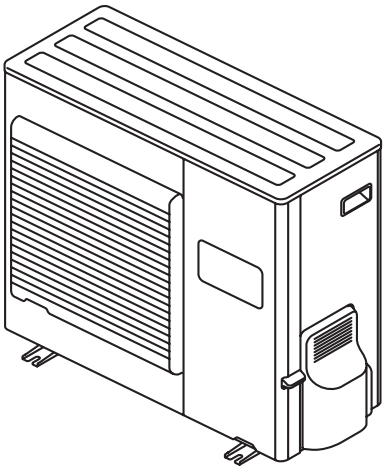
AIR CONDITIONER



INSTALLATION MANUAL
OUTDOOR UNIT
For authorized service personnel only.

English

INSTALLATIONSANLEITUNG
AUSSENGERÄT
Nur für autorisiertes Fachpersonal.

Deutsch

MANUEL D'INSTALLATION
APPAREIL EXTÉRIEUR
Pour le personnel d'entretien autorisé uniquement.

Français

MANUAL DE INSTALACIÓN
UNIDAD EXTERIOR
Únicamente para personal de servicio autorizado.

Español

MANUALE DI INSTALLAZIONE
UNITÀ ESTERNA
A uso esclusivo del personale tecnico autorizzato.

Italiano

ΕΓΧΕΙΡΙΔΙΟ ΕΓΚΑΤΑΣΤΑΣΗΣ
ΕΞΩΤΕΡΙΚΗ ΜΟΝΑΔΑ
Μόνο για εξουσιοδοτημένο τεχνικό προσωπικό.

Ελληνικά

MANUAL DE INSTALAÇÃO
UNIDADE EXTERIOR
Apenas para pessoal de assistência autorizado.

Português

РУКОВОДСТВО ПО УСТАНОВКЕ
ВНЕШНИЙ МОДУЛЬ
Только для авторизованного обслуживающего персонала.

Русский

MONTAJ KILAVUZU
DIŞ ÜNİTE
Yalnızca yetkili servis personeli için.

Türkçe

PART No. 9374995295

INSTALLATION MANUAL
OUTDOOR UNIT
PART No. 9374995295 English

Contents

1. 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.

After installation, explain correct operation to the customer, using the operating manual.

⚠ WARNING	This mark indicates procedures which, if improperly performed, might lead to the death or serious injury of the user.

- Never touch electrical components immediately after the power supply has been turned off. Electrical shock may occur. After turning off the power, always wait 5 minutes or more before touching electrical components.
- Request your dealer or a professional installer to install the outdoor unit in accordance with this Installation Manual. An improperly installed unit can cause serious accidents such as water leakage, electric shock, or fire. If the outdoor unit is installed in disregard of the instructions in the Installation Manual, it will void the manufacturer's warranty.
- 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 work must be performed in accordance with national wiring standards by authorized personnel only.
- 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.
- For the air conditioner to operate satisfactorily, install it as outlined in this installation manual.
- Connect the indoor unit and outdoor unit with the air conditioner piping and cable available standards parts.
  This installation manual describes the correct connections using the installation set available from our standard parts.
- Also, do not use an extension cable.
- 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.
- Use a vacuum pump for R410A exclusively.
- Using the same vacuum pump for different refrigerants may damage the vacuum pump or the unit.
- Use a clean gauge manifold 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.

⚠ CAUTION	This mark indicates procedures which, if improperly performed, might possibly result in personal harm to the user, or damage to property.

- Read carefully all security information before use or install the air conditioner.
- Do not attempt to install the air conditioner or a part of the air conditioner by yourself.
- 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.
- The installation must be carried out in compliance with regulations in force in the place of installation and the installation instructions of the manufacturer.
- This unit is part of a set constituting an air conditioner. It must not be installed alone or with non-authorized 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 3mm for this unit.
- The unit must be correctly grounded and the supply line must be equipped with a differential breaker in order to protect the persons.
- The units are not explosion proof and therefore should not be installed in explosive atmosphere.
- This unit contains no user-serviceable parts. Always consult authorized service personnel to repairs.
- When moving, consult authorized service personnel for disconnection and installation of the unit.
- Children should be monitored to ensure they do not play with the device.
- This product is not intended to be used by people (including children) with physical, sensory or mental disability, or persons lacking experience or knowledge unless they have been given by the through a person responsible for their safety, supervision or instruction concerning the use of the device.

2. ABOUT THE UNIT

2.1. Precautions for using R410A refrigerant

⚠ WARNING

Do not touch refrigerant that has leaked from the refrigerant pipe connections or other areas. Touching the refrigerant directly can cause frostbite.

If a refrigerant leak occurs during operation, immediately vacate the premises and thoroughly ventilate the area. If the refrigerant comes in contact with a flame, it produces a toxic gas.

The basic installation work procedures are the same as conventional refrigerant 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 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.
- 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 UNF 20 threads per inch.]
- Be careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant models. Also, when storing the piping, securely seal the openings 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.

2.2. Special tools for R410A

⚠ 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.

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/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 conventional refrigerant, 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.

Thicknesses of Annealed Copper Pipes (R410A)

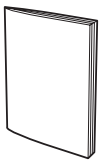
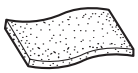
Pipe outside diameter [mm (in.)]	Thickness [mm]
9.52 (3/8)	0.80
15.88 (5/8)	1.00

2.3. Accessories

⚠ WARNING

For installation purposes, be sure to use the parts supplied by the manufacturer or other prescribed parts. The use of non-prescribed parts can cause serious accidents such as the unit falling, water leakage, electric shock, or fire.

- The following installation parts are supplied. Use them as required.
- Keep the Installation Manual in a safe place and do not discard any other accessories until the installation work has been completed.

Name and shape	Q'ty	Description
Installation Manual 	1	This manual
Drain pipe 	1	For outdoor unit drain piping work (May not be supplied, depending on the model.)
Drain cap 	2	
Insulation (seal) 	1	For filling in a gap at the entrance of connection cords

3. INSTALLATION WORK

3.1. Selecting an installation location

⚠ WARNING

Securely install the outdoor unit at a location that can withstand the weight of the unit. Otherwise, the outdoor unit may fall and cause injury.

Be sure to install the outdoor unit as prescribed, so that it can withstand earthquakes and typhoons or other strong winds. Improper installation can cause the unit to topple or fall, or other accidents.

Do not install the outdoor unit near the edge of a balcony. Otherwise, children may climb onto the outdoor unit and fall off of the balcony.

⚠ CAUTION

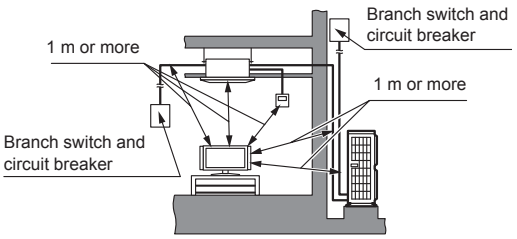
Do not install the outdoor unit in the following areas:

- Area with high salt content, such as at the seaside. It will deteriorate metal parts, causing the parts to fail or the unit to leak water.
- Area filled with mineral oil or containing a large amount of splashed oil or steam, such as a kitchen. It will deteriorate plastic parts, causing the parts to fail or the unit to leak water.
- Area that generates substances that adversely affect the equipment, such as sulfuric gas, chlorine gas, acid, or alkali. It will cause the copper pipes and brazed joints to corrode, which can cause refrigerant leakage.
- Area containing equipment that generates electromagnetic interference. It will cause the control system to malfunction, preventing the unit from operating normally.
- Area that can cause combustible gas to leak, contains suspended carbon fibers or flammable dust, or volatile inflammables such as paint thinner or gasoline. If gas leaks and settles around the unit, it can cause a fire.
- Area that has heat sources, vapors, or the risk of the leakage of flammable gas in the vicinity.
- Area where small animals may live. It may cause failure, smoke or fire if small animals enter and touch internal electrical parts.
- Area where animals may urinate on the unit or ammonia may be generated.

Do not tilt the outdoor unit more than 3 degrees.

Install the outdoor unit in a well-ventilated location away from rain or direct sunlight.

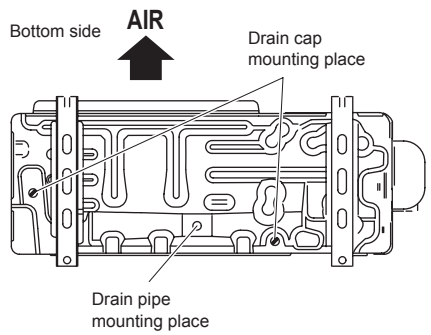
⚠ CAUTION
If the outdoor unit must be installed in an area within easy reach of the general public, install as necessary a protective fence or the like to prevent their access.
Install the outdoor unit in a location that would not inconvenience your neighbors, as they could be affected by the airflow coming out from the outlet, noise, or vibration. If it must be installed in proximity to your neighbors, be sure to obtain their approval.
If the outdoor unit is installed in a cold region that is affected by snow accumulation, snow fall, or freezing, take appropriate measures to protect it from those elements. To ensure a stable operation, install inlet and outlet ducts.
Install the outdoor unit in a location that is away from exhaust or the vent ports that discharge vapor, soot, dust, or debris.
Install the indoor unit, outdoor unit, power supply cable, connection cable, and remote controller cable at least 1 m away from a television or radio receivers. The purpose of this is to prevent TV reception interference or radio noise. (Even if they are installed more than 1 m apart, you could still receive noise under some signal conditions.)



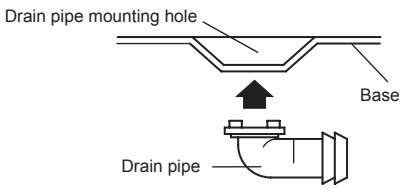
If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.
Keep the length of the piping of the indoor and outdoor units within the allowable range.
For maintenance purposes, do not bury the piping.

3.2. Drain installation

⚠ CAUTION
Perform drain work in accordance with this Manual, and ensure that the drain water is properly drained. If the drain work is not carried out correctly, water may drip down from the unit, wetting the furniture.
When the outdoor temperature is 0 °C 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)
Outdoor unit to be fasten with bolts at the four places indicated by the arrows without fail.



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 hose. (Reverse cycle model only)
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)



3.3. Installation dimensions

⚠ CAUTION
Select installation locations that can properly support the weight of the indoor and outdoor units. Install the units securely so that they do not topple or fall.

⚠ WARNING
Do not install where there is the danger of combustible gas leakage.
Do not install the unit near heat source of heat, steam, or flammable gas.
If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.

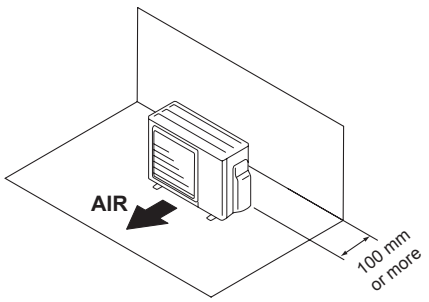
⚠ CAUTION
Install the unit where it will not be tilted by more than 3˚. However, do not install the unit with it tilted towards the side containing the compressor.
When installing the outdoor unit where it may exposed to strong wind, fasten it securely.

Decide the mounting position with the customer as follows:
(1) Install the outdoor unit in a location which can withstand the weight of the unit and vibration, and which can install horizontally.
(2) Provide the indicated space to ensure good airflow.
(3) 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 airflow.)
(4) Do not install the unit near a source of heat, steam, or flammable gas.
(5) During heating operation, drain water flows from the outdoor unit. Therefore, install the outdoor unit in a place where the drain water flow will not be obstructed. (Reverse cycle model only)
(6) Do not install the unit where strong wind blows or where it is very dusty.
(7) Do not install the unit where people pass.
(8) Install the outdoor unit in a place where it will be free from being dirty or getting wet by rain as much as possible.
(9) Install the unit where connection to the indoor unit is easy.

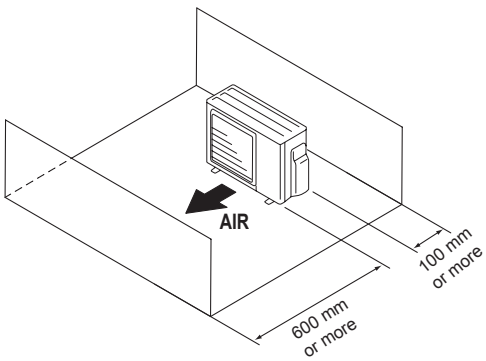
3.3.1. Single outdoor unit installation

When the upward area is open

• When there are obstacles at the back side.

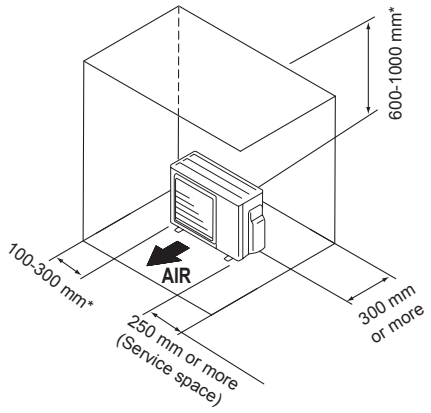


• When there are obstacles at the back and front sides.



When an obstruction is present also in the upward area

• When there are obstacles at the back, side(s), and top

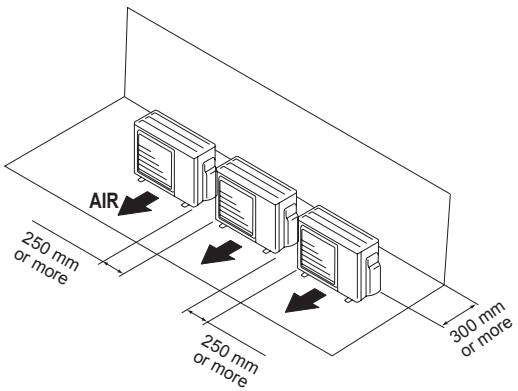


※If the space is larger than that is stated, the condition will be the same as that there are no obstacles.

3.3.2. Multiple outdoor unit installation

- Provide at least 250 mm of space between the outdoor units if multiple units are installed.
- When routing the piping from the side of an outdoor unit, provide space for the piping.
- No more than 3 units must be installed side by side.
  When 3 units or more are arranged in a line, provide the space as shown in the following example when an obstruction is present also in the upward area.

• When there are obstacles at the back side with the installation of more than one unit.

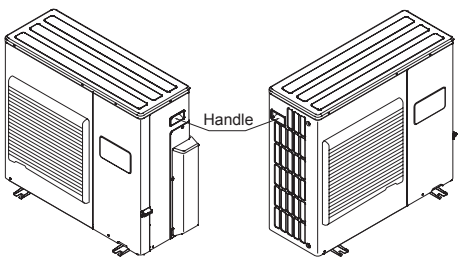


3.4. Transporting the unit

⚠ WARNING
Do not touch the fins. Otherwise, personal injury could result.

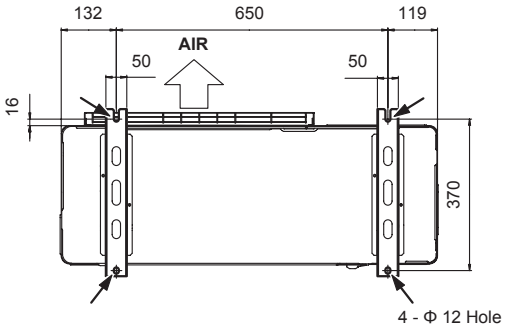
⚠ CAUTION
When carrying the unit, hold the handles on the right and left sides and be careful. If the outdoor unit is carried from the bottom, hands or fingers may be pinched.

- Be sure to hold the handles on the sides of the unit. Otherwise, the suction grilles on the sides of the unit may be deformed.

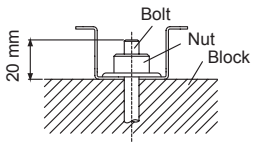


3.5. Installation

(Unit : mm)



- Install 4 anchor bolts at the locations indicated with arrows in the above figure.
- To reduce vibration, do not install the unit directly on the ground. Install it on a secure base (such as concrete blocks).
- The foundation shall support the legs of the unit and have a width of 50 mm or more.
- Depending on the installation conditions, the outdoor unit may spread its vibration during operation, which may cause noise and vibration. Therefore, attach damping materials (such as damping pads) to the outdoor unit during installation.
- Install the foundation, making sure that there is enough space for installing the connection pipes.
- Secure the unit to a solid block using foundation bolts.
  (Use 4 sets of commercially available M10 bolts, nuts, and washers.)
- The bolts should protrude 20 mm.
  (Refer to the figure below.)
- If overturning prevention is required, purchase the necessary commercially available items.



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

4. PIPE SELECTION

4.1. Selecting the pipe material

⚠ CAUTION
Do not use existing pipes.
Use pipes that have clean external and internal sides without any contamination which may cause trouble during use, such as sulfur, oxide, dust, cutting waste, oil, or water.
It is necessary to use seamless copper pipes. Material: Phosphor deoxidized seamless copper pipes. It is desirable that the amount of residual oil is less than 40 mg/10 m.
Do not use copper pipes that have a collapsed, deformed, or discolored portion (especially on the interior surface). Otherwise, the expansion valve or capillary tube may become blocked with contaminants.
Improper pipe selection will degrade performance. As an air conditioner using R410A incurs pressure higher than when using conventional refrigerant, 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 those indicated in the table even if they are available on the market.

Thicknesses of Annealed Copper Pipes (R410A)

Pipe outside diameter [mm (in.)]	Thickness [mm]
9.52 (3/8)	0.80
15.88 (5/8)	1.00

4.2. Protection of pipes

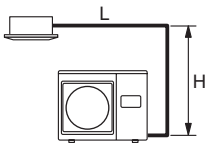
- Protect the pipes to prevent the entry of moisture and dust.
- Especially, pay attention when passing the pipes through a hole or connecting the end of a pipe to the outdoor unit.

Location	Working period	Protection method
Outdoor	1 month or more	Pinch pipes
	Less than 1 month	Pinch or tape pipes
Indoor	-	Pinch or tape pipes

4.3. Refrigerant pipe size and allowable piping length

⚠ CAUTION

Keep the piping length between the indoor unit and outdoor unit within the allowable tolerance.

Capacity [BTU/h class]	30,000	36,000
Pipe diameter <Liquid/Gas> [mm (in.)]	9.52 (3/8) / 15.88 (5/8)	
Max. piping length (L) [m]	50	
Min. piping length (L) [m]	5	
Max. height difference (H) <Indoor unit to outdoor unit> [m]	30	
View (Example)		

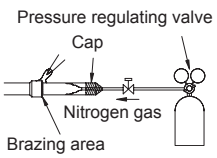
5. PIPE INSTALLATION-1

5.1. Brazing

⚠ CAUTION

If air or another type of refrigerant enters the refrigeration cycle, the internal pressure in the refrigeration cycle will become abnormally high and prevent the unit from exerting its full performance.

Apply nitrogen gas while brazing the pipes. If a pipe is brazed without applying nitrogen gas, an oxidation film will be created.
This can degrade performance or damage the parts in the unit (such as the compressor or valves).
Nitrogen gas pressure: 0.02 MPa
(= pressure felt sufficiently on the back of the hand)



For brazing material, use phosphor copper that does not require flux. Do not use flux to braze pipes. If the flux is the chlorine type, it will cause the pipes to corrode.
Furthermore, if the flux contains fluoride, it will adversely affect the refrigerant pipe system such as by degrading the refrigerant.
If fluoride is contained, quality of refrigerant deteriorates and affects the refrigerant piping system.

5.2. Flare connection (pipe connection)

⚠ CAUTION

Do not use mineral oil on a flared part. Prevent mineral oil from getting into the system as this would reduce the lifetime of the units.

While welding the pipes, be sure to blow dry nitrogen gas through them.

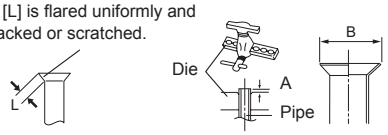
The maximum lengths of this product are shown in the table. If the units are further apart than this, correct operation cannot be guaranteed.

5.2.1. Flaring

- Use special pipe cutter and flare tool exclusive for R410A.

(1) Cut the connection pipe to the necessary length with a pipe cutter.
(2) Hold the pipe downward so that the cuttings will not enter the pipe and remove any burrs.
(3) Insert the flare nut (always use the flare nut attached to the indoor and outdoor units respectively) onto the pipe and perform the flare processing with a flare tool. Leakage of refrigerant may result if other flare nuts are used.
(4) Protect the pipes by pinching them or with tape to prevent dust, dirt, or water from entering the pipes.

Check if [L] is flared uniformly and is not cracked or scratched.

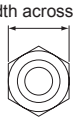


Pipe outside diameter [mm (in.)]	Dimension A [mm]
	Flare tool for R410A, clutch type
9.52 (3/8)	0 to 0.5
15.88 (5/8)	

Pipe outside diameter [mm (in.)]	Dimension B $^{0}_{-0.4}$ [mm]
9.52 (3/8)	13.2
15.88 (5/8)	19.7

- When using conventional flare tools to flare R410A pipes, the dimension A should be approximately 0.5 mm more than indicated in the table (for flaring with R410A flare tools) to achieve the specified flaring. Use a thickness gauge to measure the dimension A.

Width across flats



Pipe outside diameter [mm (in.)]	Width across flats of Flare nut [mm]
9.52 (3/8)	22
15.88 (5/8)	29

5.2.2. Bending pipes

⚠ CAUTION

To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 100 mm to 150 mm.

If the pipe is bent repeatedly at the same place, it will break.

- If pipes are shaped by hand, be careful not to collapse them.
- Do not bend the pipes at an angle of more than 90°.
- When pipes are repeatedly bent or stretched, the material will harden, making it difficult to bend or stretch them any more.
- Do not bend or stretch the pipes more than three times.

5.2.3. Pipe connection

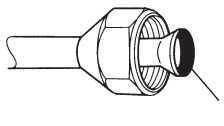
⚠ CAUTION

Be sure to install the pipe against the port on the indoor unit and the outdoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.

Do not remove the flare nut from the outdoor unit pipe until immediately before connecting the connection pipe.

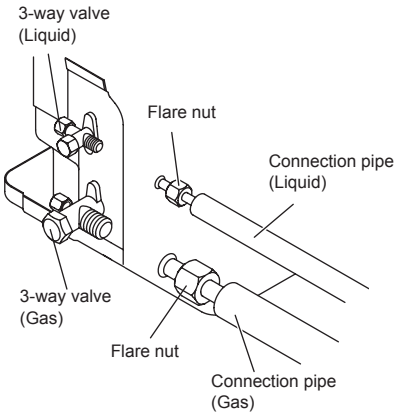
After installing the piping, make sure that the connection pipes do not touch the compressor or outer panel. If the pipes touch the compressor or outer panel, they will vibrate and produce noise.

(1) Detach the caps and plugs from the pipes.
(2) Center the pipe against the port on the outdoor unit, and then turn the flare nut by hand.

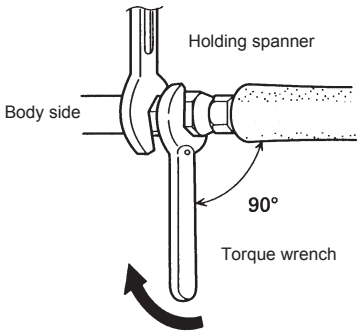


To prevent gas leakage, coat the flare surface with alkylbenzene oil (HAB). Do not use mineral oil.

(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.



⚠ CAUTION

Hold the torque wrench at its grip, keeping it in a right angle with the pipe, in order to tighten the flare nut correctly.

Flare nut [mm (in.)]	Tightening torque [N·m (kgf·cm)]
9.52 (3/8) dia.	32 to 42 (320 to 420)
15.88 (5/8) dia.	63 to 75 (630 to 750)

5.3. Sealing test

⚠ WARNING

Before operating the compressor, install the pipes and securely connect them. Otherwise, if the pipes are not installed and if the valves are open when the compressor operates, air could enter the refrigeration cycle. If this happens, the pressure in the refrigeration cycle will become abnormally high and cause damage or injury.

After the installation, make sure there is no refrigerant leakage. If the refrigerant leaks into the room and becomes exposed to a source of fire such as a fan heater, stove, or burner, it produces a toxic gas.

Do not subject the pipes to strong shocks during the sealing test. It can rupture the pipes and cause serious injury.

⚠ CAUTION

Do not block the walls and the ceiling until the sealing test and the charging of the refrigerant gas have been completed.

For maintenance purposes, do not bury the piping of the outdoor unit.

- After connecting the pipes, perform a sealing test.
- Make sure that the 3-way valves are closed before performing a sealing test.
- Pressurize nitrogen gas to 4.15 MPa to perform the sealing test.
- Add nitrogen gas to both the liquid pipes and the gas pipes.
- Check all flare connections and welds. Then, check that the pressure has not decreased.
- Compare the pressures after pressurizing and letting it stand for 24 hours, and check that the pressure has not decreased.
  * When the outdoor air temperature changes 5 °C, the test pressure changes 0.05 MPa. If the pressure has dropped, the pipe joints may be leaking.
- If a leak is found, immediately repair it and perform the sealing test again.
- After completing the sealing test, release the nitrogen gas from both valves.
- Release the nitrogen gas slowly.

5.4. Vacuum process

⚠ CAUTION

Perform a refrigerant leakage test (air tightness test) to check for leaks using nitrogen gas while all valves in the outdoor unit are closed. (Use the test pressure indicated on the nameplate.)

Be sure to evacuate the refrigerant system using a vacuum pump.

The refrigerant pressure may sometimes not rise when a closed valve is opened after the system is evacuated using a vacuum pump. This is caused by the closure of the refrigerant system of the outdoor unit by the electronic expansion valve. This will not affect the operation of the unit.

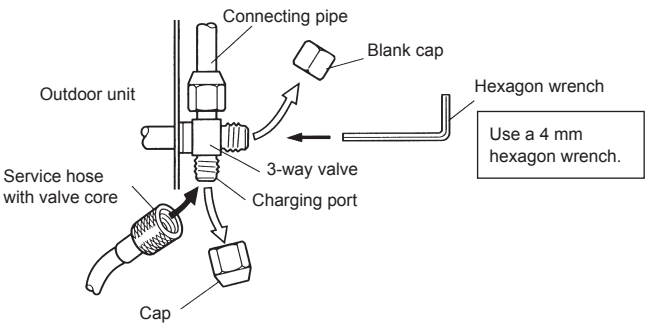
If the system is not evacuated sufficiently, its performance will drop.

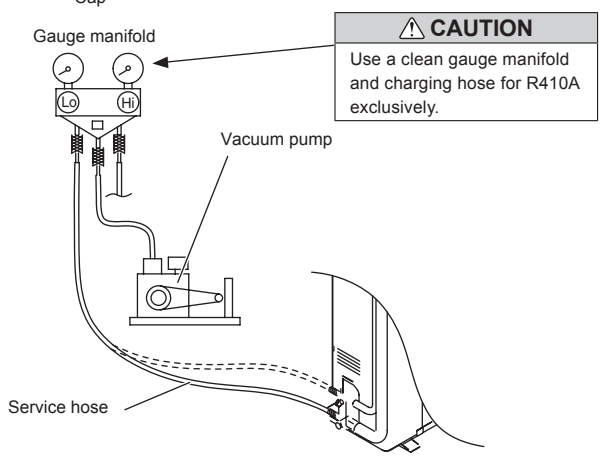
Use a clean gauge manifold and charging hose that were designed specifically for use with R410A. Using the same vacuum equipment for different refrigerants may damage the vacuum pump or the unit.

Do not purge the air with refrigerants, but use a vacuum pump to evacuate the system.

(1) Remove the cap, and connect the gauge manifold and the vacuum pump to the charging valve by the service hoses.
(2) Vacuum the indoor unit and the connecting pipes until the pressure gauge indicates –0.1 MPa (–76 cmHg).
(3) When –0.1 MPa (–76 cmHg) is reached, operate the vacuum pump for at least 60 minutes.
(4) Disconnect the service hoses and fit the cap to the charging valve to the specified torque.
(5) 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)].
(6) Tighten the blank caps of the 2-way valve and 3-way valve to the specified torque.

		Tightening torque
Blank cap	9.52 mm (3/8 in.)	20 to 25 N·m (200 to 250 kgf·cm)
	15.88 mm (5/8 in.)	30 to 35 N·m (300 to 350 kgf·cm)
Charging port cap		10 to 12 N·m (100 to 120 kgf·cm)





⚠ CAUTION

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

5.5. Additional charging

⚠ WARNING

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

After vacuuming the system, add refrigerant.

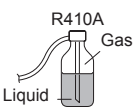
Do not reuse recovered refrigerant.

When charging the refrigerant R410A, always use an electronic scales for refrigerant charging (to measure the refrigerant by weight). Adding more refrigerant than the specified amount will cause a malfunction.

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. Adding refrigerant through the gas pipe will cause a malfunction.

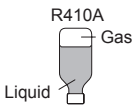
Check if the steel cylinder has a siphon installed or not before filling. (There is an indication "with siphon for filling liquid" on the steel cylinder.)

Filling method for cylinder with siphon



Set the cylinder vertical and fill with the liquid.
(Liquid can be filled without turning bottom up with the siphon inside.)

Filling method for other cylinders



Turn bottom up and fill with liquid.
(Be careful to avoid turning over the cylinder.)

Be sure to use the special tools for R410A for pressure resistance and to avoid mixing of impure substances.

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

Make sure to back closing valve after refrigerant charging. Otherwise, the compressor may fail.

Minimize refrigerant release to the air. Excessive release is prohibited under the Freon Collection and Destruction Law.

5.5.1. For Pre-charge length

Piping length (L) *Pre-Charge [m]
20

5.5.2. If additional refrigerant is required

- When the piping is longer than Pre-charge length, additional charging is necessary.
- For the additional amount, see the table below.

Additional charging amount

Refrigerant pipe size [mm (in.)]		Piping length (L)*				
		~20 m	30 m	40 m	50 m	g/m
Liquid	9.52 (3/8)	None	400 g	800 g	1,200 g	40 g/m
Gas	15.88 (5/8)					

* Refer to "4.3. Refrigerant pipe size and allowable piping length".

6. ELECTRICAL WIRING

Cable	Cable size [mm²]	Type	Remarks
Power Supply Cable	3.5	Type60245 IEC66	3 Cable + Ground 1 Φ 230 V
Connection Cable	1.5	Type60245 IEC57	3 Cable + Ground 1 Φ 230 V

Max. Cable Length : Limit voltage drop to less than 2%. Increase cable if voltage drop is 2% or more.

6.1. Notes for electrical wiring

⚠ WARNING

Wiring connections must be performed by a qualified person in accordance with the specifications. The voltage rating for this product is 230 V at 50 Hz. It should be operated within the range of 198 to 264 V.

Before connecting the wires, make sure the power supply is OFF.

Never touch electrical components immediately after the power supply has been turned off. Electrical shock may occur. After turning off the power, always wait 5 minutes or more before touching electrical components.

Use a dedicated power supply circuit. Insufficient power capacity in the electrical circuit or improper wiring may cause electric shock or fire.

Be sure to install a breaker of the specified capacity.
When selecting breaker, please comply with the laws and the regulations of each country. One breaker must be installed on the power supply of the outdoor unit.
Wrong selection and setup of the breaker will cause electric shock or fire.

When selecting breaker, please comply with the laws and the regulations of each country. One breaker must be installed on the power supply of the outdoor unit.
Wrong selection and setup of the breaker will cause electric shock or fire.

Be sure to install an earth leakage breaker.
Otherwise, it will cause electric shock or fire.

A circuit breaker is installed in the permanent wiring. Always use a circuit that can trip all the poles of the wiring and has an isolation distance of at least 3 mm between the contacts of each pole.

Use designated cables and power cables. Improper use may cause electric shock or fire by poor connection, insufficient insulation, or over current.

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.

Connect the connector cable securely to the terminal. Check no mechanical force bears on the cables connected to the terminals. Faulty installation can cause a fire.

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

Make sure to secure the insulation portion of the connector cable with the cable clamp. Damaged insulation can cause a short circuit.

Fix cables so that cables do not make contact with the pipes (especially on high pressure side). Do not make power supply cable and transmission cable come in contact with valves (Gas).

Do not connect the AC power supply to the transmission line terminal board. Improper wiring can damage the entire system.

Never install a power factor improvement condenser. Instead of improving the power factor, the condenser may overheat.

Be sure to perform the grounding work.
Do not connect grounding wires to a gas pipe, water pipe, lightning rod or grounding wire for a telephone.

- Connection to a gas pipe may cause a fire or explosion if gas leaks.
- Connection to a water pipe is not an effective grounding method if PVC pipe is used.
- Connection to the grounding wire of a telephone or to a lightning rod may cause a dangerously abnormal rise in the electrical potential if lightning strikes.
- Improper grounding work can cause electric shocks.

Securely install the electrical box cover on the unit. An improperly installed service panel can cause serious accidents such as electric shock or fire through exposure to dust or water.

⚠ CAUTION
The primary power supply capacity is for the air conditioner itself, and does not include the concurrent use of other devices.
Do not use crossover power supply wiring for the outdoor unit.
If the electrical power is inadequate, contact your electric power company.
Install a breaker in a location that is not exposed to high temperatures. If the temperature surrounding the breaker is too high, the amperage at which the breaker cuts out may decrease.
When using an earth leakage breaker that has been designed solely for ground fault protection, be sure to install a fuse-equipped switch or circuit breaker.
This system uses an inverter, which means that it must be used an earth leakage breaker that can handle harmonics in order to prevent malfunctioning of the earth leakage breaker itself.
Do not connect the AC power supply to the transmission line terminal board. Improper wiring can damage the entire system.
Do not use crossover power supply wiring for the outdoor unit.
If the temperature surrounding the breaker is too high, the amperage at which the breaker cuts out may decrease.
When the electrical switchboard is installed outdoors, place it under lock and key so that it is not easily accessible.
Start wiring work after closing branch switch and over current breaker.
Transmission cable between indoor unit and outdoor unit is 230 V.
Be sure not to remove thermistor sensor etc. from power wiring and connection wiring. Compressor may fail if operated while removed.
Do not fasten the power supply cable and connection cable together.
Always keep to the maximum length of the connection cable. Exceeding the maximum length may lead to erroneous operation.
Do not start operation until the refrigerant is charged completely. The compressor will fail if it is operated before the refrigerant piping charging is complete.
The static electricity that is charged to the human body can damage the control PC Board when handling the control PC Board for address setting, etc. Please keep caution to the following points. Provide the grounding of Indoor unit, Outdoor unit and Option equipment. Cut off the power supply (breaker). Touch the metal section (such as the unpainted control box section) of the indoor or outdoor unit for more than 10 seconds. Discharge the static electricity in your body. Never touch the component terminal or pattern on the PC Board.

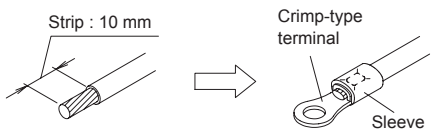
How to connect wiring to the terminal

Caution when wiring cable

- When stripping off the coating of a lead wire, always use a special tool such as a wire stripper. If there is no special tool available, carefully strip the coating with a knife etc.

(1) Use crimp-type terminals with insulating sleeves as shown in the figure below to connect to the terminal block.

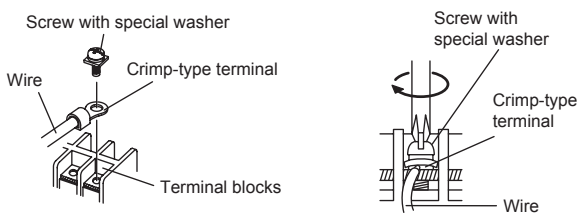
(2) Securely clamp the crimp-type terminals to the wires using an appropriate tool so that the wires do not come loose.



(3) Use the specified wires, connect them securely, and fasten them so that there is no stress placed on the terminals.

(4) 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.

(5) Do not tighten the terminal screws too much, otherwise, the screws may break.



(6) See the table below for the terminal screw tightening torques.

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

6.2. Selecting circuit breaker and wiring

⚠ CAUTION
Be sure to install a breaker of the specified capacity.
Regulation of cables and breaker differs from each locality, refer in accordance with local rules.

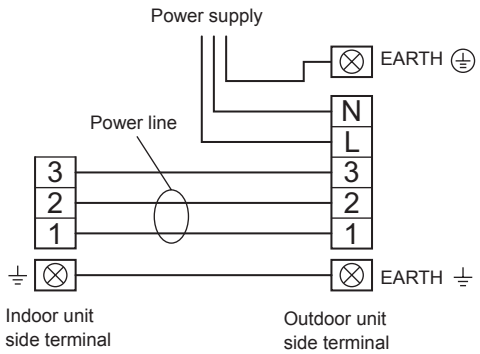
Breaker and wiring specifications

Breaker capacity [A]	Earth leakage breaker [mA]	Power supply cable	Transmission cable*	
		Conductor size [mm²]	Conductor size [mm²]	Max. length [m]
30	30	3.5	2.5	50

- Selected sample: Select the correct cable type and size according to the country or region's regulations.
- Max. wire length: Set a length so that the voltage drop is less than 2%. Increase the wire diameter when the wire length is long.
- Select the appropriate breaker of the described specification according to the national or regional standards.
- Select the breaker that enough load current can pass through it.
- Before starting work check that power is not being supplied to all poles of the indoor unit and outdoor unit.
- Install all electrical works in accordance to standard.
- Install the disconnect device with a contact gap of at least 3mm in all poles nearby the units. (Both indoor unit and outdoor unit)
- Wiring size must comply with the applicable local and national code.

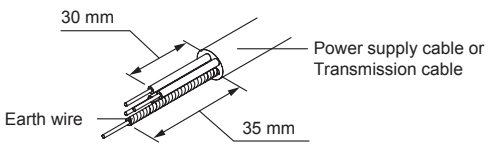
6.3. Wiring method

6.3.1. Connection diagrams



6.3.2. Connection cable preparation

- Keep the earth wire longer than the other wires.

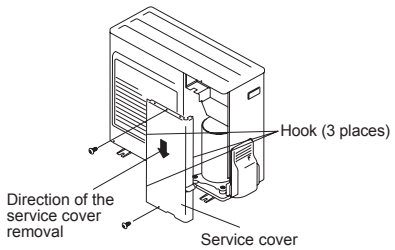


6.3.3. Wiring procedure

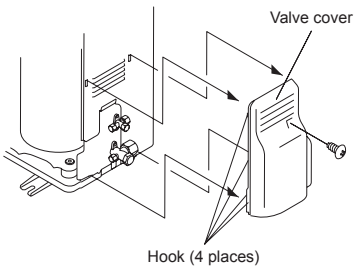
⚠ CAUTION

When connecting the power supply cable, 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.

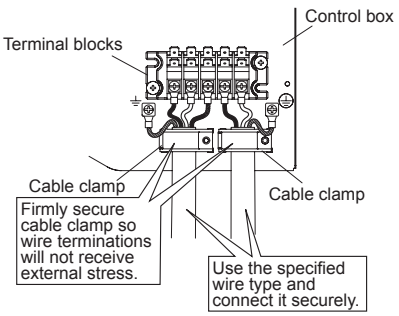
(1) Service cover removal
- Remove the two mounting screws.
- Remove the service cover by pushing downwards.

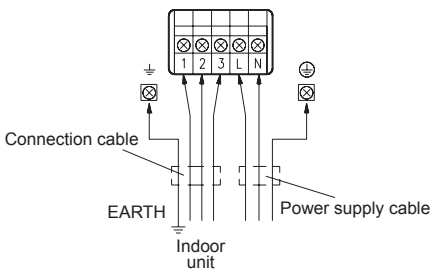


(2) Valve cover removal.
- Remove the one mounting screw.
- Remove the valve cover by sliding upward.

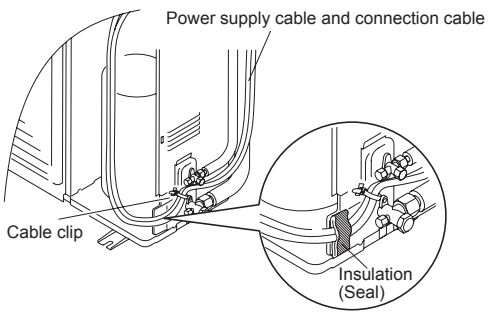


(3) Connect the power supply cable and the connection cable to terminal.
(4) Fasten the power supply cable and connection cable with cable clamp.



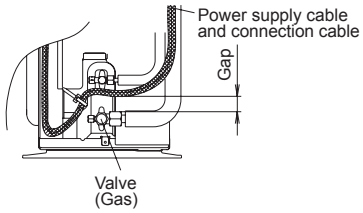


(5) Power supply cable and connection cable should be fixed with cable clip as shown in the figure.
Fill in a gap at the entrance of the cables with insulation (seal).



⚠ CAUTION

Fix cables so that cables do not make contact with the pipes (especially on high pressure side).
Do not make power supply cable and connection cable come in contact with valve (Gas).



(6) Put the service cover and valve cover back after completion of the work.

7. PIPE INSTALLATION-2

Installing insulation

- Determine the thickness of the insulation material by referring to Table A.

Table A, Selection of insulation
(for using an insulation material with equal heat transmission rate or below 0.040 W/(m·k))

Relative humidity [mm (in.)]		Insulation material			
		Minimum thickness [mm]			
		70% or more	75% or more	80% or more	85% or more
Pipe diameter	9.52 (3/8)	9	11	14	18
	15.88 (5/8)	10	12	16	20

- If the ambient temperature and relative humidity exceed 32 °C, increase the level of heat insulation for the refrigerant pipes.

8. TEST RUN

⚠ CAUTION

Always turn on the power 12 hours prior to the start of the operation in order to ensure compressor protection.

Make a TEST RUN in accordance with the installation instruction sheet for the indoor unit.

9. PUMP DOWN

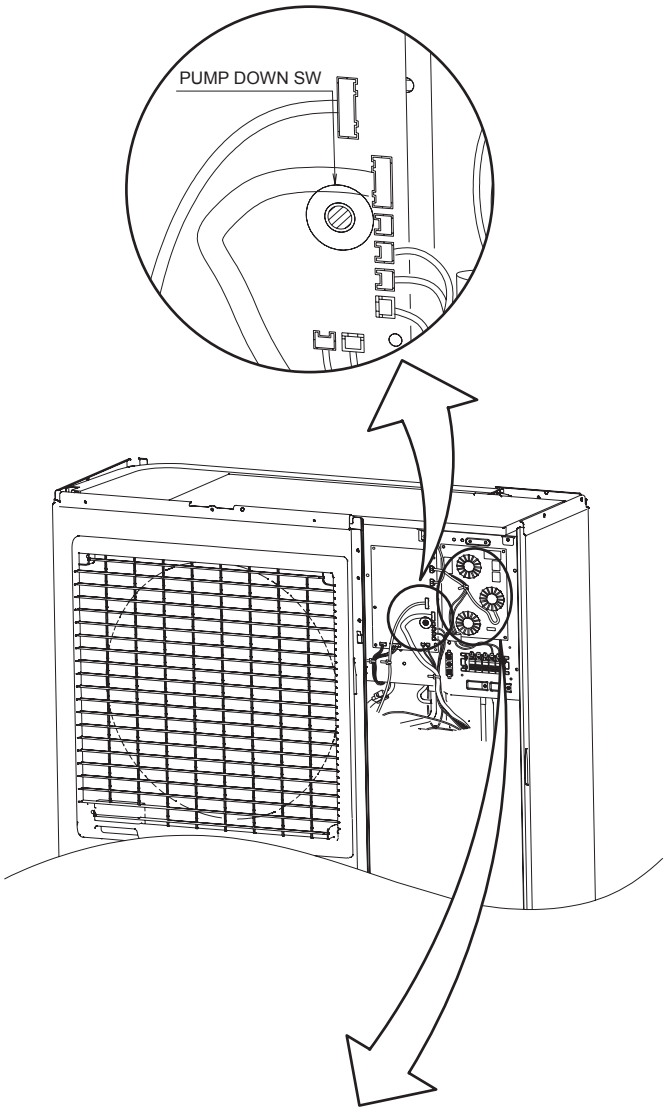
PUMP DOWN (Refrigerant collecting operation)

Perform the following procedures to collect the refrigerant when moving the indoor unit or the outdoor unit.

(1) Press the push-button switch on the circuit board once.
The LED on the circuit board starts lighting. This indicates the start of PUMP DOWN operation.
When the switch is pressed while the compressor is in operation, PUMP DOWN operation starts automatically.
When the switch is pressed while the compressor is in stop, the compressor starts to operate automatically, and then move on to PUMP DOWN operation.

(2) PUMP DOWN operation continues for a bout 1 minute. When PUMP DOWN operation is completed, the compressor stops automatically. Then close the 2-way valve and 3-way valve immediately.

(3) Turn the power off.



⚠ DANGER
This part (Choke coil) generates high voltages. Never touch this part.