

Installation and Operation Manual



F R I E D R I C H



Models

Outdoor Unit	FSHSR09A1A	FSHSR12A1A
	FSHSR18A3A	FSHSR24A3A

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This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

If it needs to install, move or maintain the air conditioner, please contact dealer or local service center to conduct it at first. Air conditioner must be installed, moved or maintained by appointed unit. Otherwise, it may cause serious damage or personal injury or death.

Explanation of Symbols



Indicates a hazardous situation that, if not avoided, will result in death or serious injury.



Indicates a hazardous situation that, if not avoided, could result in death or serious injury.



Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.



Indicates important but not hazard-related information, used to indicate risk of property damage.



Indicates a hazard that would be assigned a signal word WARNING or CAUTION.

Exception Clauses

Manufacturer will bear no responsibilities when personal injury or property loss is caused by the following reasons.

1. Damage to product due to improper use or misuse of the product.
2. Alter, change, maintain or use the product with other equipment without abiding by the instruction manual of manufacturer.
3. After verification, the defect of product is directly caused by corrosive gas.
4. After verification, defects are due to improper operation during transportation of product.
5. Operate, repair, maintain the unit without abiding by instruction manual or related regulations.
6. After verification, the problem or dispute is caused by the quality specification or performance of parts and components that produced by other manufacturers.
7. The damage is caused by natural disasters, improper installation environment or force majeure.

Precautions



WARNING

Operation and Maintenance

- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.
- Children shall not play with the appliance.
- Cleaning and user maintenance shall not be made by children without supervision.
- Do not connect air conditioner to multi-purpose socket. Otherwise, it may cause fire hazard.
- Do disconnect power supply when cleaning air conditioner. Otherwise, it may cause electric shock.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- Do not spray water on indoor unit. It may cause electric shock or malfunction.
- After removing the filter, do not touch fins.
- Do not use fire or hair dryer to dry the filter to avoid deformation or fire hazard.

Precautions



WARNING

- Maintenance must be performed by qualified professionals. Otherwise, it may cause personal injury or damage.
- Do not repair air conditioner by yourself. It may cause electric shock or damage. Please contact dealer when you need to repair air conditioner.
- Do not extend fingers or objects into air inlet or air outlet. It may cause personal injury or damage.
- Do not block air outlet or air inlet. It may cause malfunction.
- Do not spill water on the remote controller, otherwise the remote controller may be broken.
- When below phenomenon occurs, please turn off air conditioner and disconnect power immediately, and then contact the dealer or qualified professionals for service.
 - Power cord is overheating or damaged.
 - There's abnormal sound during operation.
 - Circuit break trips off frequently.
 - Air conditioner gives off burning smell.
 - Indoor unit is leaking.
- If the air conditioner operates under abnormal conditions, it may cause malfunction, electric shock or fire hazard.
- When turning on or turning off the unit by emergency operation switch, please press this switch with an insulating object other than metal.
- Do not step on top panel of outdoor unit, or put heavy objects. It may cause damage or personal injury.

Precautions



WARNING

Attachment

- Installation must be performed by qualified professionals. Otherwise, it may cause personal injury or damage.
- Must follow the electric safety regulations when installing the unit.
- According to the local safety regulations, use qualified power supply circuit and circuit break.
- Do install the circuit break. If not, it may cause malfunction.
- An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring.
- Including an circuit break with suitable capacity, please note the following table. Air switch should be included magnet buckle and heating buckle function, it can protect the circuit-short and overload.
- Air Conditioner should be properly grounded. Incorrect grounding may cause electric shock.
- Don't use unqualified power cord.
- Make sure the power supply matches with the requirement of air conditioner. Unstable power supply or incorrect wiring may result in electric shock, fire hazard or malfunction. Please install proper power supply cables before using the air conditioner.
- Properly connect the live wire, neutral wire and grounding wire of power socket.
- Be sure to cut off the power supply before proceeding any work related to electricity and safety.

Precautions



WARNING

- Do not power before finishing installation.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- The temperature of refrigerant circuit will be high, please keep the interconnection cable away from the copper tube.
- The appliance shall be installed in accordance with national wiring regulations.
- Installation must be performed in accordance with the requirement of NEC and CEC by authorized personnel only.
- Air conditioner must be properly grounding with specialized grounding device by a professional. Please make sure it is always grounded effectively, otherwise it may cause electric shock.
- The yellow-green wire in air conditioner is grounding wire, which can't be used for other purposes.
- The grounding resistance should comply with national electric safety regulations.
- All wires of indoor unit and outdoor unit should be connected by a professional.

Precautions



WARNING

- Caution: This equipment is not intended for use during construction. The use of equipment during construction could result in premature failure of the components and/or system and is in violation of our standard warranty guidelines and may result in the suspension or termination of the warranty.
- Ensure that proper N.E.C. code is followed.
- If you need to relocate the air conditioner to another place, only the qualified person can perform the work. Otherwise, it may cause personal injury or damage.
- Select a location which is out of reach for children and far away from animals or plants. If it is unavoidable, please add the fence for safety purpose.
- The indoor unit should be installed close to the wall.

Working temperature range

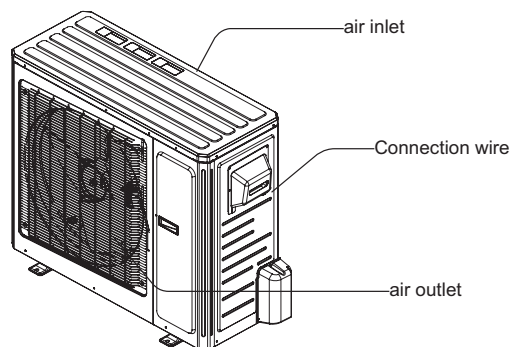
	Indoor side DB/WB(°F/°C)	Outdoor side DB/WB(°F/°C)
Maximum cooling	80/67(26.7/19.4)	115/75(46/24)
Maximum heating	80/-(26.7/-)	75/65(24/18)

NOTICE:

- The operating temperature range (outdoor temperature) for cooling only unit is 0°F (-18C)~ 115°F(46C); for heat pump unit is -4°F (-20C)~115°F(45C).

Parts Name

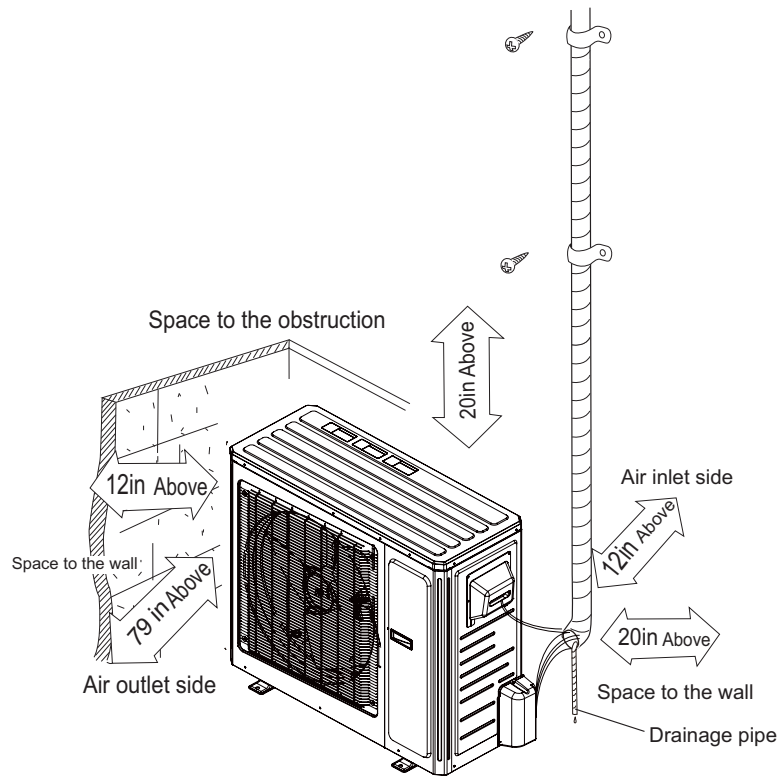
Outdoor Unit



NOTICE:

Actual product may be different from above graphics, please refer to actual products.

Installation dimension diagram



Safety precautions for installing and relocating the unit

To ensure safety, please be mindful of the following precautions.

Warning

- **When installing or relocating the unit, be sure to keep the refrigerant circuit free from air or substances other than the specified refrigerant.**
Any presence of air or other foreign substance in the refrigerant circuit will cause system pressure rise or compressor rupture, resulting in injury.
- Only qualified technicians, should install, move or service this equipment.
Please follow the units nameplate and installation instruction to ensure safe and accurate operation of product.
- If there is a need to recover refrigerant during installation, ensure system is running in cooling mode. Fully close high pressure service valve (Liquid valve) and allow to pump-down for 30-40 seconds, then fully close the low pressure service valve (Gas valve) and immediately remove power from unit. Do not exceed 1 minute in pump-down otherwise system contamination or breakage can occur.
- Ensure unit is leak free by applying 500psig of dry nitrogen and check all flares with a liquid bubble solution. Watch carefully for small bubbles indicating a leak.
- Do not install unit in a area where corrosive gases or flammable gases exist. Otherwise premature failure of product can occur, or fire.
- Do not use supply (power) cords or extension cords with equipment. This product must be installed by a certified installer. Wired per NEC codes.
- Follow local and national codes for interconnection between indoor and outdoor units.

Tools for installation

1 Level	2 Screw driver	3 Impact drill
4 Drill	5 Pipe expander	6 Torque wrench
7 Wrench	8 Pipe cutter	9 Leakage detector
10 Vacuum pump	11 HVAC manifold	12 Multi-Meter
13 Allen wrenches		14 Measuring tape

Note:

- Please contact a license installer.
- Install following all local and national codes.

Selection of installation location

Basic requirement

Installation in the following locations can cause system failures prematurely. If location is questionable, please contact the manufacturer for assistance.

1. Any location with excessive heat, vapors or flammable gases.
2. Areas that utilize High frequency or variable frequency devices, such as welding equipment or medical equipment such as X-Ray.
3. Coastal regions- If installed in coastal locations care to keep equipment out of direct exposure should be made. Regular cleaning should be done more frequently in these areas.

Outdoor unit

1. Installation location must be clear of obstructions of inlet/outlet of unit to ensure proper operations.
2. Location should be able to support the weight of the unit.

Requirements for electric connection

Safety precaution

1. Follow local and national electrical codes when wiring.
2. Ensure proper wire sizing.
3. Follow wiring diagrams
4. Be sure to disconnect power before performing installation or maintenance.
5. Refrigerant can operate at very high temperatures. Please be sure to keep wires separate from piping.

Grounding requirement

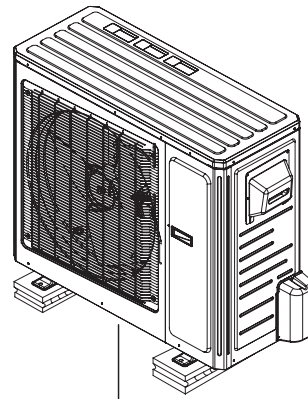
1. Ensure proper grounding
2. Yellow/Green wire is reserved for Ground only
3. Grounding should comply with Local and National codes

Installation of outdoor unit

Step one: Mounting of the outdoor unit

1. Select installation base on building material.
2. Choose the correct mounting hardware for application.

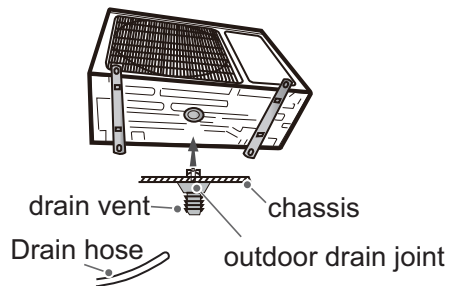
1. Take care to mount outdoor unit in a safe and operable manner.
2. Unit mounting if above ground must be able to support 4 times the unit weight.
3. Outdoor unit must be installed at least 2" above the ground for heat pump operation, this will allow proper water drainage.
4. Based on unit weight choose the best anchors for your mounting material.



at least 2 above the floor

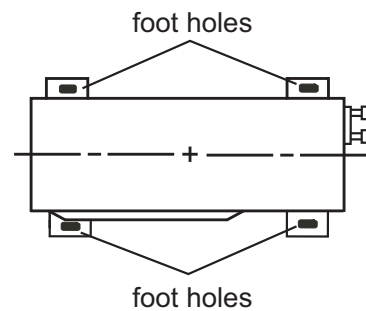
Step two: install drain joint

1. Connect the outdoor drain joint into the hole on the chassis, as shown in the picture below.
2. Connect the drain hose into the drain vent.



Step three: fix outdoor unit

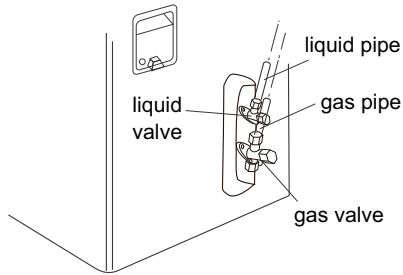
1. Place the outdoor unit on the support.
2. Fix the foot holes of outdoor unit with bolts.



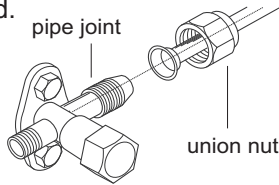
Installation of outdoor unit

Step four: connect indoor and outdoor pipes

1. Remove the screw cap of valve and aim the pipe joint at the bellmouth of pipe.



2. Pretighten the union nut with hand.

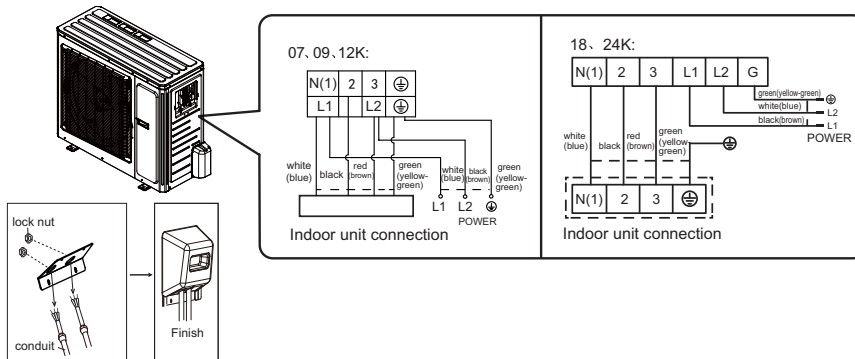


3. Tighten the union nut with torque wrench by referring to the sheet below.

Hex nut diameter	Tightening torque (N·m)
1/4"	15~20
3/8"	30~40
1/2"	45~55
5/8"	60~65
3/4"	70~75

Step five: connect outdoor electric wire

1. Remove the wire clip; connect the power connection wire and signal control wire (only for cooling and heating unit) to the wiring terminal according to the color; fix them with screws.



Installation of outdoor unit

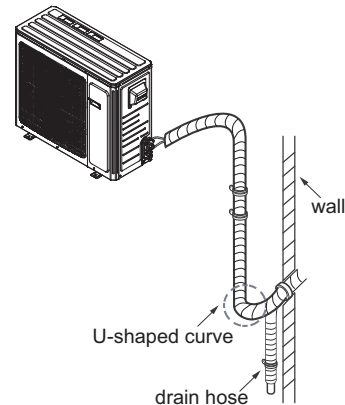
- Fix the power connection wire and signal control wire with wire clip.

Note:

- After tighten the screw, pull the power cord slightly to check if it is firm.
- Never cut the power connection wire to prolong or shorten the distance.

Step six: Arrange piping

- The pipes should be placed along the wall, bent reasonably and hidden
- If outdoor unit placement is higher than wall penetration, create a drip loop in the line-set to keep water from entering the building.

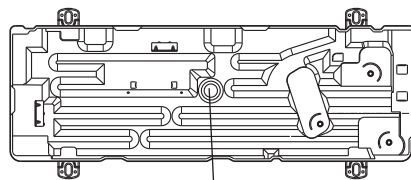


Outdoor Condensate Drainage (only for Heat pump unit)

During heating operation, the condensate and defrosting water should be drained out reliably through the drain hose. Install the outdoor drain connector in a $\Phi 25$ hole or $\Phi 42$ hole on the base plate and attach the drain hose to the connector so that the waste water formed in the outdoor unit can be drained out. The hole diameter 25 or 42 must be plugged.

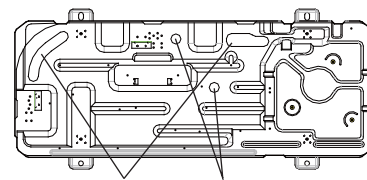
Whether to plug other holes will be determined by the dealers to actual conditions.

07、09、12K UNIT:



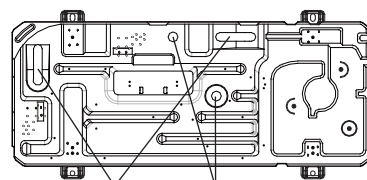
Drain-water hole
Bottom frame

18K UNIT:



drain hole Drain-water hole
Bottom frame

24K UNIT:



drain hole Drain-water hole
Bottom frame

Installation of outdoor unit

The 18K、24K UNIT drainage hole consists of two $\Phi 25$ and two kidney holes (see the fig.1). The drain plug consists of one $\Phi 25$ and two kidney plugs.

(The figures in this manual may be different with the material objects, please refer to the material objects for reference)

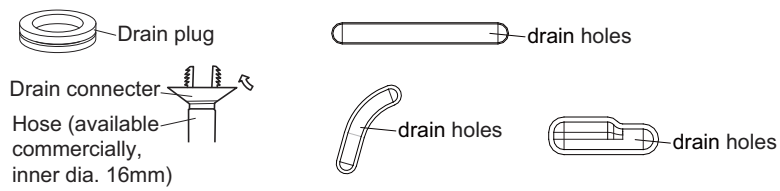
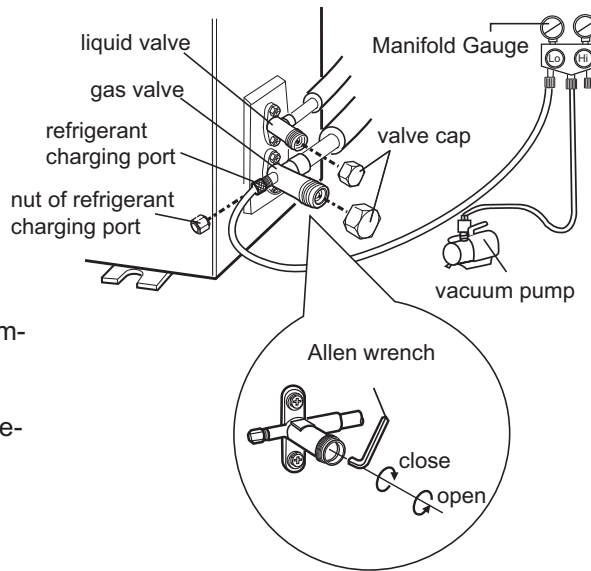


Fig.1

Vacuum pumping

Use vacuum pump

1. Remove the valve caps on the liquid valve and gas valve and the nut of refrigerant charging vent.
2. Connect the charging hose Manifold Gauge to the refrigerant charging port of gas valve and then connect the other charging hose to the vacuum pump.
3. Open the Manifold Gauge completely and operate for 10-15min to check if the pressure of Manifold Gauge remains in -0.1MPa .
4. Close the vacuum pump and maintain for 1-2min to check if the pressure of Manifold Gauge remains in -0.1MPa . If the pressure decreases, there may be leakage.
5. Remove the Manifold Gauge, open the valve core of liquid valve and gas valve completely with Allen wrench.
6. Tighten the screw caps of valves and refrigerant charging port.
7. Reinstall the handle.



Leakage detection

1. With leakage detector:
Check if there is leakage with leakage detector.
2. With soap water:
If leakage detector is not available, please use soap water for leakage detection. Apply soap water at the suspected position and keep the soap water for more than 3min. If bubbles are present at flare joints, re-torque flare nuts.

Check after installation

- Check according to the following requirement after finishing installation.

Items to be checked	Possible malfunction
Has the unit been installed firmly?	The unit may drop, shake or emit noise.
Have you done the refrigerant leakage test?	It may cause insufficient cooling (heating) capacity.
Is heat insulation of pipeline sufficient?	It may cause condensation and water dripping.
Is water drained well?	It may cause condensation and water dripping.
Is the voltage of power supply according to the voltage marked on the nameplate?	It may cause malfunction or damaging the parts.
Is electric wiring and pipeline installed correctly?	It may cause malfunction or damaging the parts.
Is the unit grounded securely?	It may cause electric leakage.
Does the power cord follow the specification?	It may cause malfunction or damaging the parts.
Is there any obstruction in the air inlet and outlet?	It may cause insufficient cooling (heating) capacity.
The dust and sundries caused during installation are removed?	It may cause malfunction or damaging the parts.
The gas valve and liquid valve of connection pipe are open completely?	It may cause insufficient cooling (heating) capacity.
Is the inlet and outlet of piping hole been covered?	It may cause insufficient cooling (heating) capacity or waster eletricity.

Test operation

1. Preparation of test operation

- The client approves the air conditioner.
- Specify the important notes for air conditioner to the client.

2. Method of test operation

- Put through the power, press ON/OFF button on the remote controller to start operation.
- Press MODE button to select AUTO, COOL, DRY, FAN and HEAT to check whether the operation is normal or not.
- If the ambient temperature is lower than 61 °F (16°C), the air conditioner can't start cooling.

Configuration of connection pipe

1. Standard length of connection pipe
 - 15ft, 22.5ft, 24ft
2. Min. length of connection pipe is 9Ft.
3. Max. length of connection pipe.

Max. length of connection pipe

Unit: ft

Cooling capacity	Max. length of connection pipe	Cooling capacity	Max. length of connection pipe
5000Btu/h	45	24000Btu/h	75
7000Btu/h	45	28000Btu/h	90
9000Btu/h	45	36000Btu/h	90
12000Btu/h	60	42000Btu/h	90
18000Btu/h	75	48000Btu/h	90

4. Additional refrigerant may be required when extending the line-set.
 - After the line-set has been extended 33ft past standard length of 25ft, adding additional 5ml of refrigerant oil for each additional 16ft.
 - The calculation method of additional refrigerant charging amount (on the basis of liquid pipe):
 Additional refrigerant charge amount = extended length of liquid line x required additional amount per foot.
 - Basing on the length of standard pipe, add refrigerant according to the requirement as shown in the table. The additional refrigerant charging amount per foot is different according to the diameter of liquid pipe. See the following sheet.

Configuration of connection pipe

Additional charge amount for R410A

Diameter of connection pipe		Outdoor unit charge
Liquid pipe	Gas pipe	Cooling and heating(oz/g)
1/4"	3/8" or 1/2"	0.71
1/4" or 3/8"	5/8" or 3/4"	1.76
1/2"	3/4" or 7/8"	4.23
5/8"	1" or 1 1/4"	4.23
3/4"	—	8.82
7/8"	—	12.35

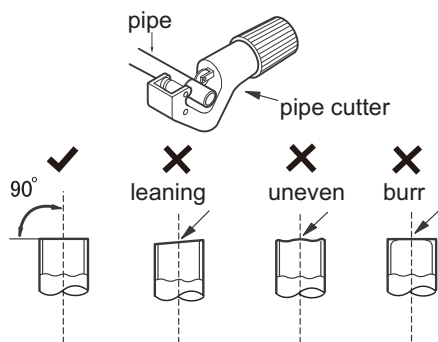
Pipe expanding method

Note:

Improper pipe expanding is the main cause of refrigerant leakage. Please expand the pipe according to the following steps:

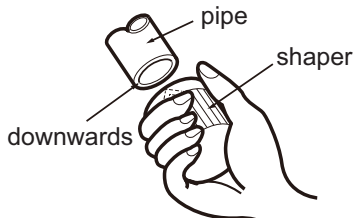
A: Cut the pipe

- Confirm the pipe length according to the distance of indoor unit and outdoor unit.
- Cut the required pipe with pipe cutter.



B: Remove the burrs

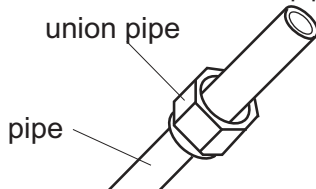
- Remove the burrs with shaper and prevent the burrs from getting into the pipe.



C: Put on suitable insulating pipe

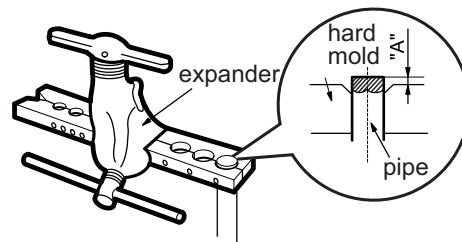
D: Put on the union nut

- Remove the union nut on the indoor connection pipe and outdoor valve; install the union nut on the pipe.



E: Expand the port

- Expand the port with expander.



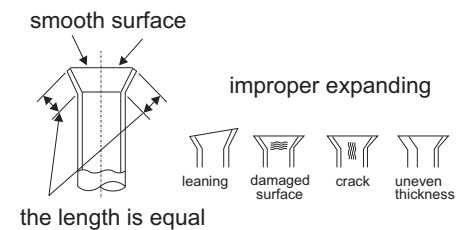
Note:

- "A" is different according to the diameter, please refer to the sheet below:

Outer diameter	A(in)	
	Max	Min
(1/4")Φ6-6.35	0.05	0.03
(3/8")Φ9.52	0.06	0.04
(1/2")Φ12-12.7	0.07	0.04
(5/8")Φ15.8-16	0.94	0.09

F: Inspection

- Check the quality of expanding port. If there is any blemish, expand the port again according to the steps above.





F R I E D R I C H

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