HEAT CONTROLLER, INC.

Wall Mounted
Multi-Split System
Air Conditioning/Heat Pump

Service Manual

Model: DMC24DB-1
DMH24DB-1

CAUTION

Before servicing the unit, read the
"safety precautions" in this manual.

Only for authorized service personnel.

TABLE OF CONTENTS

Combination table **3**
Safety Precautions **4**
Dimensions **10**
Indoor Unit 10
Outdoor Unit 11
Product Specifications **12**
DMC24DB-1 12
DMH24DB-1 13
Installation **14**
Installation Parts 14
Installation Tools 14
Select the best location 15
Piping length and elevation 16
Fixing Installation Plate(Standard Type) 17
Flaring Work and Connection of Piping **18**
Flaring work 18
Connecting the Piping 19
Connecting the Cable between Indoor Unit and Outdoor Unit **25**
Connect the cable to the Indoor unit. 25
Connect the cable to the Outdoor unit. 26
Connection method of the connecting cable(Example) 27
Connect the cable to the indoor unit 28
Checking the Drainage, Forming the Pipings and Long Pipe Setting **29**
Checking the drainage 29
Forming the piping 30
Air Purging and Evacuation **31**
Checking method 31
Evacuation 32
Charging **33**
Test Running **34**
Operation **35**
Function of control 35
Function of Indoor Unit 40
Function of Outdoor Unit 41
Remote Control Operation 42
Disassembly **43**
Indoor Unit 43
Schematic Diagram **46**
Electronic Control Device 46
Wiring Diagram 49
Components Locations 50
Troubleshooting Guide **54**
Refrigeration Cycle Diagram 54
Self-diagnosis Function 55
Cycle Troubleshooting Guide 56
Electronic Parts Troubleshooting Guide 57
Error Code 62
2-way, 3-way Valve **66**

Combination table

Operation	Combination of Indoor Unit(kBtu/h)			Cooling				Heating			
				Each Capacity		Total Capacity		Each Capacity		Total Capacity	
	Unit-A	Unit-B	Total	UNIT-A(Btu/h)	UNIT-B(Btu/h)	Btu/h	kW	UNIT-A(Btu/h)	UNIT-B(Btu/h)	Btu/h	kW
1 Unit	12		12	12000	-	12000	3516	12000	-	12000	3516
2 Unit	12	12	24	12000	12000	24000	7033	12000	12000	24000	7033

Notes :

1.Cooling Capacity is based on : indoor temp. 26.7°C(80.1°F)DB, 19.4°C(66.9°F)WB; outdoor temp. 35°C(95°F)DB, 23.9°C(75°F)WB

2.Heating Capacity is based on : indoor temp. 21.1°C(70°F)DB, 15.6°C(60.1°F)WB; outdoor temp. 8.3°C(46.9°F)DB, 6.1°C(43°F)WB

3.The total ability of connected a indoor unit is up to 24k Btu/h

Symbols Used in this Manual

This symbol alerts you to the risk of electric shock.

This symbol alerts you to hazards that could cause harm to the air conditioner.

NOTICE **This symbol indicates special notes.**

Safety Precautions

To prevent injury to the user or other people and property damage, the following instructions must be followed.

■ Incorrect operation due to ignoring instruction will cause harm or damage. The seriousness is classified by the following indications.

⚠WARNING	This symbol indicates the possibility of death or serious injury.
⚠CAUTION	This symbol indicates the possibility of injury or damage to properties only.

■ Meanings of symbols used in this manual are as shown below.

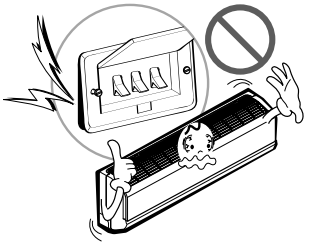
⃠	**Be sure not to do.**
❗	**Be sure to follow the instruction.**

⚠WARNING

■ Installation

Do not use a defective or under-rated circuit breaker. Use this appliance on a dedicated circuit.

• There is risk of fire or electric shock.

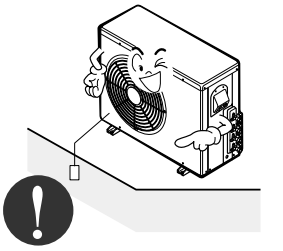


For electrical work, contact the dealer, seller, a qualified electrician, or an Authorized Service Center.

• Do not disassemble or repair the product. There is risk of fire or electric shock.

Always ground the product.

• There is risk of fire or electric shock.

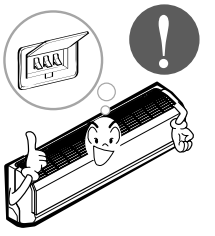


Install the panel and the cover of control box securely.

• There is risk of fire or electric shock.

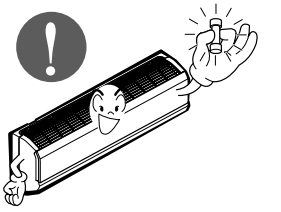
Always install a dedicated circuit and breaker.

• Improper wiring or installation may cause fire or electric shock



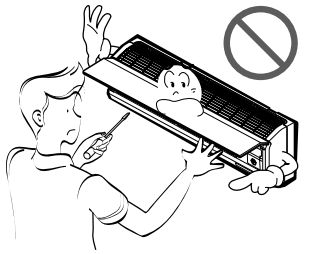
Use the correctly rated breaker or fuse.

• There is risk of fire or electric shock.



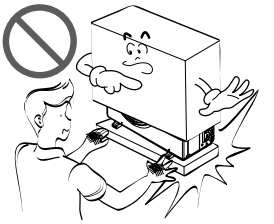
Do not install, remove, or re-install the unit by yourself (customer).

- There is risk of fire, electric shock, explosion, or injury.



Be cautious when unpacking and installing the product.

- Sharp edges could cause injury. Be especially careful of the case edges and the fins on the condenser and evaporator.

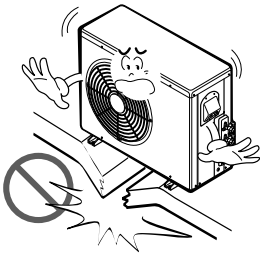


For installation, always contact the dealer or an Authorized Service Center.

- There is risk of fire, electric shock, explosion, or injury.

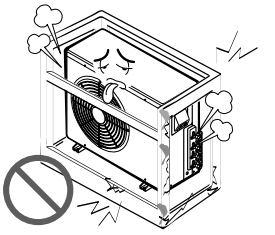
Do not install the product on a defective installation stand.

- It may cause injury, accident, or damage to the product.



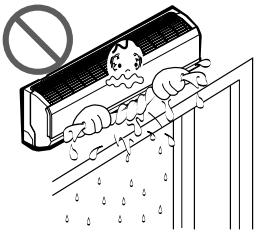
Be sure the installation area does not deteriorate with age.

- If the base collapses, the air conditioner could fall with it, causing property damage, product failure, and personal injury.



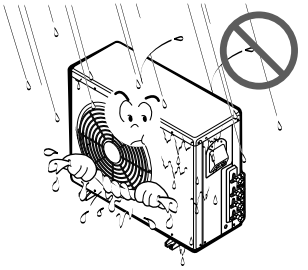
Do not let the air conditioner run for a long time when the humidity is very high and a door or a window is left open.

- Moisture may condense and wet or damage furniture.



Do not allow water to run into electric parts.

- It may cause There is risk of fire, failure of the product, or electric shock.

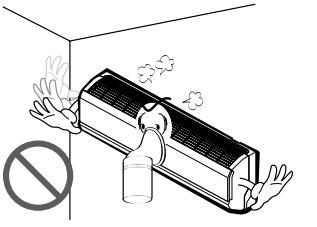


Do not store or use flammable gas or combustibles near the product.

- There is risk of fire or failure of product.

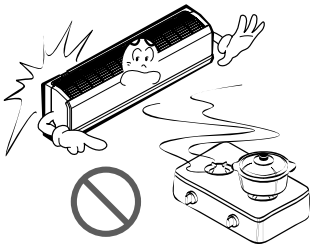
Do not use the product in a tightly closed space for a long time.

- Oxygen deficiency could occur.



When flammable gas leaks, turn off the gas and open a window for ventilation before turn the product on.

- Do not use the telephone or turn switches on or off. There is risk of explosion or fire

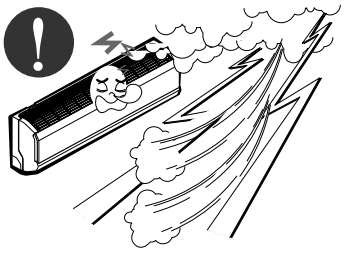


If strange sounds, or smoke comes from product. Turn the breaker off.

- There is risk of electric shock or fire.

Stop operation and close the window in storm or hurricane. If possible, remove the product from the window before the hurricane arrives.

- There is risk of property damage, failure of product, or electric shock.

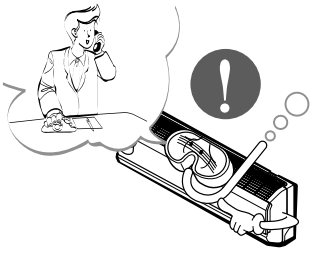


Do not open the inlet grill of the product during operation. (Do not touch the electrostatic filter, if the unit is so equipped.)

- There is risk of physical injury, electric shock, or product failure.

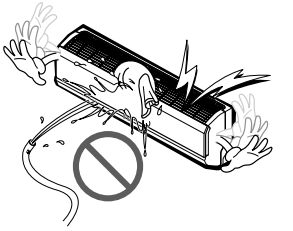
When the product is soaked (flooded or submerged), contact an Authorized Service Center.

- There is risk of fire or electric shock.



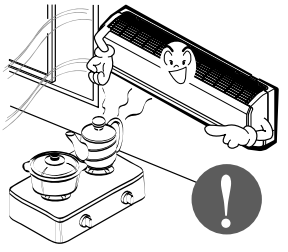
Be cautious that water could not enter the product.

- There is risk of fire, electric shock, or product damage.



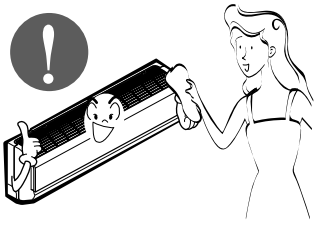
Ventilate the product from time to time when operating it together with a stove, etc.

- There is risk of fire or electric shock.



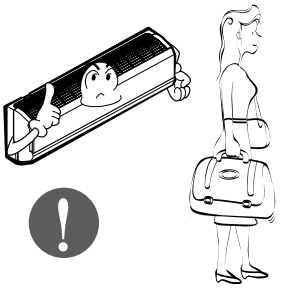
Turn the main power off when cleaning or maintaining the product.

- There is risk of electric shock.



When the product is not to be used for a long time, disconnect the power by turning off the breaker.

- There is risk of product damage or failure, or unintended operation.



Take care to ensure that nobody could step on or fall onto the outdoor unit.

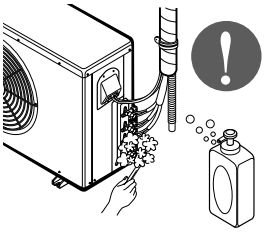
- This could result in personal injury and product damage.

⚠CAUTION

■ Installation

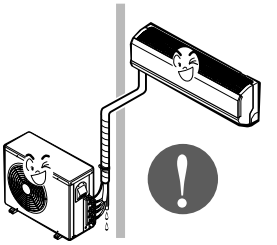
Always check for gas (refrigerant) leakage after installation or repair of product.

- Low refrigerant levels may cause failure of product.



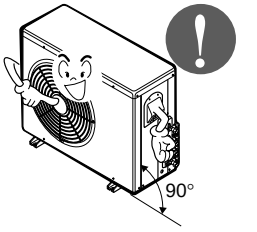
Install the drain hose to ensure that water is drained away properly.

- A bad connection may cause water leakage.



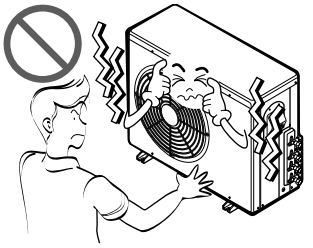
Keep level even when installing the product.

- To avoid vibration or water leakage.



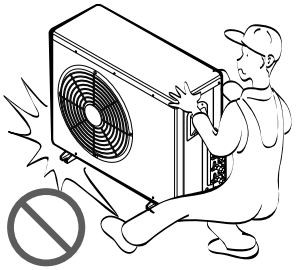
Do not install the product where the noise or hot air from the outdoor unit could oftend neighbors.

- It may cause a problem for your neighbors.



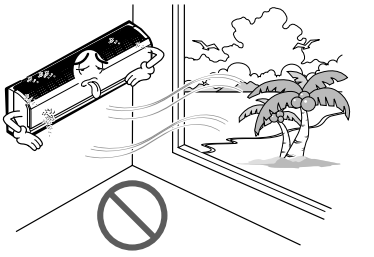
Use two or more people to lift and transport the product.

- Avoid personal injury.



Do not install the product where it will be exposed to sea wind (salt spray) directly.

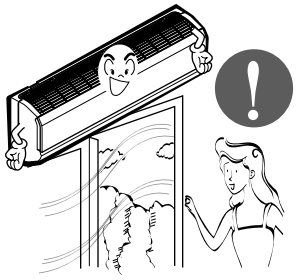
- It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.



■ Operational

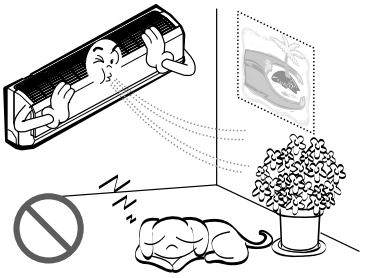
**Do not expose the skin directly to cool air for long periods of time.
(Don't sit in the draft.)**

• This could harm to your health.



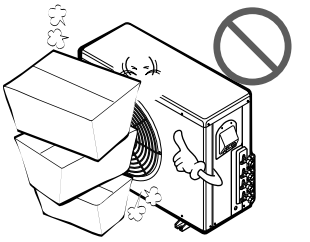
Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigeration system.

• There is risk of damage or loss of property.



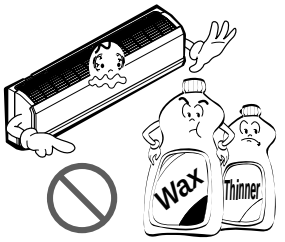
Do not block the inlet or outlet of air flow.

• It may cause product failure.



Use a soft cloth to clean. Do not use harsh detergents, solvents, etc.

• There is risk of fire, electric shock, or damage to the plastic parts of the product.

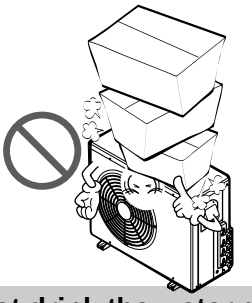


Do not touch the metal parts of the product when removing the air filter. They are very sharp!

• There is risk of personal injury.

Do not step on or put anyting on the product. (outdoor units)

• There is risk of personal injury and failure of product.

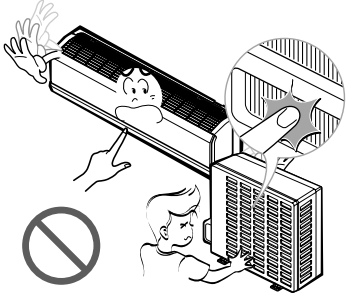


Always insert the filter securely. Clean the filter every two weeks or more often if necessary.

• A dirty filter reduces the efficiency of the air conditioner and could cause product malfunction or damage.

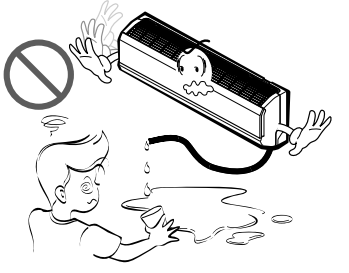
Do not insert hands or other objects through the air inlet or outlet while the product is operated.

• There are sharp and moving parts that could cause personal injury.



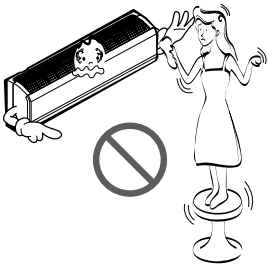
Do not drink the water drained from the product.

• It is not sanitary and could cause serious health issues.



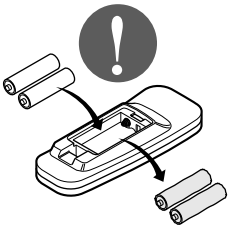
Use a firm stool or ladder when cleaning or maintaining the product.

• Be careful and avoid personal injury.



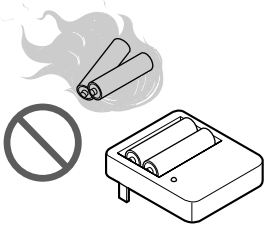
Replace the all batteries in the remote control with new ones of the same type. Do not mix old and new batteries or different types of batteries.

• There is risk of fire or explosion



Do not recharge or disassemble the batteries. Do not dispose of batteries in a fire.

• They may burn or explode.



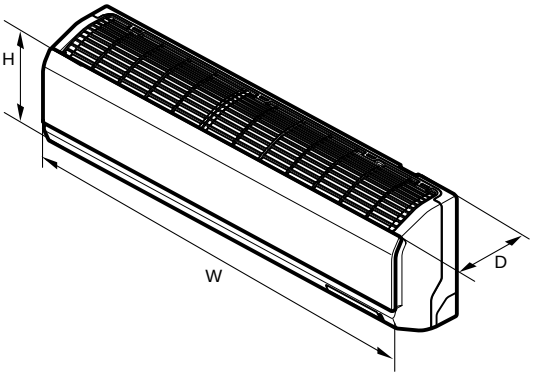
If the liquid from the batteries gets onto your skin or clothes, wash it well with clean water. Do not use the remote if the batteries have leaked.

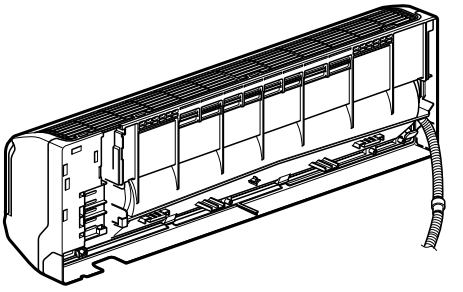
• The chemicals in batteries could cause burns or other health hazards.

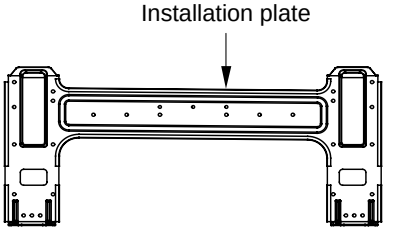
Dimensions

Indoor Unit

Split Type Indoor

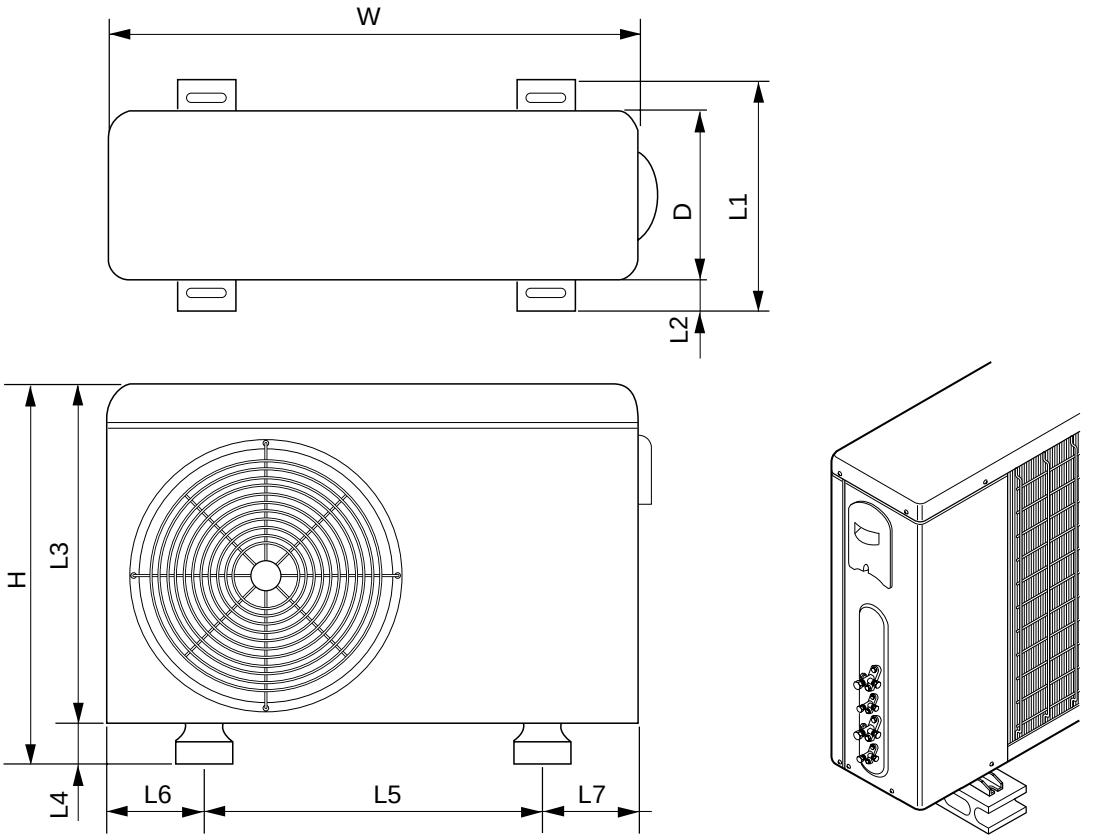






Dimension \ Model		Split Type(SE)
		12 kBtu/h
W	mm(in)	895(35.2)
H	mm(in)	282(11.1)
D	mm(in)	165(6.5)

Outdoor Unit



DIM \ MODEL		UE1 24kBtu/h
W	mm(in)	870(34.3)
H	mm(in)	800(31.5)
D	mm(in)	320(12.6)
L1	mm(in)	370(14.6)
L2	mm(in)	25(1.0)
L3	mm(in)	775(30.5)
L4	mm(in)	25(1.0)
L5	mm(in)	546(21.5)
L6	mm(in)	160(6.3)
L7	mm(in)	160(6.3)

Product Specifications

DMC24DB-1

Item \ Operation / Unit				2-Unit On		1-Unit On	Remarks
Cooling Capacity		Btu/h		23,600/24,000		11,800/12,000	208/230V
Heating Capacity				-		-	
Moisture Removal		ℓ /h(ft³/h)		2.4(0.085)		1.2(0.042)	at 230V
Power Source		ø, V, Hz		1Ø, 208/230V, 60Hz			
Air Circulation		㎥/min(ft³/min)	Indoor	–		9.4(331.9)	
			Outdoor	53(1871.8)			
Noise Level (Hi / Med / Low)		dB(A)	Indoor	–		36/32/29	at 230V
			Outdoor	54			
Input	Cooling	W		2,390/2,390		1,420/1,420	208/230V
	Heating			-		-	
Runnig Current	Cooling	A		10.1/10.1		6.3/6.3	
	Heating			-		-	
E.E.R.	Cooling	Btu/h·w		9.9/10.1		8.3/8.5	
C.O.P.	Heating	-		-		-	
Dimensions(W x H x D)		mm(in)	Indoor	895 x 282 x 165(35.2x11.1x6.5)			
			Outdoor	870 x 800 x 320(34.2x31.5x12.6)			
Net. Weight		kg(lb)	Indoor	9.5			
			Outdoor	69			
Service Valve		mm(In)	Liquid	6.35(1/4)			
			Gas	9.52(3/8)			
Refrigerant(R-410A)		g(lb)		1,600(3.5)		–	at 7.5m
Airflow Direction Control(Up & Down)				O			
Remote Controller Type				L.C.D Wireless			
Sleeping Operation				O			
Drain Hose				O			

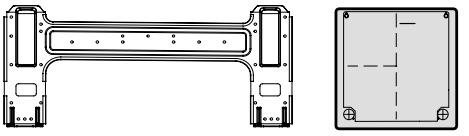
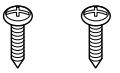
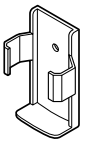
DMH24DB-1

Item \ Operation / Unit			2-Unit On		1-Unit On	Remarks
Cooling Capacity		Btu/h	23,600/24,000		11,800/12,000	208/230V
Heating Capacity			23,600/24,000		11,800/12,000	
Moisture Removal		ℓ /h(ft³/h)	2.4(0.085)		1.2(0.042)	at 230V
Power Source		ø, V, Hz	1Ø, 208/230V, 60Hz			
Air Circulation		㎥/min(ft³/min)	Indoor	–	9.4(331.9)	
			Outdoor	53		
Noise Level (Hi / Med / Low)		dB(A)	Indoor	–	36/32/29	at 230V
			Outdoor	54		
Input	Cooling	W	2,390/2,390		1,420/1,420	208/230V
	Heating		2,440/2,440		1,620/1,620	
Runnig Current	Cooling	A	10.1/10.1		6.3/6.3	
	Heating		9.8/9.8		7.2/7.2	
E.E.R.	Cooling	Btu/h·w	9.9/10.1		8.3/8.5	
C.O.P.	Heating	-	2.83/2.88		2.13/2.17	
Dimensions(W x H x D)		mm(in)	Indoor	895 x 282 x 165(35.2x11.1x6.5)		
			Outdoor	870 x 800 x 320(34.2x31.5x12.6)		
Net. Weight		kg(lb)	Indoor	9.5		
			Outdoor	69		
Service Valve		mm(In)	Liquid	6.35(1/4)		
			Gas	9.52(3/8)		
Refrigerant(R-410A)		g(lb)	1,600(3.5)		–	at 7.5m
Airflow Direction Control(Up & Down)			O			
Remote Controller Type			L.C.D Wireless			
Sleeping Operation			O			
Drain Hose			O			

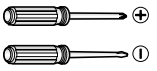
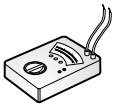
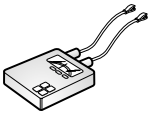
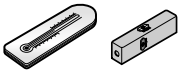
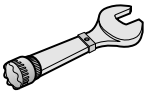
Installation

Read carefully, and then follow step by step.

Installation Parts

Installation plate	Type "A" screw and plastic anchor
	
Type "B" screw	Remote Control Holder
	

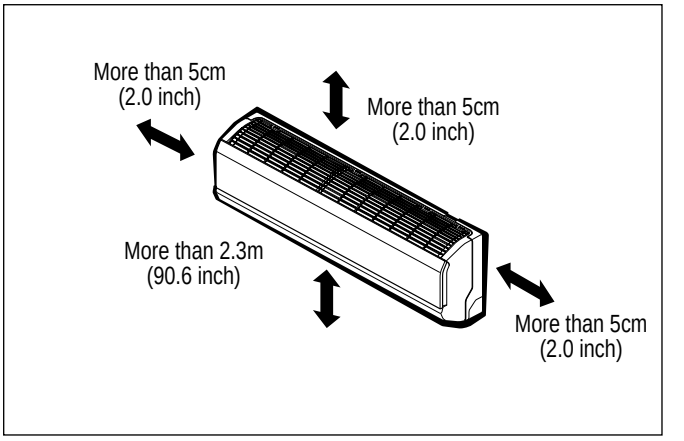
Installation Tools

Figure	Name	Figure	Name
	Screw driver		Ohmmeter
	Electric Drill		Hexagonal wrench
	Measuring Tape, Knife		Ammeter
	Hole Core Drill		Gas Leak Detector
	Spanner		Thermometer, Level
	Torque wrench		Flaring Tool Set

Select the best location

Indoor unit

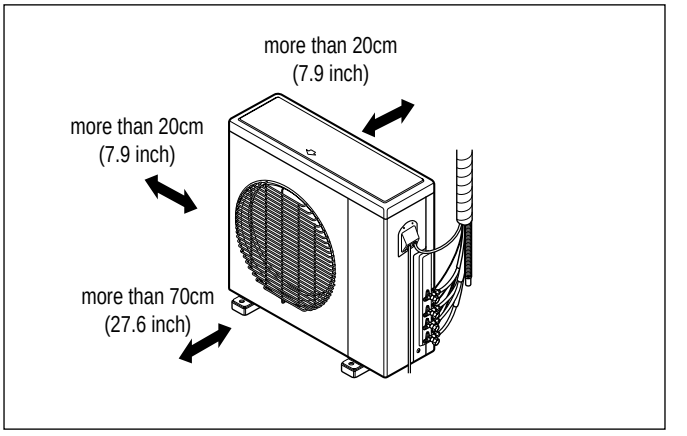
1. Do not have any heat or steam near the unit.
2. Select a place where there are no obstacles in front of the unit.
3. Make sure that condensation drainage can be conveniently routed away.
4. Do not install near a doorway.
5. Ensure the spaces indicated by arrows from the wall, ceiling, fence or other obstacles.
6. Use a stud finder to locate studs to prevent unnecessary damage to the wall.



CAUTION: Install the indoor unit on the wall where the height from the floors more than 2.3m(7.5ft).

Outdoor unit

1. If an awning is built over the unit to prevent direct sunlight or rain exposure, make sure that heat radiation from the condenser is not restricted.
2. Ensure that the spaces indicated by arrows around front, back and side of the unit.
3. Do not place animals and plants in the path of the warm air.
4. Take the air conditioner weight into account and select a place where noise and vibration are minimum.
5. Select a place so that the warm air and sound from the air conditioner do not disturb neighbors.



Rooftop Installations:

If the outdoor unit is installed on a roof structure, be sure to level the unit. Ensure the roof structure and anchoring method are adequate for the unit location. Consult local codes regarding rooftop mounting.

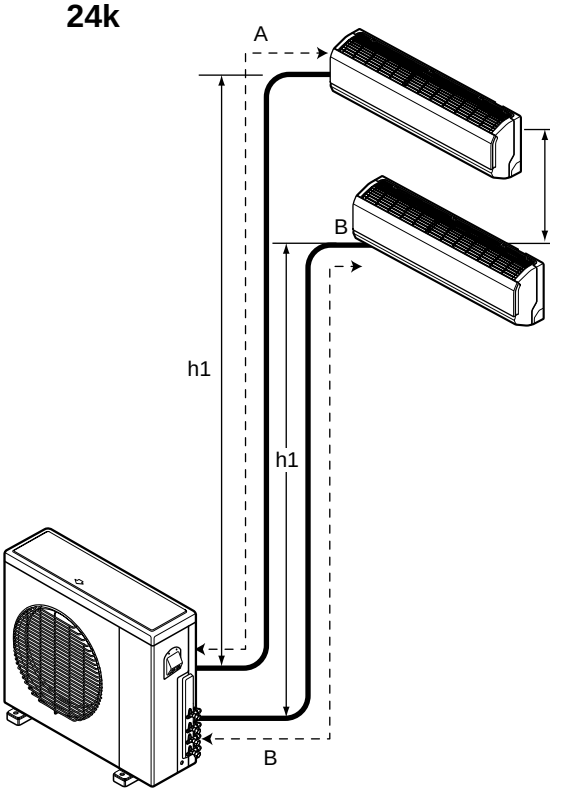
Piping length and elevation

Multi Piping Type

Capacity(Btu/h)	Max total length of all pipes (A+B)	Max length of each pipe (A/B)	Min length of each pipe (A/B)	Max Elevation between each indoor unit and out-door unit (h1)	Max elevation between indoor units (h2)
24k	30m(100ft)	15m(50ft)	3m(10ft)	7.5m(25ft)	7.5m(25ft)

Indoor Capacity (Btu/h)	Pipe Size			
	Gas	Liquid	Standard Length	Additional Refrigerant
12K	3/8"	1/4"	7.5m(25ft)	20g/m(0.32oz/ft)

24k

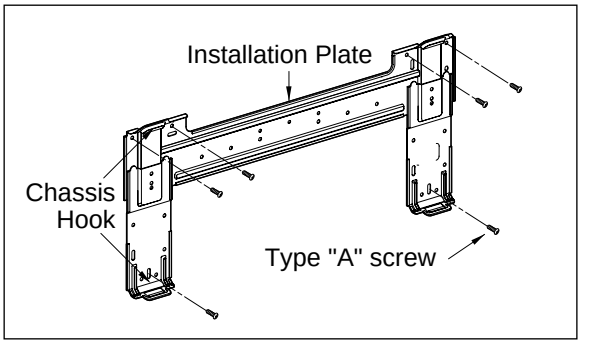


CAUTION: Capacity is based on standard length and maximum allowance length is on the basis of reliability. Oil trap should be installed every 5~7 meters (16.4~23.0ft).

Fixing Installation Plate(Standard Type)

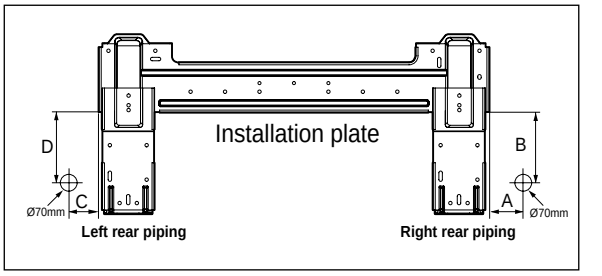
The wall you select should be strong and solid enough to prevent vibration

1. Mount the installation plate on the wall with type "A" screws. If mounting the unit on a concrete wall, use anchor bolts.
   • Mount the installation plate horizontally by aligning the centerline using a level.



2. Measure the wall and mark the centerline. It is also important to use caution concerning the location of the installation plate-routing of the wiring to power outlets is through the walls typically. Drilling the hole through the wall for piping connections must be done safely.

CHASSIS (Grade)	Distance (mm)			
	A	B	C	D
SE	65	110	85	110



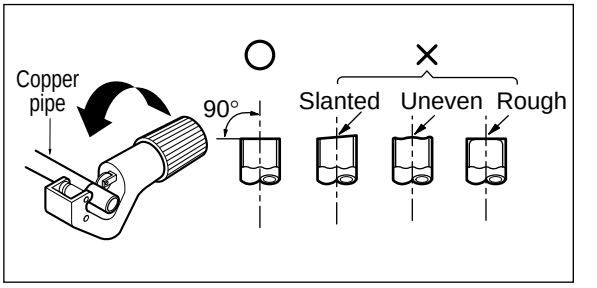
Flaring Work and Connection of Piping

Flaring work

Main cause for gas leakage is due to defect in flaring work. Carry out correct flaring work in the following procedure.

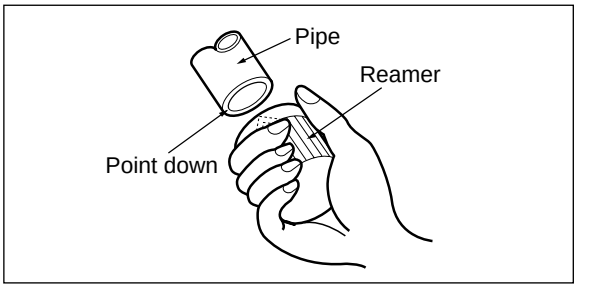
Cut the pipes and the cable.

1. Use the piping kit accessory or the pipes purchased locally.
2. Measure the distance between the indoor and the outdoor unit.
3. Cut the pipes a little longer than measured distance.
4. Cut the cable 1.5m (5.0ft) longer than the pipe length.



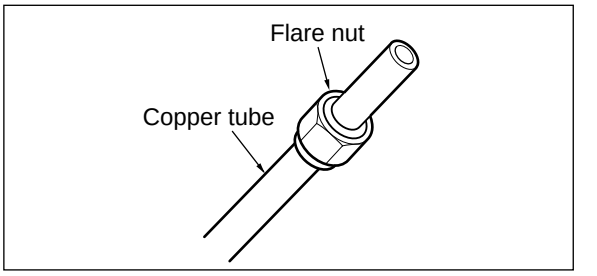
Burrs removal

1. Completely remove all burrs from the cut cross section of pipe/tube.
2. Put the end of the copper tube/pipe in a downward direction as you remove burrs in order to avoid dropping burrs into the tubing.



Putting nut on

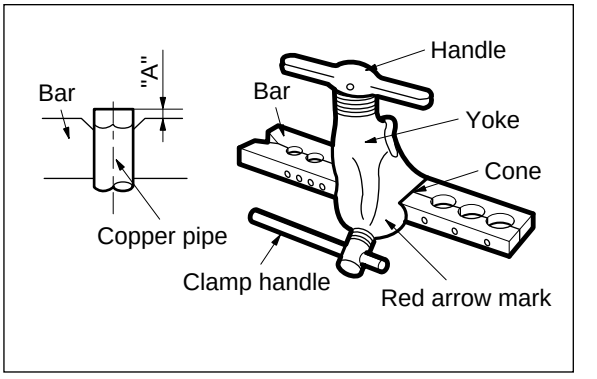
• Remove flare nuts attached to indoor and outdoor unit, then put them on pipe/tube having completed burr removal. (not possible to put them on after flaring work)



Flaring work

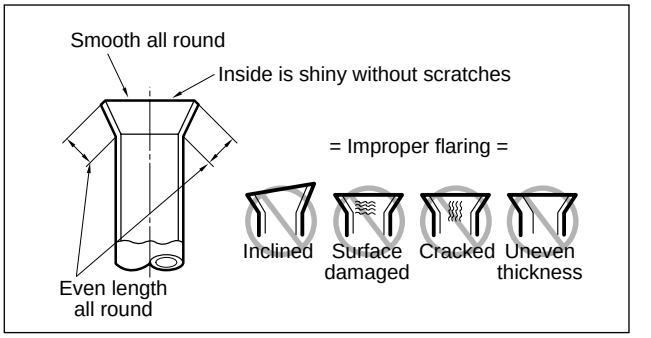
• Carry out flaring work using flaring tool as shown below.
• Firmly hold copper pipe in a die in the dimension shown in the table above.

Outside diameter		A
mm	inch	mm
Ø6.35	1/4	0~0.5
Ø9.52	3/8	0~0.5



Check

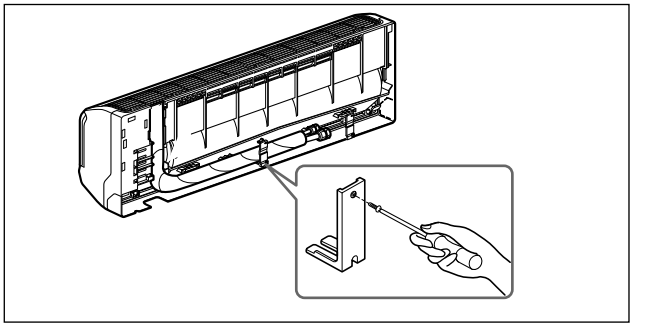
1. Compare the flared work with the figure by.
2. If a flared section is defective, cut it off and do flaring work again.



Connecting the Piping

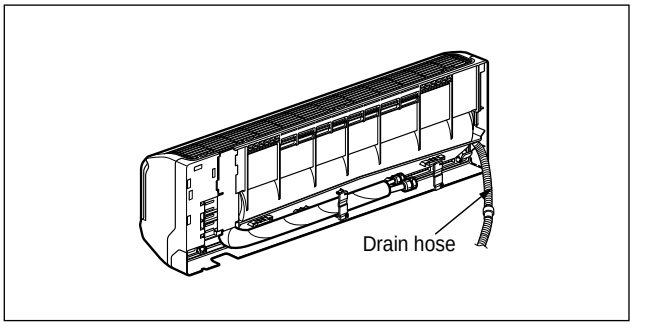
Indoor

1. Prepare the indoor unit's piping and drain hose for installation through the wall.
2. Remove the plastic tubing retainer(see the illustration by) and pull the tubing and drain hose away from chassis.
3. Replace only the plastic tubing holder 1, not the holder 2 in the original position.



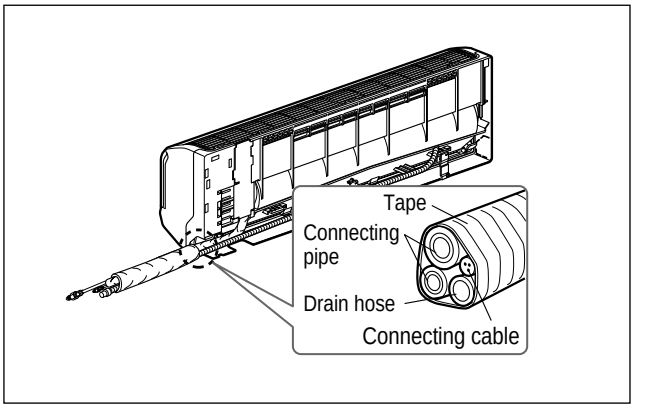
For right rear piping

1. Route the indoor tubing and the drain hose in the direction of rear right.
2. Insert the connecting cable into the indoor unit from the outdoor unit through the piping hole.
   • Do not connect the cable to the indoor unit.
   • Make a small loop with the cable for easy connection later.
3. Tape the tubing, drain hose, and the connecting cable. Be sure that the drain hose is located at the lowest side of the bundle. Locating at the uper side can cause drain pan to overflow inside the unit.



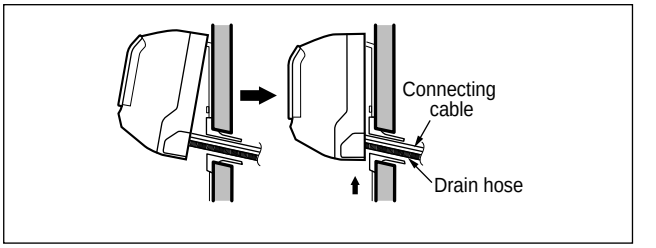
⚠ CAUTION

If the drain hose is routed inside the room, insulate the hose with an insulation material* so that dripping from "sweating"(condensation) will not damage furniture or floors.
*Foamed polyethylene or equivalent is recommended.



4. Indoor unit installation
   Hook the indoor unit onto the upper portion of the installation plate.(Engage the two hooks of the rear top of the indoor unit with the upper edge of the installation plate.) Ensure that the hooks are properly seated on the installation plate by moving it left and right.

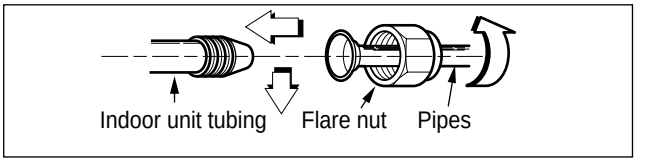
   Press the lower left and right sides of the unit against the installation plate until the hooks engage into their slots(clicking sound).

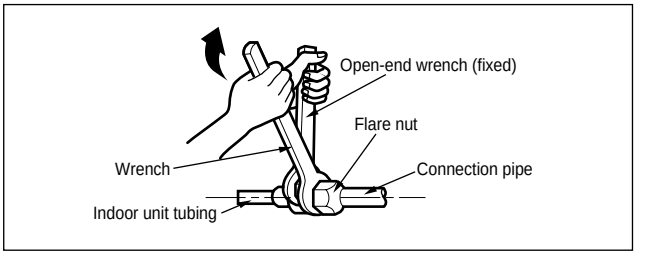


Connecting the piping to the indoor unit and drain hose to drain pipe.

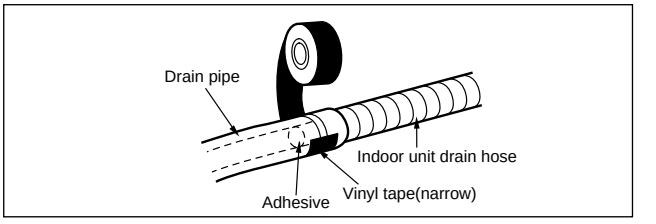
1. Align the center of the pipes and sufficiently tighten the flare nut by hand.
2. Tighten the flare nut with a wrench.

Outside diameter		Torque	
mm	inch	kg·m	lbf.in
Ø6.35	1/4	1.8	156.2
Ø9.52	3/8	4.2	364.5



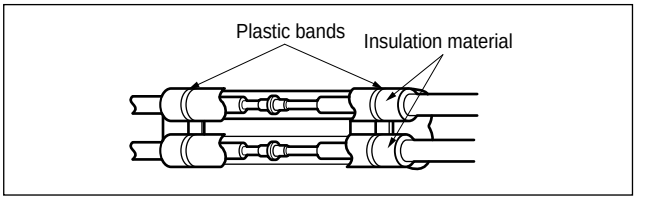


3. When extending the drain hose at the indoor unit, install the drain pipe.

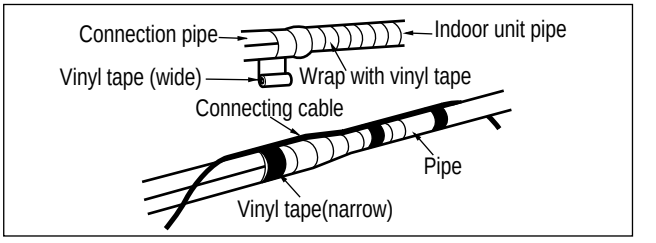


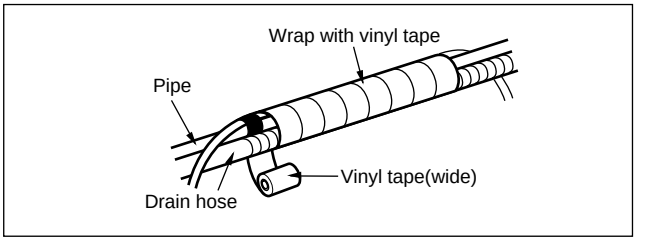
Wrap the insulation material around the connecting portion.

1. Overlap the connection pipe insulation material and the indoor unit pipe insulation material. Bind them together with vinyl tape so that there may be no gap.
2. Wrap the area which accommodates the rear piping housing section with vinyl tape.



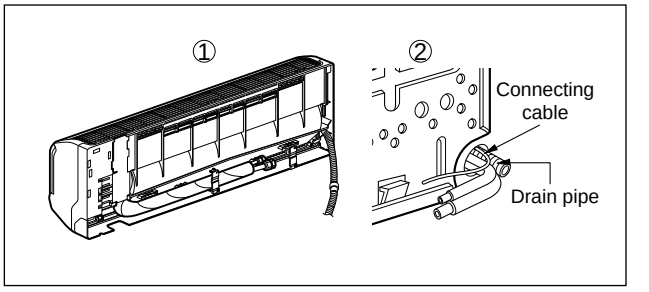
3. Bundle the piping and drain hose together by wrapping them with vinyl tape for enough to cover where they fit into the rear piping housing section.

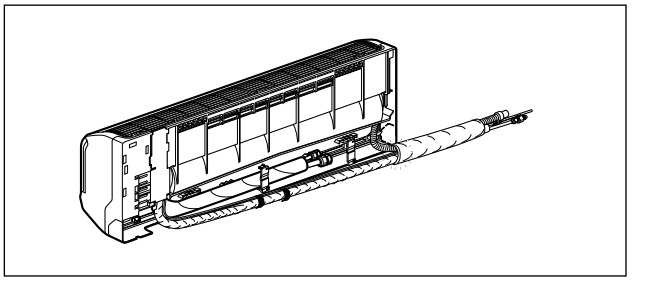




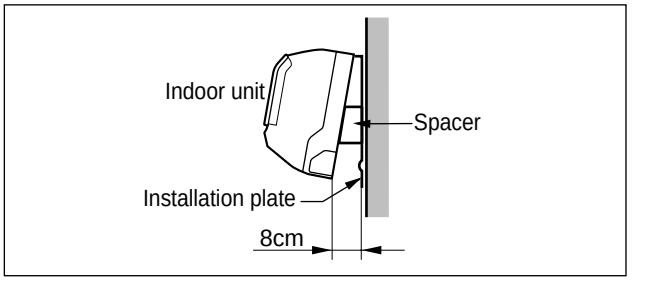
For left rear piping

1. Route the indoor tubing and the drain hose to the required piping hole position.
2. Insert the piping, drain hose, and the connecting cable into the piping hole.
3. Insert the connecting cable into the indoor unit.
   - Don't connect the cable to the indoor unit.
   - Make a small loop with the cable for easy connection later.
4. Tape the drain hose and the connecting cables.



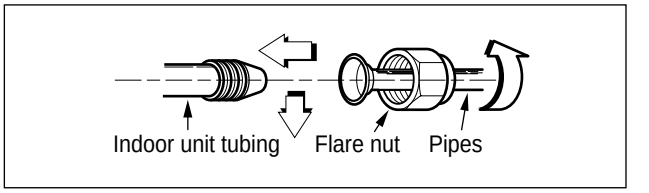


5. Indoor unit installation
   - Hang the indoor unit from the hooks at the top of the installation plate.
   - Insert the spacer etc. between the indoor unit and the installation plate and separate the bottom of the indoor unit from the wall.



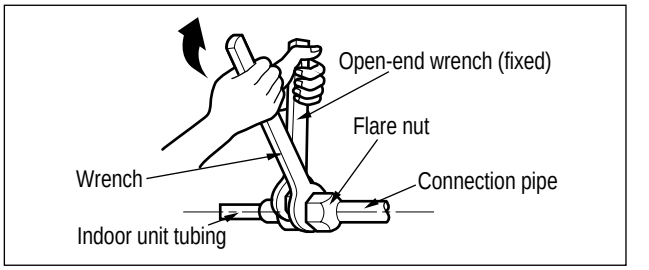
Connecting the piping to the indoor unit and the drain hose to drain pipe.

1. Align the center of the pipes and sufficiently tighten the flare nut by hand.

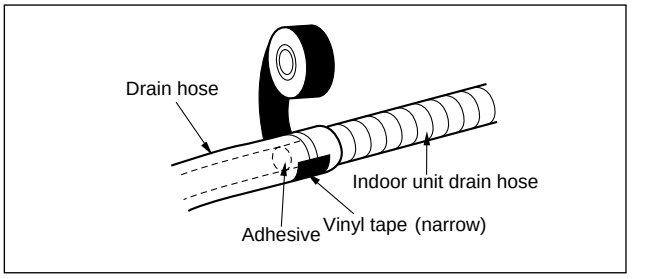


2. Tighten the flare nut with a wrench.

Outside diameter		Torque	
mm	inch	kg·m	lbf.in
Ø6.35	1/4	1.8	156.2
Ø9.52	3/8	4.2	364.5

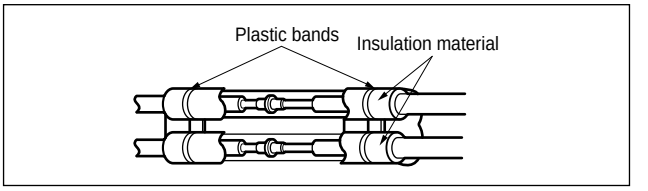


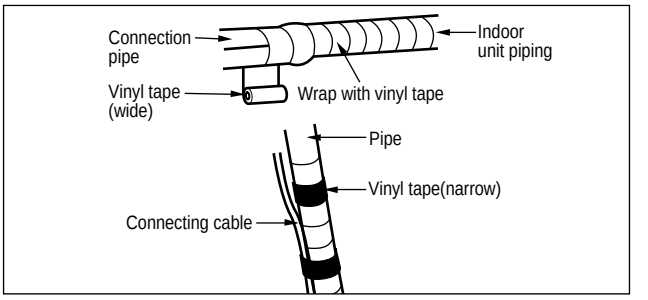
3. When extending the drain hose at the indoor unit, install the drain pipe.



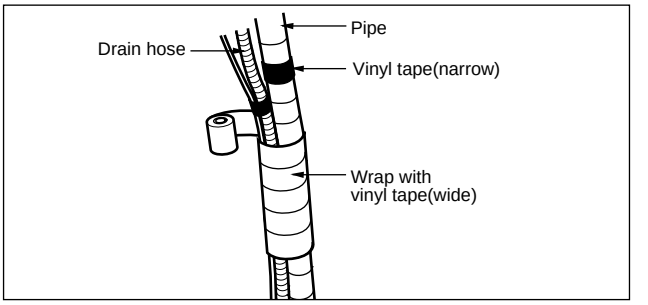
Wrap the insulation material around the connecting portion.

1. Overlap the connection pipe heat insulation and the indoor unit pipe heat insulation material. Bind them together with vinyl tape so that there may be no gap.
2. Wrap the area which accommodates the rear piping housing section with vinyl tape.

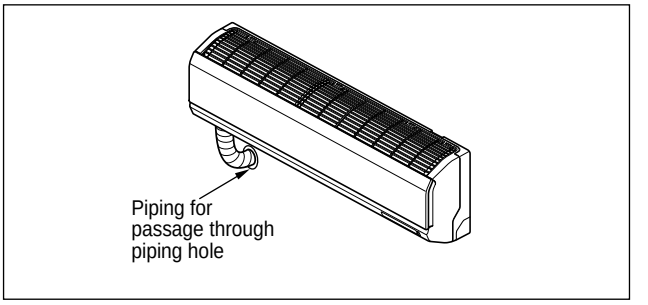




3. Bundle the piping and drain hose together by wrapping them with cloth tape over the range within which they fit into the rear piping housing section.

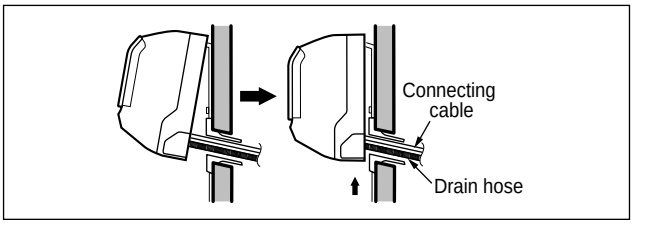


Reroute the pipings and the drain hose across the back of the chassis.



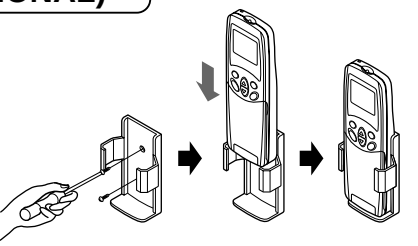
Indoor unit installation

1. Remove the spacer.
2. Ensure that the hooks are properly seated on the installation plate by moving it left and right.
3. Press the lower left and right sides of the unit against the installation plate until the hooks engage into their slots(clicking sound).



REMOTE CONTROL PREPARATION(OPTIONAL)

HOW TO MOUNT ONTO A WALL



HOW TO INSERT BATTERIES

1 Remove the battery cover from the remote controller.
- Slide the cover according to the arrow direction.

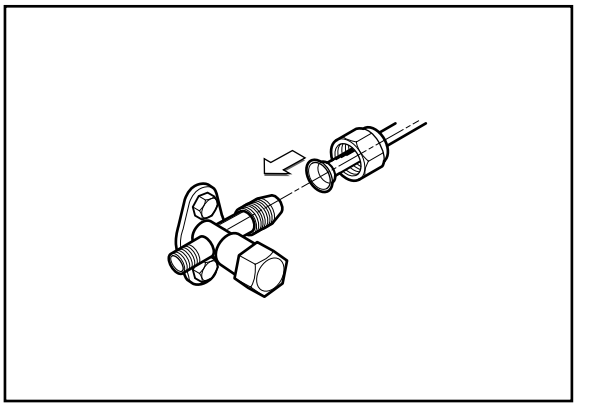
2 Insert the two batteries.
- Be sure that the (+) and (-) directions are correct.
- Be sure that both batteries are new.

3 Re-attach the cover.
- Slide it back into position.

- Do not use rechargeable batteries, such batteries differ from standard dry cells in shape, dimensions, and performance.
- Romove the batteries from the remote controller if the air conditioner is not going to be used for some long time.

Outdoor

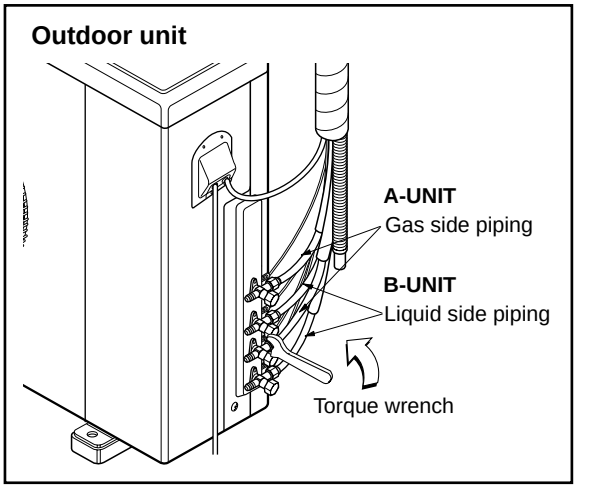
Align the center of the pipings and sufficiently tighten the flare nut by hand.



Finally, tighten the flare nut with torque wrench until the wrench clicks.

- When tightening the flare nut with torque wrench, ensure the direction for tightening follows the arrow on the wrench.

Outside diameter		Torque	
mm	inch	kg·m	lbf.in
Ø6.35	1/4	1.8	156.2
Ø9.52	3/8	4.2	364.5



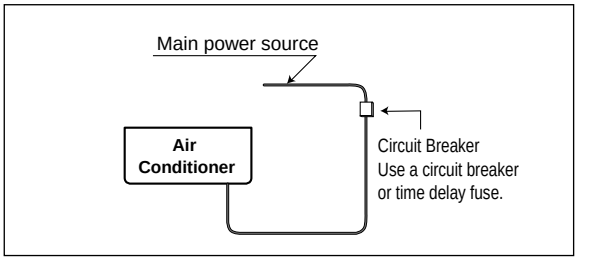
Connecting the Cable between Indoor Unit and Outdoor Unit

Connect the cable to the Indoor unit.

Connect the cable to the indoor unit by connecting the wires to the terminals on the control board individually according to the outdoor unit connection. (Ensure that the color of the wires of the outdoor unit and the terminal No. are the same as those of the indoor unit.)
The earth wire should be longer than the common wires.
The circuit diagram is not subject to change without notice.
When installing, refer to the electrical diagram behind the front panel of Indoor Unit.
The wiring for the outdoor unit can be found on the inside of the Outdoor Unit control cover.

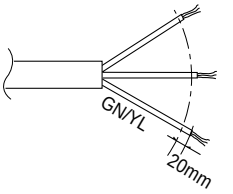
WARNING:
- **The circuit diagram is not subject to change without notice.**
- **Be sure to connect wires according to the wiring diagram.**
- **Connect the wires firmly, so that not to be pulled out easily.**
- **Connect the wires according to color codes by referring to the wiring diagram.**

WARNING: Provide a circuit breaker between power source and the outdoor unit as shown below.



WARNING: The power cord connected to the outdoor unit should be complied with the following specifications (ETL recognized and CSA certified).

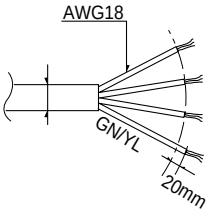
Line voltage (208~230V)



Wire gauge per
MCA on unit name plate
and local and national code.

The power connecting cable connected to the indoor and outdoor unit should be complied with the following specifications (ETL recognized and CSA certified).

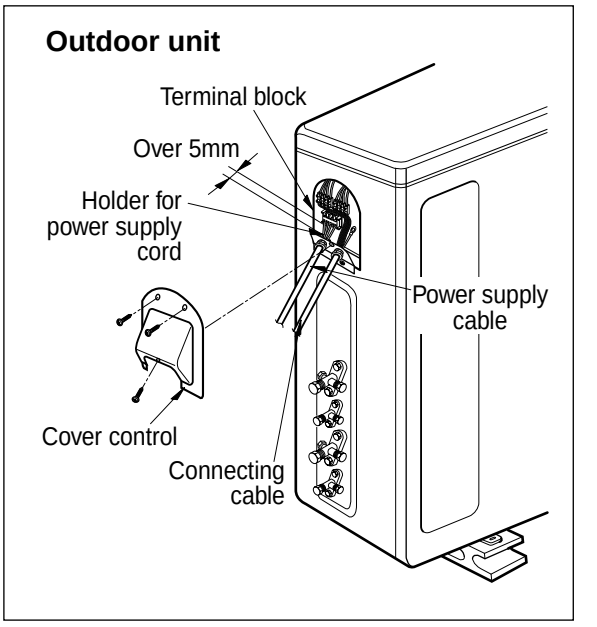
Low voltage (below 40V)

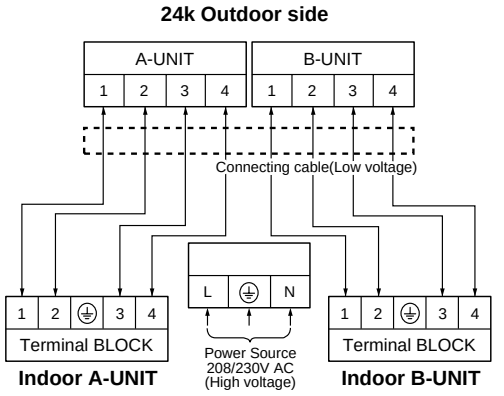


WARNING: When using the separate wire as the power cord, please fix the separate wire into the control box panel by using tie wrap as the fixture.

Connect the cable to the Outdoor unit.

1. Remove the cover control from the unit by loosening the screw.
   Connect the wires to the terminals on the control board individually as the following.
2. Secure the cable onto the control board with the holder (clamper).
3. Refix the cover control to the original position with the screw.





NOTICE :

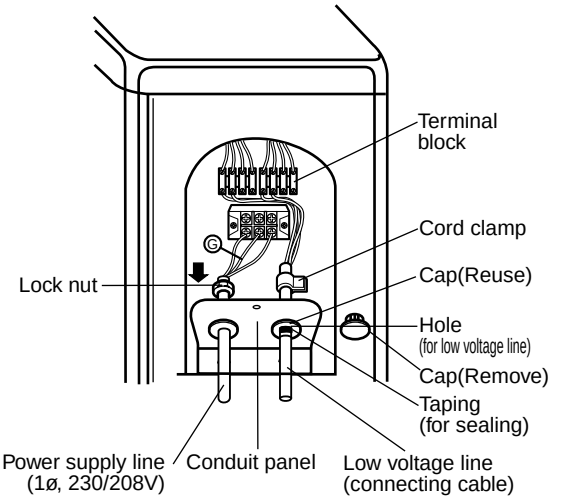
1. Separately wire the high and low voltage line.
2. Use heat-proof electrical wiring capable of withstanding temperature up to 75°C(167°F).
3. Use outdoor and waterproof connection cable rated more than 300V for the connection between indoor and outdoor unit. (For example, Type SJOW)

WARNING:

- **Be sure to comply with local codes while running the wire from the indoor unit to the outdoor unit(size of wire and wiring method, etc).**
- **Every wire must be connected firmly.**
- **No wire should be allowed to touch refrigerant tubing, the compressor or any moving parts.**

Connection method of the connecting cable(Example)

(1) Remove two-caps on the conduit panel.
(2) Make a hole appropriate for the passage of connection cable through on cap by tool.
(for low voltage line)
(3) Pass the connecting cable through the hole.
(4) Properly connect the cable on the terminal block.
(5) Fix the connection cable with cord clamp provided on the unit not to have strain at the terminal when the connection cable is pulled outside up to a 35 pound weight.
(6) Wind the vinyl tape round the connecting cable for sealing between the surface of the connection cable and cap.
(7)Finally, Fix the cap to the conduit panel.



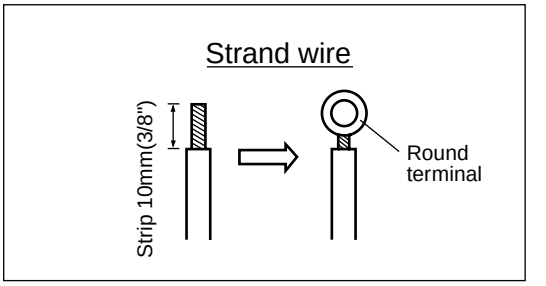
WARNING: Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also exist. Therefore, be sure all wiring is tightly connected.

When connecting each power wire to the corresponding terminal, follow instructions "How to connect wiring to the terminals" and fasten the wire tightly with the fixing screw of the terminal plate.

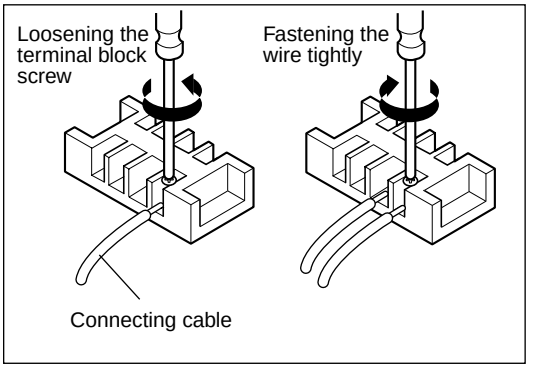
How to connect wiring to the terminals

■ For strand wiring
(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to expose the strand wiring about 10mm(3/8").
(2) Using a screwdriver, remove the terminal screw(s) on the terminal plate.
(3) Using a round terminal fastener or pliers, securely clamp each stripped wire end with a round terminal.
(4) Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver.

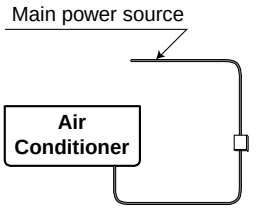
High voltage



Low voltage



CAUTION: Provide a circuit breaker between power source and the unit as shown below.

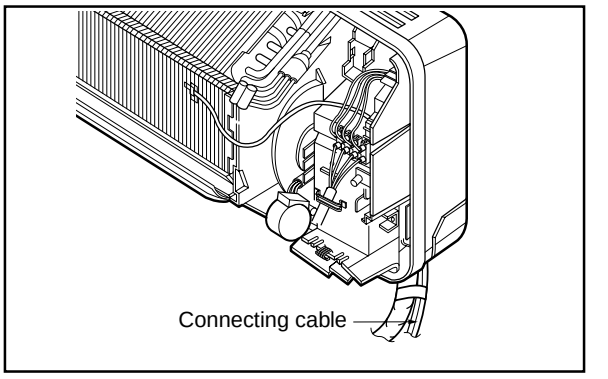


Circuit Breaker
Use a circuit breaker or time delay fuse.

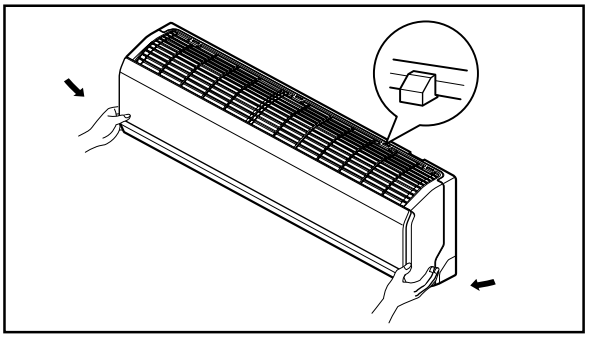
Model	Power source	Fuse or breaker Capacity
24k	1Ø, 230/208V	Per max. fuse size on unit name plate

Connect the cable to the indoor unit

1. Connect the wires to the terminals on the control board individually according to the outdoor unit connection.
   - Ensure that the color of the wires of outdoor unit and the terminal No. are the same as those of indoor unit respectively.



2. Attach the Grille onto the cabinet.
   - Grasp the lower left and right side of the Grille and engage four tabs on the top inside edge of the chassis.
   - Press the Grille toward the chassis until it will be back into place.

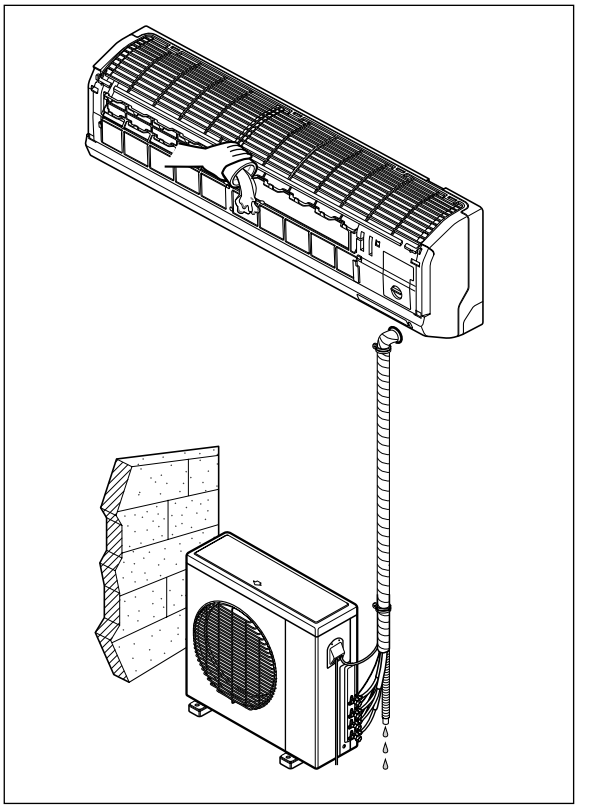


Checking the Drainage, Forming the Pipings and Long Pipe Setting

Checking the drainage

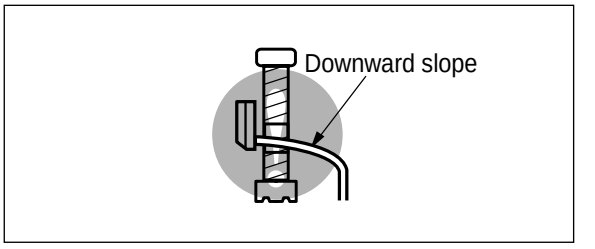
To check the drainage.

1. Pour a glass of water on the evaporator.
2. Ensure the water flows through the drain hose of the indoor unit without any leakage and goes out the drain exit.

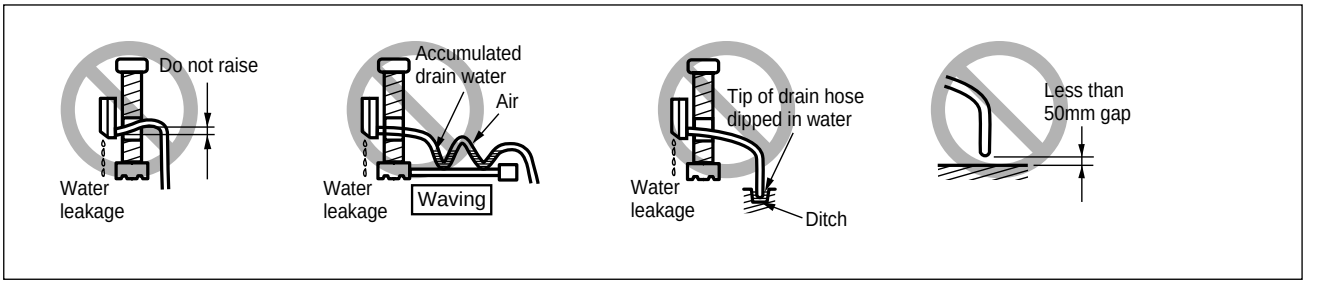


Drain piping

1. The drain hose should point downward for easy drain flow.



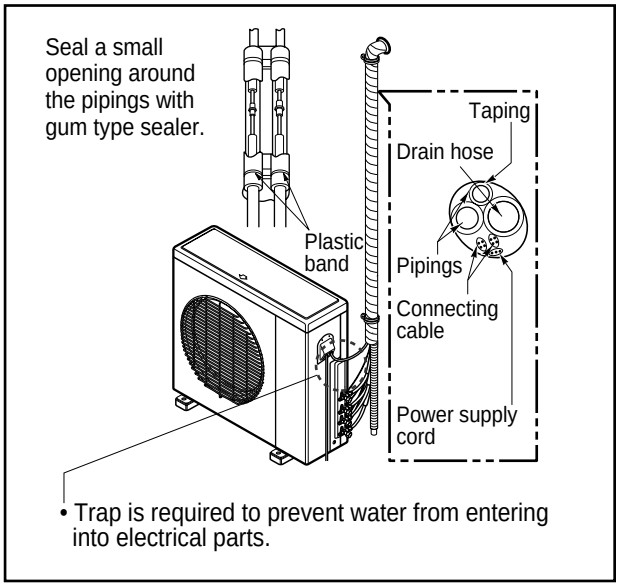
2. Do not make drain piping.



Forming the piping

Form the piping by wrapping the connecting portion of the indoor unit with insulation material and secure it with two kinds of vinyl tape.

• If you want to connect an additional drain hose, the end of the drain outlet should be routed above the ground. Secure the drain hose appropriately.

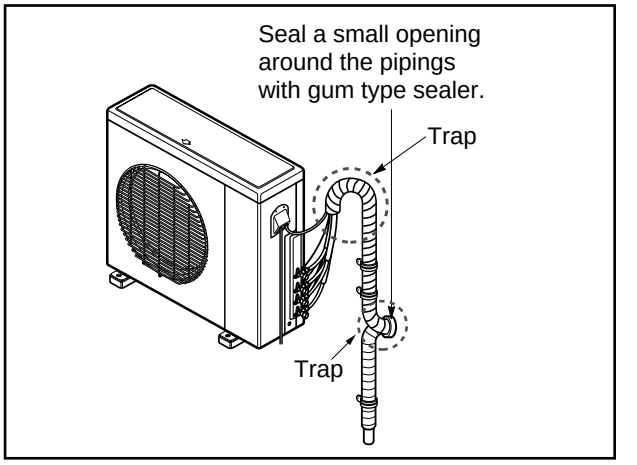


In cases where the outdoor unit is installed below the indoor unit perform the following.

1. Tape the piping, drain hose and connecting cable from down to up.
2. Secure the tapped piping along the exterior wall using saddle or equivalent.

In cases where the Outdoor unit is installed above the Indoor unit perform the following.

1. Tape the piping and connecting cable from down to up.
2. Secure the taped piping along the exterior wall. Form a trap to prevent water entering the room.
3. Fix the piping onto the wall by saddle or equivalent.



Air Purging and Evacuation

Air and moisture remaining in the refrigerant system have undesirable effects as indicated below.
1. Pressure in the system rises.
2. Operating current rises.
3. Cooling(or heating) efficiency drops.
4. Moisture in the refrigerant circuit may freeze and block capillary tubing.
5. Water may lead to corrosion of parts in the refrigeration system.

Therefore, the indoor/outdoor unit and connecting tube must be checked for leak tight, and vacuumed to remove incondensible gas and moisture in the system.

Checking method

Preparation

- Check that each tube(both liquid and gas side tubes) between the indoor and outdoor units have been properly connected and all wiring for the test run has been completed. Remove the service valve caps from both the gas and the liquid side on the outdoor unit. Check that both the liquid and the gas side service valves on the outdoor unit are kept closed at this stage.

Leakage test

- Connect the manifold valve(with pressure gauges) and dry nitrogen gas cylinder to this service port with charge hoses.

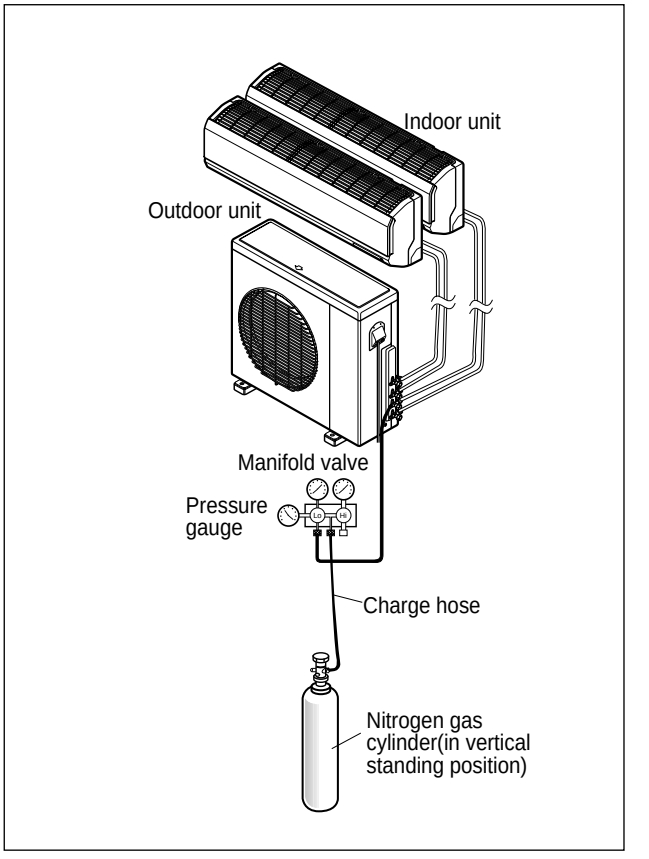
⚠ CAUTION: Be sure to use a manifold valve for leak testing.
The high side manifold valve must always be kept closed.

- Pressurize the system to no more than 150 P.S.I.G. with dry nitrogen gas and close the cylinder valve when the gauge reading reached 150 P.S.I.G. Next, test for leaks with liquid soap.

⚠ CAUTION: To avoid nitrogen entering the refrigerant system in a liquid state, the top of the cylinder must be higher than its bottom when you pressurize the system. Usually, the cylinder is used in a vertical standing position.

NOTICE : Leakage test shoud be done for each indoor unit connection set, separately.

1. Do a leakage test of all joints of the tubing(both indoor and outdoor) and both gas and liquid side service valves. Bubbles indicate a leak. Be sure to wipe off the soap with a clean cloth.
2. After the system is found to be free of leaks, relieve the nitrogen pressure by loosening the charge hose connector at the nitrogen cylinder. When the system pressure is reduced to normal, disconnect the hose from the cylinder.



Evacuation

1. Connect the charge hose end described in the preceding steps to the vacuum pump to evacuate the tubing and indoor unit.
   Confirm the "Lo" knob of the manifold valve is open. Then, run the vacuum pump.
   The operation time for evacuation varies with tubing length and capacity of the pump. The following table shows the time required for evacuation.

Required time for evacuation when 4 CFM vacuum pump is used	
If tubing length is less than 10m (33 ft)	If tubing length is longer than 10m (33 ft)
10 min. or more	15 min. or more

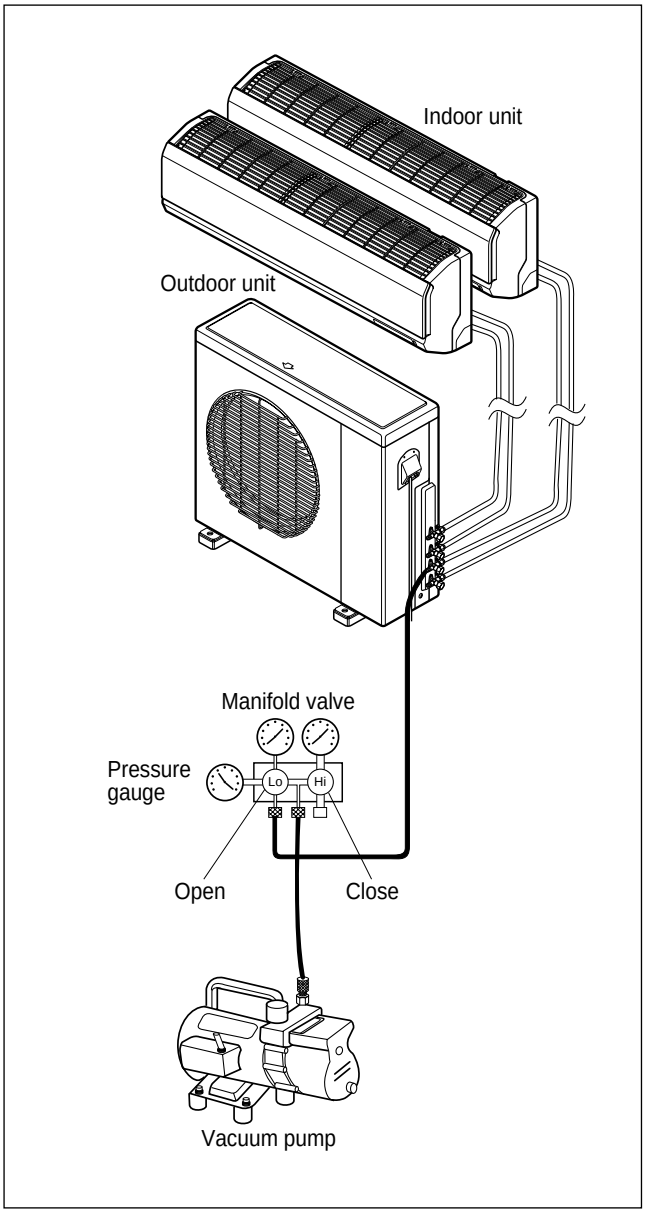
2. When the desired vacuum is reached, close the "Lo" knob of the manifold valve and stop the vacuum pump.

Finishing the job

1. With a service valve wrench, turn the valve stem of liquid side valve counter-clockwise to fully open the valve.
2. Turn the valve stem of gas side valve counter-clockwise to fully open the valve.
3. Loosen the charge hose connected to the gas side service port slightly to release the pressure, then remove the hose.
4. Replace the flare nut and its bonnet on the gas side service port and fasten the flare nut securely with an adjustable wrench. This process is very important to prevent leakage from the system.
5. Replace the valve caps at both gas and liquid side service valves and fasten them tight.

This completes air purging with a vacuum pump.

The air conditioner is now ready for test running.



NOTICE

: Repeat evacuation procedure for each indoor unit.

Charging

■ Each outdoor unit is factory charged (nameplate charge) for the evaporator as well as a 7.5m(25ft) line set for each indoor line.
Any time total line set is used either shorter or longer then the nominal 22.5m(75ft: for tri-zone) line set length the refrigerant charge has to be adjusted.

■ Whether the line set is made shorter or longer you must adjust the charge based on how many ft of tubing are either added or removed based on 20g(0.22oz) of R-410A per meter(foot).

Capacity (Btu/h)	Max total length of all pipes (A+B)	Max length of each pipe (A/B)	Min length of each pipe (A/B)	Max Elevation between each indoor unit and outdoor unit (h1)	Max elevation between indoor units (h2)	Additional Refrigerant
24k	30m(100ft)	15m(50ft)	3m(10ft)	7.5m(25ft)	7.5m(25ft)	20g/m(0.22oz/ft)

Example: A 80ft line set is used for dual - zone 5 additional ft X 0.22 ounces per foot= add 1.1 ounces of R-410A

Important:

If you are ever uncertain of the unit charge, reclaim, evacuate and weigh in the correct charge using the unit nameplate charge adjusting for line sets longer or shorter than 7.5m(25ft) for each indoor unit. Unit is critically charged.

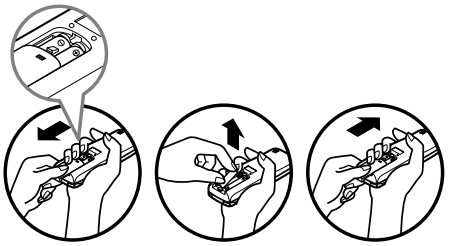
Test Running

Split Type

1. Check that all tubing and wiring have been properly connected.
2. Check that the gas and liquid side service valves are fully open.

1) Prepare remote controller

❶ Remove the battery cover by pulling it according to the arrow direction.
❷ Insert new batteries making sure that the (+) and (–) of battery are installed correctly.
❸ Reattach the cover by pushing it back into position.



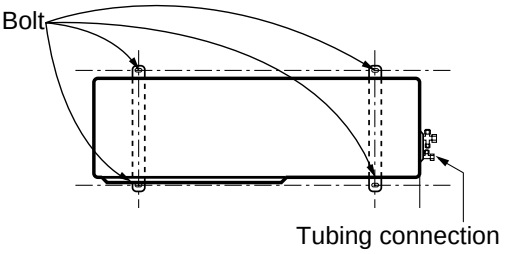
NOTE:
- Use 2 AAA(1.5volt) batteries. Do not use rechargeable batteries.
- Remove the batteries from the remote controller if the system is not going to be used for a long time.

2) Precautions in test run

■ The initial power supply must provide at least 90% of the rated voltage.
Otherwise, the air conditioner should not be operated.
■ For test run, carry out the cooling operation firstly even during heating season. If heating operation is carried out firstly, it leads to the trouble of compressor. Then attention must be paid.
■ Carry out the test run more than 5 minutes without fail. (Test run will be cancelled 18 minutes later automatically)
■ The test run is started by pressing timer cancel button five times continuously. (Room type)
■ To cancel the test run, press any button.

3) Settlement of outdoor unit

■ Anchor the outdoor unit with a bolt and nut(ø10mm) tightly and horizontally on a concrete or rigid mount.
■ When installing on the wall, roof or rooftop, anchor the mounting base securely with a nail or wire assuming the influence of wind and earthquake.
■ In the case when the vibration of the unit is conveyed to the hose, secure the unit with an anti-vibration rubber.

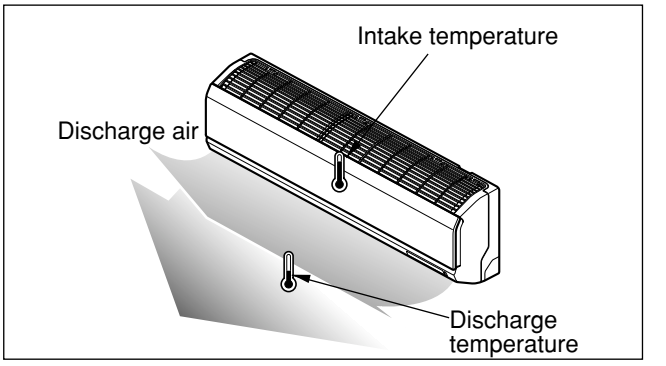


4) Evaluation of the performance

Operate unit for 15~20 minutes, then check the system refrigerant charge:

1. Measure the pressure of the gas side service valve.
2. Measure the temperature of the intake and discharge of air.
3. Ensure the difference between the intake temperature and the discharge is more than 8°C(14.4°F) (Cooling) or reversely (Heating).

Refrigerant	Outside ambient TEMP.	The pressure of the gas side service valve.
R-410A	35°C (95°F)	8.5~9.5kg/cm²G(120~135 P.S.I.G.)



Operation

Function of control

1. MAIN UNIT FUNCTION

• DISPLAY

Operation Indicator

- On while in appliance operation, off while in appliance pause
- Flashing while in disconnection or short in Thermistor (3 sec off / 0.5 sec on)

Sleep Timer Indicator

- On while in sleep timer mode, off when sleep timer cancel or appliance operation pause

Timer Indicator

- On while in timer mode (on/off), off when timer mode is completed or canceled

Defrost Indicator

- Off except when hot start during heating mode operation or while in defrost control

■ Cooling Mode Operation

- When the intake air temperature reaches 0.5°C(0.9°F) below the setting temp, the compressor and the outdoor fan stop.
- When it reaches 0.5°C(0.9°F) above the setting temp, they start to operate again.
  Compressor ON Temp ➲ Setting Temp+0.5°C(0.9°F)
  Compressor OFF Temp ➲ Setting Temp-0.5°C(0.9°F)
- While in compressor running, operating with the airflow speed set by the remote control. While compressor is off fan operates at low speed regardless of the setting.

■ Soft Dry Operation Mode

- When the dehumidification operation input by the remote control is received, the intake air temperature is detected and the setting temp is automatically set according to the intake air temperature.
  26°C(78.8°F) ≤ Intake Air Temp ➲ 25°C(77°F)
  24°C(75.2°F) ≤ Intake Intake Air Temp<26°C(78.8°F) ➲ Intake Air Temp-1°C(30.2°F)
  18°C(64.4°F) ≤ Intake Intake Air Temp<24°C(75.2°F) ➲ Intake Air Temp-0.5°C(31.1°F)
  Intake Air Temp<18°C(64.4°F) ➲ 18°C(64.4°F)
- While compressor off, the indoor fan repeats low airflow speed and stop.
- While the intake air temp is between compressor on temp. and compressor off temp., 10-min dehumidification operation and 4-min compressor off repeat.
  Compressor ON Temp. ➲ Setting Temp+0.5°C(0.9°F)
  Compressor OFF Temp. ➲ Setting Temp-0.5°C(0.9°F)
- In 10-min dehumidification operation, the indoor fan operates with the low airflow speed.

■ Heating Mode Operation

- When the intake air temp reaches +3°(37.4°F)…above the setting temp, the compressor is turned off. When below the setting temp, the compressor is turned on.
  Compressor ON Temp. ➲ Setting Temp.
  Compressor OFF Temp. ➲ Setting Temp.+3°C(37.4°F)
- While compressor on, the indoor fan is off when the indoor pipe temp. is below 20°C(68°F), when above 27°C(80.6°F) , it operates with the low or setting speed. When the indoor pipe temp is between 20°C(68°F) and