

6. Installation

8.1 Preparation and equipments before installation

1	Please buy following spare parts from your local market before installation
2	Hung bolts M12, 4 pcs
3	Drainage pipe PVC
4	Copper connecting pipe
5	Adhesive belt (big size) 5 pcs, (small size) 5 pcs
6	Heat insulation material used to connect copper pipe (PE foam material, its thickness is more than 8mm)
7	Power cable, electrical wire between indoor and outdoor unit(Must be in accordance with the wire diameter in the wiring diagram)
8	Acetylene cylinders, oxygen cylinders (when longer pipe used it should be welded)
9	One set pipe cut machine. (cut copper pipe)
10	Refrigerant cans, electronic balance (when longer pipe used additional gas should be charged)
11	Pressure gauges, pipe clamp, welding torch, 2B silver electrode
12	Wrench 2 pcs, one of them is with adjustable torque wrench(42N.m,65N.m,100N.mm)
13	Nitrogen cylinder (in order to prevent oxidation when welding, using Nitrogen to replace the air)

Select installation position of outdoor unit

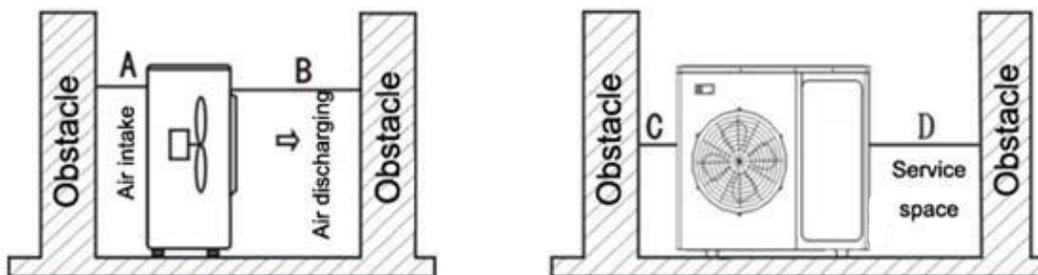
- ◇The site shall be strong enough to bear its weight, prevent noise and vibration.
- ◇The site shall be ensured to avoid direct sunshine, if necessary set a Havelock above the outdoor unit.
- ◇The site shall be easy to drainage the rain water and the frost water.
- ◇The site shall be ensured that the outdoor unit will not be covered by snow LDring the winter season.
- ◇The site shall be ensured that the outlet is not facing the strong wind.
- ◇The site shall be ensured that outlet air and operation noise will not affect the neighbors' daily life.
- ◇The site shall be ensured that the outdoor unit will not be affected by the garbage and oil mist.

Warning :

If outdoor unit working under such environment which contains oil (including machine oil) salt(marine areas), sulfide gas (hot springs and oil refinery areas), those substance may lead to the failure work of the outdoor unit.

Maintenance and ventilation space

- ◇The site shall be easy for ventilation then the outdoor unit can inhale and discharge air easily. What's more please reserve enough space for maintenance.



Note: Require $A > 300\text{mm}$; $B > 1500\text{mm}$; $C > 300\text{mm}$; $D > 500\text{mm}$;

Outdoor unit installation

- ◇ Use size M10 bolt and nut to fasten the outdoor unit tightly on the bracket, keep it in the horizontal level. The suitable length for bolt shall 20mm over the base level, in order to minimize vibration please do set a rubber shock absorber.



- ◇ If the outdoor unit is mounted on the wall or on the rooftop, in order to prevent earthquake and strong wind please fasten it as tightly as possible.
- ◇ Set a drainage channel to ensure the condensing water can drain out smoothly.
- ◇ Avoid that only four angles metal sheet to support the outdoor unit.

Transport

When the outdoor unit is to be lifted, please use two slings longer than 8m and insert cushioning material between the slings and outdoor unit to avoid damaging the casing.

8.2 Connection piping installation

Piping installation precaution

Please choose copper pipe as the piping.

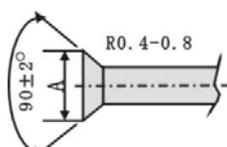
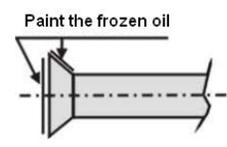
- ◇ If the piping installation needs welding:

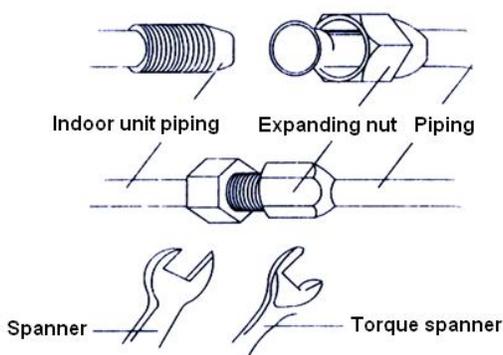
Please welding before fasten the nut, when welding using nitrogen gas to replace the air in the pipe in order to prevent oxidation.

- ◇ If there are many points to be welded ,please set a filter in the pipe(buy from local market)
- ◇ Please use nitrogen gas or air to remove the dust and water in the pipe,
- ◇ Please lay out the piping according to the tend towards of the piping, but it is not allowed more than 3 times curved at the same point of the pipe(if do like this the pipe will become rigid)
- ◇ When using pipe bending machine, the curvature shall not be too small or it will affect the refrigerant flow.

Piping specification selection

As to the detail selection please take reference to the cooling capacity adjust index figure during different installation situations.

Piping diameter	Tighten torque	Expanding size (A)	Expanding shape	Paint the frozen oil
1/4in(φ6.35mm)	15-19(N·m)	8.3-8.7mm		
3/8in(φ9.52mm)	35-40(N·m)	12.0-12.4mm		
1/2in(φ12.7mm)	50-60(N·m)	15.4-15.8mm		
5/8in(φ15.88mm)	62-76(N·m)	18.6-19.0mm		
3/4in(φ19.05mm)	70-75(N·m)	22.9-23.3mm		



Piping connection

- ◇Using expanding machine to expand accessories, the size of horn shown in the above figure:
- ◇Paint a thin layer of frozen oil at both inside and outside part of the expanding.
- ◇Make the expanding right to the screw thread shape connection of the indoor unit, using hands to tighten the nut then using a wrench to tighten the nut again.
- ◇Take out the cover of the indoor unit gas valve and liquid valve, make the expanding right to the stop valve of outdoor unit, using hands to tighten the nut then using a wrench to tighten the nut again.

Equivalent pipe length conversion

Equivalent pipe length means converting pipe elbow to straight pipe length after considerate the pressure loss.

Elbow and Oil loop conversion tablet

Pipe Dia.(mm) \ Type	Bend	Oil Loop
6.35	0.10	0.7
9.52	0.18	1.3
12.70	0.20	1.5
15.88	0.25	2.0
19.05	0.35	2.4
22.02	0.40	3.0

Equivalent pipe length $L = \text{Actual Pipe length} + \text{Bend Qty} \times \text{Equivalent pipe bend length} + \text{Oil Loop Qty} \times \text{Equivalent Oil Loop length}$

Sample:

AMCA-H09/4R3A Actual Pipe length is 25 meters, Gas pipe diameter is 9.52mm. If there's 5 bends and 2 oil loops during the installation, then the equivalent pipe length should be:

$$L = 25 + 0.18 \times 5 + 1.3 \times 2 = 28.5(m)$$

Specification of Connection Pipe for Indoor Unit and Outdoor Unit

Cooling Capacity(Btu/h)		1 drive 2	1 drive 3
Connection Pipe (mm)	Liquid Pipe	Φ6.35	
	Gas Pipe	Φ9.52	
Max. length for all rooms (m)		40	60
Max. length for one IU (m)		25	30
Max. height difference between IU and OU (m)		15	15
Max. height difference between IUs (m)		10	10
Max. oil loops		2	
Max. Bend Qty		5	
Extra R410a per meter when the pipe length is more than 7.5 meter (kg)		0.022	

◇ **Additional refrigerant charge**

Outdoor series	1 drive 2	1 drive 3
Chargeless pipe length (m)	15	22.5
Additional refrigerant charge(g)	16x(length for all rooms - 15)	16 x (length for all rooms - 22.5)

Emptying or vacuum

Before charging the refrigerant to the system, to ensure that there is no impurities, water or non-condensable gas. So, emptying and vacuum operation should be carried out.

◇Vacuum: when process this operation please be sure that the connection pipe is tightened up.

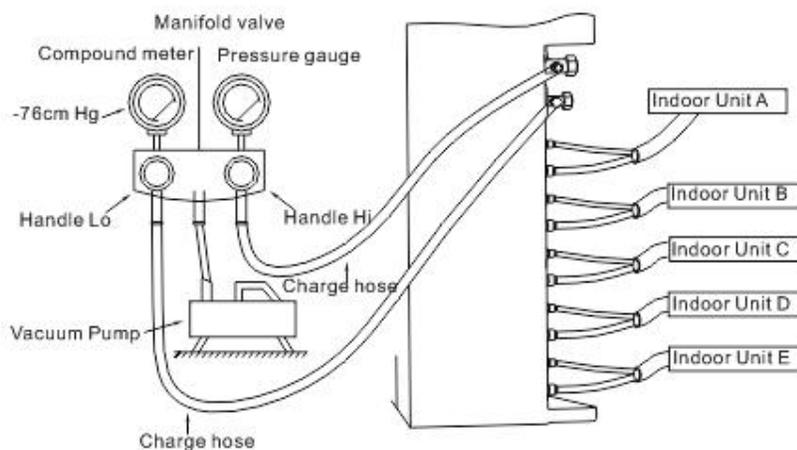
1. Screw off the cover of maintenance valve connection, connect the pressure gauge to the connection of maintenance valve
2. Connect the vacuum pump to the pressure gauge, turn on the vacuum pump and pressure gauge to process the vacuum operation toward the indoor unit and piping, while to ensure that the absolute pressure is no less than 50Pa after this operation.
3. Turn off the pressure gauge and vacuum pump to keep the pressure in the same level in 20 minutes.

◇Emptying: when process this operation, please disconnect the high pressure valve with liquid valve.

1. Connect the gas valve of the stop valve to the thimble side of the rubber hoses, the other side of rubber hoses should be connected to the refrigerant tank.
2. Open the refrigerant tank valve, using the refrigerant inside the tank with high speed to empty the air in the indoor unit and the connection piping. When the outlet air becomes mist (it feels cold by touching it), then the air is emptied.
3. When ensure that the air is emptied, connect and tighten the high pressure valve of outdoor unit stop valve and liquid side connection pipe, keep this state more than 10 seconds.
4. Use soapy what to test each connection junctions (including lengthen piping welding junction)
5. Confirmed that there is no leakage, turn off the valve of refrigerant tank, take down the rubber hose as well.

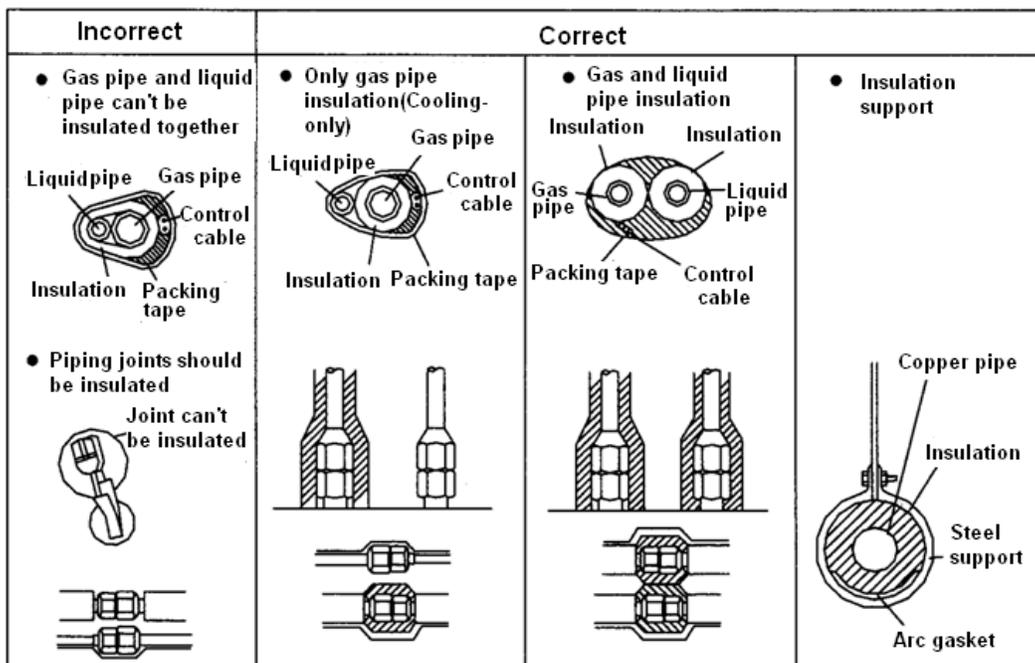
◇Turn on the high-low pressure valve of the outdoor unit.

After vacuum and emptying, screw back the cover of the maintenance valve of outdoor unit low pressure valve, screw off the high-low pressure valve of the outdoor unit (note: shall totally turned off). Connect the refrigerant to the system.



Heat insulation package of piping

◇ Use heat insulation material with good insulation performance to wrap the pipe.



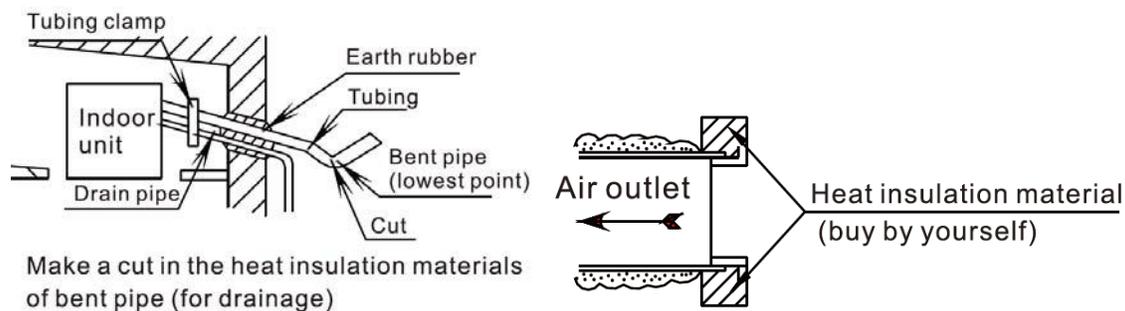
Notes

Drainage pipe and connection piping should be wrapped by heat insulation material respectively lift the air conditioner is proved my dew conditioner experiment. But if it keeps on working in high humidity (the dew temperature is more than 23°C) environment which may lead to water leakage, please use following additional insulation material:

- ◇ Glass fiber insulation material with the thickness between 10~20mm can be used.
- ◇ The part of indoor unit which get in touch with the back side of ceiling should pasted with insulation material.
- ◇ Besides the previous more than 8mm thick insulation material, connection piping (both gas pipe and liquid pipe), drainage pipe should be wrapped by additional 10~30 mm thick insulation material.

Seal the hole on the wall.

- ◇ To prevent rainwater or other foreign bodies from entering the room and air-conditioner, the gap between wall hole and tubing, drain pipe and electric wire should be sealed with mastic, sealant rubber or putty.
- ◇ If the outdoor unit is higher than indoor unit, tubing should be bent to ensure that the lowest point of the tubing is lower than the wall hole to prevent rainwater entering the room or air-conditioner along the piping system.



Additional refrigerant charge

When pipe length exceeds 5m, please add refrigerant according to the table below:

Connection piping	Piping size)		Additional refrigerant charge amount (kg/m)
	Gas pipe	Liquid pipe	
Piping between indoor and outdoor unit	φ9.52×0.75mm	φ6.35×0.75mm	0.022
	φ12.7×1mm	φ6.35×0.75mm	0.022
	φ15.88×1mm	φ9.52×0.75mm	0.050
	φ19.05×1mm	φ9.52×0.75mm	0.070
	φ19.05×1mm	φ12.7×1mm	0.090

Oil grade and standard oil-filled volume of Compressor

Outdoor unit model	Brand	Compressor model	Oil type	Oil volume(cm ³)
AM2-H18/4DR3	GMCC	ASM135D23UFZ	VG74	450
AM3-H27/4DR3	GMCC	ATM240D57UKP	VG74	670

Others

Make sure that the oil can return to the unit smoothly.

- ◇Horizontal pipes should incline toward the outdoor unit using a 20:1 slope
- ◇If there is a height difference(ΔH) between the indoor and outdoor unit, oil loops should be installed in the interconnecting gas (large) pipe;

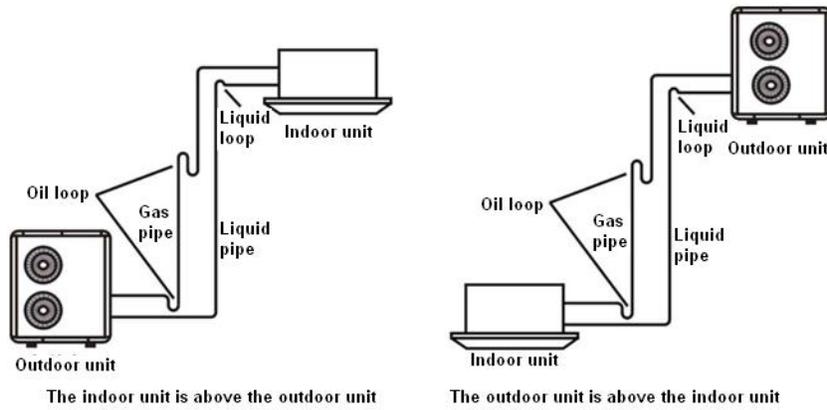
When ΔH ≤ 5 meters, an oil loop should be installed at the bottom of the gas (large) pipe; if the constant rise distance is too long, an oil loop should be installed in the gas (large) pipe every 10 meters.

When ΔH > 5 meters, then for every 5 meters an oil loop must be installed at the bottom of the gas (large) pipe, and a short loop (liquid ring) should be installed at the exit of the indoor unit liquid (small) pipe;

- ◇When the outdoor and indoor units are at the same elevation, if the horizontal connecting pipe length is less than 10

m,the oil deposit bend and liquid ring donot need to be installed.

If the horizontal connecting pipe length is more than 10 m, install an oil loop in the gas (large)pipe every 10 metres.



Note:

This chart is for explanation purposes. An actual installation will differ from this according to the site conditions. When making an oil loop the radius of the bend should be between 1.5 and 2 times the pipe diameter.

8.3Electrical connection

8.3.1Electrical connection precaution

Warning	Installation of electric items must be carried out by qualified, professional technicians.
	An isolated circuitry should be fixed with whole-pole disconnection devices, which is with at least 3mm gap of touch point . Power supply and indoor to outdoor connection wire should use special cable.

	<p>Providing the necessity of installation or replacement, the professional technician of service store appointed by manufacturer must be required, while self-operation by users is prohibited.</p> <p>In case of any electric shock accident, the creepage protection devices /power supply on-off switch and breaker must be required with.</p> <p>The specification of fuse for single phase control board is F5AL 250V, while for 3 phase control board, both indoor and outdoor unit, it is F3.15AL 250V.</p> <p>Machine must be earthed surely. or it'll be probably causecreepage.</p>
Notice	The earth line is neither allowed to connect to gas pipe, water pipe ,circuitry of telephone or lighting rod, nor to the earth line of other devices.
Others	<p>Please fix power supply cord and connection wires of indoor and outdoor, in accordance with circuit diagram</p> <p>Fix the cords into terminal boards properly and safely with cable fixation tools to avoid any danger caused by the power cord under outside forces.</p> <p>After fixation, use bind tape (affixed) to bind wires avoiding any collision with other components like compressor, copper pipes...etc</p>

8.3.2 Electrical connection

Wiring diagram of indoor & outdoor, refer to the section of part 1

Recommendation of power supply cord

Power supply:220~240V,50Hz

Capacity (BTU)	Model	Power supply	Indoor power cable
7000	AMWM-H07/4R3(#)	Outdoor unit 220-240V~50Hz	3×1mm ²
9000	AMWM-H09/4R3(#)		3×1mm ²
12000	AMWM-H12/4R3(#)	IndoorUnit 220-240V~50Hz	3×1mm ²
18000	AMWM-H18/4R3(#)		3×1mm ²

Power supply	Series	Max. Current(Normal)		
		Rated cooling (35/24 27/19)	Maximum frequency operation	Maximum capacity operation

			(39/26 32/23)	(43/26 32/23)
Outdoor unit 220-240V~50Hz	1 drive 2(18K)	9.9	10.6	9.5
	1 drive 3(27K)	15.6	16.3	15.0
Outdoor unit 187V~50Hz	1 drive 2(18K)	10.9	11.6	10.6
	1 drive 3(27K)	16.6	17.3	16.0

Notice:

- ◇ Above mentioned power supply cord is the cable which connect air on-off of indoor to indoor/outdoor unit. Power supply cord of indoor/outdoor unit is the power supply cable connecting indoor and outdoor unit
- ◇ The section area of power supply cord core is minimized one. To avoid voltage pressure dropped down, while longer power supply cord needed, the section area should be enlarged for one gauge.
- ◇ The connection wires to indoor unit is the cable of 27IEC53(RVV) type, 300/500V; while the connection wires to outdoor unit and the connection wires from outdoor to indoor unit is the multi-end of cable (neoprene)of 245IEC57(YZW)type,300/500V. if the single core with double skin type of cable is chosen for installation,, please choose 1# gauge of section area and wrapped with special jacket for electrician.
- ◇ All of the ceiling/floor type unit is without accessorial electric heating

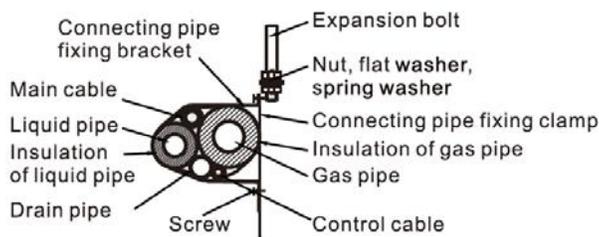
8.3.3 Wire connection

Indoor wire connection

Remove electric control box cover of indoor unit, connect the wires in accordance with the electradiagram mentioned on the back of the cover. The wire ends must be tightly fixed into terminal boards. The earth wire must be fixed into appointed position.

Outdoor wire connection

- ◇ Remove the electric item cover, which is positioned in the right side of outdoor unit, connect the wires in accordance with the electric diagram on the back of the cover.
- ◇ Be sure that pressing the wires tightly with the terminal boards while it through the board, the wire ends must be tightly fixed into terminal boards. The earth wire must be fixed into appointed position.
- ◇ After all the wire connected, bundle connection pipe, connection wires and drainage pipewith strips like mentioned drawing below:



Notice:

- ◇ **Be sure don't make the drainage pipe flat while bundled.**

8.4 Commissioning

Check installation condition

- ◇ Check indoor/outdoor unit installation and wire connection in accordance with the requirement of service manual.
- ◇ Check the power supplying, diameter of wires, air on-off switch and make sure that the items can be matched with machines, earth wire connection safety.
- ◇ Check air inlet/outlet duct and make sure that the items is clean, operating smoothly.

Commissioning

- ★ The system should be power on for 8 hours for preheat before the first time start up.
- ★ During winter, while after 8 hours power off, the performance test should be 2.5 and half hours power on later:
 - ◇ Power on the system and start up in cooling mode.
 - ◇ After 3 minutes compressor protection, check whether there is normal cooling air come from indoor unit and if there is abnormal noise come from indoor/outdoor units
 - ◇ Configure the mode with “fan” and check whether there is high speed airflow come from indoor unit.
 - ◇ Operate “swing” mode, check whether the louver is properly swaying.
 - ◇ Press the other buttons on the remote controller and check whether the complete unit is on proper working condition
 - ◇ Keep on running for 1 hour with “cooling” mode and check if the drainage system is on proper condition
 - ◇ Switch the mode for “heating” and check whether there is warm airflow come from indoor unit, whether there is abnormal noise come from indoor/outdoor units
 - ◇ After confirmation of normal working condition, press the “on-off” button to stop the system.
 - ◇ At last, train the end users with operation, maintaining and special notice.

8.5 Daily maintenance

Clean filter net

- ◇ Before cleaning the filter, ensure the unit is switched off and the power is off.
- ◇ Forbidden to use water clean the filter , it will hurt PCB or get an electric shock.
- ◇ When cleaning filter net, be sure to stand steadily, and please be careful if using a lift or others.

Washing filter net

- ◇ Use vacuum or water to clean the net.
- ◇ In order to ensure the best performance of your air conditioner, clean the air filter regularly, We recommend cleaning once a month or more frequently if required.
- ◇ When the filter is very dirty it can be washed in detergent and hot water (below 45°C).
- ◇ Ensure the filter is fully dry before reinstallation to avoid risk of electric shock or short circuiting.
- ◇ Do not dry the filter using direct sunlight.



Check at the beginning of each season

- ◇ Check whether there are no physical obstructions at the air inlet or outlet of either indoor or outdoor unit.
- ◇ Check whether there are garbage at the water outlet.
- ◇ Check whether electrical cables are in good condition, particularly the earth cable.
- ◇ When power on, check weather letters display on the screen of the wired controller.
- ◇ When working in winter, the system must be power on for 8 hours before the first time start up.

Check at the end of service season

- ◇ Operate for 2~3 hours under the ventilation condition; remove the moisture of the indoor unit..
- ◇ If not use air conditioner in a long time, please cut off the power to save energy, the letter will disappear on wired controller.
- ◇ Take the batteries out of remote controller.
- ◇ Use dustproof to cover the **outdoor unit**.

8.6 Sound level of different running status

frequency (Hz)	AM2-H18/4DR3	AM3-H27/4DR3
	Sound Pressure Level (dB)	
20	51.6	51.5
25	51.9	51.5
30	51.6	51.5
35	51.8	51.7
40	51.7	52.5
45	51.7	52.6
50	52.4	52.7
55	52.6	52.8
60	53.1	52.8
65	52.9	53.6
70	53.0	54
75	53.6	55.3
80	53.9	55.7
85	54.0	55.5
90	54.7	56.2

