ComfortStar®
Air Conditioning & Heating Products

R410A T3 60Hz(220V) Split Type Top-discharge Series Technical Service Manual

Outdoor unit
CSC70-3
CSC90-3
CSC120-3

Content

Part. 1 General information

1. Model Names of Outdoor Units

Model names of units with cooling only:

Outdoor unit			Cooling capacity
Model	Qty.	Power supply	kW
CSC70-3	1	208-230V~, 3Ph, 60Hz	22
CSC90-3	1		28
CSC120-3	1		35
CSC70-3	2		44
CSC90-3	2		52.5
CSC120-3	2		70
CSC70-3	1		22
CSC90-3	1		28

2. External Appearances

Outdoor unit

CSC70-3/CSC90-3	**CSC120-3**
	

Part. 2 Outdoor Unit

1. Specifications

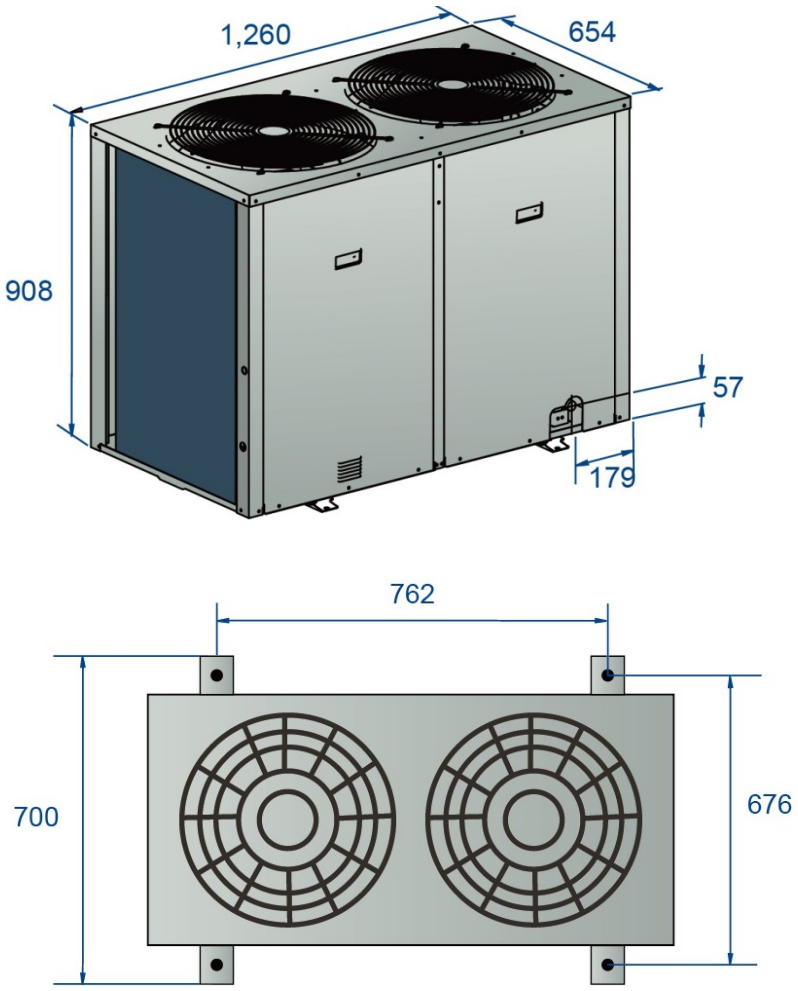
Model			CSC70-3	CSC90-3	CSC120-3
Power supply		\	208-230V~, 3Ph, 60Hz		
Ambient temp in cooling		°C	17～52	17～52	17～52
Ambient temp in heating		°C	\	\	\
Rated input (Outdoor unit)		W	11,100	16,700	18,200
Rated current (Outdoor unit)		A	32.5	44.4	53.1
Noise level		dB(A)	65	69	70
Compressor	Type ×Qty.	\	Scroll ×1	Scroll ×1	Scroll ×1
	Model (Brand)	\	C-SBP205H36A (Sanyo)	SH090A3ALC (Danfoss)	SH120A3ALC (Danfoss)
	Capacity	W	20,400	27,100	32,620
	Input	W	6,700	8,569	10,275
	Rated current	A	20.5	30.7	43.6
	Locked rotor Amp	A	114	203	267
	Refrigerant oil	mL	1,700 (FV68S)	3,000 (POE-160SZ)	3,300 (POE-160SZ)
Refrigerant type/charge		\	R410A/4,500g	R410A/6,500g	R410A/7,500g
Fan	Type ×Qty.	\	Axial fan ×2	Axial fan ×2	Axial fan ×2
	Motor model	\	YDK210-6B	YDK320-6B	YDK320-6B
	Motor input (4/3 fan blades)	\	320/303	580/560	580/560
	Capacitor	\	10μF/450V	25μF/450V	25μF/450V
	Motor speed (4/3 fan blades)	rpm	910/950	1080/1100	1080/1100
Coil	Type	\	Copper tube and aluminum fin		
	Tube size	mm	Φ7	Φ7	Φ7
	No. of rows	\	2	3	3
	Fin space	mm	1.3	1.3	1.3
	Tube pitch(a)×row pitch(b)	mm	21×13.37	21×13.37	21×13.37
	Coil (W×H)	mm	2,175×882	2,179×882	(1,380×882)+(1,380×882)
	Number of circuits	\	20	20	11+11
Refrigerant pipe	Liquid side/ Gas side	mm	Φ9.52/Φ19	Φ9.52/Φ22	Φ12.7/Φ25
	Max. pipe length	m	50	50	50
	Max. difference in level	\	25m(O.D. up) /30m(O.D. down)		
Connection wire	Power wire	\	5×10.0mm^2	5×16.0mm^2	5×20.0mm^2
	Signal wire (I.D. & O.D.)	\	2×1.0mm^2	2×1.0mm^2	2×1.0mm^2
	Signal wire (When double.)	\	3×0.5mm^2	3×0.5mm^2	3×0.5mm^2
Dimension (W×H×D)		mm	1,260×908×700	1,260×908×700	1,260×908×700
Packing (W×H×D)		mm	1,320×1,060×730	1,320×1,060×730	1,320×1,060×730
Net/ Gross weight		kg	148/167	187/204	199/215

Notes:

1. ESP: external static pressure. Rated input = Max. input, Rated current = Max. current.
2. Nominal cooling capacities are based on the following conditions: Indoor temp 27°C DB, 19°C WB; Outdoor temp 35°C DB, 24°C WB. Nominal heating capacities are based on the following conditions: Indoor temp 20°C DB, 15°C WB; Outdoor temp 7°C DB, 6°C WB.

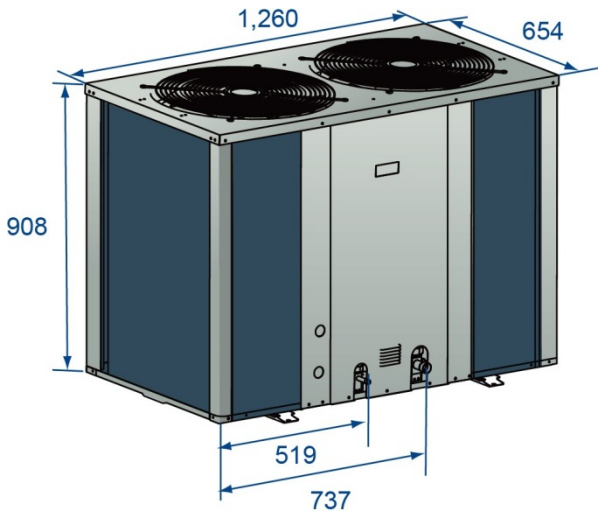
2. Dimensions (Unit: mm)

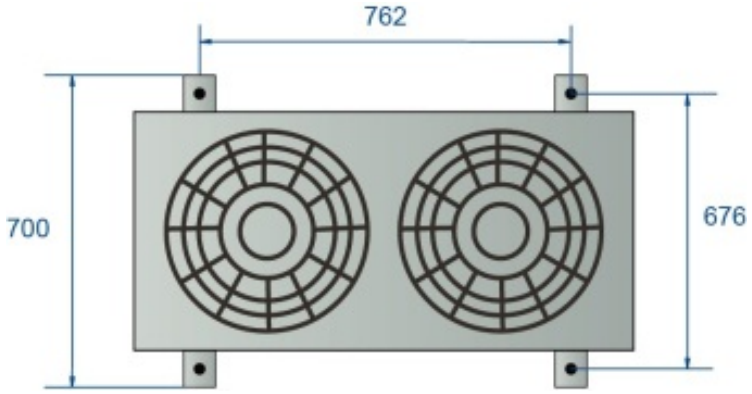
CSC70-3, CSC90-3



Top view

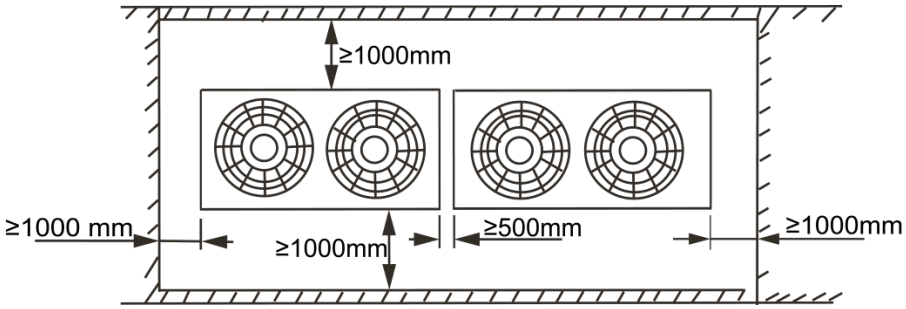
CSC120-3





Top view

3. Service Space

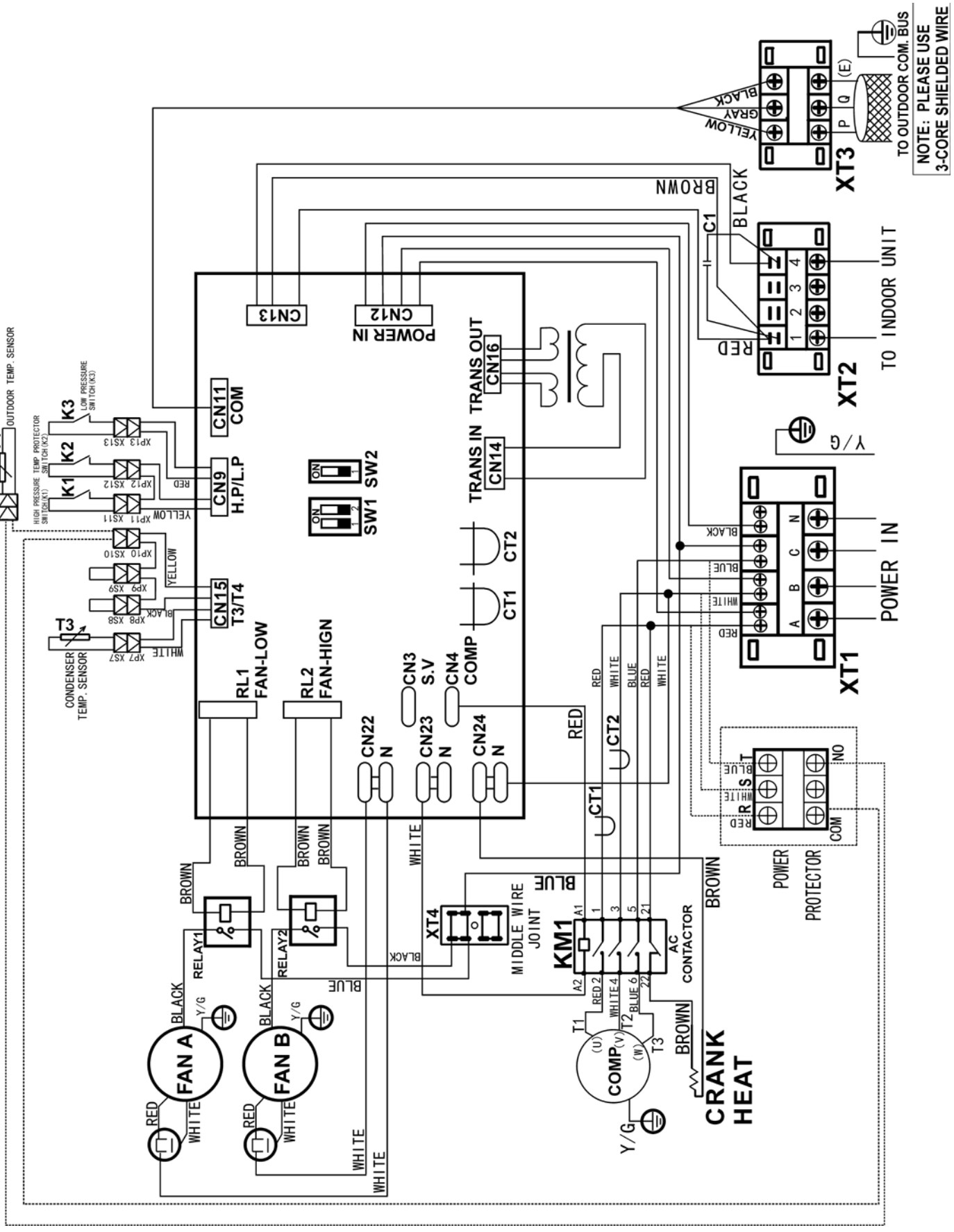


Notes:

1. **In case any obstacles exist above the outdoor unit, such obstacles must be 2000mm above the outdoor unit.**
2. **If miscellaneous articles are piled around the outdoor unit, such articles must be 400mm below the top of the outdoor unit.**

4. Wiring diagrams

CSC70-3



LED INDICATION DESCRIPTION

NO.	LED1	LED2	DESCRIPTION
1	☆	☆	Stand-by
2	◆	◇	Cooling mode
3	◆	◆	Heating mode
4	◇	◆	Defrost
5	◆	●★	Sequence protection
6	◆	●●★	Communication failure
7	◆	●●●	Fault of outdoor pipe temperature
8	◆	●●●●★	Fault of outdoor ambient temperature
9	◇	●★	Low pressure protection
10	◇	●●★	High pressure protection
11	◇	●●●★	Current protection
12	◇	●●●●★	Condenser high temperature protection

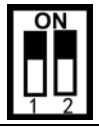
Note:

●, Light 0.4sec, Extinguish 0.4sec ★, Light 2sec, Extinguish 2sec

___☆, Light 1sec, Extinguish 1sec _◇, Extinguish

◆, Light _, Light 0.2sec, Extinguish 0.2sec

FUNCTION OF SWITCH

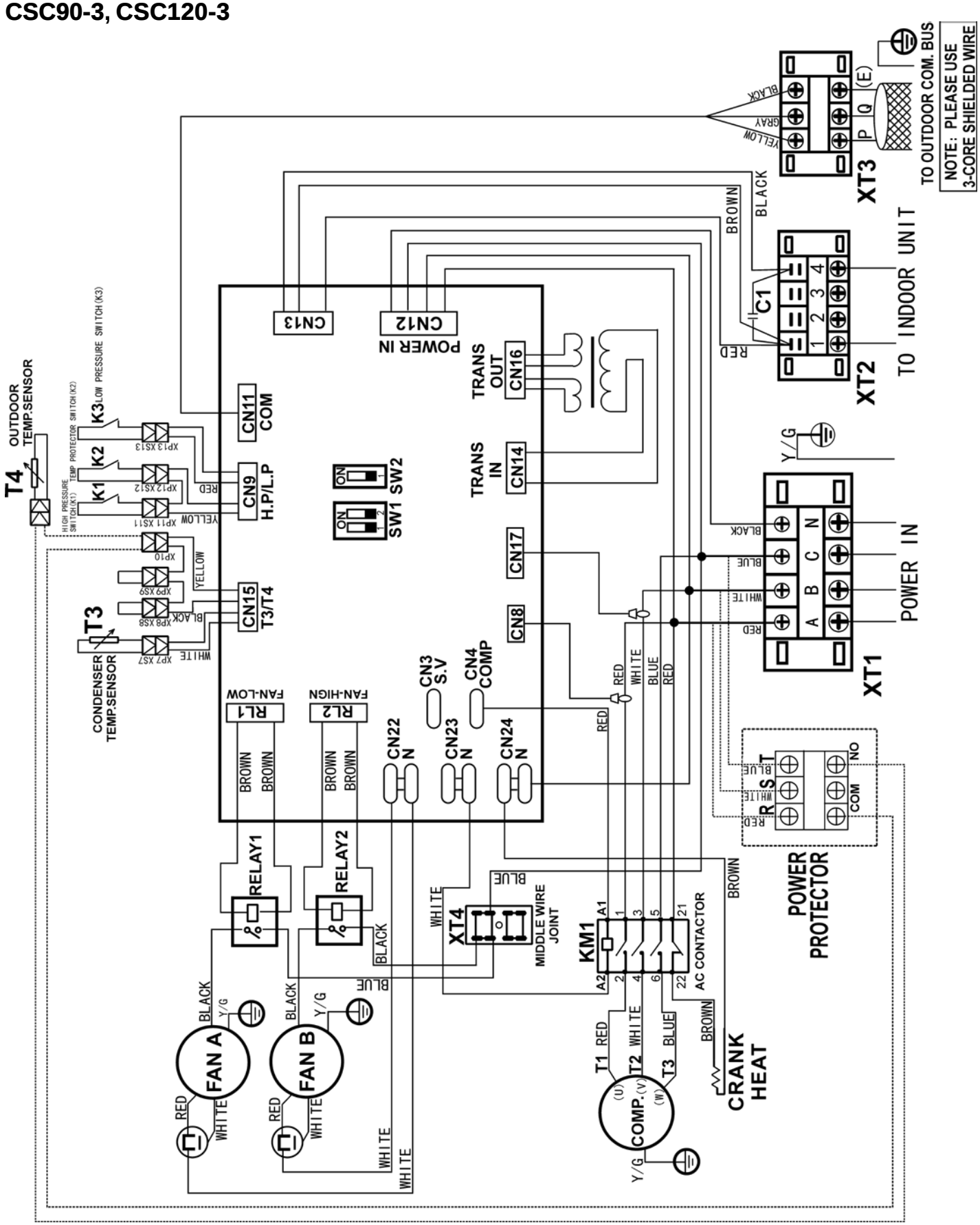
SW2	NET OFF 	NET ON 		
SW1	NO.0 Unit (Main) 	NO.1 Unit (AUX) 	NO.2 Unit (AUX) 	NO.3 Unit (AUX) 

Note:

SW2 default setting as NET OFF.

SW1 default setting as main unit (No. 0 unit).

CSC90-3, CSC120-3



LED INDICATION DESCRIPTION

NO.	LED1	LED2	DESCRIPTION
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10	◇	●●★	High pressure protection
11	◇	●●●★	Current protection
12	◇	●●●●★	Condenser high temperature protection

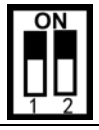
Note:

●, Light 0.4sec, Extinguish 0.4sec ★, Light 2sec, Extinguish 2sec

___☆, Light 1sec, Extinguish 1sec _◇, Extinguish

◆, Light _, Light 0.2sec, Extinguish 0.2sec

FUNCTION OF SWITCH

SW2	NET OFF 	NET ON 		
SW1	NO.0 Unit (Main) 	NO.1 Unit (AUX) 	NO.2 Unit (AUX) 	NO.3 Unit (AUX) 

Note:

SW2 default setting as NET OFF.

SW1 default setting as main unit (No. 0 unit).

5. Electric Characteristics

Model	Outdoor Unit				Power Supply			Compressor		OFM	
	Hz	Voltage	Min.	Max.	MCA	TOCA	MFA	MSC	RLA	KW	FLA
CSC70-3	60	208-230V	198V	240V	26.88	32.5	35.75	153	20.8	0.42	2.86
CSC90-3	60	208-230V	198V	240V	38.4	44.4	48.8	203	30.7	0.64	5.34
CSC120-3	60	208-230V	198V	240V	43	58.3	64	267	43.6	0.64	5.34

Notes:

MCA: Min. Current Amps. (A)

TOCA: Total Over-current Amps. (A)

MFA: Max. Fuse Amps. (A)

MSC: Max. Starting Amps. (A)

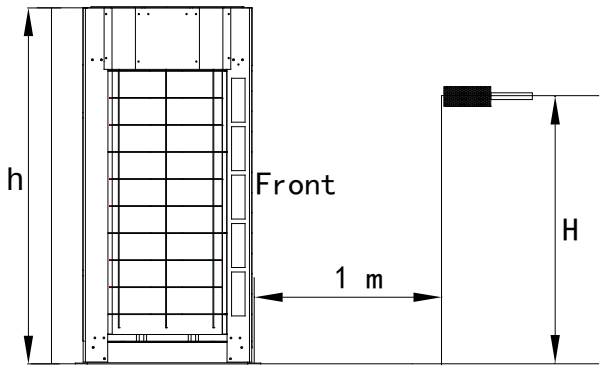
RLA: Rated Locked Amps. (A)

OFM: Outdoor Fan Motor.

FLA: Full Load Amps. (A)

KW: Rated Motor Output (kW)

6. Sound Levels



Note: H = (h+1) / 2

Model	Noise level
CSC70-3	65 dB(A)
CSC90-3	69 dB(A)
CSC120-3	70 dB(A)

Part. 3 Installation

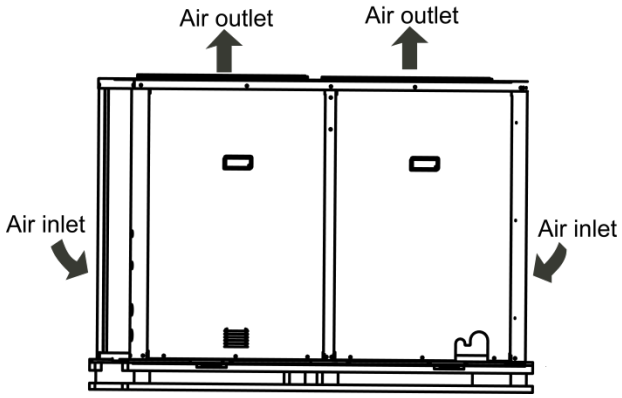
1. Notes

CAUTION:

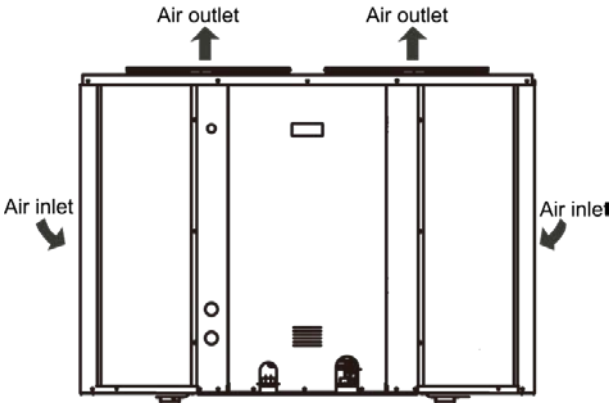
- Transport the air conditioner with the original package.
- If the air conditioner needs to be installed on a metal part of the building, electric insulation must be performed, and the installation must meet the relevant technical standards of electric devices.
- The unit must be installed 2.3m above floor and shall not be installed in the laundry.
- The enclosure of the appliance shall be marked by word, or by symbols, with the direction of fluid flow.
- An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring.
- Operate the remote controller within the receiving scope of the indoor unit, and direct the transmitting part of the remote controller to the receiver of the indoor unit.
- Install the unit where enough space of installation and maintenance is available.
- Install the unit where the ceiling is horizontal and enough for bearing the weight of the indoor unit.
- Install the unit where the air inlet and outlet are not baffled and the least affected by external air.
- Install the unit where the supply air flow can be sent to all parts in the room.
- Install the unit where it is easy to lead out the connective pipe and the drain pipe.
- Install the unit where no heat is emitted from a heat source directly.
- Installing the equipment in any of the following places may lead to faults of the equipment (if that is inevitable, consult the supplier):
  - ✓ The site contains mineral oils such as cutting lubricant.
  - ✓ Seaside where the air contains much salt.
  - ✓ Hot ring area where corrosive gases exist, e.g., sulfide gas.
  - ✓ Factories where the supply voltage fluctuates seriously.
  - ✓ Inside a car or cabin.
  - ✓ Place like kitchen where oil permeates.
  - ✓ Place where strong electromagnetic waves exist.
  - ✓ Place where flammable gases or materials exist.
  - ✓ Place where acid or alkali gases evaporate, or other special environments.
- Install the unit in a dry and well ventilated place.
- Install the unit where the bearing surface is level and can bear weight of the unit, and is suitable for installing the unit horizontally without increasing noise or vibration.
- Install the unit where the operation noise and the expelling of air do not affect neighbors.
- Install the unit where no flammable gas is leaked.6Install the unit where it is convenient for pipe connection and electric connection.

2. Installation of Outdoor Units

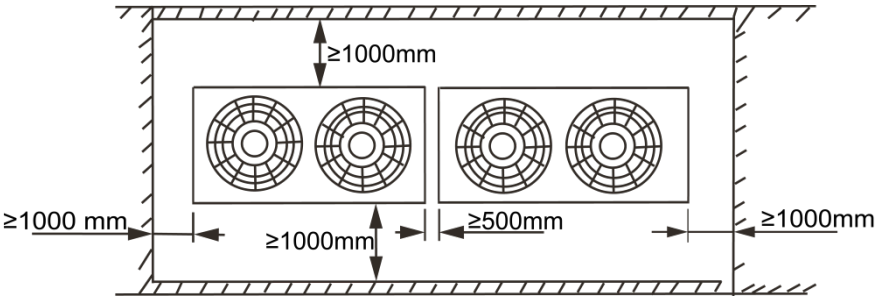
- When installing the unit, leave a space for maintenance shown in the following figure. Install the power supply at the side of the outdoor unit.



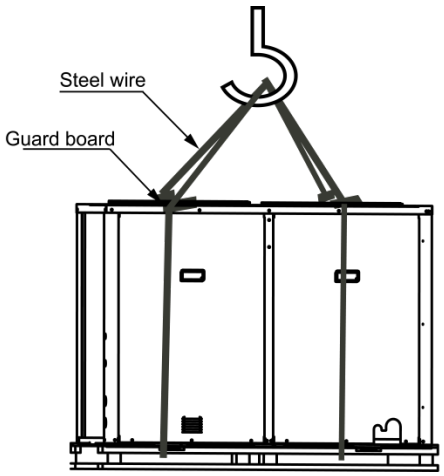
CSC70-3, CSC90-3



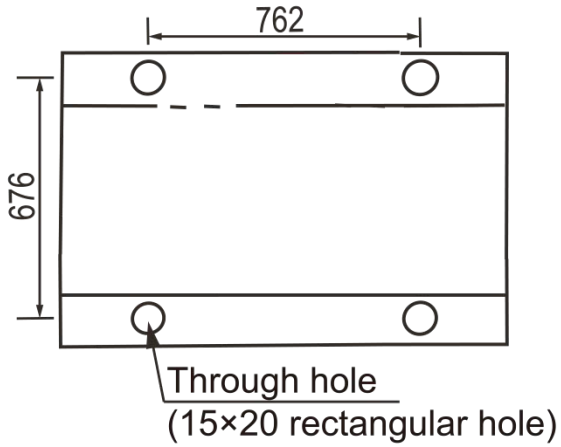
CSC120-3



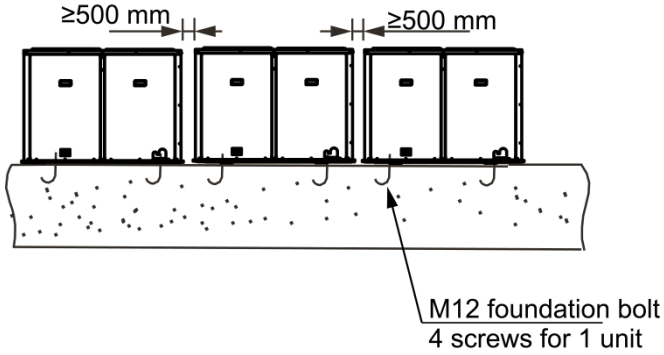
- In case any obstacles exist above the outdoor unit, such obstacles must be 2000mm above the outdoor unit.
- If miscellaneous articles are piled around the outdoor unit, such articles must be 400 mm below the top of the outdoor unit. Use 4 steel ropes of a diameter 6mm or bigger size to hoist the outdoor unit and move it into the site.
- In order to prevent scratch and deformity the outdoor unit, apply a guard board to the surface of contact between the steel wire and the air conditioner. Remove the cushion for use in the transport after finishing the transport.



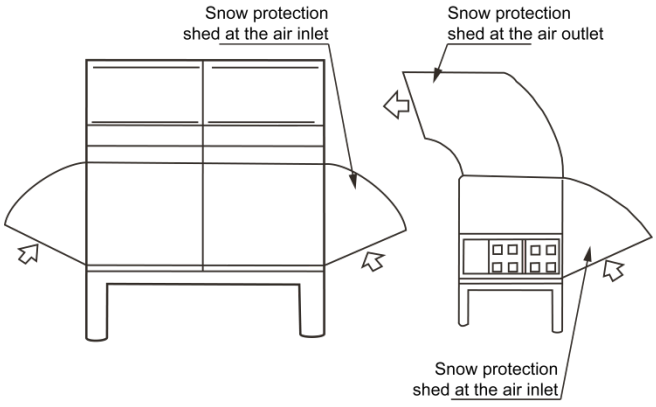
- The distance of the foundation bolt is shown in following picture. (Unit: mm)



- As the following shown picture, leave an interval between the multi-outdoor unit.



- Snow protection facilities must be installed in the snowfall areas. In order to prevent influence caused by snow, set up raised pavilion, and install snow protection sheds at the air inlet and air outlet. The snow protection facilities are provided in the site.

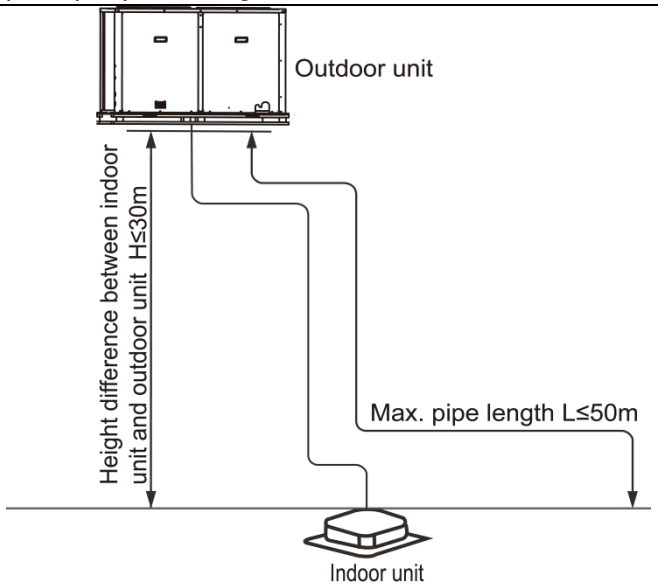


3. Connection of Refrigerant Pipe

- The refrigerant pipe adapter is located inside the outdoor unit. So remove the right front board first, and remove M5 screws.
- When the pipe is connected from the front side, the pipe can be led out through the right front board.
- When welding the refrigerant pipe, in order to prevent internal oxidation of the pipe, nitrogen must be filled in. Otherwise, the oxidized chips may block refrigerating circulatory system.
- Trash and foreign matters may come into the pipe in the process of installing the refrigerant pipe. Be sure to blow them off with nitrogen before connecting the pipe to the outdoor units.
- Use high-pressure nitrogen to clean the pipelines. Do not use the refrigerant of the outdoor unit for cleaning.
- Pipes size of the units.

Outdoor units	Liquid pipe	Gas pipe
CSC70-3	Φ9.52mm	Φ19mm
CSC90-3	Φ9.52mm	Φ22mm
CSC120-3	Φ12.7mm	Φ25mm

- All connections between indoor unit and outdoor unit are copper-to copper and should be brazed with a phosphorous-copper alloy material such as Silfos-5 or equivalent. Do not use soft solder. The outdoor units have reusable valves on both the liquid and vapor connections. The total system refrigerant charge is retained within the outdoor unit during shipping and installation. The reusable valves are provided to evacuate and charge per the instruction.
- Dry nitrogen should always be supplied through the tubing while it is being brazed, because the temperature required is high enough to cause oxidation of the copper unless an inert atmosphere is provided. The flow of dry nitrogen should continue until the joint has cooled. Always use a pressure regulator and safety valve to insure that only low pressure dry nitrogen is introduced into the tubing. Only a small flow is necessary to displace air and prevent oxidation.
- Install the connective pipe only after fixing the indoor unit and outdoor unit. Keep dry when installing the connective pipe. Do not let moist intrude into the pipeline system.
- Allowed length of refrigerant pipe and height difference.

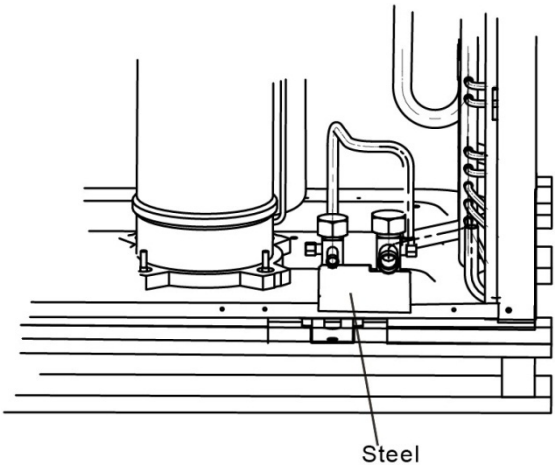


		Allowed value
Max. actual length of pipe (L)		50m
Max. height difference between indoor and outdoor unit	Outdoor unit (upper)	25m
	Outdoor unit lower (lower)	30m
Max. number of bends		15

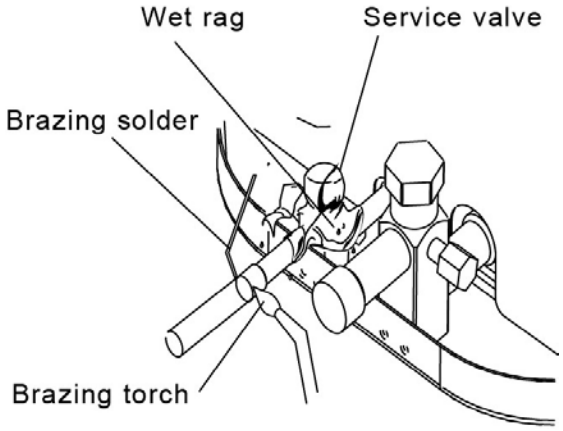
- Do not increase or decrease piping sizes.

- The indoor unit and outdoor unit are categorized into the system A and B. When installing the connecting the indoor unit and outdoor unit correspond to the outdoor unit exactly. Otherwise, it may lead to fault of the air conditioner.

- As shown in following picture, when brazing the indoor and outdoor connective lines, pad a sheet metal under the valve avoids the flame burning the chassis.



- Precaution should be taken to prevent heat damage to the valve by wrapping a wet rag around it. Remove the cap and Schrader core from both the liquid and vapor service valve service ports at the outdoor unit. Connect low pressure nitrogen to the liquid line service port.



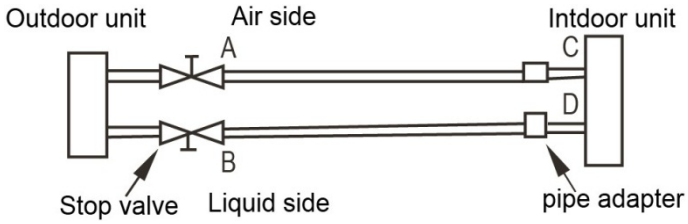
- Braze the liquid line to the high pressure valve (liquid valve) at the outdoor unit. Be sure to wrap the valve body with a wet rag. Allow the nitrogen to continue flowing.
- Carefully remove the rubber plugs from the evaporator liquid and vapor connections at the indoor unit.
- Braze the liquid line to the indoor liquid connection. Nitrogen should be flowing through the evaporator coil.
- Slide the plastic cap away from the vapor connection at the indoor coil. Braze the vapor line to the evaporator vapor connection.
- Protect the vapor valve with a wet rag and braze the vapor line connection to the outdoor unit. The nitrogen flow should be exiting the system from the vapor service port connection. After this connection has cooled, remove the nitrogen source from the liquid fitting service port.
- Replace the Schrader core in the liquid and vapor valves.
- Leak test all refrigerant piping connections including the service port flare caps to be sure they are leak tight.
- Do not over tighten. (between 40 and 60 inch-lbs. maximum)
- Evacuate the vapor line, evaporator and the liquid line, to 500 microns or less.
- Replace cap on service ports. Do not remove the flare caps from the service ports except when necessary for servicing the system.
- Do not connect manifold gauges unless trouble is suspected. Approximately 3/4 ounce of refrigerant will be lost each time a standard manifold gauge is connected.
- Release the refrigerant charge into the system. Open both the liquid and vapor valves by removing the plunger cap and with a hex wrench back out counter-clockwise until valve stem just touches the chamfered retaining wall.
- Replace plunger cap finger tight, then tighten an additional 1/12 turn (1/2 hex flat). Cap must be replaced to prevent leaks.
- Never attempt to repair any brazed connections while the system is under pressure. Personal injury could result.
- After the pipes between the indoor unit and the outdoor unit are connected, replenish compressed nitrogen to perform airtight test.
  - ✓ The airtight test is performed by using the compressed nitrogen, 2.94MPa (30kg/cm^{2}G). Leak test with a bubble type leak detector. Do not use the system refrigerant in the outdoor unit to purge or leak test.
  - ✓ Tighten the spool of the low pressure valve and high pressure valve before compressing the nitrogen.
  - ✓ Compress the nitrogen at the air vent of the gas valve.
  - ✓ The low pressure valve and high pressure valve are closed in the process of compressing the nitrogen.
  - ✓ **Do not** use oxygen, flammable gas or toxic gas in the airtight test.

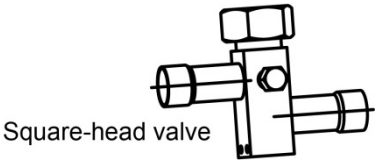
- Vacuum

Length of connective pipe (Single pass)	Procedure of expelling air
Less than 5m	Use refrigerant in the outdoor unit.
5~15m	Use vacuum pump or refrigerant tank.

Note: If the air conditioner is relocated, be sure to use a vacuum pump or refrigerant tank to expel air.

✓ Use the refrigerant in the outdoor unit to expel air.



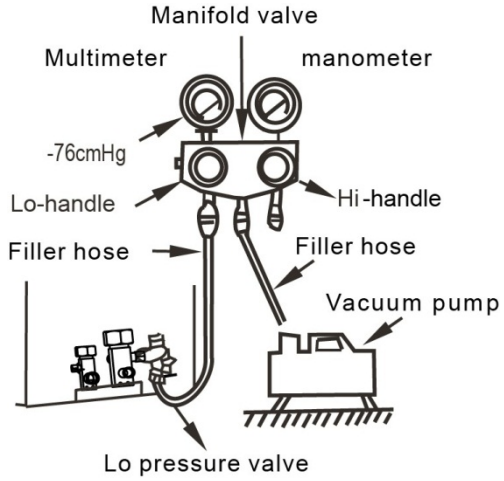


- Screw up the pipe nuts at A, B, C and D completely.
- Loosen and remove the square-head cover of valves A and B, rotate the square-head spool of valve B counter-clockwise for 45 degrees and stay for about 10 seconds, and then close the spool of valve B tightly.
- Detect leak for all adapters at A, B, C and D. After making sure that no leak exists, open the maintenance orifice nut of valve A. After all air is expelled, tighten the maintenance orifice nut of valve A.
- Open the spools of valves A and B completely.
- Tighten the square-head cover of valves A and B completely.

✓ Use refrigerant tank to expel air.

- Screw up the pipe nuts at A, B, C and D completely.
- Loosen and remove the square-head cover and maintenance orifice nut of valves A and B.
- Connect the filler hose of refrigerant tank with the maintenance orifice of valve A.
- Loosen the valve of the refrigerant tank, continue filling refrigerant for 6 seconds to expel the air, and tighten the nut of valve B quickly.
- Loosen the valve of the refrigerant tank again, and fill the refrigerant for 6 seconds. Detect leak for all adapters at A, B, C and D. After making sure that no leak exists, screw off the filler hose. After all the filled refrigerant is expelled, screw up the maintenance orifice nut of valve A quickly.
- Open the square-head pools of valves A and B completely.
- Tighten the square-head cover of valves A and B.

✓ Use a vacuum pump



- Loosen and remove the maintenance orifice nut of valve A, and connect the filler hose of the manifold valve to the maintenance orifice of valve A (Tighten both valve A and valve B).

- Connect the filler hose adapter to the vacuum pump.
- Open the low (Lo) pressure handle of the manifold valve completely.
- Start the vacuum pump to extract air. At the beginning of extracting air, slightly loosen the maintenance orifice nut of valve B, check whether any air enters it (The vacuum pump noise changes, and the multi-meter indicates from negative to 0.). Then tighten this maintenance orifice nut.
- Upon completion of vacuuming, tighten the low pressure handle of the manifold valve completely and stop the vacuum pump. Keep extracting air for over 15 minutes. Check whether the multi-meter points at -1.0×10Pa (-76cmHg).
- Loosen the remove the square-head cover of valves A and B. After opening valves A and B completely, tighten the square-head cover of valves A and B.
- Remove the filler hose of the maintenance orifice of valve A, and then tighten the nut.
- Procedure of using stop valve

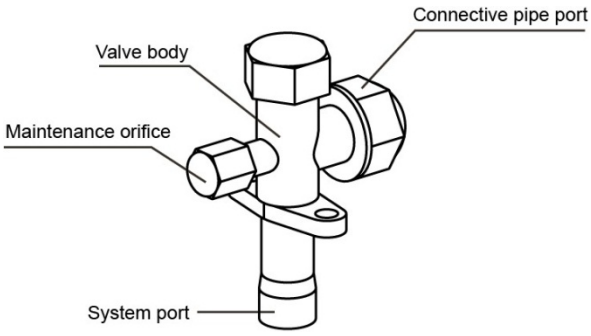
✓ Open the spool until it touches the stop block. Do not attempt to open further.

✓ Use a spanner or a similar tool to tighten the bonnet.

✓ Upon completion of installation, open all valves before trial run. Each unit has two valves of different sizes located at the outdoor unit side. Of the two valves, one is gas valve and the other is liquid valve. The procedure of opening / closing the valve is shown in following picture.

✓ Procedure of opening the valve: Open the square-head cover, use a spanner to capture the square head and open it thoroughly. Then tighten the square-head cover.

✓ Procedure of closing the valve: Same as the procedure of opening the valve, but rotate the spanner clockwise thoroughly.



- After vacuum, according to the diameter and length of the connective pipe of liquid side between the indoor unit and outdoor unit, calculate the refrigerant replenishment quantity. The refrigerant for replenishment is R410A.

Diameter of liquid-side pipe	Quantity of refrigerant replenished for 1m pipe length
Φ9.52mm	0.06kg
Φ12.7mm	

Note: Please check and record the replenished quantity of the air conditioner.

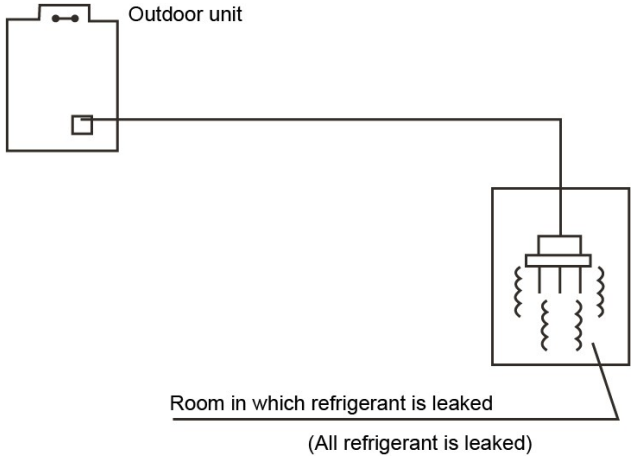
- Refrigerant leak precautions. This air conditioner uses refrigerant R410A. R410A is safe refrigerant which is harmless and non-flammable. The room for placing the air conditioner should have a proper space. Even if refrigerant leakage occurs, the density threshold will not be crossed. Additional measures may also be taken.

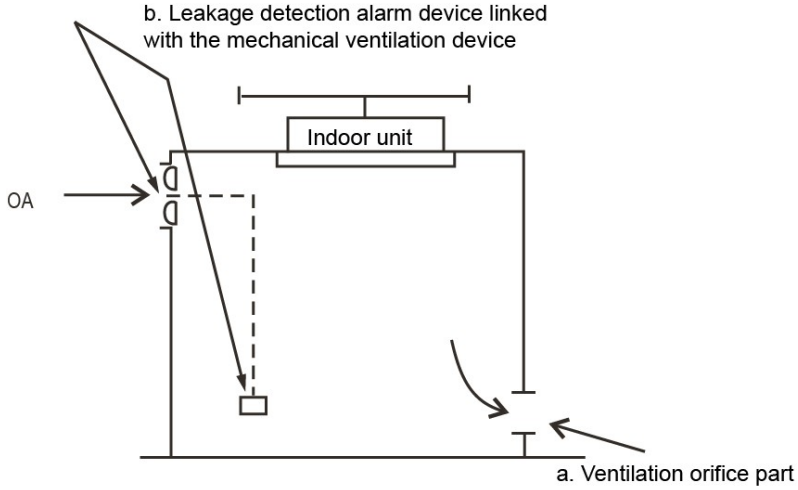
✓ Density threshold: Density of the Freon gas that does not harm the human body. Density threshold of R410A: 0.3kg/m3.

✓ Calculate the total quantity of refrigerant to be replenished [A (kg)].

✓ Total refrigerant quantity = refrigerant replenishment quantity upon shipment + additional refrigerant replenishment corresponding to the pipe length.

- ✓ Calculate out the indoor volume [B (m3)] (according to the minimum volume)
- ✓ Calculate out the refrigerant density:
- ✓ [A (kg)] / [B (m3)] ≤ Density threshold: 0.3kg/m3
- ✓ Measures against crossing of the refrigerant density threshold.
- ✓ In order to keep the refrigerant density below the threshold value, please install a mechanic ventilation device. (Perform ventilation often.)
- ✓ In case frequent ventilation is impossible, please install the leakage detection alarm device linked with the mechanical ventilation device.





(The leakage detection alarm device should be installed at the place vulnerable to retention of the refrigerant)

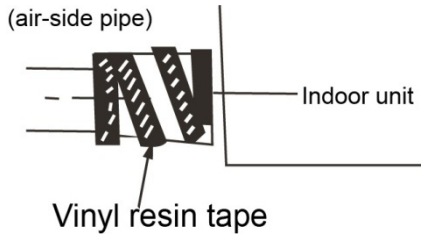
4. Heat Insulation of Refrigerant Pipe

In order to prevent faults caused by condensate of the refrigerant pipe and drain pipe, perform condensate prevention and heat insulation properly. If it is forecast that high humidity and temperature environment (Condensate temperature is over 23°C) may exist in the ceiling, e.g., inside the ceiling with slab, ceiling which is in the same environment as the outdoor air. It is necessary to apply 10mm or thicker adiabatic wool (16~20kg/m^2) to the refrigerant pipe and the drain pipe in addition to applying the general heat insulation materials. Enough heat insulation materials should also be applied to the refrigerant joint and the pipe joint.

Note: the heat insulation of drain pipe refer to the installation of indoor unit.

- Please use heat-resistant materials as heat insulation material of the air-side pipe. (e.g., EPT)
- Cover heat insulation materials separately at the liquid side and the air side. Moreover, perform heat insulation thoroughly for the air-side pipes of the indoor unit, and prevent water from dripping outside the unit.
- After applying the auxiliary heat insulation materials, use vinyl resin tape to seal refrigerant pipe and

drainage pipe to prevent water leak.



5. Trial Run

- Please conduct in accordance with the nameplate of Trial Run Tenor on the electric control box.
- Perform the trial run only after the outdoor unit has been powered on for over 12 hours.
- Check whether all valves are opened before trial run.
- Check the electric safety before trial run.
- Do not perform compulsory operation in any way, because it is very dangerous if the protection device is not active.
- Perform trial run only after all installations are finished.
- Confirm the following issues before trial operation:
- Install the remote controller holder as required by the user. The holder must be installed in a location suitable for transmitting the signals of the remote controller to the indoor unit.
- Use the remote controller or wired controller to let the air conditioner run in the cooling mode. Inspect the following items according to the operation manual. If any fault occurs, remove the fault first.
- Check the indoor unit:
  - ✓ Whether any vibration or abnormal sound occurs during the operation.
  - ✓ Whether the air, noise and condensate generated by the unit affect the neighbors.
  - ✓ Whether any refrigerant is leaked.
  - ✓ Check whether the connective copper pipes and drain pipes generate condensate due to loose wrapping.
  - ✓ Open the air inlet grille of indoor unit to check whether any penetration or leak of water occurs, especially at the drain stopper.

6. Trouble shooting

6.1 Phenomena not attributable to faults of air conditioner

- The system does not run.
  - After pressing the **ON/OFF** button, the system does not run immediately.
  - If the Run indicator is on, it indicates the air conditioner runs in the normal status.
  - It does not run immediately because the safety device in the system is active to prevent overload.
  - Three minutes later, the air conditioner compressor will run automatically.
  - If the Run indicator and the Defrost/Preheat indicator are on, it indicates the heating mode is selected. At the beginning after startup, since the compressor does not run, the temperature of the indoor unit is too low.
- The indoor unit gives out white aerosol.
  - This phenomenon may occur when the indoor relative humidity is too high and the unit runs in the cooling mode.
  - The indoor unit is installed in a place where there is much oil mist or dust. If the internal stain of the indoor unit is heavy, the temperature in the room will be distributed unevenly. In the case, the interior of the indoor unit must be cleaned. The cleaning units must be performed by professional maintainers.
  - This phenomenon may also occur when the air conditioner shifts from defrosting operation to heating operation. That is because the moist generated by defrosting is expelled as steam.
- Noise of air conditioner
  - When the air conditioner runs in the cooling, dry or heating mode automatically, grave continuous sizzles may occur. That is the sounds of refrigerant flowing between the indoor unit and the outdoor unit. The sizzles may be heard shortly after the unit stops running or when the unit runs in the defrost mode. That is the sound raised because the refrigerant stops flowing or changes to the volume of flow.
  - Squeak may occur when the air conditioner starts or stops running. That is the sound raised because the plastic assemblies inflate or deflate when the temperature changes.
- Dust is blown out of the indoor unit.
  - When the air conditioner resumes service after a long period out of service, the dust in the indoor unit will be blown out.
- The indoor unit gives out smell.
  - The indoor unit absorbs the smell of the room, furniture or smoking, and gives it out when running.
- Shift from cooling mode to air supply mode.
  - In order to prevent frosting of the indoor heat exchanger, the air conditioner shifts to air supply mode automatically, and resumes to cooling mode in a short time.
  - When the room temperature decreases to the set temperature, the air conditioner will shut down the compressor automatically, and shifts to the air supply status. After the room temperature rises, the compressor will restart. The action of the compressor in the heating mode is the contrary.

6.2 Faults of air conditioner and cause

- If any of the following exceptions occur, operation of the air conditioner will be immediately stopped. Turn off the power switch, and check it.
  - The ***Run*** indicator blinks quickly (2 blinks per second.). After turning off the power switch and then turning it on again, that indicator still blinks quickly. The receiving function of the remote controller fails, or the start and shutdown operation is abnormal.

- The fuse blows out frequently, or the circuit breaker protection occurs frequently.
- Foreign substance or moist enters the air conditioner or other exceptions occur.

● If the air conditioner fails but does not meet the foregoing phenomena obviously, check the system in the following procedure:

Symptom	Possible causes	Way of handing
The system does not run.	Power supply fails.	Operate it after power supply resumes and connect the power supply properly.
	The power switch is not connected.	
	The fuse blows out or the circuit breaker acts.	Replace the fuse or check whether electric leakage occurs.
	The remote controller or wired controller fails.	Check the remote controller or wired controller.

Symptom	Possible causes	Way of handing
The heating effect is poor.	The outdoor environment temperature is lower than -7°C.	Use a heating device. The unit cannot operate normally.
	The door or window is not closed tightly.	Close door and window tightly.
	The refrigerant is leaked or replenishment is deficient.	Detect leak, and fill the refrigerant of a correct quantity.

Symptom	Possible causes	Way of handing
The air conditioner sends air out but cannot provide cool air at all.	The setting temperature is improper.	The setting temperature is lower than the room’s during the cooling status or higher during the heating status.
	3-minutes protection of the compressor.	Waiting for 3 minutes.

Symptom	Possible causes	Way of handing
The cooling effect is poor.	The condenser or evaporator is too dirty.	Clean the heat-exchanger.
	The filter is blocked.	Clean the filter.
	The intake orifice or exhaust orifice of the indoor and outdoor unit is blocked.	Remove foreign mattes to keep well ventilated.
	The door or window is opened.	Close all the windows and doors.
	Directly exposed to sunlight.	Obstruct sunlight by curtains or jalousie.
	Too many heat sources.	Reduce heat sources.
	Too high outdoor environment temperature.	It is normal, and the cooling effect of the air conditioner is deteriorated.
	The refrigerant is leaked or the replenishment is deficient.	Detect leak, and fill the refrigerant of a correct quantity.

Symptom	Possible causes	Way of handing
The unit keep starting up and shutting down frequently.	The refrigerant is excessive or deficient.	Detect leak, and fill the refrigerant of a correct quantity.
	Air or non-condensable gas exists in the refrigerant loop.	Make a vacuum again and fill the refrigerant.
	The compressor fails.	Repair or replace the compressor.
	The voltage is too high or too low.	Install a voltage regulator.
	The refrigerant loop is obstructed.	Locate the causes and replace the part.

6.3 Faults of remote controller and cause

- The shift function cannot be set.

Symptom	Check item	Cause
The wind speed cannot be shifted.	Check whether the mode marked the screen of controller is ***AUTO***.	When the auto mode is selected, the indoor fan speed will be in automatically running and cannot be adjusted.
	Check whether the mode marked on the controller screen is ***DRY***.	When the dry mode is selected, the indoor unit will set fan speed automatically. The speed can selectable only in cooling, heating and fan mode.

- The transmitting symbol ▲ does not blink.

Symptom	Check item	Cause
Pressing **ON/OFF** button, the remote controller signal cannot be transmitted.	Check whether the batteries of remote controller are low.	When the batteries are exhausted, the signals cannot be transmitted.

- The temperature indicator does not light up.

Symptom	Check item	Cause
The temperature indicator does not light up.	Check whether the mode marked on the screen is ***FAN***.	In the fan mode, the temperature cannot be set.

- The display disappears.

Symptom	Check item	Cause
After a while the ***ON/OFF*** display disappears.	Check whether the time set on the timer has expired.	The air conditioner stops running because the set time has expired.
After a while the ***TIMING ON*** display disappears.	Check whether the time set on the time has expired.	When it comes to the set time of starting operation of the air conditioner, the air conditioner will start running automatically, and the corresponding display will disappear.

- No sound of receiving signal.

Symptom	Check item	Cause
Pressing the **ON/OFF** button, the air conditioner does not raise the receiving tone.	When the **ON/OFF** button is pressed, check whether the signal transmitting part of the remote controller is aligned with the receiving part of the indoor unit.	Align the signal transmitting part of the remote controller with the receiving part of the indoor unit. Then press the **ON/OFF** button repeatedly.
	Check whether the power switch of the air conditioner is connected properly.	The air conditioner cannot receive the signals of the remote controller, because it is shut down.
The buttons of the remote controller do not work.	Check whether the lock icon is in the screen of the remote controller.	Lock the buttons.

6.4 Outdoor unit malfunction and protection codes

Type	LED1	LED2
Phase sequence or lack of phase.	●	☆★
Communication error.	●	☆☆★
Condenser temperature sensor error.	●	☆☆☆★
Ambient temperature sensor error	●	☆☆☆☆★
System low pressure protection.	O	☆★
Three times low pressure protections within 1 hour.	☆	☆★
System hi-pressure protection, hi-temperature protection of compressor discharger.	O	☆☆★
Current overload protection.	O	☆☆☆★
High temperature protection of condenser.	O	☆☆☆☆★

Note:

●: Light

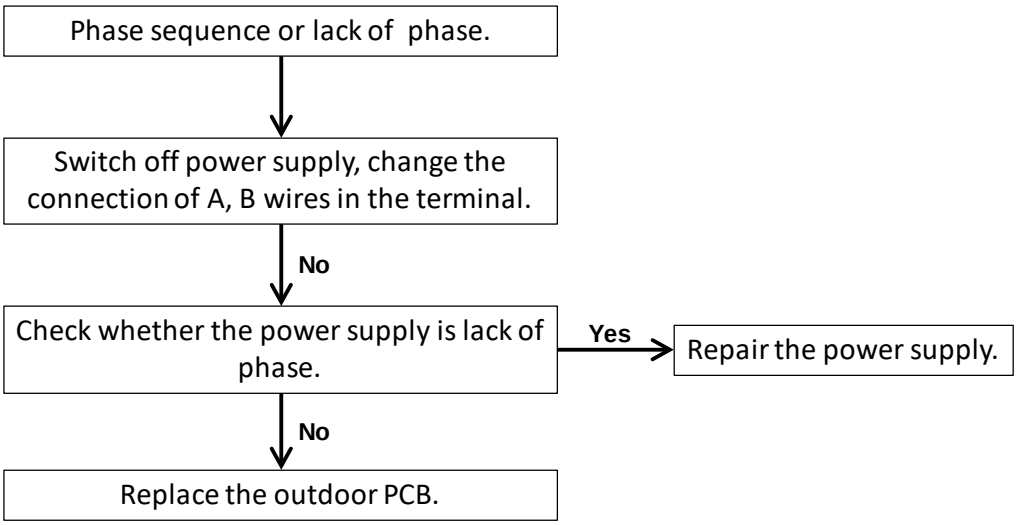
○: Extinguishing

☆: Rapidly flash

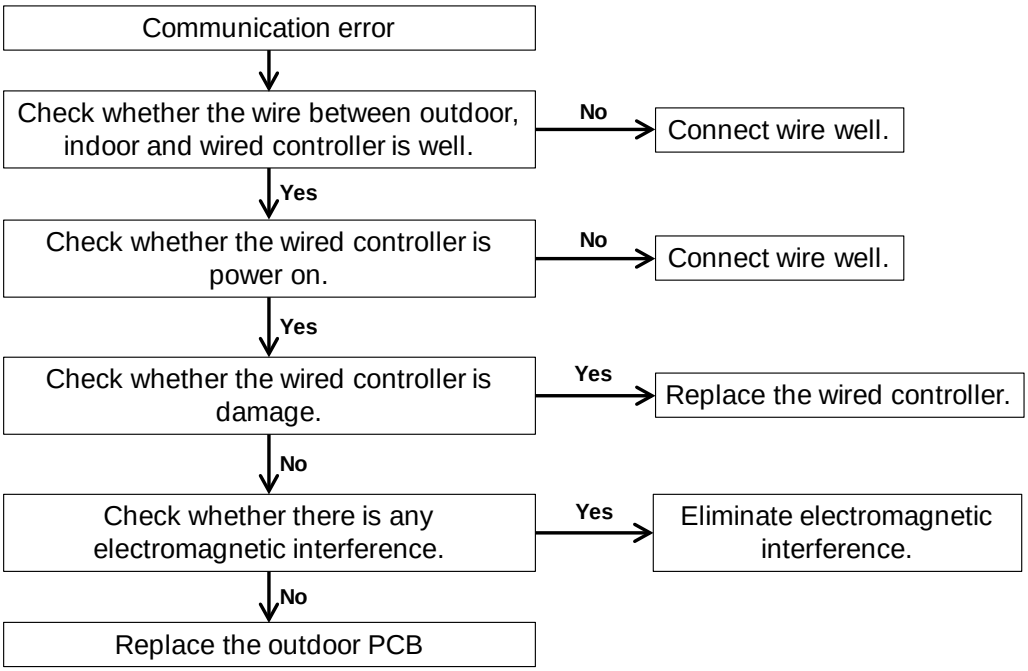
★:Slowly flash

When the outdoor unit protections of temperature or system pressure are triggered three times within 1 hour, the unit will resume after power on again.

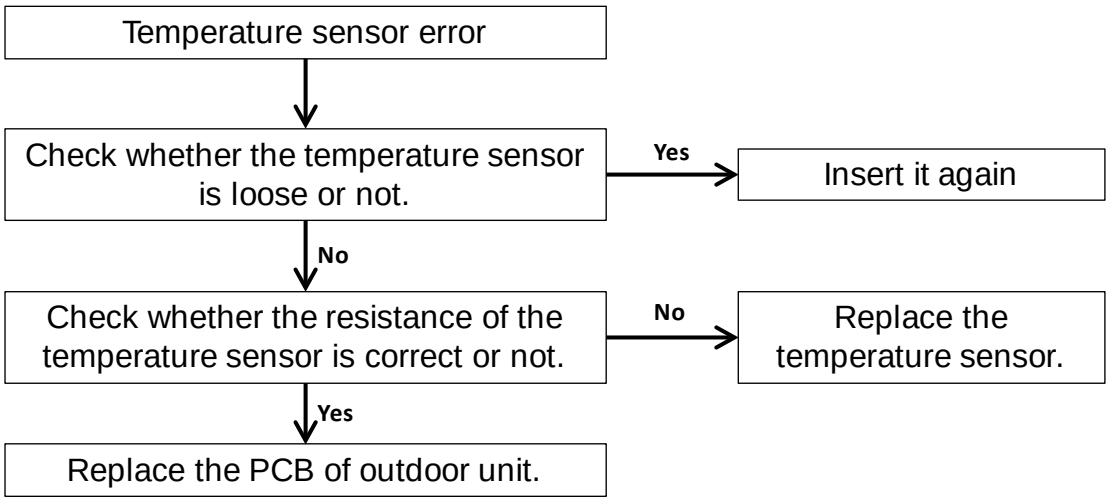
✓ **Phase sequence or lack of phase**



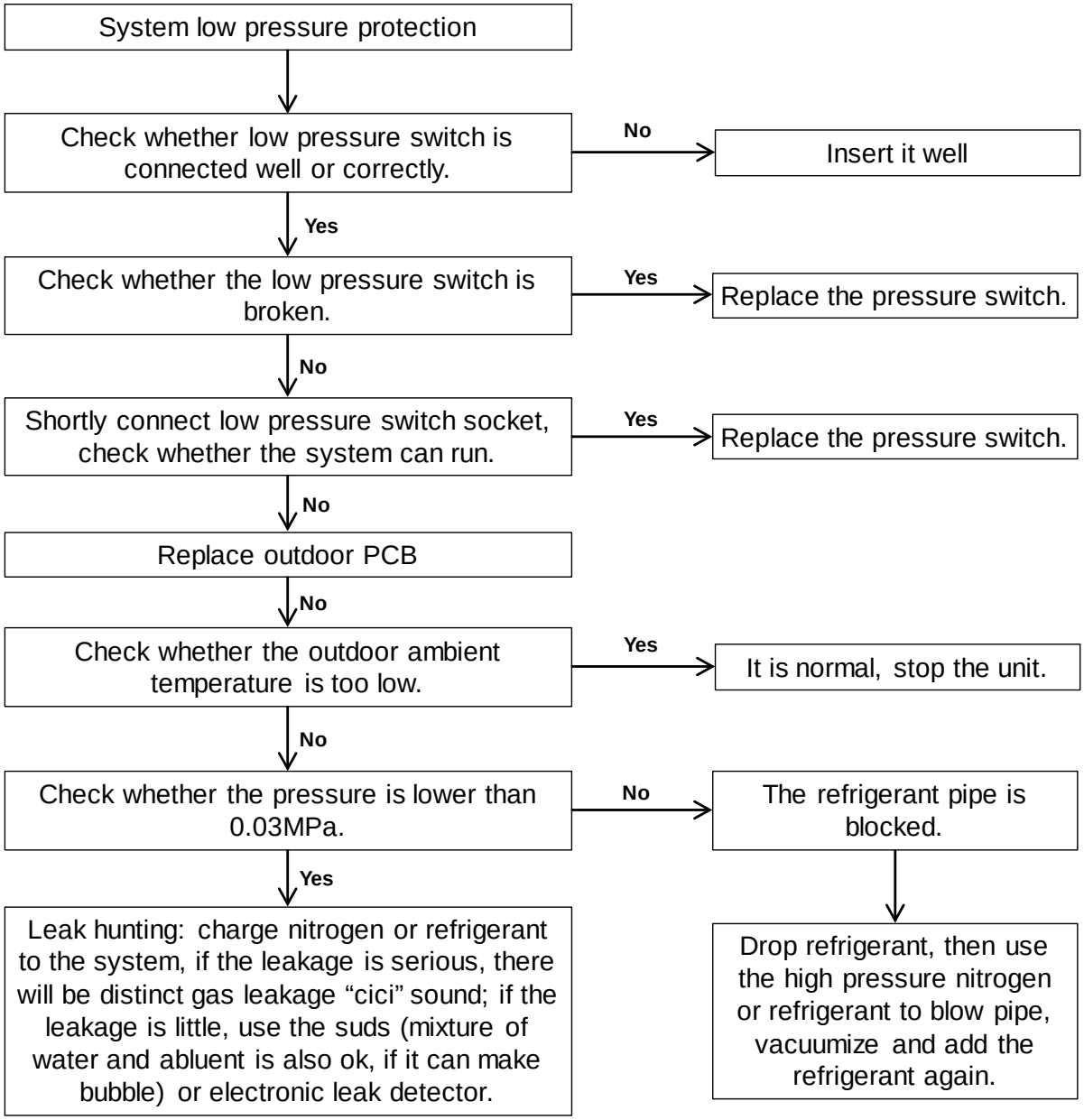
✓ **Communication error**



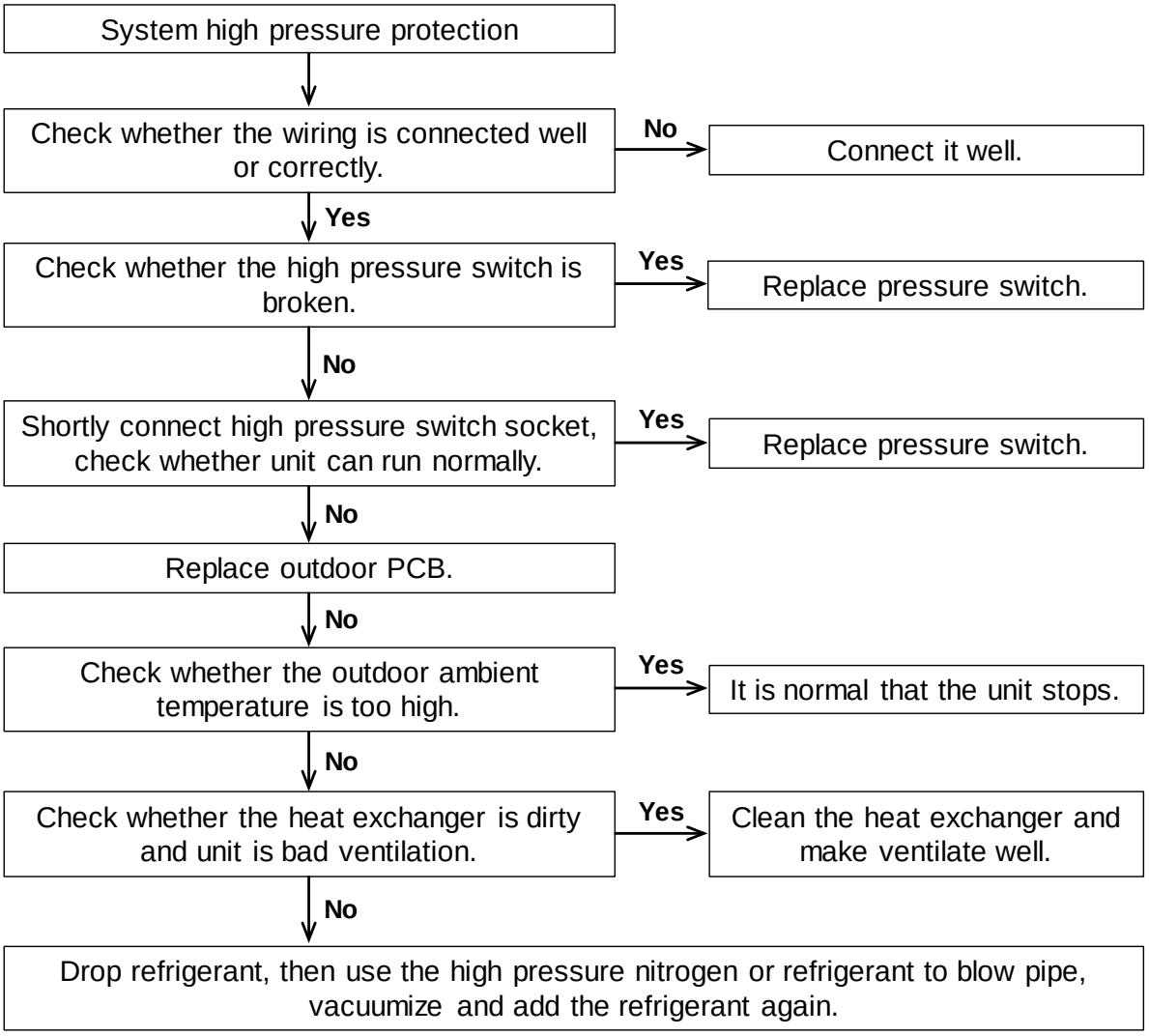
- ✓ **Condenser temperature sensor error**
- ✓ **Ambient temperature sensor error**



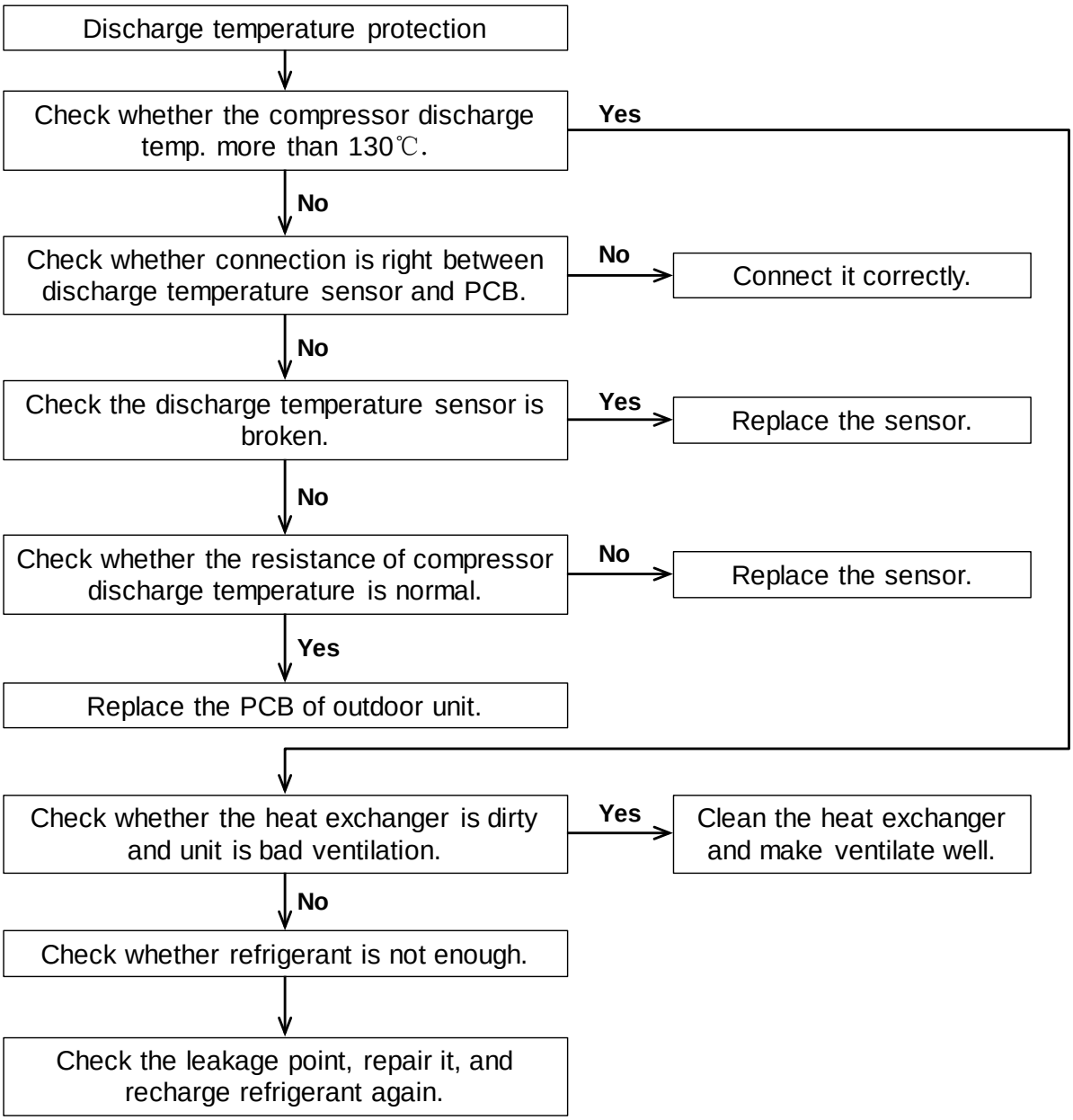
- ✓ **System low pressure protection**
- ✓ **Three times low pressure protections within 1 hour**



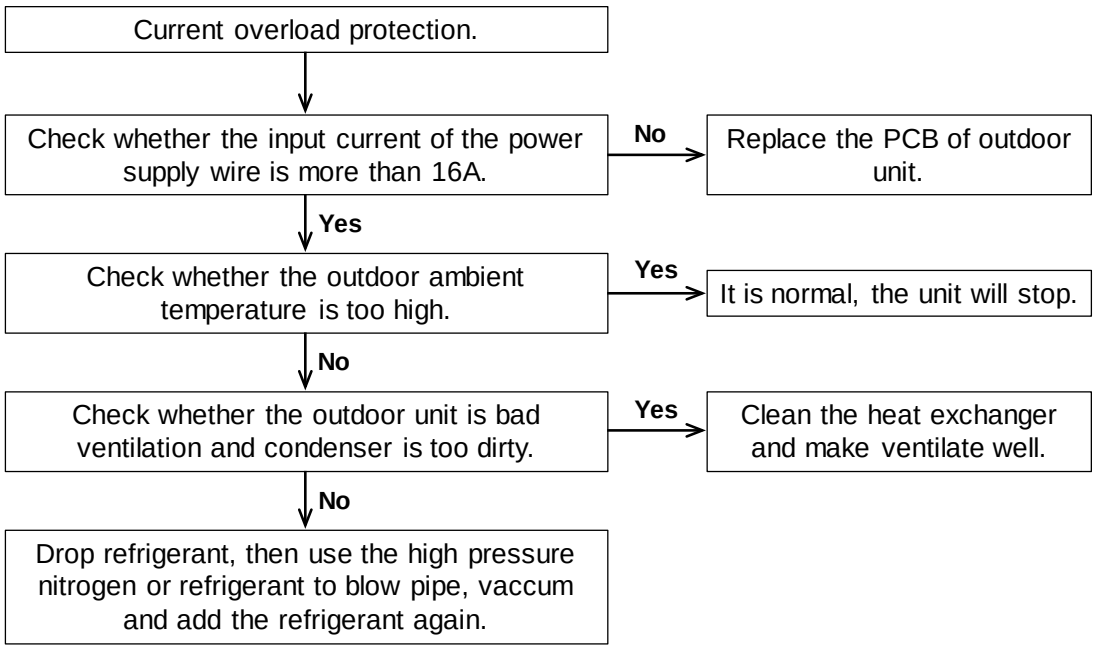
✓ **System high pressure protection**



✓ **Hi-temperature protection of compressor discharger**

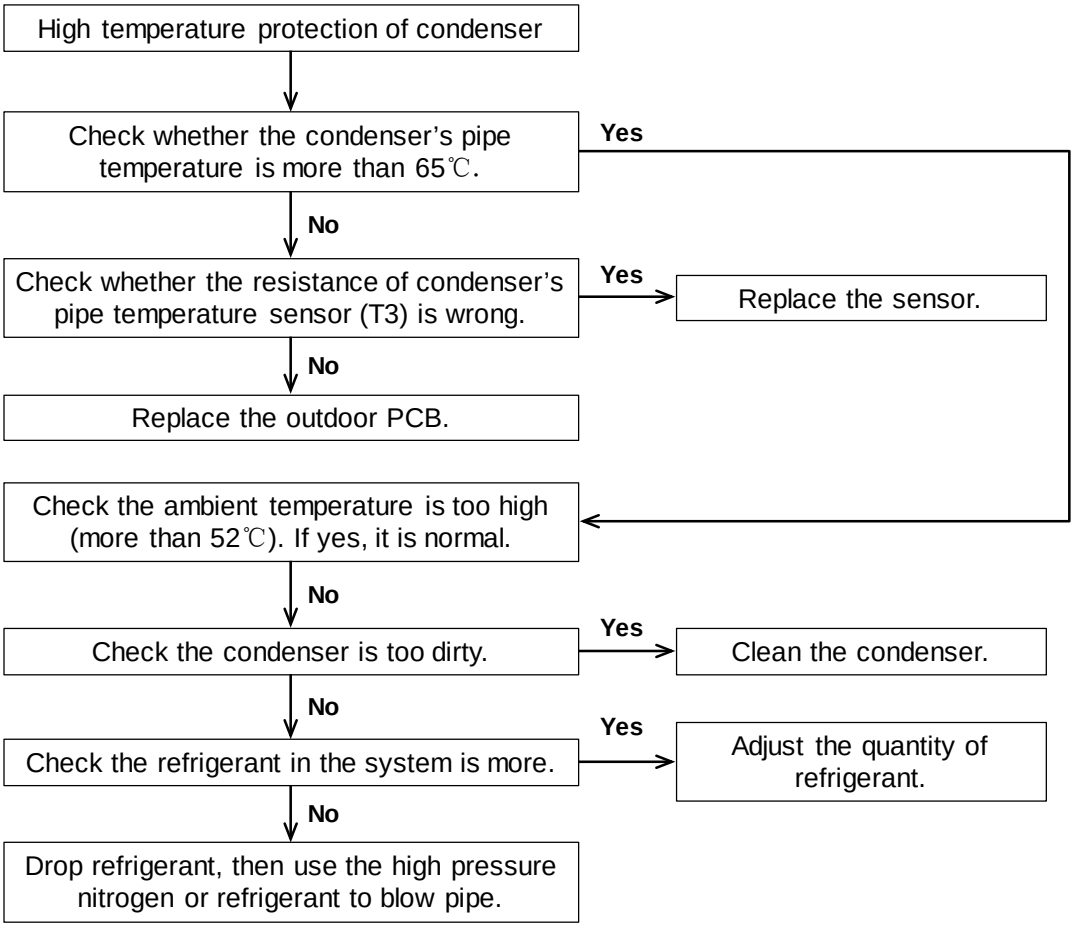


✓ **Current overload protection**



Note: The value of current protection is 34A for 76000Btu/h outdoor unit, 42A for 96000Btu/h outdoor unit, 60A for 12000Btu/h outdoor unit.

✓ **High temperature protection of condenser**



7. Maintenance

- Operation required before leaving the unit idle for a long period.
  - Let the air conditioner run in the fan mode for about half a day, and let its interior be fully dry.
  - Switch off the power by the button in remote controller, and then cut off the power supply.

- When the main power switch is turned on, a certain extent of electric power is consumed even if the air conditioner does not run. Turning off the main power switch can save energy.
- Remove the batteries out of the remote controller.
- After the air conditioner has been in service for several seasons, foreign substance accumulates inside the unit to an extent dependent on the working conditions. Therefore, shut down the air conditioner through the ON/OFF button of the controller, and then cut off the power supply.

- Startup after a long period out of service.
  - Check the following issues:
  - Check whether the air inlet or outlet of the indoor unit and outdoor unit is blocked. Remove foreign substance if any.
  - Check whether the ground wire is connected properly.
  - Check whether the condensate water is discharged normally.
  - Check whether the insulation work of refrigerant circuit and ventilating duct is on sound status. Check whether the installing seat is corroded or rusted.
- Startup
  - Connect the indoor unit 12 hours after connect the outdoor unit to power supply.
  - Switch on the power control of remote controller or wired controller, and then startup the air conditioning.
- Maintenance and upkeep of outdoor unit
  - The edge of some sheet metal assemblies and the fin of the condenser are very sharp. Incorrect operation may cause harm. Be cautious when cleaning them up.
  - Check the air inlet and outlet of the outdoor unit periodically to see whether they are blocked by stain or lampblack.