

# SPLIT TYPE ROOM AIR CONDITIONER INSTALLATION INSTRUCTION SHEET

(PART NO. 9373856023)

For authorized service personnel only.

- ⚠ DANGER** This mark indicates procedures which, if improperly performed, are most likely to result in the death of or serious injury to the user or service personnel.
- ⚠ WARNING** This mark indicates procedures which, if improperly performed, might lead to the death or serious injury of the user.
- ⚠ CAUTION** This mark indicates procedures which, if improperly performed, might possibly result in personal harm to the user, or damage to property.

## This air conditioner uses new refrigerant HFC (R410A).

- The basic installation work procedures are the same as conventional refrigerant models.
- Since the working pressure is 1.6 times higher than that of conventional refrigerant models, some of the piping and installation and service tools are special. (See the table below.) Especially, when replacing a conventional refrigerant model with a new refrigerant R410A model, always replace the conventional piping and then use 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 and for safety. Therefore, check beforehand. (The charging port thread diameter for R410A is 1/2 NPT 20 threads per inch.)
  - Be more careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant models. Also, when starting the piping, securely seal the openings by pinching, tapping, etc.
  - When changing the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.

Special tools for R410A	
Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with conventional gauge. To prevent erroneous tracing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with size: 1/8" (3.18mm) - 1/2" using 53 kgf/cm <sup>2</sup> or high pressure. 4-1 to 4-10 (1/8" - 1/2" ports) is recommended.
Charging hose	1. Conventional charging hose cannot be used with this model. 2. Use a new charging hose with 1/2" NPT 20 threads per inch.
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

Thicknesses of Annealed Copper Pipes (R410A)		
Pipe nominal diameter	Thickness	Thickness
6.35 mm (1/4")	0.80 mm	0.80 mm
9.52 mm (3/8")	0.80 mm	0.80 mm
12.70 mm (1/2")	0.80 mm	0.80 mm
15.88 mm (5/8")	1.00 mm	1.00 mm
19.05 mm (3/4")	1.00 mm	1.00 mm

**Copper pipes**  
It is necessary to use annealed copper pipes and it is desirable that the amount of residual oil is less than 40 mg/10 l. Do not use copper pipes having a coating, painted or galvanized (especially on the interior surface). Otherwise, the separator valve or capillary tube may become blocked with contaminants. As an air conditioner using R410A, please always use higher than when using R22. Thicknesses of copper pipes used with R410A are shown in the table. Never use copper pipes thinner than that in the table when it is available on the market.

**⚠ DANGER** 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.

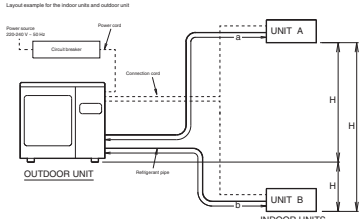
**⚠ WARNING**

- For the room air conditioner to operate satisfactorily, install it as outlined in this installation instruction sheet.
- Correct the indoor unit and outdoor unit with the room air conditioner piping and cable available standards parts. This installation instruction sheet describes the correct connections using the standard parts available from our standard parts.
- Installation work must be performed in accordance with national safety standards by authorized personnel only.
- Also, do not use an extension cord.
- Do not turn on the power until all installation work is complete.
- 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.
- 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.
- Be careful not to scratch the room air conditioner when handling it.
- After installation, explain correct operation to the customer, using the operating manual.
- Let the customer keep this installation instruction sheet because it is used when the room air conditioner is serviced or moved.

## STANDARD PARTS

Name and Shape	Qty	Use	Name and Shape	Qty	Use
Drain pipe	1	For outdoor unit drain piping work	Adapter ring	1	For use when connecting model 1-11 (outdoor unit)
Drain cap	1	For use when connecting model 1-11 (outdoor unit)			

## SYSTEM LAYOUT



## 1. CONNECTABLE INDOOR UNIT CAPACITY TYPE

**⚠ CAUTION**  
If the total capacity of the connected indoor units, an error will be displayed and the units will not operate. (For information on error display, refer to the installation instruction sheets included with the indoor units.)

- To install an indoor unit, refer to the installation instruction sheet included with the indoor unit.
- As for two indoor units, refer to the connection to the outdoor unit.

18 Model	
Outdoor unit	Connectable indoor models
A	7-12
B	7-12/14

24 Model	
Outdoor unit	Connectable indoor models
A	7-12
B	7-12/14-15

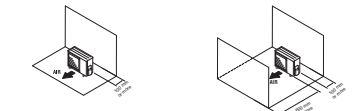
\* When connecting models 7-12 to the outdoor unit, the included adapter is necessary. (For more information, refer to **▶ HOW TO USE ADAPTER**.)

## SELECTING THE MOUNTING POSITION

**⚠ WARNING**  
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.

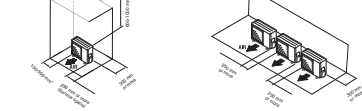
- Do not install where there is the danger of combustible gas leakage.
- Do not install the unit near heat sources of heat, steam, or flammable gas.
- If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.
- Install the unit where it will not be tilted by more than 5°.
- When installing the outdoor unit where it may be exposed to strong wind, fasten it securely.

- Exclude the mounting position with the customer as follows:
  - Install the outdoor unit in a location which is subjected to direct sunlight.
  - Provide the indicated shade to ensure good airflow.
  - If possible, do not install the unit where it is subjected to direct sunlight.
  - If necessary, install a grid that blocks direct sunlight.
  - Do not install the unit near a source of heat, steam, or flammable gas.
  - Do not install the unit where people are.
  - Install the outdoor unit in a place where it will be free from being dirty or getting wet by rain as much as possible.
  - Install the unit where connections to the indoor unit are easy.
- When there are obstacles at the back and front sides.



• When there are obstacles at the back, (left), vent top.

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



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

## 2. 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.

Total max. length (m)	20 (66 ft)
Max. height for each indoor unit (m)	20 (66 ft)
Max. height difference (m)	10 (33 ft)
Max. height for each outdoor unit (m)	5 (16 ft)

\* Address refrigerant charging in a new manner.

## 3. SELECTING PIPE SIZES

The dimensions of the connection pipes after according to the capacity of the indoor unit in the following table for the proper diameters of the connection pipes between the indoor and outdoor units.

Capacity (kW)	Gas pipe size (diameter) (mm)	Liquid pipe size (diameter) (mm)
7-12	φ12.7 (1/2")	φ9.52 (3/8")
14-18	φ12.7 (1/2")	φ9.52 (3/8")

**⚠ CAUTION**  
Operation cannot be guaranteed if the correct combination of pipes, wires, etc., is not used to connect the indoor and outdoor units.

## 4. HEAT INSULATION AROUND CONNECTION PIPES REQUIREMENTS

**⚠ CAUTION**  
Insulate heat insulation around both the gas and liquid pipes. Failure to do so may cause water leaks. The heat insulation with heat resistance above 120 °C (the reverse cycle model only). In addition, if the humidity level at the installation location of the refrigerant piping is expected to exceed 70%, insulate heat insulation around the refrigerant piping. If the expected humidity level is 70-80%, use heat insulation that is 10 mm or thicker and if the expected humidity exceeds 80%, use heat insulation that is 20 mm or thicker. If heat insulation is used that is not as thick as specified, the heat insulation must be 20 mm or thicker. In addition, use heat insulation with heat conductivity of 0.040 W/m·K or less (at 25 °C).

Connect the connection pipes according to **▶ CONNECTING THE PIPING** in the installation instruction sheet.

## 5. ELECTRICAL REQUIREMENT

Power supply cord (part)

Model	4.0
MM	5.5
MMX	5.5

Connection cord (part)

Outdoor unit	25
Indoor unit <td>10</td>	10

Four capacity (A)

• Install the disconnect switch between the power supply and the indoor unit.

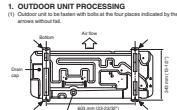
• Always make the air conditioner power supply a special branch circuit and provide a special breaker.

• Always use an ELCB or equivalent in the power supply cord and the connection cord.

## INSTALLATION PROCEDURE

### 1. OUTDOOR UNIT INSTALLATION

(1) Outdoor unit is to be fixed with the fasteners indicated by the arrows in the left.



(2) Fix securely with bolts in a solid block. Use a set of commercially available 802 bolt, nut and washer.



(3) Since the drain water flows out of the outdoor unit during heating operation, install the drain pipe and drain cap. If the drain pipe and drain cap are not used, the drain water in the pipe may freeze in extremely cold weather. (Reverse cycle model only.)

**⚠ CAUTION**  
When the outdoor temperature is 0 °C or less, do not use the necessary 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.)

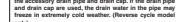


(4) Check the connection pipe.

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



(6) The flare nut is best repeatedly at the same place, it will break.



(7) Connect the connection pipes.

(8) Connect the gas pipe and liquid pipe to the power.

**⚠ CAUTION**  
Be sure to apply the pipe joint sealant to the indoor unit and outdoor unit correctly. If the sealant is improper, the flare nut cannot be tightened correctly. If the flare nut is not tightened, the flare nut will be damaged.

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

(9) Connecting the pipe against part on the indoor unit, turn the flare nut with your hand.

To prevent gas leakage, use the flare nut and tighten it with a torque wrench.

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	Tightening torque
φ12.7 mm (1/2")	20 to 25 (20 to 25) kgf·cm
φ9.52 mm (3/8")	10 to 15 (10 to 15) kgf·cm
φ15.88 mm (5/8")	25 to 30 (25 to 30) kgf·cm

Adapter tightening torque

Adapter type	Tightening torque
φ12.7 mm (1/2")	20 to 25 (20 to 25) kgf·cm
φ9.52 mm (3/8")	10 to 15 (10 to 15) kgf·cm
φ15.88 mm (5/8")	25 to 30 (25 to 30) kgf·cm

## 2. CONNECTING THE PIPE

**⚠ CAUTION**  
Do not use oil mineral oil on flare part. Prevent mineral oil from getting into the system as this would reduce the lifetime of the units.

When pipe are already laid or attached, the material will freeze, making difficult to bend and break them any more. Do not bend the pipe more than three times.

When pipe are already laid or attached, the material will freeze, making difficult to bend and break them any more. Do not bend the pipe more than three times.

When 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.

**1. FLARING**  
Cut the connection pipe to the necessary length with a pipe cutter. Hold the pipe diameter at the cutting site with the pipe end holder (A) and (B).

Hold the flare nut (C) between the flare and attached to the indoor and outdoor units respectively onto the flare and perform the flare processing with a flare tool.

Use the flare tool (D) face, not the connection flare tool. Check (A) is in a fixed position.



Pipe outside diameter	Dimension A (mm)	Dimension B (mm)	Dimension C (mm)
6.35 mm (1/4")	12.7	12.7	12.7
9.52 mm (3/8")	12.7	12.7	12.7
12.70 mm (1/2")	12.7	12.7	12.7
15.88 mm (5/8")	12.7	12.7	12.7
19.05 mm (3/4")	12.7	12.7	12.7

Pipe outside diameter	Dimension D (mm)
6.35 mm (1/4")	12.7
9.52 mm (3/8")	12.7
12.70 mm (1/2")	12.7
15.88 mm (5/8")	12.7
19.05 mm (3/4")	12.7

When using conventional flare tools to flare DR15A pipes, the dimension A should be approximately 0.5 mm more than indicated in the table for flaring with DR15A face tool to achieve the specified flaring. Use a flare gauge to measure the dimension A.

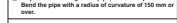
Pipe outside diameter	Width across flats of flare nut
6.35 mm (1/4")	17 mm
9.52 mm (3/8")	17 mm
12.70 mm (1/2")	22 mm
15.88 mm (5/8")	22 mm
19.05 mm (3/4")	22 mm

The pipes are already in your hands. Be careful not to collapse them. Do not bend the pipe at an angle more than 90°.

When pipe are already laid or attached, the material will freeze, making difficult to bend and break them any more. Do not bend the pipe more than three times.

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

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



(9) Connect the connection pipes.

(10) Connect the gas pipe and liquid pipe to the power.

**⚠ CAUTION**  
Be sure to apply the pipe joint sealant to the indoor unit and outdoor unit correctly. If the sealant is improper, the flare nut cannot be tightened correctly. If the flare nut is not tightened, the flare nut will be damaged.

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

(11) Connecting the pipe against part on the indoor unit, turn the flare nut with your hand.

To prevent gas leakage, use the flare nut and tighten it with a torque wrench.

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	Tightening torque
φ12.7 mm (1/2")	20 to 25 (20 to 25) kgf·cm
φ9.52 mm (3/8")	10 to 15 (10 to 15) kgf·cm
φ15.88 mm (5/8")	25 to 30 (25 to 30) kgf·cm

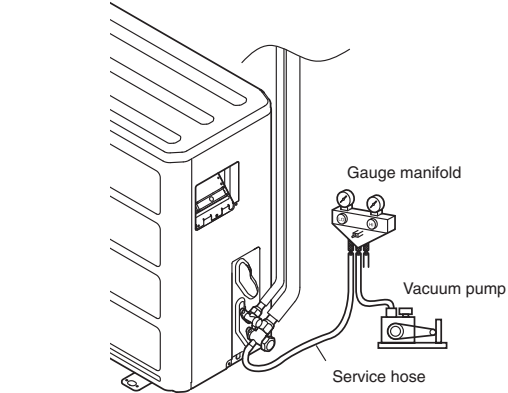
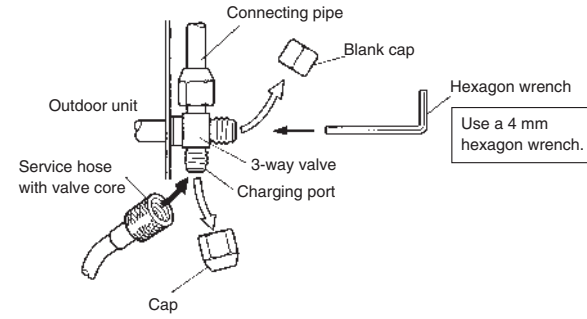
Adapter tightening torque

Adapter type	Tightening torque
φ12.7 mm (1/2")	20 to 25 (20 to 25) kgf·cm
φ9.52 mm (3/8")	10 to 15 (10 to 15) kgf·cm
φ15.88 mm (5/8")	25 to 30 (25 to 30) kgf·cm

## 5. 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 30 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	6.35 mm (1/4 in.)	20 to 25 N·m (200 to 250 kgf·cm)
	9.52 mm (3/8 in.)	20 to 25 N·m (200 to 250 kgf·cm)
	12.70 mm (1/2 in.)	25 to 30 N·m (250 to 300 kgf·cm)
	15.88 mm (5/8 in.)	30 to 35 N·m (300 to 350 kgf·cm)
Charging port cap	19.05 mm (3/4 in.)	35 to 40 N·m (350 to 400 kgf·cm)
		10 to 12 N·m (100 to 120 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.
- Charging of additional refrigerant (R410A) according to the piping length is unnecessary.

## 6. GAS LEAKAGE INSPECTION

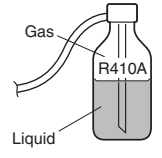
### CAUTION

- 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.

## 7. RECHARGING THE REFRIGERANT

### 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 can not be guaranteed.



## 3

## POWER

### WARNING

- The rated voltage of this product is 220-240 V A.C. 50 Hz.
- Before turning on verify that the voltage is within the 198 V to 264 V range.
- Always use a special branch circuit and install a special receptacle to supply power to the air conditioner.
- Use a special branch circuit breaker and receptacle matched to the capacity of the air conditioner. (Install in accordance with standard.)
- Perform wiring work in accordance with standards so that the air conditioner can be operated safely and positively.
- Install a leakage special branch 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.

## 4

## ELECTRICAL WIRING

### WARNING

- Before starting work, check that power is not being supplied to the indoor unit and outdoor unit.
- Match the terminal board 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 board. 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.)
- Always connect the ground wire.

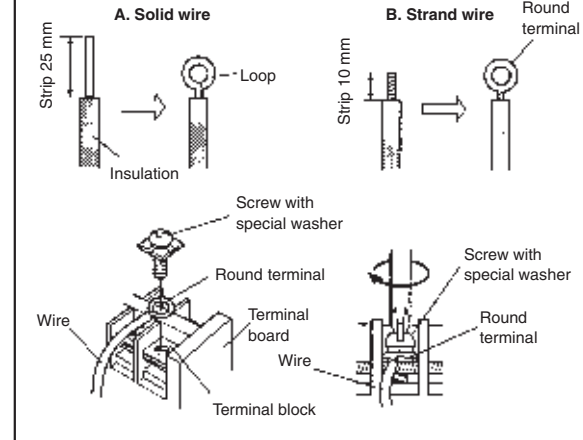
### HOW TO CONNECT WIRING TO THE TERMINALS

#### A. For solid core wiring (or F-cable)

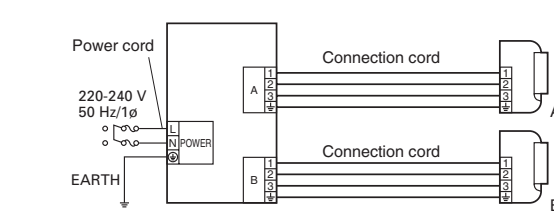
- Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 25 mm to expose the solid wire.
- Using a screwdriver, remove the terminal screw(s) on the terminal board.
- Using pliers, bend the solid wire to form a loop suitable for the terminal screw.
- Shape the loop wire properly, place it on the terminal board and tighten securely with the terminal screw using a screwdriver.

#### B. For strand wiring

- Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 10 mm to expose the strand wiring.
- Using a screwdriver, remove the terminal screw(s) on the terminal board.
- Using a round terminal fastener or pliers, securely clamp a round terminal to each stripped wire end.
- Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver.

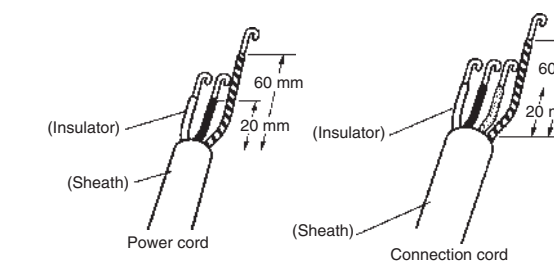


## 1. CONNECTION DIAGRAMS



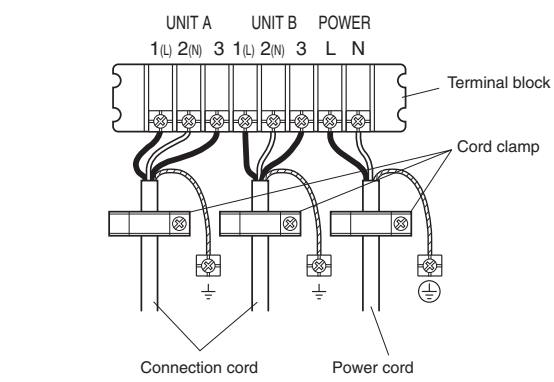
## 2. CORD PREPARATION

Keep the earth wire longer than the other wires.

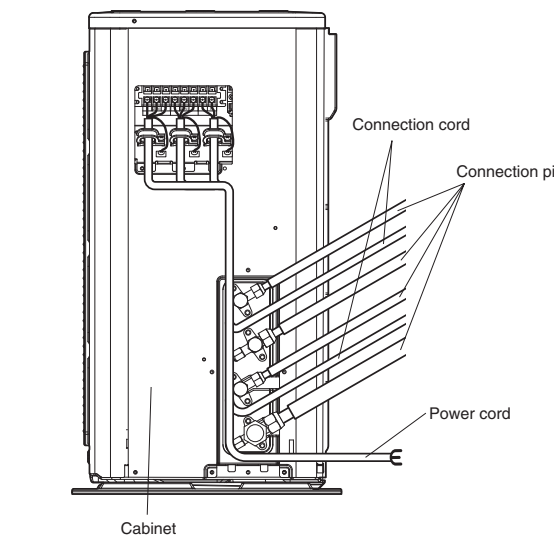


## 3. OUTDOOR UNIT

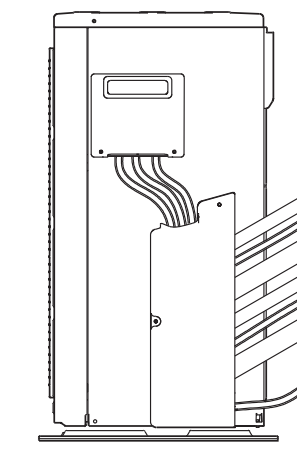
- Connect the power supply cord and the connection cord to terminal.
- Fasten the power supply cord and connection cord with cord clamp.



- Pass the connection cord and power cord through the hole of the 3-way valve bracket and run them to the outside of the cabinet.



- Install the valve cover and terminal cover as shown. Pass the power cord and connections cords through the valve cover when wiring them.



## 5

## TEST RUNNING

The test run method may be different for each indoor unit that is connected. Refer to the installation instruction sheet included with each indoor unit.

## 6

## CUSTOMER GUIDANCE

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

- Starting and stopping method, operation switching, temperature adjustment, timer, air flow adjustment, and other remote control unit operations.
- Air filter removal and cleaning.
- Give the operating manual and installation instruction sheet to the customer.