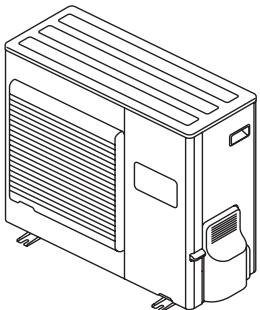


AIR CONDITIONER OUTDOOR UNIT

INSTALLATION MANUAL



INSTALLATION MANUAL

For authorized service personnel only.

English

INSTALLATIONSANLEITUNG

Nur für autorisiertes Personal.

Deutsch

MANUEL D'INSTALLATION

Pour le personnel agréé uniquement.

Français

MANUAL DE INSTALACIÓN

Solo para personal autorizado.

Español

MANUALE D'INSTALLAZIONE

Ad uso esclusivo del personale autorizzato.

Italiano

ΕΓΧΕΙΡΙΔΙΟ ΕΓΚΑΤΑΣΤΑΣΗΣ

Για εξουσιοδοτημένο προσωπικό σέρβις.

Ελληνικά

MANUAL DE INSTALAÇÃO

Apenas para técnicos autorizados.

Português

РУКОВОДСТВО ПО УСТАНОВКЕ

Для уполномоченного персонала.

Русский

KURULUM KILAVUZU

Yetkili servis personeli içindir.

Türkçe

INSTALLATION MANUAL

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1. SAFETY PRECAUTIONS

1.1. For authorized service personnel only

⚠ WARNING	This mark indicates procedures which, if improperly performed, might lead to the death or serious injury of the user.
For the room air conditioner to operate satisfactory, install it as outlined in this installation manual.	
Connect the indoor unit and outdoor unit with the air conditioner piping and cables available standards parts. This installation manual describes the correct connections using the standard accessories and the parts specified in this installation manual.	
Have installation work done by authorized service personnel only.	
Do not use an extension cable.	
Do not turn on the power until all installation work is complete.	
⚠ CAUTION	This mark indicates procedures which, if improperly performed, might possibly result in personal harm to the user, or damage to property.
When installing pipes shorter than 3 m, sound of the outdoor unit will be transferred to the indoor unit, which will cause large operating sound or some abnormal sound.	
This installation manual describes how to install the outdoor unit only. To install the indoor unit, refer to the installation manual included with the indoor unit.	

- Be careful not to scratch the air conditioner when handling it.
- After installation, explain correct operation to the customer, using the operating manual.
- Let the customer keep this installation manual because it is used when the air conditioner is serviced or moved.
- The maximum lengths of this product are shown in the following table. If the units are further apart than this, correct operation cannot be guaranteed.

Model type	Pipe diameter		Piping length		Max. height difference (Indoor unit to outdoor unit)
	Liquid	Gas	MAX.	MIN.	
30L	9.52 mm (3/8 in.)	15.88 mm (5/8 in.)	50 m	5 m	30 m

2. ABOUT THE UNIT

2.1. Precautions for using R410A refrigerant

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 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 inch.]
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.

2.2. 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 value 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
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 failure, injury, etc. (Use the special R410A materials.)
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.

2.3. Power

- The rated voltage

230V AC 50Hz.

⚠ WARNING
The rated voltage of this product is 230 V AC 50 Hz.
Before turning on the power, check if the voltage is within the 220 V -10 % to 240 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 cable.
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.
The 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.

⚠ 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.

2.4. Electric requirement

- Electric wire size and fuse capacity:

Power supply cable (mm ²)	MAX.	4.0
	MIN.	3.5
Connection cable (mm ²)	MAX.	2.5
	MIN.	1.5
Fuse capacity (A)		30

• Use conformed cable with Type245 IEC57.

• Install all electrical works in accordance to the national standard.

• Install the disconnect device with a contact gap of at least 3 mm in all poles nearby the units. (Both indoor unit and outdoor unit)

• Install the circuit breaker nearby the units.

2.5. Operating range

Outdoor	Cooling / Dry Mode	Heating Mode
Temperature	About -10 to 46 °C	About -15 to 24 °C

2.6. Additional charge

Refrigerant suitable for a piping length of 20 m is charged in the outdoor unit at the factory. When the piping is longer than 20 m, additional charging is necessary.

For the additional amount, see the table below.

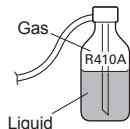
Model type	Piping length	20 m	30 m	40 m	50 m	Rate
30L	None	400 g	800 g	1200 g	40 g/m	

⚠ 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.

2.7. Accessories

Name and Shape	Q'ty	Name and Shape	Q'ty
Insulation (seal)	1	Installation manual	1
Drain pipe	1	Drain cap	2

One set of following parts are necessary in installation of this air conditioner.

Name
Connection pipe assembly
Connection cable
Wall pipe
Decorative tape
Vinyl tape
Wall cap
Saddle
Drain hose
Tapping screws
Sealant
M10 bolt, nut

3. SELECTING THE MOUNTING POSITION

- Decide the mounting position with the customer as follows:

• Do not set to a place where there is oily smoke, oil is used in the factory, the unit can contact sea breeze, sulfide gases will be generated in the hot spring area, corrosive gases will be generated, animal may urine on the unit and ammonia will be generated and a dusty place.

3.1. Outdoor unit

- 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.)
- Do not install the unit where a strong wind blows or where it is very dusty.
- Do not install the unit where people pass.
- Take your neighbors into consideration so that they are not disturbed by air blowing into their windows or by noise.
- Provide the space shown in figure so that the airflow is not blocked. Also for efficient operation, leave open three of the four directions front, rear, and both sides.
- Install the outdoor unit in a location which can withstand the weight of the unit and vibration, and which can install horizontally.
- Provide the indicated space to ensure good airflow.
- 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)
- Install the outdoor unit in place where it will be free from being dirty or getting wet by rain as much as possible.
- Install the unit where connection to the indoor unit is easy.

⚠ WARNING

Install at a place that can withstand the weight of the 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.

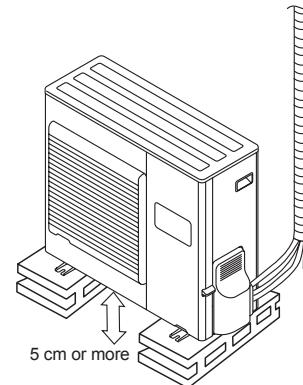
Do not install near heat sources.

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

4. INSTALLATION DIAGRAM

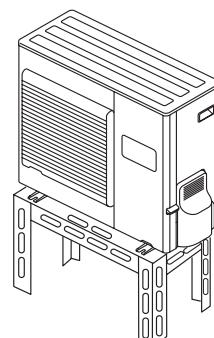
[OUTDOOR UNIT]

- Do not directly install it on the ground, otherwise it will cause failure.

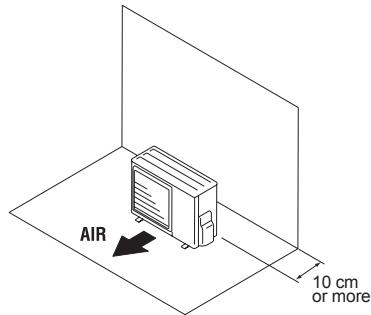


⚠ CAUTION

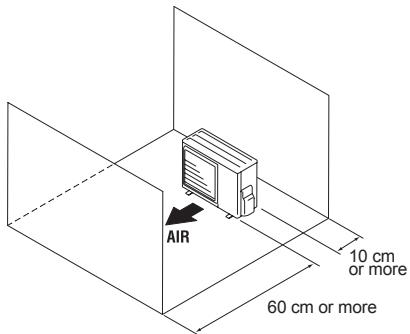
In the area with heavy snowfall, if the intake and outlet of outdoor unit is blocked with snow, it might become difficult to get warm and it is likely to cause of the breakdown. Please construct a canopy and a pedestal or place the unit on a high stand (local configured).



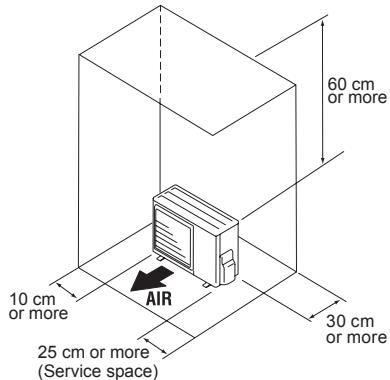
When there are obstacles at the back side.



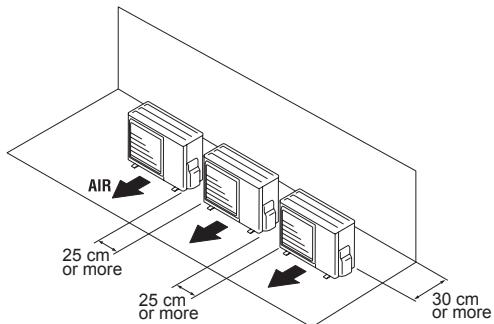
When there are obstacles at the back and front sides.



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



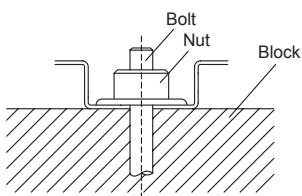
When there are obstacles at the back side with the installation of more than one unit.



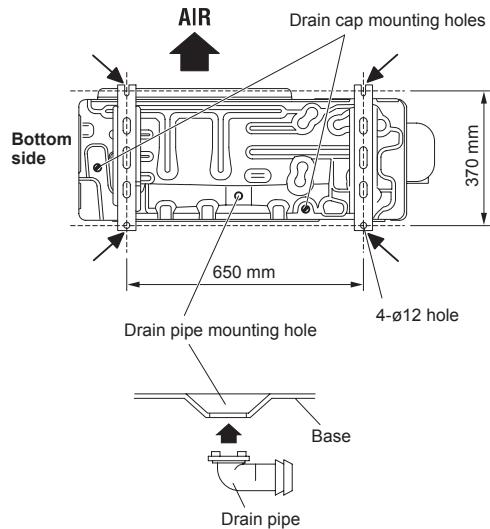
5. INSTALLATION

5.1. Installation

- (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 hose. 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 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)

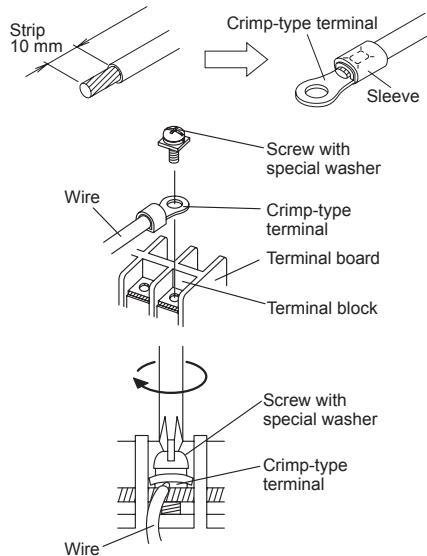
5.2. Outdoor unit wiring

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 cable colors with those of the outdoor unit. Erroneous wiring may cause burning of the electric parts.
- Connect the connection cable firmly to the terminal block. Imperfect installation may cause a fire.
- Always fasten the outside covering of the connection cable with the cable clamp. (If the insulator is chafed, electric leakage may occur.)
- Securely earth the power cable plug.
- Do not use the earth screw for an external connector. Only use for interconnection between two units.

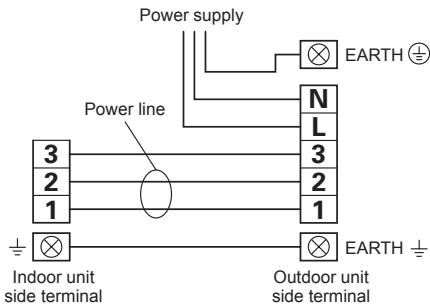
HOW TO CONNECT THE WIRE TO THE TERMINALS

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



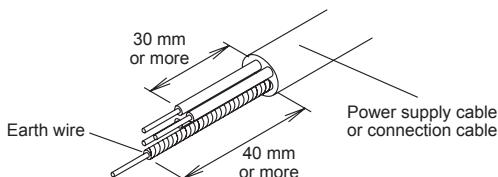
Tightening torque	
M4 screw	1.2 to 1.8 N·m (12 to 18 kgf·cm)
M5 screw	2.0 to 3.0 N·m (20 to 30 kgf·cm)

1. CONNECTION DIAGRAMS



2. CONNECTION CABLE PREPARATION

Keep the earth wire longer than the other wires.

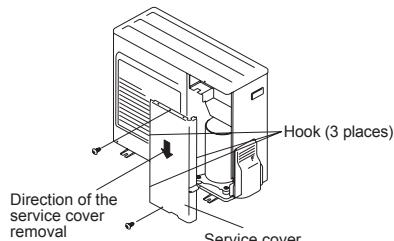


CAUTION

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.

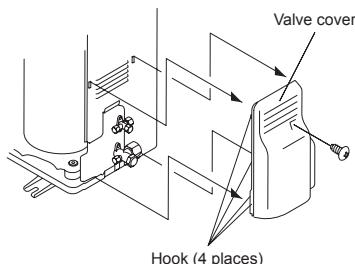
(1) Service cover removal

- Remove the two mounting screws.
- Remove the service cover by pushing downwards.



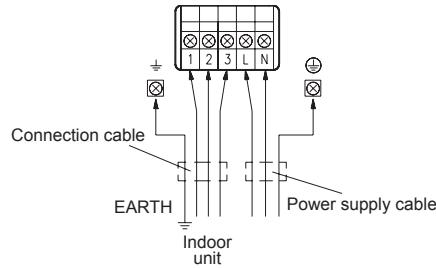
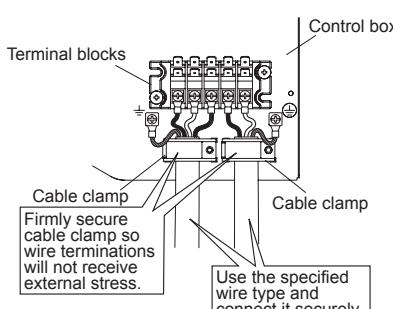
(2) Valve cover removal.

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



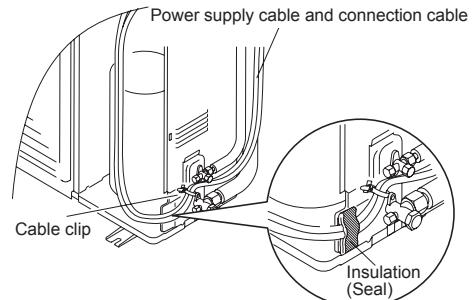
(3) Connect the power supply cable and the connection cable to terminal.

(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.

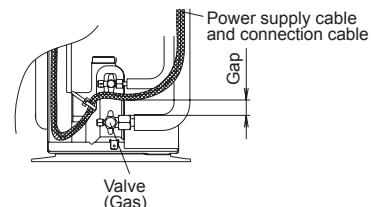
Fill in a gap at the entrance of the cables with insulation (seal).



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.

5.3. Connecting the piping

FLARING

- (1) Cut the connection pipe to the necessary length with a pipe cutter.
- (2) Hold the pipe downward so that cuttings will not enter the pipe and remove the burrs.

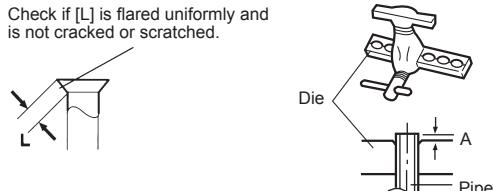
- (3) Insert the flare nut onto the pipe and flare the pipe with a flaring tool.

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.

Use the special R410A flare tool, or the conventional (for R22) flare tool.

When using the conventional flare tool, always use an allowance adjustment gauge and secure the A dimension shown in table 2.

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



Pipe outside diameter	A (mm)		
	Flaring tool for R410A, clutch type	Conventional (R22) Flaring tool	
Clutch type	Wing nut type		
ø 9.52 mm (3/8")	0 to 0.5	1.0 to 1.5	1.5 to 2.0
ø 15.88 mm (5/8")	0 to 0.5	1.0 to 1.5	1.5 to 2.0

BENDING PIPES

- (1) When bending the pipe, be careful not to crush it.
- (2) To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 70 mm or over.
- (3) If the copper pipe is bent the pipe or pulled to often, it will become stiff. Do not bend the pipes more than three times at one place.

CONNECTION PIPES

Outdoor unit

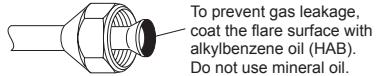
- Detach the caps and plugs from the pipes.

CAUTION

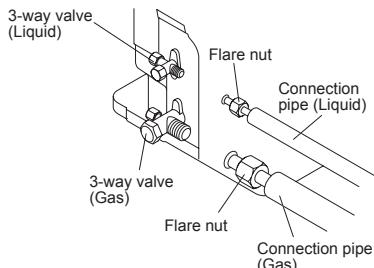
Be sure to apply the pipe against the port on the indoor unit and the outdoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.

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

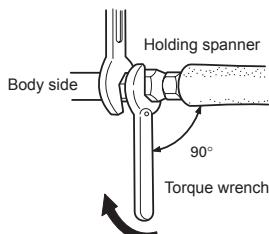
- Centering the pipe against port on the outdoor unit, turn the flare nut with your hand.



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



- 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 the right angle with the pipe, in order to tighten the flare nut correctly.

Flare nut

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

CAUTION

Fasten a flare nut with a torque wrench as instructed in this manual. If fastened too tight, the flare nut may be broken after a long period of time and cause a leakage of refrigerant.

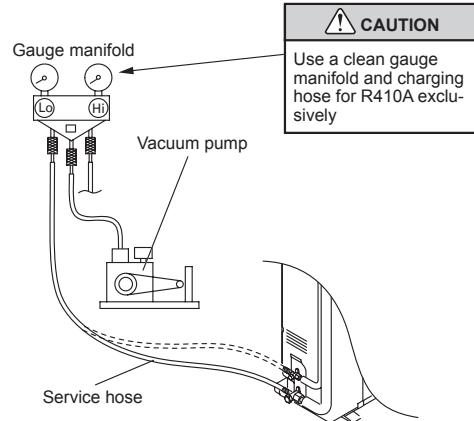
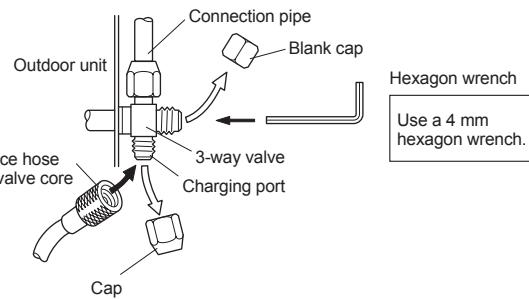
5.4. Air purge

Always use a vacuum pump to purge the air.

Refrigerant for purging the air is not charged in the outdoor unit at the factory.

- 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 connection 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	9.52 mm (3/8 in.) 15.88 mm (5/8 in.)	20 to 25 N·m (200 to 250 kgf·cm) 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

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.

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.

CAUTION

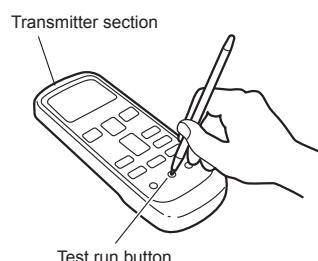
Install insulation around both the gas and liquid pipes. Failure to do so may cause water leaks.

Use insulation with heat resistance above 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 insulation around the refrigerant piping. If the expected humidity level is 70-80%, use insulation that is 15 mm or thicker, and if the expected humidity level exceeds 80%, use insulation that is 20 mm or thicker.
If insulation is used that is not as thick as specified, condensation may form on the surface of the insulation.

In addition, use insulation with heat conductivity of 0.045 W/(m·K) or less (at 20 °C).

5.5. Test run

- Perform test operation and check items.
- For the test operation method, refer to the operating manual.
- The outdoor unit, may not operate, depending on the room temperature. In this case, press the test run button on the remote controller while the air conditioner is running. (Point the transmitter section of the remote controller toward the air conditioner and press the test run button with the tip of a ball-point pen, etc.)
- To end test operation, press the remote controller START/STOP button.
(When the air conditioner is run by pressing the test run button, the OPERATION indicator lamp and TIMER indicator lamp will simultaneously flash slowly.)



OUTDOOR UNIT

- (1) Is there any abnormal noise and vibration during operation?
- (2) Will noise, wind, or drain water from the unit disturb the neighbors?
- (3) Is there any gas leakage?

5.6. Customer guidance

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

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

6. PUMP DOWN

6.1. Pump down

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.).

- (1) Do the air purging of the charge hose by connecting the charging hose of gauge manifold to the charging port of 3-way valve and opening the low-pressure valve slightly.
- (2) Close the valve stem of 2-way valve completely.
- (3) Start the cooling operation or following forced cooling operation. Keep on pressing the MANUAL AUTO button of the indoor unit for more than 10 seconds. The operation indicator lamp and timer indicator lamp will begin to flash simultaneously during test run. (The forced cooling operation cannot start if the MANUAL AUTO button is not kept on pressing for more than 10 seconds.)
- (4) Close the valve stem of 3-way valve when the reading on the compound pressure gage becomes 0.05~0 Mpa (0.5~0 kg/cm²).
- (5) Stop the operation.
 - Press the START/STOP button of the remote control unit 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 with 2 way or 3 way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to rupture and even injury.