

SPLIT TYPE ROOM AIR CONDITIONER

INSTALLATION MANUAL

(PART No. 9374995462)

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.

• Hazard 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 earthing (grounding) can cause accidental injury or death.
- Earth (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.
- 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 opening the refrigerant valves.

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.

CAUTION
Read carefully all safety information written in this manual before you install or use the air conditioner.

SAFETY PRECAUTIONS

Be sure to read this manual carefully before installation.

The warnings and precautions indicated in this manual contain important information pertaining to your safety. Be sure to observe them.

Hand this manual, together with the operating manual, to the customer. Request the customer to keep them on hand for future use, such as for relocating or repairing the unit.

WARNING

Installation of this product must be done by experienced service technicians or professional installers only in accordance with this manual. Installation by nonprofessionals or improper installation of the product may cause serious accidents such as injury, water leakage, electric shock, or fire. If the product is installed in disregard of the instructions in this manual, it will void the manufacturer's warranty.

To avoid getting an electric shock, never touch the electrical components soon after the power supply has been turned off. After turning off the power, always wait 10 minutes or more before you touch the electrical components.

Do not turn ON the power until all work has been completed. Turning ON the power before the work is completed can cause serious accidents such as electric shock or fire.

If refrigerant leaks while work is being carried out, ventilate the area. If the refrigerant comes in contact with a flame, it produces a toxic gas.

Installation must be performed in accordance with regulations, codes, or standards for electrical wiring and equipment in each country, region, or the installation place.

Do not use this equipment with air or any other unspecified refrigerant in the refrigerant lines.

Excess pressure can cause a rupture.

During installation, make sure that the refrigerant pipe is attached firmly before you run the compressor. Do not operate the compressor under the condition of refrigerant piping not attached properly with 2-way or 3-way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to rupture and even injury.

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 rupture, injury, etc.

To connect the indoor unit and outdoor unit, use air conditioner piping and cables available locally as standard parts. This manual describes proper connections using such installation set.

If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

Do not modify power cable, use extension cable or branch wiring. Improper use may cause electric shock or fire by poor connection, insufficient insulation or over current.

Do not purge the air with refrigerants but use a vacuum pump to vacuum the installation.

There is not extra refrigerant in the outdoor unit for air purging.

Using the same vacuum pump for different refrigerants may damage the vacuum pump or the unit.

Use a clean gauge manifold, vacuum pump and charging hose for R410A exclusively.

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 with 2 way or 3 way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to rupture and even injury.

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

To avoid danger of suffocation, keep the plastic bag or thin film used as the packaging material away from young children.

CAUTION

Read carefully all safety information written in this manual before you install or use the air conditioner.

This unit must be installed by qualified personnel with a capacity certificate for handling refrigerant fluids. Refer to regulation and laws in use on installation place.

CAUTION

Install the product by following local codes and regulations in force at the place of installation, and the instructions provided by the manufacturer.

This product is part of a set constituting an air conditioner. The product must not be installed alone or be installed with non-authorized device by the manufacturer.

Always use a separate power supply line protected by a circuit breaker operating on all wires with a distance between contact of 3 mm for this product.

To protect the persons, earth (ground) the product correctly, and use the power cable combined with an Earth Leakage Circuit Breaker (ELCB).

This product is not explosion proof, and therefore should not be installed in explosive atmosphere.

Do not touch the fins of the heat exchanger. Touching the heat exchanger fins could result in damage to the fins or personal injury such as skin rupture.

This product contains no user-serviceable parts. Always consult experienced service technicians for repairing.

When moving or relocating the air conditioner, consult experienced service technicians for disconnection and reinstallation of the product.

Do not place any other electrical products or household belongings under the indoor unit or outdoor unit. Dripping condensation from the unit might get them wet, and may cause damage or malfunction of your property.

ABOUT THIS PRODUCT

PRECAUTIONS FOR USING R410A REFRIGERANT

WARNING

The basic installation work procedures are the same as conventional refrigerant (R22) models.

However, pay careful attention to the following points:

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 specific. (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.

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 1/2-20 UNF.]

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.

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 where refrigerant composition is stable.

SPECIAL TOOLS FOR R410A

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional (R22) 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/10 m. 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 Table1. Never use copper pipes thinner than 0.8 mm even when it is available on the market.

CONNECTION PIPE REQUIREMENT

Nominal diameter	Outer diameter	Thickness
3/8 in	9.52 mm	0.8 mm
5/8 in	15.88 mm	1.0 mm

WARNING

To install a unit that uses R410A refrigerant, use dedicated tools and piping materials that have been manufactured specifically for R410A use. Because the pressure of R410A refrigerant is approximately 1.6 times higher than R22, failure to use dedicated piping material or improper installation can cause rupture or injury. Furthermore, it can cause serious accidents such as water leakage, electric shock, or fire.

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.

LIMITATION OF REFRIGERANT PIPING LENGTH

CAUTION

The total maximum pipe lengths and height difference of this product are shown in the table.

If the units are further apart than this, correct operation cannot be guaranteed.

Pipe length	Maximum height (between indoor and outdoor)
MAX. 165ft. (50m)	MIN. 16ft. (5m) 99ft. (30m)

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.

SELECTING THE MOUNTING POSITION

Decide the mounting position with the customer as follows:

OUTDOOR UNIT

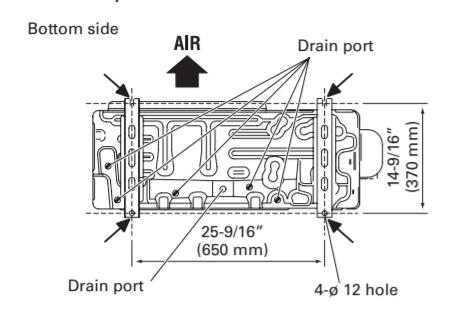
OUTDOOR UNIT INSTALLATION

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 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.)

CAUTION

Do not use the 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.

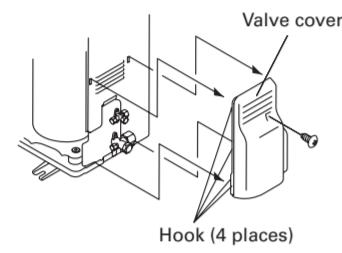
CONNECTING THE PIPE

1. CONNECTION PIPES

Outdoor unit

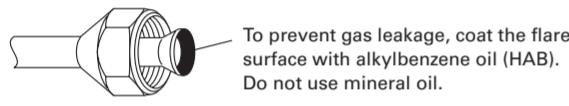
Valve cover removal.

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

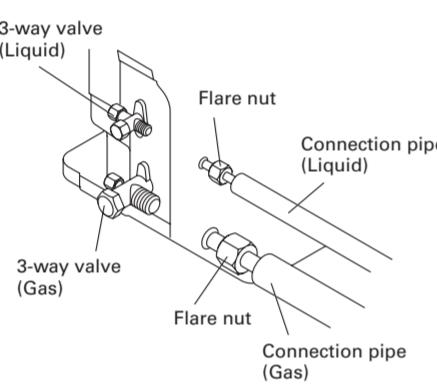


(1) Detach the caps and plugs from the pipes.

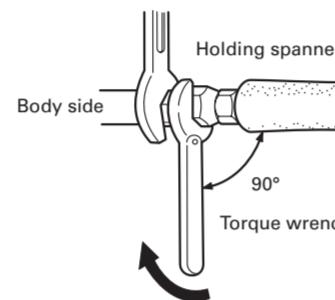
(2) Centering the pipe against port on the outdoor unit, turn the flare nut with your hand.



(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.



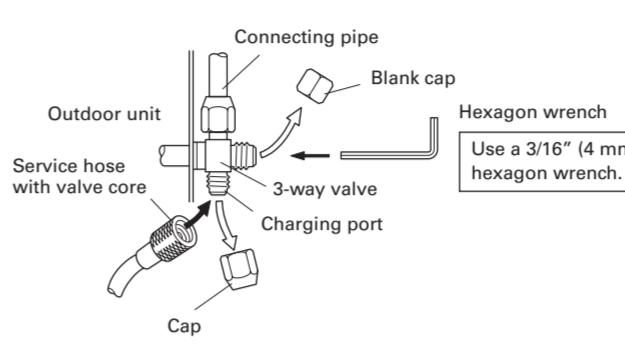
Flare nut tightening torque

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

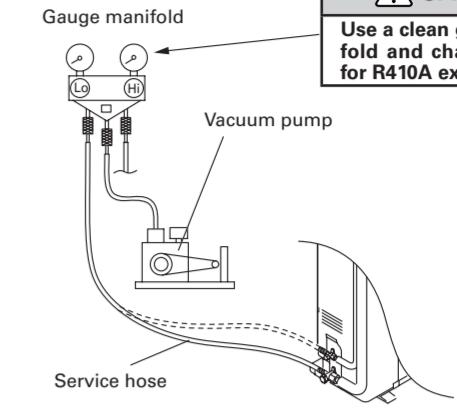
2. VACUUM

- 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.

		Tightening torque
Blank cap	3/8" (9.52 mm)	20 to 25 N·m (200 to 250 kgf·cm)
	5/8" (15.88 mm)	30 to 35 N·m (300 to 350 kgf·cm)
Charging port cap		12.5 to 16 N·m (125 to 160 kgf·cm)



CAUTION	
Use a clean gauge manifold and charging hose for R410A exclusively.	



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.

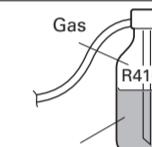
Piping length	66ft (20m)	99ft (30m)	131ft (40m)	165ft (50m)	Rate
Additional charge	None	14.2oz (400g)	1lb 12oz (800g)	2lb 10oz (1200g)	0.43oz/ft (40g/m)

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.

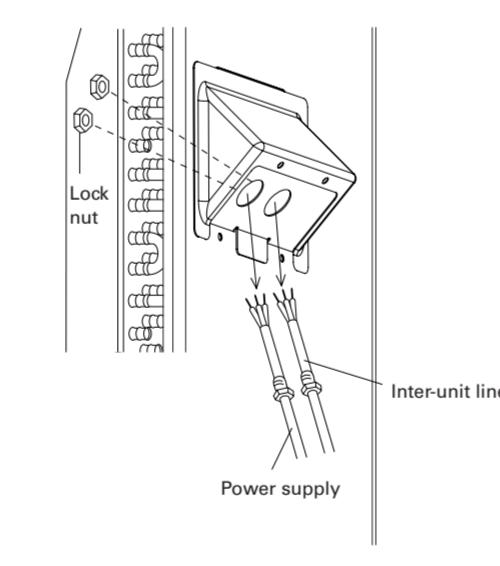
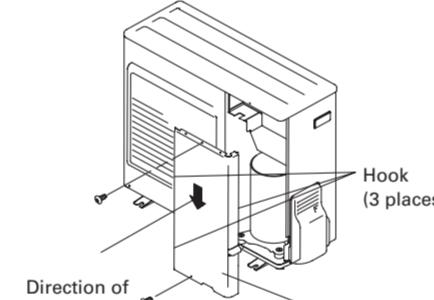
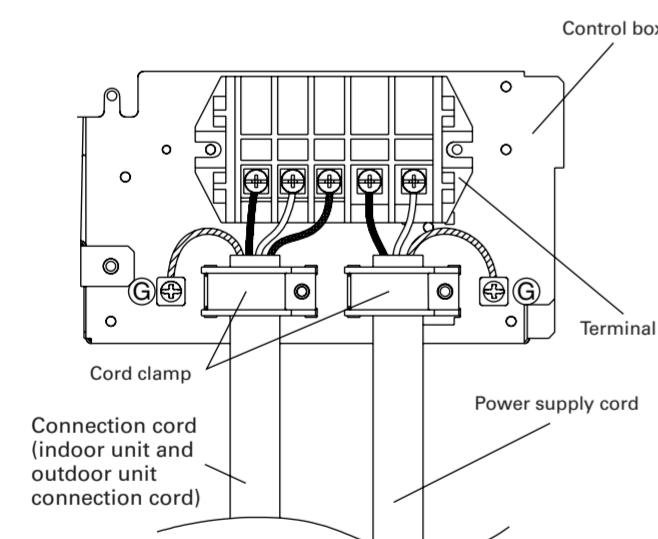
When inspecting gas leakage, always use the vacuum pump for pressure. Do not use nitrogen gas.

ELECTRICAL WIRING (OUTDOOR UNIT)

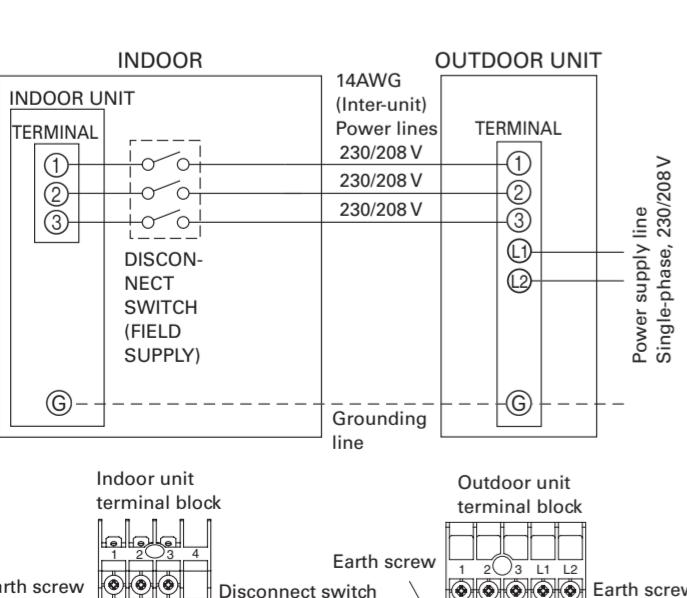
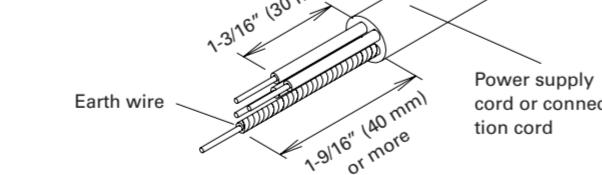
CAUTION

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.

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

Use ring 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.)

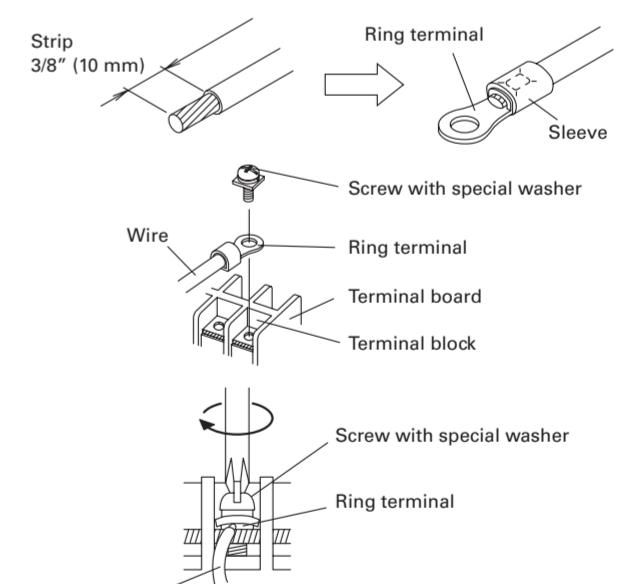
Securely earth the power cord plug.

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 ring terminals with insulating sleeves as shown in the figure below to connect to the terminal block.
- Securely clamp the ring 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 kgf/cm²).
- 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.)

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 (120 °C). (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 9/16" (15 mm) or thicker and if the expected humidity exceeds 80%, use heat insulation that is 13/16" (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 (20 °C)].