

DUCTED CONCEALED (CEILING RECESSED) MINI SPLIT SYSTEM
AIR CONDITIONER/HEAT PUMP
MEDIUM EXTERNAL STATIC PRESSURE TYPE



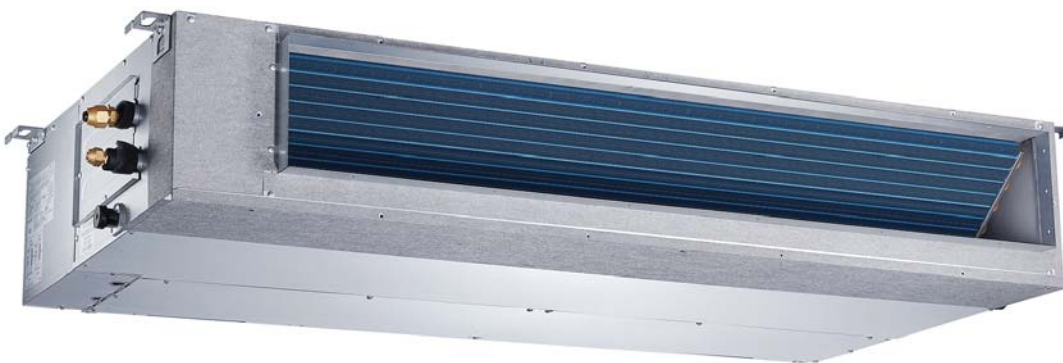
RAB/RYB Series

RAB: Cooling Only Version

RYB Cooling and Heating Version

Inverter+ and Inverter++ Models

9,000-48,000 BTU/hr



Installation Manual

IMPORTANT NOTICE:

Please read this manual carefully before installing or operating your new air conditioning system. Be sure to save this manual for future reference.

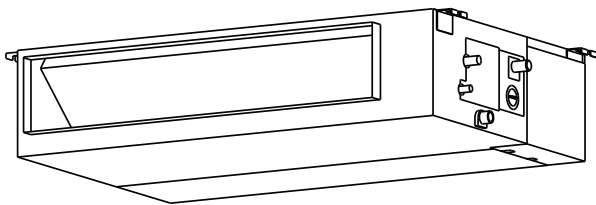
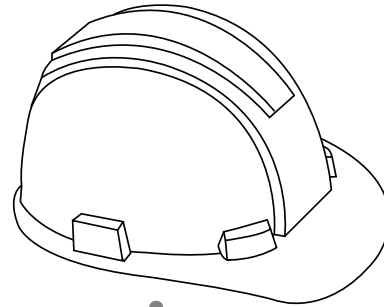


If your indoor unit is a part of a MULTI-SPLIT system set, refer to the installation manual that is packed with your outdoor unit as well.

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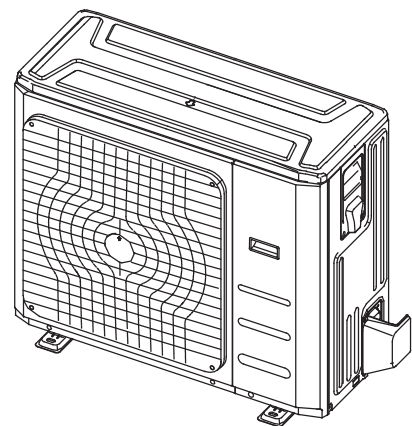
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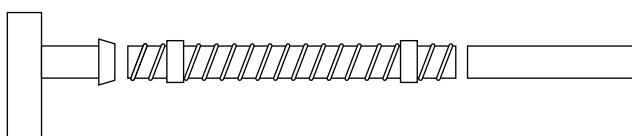


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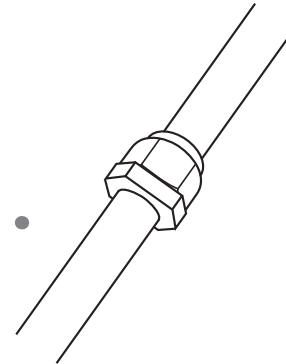
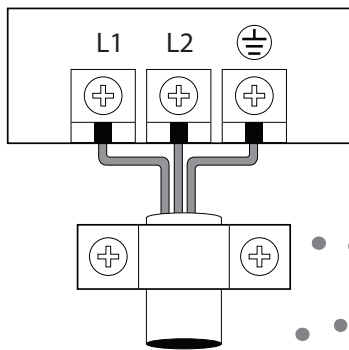
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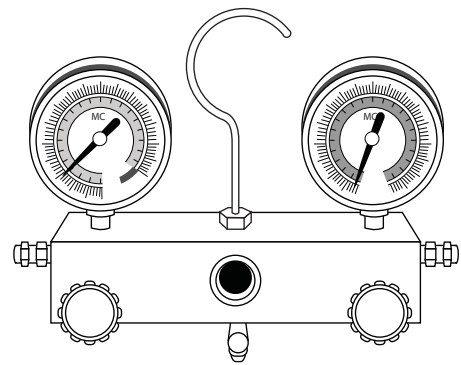
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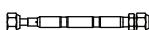






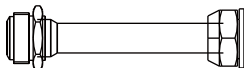
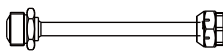
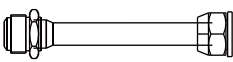



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The air conditioning system comes with the following accessories. Use all of the installation parts and accessories to install the air conditioner. Improper installation may result in water leakage, electrical shock and fire, or equipment failure.

	NAME	SHAPE	QUANTITY
Tubing & Fittings	Soundproof/Insulation Sheath		2
	Seal Sponge (some models)		1
	Orifice (some models)		1
Drainpipe Fittings (for cooling & heating)	Drain Joint (some models)		1
	Seal Ring (some models)		1
EMC Magnetic Ring (some models)	Magnetic Ring (wrap the electric wires S1 & S2 (P & Q & E) around the magnetic ring twice)	 S1&S2(P&Q&E)	1
	Magnetic Ring (Hitch on the connective cable between the indoor unit and outdoor unit after installation.)		1
Others	Owner's Manual		1
	Installation Manual		1
	Transfer Connector (Φ12.7-Φ15.9)/ (Φ0.5in-Φ0.63in)(Packed with the indoor unit) NOTE: Pipe size may differ from appliance to appliance. To meet different pipe size requirements, sometimes the pipe connections need a transfer connector installed on the outdoor unit .		1 (on some models)
	Transfer Connector (Φ6.35-Φ9.52)/ (Φ0.25in-Φ0.375in)(Packed with the indoor unit) NOTE: Pipe size may differ from appliance to appliance. To meet different pipe size requirements, sometimes the pipe connections need a transfer connector installed on the outdoor unit .		1 (on some models)
	Transfer Connector (Φ9.52-Φ12.7)/ (Φ0.375in-Φ0.5in) (Packed with the indoor unit, used for multi-type models only) NOTE: Pipe size may differ from appliance to appliance. To meet different pipe size requirements, sometimes the pipe connections need a transfer connector installed on the outdoor unit .		1 (on some models)
	Connecting Wire for Display (2m)		1 (on some models)
	Cord Protection Rubber Ring		1 (on some models)
	Display Panel *For testing purposes only		1 (on some models- KJR-120G,KJR-120H)

Optional accessories

- There are two types of remote controls: wired and wireless. Select a remote controller based on customer preferences and requirements, and install in an appropriate place. Refer to catalogues and technical literature for guidance on selecting a suitable remote controller.

Read and Understand Safety Precautions Prior to Installation

Improper installation due to negligence of instructions may result in serious damage or injury. The magnitude of potential damages or injuries is classified as either a **WARNING** or a **CAUTION**.



WARNING

Failure to observe a warning may result in death. The product must be installed by installers or contractors who are licensed HVAC professionals and in compliance with all local, state, and provincial laws.



CAUTION

Failure to observe a caution may result in injury or equipment damage.

WARNING

- Read the Safety Precautions carefully before installation.
- In certain functional environments, such as kitchens, server rooms, etc., the use of specially designed air-conditioning units is highly recommended.
- Only trained and certified technicians should install, repair, and service this air conditioning unit.
- Attempts to self-install can lead to inefficient performance, and risk of equipment damage over time.
- Strictly follow the installation instructions set forth in this manual.
- Improper installation may result in electrical shock, short circuit, leaks, fire or other damage to the equipment.
- Before you install the unit, consider strong winds, typhoons, and earthquakes that might affect your unit, and locate it accordingly. Failure to do so could cause the equipment to fail.
- After installation, ensure there are no refrigerant leaks and that the unit is operating properly. Refrigerant is both toxic and flammable, and poses a serious health and safety risk.

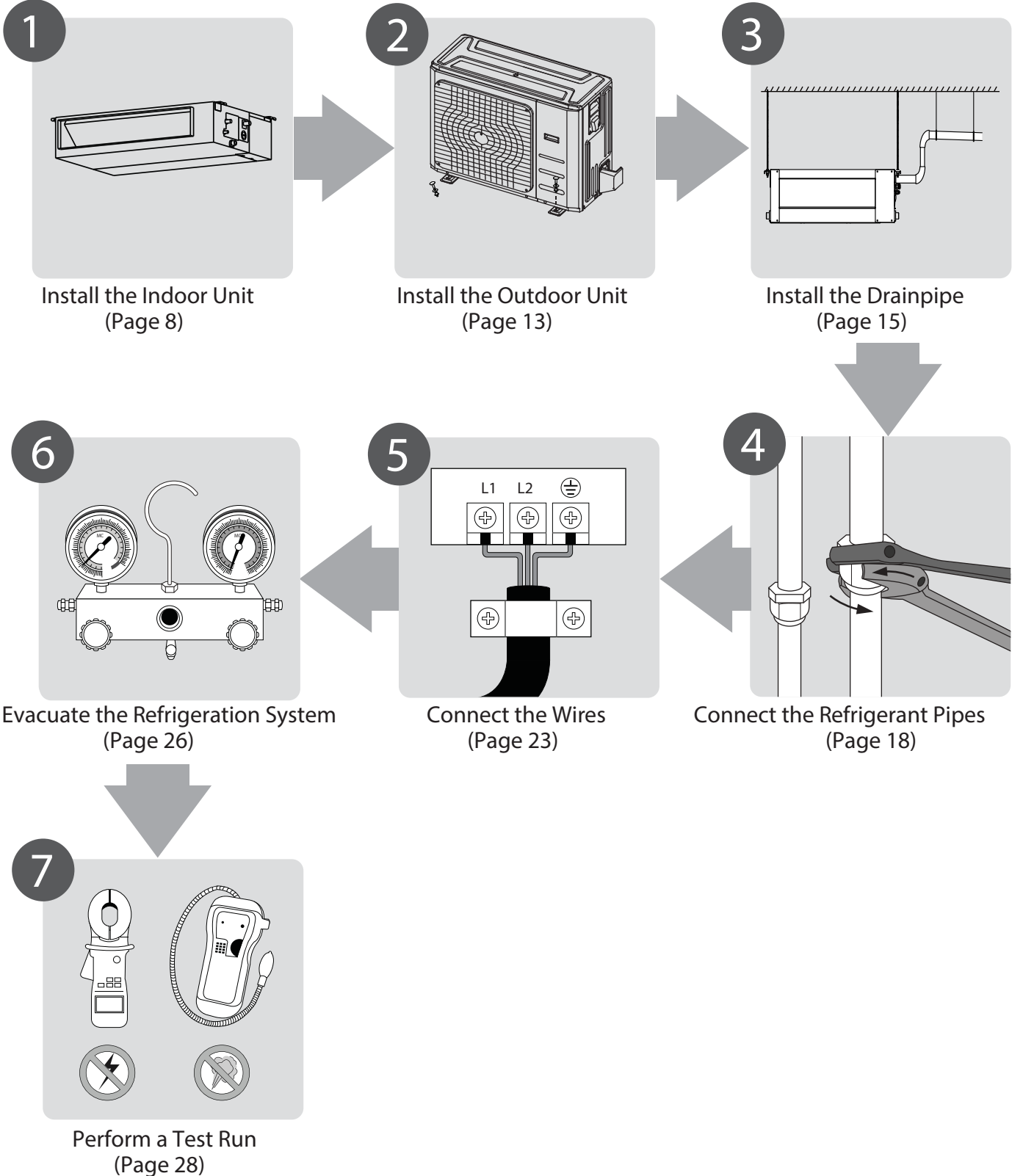
Note about Fluorinated Gases

1. This air-conditioning unit contains fluorinated gases. For specific information on the type of gas and the amount, please refer to the relevant label on the unit itself.
2. Installation, service, maintenance, and repair of this unit must be performed by a certified technician.
3. Product uninstallation and recycling must be performed by a certified technician.
4. If the system has a leak-detection system installed, it must be checked for leaks at least every 12 months.
5. When the unit is checked for leaks, proper record-keeping of all checks is strongly recommended.

Installation Overview

3

INSTALLATION ORDER



Indoor Unit Installation

Indoor Unit Parts

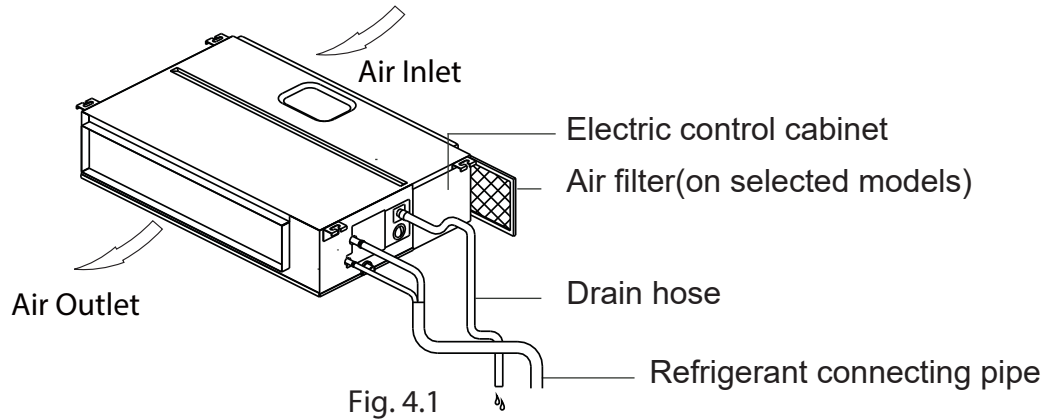


Fig. 4.1

Safety Precautions

! WARNING

- Securely install the indoor unit on a structure that can sustain its weight. If the structure is too weak, the unit may fall, causing personal injury, unit and property damage, or even death.
- **DO NOT** install the indoor unit in a bathroom or laundry room, as excessive moisture can short the unit and corrode the wiring.

! CAUTION

- Install the indoor and outdoor units, cables, and wires at least 1m (3.2') from televisions or radios, to prevent static or image distortion. Depending on the appliances, a 1m (3.2') distance may not be sufficient.
- If the indoor unit is installed on a metal part of the building, it must be grounded.

Indoor Unit Installation Instructions

Step 1: Select installation location

The indoor unit should be installed in a location that meets the following requirements:

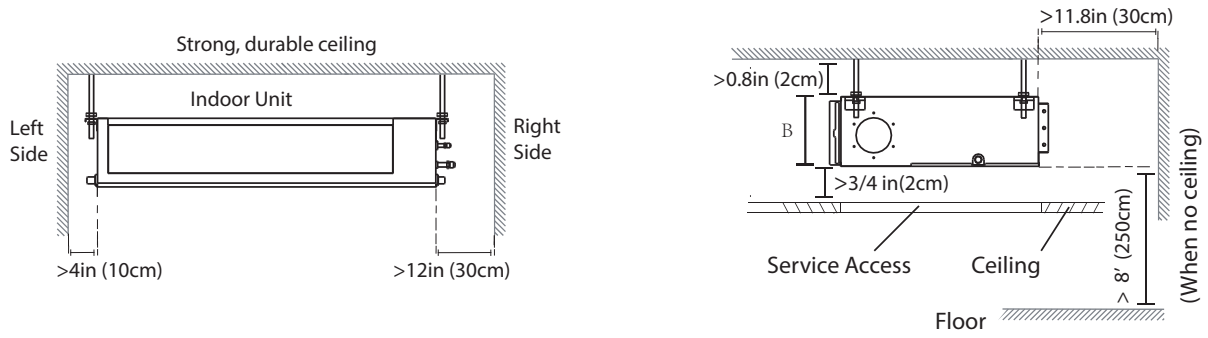
- ☑ Enough room for installation and maintenance.
- ☑ Enough room for the connecting pipe and drainpipe.
- ☑ The ceiling is horizontal, and its structure can sustain the weight of the indoor unit.
- ☑ The air inlet and outlet are not impeded.
- ☑ The airflow can fill the entire room.
- ☑ There is no direct radiation from heaters.
- ☑ It is an embeded installation.
- ☑ Models with a cooling capacity of 9000 BTU to 18000 BTU are only applicable to one room.

! CAUTION

DO NOT install the unit in the following locations:

- ⊘ Where oil drilling or fracking is taking place.
- ⊘ Coastal areas with high salt content in the air
- ⊘ Near geothermal activity and corrosive gas
- ⊘ Buildings that may experience power fluctuations
- ⊘ Enclosed spaces
- ⊘ Areas with strong electromagnetic waves
- ⊘ Areas that store flammable materials or gas
- ⊘ Rooms with high humidity, such as bathrooms or laundry rooms

Installation Location



Maintenance Space

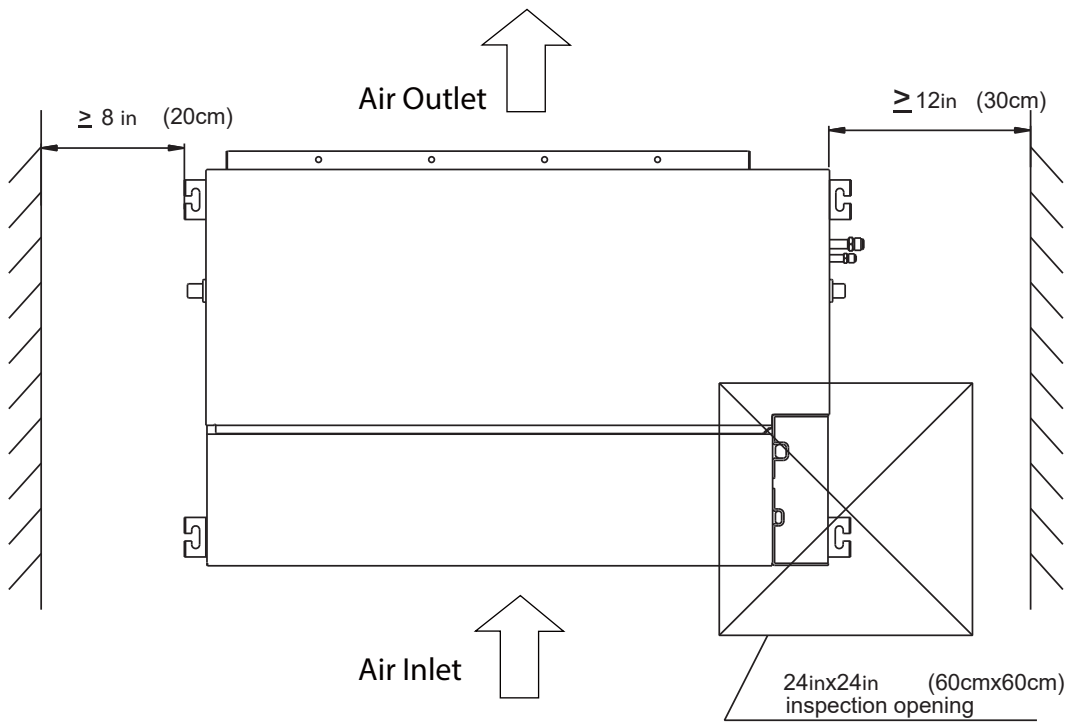
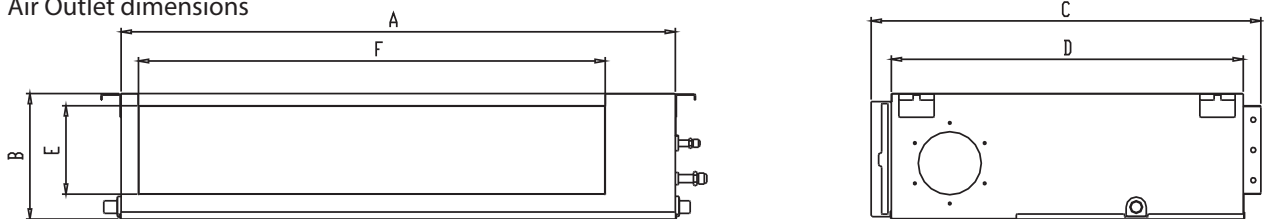


Fig. 4.2

Step 2: Hang the Indoor Unit.

1. Please refer to the following diagrams to locate the four positioning screw bolt holes on the ceiling. Be sure to mark the places where you will drill ceiling hook holes.

Air Outlet dimensions



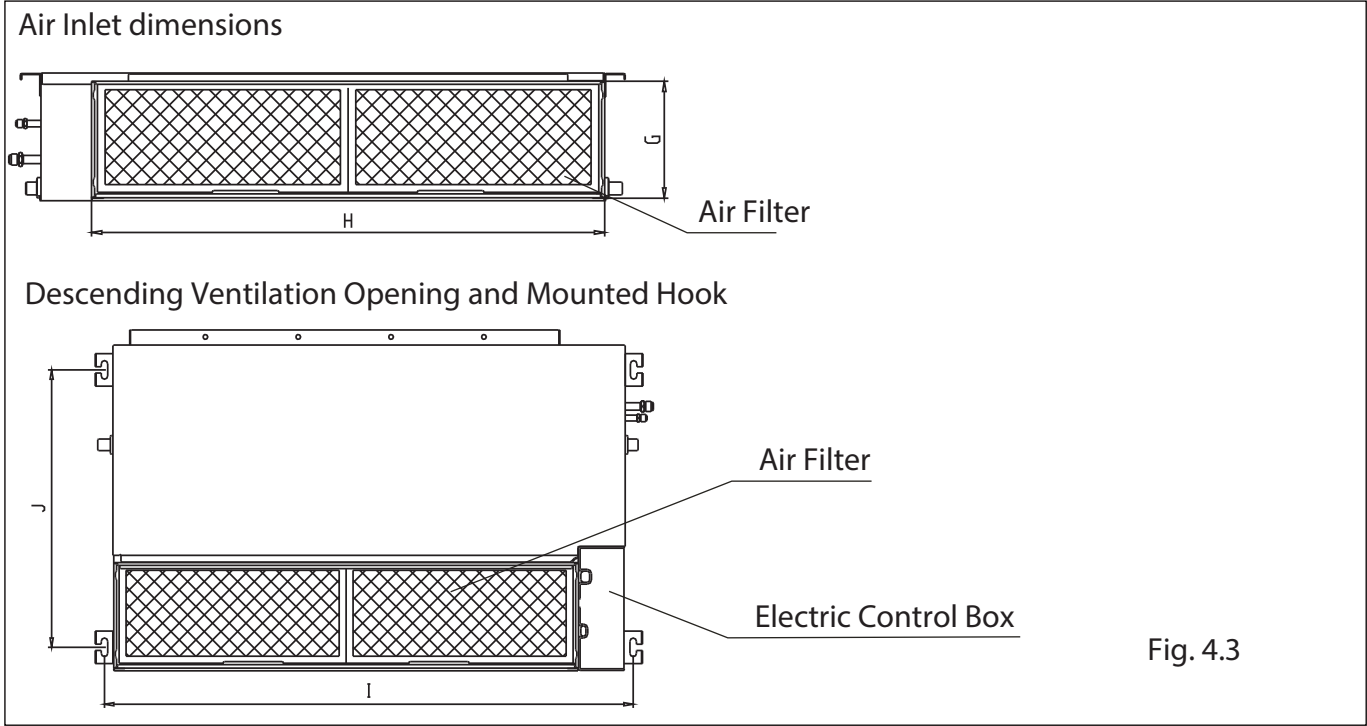


Fig. 4.3

Table.4-1 (unit: mm/inch)

MODEL (Btu/h)	Outline dimension				Air Outlet Opening size		Air Return Opening size		Size of Mounted Lug	
	A	B	C	D	E	F	G	H	I	J
9K/12K	700/27.6	200/7.9	506/19.9	450/17.7	152/6	537/21.1	186/7.3	599/23.6	741/29.2	360/14.2
18K	880/34.6	210/8.3	674/26.5	600/23.6	136/5.4	706/27.8	190/7.5	782/30.8	920/36.2	508/20
24K	1100/43.3	249/9.8	774/30.5	700/27.6	175/6.9	926/36.5	228/8.9	1001/39.4	1140/44.9	598/23.5
30K~36K	1360/53.5	249/9.8	774/30.5	700/27.6	175/6.9	1186/46.7	228/8.9	1261/49.6	1400/55.1	598/23.5
36K~60K	1200/47.2	300/11.8	874/34.4	800/31.5	227/8.9	1044/41.1	280/11	1101/43.3	1240/48.8	697/27.4

Wood

Place the wood mounting across the roof beam, then install the hanging screw bolts. (See Fig. 4.4)

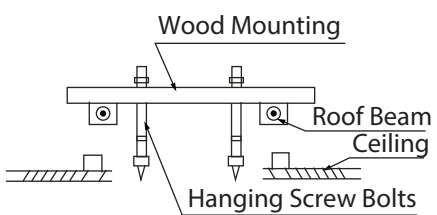


Fig. 4.4

New Concrete Bricks

Inlay or embed the screw bolts. (See Fig. 4.5)

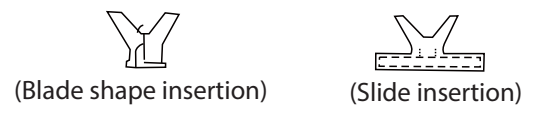


Fig. 4.5

Original Concrete Bricks

Use an embedding screw bolt, crock, and stick harness. (See Fig. 4.6)

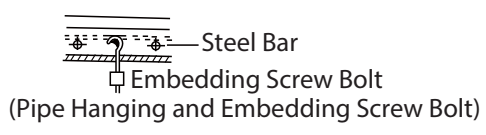


Fig. 4.6

Steel Roof Beam Structure

Install and use the steel supporting angle. (See Fig. 4.7)

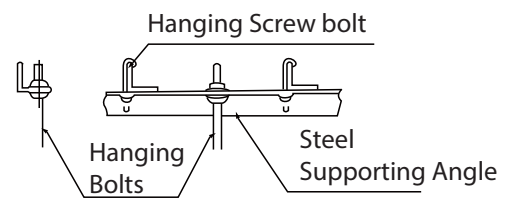


Fig. 4.7

CAUTION
 The unit body must be completely aligned with the hole. Ensure that the unit and the hole are the same size before moving on.

2. Install and fit pipes and wires after you have finished installing the main body. When choosing where to start, determine the direction of the pipes to be drawn out. Especially in cases where there is a ceiling involved, align the refrigerant pipes, drain pipes, and indoor and outdoor lines with their connection points before mounting the unit.
3. Install hanging screw bolts.
 - Cut off the roof beam.
 - Strengthen the point at which the cut was made. Consolidate the roof beam.
4. After you select an installation location, align the refrigerant pipes, drain pipes, as well as indoor and outdoor wires, with their connection points, before mounting the unit.
5. Drill 4 holes 10 cm (4") deep at the ceiling hook positions in the internal ceiling. Be sure to hold the drill at a 90° angle to the ceiling.
6. Secure the bolt using the washers and nuts provided.
7. Install the four suspension bolts.
8. Mount the indoor unit, with at least two people to lift and secure it. Insert suspension bolts into the unit's hanging holes. Fasten them using the washers and nuts provided. (See Fig. 4.8).

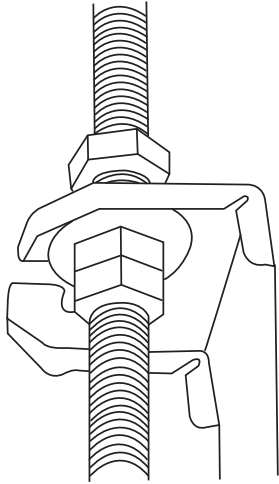


Fig. 4.8

9. Mount the indoor unit onto the hanging screw bolts with a block. Position the indoor unit flatly, using a level indicator to prevent leaks. (See Fig. 4.9).

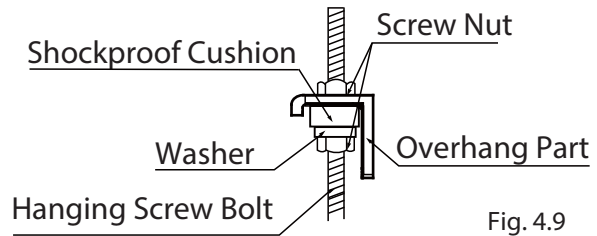


Fig. 4.9

NOTE: Confirm the minimum drain tilt is 1/100 or more.

Step 3: Duct and Accessories Installation

1. Install the filter (optional), according to the size of the air inlet.
2. Install the canvas tie-in between the body and the duct.
3. The air inlet and air outlet duct should be far enough apart to avoid air passage short-circuiting.
4. Connect the duct according to the following diagram:

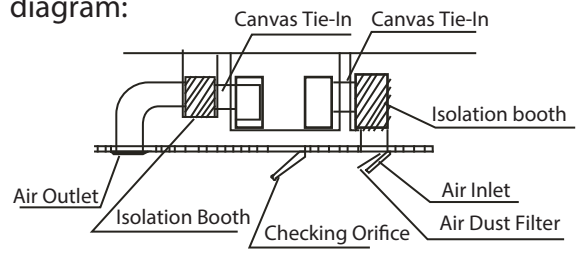


Fig. 4.10

5. Refer to the following static pressure guidelines when installing the indoor unit.

Table.4-2

MODEL (Btu/h)	Static Pressure (Pa/in.wg)
9K	0~50/0~1/4
12K	0~50/0~1/4
18K	0~100/0~3/8
24K	0~160/0~5/8
30K~36K	0~160/0~5/8
42K~60K	0~160/0~5/8

Change the fan motor static pressure according to external duct static pressure.

NOTE: 1. Do not place the connecting duct weight onto the indoor unit.
 2. When connecting the duct, use a nonflammable canvas tie-in, to prevent vibrating.
 3. Insulation foam must be wrapped outside the duct to avoid condensate. An internal duct underlayer can be added to reduce noise, if the end-user requires.

Step 4: Adjust the air inlet direction (from rear side to under-side).

1. Take off the ventilation panel and flange.

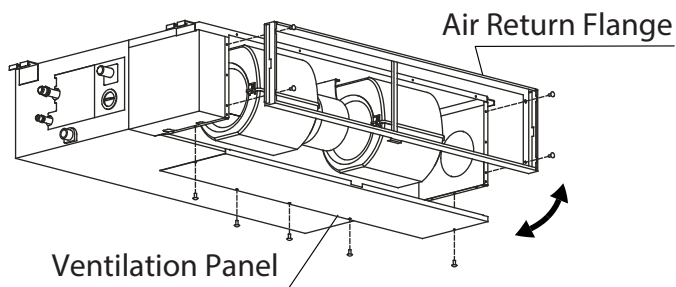


Fig. 4.11

2. Change the mounting positions of the ventilation panel and air return flange.

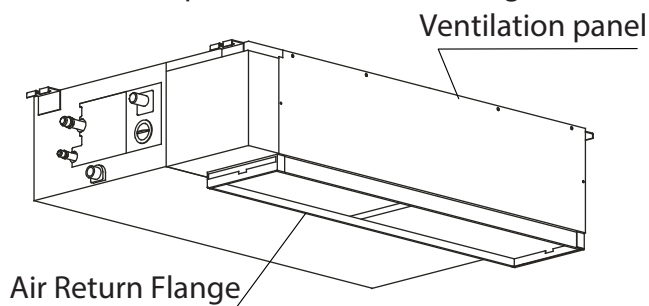


Fig. 4.12

3. When installing the filter mesh, fit it into the flange, as illustrated in the following figure.

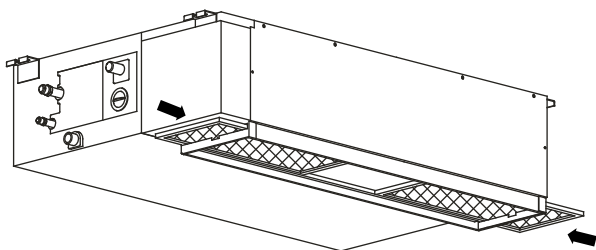


Fig. 4.13

NOTE: All figures in this manual are for explanatory purposes only. The air conditioner you have purchased may slightly differ in design, though it remains similar in shape.

Step 5: Fresh air duct installation

Dimension :

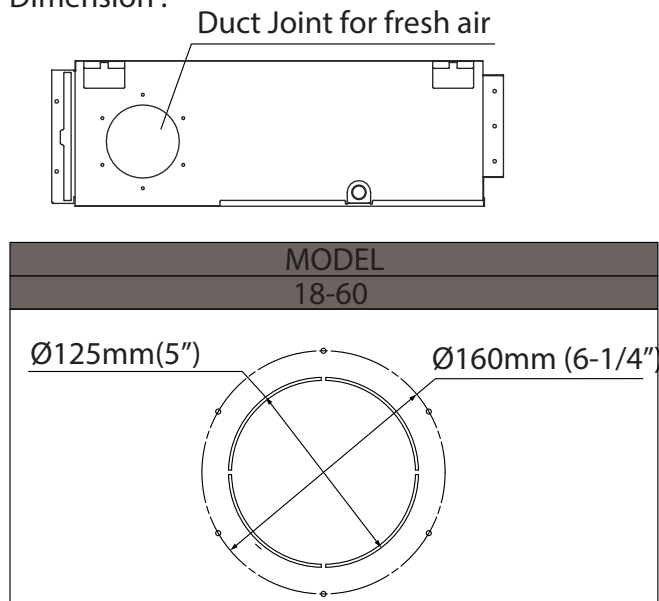


Fig. 4.14

Step 6: Motor and drain pump maintenance

(The rear ventilated panel is used as an example)

Motor Maintenance:

1. Take off the ventilated panel.
2. Take off the blower housing.
3. Take off the motor.

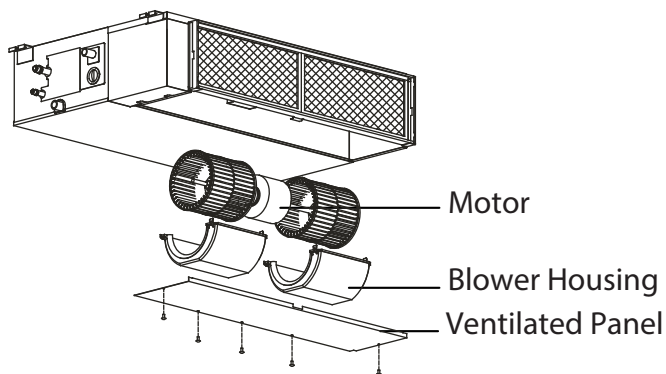


Fig. 4.15

Pump Maintenance:

1. Remove four screws from the drain pump.
2. Unplug the pump power supply and water level switch cable.
3. Detach the pump.

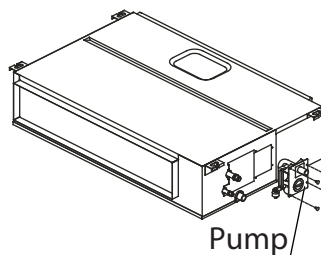


Fig. 4.16

Outdoor Unit Installation Instructions

Step 1: Select Installation Location.

The outdoor unit should be installed in a location that meets the following requirements:

- ☑ The location is as close to the indoor unit as possible.
- ☑ Ensure that there is enough room for installation and maintenance.
- ☑ The air inlet and outlet are not obstructed, or exposed to strong wind.
- ☑ The location of the unit will not be subject to snowdrifts, accumulation of leaves, or other seasonal debris. If possible, provide an awning for the unit. Ensure the awning does not obstruct airflow.
- ☑ The installation area is dry and well ventilated.
- ☑ There must be enough room to install the connecting pipes and cables, and to access them for maintenance.

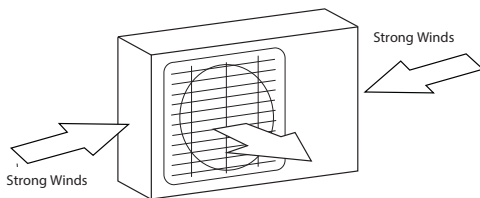


Fig. 5.1

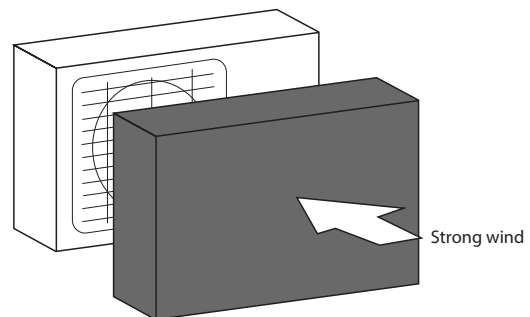


Fig. 5.2

- ☑ The area must be free of combustible gases and chemicals.
- ☑ The pipe length between the outdoor and indoor unit may not exceed the maximum allowable pipe length.
- ☑ If possible, DO NOT install the unit where it will be exposed to direct sunshine.
- ☑ If possible, make sure the unit is located far away from the property of neighbors, so that the unit noise will not cause disturbances.
- ☑ If the location is exposed to strong winds (for example: near a seaside), the unit must be placed against the wall to shelter it from the wind. If necessary, use an awning. (See Fig. 5.1 & 5.2)
- ☑ Install the indoor and outdoor units, cables, and wires at least 1 meter from televisions or radios, to prevent static or image distortion. Depending on the radio waves, a 1 meter distance may not be enough to eliminate all interference.

Step 2: Install Outdoor Unit.

Fix the outdoor unit with anchor bolts (M10)

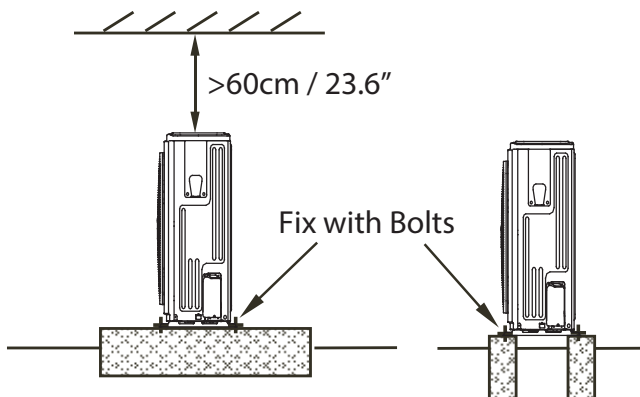


Fig. 5.3

! CAUTION

- Be sure to remove any obstacles that may block air circulation.
- Refer to Length Specifications to ensure there is enough room for installation and maintenance.

Split Type Outdoor Unit

(Refer to Fig 5.4, 5.5, 5.6, 5.10 and Table 5.1)

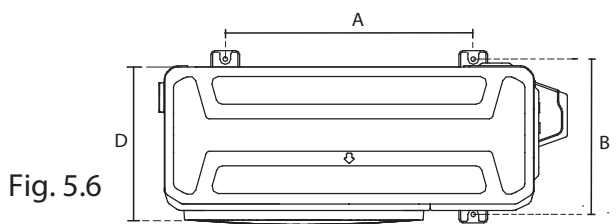
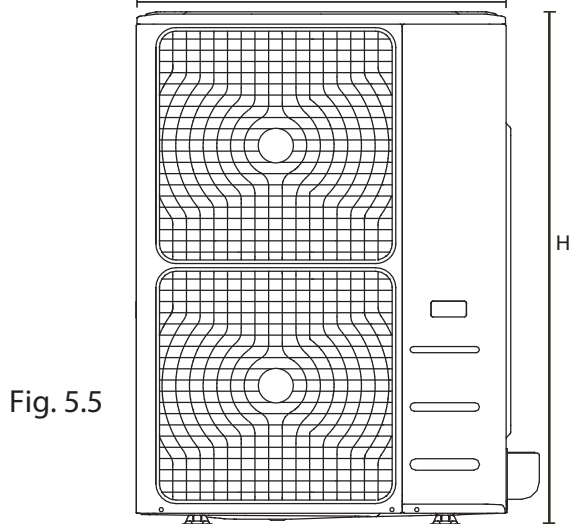
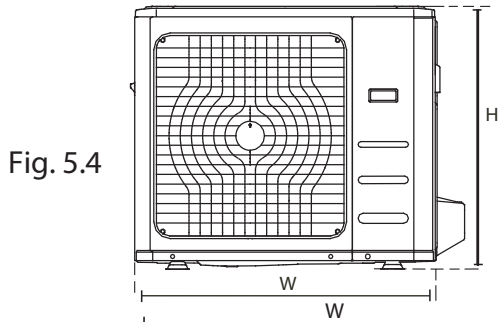


Table 5.1: Length Specifications of Split Type Outdoor Unit (unit: mm/inch)

Outdoor Unit Dimensions W x H x D	Mounting Dimensions	
	Distance A	Distance B
YN009GMFI22RPD:		
770x555x300 (30.3x21.9x11.8)	549 (21.6)	325 (12.8)
YN012GMFI22RPD:		
800x554x333 (31.5x21.8x13.1)	514 (20.24)	340 (13.39)
YN018GMFI22RPD:		
845x702x363 (33.27x27.6x14.3)	540 (21.26)	350 (13.8)
YN024GMFI22RPD:		
946x810x410 (37.24x31.9x16.14)	673 (26.5)	403 (15.87)
YN036GMFI17RUD:		
946x810x410 (37.24x31.9x16.14)	673 (26.5)	403 (15.87)
YN048GMFI17RUD:		
952x1333x415 (37.5x52.5x16.34)	634 (24.96)	404 (15.9)

NOTE: The minimum distance between the outdoor unit and walls described in the installation guide does not apply to airtight rooms. Be sure to keep the unit unobstructed in at least two of the three dimensions (M, N, P) (See Fig. 5.10)

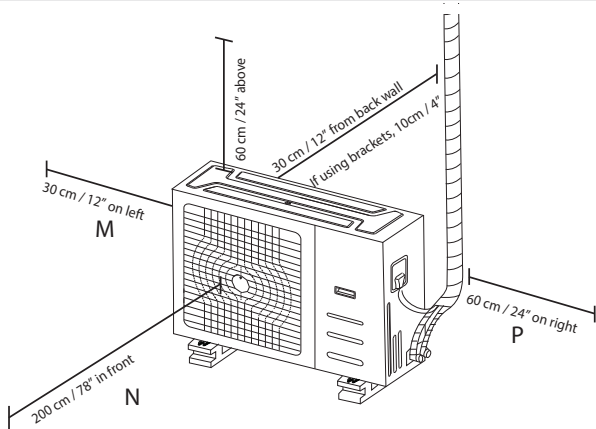


Fig. 5.10

Rows of Series Installation

Table 5.3 The relations between H, A, and L are as follows.

	L	A
L ≤ H	L ≤ 1/2H	25 cm / 10" or more
	1/2H < L ≤ H	30 cm / 12" or more
L > H	Cannot be installed	

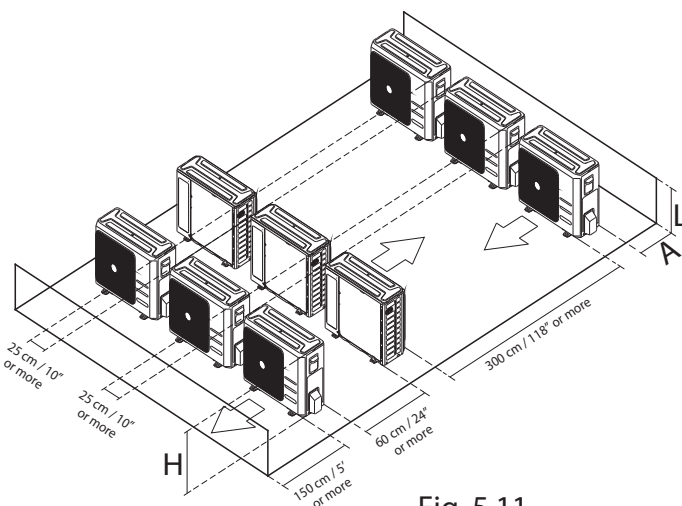


Fig. 5.11

Drain Joint Installation

If the drain joint comes with a rubber seal (see Fig. 5.12 - A), do the following:

1. Fit the rubber seal on the end of the drain joint that will connect to the outdoor unit.

2. Insert the drain joint into the hole in the base pan of the unit.
3. Rotate the drain joint 90° until it clicks into place facing the front side of the unit.
4. Connect a drain hose extension (not included) to the drain joint, to redirect water from the unit during heating mode.

If the drain joint doesn't come with a rubber seal (see Fig. 5.12 - B), do the following:

1. Insert the drain joint into the hole in the base pan of the unit. The drain joint will click into place.
2. Connect a drain hose extension (not included) to the drain joint, to redirect water from the unit during heating mode.

NOTE: Make sure the water drains to a safe location, where it will not cause water damage or a slipping hazard.

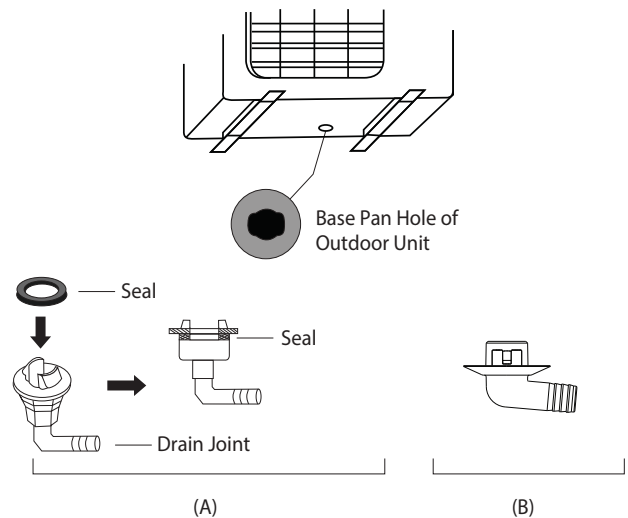


Fig. 5.12

Notes On Drilling Wall Hole

You must drill a hole into the wall for the refrigerant piping and the signal cable that will connect the indoor and outdoor units.

1. Determine the location of the wall hole based on the location of the outdoor unit.
2. Using a 65-mm (2.5") core drill, drill a hole into the wall.

NOTE: When drilling the wall hole, be sure to avoid wires, plumbing, and other sensitive components.

3. Place the protective wall cuff into the hole. This protects the edges of the hole, and will help seal it when you finish the installation process.

Drainpipe Installation

The drainpipe is used to drain water away from the unit. Improper installation may cause unit and property damage.

CAUTION

- Insulate all piping to prevent condensation, which could lead to water damage.
- If the drainpipe is bent, or installed incorrectly, water may leak and cause a water-level switch malfunction.
- In HEAT mode, the outdoor unit will discharge water. Ensure that the drain hose is placed in an appropriate area, to avoid water damage and slippage.
- **DO NOT** pull on the drainpipe forcefully. This could disconnect it and cause damage.

NOTE ON PURCHASING PIPES

Installation requires a polyethylene tube (exterior diameter = 3.7-3.9cm, interior diameter = 3.2cm), which can be obtained at your local hardware store or dealer.

Indoor Drainpipe Installation

Install the drainpipe as illustrated in Figure 6.2.

1. Cover the drainpipe with heat insulation, to prevent condensation and leakage.
2. Attach the mouth of the drain hose to the unit's outlet pipe. Sheath the mouth of the hose, and clip it firmly with a pipe clasp. (See Fig 6.1)

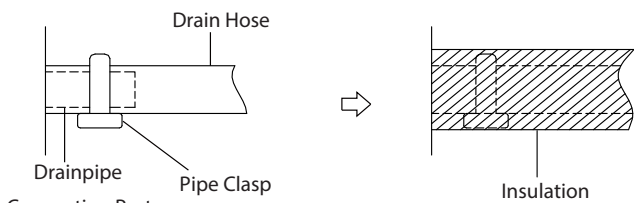


Fig. 6.1

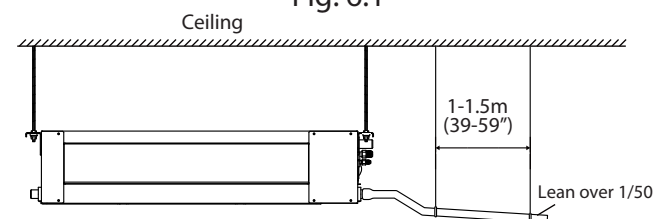


Fig. 6.2

NOTE ON DRAINPIPE INSTALLATION

- When using an extended drainpipe, tighten the indoor connection with an additional protection tube. This prevents it from pulling loose.
- The drainpipe should slope downward at a gradient of at least 1/100, to prevent water from flowing back into the air conditioner.
- To prevent the pipe from sagging, space hanging wires every 1-1.5m (39-59").
- If the outlet of the drainpipe is higher than the body's pump joint, provide a lift pipe for the exhaust outlet of the indoor unit. The lift pipe must be installed no higher than 55cm (21.7") from the ceiling board. The distance between the unit and the lift pipe must be less than 20cm (7.9"). Incorrect installation could cause water to flow back into the unit and flood.
- To prevent air bubbles, keep the drain hose level, or slightly tiled up (<75mm / 3").

Drainpipe installation, for units with a pump

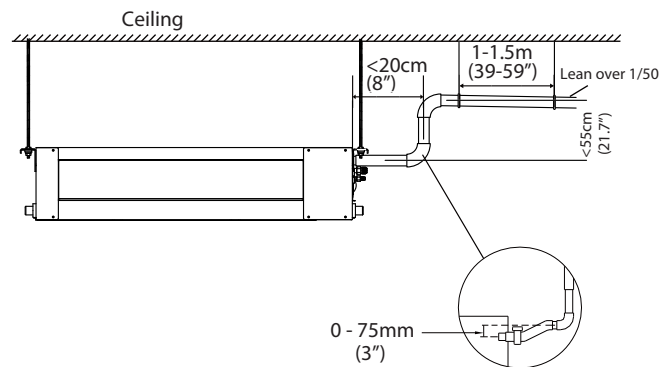


Fig. 6.3

NOTE: When connecting multiple drainpipes, install the pipes as illustrated in Fig 6.4.

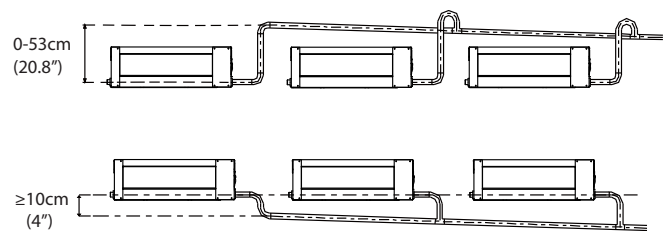


Fig. 6.4

- Using a 65-mm (2.5") core drill, drill a hole into the wall. Be sure that the hole is drilled at a slightly downward angle, so that the outdoor end of the hole is lower than the indoor end by about 12-mm (0.5"). This will ensure proper water drainage (See Fig. 6.5). Place the protective wall cuff into the hole. This protects the edges of the hole, and will help seal it once installation is completed.

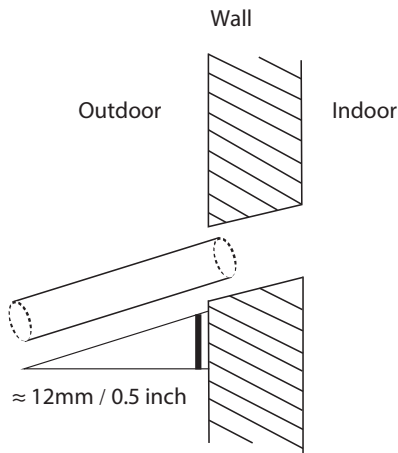


Fig. 6.5

NOTE: When drilling the hole, be sure to avoid wires, plumbing, and other sensitive components.

- Pass the drain hose through the wall hole. Make sure the water drains to a safe location where it will not cause water damage, or a slipping hazard.

NOTE: The drainpipe outlet should be at least 5cm (1.9") above the ground. If it touches the ground, the unit may become blocked, and malfunction. If you discharge the water directly into a sewer, make sure that the drain has a U or S pipe, to catch odors that might otherwise come back into the house.

Drainage Test

Check that the drainpipe is unhindered. This test should be performed on newly built houses, before the ceiling is paved.

Units WITHOUT a Pump

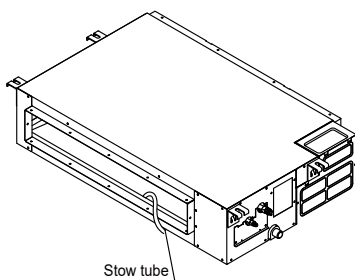
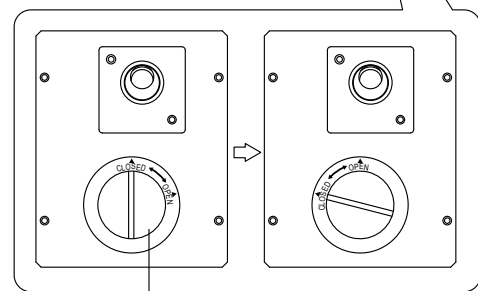
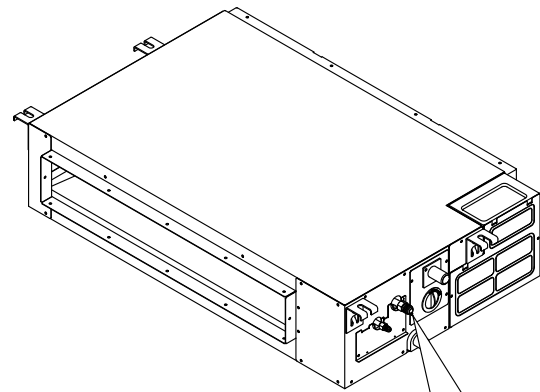


Fig.6.6

Fill the water pan with 2 liters of water. Check that the drainpipe is unhindered.

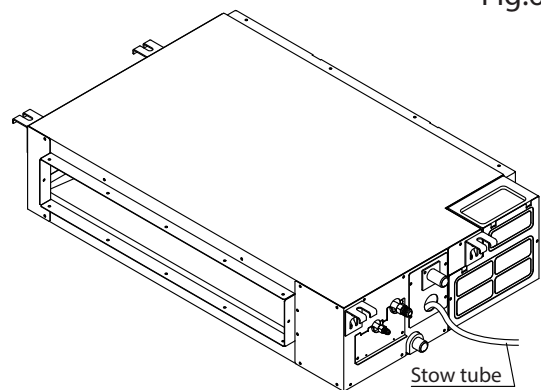
Units WITH a Pump.

- Remove the test cover. Fill the water pan with 2 liters of water.



Test cap

Fig.6.7



Stow tube

Fig.6.8

- Turn on the unit, in COOLING mode. You will hear the drain pump work. Check whether the water is discharged properly (a 1-minute lag is possible, depending on the length of the drain pipe), Check whether water leaks from the joints.
- Turn off the air conditioner, and put the cap back on.

Safety Precautions

WARNING

- All field piping must be completed by a licensed technician, and must comply with all relevant local and national regulations.
- When the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration in the room from exceeding the safety limit, in the event of refrigerant leakage. If the refrigerant leaks, and its concentration exceeds its proper limit, hazards due to lack of oxygen may result.
- When installing the refrigeration system, ensure that air, dust, moisture, or foreign substances do not enter the refrigerant circuit. Contamination in the system may cause poor operating capacity, high pressure in the refrigeration cycle, explosion, or injury.
- Ventilate the area immediately if there is refrigerant leakage during the installation. Leaked refrigerant gas is both toxic and flammable. Ensure there is no refrigerant leakage after completing the installation work.

Notes On Pipe Length and Elevation

Ensure that the length of the refrigerant pipe, the number of bends, and the drop height between the indoor and outdoor units meets the requirements shown in Table 7.1:

Table 7.1: The Maximum Length And Drop Height, Based on Models. (Unit: m/ft.)

Type of Model	Capacity (Btu/h)	Length of Piping	Maximum Drop Height
North America, Australia and the EU Models Inverter Split Type	<15K	25/82	10/33
	≥15K - <24K	30/100	20/66
	≥24K - <36K	50/164	25/82
	≥36K - ≤60K	65/213	30/100
Other Split Type	12K	15/49	8/26
	18K-24K	25/82	15/49
	30K-36K	30/98.4	20/66
	42K-60K	50/164	30/100

! CAUTION

• Oil traps

When the indoor unit is installed higher than the outdoor unit:

-If oil flows back into the outdoor unit's compressor, this might cause liquid compression, or deterioration of oil return. Oil traps in the rising gas piping can prevent this.

An oil trap should be installed every 10m (32.8ft) of vertical suction line riser.

(See Fig. 7.2)

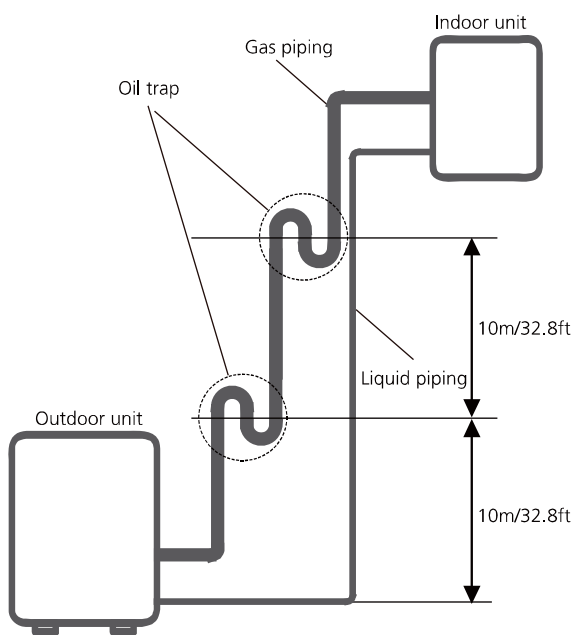


Fig. 7.2

- The indoor unit is installed higher than the outdoor unit

! CAUTION

When the outdoor unit is installed higher than the indoor unit:

-It is recommended that vertical suction risers not be upsized. Proper oil return to the compressor should be maintained with suction gas velocity. If velocities drop below 7.6 m/s (1500 fpm (feet per minute)), oil return will be decreased. An oil trap should be installed every 6m (20ft) of vertical suction line riser. (See Fig. 7.3)

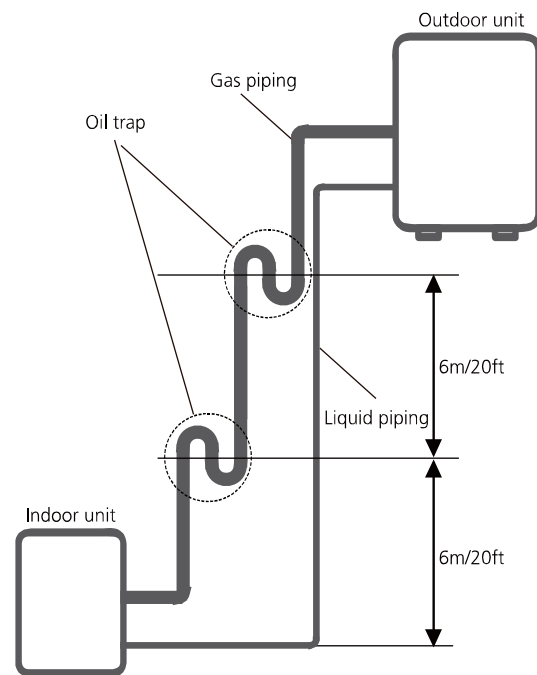


Fig. 7.3

- The outdoor unit is installed higher than the indoor unit

Table 7.2

		Permitted length		
Piping Length	Total Piping length	18K+18K	30m/98'	L+Max (L1, L2)
		24K+24K	50m/164'	
		30K+30K		
Piping Length	(farthest distance from the line pipe branch)	15m/50'		L1, L2
	(farthest distance from the line pipe branch)	10m/33'		L1-L2
Drop Height	Drop height between indoor and outdoor unit	20m/66'		H1
	Drop height between two indoor units	0.5m/1.5'		H2

Step 1: Cut pipes

When preparing refrigerant pipes, take extra care to cut and flare them properly. This will ensure efficient operation, and minimize the need for future maintenance.

1. Measure the distance between the indoor and outdoor units.
2. Using a pipe cutter, cut the pipe a bit longer than the measured distance.

! CAUTION

DO NOT deform pipe while cutting. Be extra careful not to damage, dent, or deform the pipe while cutting. This will drastically reduce the heating efficiency of the unit.

1. Ensure that the pipe is cut at a perfect 90° angle. Refer to Fig. 7.4 for examples of bad cuts.

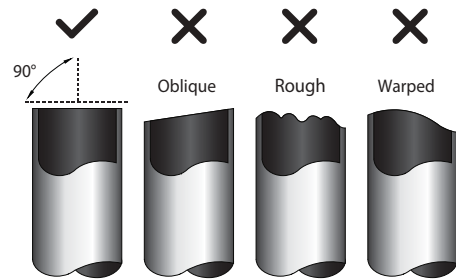


Fig. 7.4

Step 2: Remove burrs

Burrs can affect the air-tight seal of the refrigerant piping connection. They must be completely removed.

1. Hold the pipe at a downward angle, to prevent burrs from falling into the pipe.
2. Using a reamer or deburring tool, remove all burrs from the cut section of the pipe.

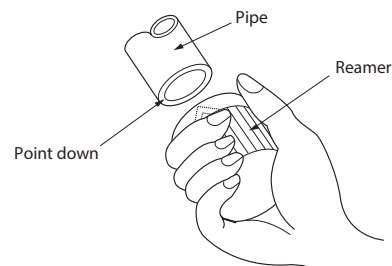


Fig. 7.5

Step 3: Flare Pipe Ends

Proper flaring is essential in achieving an airtight seal.

1. After removing burrs from the cut pipe, seal the ends with PVC tape, to prevent foreign materials from entering into the pipe.
2. Sheath the pipe with insulating material.
3. Place flare nuts on both ends of pipe. Make sure that they are facing the correct direction, because they cannot be put on or have their direction changed after flaring. See Fig. 7.6

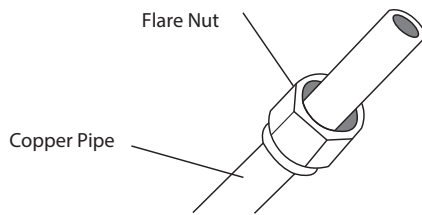


Fig. 7.6

4. Remove PVC tape from pipe ends when ready to perform flaring work.
5. Clamp flare form onto the end of the pipe. The end of the pipe must extend beyond the flare form.

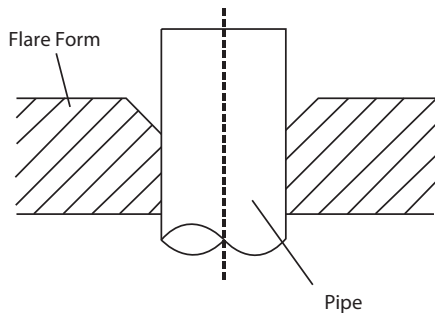


Fig. 7.7

6. Place flaring tool onto the form.
7. Turn the handle of the flaring tool clockwise until the pipe is fully flared. Flare the pipe in accordance with the dimensions shown in Table 7.5.

Pipe Gauge	Tightening Torque	Flare Dimension (A) (Unit: mm/Inch)		Flare Shape
		Min.	Max .	
Ø 1/4	14.2-17.2 N.m (10.5 - 12.5 Lb.Ft.)	8.3/0.3	8.3/0.3	<p>Fig. 7.6</p>
Ø 3/8	32.7-39.9 N.m (24 - 30 Lb.Ft.)	12.4/0.5	12.4/0.5	
Ø 1/2	49.5-60.3 N.m (36 - 45 Lb.Ft.)	15.4/0.6	15.8/0.6	
Ø 5/8	61.8-75.4 N.m (45 - 52 Lb.Ft.)	18.6/0.7	19/0.74	
Ø 3/4	97.2-118.6 N.m (72 - 88 Lb.Ft.)	22.9/0.9	23.3/0.9	
Ø 7/8	109.5-133.7 N.m (81 - 102 Lb.Ft.)	27/1.06	27.3/1.07	

8. Remove the flaring tool and flare form, and inspect the end of the pipe for cracks and for even flaring.

Step 4: Connect the Pipes

First connect the copper pipes to the indoor unit, then connect it to the outdoor unit. You should first connect the low-pressure pipe, then the high-pressure pipe.

1. When connecting the flare nuts, apply a thin coat of refrigeration oil to the flared ends of the pipes.
2. Align the center of the two pipes that you will connect.

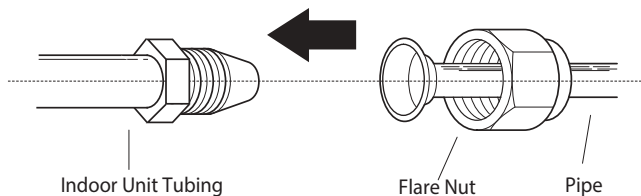


Fig. 7.9

3. Tighten the flare nut as tightly as possible by hand.
4. Using a spanner, grip the nut on the unit tubing.
5. While firmly gripping the nut, use a torque wrench to tighten the flare nut, according to the torque values in Table 7.5.

NOTE: Use both a spanner and a torque wrench when connecting or disconnecting pipes to/from the unit.

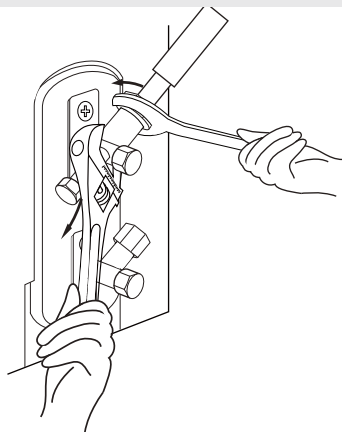


Fig. 7.10

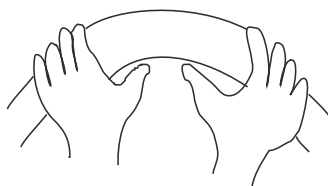
! CAUTION

- Be sure to wrap insulation around the piping. Direct contact with the bare piping may result in burns or frostbite.
- Make sure the pipe is properly connected. Over tightening may damage the bell mouth, and under tightening may lead to leakage.

NOTE ON MINIMUM BEND RADIUS

Carefully bend the tubing in the middle according to the diagram below. **DO NOT** bend the tubing more than 90°, or more than 3 times.

Bend the pipe using thumbs



min-radius 10cm (~4")

Fig. 7.11

6. After connecting the copper pipes to the indoor unit, wrap the power cable, signal cable, and the piping together using binding tape.

NOTE: **DO NOT** intertwine signal cable with other wires. While bundling these items together, do not intertwine or cross the signal cable with any other wiring.

7. Thread this pipeline through the wall and connect it to the outdoor unit.
8. Insulate all the piping, including the valves of the outdoor unit.
9. Open the stop valves of the outdoor unit to start the flow of the refrigerant between the indoor and outdoor unit.

! CAUTION

Check to make sure there is no refrigerant leak after completing the installation work. If there is a refrigerant leak, ventilate the area immediately and evacuate the system (refer to the Air Evacuation section of this manual).

Safety Precautions

WARNING

- Disconnect the power supply before doing work on the unit.
- All wiring must be performed according to all relevant local and national regulations.
- Wiring must be done by a qualified technician. Improper connections may cause electrical malfunction, injury, or fire.
- An independent circuit and single outlet must be used for this unit. DO NOT plug another appliance or charger into the same outlet. If it cannot handle the load or there is a defect in the wiring, it can lead to shock, fire, and unit and property damage.
- Connect the power cable to the terminals and fasten it with a clamp. An unsecure connection may cause fire.
- Make sure that all wiring is done correctly and that the control board cover is properly installed. Failure to do so can cause overheating at the connection points, fire, and electrical shock.
- Ensure that main power supply connection is made through a switch that disconnects all poles, with a contact gap of at least 3mm (0.12").
- DO NOT modify the length of the power cord, or use an extension cord.

CAUTION

- Connect the outdoor wires before connecting the indoor wires.
- Make sure you ground the unit. The grounding wire should be located away from gas pipes, water pipes, lightning rods, telephone wires or other grounding wires. Improper grounding may cause electrical shock.
- DO NOT connect the unit to the power source until all wiring and piping is completed.
- Make sure that you do not cross your electrical wiring with your signal wiring. This may cause distortion and interference.

To prevent distortion when the compressor starts (you can find the unit's power information on the rating sticker),:

- The unit must be connected to the main outlet. Normally, the power supply must have an impedance of 32 ohms.
- No other equipment should be connected to the same power circuit.

TAKE NOTE OF FUSE SPECIFICATIONS

The air conditioner's printed circuit board (PCB) is designed with a fuse that provides overcurrent protection. The specifications of the fuse are printed on the circuit board, examples of such are T5A/250VAC and T10A/250VAC.

Outdoor Unit Wiring

WARNING

Before performing any electrical or wiring work, turn off the main power to the system.

1. Prepare the cable for connection
 - a. You must first choose the right cable size. Be sure to use H07RN-F cables.

Table 8.1: Minimum Cross-Sectional Areas of Power and Signal Cables in North America

Rated Current of Appliance (A)	AWG
≤7	18
7 - 13	16
13 - 18	14
18 - 25	12
25 - 30	10

Table 8.2: Other World Regions

Rated Current of Appliance (A)	Nominal Cross-Sectional Area (mm ²)
≤ 6	0.75
6 - 10	1
10 - 16	1.5
16 - 25	2.5
25 - 32	4
32 - 45	6

- b. Using wire strippers, strip the rubber jacket from both ends of the signal cable to reveal approximately 15cm (~6") of wire.
- c. Strip the insulation from the ends.
- d. Using a wire crimper, crimp u-lugs onto the ends.

NOTE: When connecting the wires, strictly follow the wiring diagram found inside the electrical box cover.

2. Remove the electric cover of the outdoor unit. If there is no cover on the outdoor unit, take off the bolts from the maintenance board and remove the protection board. (See Fig. 8.1, 8.2)

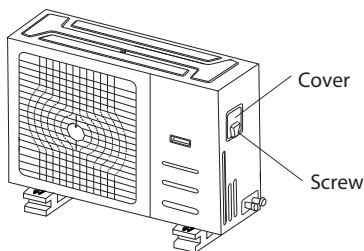
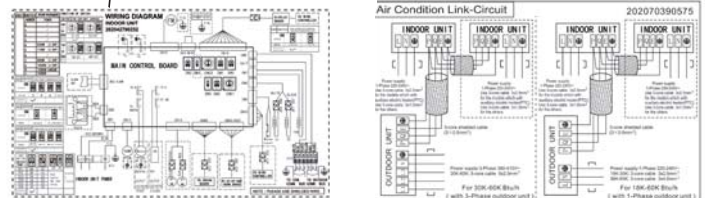
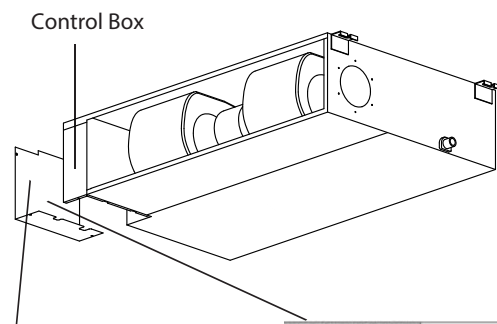


Fig. 8.1

Indoor Unit Wiring

1. Prepare the cable for connection
 - a. Using wire strippers, strip the rubber jacket from both ends of the signal cable to reveal about 15cm (~6") of the wire.
 - b. Strip the insulation from the ends of the wires.
 - c. Using a wire crimper, crimp the u-lugs onto the ends of the wires.
2. Remove the cover of the electric control box on your indoor unit.
3. Connect the u-lugs to the terminals. Match the wire colors/labels with the labels on the terminal block, and firmly screw the u-lug of each wire to its corresponding terminal. Refer to the serial number and wiring diagram located on the cover of the electric control box.



Wiring Diagram

Connective Wiring Diagram

Fig. 8.3

3. Connect the u-lugs to the terminals. Match the wire colors/labels with the labels on the terminal block, and firmly screw the u-lug of each wire to its corresponding terminal.
4. Clamp down the cable using the cable clamp.
5. Insulate unused wires with electrical tape. Keep them away from any electrical or metal parts.
6. Reinstall the cover of the electric control box.

Magnetic Ring (if supplied and packed with the accessories)

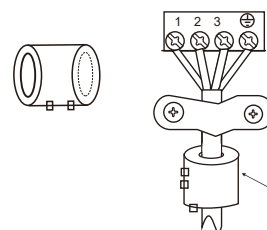


Fig. 8.4

Pass the belt through the hole of the Magnetic ring to fix it onto the cable

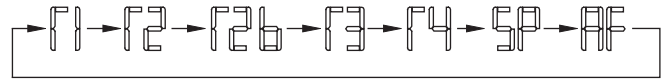
! CAUTION

- While connecting the wires, please follow the wiring diagram strictly.
- The refrigerant circuit can become very hot. Keep the interconnection cable away from the copper tube.

4. Clamp down the cable with the cable clamp. The cable must not be loose or tug on the u-lugs.
5. Reattach the electric box cover.

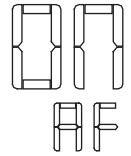
Using the wire controller to set external static pressure (some models):

- You can use the unit's automatic airflow adjustment function to set external static pressure.
 - Automatic airflow adjustment is the volume of blow-off air that has been automatically adjusted to the quantity rated.
1. Make sure the test run is done with a dry coil. If the coil is not dry, run the unit for 2 hours in FAN-ONLY mode to dry the coil.
 2. Check that both the power supply wiring and duct installation have been completed. Check that any closing dampers are open. Check that the air filter is properly attached to the air suction side passage of the unit.
 3. If there is more than one air inlet and outlet, adjust the dampers so that the airflow rate of each air inlet and outlet conforms with the designed airflow rate. Make sure the unit is in FAN-ONLY mode. Press and set the airflow adjustment button on the remote control to change the airflow rate from H or L.
 4. Set the parameters for automatic airflow adjustment. When the air conditioning unit is off, perform the following steps:
 - Press "COPY".
 - Press "+" or "-" to select the AF.



- Press "CONFIRM". The air conditioning unit will then start the fan for automatic airflow adjustment.

ON will flash when the fan is on during automatic airflow adjustment.



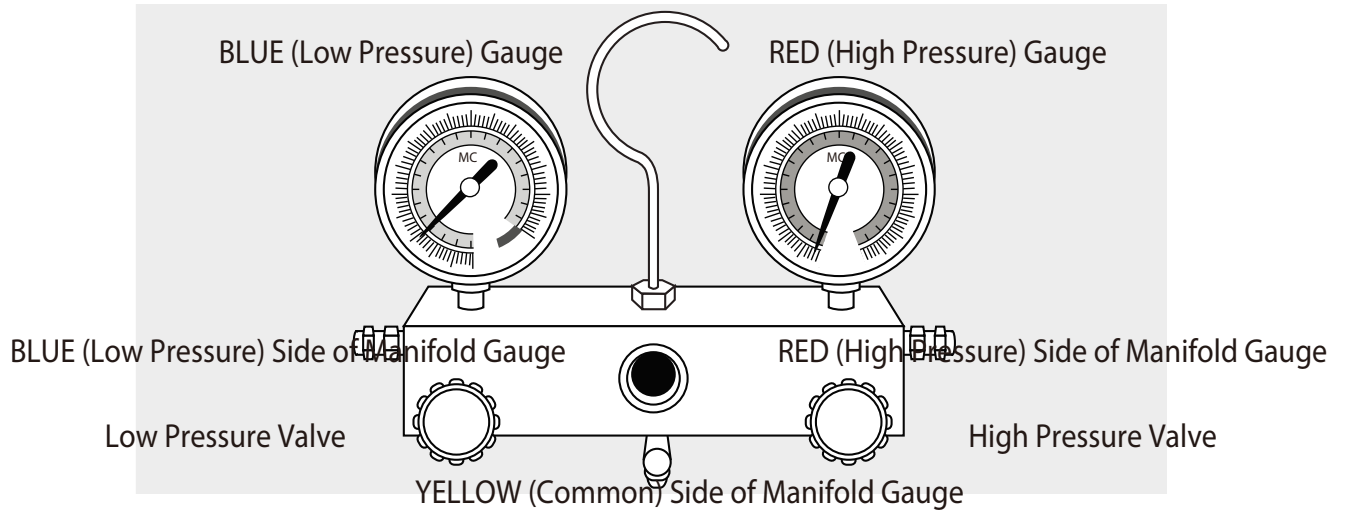
! CAUTION

- DO NOT adjust the dampers when automatic airflow adjustment is active.

After 3 to 6 minutes, the air conditioning unit will stop operating, once automatic airflow adjustment has finished.

! CAUTION

- If there is no change after airflow adjustment in the ventilation paths, be sure to reset the automatic airflow adjustment.
- If there is no change to ventilation paths after airflow adjustment, contact your dealer, especially if this occurs after testing the outdoor unit, or if the unit has been moved to a different location.
- Don't use automatic airflow adjustment with the remote control if you are using booster fans, outdoor air processing units, or an HRV via duct.
- If the ventilation paths have been changed, reset airflow automatic adjustment as described from step 3 onwards.



Caution: Systems are precharged with refrigerant (entire amount necessary for the system set has been charged into the outdoor section). The line sets and the indoor units are not charged, and must be evacuated prior to releasing the refrigerant from the outdoor unit to the rest of the system. Do NOT open the valves of the 2 service ports on your outdoor unit until the air evacuation is completed successfully, and the system passes leak checks. BOTH of those Service valves MUST BE OPENED to release the refrigerant before turning the system ON. Operating the system with service valves closed will result in compressor damage.

Preparations and Precautions

Air and foreign matter in the refrigerant circuit can cause abnormal rises in pressure, which can damage the air conditioner, reduce its efficiency, and cause injury. Use a vacuum pump and manifold gauge to evacuate the line set and the indoor unit, removing any non-condensable gas and moisture from the system.

Evacuation should be performed upon initial installation, and when the unit is relocated.

BEFORE PERFORMING EVACUATION

- ☑ Check to make sure that both LIQUID SIDE and GAS SIDE pipes between the indoor and outdoor units are connected properly, in accordance with the Refrigerant Piping Connection section of this manual.
- ☑ Check to make sure all wiring is connected properly.

Before using the manifold gauge and vacuum pump, read their operation manuals to familiarize yourself with how to use them properly.

Evacuation Instructions

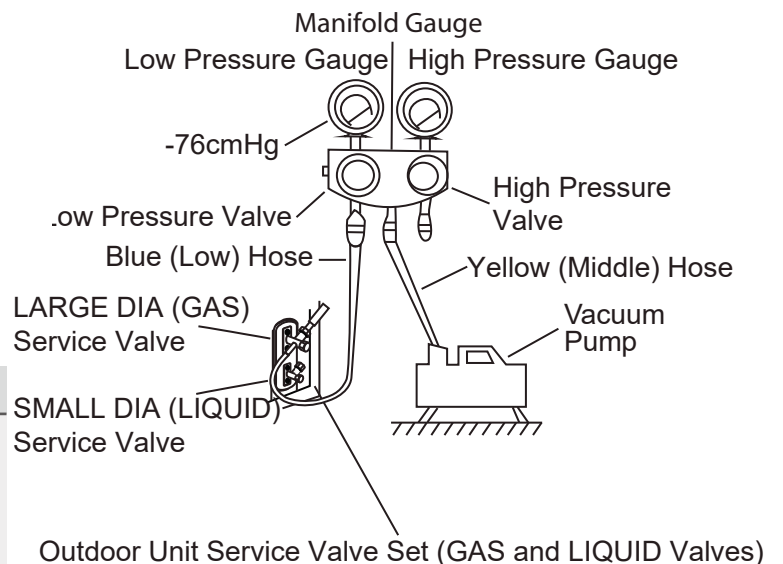


Fig. 6.1

1. Connect the blue (low side) hose of the manifold gauge to the service port on the outdoor unit's GAS SIDE valve (use a 1/4" to 5/16" port adapter if needed, which is sold separately)
2. Connect the yellow (middle or common) hose from the manifold gauge to the vacuum pump.

3. Open the BLUE (Low Pressure) valve of the manifold Gauge. Keep the RED (High Pressure) Valve closed.
4. Turn the vacuum pump ON to start evacuating the air from the line set and indoor unit circuits.
5. Run the vacuum pump for at least 15 minutes, or until the Low Pressure Gauge reads -76cmHG (-100 kPa or -30 in Hg) (negative value).
6. Close the Blue (Low Pressure) Valve of the Manifold Gauge, then turn the vacuum pump OFF.
7. Wait for 5 minutes, then check that there has been no rise in the Low Pressure Gauge reading.
8. If there is a rise (Vacuum Loss), refer to the Gas Leak Check section for information on how to check for leaks. If there is no change in vacuum reading, unscrew the cap from the LIQUID Side Service Valve (Fig. 6.2)
9. Insert a hexagonal wrench into the service valve (LIQUID Side Valve), and open the valve by turning the wrench for a 1/4 counterclockwise turn. Listen for the sound of gas exiting the system, then close the valve after 5 seconds.
10. The Low Pressure Gauge should now show a positive pressure value (above zero). Watch the Pressure Gauge for a few minutes, to make sure that there is no drop in the pressure value (indicating a leak)

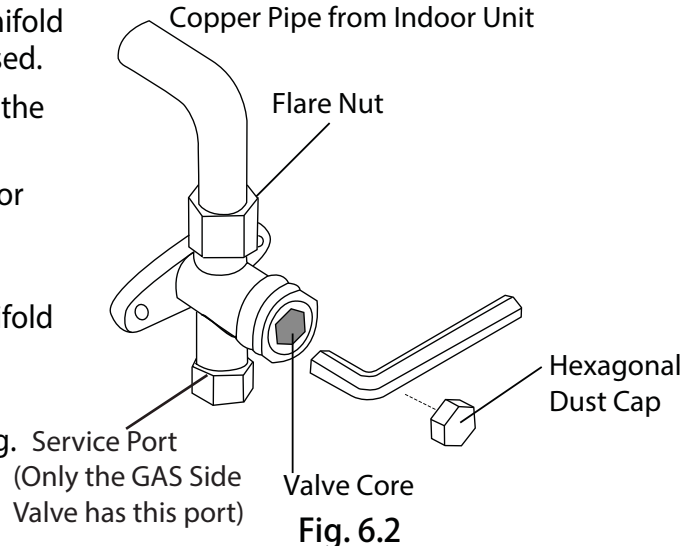


Fig. 6.2

11. Using a hexagonal wrench, fully open both the LIQUID side and GAS side service valves.
12. Remove the charging hose from the service port.
13. Tighten the valve caps on all three valves (service port, liquid side, gas side) by hand. Then tighten it further, using a torque wrench, if needed.

! OPEN VALVE STEMS GENTLY

When opening valve stems, turn the hexagonal wrench until it seats against the stopper. Do not try to force the valve to open further.

Note on Adding Refrigerant

Some systems require additional charging, depending on pipe lengths. The pipe length varies according to locations of the indoor and outdoor units. The system has been factory charged with sufficient R410a refrigerant for the standard pipe length of 5m (~16'). The additional refrigerant to be charged can be calculated using the following formula. This is only necessary if the length exceeds 7.5m (~25 feet).

ADDITIONAL REFRIGERANT PER PIPE LENGTH

Connective Pipe Length (m)	Air Purging Method	Additional Refrigerant	
≤ Standard pipe length	Vacuum Pump	N/A	
> Standard pipe length (5m/16ft)	Vacuum Pump	Liquid Side: Ø 6.35 (ø 1/4") Gas side either Ø 9.52 (ø 3/8") or Ø 12.7 (ø 1/2") Default charge has tolerance up to 25ft, for lengths beyond 25ft (7.6m), add: 15 g/m x each additional meter after 5m 0.16 oz/ft x each additional foot after 16ft	Liquid Side: Ø 9.52 (ø 3/8") Gas side either Ø 15.87 (ø 5/8") or Ø 19.05 (ø 3/4") Default charge has tolerance up to 25ft, for lengths beyond 25ft (7.6m), add: 30 g/m x each additional meter after 5m 0.32 oz/ft x each additional foot after 16ft

! CAUTION

DO NOT mix refrigerant types. Use only the same type of refrigerant (R410a).

Before the Test Run

A test run must be performed after the entire system has been fully installed. Confirm the following points prior to performing the test:

- a) The indoor and outdoor units are properly installed.
- b) Piping and wiring are properly connected.
- c) No obstacles are near the inlet and outlet of the unit that might cause poor performance or product malfunction.
- d) The refrigeration system does not leak.
- e) The drainage system is unimpeded and is draining to a safe location.
- f) The heating insulation is properly installed.
- g) The grounding wires are properly connected.
- h) The length of the piping and the additional refrigerant stow capacity have been recorded.
- i) The power voltage is the correct voltage for the air conditioner.

CAUTION

Failure to perform the test run may result in unit damage, property damage, or personal injury.

Test Run Instructions

1. Open both the liquid and gas stop valves.
2. Turn on the main power switch, and allow the unit to warm up.
3. Set the air conditioner to COOL mode.
4. For the Indoor Unit
 - a. Ensure the remote control and its buttons work properly.
 - b. Ensure the louvers move properly and can be changed by using the remote control.
 - c. Double check to see if the room temperature is registered correctly.
 - d. Ensure that the indicators on the remote control and the display panel on the indoor unit work properly.
 - e. Ensure that the manual buttons on the indoor unit work properly.

- f. Check to see that the drainage system is unimpeded, is and draining smoothly.
- g. Ensure there is no vibration or abnormal noise during operation.
5. For the Outdoor Unit
 - a. Check to see if the refrigeration system is leaking.
 - b. Make sure that there is no vibration or abnormal noise during operation.
 - c. Ensure that the wind, noise, and water generated by the unit do not disturb your neighbors, or pose a safety hazard.
6. Drainage Test
 - a. Ensure that the drainpipe flows smoothly. New buildings should perform this test before finishing the ceiling.
 - b. Remove the test cover. Add 2,000 ml of water to the tank through the attached tube.
 - c. Turn on the main power switch, and run the air conditioner in COOL mode.
 - d. Listen to the sound of the drain pump to see if it makes any unusual noises.
 - e. Check to see that the water has discharged. It may take up to one minute before the unit begins to drain, depending on the drainpipe.
 - f. Make sure that there are no leaks in any of the pipings.
 - g. Stop the air conditioner. Turn off the main power switch, and reinstall the test cover.

NOTE: If the unit malfunctions or does not operate according to your expectations, please refer to the Troubleshooting section of the Owner's Manual before calling customer service.