

SPLIT TYPE ROOM AIR CONDITIONER

INSTALLATION MANUAL

(PART NO. 9374995172)

ENGLISH

IMPORTANT!

Please Read Before Starting

This air conditioning system meets strict safety and operating standards. As the installer or service person, it is an important part of your job to install or service the system so it operates safely and efficiently.

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- Observe all local, state, and national electrical codes.
- Pay close attention to all danger, warning, and caution notices given in this manual.

WARNING: This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

CAUTION: This symbol refers to a hazard or unsafe practice which can result in personal injury and the potential for product or property damage.

- Hazel alerting symbols



Electrical



Safety / alert

If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

SPECIAL PRECAUTIONS

When Wiring

ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause **accidental injury or death**.
- **Ground the unit** following local electrical codes.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.

When Transporting

Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut your fingers.

When Installing...

...In a Ceiling or Wall

Make sure the ceiling/wall is strong enough to hold the unit's weight. It may be necessary to construct a strong wood or metal frame to provide added support.

...In a Room

Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and water damage to walls and floors.

...In Moist or Uneven Locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

...In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

...In a Snowy Area (for Heat Pump-type Systems)

Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.

When Connecting Refrigerant Tubing

- Keep all tubing runs as short as possible.
- Use the flare method for connecting tubing.
- Apply refrigerant lubricant to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before starting the test run.

NOTE:

Depending on the system type, liquid and gas lines may be either narrow or wide. Therefore, to avoid confusion the refrigerant tubing for your particular model is specified as either "small" or "large" rather than as "liquid" or "gas".

When Servicing

- Turn the power OFF at the main circuit breaker panel before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.
- After installation, explain correct operation to the customer, using the operating manual.

This air conditioner uses new refrigerant HFC (R410A).

The basic installation work procedures are the same as conventional refrigerant (R22) models. However, pay careful attention to the following points:

- (1) Since the working pressure is 1.6 times higher than that of conventional refrigerant(R22) models, some of the piping and installation and service tools are special. (See the table below.) Especially, when replacing a conventional refrigerant(R22) model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.
- (2) Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with conventional refrigerant(R22) and for safety. Therefore, check beforehand. [The charging port thread diameter for R410A is 1/2 threads per inch.]
- (3) Be more careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant(R22) models. Also, when storing the piping, securely seal the opening by pinching, taping, etc.
- (4) When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.

Special tools for R410A

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with seals -0.1 to 5.3 MPa (-1 to 53 bar) for high pressure. -0.1 to 3.8 MPa (-1 to 38 bar) for low pressure.
Charge hose	To increase pressure resistance, the hose material and base size were changed.
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter.
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

Copper pipes

It is necessary to use seamless copper pipes and it is desirable that the amount of residual oil is less than 40 mg/10m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion valve or capillary tube may become blocked with contaminants.

As an air conditioner using R410A incurs pressure higher than when using R22, it is necessary to choose adequate materials. Thicknesses of copper pipes used with R410A are as shown in the table. Never use copper pipes thinner than that in the table even when it is available on the market.

CONNECTION PIPE REQUIREMENT

Nominal diameter	Outer diameter	Thickness	Maximum length	Maximum height (between indoor and outdoor)
3/8in	9.52mm	0.8mm	165ft(50m)	99ft(30m)
5/8in	15.88mm	1.0mm		

WARNING

Do not use the existing (for R22) piping and flare nuts.

- If the existing materials are used, the pressure inside the refrigerant cycle will rise and cause breakage, injury, etc. (Use the special R410A materials.)

When installing and relocating the air conditioner, do not mix gases other than the specified refrigerant(R410A) to enter the refrigerant cycle.

- If air or other gas enters the refrigerant cycle, the pressure inside the cycle will rise to an abnormally high value and cause breakage, injury, etc.

CAUTION

When installing pipes shorter than 17ft (5m), sound of the outdoor unit will be transferred to the indoor unit, which will cause large operating sound or some abnormal sound.

GENERAL

This INSTALLATION MANUAL briefly outlines where and how to install the air conditioning system. Please read over the entire set of instructions for the indoor and outdoor units and make sure all accessory parts listed are with the system before beginning.

1. TYPE OF COPPER PIPE AND INSULATION MATERIAL

Copper tubing for connecting the outdoor unit to the indoor unit and insulation material is available for purchase locally. When you purchase them, please specify the following.

A. Deoxidized annealed copper pipe for refrigerant piping as:

Small pipe		Large pipe	
Outer diameter	Thickness	Outer diameter	Thickness
3/8"(9.52 mm)	0.031496 in (0.8 mm)	5/8"(15.88 mm)	0.03937 in (1.0 mm)

Cut each pipe to the appropriate length +12" (30 cm) to 16" (40 cm) to dampen vibration between units.

B. Foamed polyethylene insulation for copper pipes as required to precise length of piping. Wall thickness of the insulation should not be less than 5/16" (8 mm).

C. Use insulated copper wire for field wiring.

CAUTION

Check local electrical codes and regulations before obtaining wire. Also, check any specified instructions or limitations.

2. ADDITIONAL MATERIALS REQUIRED FOR INSTALLATION

- Refrigeration (armored) tape
- Insulated staples or clamps for connecting wire (See your local electrical codes.)
- Putty
- Refrigeration lubricant
- Clamps or saddles to secure refrigerant piping

3. OPERATING RANGE

	MODEL	Cooling/Dry Mode	Heating Mode
Outdoor temperature	18R	About 5 to 115 °F	About 5 to 75 °F
	24R	About 0 to 115 °F	About 0 to 75 °F
Indoor temperature	—	About 64 to 90 °F	86 °F or less
Indoor humidity	—	About 80% or less	—

STANDARD ACCESSORIES

The following installation accessories are supplied. Use them as required.

Name and Shape	Q'ty	Description
Adapter [mm (in.)] 12.7 (1/2) → 15.88 (5/8)	1	Adapter is necessary in the connection of the indoor unit. For more information, refer to the installation manual included with the indoor unit.
(18R MODEL only)		
Adapter [mm (in.)] 6.35 (1/4) → 9.52 (3/8)	1	
Drain pipe (Reverse cycle model only)	1	—
Drain cap	5	—

The following items are necessary to install this air conditioner. (The items are not included with the air conditioner and must be purchased separately.)

Name	Q'ty
Connection pipe assembly	1
Connection cord	1
Wall pipe	1
Decorative tape	1
Vinyl tape	1
Wall cap	1
Saddle	1 set
Drain hose	1
Tapping screws	1 set
Sealant	1
M10 bolt, nut	4 set

ELECTRICAL REQUIREMENT

Always make the air conditioner power supply a special branch circuit and provide a special switch and receptacle. Do not extend the power cord.

CAUTION		
MODEL	18 R	24 R
MINIMUM CIRCUIT AMPACITY	17 A	18 A
MAXIMUM OVERCURRENT PROTECTION (TIME DELAY FUSE OR HACR TYPE CIRCUIT BREAKER)	20 A	30 A

SELECTING THE MOUNTING POSITION

Decide the mounting position with the customer as follows:

OUTDOOR UNIT

- (1) If possible, do not install the unit where it will be exposed to direct sunlight. (If necessary, install a blind that does not interfere with the air flow.)
- (2) Do not install the unit where a strong wind blows or where it is very dusty.
- (3) Do not install the unit where people pass.
- (4) Take your neighbors into consideration so that they are not disturbed by air blowing into their windows or by noise.
- (5) Provide the space shown in the figure so that the air flow is not blocked. Also for efficient operation, leave open three of the four directions front, rear, and both sides.

WARNING

Install at a place that can withstand the weight of the indoor and outdoor units and install positively so that the units will not topple or fall.

CAUTION

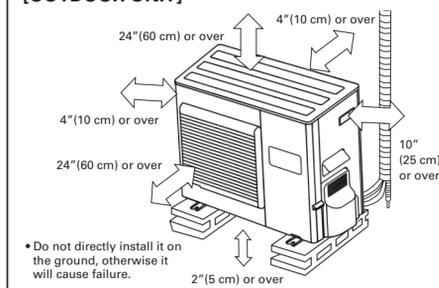
Do not install where there is the danger of combustible gas leakage.

Do not install near heat sources.

If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.

INSTALLATION DIAGRAM OF OUTDOOR UNITS

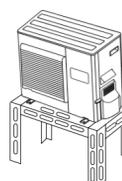
[OUTDOOR UNIT]



- Do not directly install it on the ground, otherwise it will cause failure.
- To obtain better operation efficiency, when the outdoor unit is installed, be sure to open the front and left side.

CAUTION

In the area with heavy snowfall, if the intake and outlet of outdoor unit is blocked with snow, it is likely to cause of the breakdown. Please construct a canopy and a pedestal or place the unit on a high stand (local configured).



POWER

WARNING

The rated voltage of this product is 208/230 V AC 60 Hz.

Before turning on the power, check if the voltage is within the 208 V -10 % to 230 V +10% range.

Always use a special branch circuit and install a special receptacle to supply power to the room air conditioner.

Use a circuit breaker and receptacle matched to the capacity of the air conditioner.

Do not extend the power cord.

Perform wiring work in accordance with standards so that the air conditioner can be operated safely and positively.

Install a leakage circuit breaker in accordance with the related laws and regulations and electric company standards.

CAUTION

The power source capacity must be the sum of the air conditioner current and the current of other electrical appliances. When the current contracted capacity is insufficient, change the contracted capacity.

When the voltage is low and the air conditioner is difficult to start, contact the power company the voltage raised.

CUSTOMER GUIDANCE

Explain the following to the customer in accordance with the operating manual:

- (1) Starting and stopping method, operation switching, temperature adjustment, timer, air flow switching, and other remote controller operations.
- (2) Air filter removal and cleaning, and how to use the air louvers.
- (3) Give the operating and installation manuals to the customer.

OUTDOOR UNIT

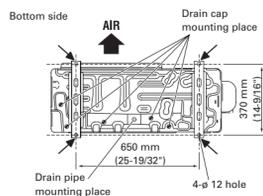
OUTDOOR UNIT INSTALLATION

WARNING

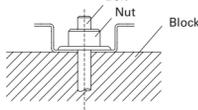
Install the unit where it will not be tilted by more than 3°. However, do not install the unit with it tilted towards the side containing the compressor.

When installing the outdoor unit where it may be exposed to strong wind, fasten it securely.

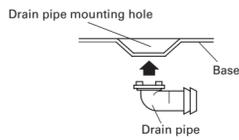
- (1) Outdoor unit to be fasten with bolts at the four places indicated by the arrows without fail.



- (2) Fix securely with bolts on a solid block. (Use 4 sets of commercially available M10 bolt, nut and washer.)



- (3) Since the drain water flows out of the outdoor unit during heating operation, install the drain pipe and connect it to a commercial 16 mm (5/8") hose. (Reverse cycle model only)
 (4) When installing the drain pipe, plug all the holes other than the drain pipe mounting hole in the bottom of the outdoor unit with putty so there is no water leakage. (Reverse cycle model only)



CAUTION

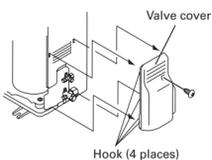
When the outdoor temperature is 32 °F or less, do not use the accessory drain pipe and drain cap. If the drain pipe and drain cap are used, the drain water in the pipe may freeze in extremely cold weather. (Reverse cycle model only)

CONNECTING THE PIPE

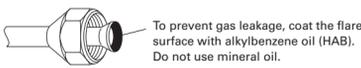
1. CONNECTION PIPES

Outdoor unit

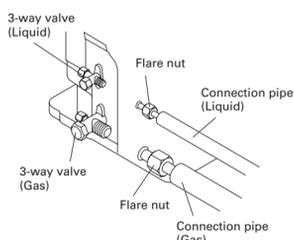
- Valve cover removal.
- Remove the one mounting screw.
 - Remove the valve cover by sliding upward.



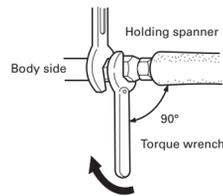
- (1) Detach the caps and plugs from the pipes.
 (2) Centering the pipe against port on the outdoor unit, turn the flare nut with your hand.



- (3) Tighten the flare nut of the connection pipe at the outdoor unit valve connector.



- (4) When the flare nut is tightened properly by your hand, use a torque wrench to finally tighten it.



Flare nut tightening torque

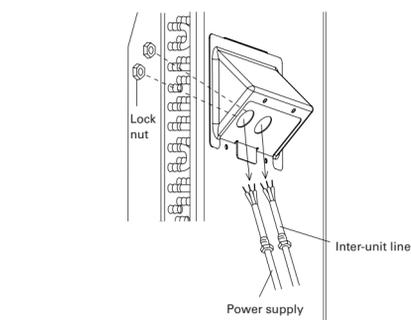
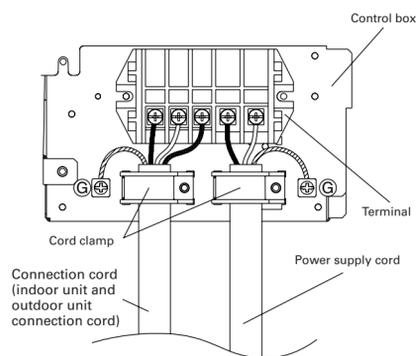
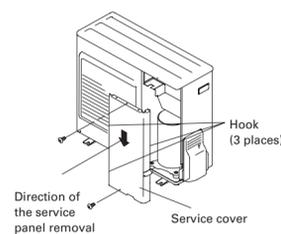
Flare nut [mm (in.)]	Tightening torque [N·m (lbf·ft)]
9.52 (3/8) dia.	32 to 42 (23.6 to 31.0)
15.88 (5/8) dia.	63 to 75 (46.5 to 55.3)

ELECTRICAL WIRING (OUTDOOR UNIT)

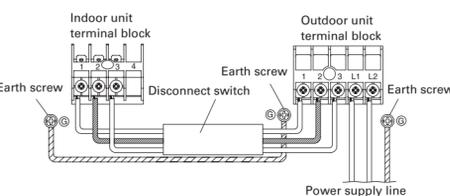
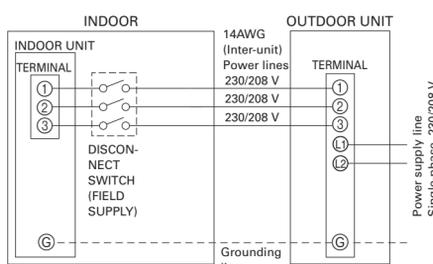
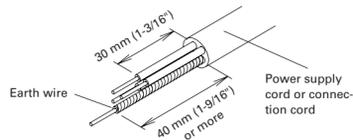
CAUTION

When connecting the power supply cord, make sure that the phase of the power supply matches with the phase of the terminal board. If the phases do not match, the compressor will rotate in reverse and will not be able to compress.

- (1) Service cover removal
- Remove the two mounting screws.
 - Remove the service cover by pushing downwards.
- (2) Fasten the power supply cord and the connection cord to the conduit holder using the lock nut. (open the knock out holes if necessary)
 (3) Connect the power supply cord and the connection cord to terminal.
 (4) Fasten the power supply cord and connection cord with cord clamp.



Keep the earth wire longer than the other wires.



NOTE:
 Factory installed protective inline fuses for indoor units' conductors are installed on the Power Supply PCB.

WARNING

Disconnect switch for over current protection given in the table below is to be installed between the indoor unit and the outdoor unit.

Disconnect switch

20A

CAUTION

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 part.

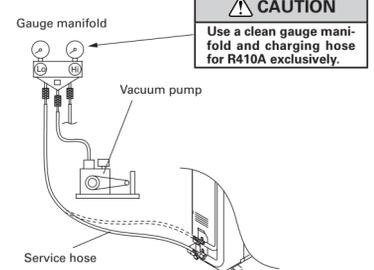
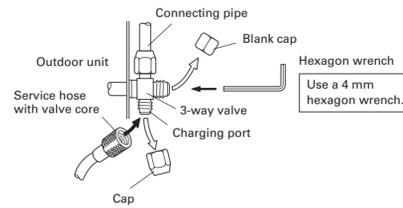
Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also exist. Therefore, be sure all wiring is tightly connected.

Connect wires to the matching numbers of terminals.

2. VACUUM

- Remove the cap, and connect the gauge manifold and the vacuum pump to the charging valve by the service hoses.
- Vacuum the indoor unit and the connecting pipes until the pressure gauge indicates -0.1 MPa (-76 cmHg).
- When -0.1 MPa (-76 cmHg) is reached, operate the vacuum pump for at least 60 minutes.
- Disconnect the service hoses and fit the cap to the charging valve to the specified torque.
- Remove the blank caps, and fully open the spindles of the 2-way and 3-way valves with a hexagon wrench [Torque: 6~7 N·m (60 to 70 kgf·cm)].
- Tighten the blank caps of the 2-way valve and 3-way valve to the specified torque.

Blank cap	Tightening torque	
	9.52 mm (3/8 in.)	20 to 25 N·m (200 to 250 kgf·cm)
Charging port cap	15.88 mm (5/8 in.)	30 to 35 N·m (300 to 350 kgf·cm)



CAUTION

Do not purge the air with refrigerants, but use a vacuum pump to vacuum the installation!
 There is no extra refrigerant in the outdoor unit for air purging!
 Use a vacuum pump and gauge manifold and charging hose for R410A exclusively.
 Using the same vacuum for different refrigerants may damage the vacuum pump or the unit.

3. ADDITIONAL CHARGE

Refrigerant suitable for a piping length of 66ft(20m) is charged in the outdoor unit at the factory.
 When the piping is longer than 66ft(20m), additional charging is necessary.
 For the additional amount, see the table below.

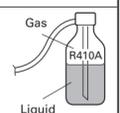
Piping length	66ft (20m)	99ft (30m)	131ft (40m)	165ft (50m)	Rate
Additional charge	None	14.2oz (400g)	1lb 12oz (800g)	2lb 10oz (1200g)	0.43oz/ft (40g/m)

CAUTION

When moving and installing the air conditioner, do not mix gas other than the specified refrigerant R410A inside the refrigerant cycle.

When charging the refrigerant R410A, always use an electronic balance for refrigerant charging (to measure the refrigerant by weight).

When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.



Add refrigerant from the charging valve after the completion of the work.

If the units are further apart than the maximum pipe length, correct operation cannot be guaranteed.

4. GAS LEAKAGE INSPECTION

CAUTION

After connecting the piping, check the all joints for gas leakage with gas leak detector.

When inspecting gas leakage, always use the vacuum pump for pressure. Do not use nitrogen gas.

WARNING

Use crimp-type terminals and tighten the terminal screws to the specified torques, otherwise, abnormal overheating may be produced and possibly cause heavy damage inside the unit.

Match the terminal block numbers and connection cord colors with those of the outdoor unit. Erroneous wiring may cause burning of the electric parts.

Connect the connection cords firmly to the terminal block. Imperfect installation may cause a fire.

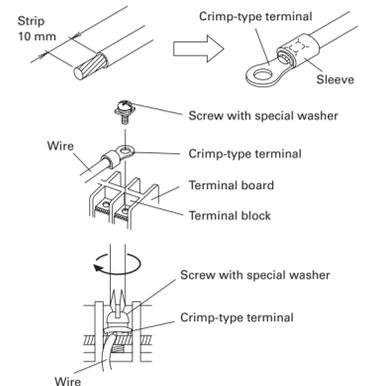
Always fasten the outside covering of the connection cord with the cord clamp. (If the insulator is chafed, electric leakage may occur.)

Securely earth the power cord plug.

Do not use the earth screw for an external connector. Only use for interconnection between two units.

HOW TO CONNECT THE WIRE TO THE TERMINALS

- Use crimp-type terminals with insulating sleeves as shown in the figure below to connect to the terminal block.
- Securely crimp the crimp-type terminals to the wires using an appropriate tool so that the wires do not come loose.
- Use the specified wires, connect them securely, and fasten them so that there is no stress placed on the terminals.
- Use an appropriate screwdriver to tighten the terminal screws. Do not use a screwdriver that is too small, otherwise, the screw heads may be damaged and prevent the screws from being properly tightened.
- Do not tighten the terminal screws too much, otherwise, the screws may break.
- See the table below for the terminal screw tightening torques.



Tightening torque

M4 screw	1.2 to 1.8 N·m (12 to 18 kgf·cm)
M5 screw	2.0 to 3.0 N·m (20 to 30 kgf·cm)

PUMP DOWN OPERATION (FORCED COOLING OPERATION)

To avoid discharging refrigerant into the atmosphere at the time of relocation or disposal, recover refrigerant by doing the cooling operation or forced cooling operation according to the following procedure. (When the cooling operation cannot start in winter, and so on, start the forced cooling operation.)

- Do the air purging of the charge hose by connecting the charging hose of gauge manifold to the charging port of 3-way valve (large) and opening the low-pressure valve slightly.
- Close the valve stem of 3-way valve (small) completely.
- Start the cooling operation or following forced cooling operation.
 When using the remote controller
 Press the TEST RUN button after starting the cooling operation by the remote controller.
 The operation indicator lamp and timer indicator lamp will begin to flash simultaneously during test run.
 When using the MANUAL AUTO button of the indoor unit (The remote controller is lost, and so on.)
 Keep on pressing the MANUAL AUTO button of the indoor unit for more than 10 seconds.
 (The forced cooling operation cannot start if the MANUAL AUTO button is not kept on pressing for more than 10 seconds.)
- Close the valve stem of 3-way valve (large) when the reading on the compound pressure gauge becomes 0.05~0 MPa (0.5~0 kg/cm²).
 (5) Stop the operation.
 • Press the START/STOP button of the remote controller to stop the operation.
 • Press the MANUAL AUTO button when stopping the operation from indoor unit side.
 (It is not necessary to press on keeping for more than 10 seconds.)

CAUTION

During the pump-down operation, make sure that the compressor is turned off before you remove the refrigerant piping. Do not remove the connection pipe while the compressor is in operation 3-way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to breakage and even injury.

CAUTION

Install heat insulation around both the gas and liquid pipes. Failure to do so may cause water leaks. Use heat insulation with heat resistance above 248 °F. (Reverse cycle model only)
 In addition, if the humidity level at the installation location of the refrigerant piping is expected to exceed 70%, install heat insulation around the refrigerant piping. If the expected humidity level is 70~80%, use heat insulation that is 15 mm or thicker and if the expected humidity exceeds 80%, use heat insulation that is 20 mm or thicker.
 If heat insulation is used that is not as thick as specified, condensation may form on the surface of the insulation. In addition, use heat insulation with heat conductivity of 0.045 W/(m·K) or less (at 68 °F).