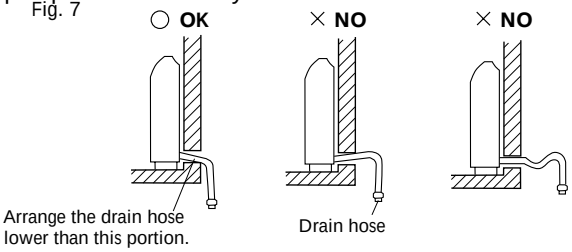
Wrap the insulation around the drain hose connection.(Fig.6)

(Fig. 6)



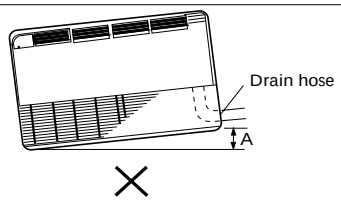
Be sure to arrange the drain hose correctly as shown in Fig. 7 so that it is lower than the drain hose connecting point of the indoor unit, if condensate pump is not fitted to system.

Fig. 7



⚠ CAUTION!

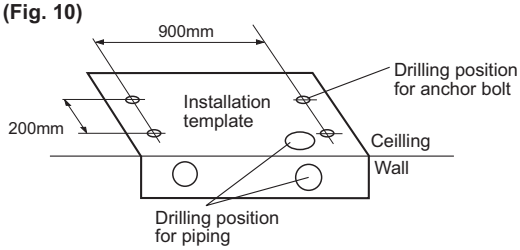
Ensure that the unit is fixed level. Height 'A' must be less than 5 mm.(Fig.8)



B. UNDER CEILING MOUNTING

Using the installation template, drill holes for piping and anchor bolts(for holes).(Fig.9)

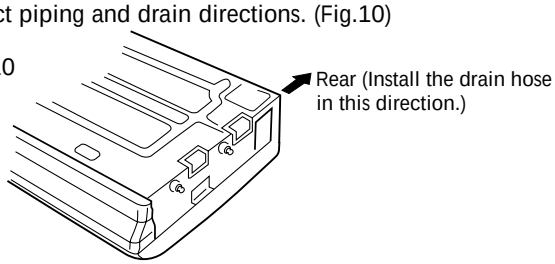
(Fig. 10)



1. DRILLING FOR PIPING

Select piping and drain directions. (Fig.10)

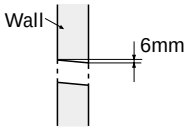
Fig 10



⚠ CAUTION

Install the drain hose at the rear; it should not be installed on the top or right side.

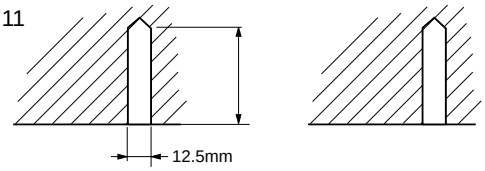
After the piping and drainage exit has been selected, drill 80mm and 50mm or 150mm dia. hole through the wall. So that the hole is slanting downward toward the outside for smooth water flow if a condensate pump is not fitted to system.



2. DRILLING HOLES FOR ANCHOR BOLTS AND INSTALLING THE ANCHOR BOLTS

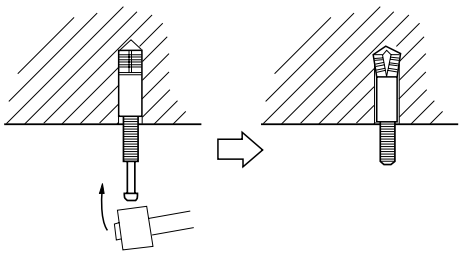
using a masonry drill, drill four 12.5 mm dia. Holes.(Fig.11)

Fig. 11



Insert the anchor bolts into the drilled holes, and drive the pins completely into the anchor bolts with a hammer. (Fig. 12)

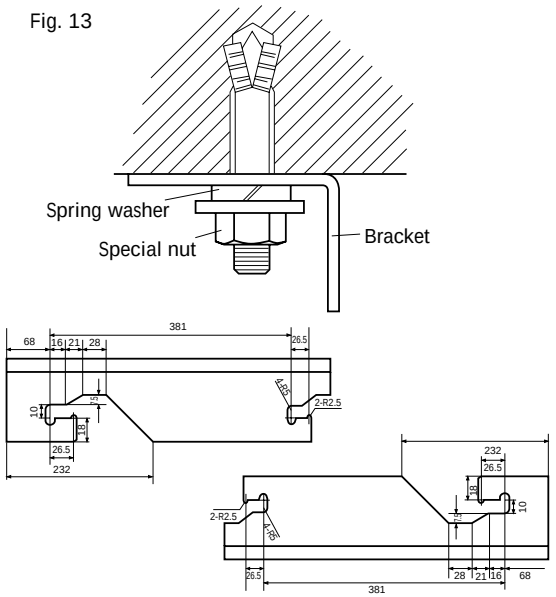
Fig. 12



3. INSTALLING BRACKETS

Install the brackets with nuts, washers and spring washers.(Fig. 13)

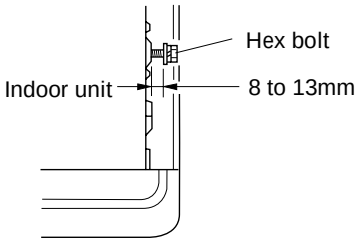
Fig. 13



4. INSTALLING INDOOR UNIT

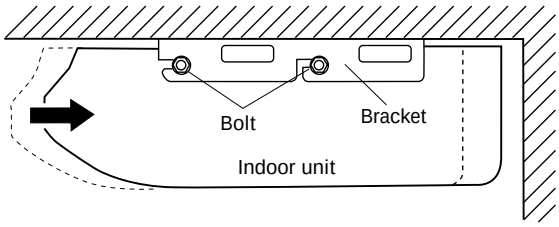
Reset the hex bolts as shown in Fig.14.

Fig. 14



Apply the indoor unit to the brackets.(Fig.15)

Fig. 15

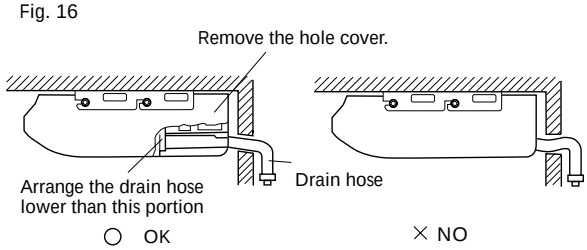


Now, securely tighten the hex bolts in both sides.

5. INSTALL THE DRAIN HOSE

The drain hose will be connected to the right side.(Fig.3)
Insert the drain hose into the drain pan, then secure the drain hose with a nylon fastener.(Fig.5)
Wrap the insulation (drain hose)around the drain hose connection. (Fig.9)
Be sure to arrange the drain hose correctly so that it is lower than the drain hose connecting port of the indoor unit (Fig.16) if condensate pump is not fitted to system.

Fig. 16



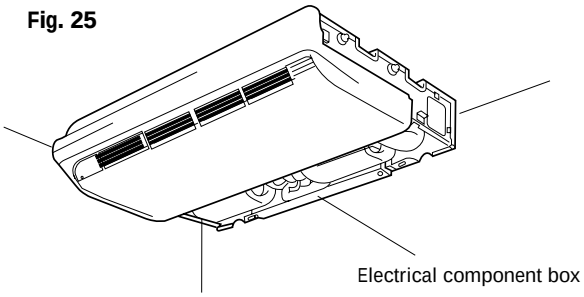
Wiring

ELECTRICAL WIRING

⚠ CAUTION
(1) Match the terminal block numbers and connection cable colours with those of the outdoor unit. Incorrect wiring may cause damage to the electrical parts.
(2) Connect the connection cables firmly to the terminal block. Incorrect installation may result in a fire.
(3) Always fasten the outside covering of the connection cable with the cable clamp.(If the insulation is chafed, a short curcuit may occur.)
(4) Always connect the earth wire.

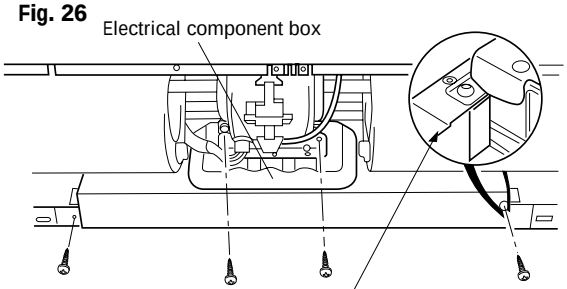
1. INDOOR UNIT SIDE
(1) Remove the electrical component box.

Fig. 25



INDOOR UNIT SIDE

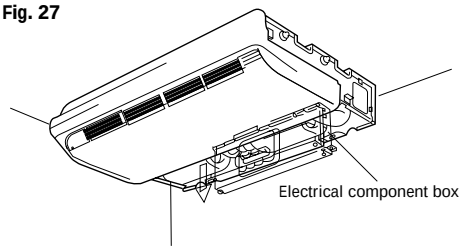
Fig. 26



⚠ CAUTION
Do not remove the screws. If the screws are removed, the electrical component box will fall.

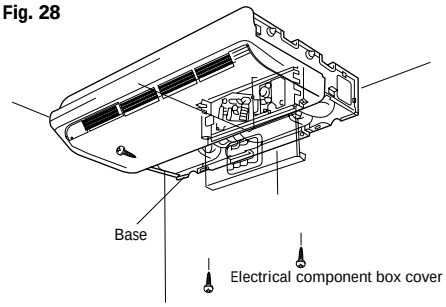
(2) Pull out the electrical component box.

Fig. 27



(3) Remove the electrical component box cover.

Fig. 28



Remove the three tapping screws

⚠ CAUTION
Be careful not to pinch the wiring between the electric component box and base.

(4) Wiring
See wiring diagrams for indoor unit.

ELECTRICAL WIRING

⚠ WARNING
(1) Ensure all wiring complies with current regulations.
(2) It is recommended that a MCB of the correct rating is used to protect the system.
(3) Always use a circuit breaker that can trip all the poles of the wiring is fitted and has an isolation distance of at least 3mm between the contacts of each pole.

CUSTOMER GUIDANCE

Explain the following to the customer in accordance with the operating manual:
(1) Starting and stopping method, operation switching, temperature adjustment, timer, air flow switching, and other remote control unit operations.
(2) Air filter removal and cleaning, and how to use air louvres.
(3) Give the operating and installation manuals to the customer.

5.2.4 AD122ALERA

Installation space

The indoor unit shall be installed at locations where cold and hot air could evenly circulated.
The following locations should be avoided:

Places with rich salt (seaside area).
Places with plenty of gas sulfides (mainly in warm spring areas where the copper tube and braze weld is easy to corrosion).
Locations with much oil (including mechanical oil) and steam.
Locations using organic solvents.
Places where there are machines generating HF electromagnetic waves.
Positions adjacent to door or window in contact with high-humidity external air. (Easy to generate dew).
Locations frequently using special aerosols.

The following points should be taken care of:

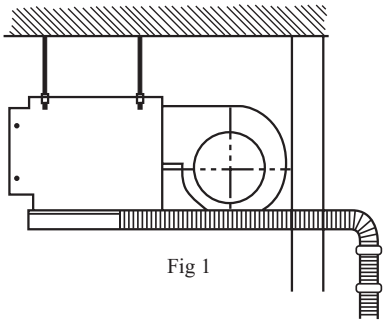


Fig 1

1. Select suitable places the outlet air can be sent to the entire room, and convenient to lay out the connection pipe, connection wire and the drainage pipe to outdoor.
2. The ceiling structure must be strong enough to support the unit weight.
3. The connecting pipe, drain pipe and connection wire shall be able to go though the building wall to connect between the indoor and outdoor units.
4. The connecting pipe between the indoor and outdoor units as well as the drain pipe shall be as short as possible. (See Figure 1)
5. If its necessary to adjust the filling amount of the refrigerant, please refer to the installation manual attached with the outdoor unit.
6. The connecting flange should be provided by the user himself.
7. The indoor unit has two water outlets one of which is obstructed at the factory (with a rubber cap). Only the outlet not obstructed (liquid inlet and outlet side) will be generally used during installation. If applicable, both the outlets should be used together.

Note: The access hole must be provided during installation of indoor unit for maintenance.

After selecting the installation space, proceed the following steps:

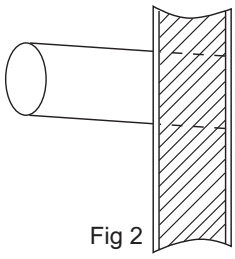
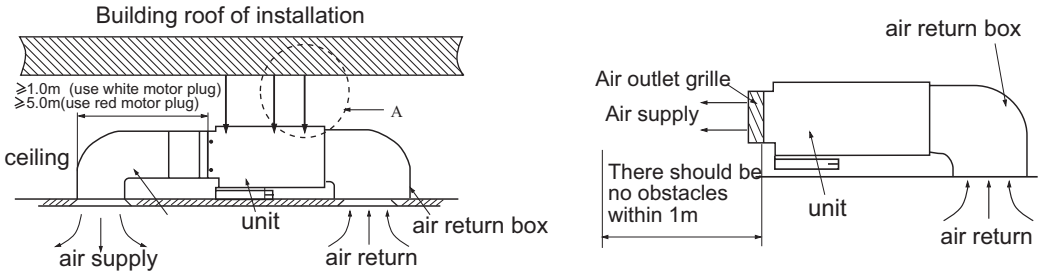


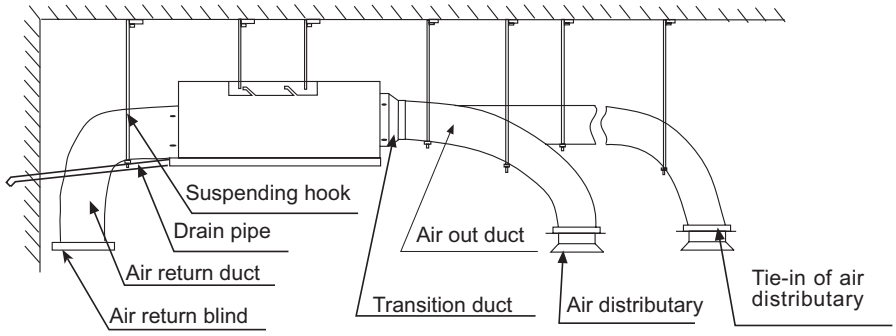
Fig 2

1. Drill a hole in the wall and insert the connecting pipe and wire through a PVC wall-through tube purchased locally. The wall hole shall be with a outward down slope of at least 1/100. (See Figure 2)
2. Before drilling check that there is no pipe or reinforcing bar just behind the drilling position. Drilling shall avoid at positions with electric wire or pipe.
3. Mount the unit on a strong and horizontal building roof. If the base is not firm, it will cause noise, vibration or leakage.
4. Support the unit firmly.
5. Change the form of the connection pipe, connection wire and drain pipe so that they can go through the wall hole easily.

- Each of the air sending duct and air return duct shall be fixed on the prefabricated panel of the floor by the iron bracket.
- The recommended distance between the edge of the air return duct and the wall is over 150mm.
- The gradient of the condensate water pipe shall keep over 1%.
- The condensate water pipe shall be thermal insulated.
- When installing the ceiling Concealed type indoor unit, the air return duct must be designed and installed (as figure shown).

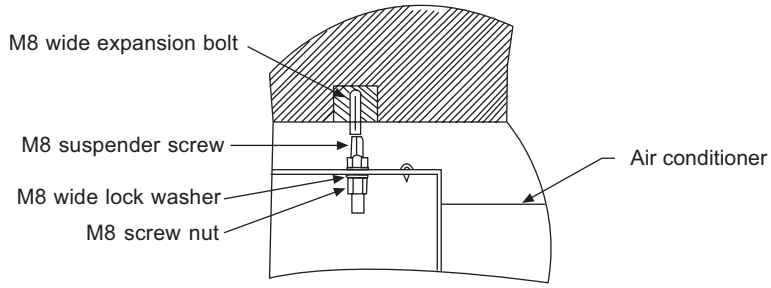


Note: When connecting the short ducts, use the low static terminals, which color is white.
The distance L from the air outlet of the duct to the air outlet of the sir conditioner shall be no more than 1 m.



The sketch map of long duct

Note: When connecting the long ducts, use the middle static terminals, which color is red.
The distance L from the air outlet of the duct to the air outlet of the sir conditioner shal be no more than 5 m.



Installation of indoor unit duct

1. Installation of air sending duct

- This unit uses rounded duct, the diameter of the duct is 180mm.
- The rounded duct needs to add a transition duct to connect with the air-sending duct of indoor unit, then connect with respective separator. As Fig. 1 shown, all the fan speed of any of the separator's air outlet shall be adjusted approximately the same to meet the requirement for the room air conditioner.

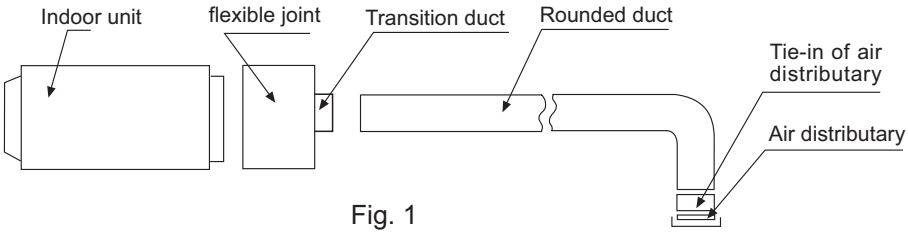


Fig. 1

Unit: mm

2. Installation of air return duct

- Use rivet to connect the air return duct on the air return inlet of the indoor unit, then connect the other end with the air return blind. As Fig. 2 shown.

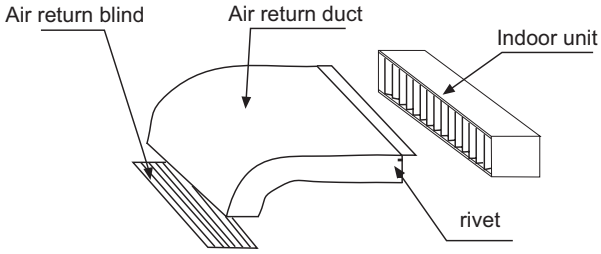


Fig. 2

3 Thermal insulation of duct

- Air-sending duct and air return duct shall be thermally insulated. First stick the gluey nail on the duct, then attach the heat preservation cotton with a layer of tinfoil paper and use the gluey nail cap to fix. Finally use the tinfoil adhesive tape to seal the connected part. As Fig. 3 shown.

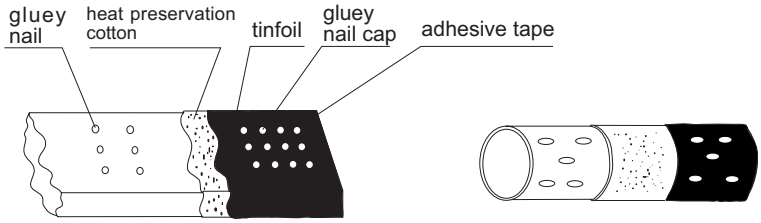


Fig. 3

Installing the suspension screw:

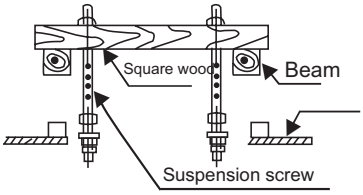
Use M8 or M10 suspension screws (4,prepared in the field)(when the suspension screwheight exceeds 0.9m, M10 size is the only choice).These screws shall be installed as follows with space adapting to air conditioner overall dimensions according to the original building structures.

Wooden structure

A square wood shall be supported by the beams and then set the suspension screws.

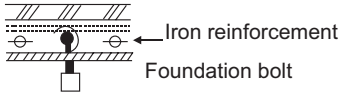
New concrete slab

To set with embedded parts,foundation bolts etc.



Knife embedded part

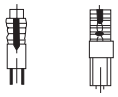
Guide plate embedded part



Pipe suspension foundation bolt

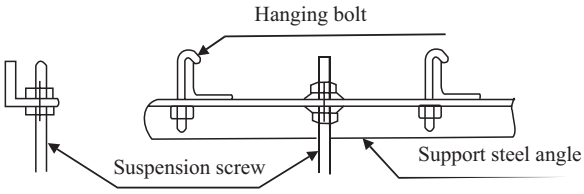
Original concrete slad

Use hole hinge,hole plunger or hole bolt.



Steel reinforcement structure

Use steel angle or new support steel angle directly.



Hanging of the indoor unit

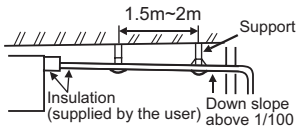
Fasten the nut on the suspension screw and then hang the suspension screw in the T slot of the suspension part of the unit. Aided with a level meter,adjust level of the unit within 5mm.

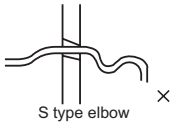
⚠ Caution

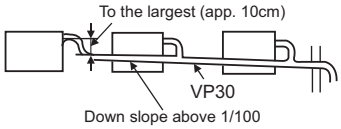
In order to drain water normally, the drain pipe shall be processed as specified in the installation manual and shall be heat insulated to avoid dew generation. Improper hose connection may cause indoor water leakage.

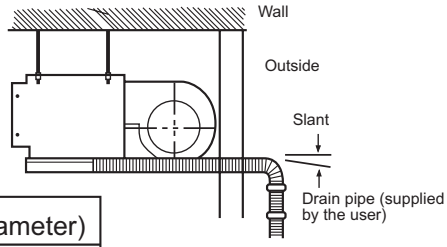
Requirements

- The indoor drain pipe shall be thermal insulated.
- The connection part between the drain pipe and the indoor unit shall be insulated so as to prevent dew generation.
- The drain pipe shall be slant downwards (greater than 1/100). The middle part shall not be of S type elbow, otherwise abnormal sound will be produced.
- The horizontal length of the drain pipe shall be less than 20 m. In case of long pipe, supports shall be provided every 1.5 – 2m to prevent wavy form.
- Central piping shall be laid out according to the following figure.
- Take care not to apply external force onto the drain pipe connection part.









Pipe and insulation material

Pipe	Rigid PVC pipe VP31.5mm (internal diameter)
Insulation	Foamed PE with thickness above 7 mm

Hose

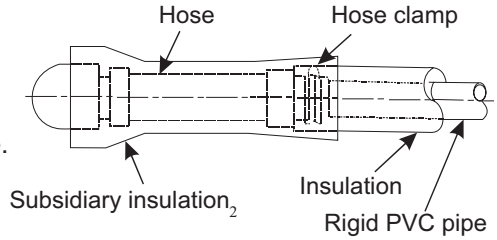
Drain pipe size: (3/4") PVC pipe

The hose is used for adjusting the off-center and angle of the rigid PVC pipe.

- Directly stretch the hose to install without making any deformation.
- The soft end of the hose must be fastened with a hose clamp.
- Please apply the hose on horizontal part

Insulation treatment:

- Wrap the hose and its clamp until to the indoor unit without any clearance with insulating material, as shown in the figure.



Drain confirmation

During trial run, check that there is no leakage at the pipe connection part during water draining even in winter.

Allowable pipe length and drop

These parameters differ according to the outdoor unit. See the instruction manual attached with the outdoor unit for details.

Pipe material and size

Pipe material	Phosphorus deoxidized copper seamless pipe (TP2) for air conditioner	
Pipe size (mm)	Gas side	Ø12.70
	Liquid side	Ø6.35

Recharge of refrigerant

The refrigerant recharge shall be performed as specified in the installation instructions. The adding procedure shall be aided with a measuring meter for a specified amount of supplemented refrigerant.

Requirement

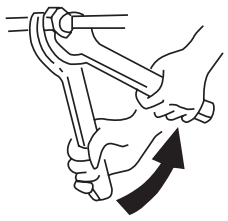
More or less refrigerant will cause compressor fault. The mount of the added refrigerant shall be as specified in the instructions.

Connection of refrigerant pipe

Conduct flared connection work to connect all refrigerant pipes.

- The connection of indoor unit pipes must use double spanners.
- The installing torque shall be as given in the following table.

Connecting pipe O.D.(mm)	Installing torque (N-m)
Ø6.35	11.8 (1.2kgf-m)
Ø12.70	49.0 (5.0 kgf-m)



Double-spanner operation

Vacuum pumping

With a vacuum pump,create vacuum from the stop valve of the outdoor unit.
Emptying with refrigerant sealed in the outdoor unit is absolutely forbidden.

Open all valves

Open all the valves on the outdoor unit.

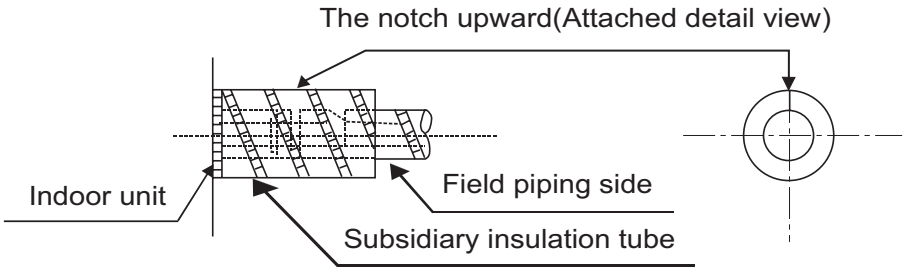
Gas leakage detection

Check with a leakage detector or soap water that if there is gas leakage at the pipe connections and bonnets.

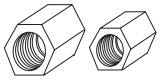
Insulation treatment

Operate insulation treatment on both the gas side and liquid side of pipes respectively.
During cooling operation,both the liquid and gas sides are cold and thus shall be insulated so as to avoid dew generation.

- The insulating material at gas side shall be resistant to a temperature above 120 degree.
- The indoor unit pipe connection part shall be insulated.

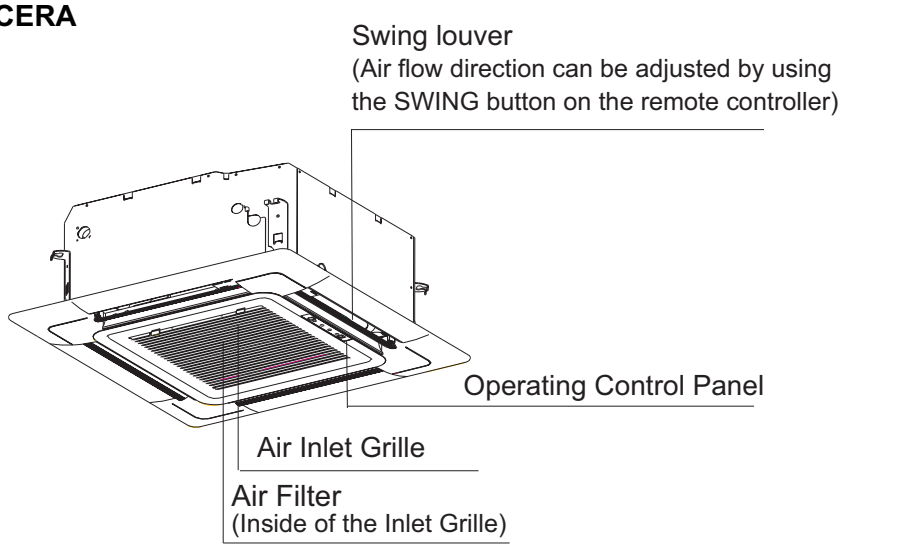


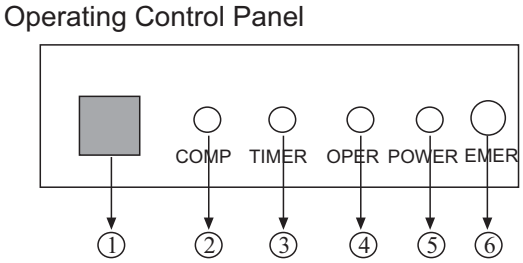
Accessory as follow:

No.	Accessory parts		Qty.
1		Wire clamp	2
2		Heat insulation sheathing	1+1
3		Screw cap	1+1

6. Parts and Functions

6.1 AB122ACERA





① Remote receiver
② Compressor Lamp
③ TIMER Lamp
④ OPERATION Lamp
⑤ Power Lamp
⑥ Emergency switch

6.2 AC122ALERA

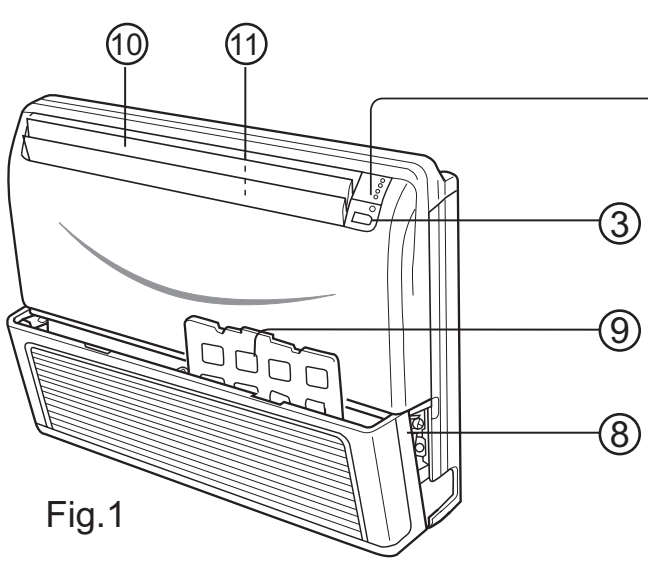


Fig.1

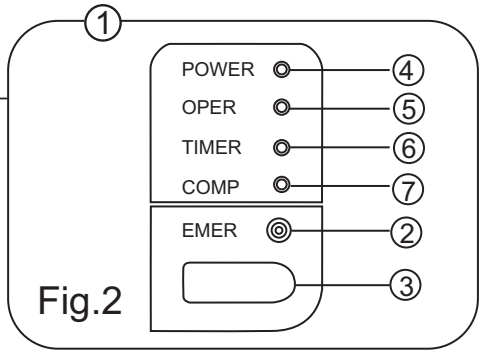
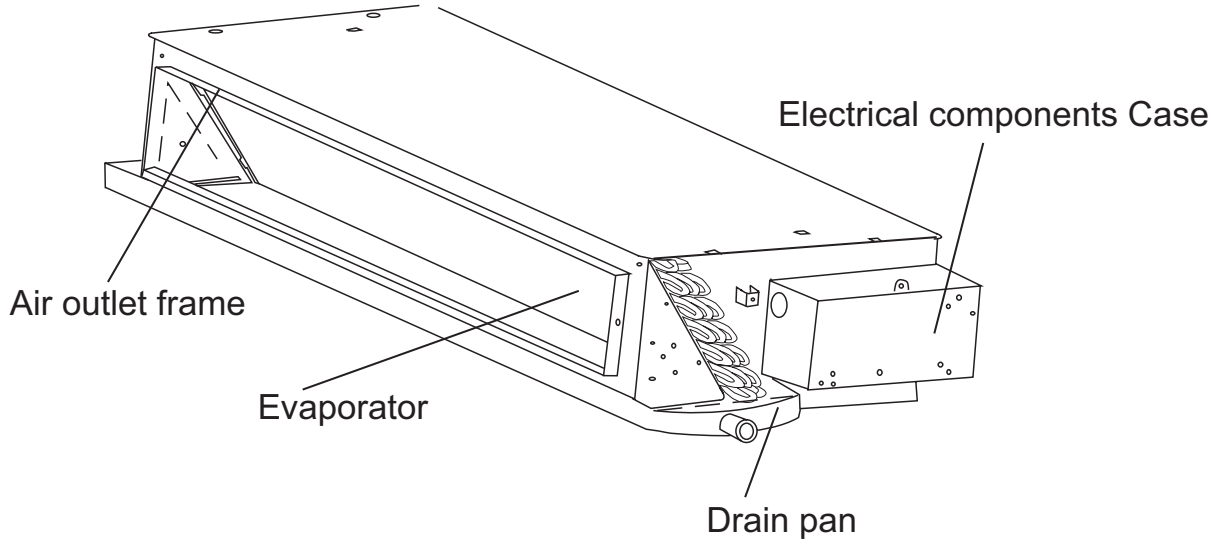


Fig.2

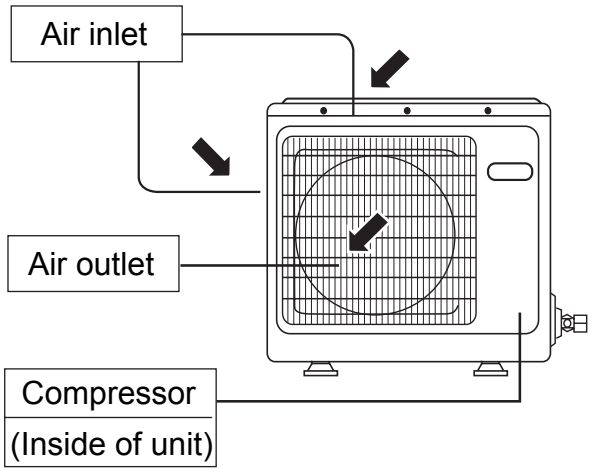
Fig.1 Indoor Unit

① Operating Control Panel (Fig.2)
② Emergency switch
③ Remote Control Signal Receiver
④ Power Indicator Lamp (Red)
⑤ OPERATION Indicator Lamp (Green)
⑥ TIMER Indicator Lamp (Yellow)
⑦ Compressor Run Lamp (Green)
⑧ Intake Grill
⑨ Air Filter
⑩ UP/DOWN Air Direction Flaps
⑪ RIGHT/LEFT Air Direction Louvers (behind UP/DOWN Air Direction Flaps)

6.3 AD122ALERA

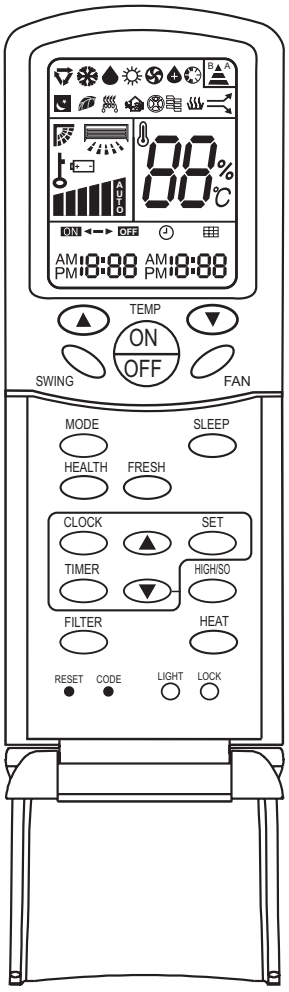


6.4 AU122AEERA

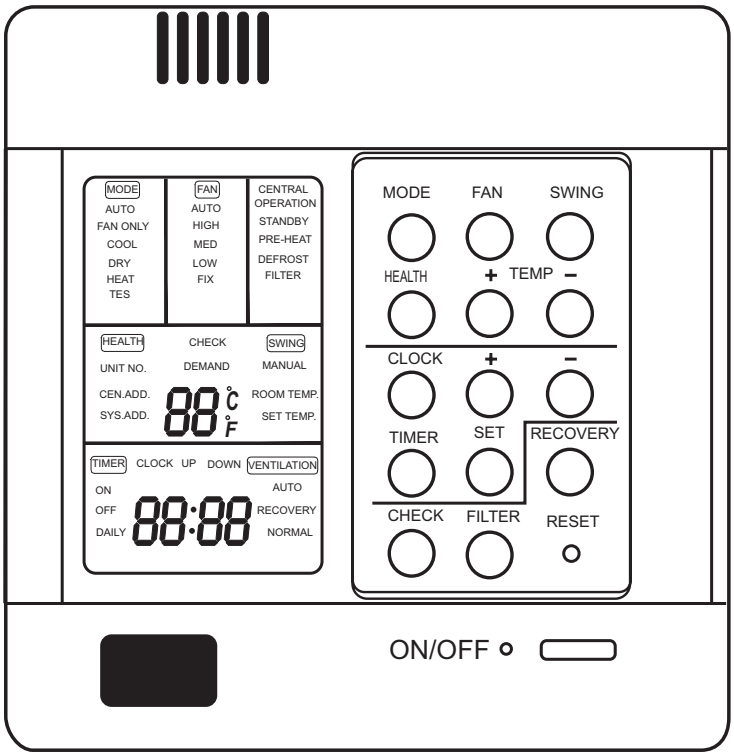


7. Controller functions

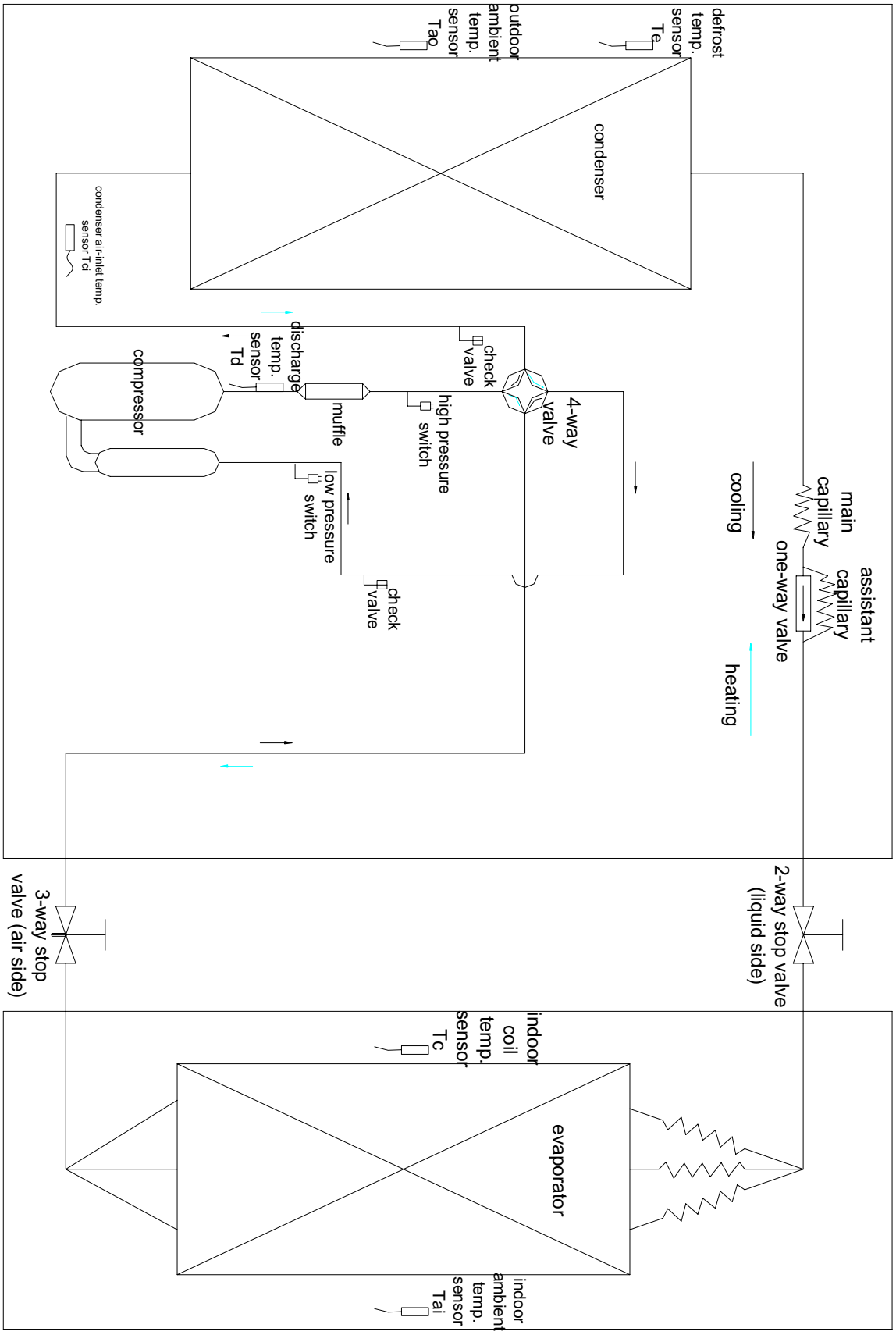
Infrared controller YR-H71



Wired controller YR-E12



8. Refrigerant circuit



9. Electrical Control Functions

9.1. Outdoor electric control functions

System main functions

Definition of sensor sign: Tnh=indoor ambient temp., Twh=outdoor ambient temp., Tpg=indoor coil, Ttc=discharge, Tcs= outdoor coil, Txr=suction.

1.1 Outdoor running frequency and the control procedure

1.1.1 Outdoor running frequency control

Outdoor running frequency range:

Compressor max. running frequency in cooling mode:

outdoor ambient temp.	~15	15~38	38~
Max. running frequency Hz(E)	60	100	80

Compressor min. running frequency in cooling mode:

outdoor ambient temp.	~38	38~
Min. running frequency Hz(E)	16	16

Compressor max. running frequency in heating mode:

outdoor ambient temp.	~0	0~15	15~
Max. running frequency Hz(E)	120	100	80

Compressor min. running frequency in heating mode:

outdoor ambient temp.	~10	10~
Min. running frequency Hz(E)	30	30

1.1.2 Compressor startup

When compressor startup for the first time, compressor running frequency must be stay at 60Hz(E) and 80Hz(E) for 1 minutes (At outdoor discharg temp. overhigh protection and compressor overcurrent protection, the frequency will be reduced), and then rise up to the target frequency. After the unit is in normal, the above procedure is not available.

1.2.3 Heating mode, cooling mode

After performing the compressor startup procedure, the unit will run according to the indoor frequency.

2 minutes later, the unit will compensate the running frequency due to the relative condition.

1.2.4 Compressor frequency rising/reducing speed

Rapid rising/reducing frequency speed 1----1Hz/second

Slow rising/reducing frequency speed 2----1Hz/10 seconds

Slow reducing frequency speed 3----2Hz/second

1.2 Outdoor motor control

Note: When the outdoor motor needs to change the class, there will be 45-second interval to avoid the fan speed changing frequently. 4 pulse for each circuit.

1.2.1 Fan motor speed class has 7 steps, the rotation and class is as follow:

Class-0	Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7
Stop	250	400	550	650	850	900	950

1.2.2 Blowing remain heat after compressor shuts off

In cooling mode, when compressor shuts off, outdoor motor will enter speed Class-5 automatically, and will shut off after blowing remaining heat for 30 seconds.

1.2.3 Outdoor motor control in cooling/dry mode

- Fan motor locked rotor: When fan motor is requested to work, if fan speed is measured to be below 50RPM and keep for 10 seconds, the compressor will stop, but 3 minutes later, it will re-start up again. If within 10 minutes, the condition occurs 3 times, the unit will stop and alarm.
- When compressor starts up, the unit will adjust automatically in 3 minutes according to the outdoor

ambient temperature, and 3 minutes later, the unit will adjust according to the outdoor ambient temperature and compressor running frequency.

Fan speed chart in 3 minutes after compressor starts up:

Ambient temp.	~10	10~25	25~
Cool	Class-3	Class-5	Class-6
heat	Class-6	Class-5	Class-3

Fan speed chart in 3 minutes after compressor runs due to the ambient temp. and compressor frequency:

Compressor frequency in cooling		F<40Hz	40Hz≤F<50Hz	50≤F
Twh	Over 28℃	Class-3	Class-5	Class-6
	Below 28℃	Class-1	Class-3	Class-5
Compressor frequency in heating		F<40Hz	40Hz≤F<50Hz	50≤F
Twh	Over 15℃	Class-1	Class-3	Class-4
	Below 15℃	Class-3	Class-5	Class-6

- Low temp. cooling mode:

Outdoor temp. To	To <0	0≤To <5	5≤To <10	10≤To <15
DC fan speed	Class-1	Class-2	Class-3	Class-4

- Rated running mode:

Outdoor fan motor runs in class-7(DC motor) in rated mode.

1.2.4 Fan motor speed control when outdoor select inverter moter

Select fan motor by SW4 on the outdoor small indicate board, ON means DC motor, OFF means inverter motor.

Blowing remain heat function: In cooling mode, when compressor shuts off, outdoor motor will run in low speed, and will shut off after 30 seconds.

Fan speed chart in 3 minutes after compressor starts up:

Ambient temp.	~15	15~25	25~
Cool	Low speed	High speed	High speed
Ambient temp.	~10	10~20	20~
heat	High speed	High speed	Low speed

Fan speed chart in 3 minutes after compressor runs due to the ambient temp. and compressor frequency:

Compressor frequency in cooling		~25	25~45	45~
Twh	Over 28℃	Low speed	High speed	High speed
	Below 28℃	Low speed	Low speed	High speed
Compressor frequency in heating		~25	25~45	45~
Twh	Over 15℃	Low speed	Low speed	High speed
	Below 15℃	Low speed	High speed	High speed

Remark: 1. There are 45 seconds delay when changing fan speed;

2. When in non-heating mode, if outdoor ambient temp. is lower than 15℃, the fan will run in low speed;
3. When in heating mode, if outdoor ambient temp. is lower than 20℃, the fan will run in low speed.

1.3 Outdoor electronic expansion valve (EEV) control

1.3.1 Movement of EEV

Full-close, full-open, open angle upper limitation, open angle lower limitation, open/close valve speed.

Initialize movement: 600 pulse close, then 50 pulse open, that is stop at 50 pulse at last;

Full-open: 480 pulse open(E);

Upper/lower limitation of open angle: 480---50 pulse;

Driving speed: open direction: 30.3 PPS; close direction: 83.3 PPS;

Electrify initialize movement: act as full-close;

The movement of valve after compressor startup/shut off ;

Compressor startup: the compressor will startup after the open angle of valve has reached the fiducial open angle;

Compressor shut off: valve begin to full-close after the compressor has stopped.

1.3.2 Enter the fiducial open angle after compressor startup(no matter 2 minutes later or 2 minutes ago), 4 minutes later adjust automatically according to the target over-heat value, 10 minutes later begin to modify the over-heat value and open angle of valve.

Cool

Outdoor temp.	~22℃			22℃~		
Compressor frquency	~50	50~80	80~	~50	50~80	80~
PMV open angle	230	220	240	260	250	280

Heat

Outdoor temp.	~6℃			6℃~		
Compressor frquency	~50	50~80	80~	~50	50~80	80~
PMV open angle	200	180	220	240	230	260

1.3.3 Confirmation of over-heat degree

Standarded over-heat degree

Actual running Hz		~20	~30	~40	~50	~60	~70	~80	~90	90~
TXRH0 （℃）	Cool, dry	2	2	1	1	1	1	1	2	2
	heat	2	2	1	1	1	1	1	1	1

When discharging temp. Td is too high or too low, modify the EEV angle

Mode	Modification angle	Max. modification
Cooling	Ttc＞100℃, standarded over-heat degree -1 degree / 2 minutes 90℃< Ttc<100℃, keep the angle Ttc<90℃, +1 degree / 2 minutes, and plus to 0 degree gradually	Max. -5
Cooling	Ttc<35℃, standarded over-heat degree +1 degree / 2 minutes 35℃< Ttc<40℃, keep the angle Ttc＞40℃, -1 degree / 2 minutes, and reduce to 0 degree gradually	Max. +5
Heating	Ttc＞100℃, standarded over-heat degree -1 degree / 2 minutes 90℃< Ttc<100℃, keep the angle Ttc<90℃, +1 degree / 2 minutes, and plus to 0 degree gradually	Max. -5
Heating	Ttc<35℃, standarded over-heat degree +1 degree / 2 minutes 35℃< Ttc<40℃, keep the angle Ttc＞40℃, -1 degree / 2 minutes, and reduce to 0 degree gradually	Max. +5

1.4 4-way valve control

- The 4-way valve control in defrosting: refer to the defrosting procedure.
- 4-way valve control in other modes:

In heating mode, 4-way valve will open in 15 seconds after compressor starts up. When compressor not startup or in non-heating mode, 4-way valve will close to ensure the compressor has stopped for at least 2 minutes.

1.5 Outdoor defrosting control

1.5.1 Enter condition

In heating mode, if the compressor has run for 10 minutes continuously and run for 45 minutes in all(clear the compressor accumulative operation time when defrost over or enter cooling mode), the system will measure the defrosting temp. sensor Tcs(check the frosting condition of outdoor heat exchanger) and outdoor ambient temp. sensor Ta, if the below condition can be met for continous 5 minutes, the unit will enter defrosting operation:

$$Tcs \leqslant C \times Ta - \alpha$$

Herein: C: Ta＜0℃, C=0.8(E)

Ta≥0℃, C=0.6(E)

Set α = 8 according to the data of EEPROM.

Herein: when $C \times Ta - \alpha$ exceed the range of $-12℃ \leqslant C \times Ta - \alpha \leqslant -6℃$,

If $C \times Ta - \alpha < -12℃$, regard it as equal to -12℃; if $C \times Ta - \alpha > -6℃$, regard it as equal to -6℃.

1.5.2 Defrost interval time

- When $C \times Ta - \alpha > -12℃$, compressor defrost accumulative operation time is 45 minutes;
- When $C \times Ta - \alpha \leqslant -12℃$, compressor defrost accumulative operation time is 45 minutes

1.5.3 Defrost operation

when defrost begins, compressor will stops for 1 minute, outdoor fan runs, after 50 seconds, 4-way valve OFF.

Outdoor fan stops when compressor starts up, compressor running frequency must be stay at 60Hz (E) for 1 minute, and then rise up to the target frequency 88Hz.

Compressor current and discharge protections are valid during defrost, when compressor stops because of protection or failure in defrost mode, resume after stopping for 3 minutes, accumulative operation time will not be cancelled. Enter defrost when the continuous operation time is met.

When enter defrost, quit defrost only when 2 minutes of the compressor min. operation time is met.

1.5.4 Quit condition

When any of the following condition is met, change defrost to heating mode.

(1): Outdoor heat exchanger temp. over 10℃ last for 60 senconds contineously;

(2): Outdoor heat exchanger temp. over 14℃ last for 30 senconds contineously;

(3): Defrost for 9 minutes contineously.

1.6 PTC output control

When outdoor unit is electrified, PTC output is 0, 3 seconds later, it is 1.

1.7 Heater control

When compressor stops and outdoor ambient temp. less than 26℃, heater will work, or stop it.

1.8 auto-checking function(pre-set)

Auto-checking function: When first short-circuit CJ601 then electrified, enter auto-checking. The process is as following: failure lamp LED001---PTC---4-way valve---heater---high speed---low speed---expansion valve(A—B—C—D)---LED lamp board(LED5—LED4—LED3—LED2—LED1—compulsory cooling—compulsory heating—DC fan motor—inverter fan motor)

Compulsory cooling when SW5-2 on LED lamp board is “ON”, LED5, LED4, LED3, LED2 and LED1 are all light, or all are black out.

Compulsory heating when SW5-1 on LED lamp board is “ON”, LED5, LED4, LED3 and LED2 are all light, LED1 is black out, or all are black out.

DC fan motor when SW5-4 on LED lamp board is “ON”, LED5, LED4, LED3 and LED1 are all light, LED2 is black out.

Inverter fan motor when SW5-4 on LED lamp board is “OFF”, LED5, LED4 and LED3 are light, LED2

and LED1 are black out.

1.9 Time shorting function

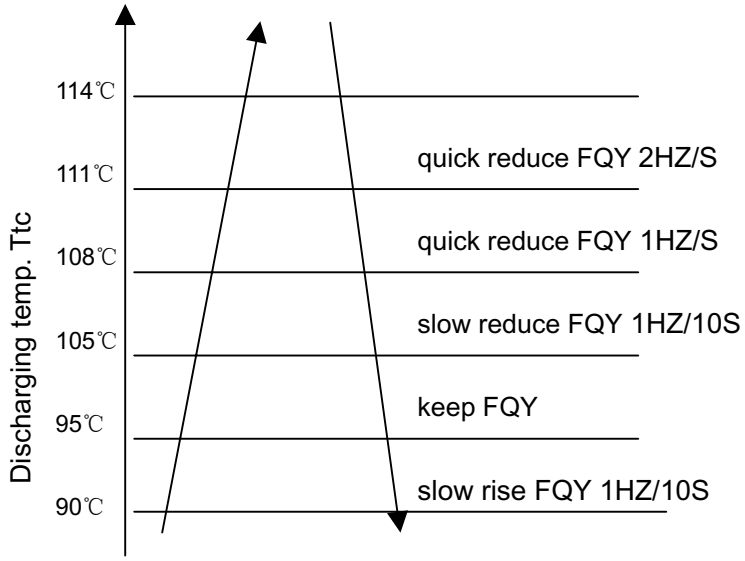
Time shorting function: If the time shorting port is in short circuit after electrifying CJ601, the unit will perform a 1/60 time shorting control.

1.10 Additional functions

1.10.1 The interval between compressor stop and startup again is 3 minutes, which can protection compressor. If being electrified for the first time, compressor will start up only when the valve opens to the normal operation angle.

1.10.2 Ttc high temperature protection

Ttc discharg temp. over-heat protection can be executed once the unit is ON, but the discharge temp. sensor can only alarm after the compressor has started up for 4 minutes.



If Ttc>=115 keeping for 10s, the discharge temp. over-heat protection excutes and unit stops, resumable after quit the protection. If in 60 minutes the protection occurs for 3 times, the failure can be sent to indoor unit.

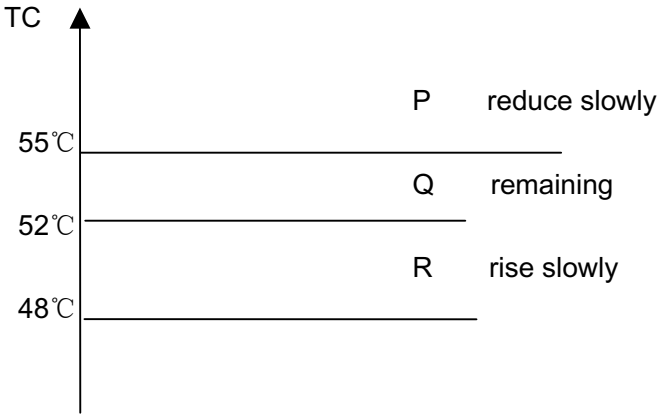
1.10.3 In heating indoor Tc high temperature protection

Indoor heat exchanger temp. sensor will check the indoor coil temperature, if it is over 55℃, the unit will reduce the compressor motor speed to perform the indoor heat exchanger temp. overhigh protection. If it is below 48℃, the unit will resume to be normal control.

P: reduce at the speed of 1Hz/10s

Q: remain the previous value

R: rise at the speed of 1Hz/10s



1.10.4 Over current protection:

The compressor will stop and alarm if current exceed 11A for 3 seconds contineously during compressor startup, the compressor can re-start up after 3 minutes. but the compressor will stop and alarm and confirm the failure if it stop abnormally 3 times in 60 minutes, the system will work continued after been power-off.

Over current reducing frequency(FQY) protection

When current exceed (B)A, the compressor will reduce FQY at 1HZ/S, if current is less than (B)A and more than (B-1)A, stop reducing FOY and then rise FQY at 1HZ/10S, when current is less than (B-A)A, reaume to the target FQY. (B is setted in the EEPROM)

Compressor power protection

1) In dry and cooling mode, when compressor power over (a)W, the compressor will reduce FQY 1HZ/S, if compressor power over (b)W, the compressor will reduce FQY 0.1HZ/S, when compressor power over (c)W, rise the compressor FQY is forbidden, when compressor power over (d)W, the compressor will rise FQY 0.1HZ/S.

2) In heating mode, when compressor power over (a1)W, the compressor will reduce FQY 1HZ/S, if compressor power over (b1)W, the compressor will reduce FQY 0.1HZ/S, when compressor power over (c1)W, rise the compressor FQY is forbidden, when compressor power over (d1)W, the compressor will rise FQY 0.1HZ/S.

Remark: a, b, c, d and a1, b1,c1,d1 are written in EEPROM, can be adjusted according to different system.

1.10.5 High, low pressure protection

High pressure protection: high pressure switch will not detect when in standby, detect after compressor has started for 3 minutes.

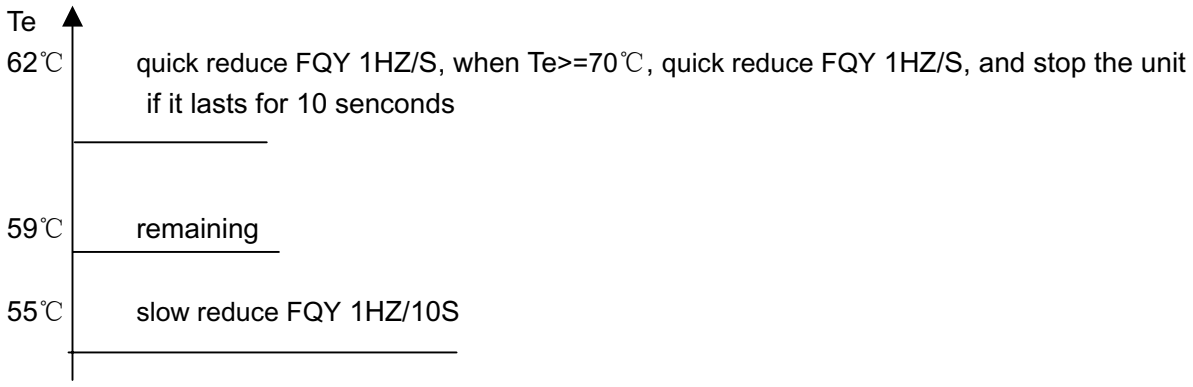
Low pressure protection: low pressure switch will detect after compressor has started for 3 minutes, and will shield during defrost or 6 minutes after defrost.

1.10.6 Sensor management: the detect time for sensor short-circuit or open-circuit is 4.5s, 3 minutes is needed for resume if failure is detected, the unit will work normally when the failure is cancelled.

Discharge temp. sensor will not detect if it short-circuit or open-circuit, detect when compressor has started for 3 minutes.

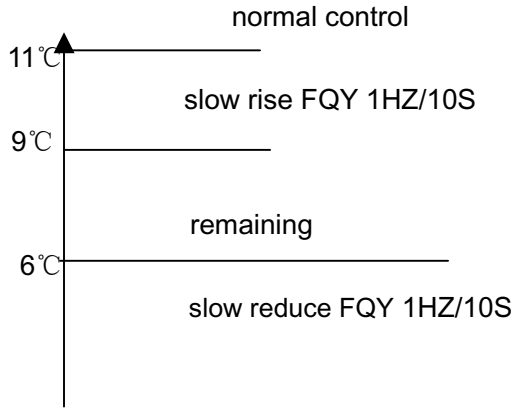
When the AD value of all sensor is less than 3, regard as the outdoor temp. too low and all sensor failtures will not alarm.

Outdoor add high temp. protection



1.10.7 Indoor heat exchanger anti-freezed protection

Anti-freezed in cooling mode



1.10.8 Rated operation(the value can be setted by EEPROM)

- Rated cooling:

When receiving the indoor rated operation command, the unit will enter rated cooling operation.

- Rated cooling:

When receiving the indoor rated operation command, the unit will enter rated heating operation.

1.10.9 Outdoor compulsory operation(select by the outdoor dip switch)

- Compulsory heating operation

Dial SW1 of the outdoor small indicate board in ON state, set the heat exchanger temp. from indoor unit 16℃, each protection is available, FQY(20—120Hz), fan speed(inverter: high/middle/low; DC motor: class 1—7) and expansion valve(10—400) can be manual adjusted.

- Compulsory cooling operation

Dial SW2 of the outdoor small indicate board in ON state, set the heat exchanger temp. from indoor unit 16℃, each protection is available, FQY(20—120Hz), fan speed(inverter: high/middle/low; DC motor: class 1—7) and expansion valve(10—400) can be manual adjusted.

Note: the dip switches for compulsory cooling and compulsory heating can not be setted ON synchronously.

1.10.10 Failure code and troubleshooting

The outdoor lamp will flash if there is failure, the flash FQY is 1HZ, the flash time is according to the following table, the lamp will off for 3 seconds after one flash circuit, meanwhile, the lamps on LED board will light in 5-bit binary system(light is 1, LED1-LED5 from low bit to high bit).

Alarm lamp is always light when there is no failure.

1.10.11 Special funtions

1) Power operation

When receiving the Power operation signal from indoor, the unit will operate as the set frequency by EEPROM. Fan speed will depend on the ambient temperature and the frequency. When the Power signal is cancelled by indoor, the Power operation will stop.

2) Soft operation

When receiving the Soft operation signal from indoor, the unit will operate as the set frequency by EEPROM. Fan speed will depend on the ambient temperature and the frequency. When the Soft signal is cancelled by indoor, the Soft operation will stop.

3) Time shorting operation

After receiving the time shorting signal, the unit will perform the 1/60 time shorting operation.

4) Compulsory cooling/heating operation

Controlled by the buttons on the outdoor small board, only indoor heat exchanger protection is invalid, all the other protections are valid.

Trouble description	Display of LED borad LED 5-4-3-2-1	Analyze and diagnose	Flash times of LED on mainborad
IPM failure	00001	IPM failure	1
Abnormal of DC moter	00010	Jam of DC motor or motor failure	2
Communication error between indoor and outdoor unit	00011	Communication fail over 4min	3
Compressor discharging temprerture protection	00100	Compressor discharging tempreature over 120 centigrade	4
Spdu / IPM module over current protection	00101	Current of spdu / ISPM module over limit	5
Abnormal of outdoor ambient sensor	00110	Outdoor ambient sensor short-circuit or open-circuit last 60 sec	6
Abnormal of piping sensor	00111	Piping sensor short-circuit or open-circuit last 60 sec	7
High pressure protection	01000	System high pressure over 4.5Mpa	8
Abnormal of compressor discharge sensor	01001	Compressor discharge sensor short-circuit or open-circuit last 60 sec	9
The power supply is not the 50Hz	01010	The power supply is not the 50Hz	10
Module PWM select circuit error	01011	Module PWM select wrong circuit	11
Detect PFC over-current	01100	The current of PFC circuit is too high	12
Module error	01101	Module error	13
Eeprom failure	01110	Outdoor main board eeprom fail	14
Compressor jam(only for spdu)	01111	Inner compressor is abnormal jamed	15
Compressor start-up abnormal	10001	Compressor start-up abnormal	17
Compressor parameter error	10010	Wrong compressor parameter is selected in the Eeprom	18
Circuit error detected by current	10011	Circuit damage detected by the current	19
Abnormal of Compressor suction sensor	10101	Compressor suction sensor short-circuit or open-circuit last 60 sec	21
SPDU Communication error	10110	Communication error send from SPDU	22
Communication error between main board and spdu module	10110	Communication fail over 4min	22
Low pressure protection	11000	System low pressure under 0.05Mpa	24
Condenser air inlet temp. sensor failure	11001	Condenser air inlet temp. sensor short-circuit or open-circuit last 60 sec	25
Module over-voltage protection (only for ISPM)	11010	Send from ISPM module	26
Module lack-voltage protection (only for ISPM)	11011	Send from ISPM module	27
Compressor phase loss	11110	U/V/W loss	30
PFC voltage abnormal	11111	Voltage of PFC circuit is abnormal	31
Compressor U-phase over-current	00101	The current of compressor U-phase is too high	32
Compressor V-phase over-current	00101	The current of compressor V-phase is too high	33
Compressor W-phase over-current	00101	The current of compressor W-phase is too high	34
4-way valve reverse failure	11100	Alarm and stop if detect Td-Tci<=25 last for 1min after compressor has started for 10min in heating mode, confirm the failure if it appears 3 times in one hour.	28
Lack off refrigerant or discharge side dirty	11101	Alarm and stop if detect Td-Tci>=25 last for 1min after compressor has started for 10min in cooling mode, confirm the failure if it appears 3 times in one hour	29

AB122ACERA AC122ACERA AD122ALERA electric control function:

1.General features

1.1 Control mode: remotr or wired control + connecting port of long-distance control + passive port switch control.

1.2 Temperature control: 16-30℃;

1.3 Precise of temperature control: ±1℃;

1.4 Indoor fan speed: AUTO, HIGH, MIDDLE, LOW (no AUTO when in FAN mode);

1.5 Swing control: the swing are controlled by the synchronous motor, main control board receive usable signal and set in swing mode or remain in other mode;

1.6 running mode: AUTO , COOL, DRY, FAN and HEAT;

1.7 Healthy function: 5VDC UV generator, 12VDC negrative ion generator - high voltage collecting-dirt, 220VAC negrative ion generator – oxygen pump;

1.8 Filter up-down control: adopt double-direction synchronous motor;

1.9 Auxiliary electric heating function: 12VDC control signal, 220VAC control signal or control switch;

1.10 Fresh air control: 12VDC DC motor,220VAC AC control port output;

1.11 CLOCK setting, TIMER ON, OFF, ON/OFF and SLEEP fuction (only TIMER function is viable and temperature variety is unviable when running the SLEEP function in FAN mode);

1.12 Drain system function: Water level inspection and water pump control

1.13 Compulsory cooling operation;

1.14 Safety and protection devices: 3-minute protection for compressor startup, freeze protection device, overheat protection device, temperature cutoff protection, sensor failure, drainage, pressure, communication etc. protection.

1.15 Indoor ambient temperature, indoor and outdoor coil temperature inspection.

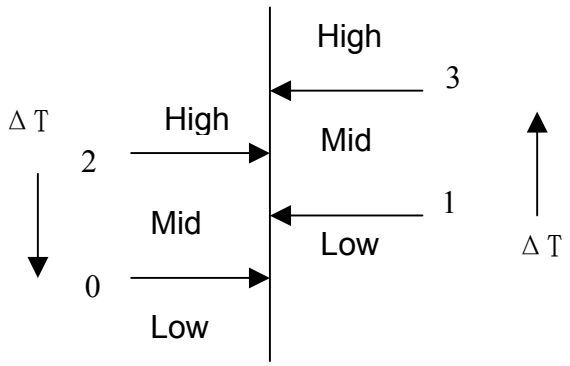
1.16 start current control: the outdoor fan start after compressor running 2s in normal situation.

2. LED function:

The LED for remote control type includes POWER, TIMER, COMPRESSOR, WATER PUMP; the POWER LED also indicate failure; when the unit is switched on by the controller, the POWER LED will be ON, when being switched off, the POWER LED will be OFF.; If the controller is in TIMER and SLEEP mode, the TIMER LED will be on; if it is not in TIMER and SLEEP mode, the TIMER LED will be off. When the compressor is running, the compressor LED will be on; when it stops, this LED will be off. POWER LED flashes when there are system failure, the flash times ti indicate the failure code.

3. Indoor AUTO FAN control

a) If the unit enters AUTO FAN for the first time, when ΔT＞2, select high speed; when ΔT≤0, select low speed; or it will select med speed; when thermostat is OFF, fan will be low speed. (the conversion temperature difference is 1 degree).



b) If the present fan speed is AUTO HIGH, when ΔT＜2, fan speed will change to AUTO MED.

c) If the present fan speed is AUTO MED, when ΔT＜0, fan speed will change to AUTO LOW; when ΔT＞3, fan speed will change to AUTO HIGH.

d) If the present fan speed is AUTO LOW, when ΔT＞1, fan speed will chenge to AUTO MED.

e) Fan speed conversion in AUTO FAN mode: the conversion will delay for 3 minutes from HIGH to LOW, and no delay from LOW to HIGH.

f) When the fan speed is HIGH/LOW/MED, on the condition that the protection does not act, the unit will run at the set fan speed; when the protection acts, for the sake of the normal operation, the fan speed will be forced to conversion; in Dry mode, fan motor will be changed as request.

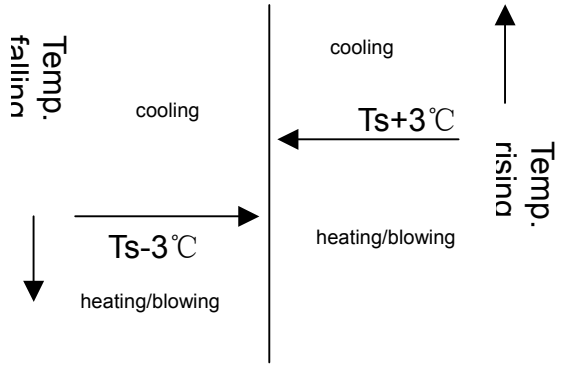
4. AUTO mode control

4.1 When entering AUTO for the first time, the unit will select the running mode due to the below

conditions, then perform the selected mode.

Tr≥Ts-3℃ select COOL mode (includes FAN mode)

Tr＜Ts-3℃ select HEAT or FAN mode



4.2 After entering the AUTO mode, the mode can change over among COOL, HEAT or FAN modes according to the indoor ambient temperature (conversion temperature difference is ±3℃).

4.3 If the unit is in COOL mode, when it arrives compressor-stop temperature, the compressor will stop; after compressor stops for 15 minutes, the unit will check the room temperature, if Tr＜Ts-3℃, the unit will enter HEAT or FAN mode, or the unit will still be in COOL mode;

4.4 For the heat pump unit, if the unit is in HEAT mode at present, when it arrives compressor-stop temperature, the compressor will stop; after the compressor stops for 15 minutes, the unit will check the room temperature, if Tr＞Ts+3℃, the unit will enter COOL mode, or it will still be in HEAT mode.

4.5 For cooling only unit, if the unit is at FAN mode, if Tr＞Ts+3℃, the unit will enter COOL mode.

4.6 When the unit is in HEAT mode, if indoor heat exchanger temperature rises up to over 63℃, the unit will change into COOL mode. And within 1 hour, the heat exchanger temperature will not be limited, the heating operation will stop temporarily. 1 hour later, the unit will select the proper mode due to the above condition.

5. COOL mode control

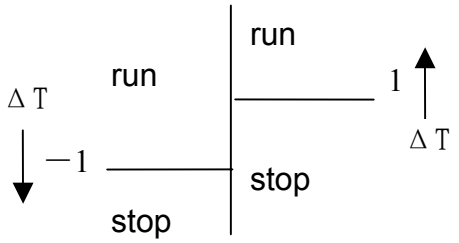
5.1 4-way valve being powered off, compressor run/stop will depends on the temperature difference between the room temperature and the set temperature.

5.2 In cooling mode, every time the compressor starts up, within 6 minutes, the compressor will not be limited by the temperature sensor, but the set temperature change, shutoff signal and protection action will not be limited by 6-minute protection, and the compressor can stop immediately.

5.3 ΔT≥1 compressor will run;

ΔT≤-1 compressor will stop;

-1<ΔT<1 compressor will stay in original state



5.4 Anti-freezed protection (invalid in compulsory operation, trial running, heating mode)

When the unit has run for over 6 minutes after compressor starts up, if indoor coil temperature Tg<1℃, the compressor and the outdoor motor will stop, and the unit will change to FAN mode; 9 minutes later after compressor stops and when indoor coil temperature rises to 10℃, the unit will resume to COOL mode, the compressor and the outdoor motor will run again.

5.5 Outdoor fan control: (realized by outdoor when with outdoor conmmunication function)

if the temp. of indoor coil sensor Tg<6℃, control the outdoor fan by the temp. of outdoor coil sensor;

if the temp. of outdoor defrost sensor Tc<34℃, the outdoor fan will be OFF and lasted 45s at least;

if the temp. of outdoor defrost sensor Tc＞44℃, the outdoor fan will be ON;

if the temp. of outdoor defrost sensor 34℃≤Tc≤44℃, the outdoor fan will remain in the original state.

5.6 Temperature cutoff protection

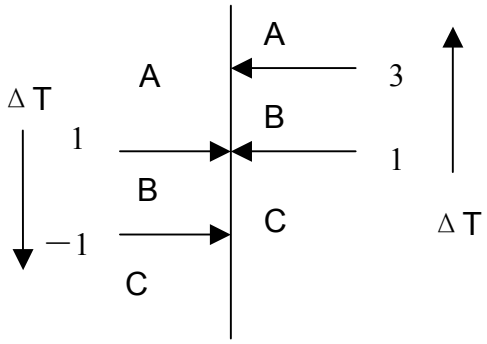
In cooling mode, the unit will check indoor coil temperature every time the compressor has run for 1 minutes, when indoor coil temperature Tg>Tr＋5, the unit will stop and 3 minutes later restart up; if the temperature cutoff occurs for 3 times continuously, the unit will stop and alarm.

6. DRY mode control

6.1 When the uint enters DRY mode for the first time, the compressor, outdoor motor and indoor motor will perform according to the below conditions:

△T＞2, the compressor and the outdoor motor will run continuously, indoor motor will run at the set speed, this area is defined as Area A;
0≤△T≤2, the compressor and the outdoor motor will always run for 10 minutes and then stop for 6 minutes, indoor motor will be LOW speed, this area is defined as Area B;
△T＜0, the compressor and the outdoor motor will stop, indoor motor will run at Low speed, this area is defined as Area C.

6.2 After the unit is running in DRY mode, the system will change over among Area A, Area B, and Area C (the conversion temperature difference ±1℃)
If the system is in Area A, when △T＜1, change to Area B;
If the system is in Area C, when △T>1, change to Area B;
If the system is in Area B, when △T>3, change to Area A;
When△T＜－1, change to Area C.



6.3 Anti-freezed protection (invalid in compulsory operation, trial running, heating mode)
When the unit has run for over 6 minutes after compressor starts up, if indoor coil temperature Tg<1℃, the compressor and the outdoor motor will stop, and the unit will change to FAN mode; 9 minutes later after compressor stops and when indoor coil temperature rises to 10℃, the unit will resume to COOL mode, the compressor and the outdoor motor will run again.
6.4 Outdoor fan control: (realized by outdoor when with outdoor conmmunication function)
if the temp. of indoor coil sensor Tg<6℃, control the outdoor fan by the temp. of outdoor coil sensor;
if the temp. of outdoor defrost sensor Tc<34℃, the outdoor fan will be OFF and lasted 45s at least;
if the temp. of outdoor defrost sensor Tc＞44℃, the outdoor fan will be ON;
if the temp. of outdoor defrost sensor 34℃≤Tc≤44℃, the outdoor fan will remain in the original state.
6.5 Temperature cutoff protection
In cooling mode, the unit will check indoor coil temperature every time the compressor has run for 1 minutes, when indoor coil temperature Tg>Tr＋5, the unit will stop and 3 minutes later restart up; if the temperature cutoff occurs for 3 times continuously, the unit will stop and alarm.

7. HEAT mode control

7.1 4-way valve control: in heating mode, compressor startup----4-way valve being electrified 10 seconds ahead; compressor running----4-way valve retains original state; compressor shutoff----4-way valve being powered off 2 minutes and 50 seconds later (except for defrosting, 4-way valve being electrified 5 seconds ahead, and being powered off 55 seconds later).
7.2 In heating mode, for everytime the compressor startup (thermostat ON), within 6 minutes, the 4-way valve will not be limited by the temperature sensor, but for the set temperature change, shutoff signal and the protection, the compressor can stop immediately without 6-minute limitation.
7.3 △T≥1 compressor running, indoor motor runs at anti-cold air mode;
△T≤-1 compressor stops, indoor motor runs at blowing remaining heat mode;
-1<△T<1 compressor retains original state
7.4 Overheat protection (for the unit with outdoor PCB, the outdoor motor is controlled by outdoor unit, but the compressor is still controlled by indoor unit, and their temperature points will not be accordant completely)
In heating mode, compressor has started up and indoor motor has run for over 30 seconds, if indoor coil temperature Tg>60℃, outdoor motor will stop; if Tg<56℃, and outdoor motor has stop for 45s, outdoor motor will run again; if Tg>73℃, the compressor will stop and indoor motor will run according to the thermostat state. After the compressor stops for 3 minutes and Tg reduces to 48℃, the unit will resume to heating mode, and the compressor and the outdoor motor will run again.
7.5 Temperature cutoff protection
In heating mode (besides the defrosting), the unit will check indoor coil temperature every time the compressor has run for 1 minutes, when indoor coil temperature Tg＜Tr-5, the unit will stop and 3 minutes later restart up; if the temperature cutoff occurs for 3 times continuously, the unit will stop and

alarm.

7.6 Anti-cold air function in heating mode

After entering heating mode, or last defrosting is over, the compressor will start up, if Tg＜28℃, indoor motor will stop; if 38℃>Tg≥28℃, indoor motor will run at low speed; if Tg≥38℃ or the compressor has run for over 4 minutes, indoor motor will run at the set speed; once the motor has started up, it will not stop because of Tg reduction.

7.7 Blowing remaining heat function

In heating mode, the thermostat is OFF, the compressor stops, indoor motor will run at low speed until Tg＜28℃ and has run for 50 seconds at least.

Note: in heating mode, “the compressor stops----indoor motor delays to stop” adjust if the pipe blows remaining heat; “the compressor startup----indoor motor delays to start up” adjust if the pipe is anti-cold air; in other conditions, the compressor and the indoor motor are allowable not to be in company. In cooling mode, the motor will run according to the control, not together with the compressor.

7.8 Defrosting function in heating mode

In defrosting and when the compressor resumes to run for 3 minutes after defrosting is over, the unit will not adjust the sensor failure.

7.8.1 Manual defrost: In heating mode, the set temperature 30℃ and in high speed, in 5 seconds, press SLEEP button 6 times continuously, then the buzzer will sound 3 times, you can enter the manual defrosting. At this moment, the unit will not adjust the enter condition of defrost and begin to defrost function directly, whose procedure is as the same as the auto defrost; the quit condition is that the defrosting time is up to 5 minutes.

7.8.2 Auto defrost enter condition: a) the compressor has run for 45 minutes continuously or for 75 minutes in all and has run for over 10 minutes continuously. b) the compressor and outdoor fan running normally. c) the temp. of indoor coil sensor lower than 45℃, d) the defrosting temp. lower than –8℃ (use the defrosting start signal from outdoor in the condition of with outdoor communication).

7.8.3 Auto defrost quit condition: The defrosting temp. over 14℃ or the defrosting time is over 12 minutes (use the defrosting end signal from outdoor in the condition of with outdoor communication)

7.8.4 Defrost process : a) enter defrosting mode, the compressor, outdoor and indoor fan motor stops; b) 55 seconds later, 4-way valve will be reverse, after more 5 sensonds, compressor begins to run; c) defrosting is over, compressor stops, outdoor fan running at high speed; d) 55 seconds later, 4-way valve runs and compressor starts up. The indoor fan motor will run at anti-cold air condition.

7.8.5 For the unit with auxiliary electric heating function:

a. If the auxiliary electric heating function is working when the defrosting condition is met, please stop electric heater firstly, 20 seconds later, defrosting can begin;
b. After defrosting, the unit will adjust the working state of electric heater according to the setting before defrosting.

7.9 Auxiliary electric heating function (valid in heating mode or heating state in AUTO mode)

Enter condition: 1) ΔT>1; 2) Thermostat ON and running for 1 minute; 3) Tr<26℃; 4) Indoor motor running; 5) Electric heating function start signal available (cancelled); 6) The system working in heating mode or in heating state of AUTO mode; 7) Tg<48℃

If the above conditions can all be met, the electric heating function will work.

Quit condition: 1) ΔT≤1; 2) Thermostat OFF; 3) Tr>26℃; 4) Indoor motor stops; 5) Electric heating function start signal not available (cancelled); 6) The system in non-heating operation; 7) Tg>52℃

If one of the above conditions can be met, the electric heater will stop.

8. FAN mode control

The compressor and the outdoor motor will stop running, indoor motor can be set at high/med/low speed, the fan blade can swing or stay at one position. In this mode, you can set the TIMER and SLEEP function.

9. CLOCK setting and TIMER function

The unit can set 24-hour TIMER ON/OFF, and the min. unit is 1 minute, after being set, the timer lamp of indoor will be on, and after the timer is over, the timer lamp will be off.

TIMER ON: RUN LED is off, compressor LED is off, and TIMER LED is on, the unit is in stop state.

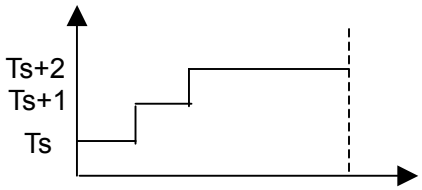
When timer is over, the unit begins to run, and the timer LED is off. The unit operation begins from receiving the timer signal for the last time. The SLEEP function only can be set before the TIMER ON begins.

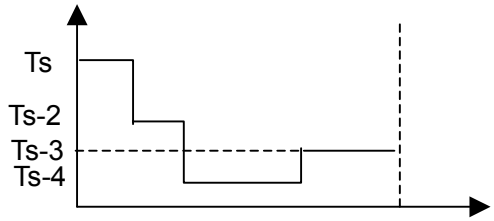
TIMER OFF: the unit running, the timer LED on, while the timer is over, timer LED off, the unit will stop, the sleep can be set, the sleep time will replace the original time of TIMER ON/OFF.

TIMER ON/OFF set at the same time: when the timer on/off is set, the timer LED will be off; the SLEEP function can be set, the sleep time will replace the original time of TIMER ON/OFF.

10 SLEEP function (energy saving function at night)

101 Standard sleep function: in cooling or dry mode, after running at SLEEP mode for 1 hour, the set temperature will rise 1℃, another 1 hour later, the set temperature will rise another 1℃; the unit continues running for 6 hours, then the unit will stop.





10.2 Standard sleep function: in heating mode, after running at SLEEP mode for 1 hour, the set temperature reduces 2℃, another 1 hour later, the set temperature will reduce 2℃, and another 3 hours later, the set temperature rises 1℃; the unit continues running for 3 hours, then the unit will stop.

10.3 Non-standard SLEEP function: the sleep function can realize 1~8 hours sleep mode when being combined with the TIMER function.

1） When in Auto mode, the unit will make SLEEP operation due to the setting.
2） After setting SLEEP function, the clock can not be adjusted.
3） If sleep time is no more than 8 hours, when the time arrives, the unit wil shut off.
4） If sleep function is set after setting TIMER OFF function, the unit will execute as the SLEEP function.
5） If SLEEP function is set, the TIMER function can not be set.
6） If sleep function is set after setting TIMER ON function, the sleep function only can be set befroe the TIMER ON time arrives.
7） After setting sleep function, press CLOCK button to check the clock; press TEMP button to display the set temperature, and press again to change the set temperature.

11 Water level inspection and water pump control

1) In COOL (including cooling state of AUTO mode and the compulsory cooling) and DRY mode, as long as the compressor runs, water pump will work; and once the compressor stops, water pump will stop 5 minutes later;

2) In standby state of cooling mode, heating mode and fan mode (including auto fan mode), after water tank is full, the float switch will disconnect, if the controller detects this signal for 2 seconds, the water pump will begin to work. After the float resets, water pump will continue working and stops 5 minutes later;

3) If the water-full signal is detected for over 5 minutes, the compressor will stop; water pump will work for 5 minutes and stop for 5 minutes, then repeat as a cycle, until the float resets, the water pump will stop 5 minutes later; if water pump has repeated for 4 cycles, the float can not reset, and the unit will alarm water drainage abnormal. And the water pump will continue the cycle.

12. System protection

12.1 3-minute protection for compressor startup

After the compressor stops, at least 3 minutes later, the compressor can restart up; the compressor can restart up. Being electrifed for the first time, there is 3-minute delay protection.

12.2 Time shorting function

If the time shorting port is in short circuit, the unit will perform a 1/60 time shorting control.

12.3 High pressure protection

After compressor is running for 3 minutes, the unit will check the pipe pressure, when the pipe pressure is too high, 30 seconds later, compressor and outdoor fan motor will stop, and then 3 minutes later, the unit will be normal. Within 30 minutes, if the compressor stops and will send failure because of too high pressure for 3 times.

12.4 Low pressure protection

After compressor is running for 3 minutes, the unit will check the pipe pressure, when the pipe pressure is too low and low pressure switch is running for 30 senconds, compressor and outdoor fan motor will stop and will send failure

13. Trouble code

The remote receiver, wired controller and indoor PCB indicator all can indicate the failure code.

Remote control indoor PCB flash times	Wired controller display	Central controller display	Fault description	Possible cause	Remedy
10	08(08H)	21D	Fault in drain system	Float switch is open 25m or longer	due to the signal, resumable
1	01(01H)	01D	Indoor ambient temp. sensor failure	sensor broken down or short circuit for more than 2m continuously	due to the signal, resumable
2	02(02H)	02D	Indoor pipe temp. sensor failure	sensor broken down or short circuit for more than 2m continuously	due to the signal, resumable
3	74(4AH)	11D	Outdoor ambient temp. sensor failure	sensor broken down or short circuit for more than 2m continuously	due to the signal, resumable
4	73(49H)	12D	Outdoor pipe temp. sensor failure	sensor broken down or short circuit for more than 2m continuously	due to the signal, resumable
5	72(48H)	10D	Overcurrent	Detector CT current is above the limit 3 times within 30m.	Need to be checked, reset
6	83(53H)	14D	High pressure malfunction	High pressure switch acts for 3 times in 30m	Need to be checked, reset
7	71(47H)	22D	Power failure	Wrong phase, phase failure or loss	Need to be checked, reset
8	07(07H)	06D	Communication failure between wired controller and indoor unit	communication abnormal for more than 4m continuously	due to the signal, resumable
9	06(06H)	05D	Communication failure between indoor and outdoor units	communication abnormal for more than 4m continuously	due to the signal, resumable
11	11(0BH)	30D	External alarm signal input	External alarm is cut out for 10s or longer	due to the signal, resumable
12	03(03H)	20D	Fault in coil/suction line temp. sensor	sensor broken down or short circuit for more than 2m continuously	due to the signal, resumable
13	13(0DH)	31D	Temperature shut-off	Directional valve malfunction repeats 3 times	Need to be checked, reset
14	76(4CH)	15D	Fault in discharging temp. sensor	sensor broken down or short circuit for more than 2m continuously	due to the signal, resumable
15	05(05H)	17D	EEPROM error	EEPROM data loss	Default operation
16	84(54H)	26D	Low pressure malfunction	low pressure switch is activated	Need to be checked, reset
17	80(50H)	15D	Compressor overheat	Detected temperature of discharge line is higher than 120℃	Resrorable when lower than 100℃
18	12(0CH)	23D	Fault in operation mode	Indoor units operate in different modes	Resrorable in same operation mode
19	75(4BH)	18D	Outdoor coil B(suction sensor-multi)	sensor broken down or short circuit for more than 2m continuously	due to the signal, resumable
20	77(4DH	15D	Outdoor	sensor broken down or short	due to the signal,

	)		discharge B (oil temp. sensor-multi)	circuit for more than 2m continuously	resumable
21	20(32D)	07D	Module failure	Module overheat, overcurrent, short-circuit	due to the signal, resumable
22	36(54D)	08D	Fault in zero-load	Current sensor failure or compressor is not started	due to the signal, resumable

14 Jumper selection (√shows jumper connected, ON; ×shows jumper disconnected, OFF; * shows no limitation)

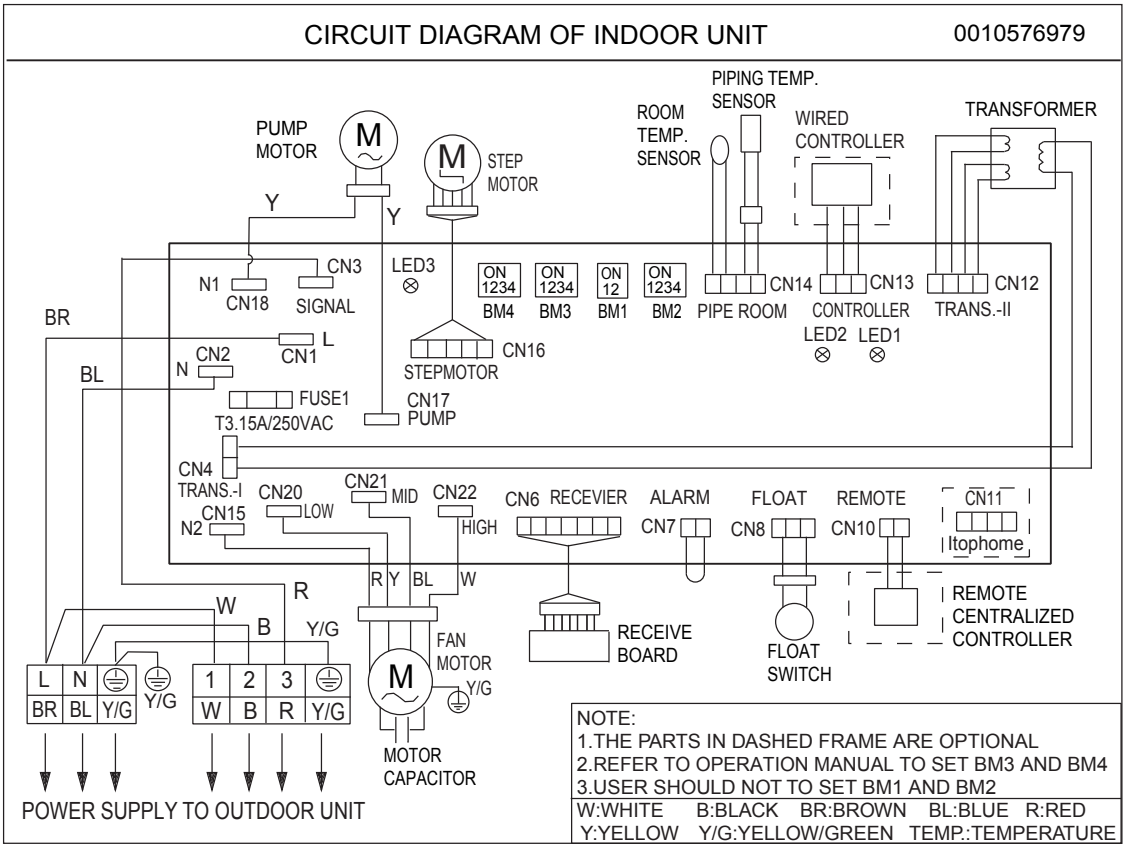
	J1	J2	J3	J4
Wired control/ infrared control	√/×	*	*	*
Temp. compensation available/not available	*	√/×	*	*
With/no outdoor PCB	*	*	√/×	*
Cooling only/heat pump	*	*	*	√/×
			J5	J6
Time shorting switch	√/×	*	*	*
Forced or not	*	√/×	*	*
Ornarment or not	*	*	×/√	*
Oxygen or not	*	*	*	×/√
	J7	J8	J9	J10
Other/2P convertible	√/×	*	*	*
single split/ multi split	*	√/×	*	*
Indoor unit address 0/other	*	*	√/×	*
2P convertible /single blade	*	*	*	√/×

15. Network address selection (√shows jumper connected, ON; ×shows jumper disconnected, OFF)

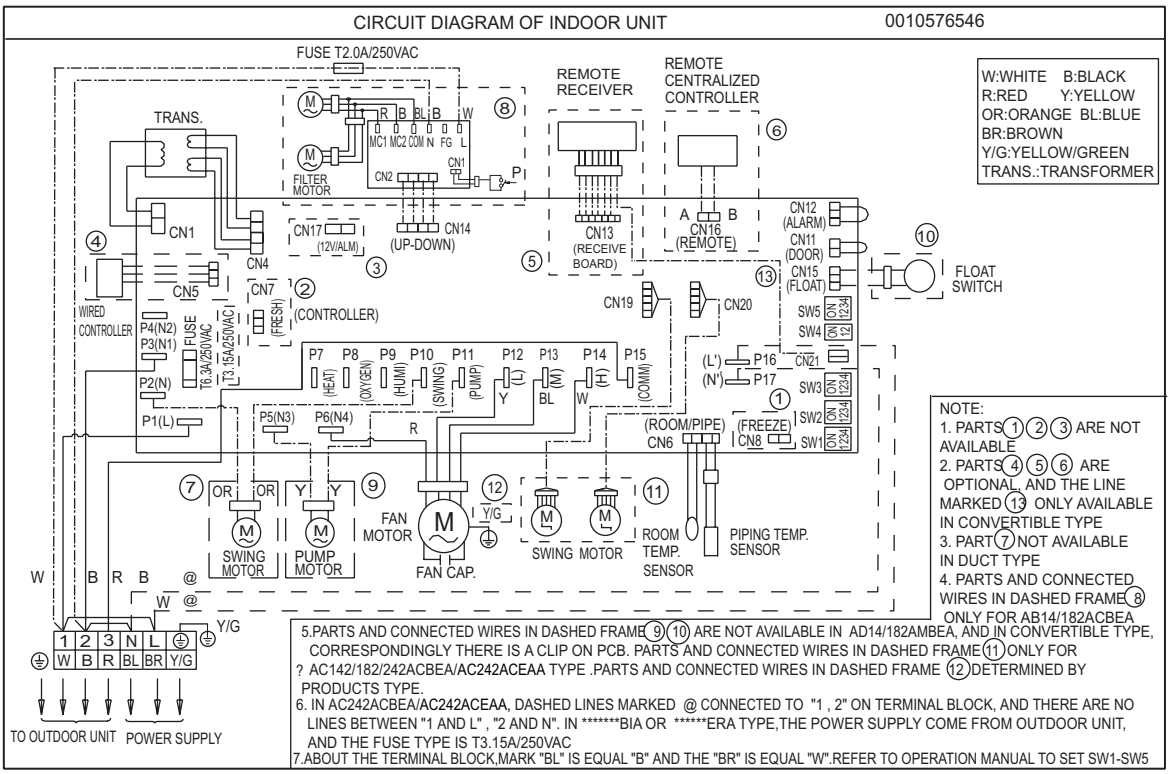
	SW1				SW2			
address	1	2	3	4	1	2	3	4
1	×	×	×	×	×	×	×	× shows passive port switch control AND
2	√	×	×	×	×	×	×	
3	×	√	×	×	×	×	×	
4	√	√	×	×	×	×	×	
5	×	×	√	×	×	×	×	√ showes passive port switch control – the later entering in priority
6	√	×	√	×	×	×	×	
……		……	……	……	……	……	……	
126	√	×	√	√	√	√	√	
127	×	√	√	√	√	√	√	
128	√	√	√	√	√	√	√	

10. Electric data

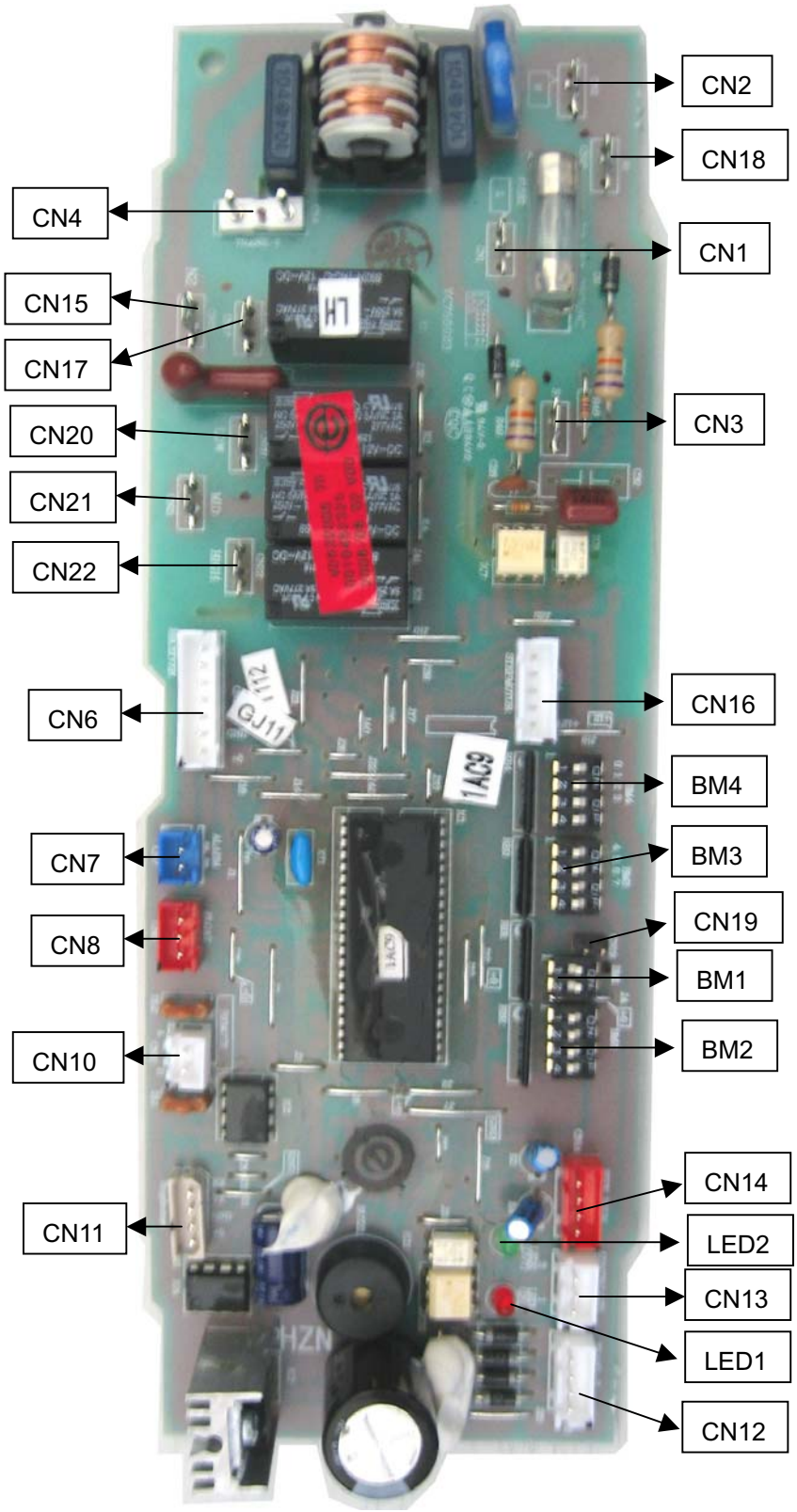
AB122ACERA



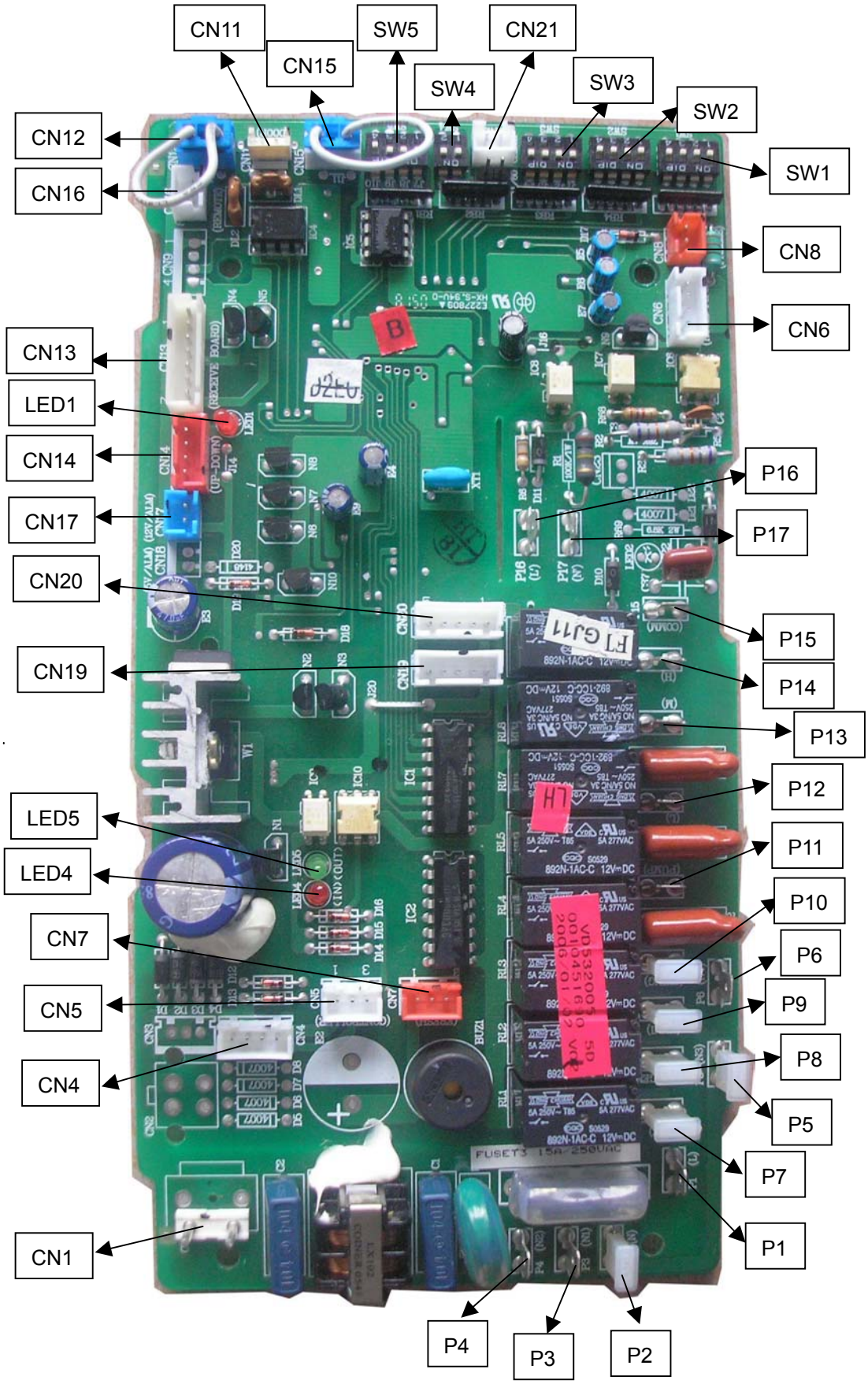
AC122ACERA AD122ALERA



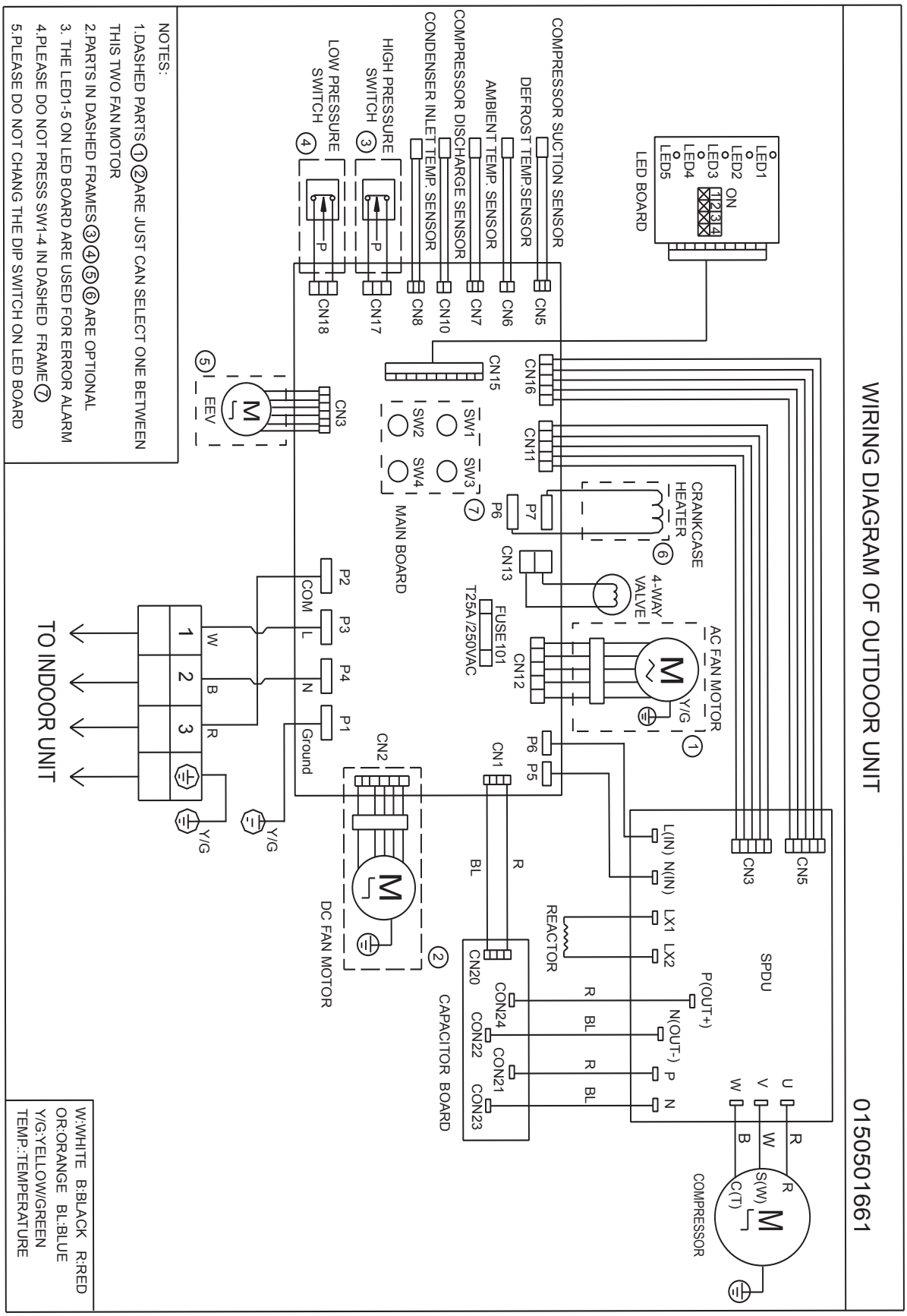
0010452325E for AB122ACERA



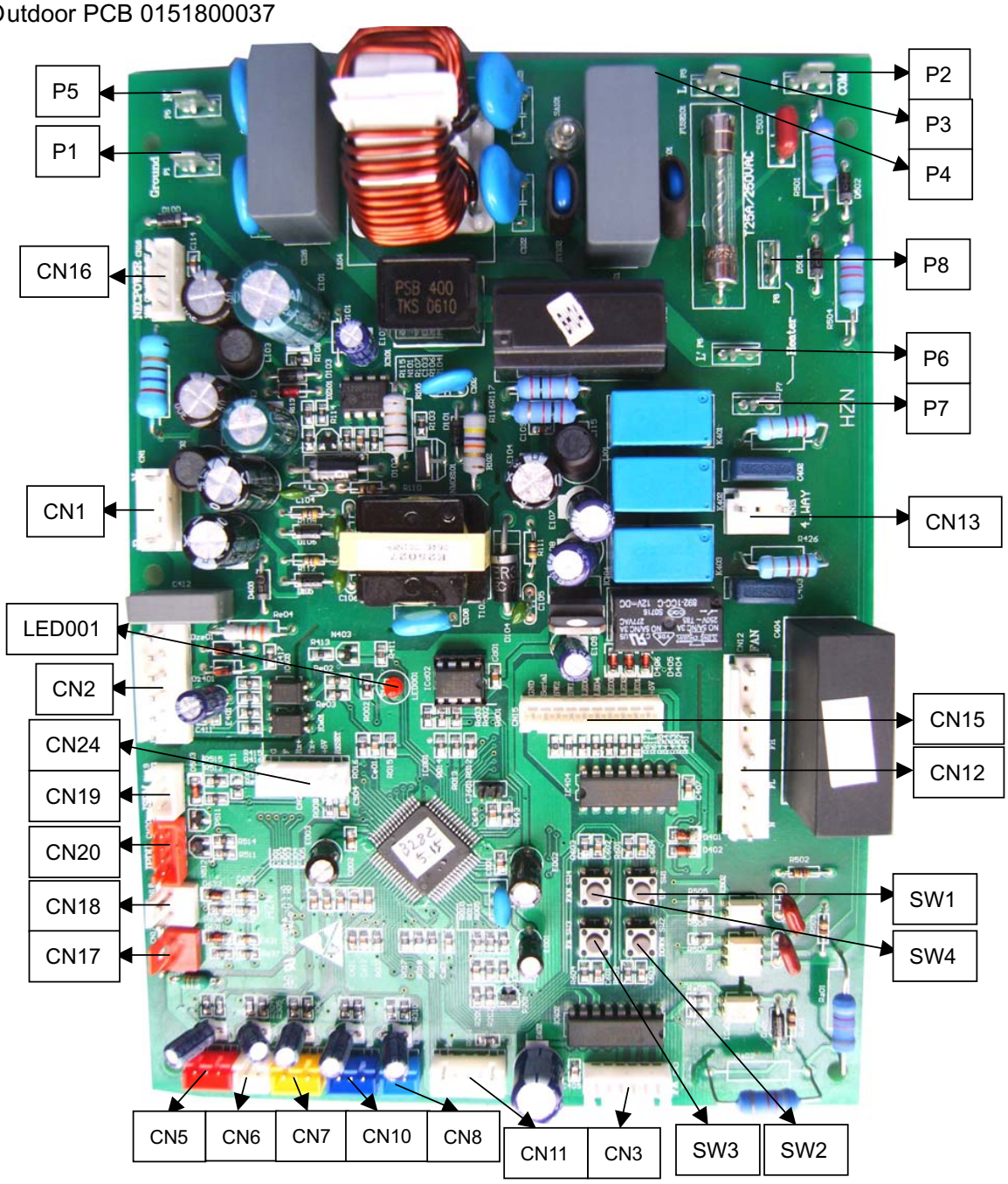
0010451690E for AC122ACERA and AD122ALERA



AU122AEERA


WIRING DIAGRAM OF OUTDOOR UNIT
0150501661
NOTES:
1.DASHED PARTS ① ② ARE JUST CAN SELECT ONE BETWEEN THIS TWO FAN MOTOR
2.PARTS IN DASHED FRAMES ③ ④ ⑤ ⑥ ARE OPTIONAL
3. THE LED1-5 ON LED BOARD ARE USED FOR ERROR ALARM
4.PLEASE DO NOT PRESS SW1-4 IN DASHED FRAME ⑦
5.PLEASE DO NOT CHANG THE DIP SWITCH ON LED BOARD
W:WHITE B:BLACK R:RED
OR:ORANGE BL:BLUE
Y/G:YELLOW/GREEN
TEMP.:TEMPERATURE
LED BOARD
LED1 LED2 LED3 LED4 LED5
ON 1 2 3 4
COMPRESSOR SUCTION SENSOR
DEFROST TEMP.SENSOR
AMBIENT TEMP. SENSOR
COMPRESSOR DISCHARGE SENSOR
CONDENSER INLET TEMP. SENSOR
HIGH PRESSURE SWITCH
LOW PRESSURE SWITCH
CN5 CN6 CN7 CN10 CN8 CN17 CN18
CN16 CN15 CN11
SW1 SW2 SW3 SW4
MAIN BOARD
CRANKCASE HEATER
4-WAY VALVE
AC FAN MOTOR
FUSE101 T25A/250VAC
CN13 CN12
P6 P7 P5 CN1
CN2
DC FAN MOTOR
CAPACITOR BOARD
CON24 CON22 CON20 CON21 CON23
REACTOR
SPDU
L(IN) N(IN) LX1 LX2
P(OUT+) N(OUT-) P N
CN3 CN5
U V W
R W B
S(W) C(T)
COMPRESSOR
EEV
P2 P3 P4 P1
COM L N Ground
TO INDOOR UNIT
1 2 3
W B R
Y/G

Outdoor PCB 0151800037



10.3 Sensor characteristic

Model	Name	Code	Sub-part code	characteristic
AU122AEERA	Outdoor ambient temp. sensor	0010450192	001A3800082	R25=10KΩ±2.5% B25/50=4200K±3%
	Compressor sunction sensor	001A3900062	/	R25=10KΩ±3% B25/50=3700K±3%
	Outdoor defrost sensor	0010450194	001A3800093	R25=10KΩ±3% B25/50=3700K±3%
	Compressor discharge sensor	0010450196	001A3800096	R80=50KΩ±3% B25/80=4450K±3%
	Condenser inlet temp. sensor	0010451307	001A3800093	R25=10KΩ±3% B25/50=3700K±3%
AB122ACERA AC122ACERA	Indoor ambient temp. sensor	001A3900005	001A3900003	R25=23KΩ±2.5% B25/50=4200K±3%
	Indoor coil temp. sensor	001A3900006	001A3900004	R25=10KΩ±3% B25/50=3700K±3%
AD122ALERA	Indoor ambient temp. sensor	0010451323	001A3900003	R25=23KΩ±2.5% B25/50=4200K±3%
	Indoor coil temp. sensor	001A3900006	001A3900004	R25=10KΩ±3% B25/50=3700K±3%

R25=10KΩ±3% B25/50=3700K±3%					
T(℃)	Rnom(KΩ)				
-20℃	90.79	24	10.43	68	2.09
-19	85.72	25	10	69	2.03
-18	80.96	26	9.59	70	1.96
-17	76.51	27	9.21	71	1.9
-16	72.33	28	8.84	72	1.85
-15	68.41	29	8.48	73	1.79
-14	64.73	30	8.15	74	1.73
-13	61.27	31	7.83	75	1.68
-12	58.02	32	7.52	76	1.63
-11	54.97	33	7.23	77	1.58
-10	52.1	34	6.95	78	1.54
-9	49.4	35	6.68	79	1.49
-8	46.86	36	5.43	80	1.45
-7	44.46	37	5.6		
-6	42.21	38	5.59		
-5	40.08	39	5.73		
-4	38.08	40	5.52		
-3	36.19	41	5.32		
-2	34.41	42	5.12		
-1	32.73	43	4.93		
0	31.14	44	4.9		
1	29.64	45	4.58		
2	28.22	46	4.42		
3	26.4	47	4.26		
4	25.61	48	4.11		
5	24.41	49	3.97		
6	23.27	50	3.83		
7	22.2	51	3.7		
8	21.18	52	3.57		
9	20.21	53	3.45		
10	19.3	54	3.33		
11	18.43	55	3.22		
12	17.61	56	3.11		
13	16.83	57	3.11		
14	16.09	58	2.9		
15	15.38	59	2.81		
16	14.71	60	2.72		
17	14.08	61	2.63		
18	13.48	62	2.54		
19	12.9	63	2.49		
20	12.36	64	2.38		
21	11.84	65	2.3		
22	11.34	66	2.23		
23	10.87	67	2.16		

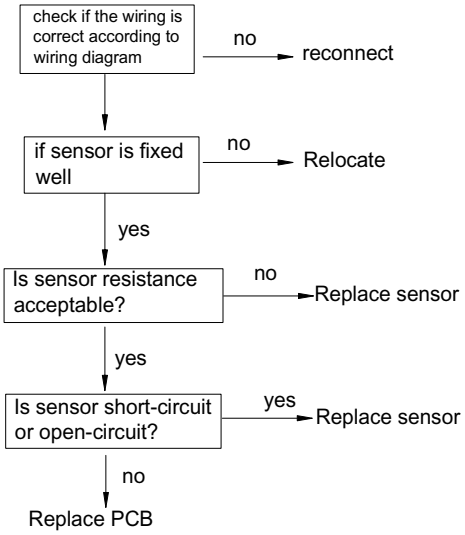
R25=23KΩ±2.5% B25/50=4200K±3%			
T(℃)	Rnom(KΩ)		
-20℃	281.34	24℃	24.12
-19℃	263.56	25℃	23
-18℃	247.04	26℃	21.94
-17℃	231.66	27℃	20.94
-16℃	217.35	28℃	19.99
-15℃	204.02	29℃	19.09
-14℃	191.61	30℃	18.23
-13℃	180.04	31℃	17.42
-12℃	169.24	32℃	16.65
-11℃	159.17	33℃	15.92
-10℃	149.77	34℃	15.22
-9℃	140.99	35℃	14.56
-8℃	132.78	36℃	13.93
-7℃	125.11	37℃	13.34
-6℃	117.93	38℃	12.77
-5℃	111.22	39℃	12.23
-4℃	104.93	40℃	11.71
-3℃	99.04	41℃	11.22
-2℃	93.52	42℃	10.76
-1℃	88.35	43℃	10.31
0℃	83.5	44℃	9.89
1℃	78.94	45℃	9.49
2℃	74.67	46℃	9.1
3℃	70.65	47℃	8.74
4℃	66.88	48℃	8.39
5℃	63.33	49℃	8.05
6℃	60	50℃	7.73
7℃	56.86	51℃	7.43
8℃	53.91	52℃	7.14
9℃	51.13	53℃	6.86
10℃	48.51	54℃	6.6
11℃	46.04	55℃	6.34
12℃	43.72	56℃	6.1
13℃	41.52	57℃	5.87
14℃	39.45	58℃	5.65
15℃	37.5	59℃	5.44
16℃	35.66	60℃	5.24
17℃	33.92		
18℃	32.27		
19℃	30.72		
20℃	29.25		
21℃	27.86		
22℃	26.54		
23℃	25.3		

R80=50KΩ±3% B25/80=4450K±3%					
T(℃)	Rnom(KΩ)				
-30	11600	13	933.4	56	127.3
-29	10860	14	886.4	57	122.1
-28	10170	15	841.9	58	117.2
-27	9529	16	800	59	112.5
-26	8932	17	760.8	60	108
-25	8375	18	722.8	61	103.8
-24	7856	19	687.3	62	99.68
-23	7372	20	653.8		
-22	6920	21	622		
-21	6498	22	592		
-20	6104	23	553.6		
-19	5736	24	536.6		
-18	5392	25	511.1		
-17	5071	26	486.9		
-16	4770	27	464		
-15	4488	28	442.3		
-14	4225	29	421.7		
-13	3978	30	402.1		
-12	3747	31	383.6		
-11	3531	32	366		
-10	3328	33	349.3		
-9	3138	34	333.5		
-8	2960	35	318.4		
-7	2793	36	304.1		
-6	2636	37	290.5		
-5	2489	38	277.6		
-4	2351	39	265.3		
-3	2221	40	253.6		
-2	2099	41	242.5		
-1	1984	42	232		
0	1877	43	221.9		
1	1775	44	212.3		
2	1680	45	203.2		
3	1590	46	194.5		
4	1506	47	186.3		
5	1426	48	178.4		
6	1351	49	170.9		
7	1280	50	163.7		
8	1214	51	155.9		
9	1151	52	150.4		
10	1092	53	144.2		
11	1036	54	138.3		
12	983.2	55	132.7		

11. Troubleshooting

1) Sensor failure

Alarm condition: ambient temperature sensor is in short circuit or open circuit



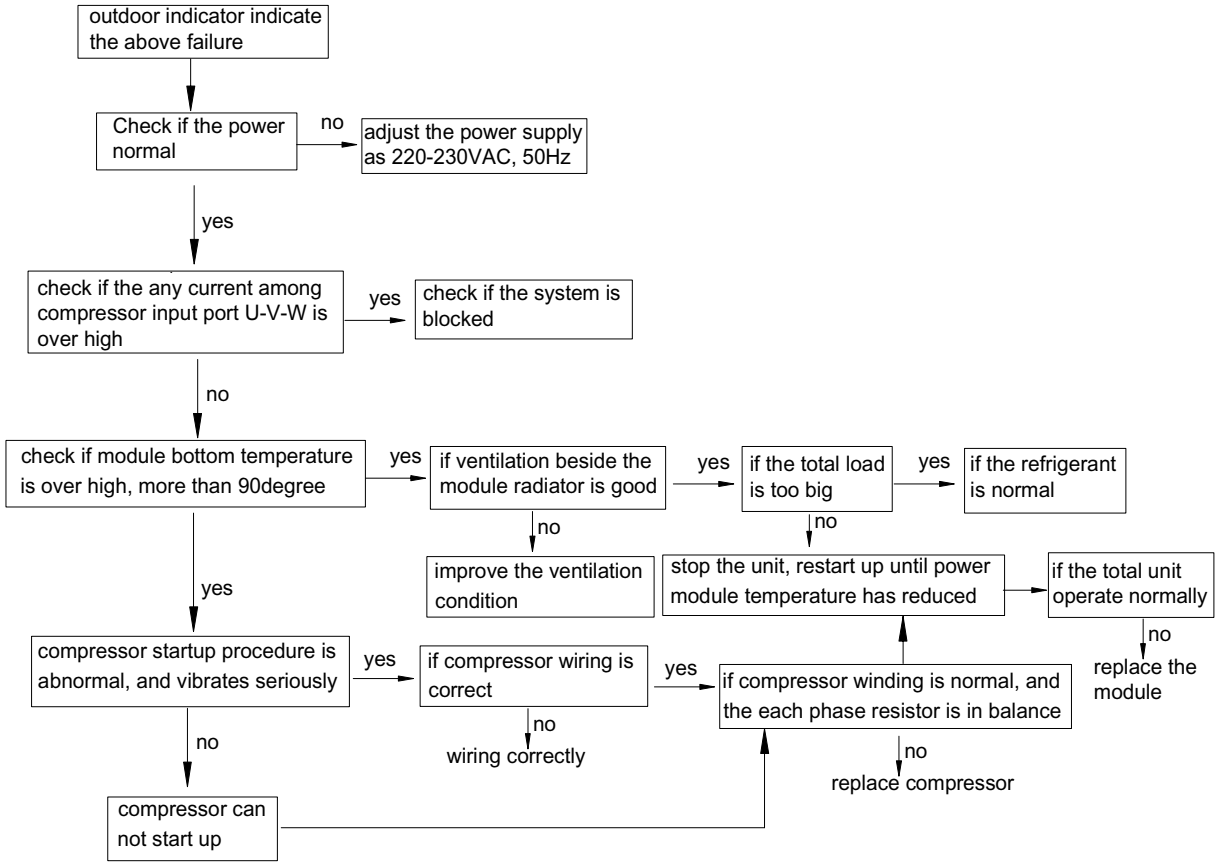
2) Outdoor power module failure

The following troubleshooting is available for:

a. IPM failure(00001)

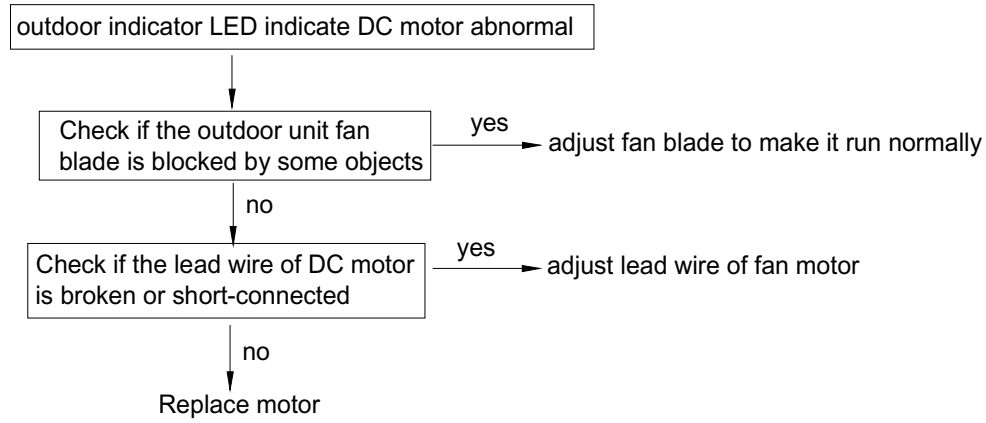
b. Compressor U-phase,V-phase and W-phase over-current(00101), total unit over-current(00101)

c. Compressor start-up abnormal(10001), Compressor jam(01111), Compressor phase loss(11110), Module lack-voltage protection(11011), Detect PFC over-current(01100), PFC voltage abnormal(11111)



3) Outdoor DC motor abnormal

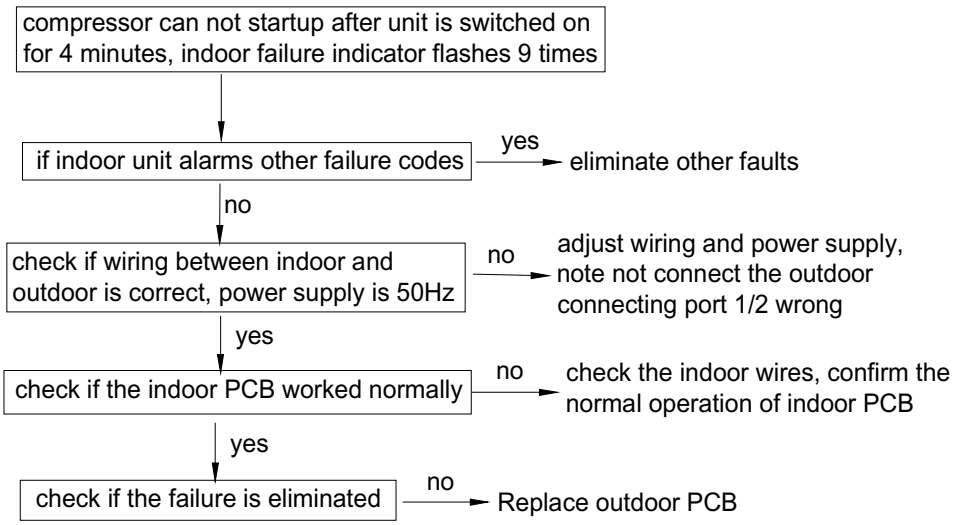
Alarm condition: outdoor DC motor is blocked rotor or broken, abnormal.



Warning: For outdoor DC fan motor, forbidden to pull off the plug when being electrified.

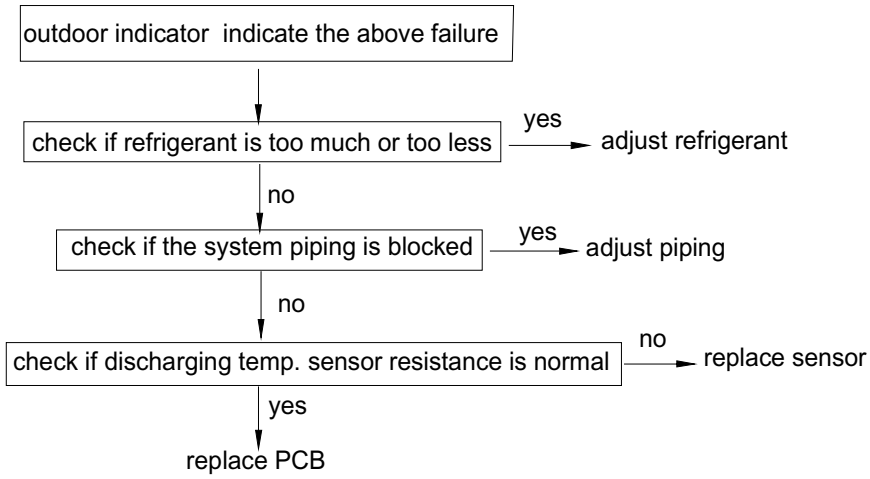
4) Communication error between indoor and outdoor units

indoor unit troubleshooting

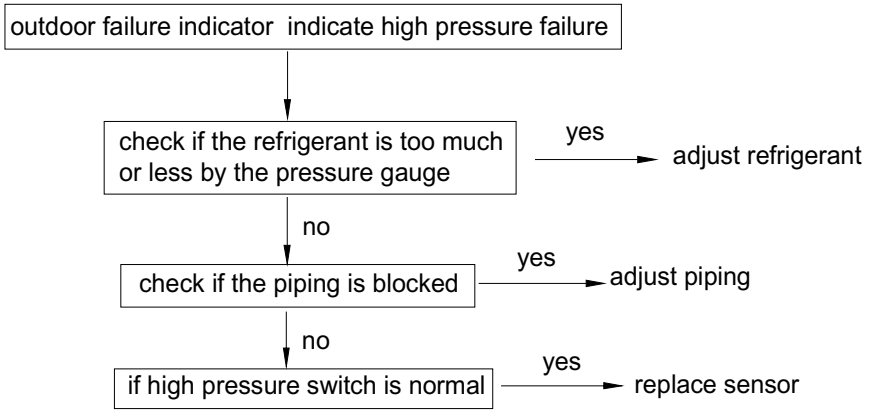


5) Compressor discharging temperature protection

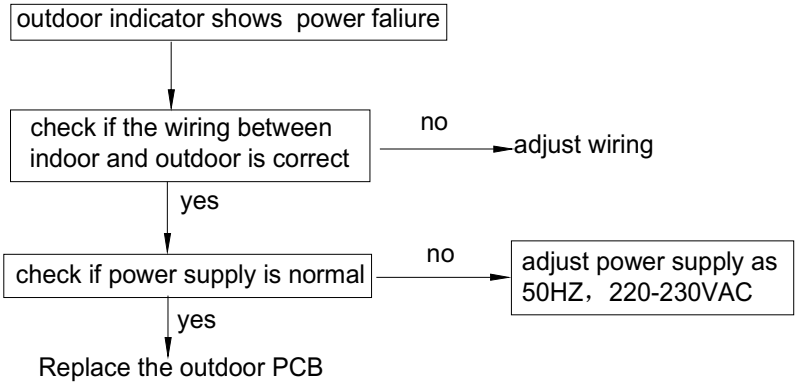
Alarm condition: Within one hour after compressor is running, compressor discharging temperature is over 115degree for 3 times continously.



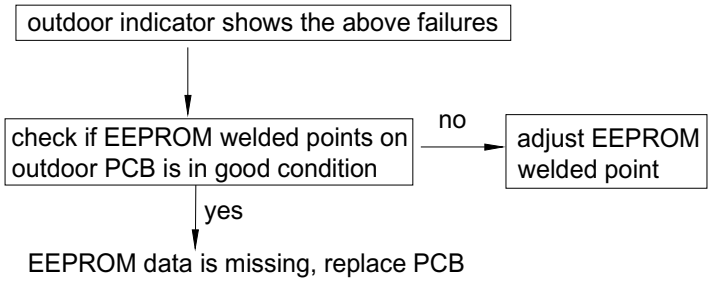
6) Outdoor high pressure protection
Alarm condition: When compressor running, high pressure is over 4.5 MPa for 30 seconds continously



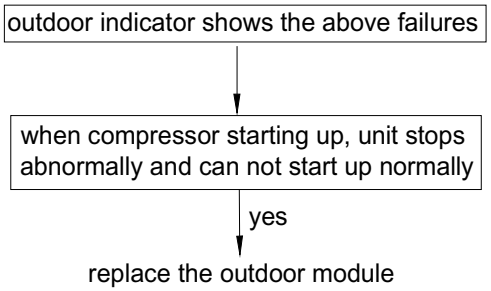
7) Outdoor power supply is abnormal
Alarm condition: if power supply is not 50Hz as standard, which will affect the normal communication and cause air conditioner bad operation.



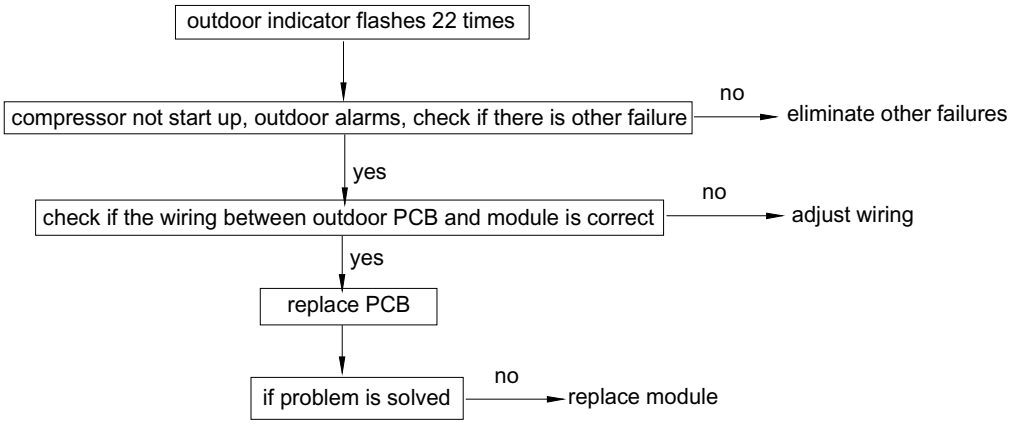
8) EEPROM failure(01110), Compressor parameter error(10010)
Alarm condition: EEPROM is fault or data is missing



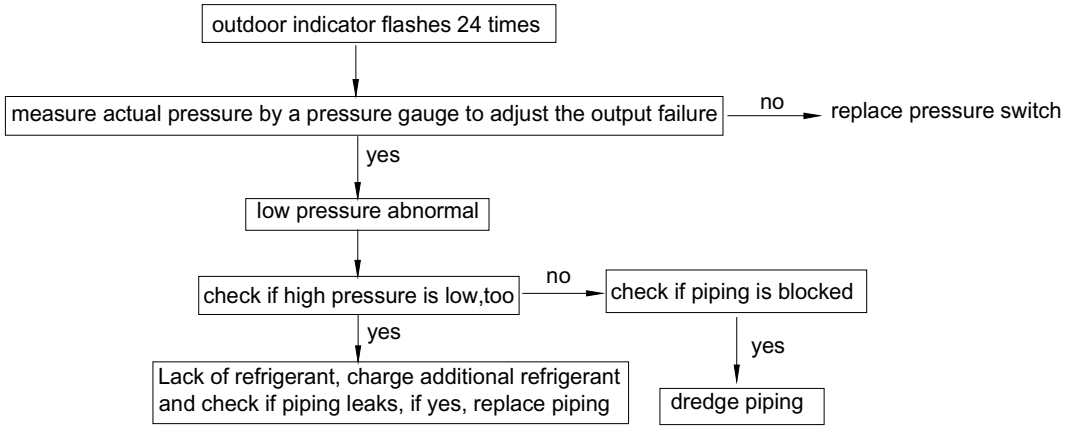
9) Circuit error detected by current(10011), Module error(01101), Module PWM select circuit error(01011)
Alarm condition: when compressor is running, the unit will be abnormal or stop



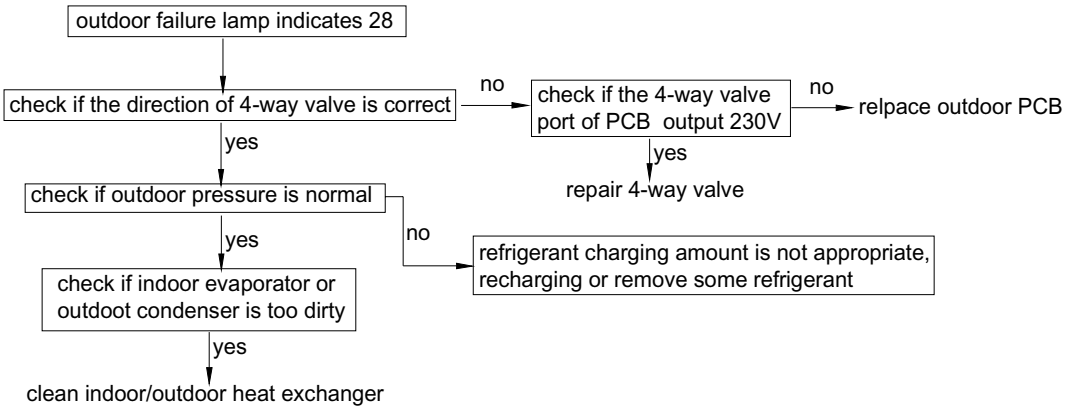
10) Communication failure between outdoor PCB and module



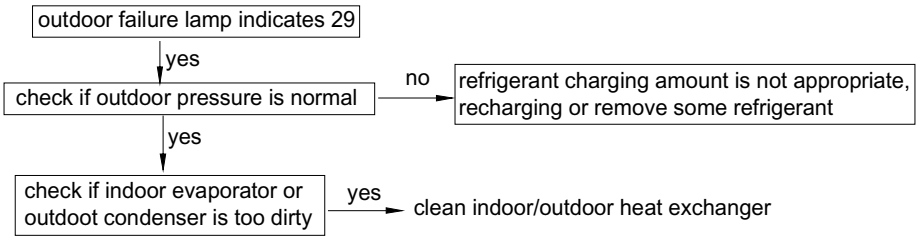
11) Outdoor low pressure abnormal
Alarm condition: outdoor system pressure is lower than 0.05MPa



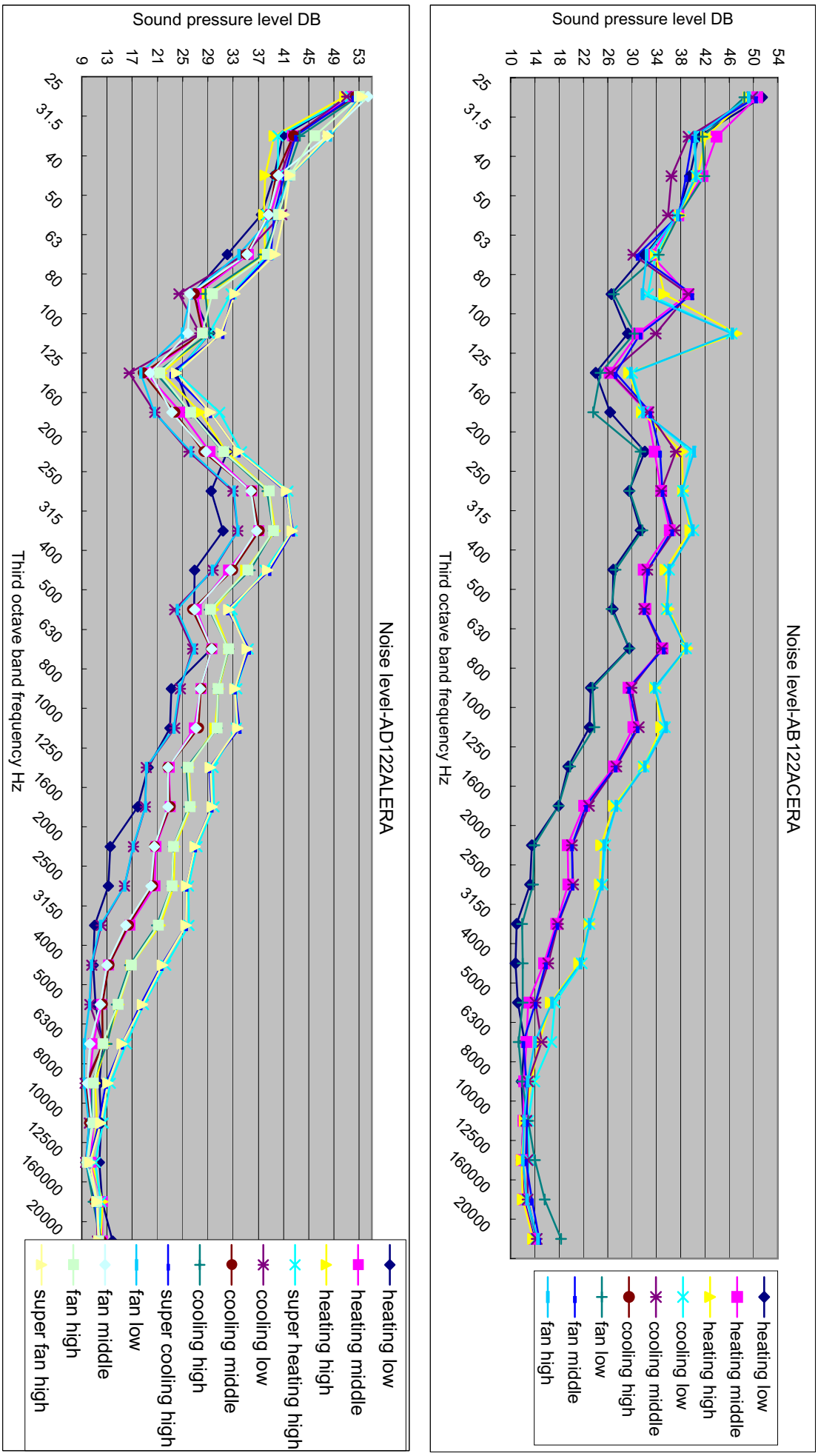
(12) 4-way valve reversing failure, systerm lack of refrigerant or discharging side dirty and blocked
Alarm condition: alarm and stop the unit when Td-Tci<=25 and lasts for 1 minute after the compressor has started for 10 minutes check in heating mode, confirm the failure if it occurs 3 times in 1 hour

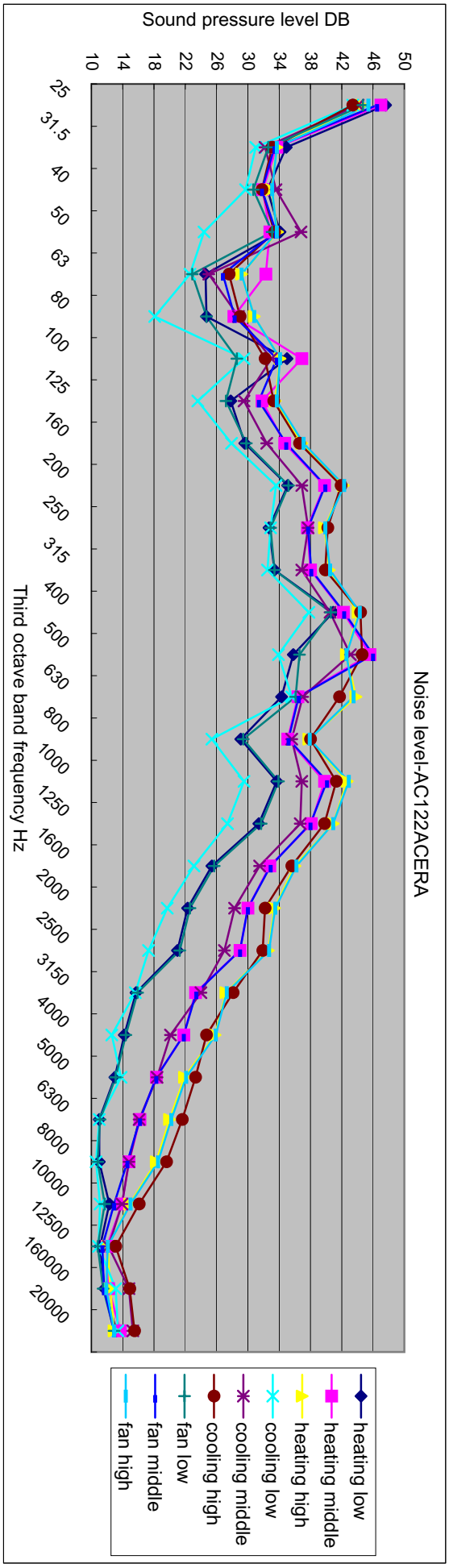


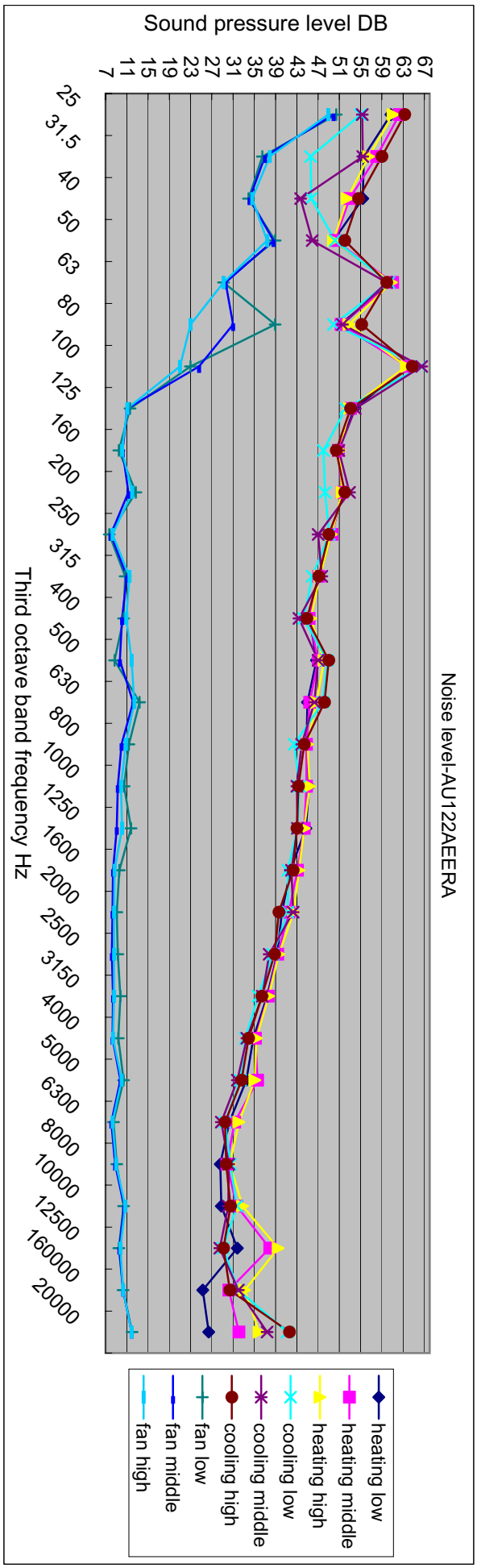
(13) systerm lack of refrigerant or discharging side dirty and blocked
Alarm condition: alarm and stop the unit when Td-Tci>=25 and lasts for 1 minute after the compressor has started for 10 minutes in cooling mode, confirm the failure if it occurs 3 times in 1 hour



12. Noise level




Noise level-AC122ACERA
Sound pressure level DB
10 14 18 22 26 30 34 38 42 46 50
Third octave band frequency Hz
25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10000 12500 160000 20000
heating low
heating middle
heating high
cooling low
cooling middle
cooling high
fan low
fan middle
fan high


Noise level-AU122AEERA
Sound pressure level DB
7 11 15 19 23 27 31 35 39 43 47 51 55 59 63 67
Third octave band frequency Hz
25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10000 12500 160000 20000
heating low
heating middle
heating high
cooling low
cooling middle
cooling high
fan low
fan middle
fan high

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