English

Français

Español

INSTALLATION MANUAL

VRF SYSTEM OUTDOOR UNIT

For authorized service personnel only

MANUEL D'INSTALLATION

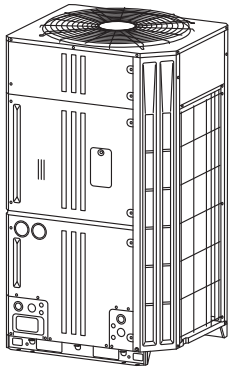
UNITÉ EXTÉRIEURE À SYSTÈME VRF

Pour le personnel agréé uniquement

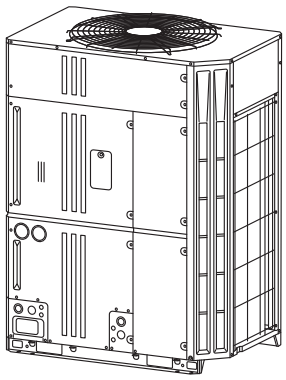
MANUAL DE INSTALACIÓN

UNIDAD EXTERIOR DEL SISTEMA VRF

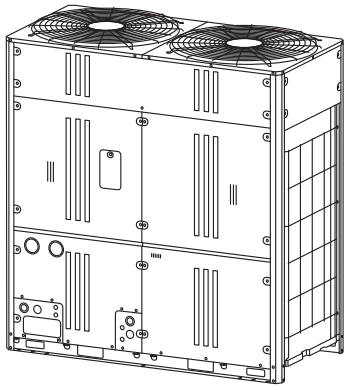
Solo para personal de servicio autorizado



AOUA72ULBV5 **(208/230 V)**
AOUA96ULBV5 **(208/230 V)**
AOUA72ULCV5 **(460 V)**
AOUA96ULCV5 **(460 V)**



AOUA120ULBV5 **(208/230 V)**
AOUA120ULCV5 **(460 V)**



AOUA144ULBV5 **(208/230 V)**
AOUA168ULBV5 **(208/230 V)**
AOUA192ULBV5 **(208/230 V)**
AOUA144ULCV5 **(460 V)**
AOUA168ULCV5 **(460 V)**
AOUA192ULCV5 **(460 V)**

FUJITSU GENERAL LIMITED

PART No. 9378945722-01

INSTALLATION MANUAL

[Original instructions]

PART No. 9378945722-01
VRF system outdoor unit

Contents

1. SAFETY PRECAUTIONS

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.

IMPORTANT!

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

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

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

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

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

- Hazard alerting symbols


Electrical


Safety / alert

If Necessary, Get Help

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

In Case of Improper Installation

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

SPECIAL PRECAUTIONS

When Wiring

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

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

When Transporting

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

When Installing...

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

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

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

...In an Area with High Winds
Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

...In a Snowy Area
Install the outdoor unit on a raised support that is higher than drifting snow. Provide snow vents.

When Connecting Refrigerant Tubing

- Keep all tubing runs as short as possible.
- Use the brazing method for connecting tubing.
- Apply refrigeration compressor oil (or equivalent) used for the outdoor unit to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak free connection.
- Check carefully for leaks before starting the test run.

When Servicing...

- Turn the power OFF at the main circuit breaker panel before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.
- After installing the unit, perform a test run to make sure the unit operates normally. Then, explain to the customer how to operate and maintain the unit.
- Please pass this installation manual together with the operation manual to the customer. Please ask the customer to keep the operation manual and Installation manual at hand for future reference during the moving or repair of the main unit.

⚠ WARNING
For installation purposes, be sure to use the parts supplied by the manufacturer or other prescribed parts. Using non-specified parts will cause serious accidents such as falling unit, refrigerant leakage, water leakage, electric shock, and fire.
To install a unit that uses the R410A refrigerant, use dedicated tools and piping materials that have been manufactured specifically for R410A use. Because the pressure of the R410A refrigerant is approximately 1.6 times higher than the R22, failure to use dedicated piping material or improper installation can cause rupture or injury. It will also cause serious accidents such as refrigerant leakage, water leakage, electric shock, and fire.
Do not use this equipment with air or any other unspecified refrigerant in the refrigerant lines. Excess pressure can cause a rupture.
Be sure to install the 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.
Ensure that the outdoor unit is securely installed at a place that can withstand the weight of the unit. Improper installation will cause injuries caused by falling unit.
If there is a refrigerant leakage, make sure that it does not exceed the concentration limit. If a refrigerant leakage exceeds the concentration limit, it can lead to accidents such as oxygen starvation.
If a refrigerant leakage occurs during operation, immediately vacate the premises and thoroughly ventilate the area. If the refrigerant is exposed to fire, it will create a hazardous gas.
Electrical work must be performed in accordance with this Installation manual by a person certified under the national or regional regulations. Be sure to use a dedicated circuit for the unit. An insufficient power supply circuit or improperly performed electrical work can cause serious accidents such as electric shock or fire.
For wiring, use the prescribed type of cables, connect them securely, making sure that there are no external forces of the cables applied to the terminal connections. Improperly connected or secured cables can cause serious accidents such as overheating the terminals, electric shock, or fire.
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.
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 will create a hazardous gas.
Use a wall hole pipe. Otherwise, it may cause a short circuit.
Do not place the outdoor unit near the handrail of the balcony. Children may climb onto the outdoor unit, lean over the handrail and fall over.
Use only a specified power cable. Poor connection, poor insulation, and exceeding the allowable current will lead to electric shock and fire.
Attach the connecting cables securely to the terminal. Or secure it firmly with a "wiring suppressor". Loose connection will lead to malfunction, electric shock, and fire.
Install a breaker to cut off all AC main current at the same time. If you do not install a breaker, it may cause electric shock and fire.
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.
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 breakage and even injury.
If there is a possibility of touching the fan during maintenance, make sure to turn OFF the power before implementing the maintenance. Even if operations are suspended, the fan of outdoor unit sometimes rotates, so if the fan rotates suddenly while in contact with you may cause serious injury.

⚠ CAUTION
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 location.
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.
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.
Do not install the unit in the following areas: • Area with high salt content, such as at the seaside. It will deteriorate metal parts, causing the parts to fall 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 fall 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 flammables such as paint thinner or gasoline. If gas leaks and settles around the unit, it can cause a fire. • Avoid installing the unit at places where it will come into contact with animals' urine or ammonia.
The units are not explosion proof and therefore should not be installed in explosive atmosphere.
Do not use the unit for special purposes, such as storing food, raising animals, growing plants, or preserving precision devices or art objects. It can degrade the quality of the preserved or stored objects.
Ground the unit. Do not connect the ground wire to a gas pipe, water pipe, lightning rod, or a telephone ground wire. Improper grounding may cause electric shock.
Perform draining for the unit according to the Installation manual. Check that the water is properly drained. If the drain processing is improperly installed, water may drip down from the unit, wetting the furniture.
Do not touch the fins with bare hands.
Be sure not to start or stop the operation of air conditioning with power breaker. Otherwise, it may cause malfunction or water leakage.
When setting it up near the equipment that generates electromagnetic waves and the equipment that generates the higher harmonics wave, be sure to take measures against noise. Otherwise, it may cause malfunction or failure.
When energizing to the crankcase heater, please turn on the power 12 hours or earlier before operation begins. When the energizing time is short, it may cause failure. Besides, please do not turn off power during the busy season.
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 THIS PRODUCT

2.1. Precautions for using R410A refrigerant

Pay careful attention to the following points:

Since the working pressure is 1.6 times higher than that of R22 models, some of the piping and installation and service tools are special. (See the table in the SPECIAL TOOLS FOR R410A section.) Especially, when replacing a conventional refrigerant (other than R410A) 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 R22, R407C and for safety. Therefore, check beforehand. [The charging port thread diameter for R410A is 1/2 UNF 20 threads per inch.]
Be more careful than the installation of the refrigerant (other than R410A) models, not to enter foreign matters (oil, water, etc.) and other refrigerant into the piping. 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 side whose composition is stable.

2.2. Special tools for R410A

Tool name	Contents of change for R22 tool
Gauge manifold	Pressure is huge 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 to use a gauge manifold with a high pressure display range 500 microns to 768 psi (-0.1 to 5.3 MPa) and a low pressure display range 500 microns to 551 psi (-0.1 to 3.8 MPa).
Charging 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. • A conventional vacuum pump can be used by installing a vacuum pump adapter. • Be sure that the pump oil does not back flow into the system. Use one capable for vacuum suction of 500 microns (-100.7 kPa).
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

2.3. Accessories

Use connecting parts as required.
Do not throw away the connecting parts until the installation has been complete.

Name and shape	Q'ty	Application
Installation manual 	1	(This manual)
Specifications manual 	1	—
Push mount cable tie (Black) 	2	For fixing power cable
Push mount cable tie (White) 	3	For fixing transmission cable
Cable tie 	1	For fixing transmission cable

Joint pipes included to each outdoor unit

Name and shape [in (mm)] ID: Inside diameter OD: Outside diameter	Quantity per model		
	AOUA72/96	AOUA120	AOUA 144/168/192
Joint pipe A ID 1 (25.4) ID 1-1/8 (28.58) ID 7/8 (22.22) ID 3/4 (19.05)	1	—	1
Joint pipe B ID 3/4 (19.05) ID 7/8 (22.22) ID 3/4 (19.05) ID 5/8 (15.88)	1	—	—
Joint pipe C ID 1-1/8 (28.58)	—	1	1
Joint pipe D ID 1 (25.4) ID 1-1/8 (28.58) ID 3/4 (19.05)	—	1	—
Joint pipe E ID 1 (25.4) OD 1-1/8 (28.58) OD 7/8 (22.22) OD 3/4 (19.05)	1	—	1
Joint pipe F ID 3/4 (19.05) OD 7/8 (22.22) OD 3/4 (19.05) OD 5/8 (15.88)	1	—	—
Joint pipe G ID 1-1/8 (28.58) OD 1-1/8 (28.58)	—	1	1
Joint pipe H ID 1 (25.4) OD 1-1/8 (28.58) OD 3/4 (19.05)	—	1	—
Joint pipe I OD 1/2 (12.70) ID 3/8 (9.52)	1	—	—
Joint pipe J OD 1/2 (12.70) ID 5/8 (15.88)	—	—	1 (Not used for AOUA144.)

Application of the joint pipes

Model	Joint pipe type	For Heat Pump system	For Heat Recovery system		For between outdoor unit liquid pipe and branch kit
		For gas pipe	For discharge gas pipe	For suction gas pipe	
AOUA72/96	Elbow	Joint pipe B	Joint pipe B	Joint pipe A	—
	Straight	Joint pipe F	Joint pipe F	Joint pipe E	Joint pipe I
AOUA120	Elbow	Joint pipe D	Joint pipe D	Joint pipe C	—
	Straight	Joint pipe H	Joint pipe H	Joint pipe G	—
AOUA144/168/192	Elbow	Joint pipe A	Joint pipe A	Joint pipe C	—
	Straight	Joint pipe E	Joint pipe E	Joint pipe G	Joint pipe J

2.4. Combinations

A maximum of 3 outdoor units can be connected to 1 refrigerant system.
For the combination of outdoor units per refrigerant system, refer to the Design & Technical manual.
The number of indoor units that can be connected are as follows:

Ton	Cooling capacity (Btu/h)	Set model name	Model name			Maximum number of connectable indoor units
			Unit 1	Unit 2	Unit 3	
6	72,000	AOUA72UL*V5	AOUA72UL*V5	—	—	16
8	96,000	AOUA96UL*V5	AOUA96UL*V5	—	—	21
10	120,000	AOUA120UL*V5	AOUA120UL*V5	—	—	26
12	144,000	AOUA144UL*V5	AOUA144UL*V5	—	—	32
14	168,000	AOUA168UL*V5	AOUA168UL*V5	—	—	37
16	192,000	AOUA192UL*V5	AOUA192UL*V5	—	—	42
18	216,000	AOUA216UL*VG5	AOUA120UL*V5	AOUA96UL*V5	—	47
20	240,000	AOUA240UL*VG5	AOUA120UL*V5	AOUA120UL*V5	—	52
22	264,000	AOUA264UL*VG5	AOUA144UL*V5	AOUA120UL*V5	—	58
24	288,000	AOUA288UL*VG5	AOUA144UL*V5	AOUA144UL*V5	—	64
26	312,000	AOUA312UL*VG5	AOUA168UL*V5	AOUA144UL*V5	—	64
28	336,000	AOUA336UL*VG5	AOUA168UL*V5	AOUA168UL*V5	—	64
30	360,000	AOUA360UL*VG5	AOUA192UL*V5	AOUA168UL*V5	—	64
32	384,000	AOUA384UL*VG5	AOUA192UL*V5	AOUA192UL*V5	—	64
34	408,000	AOUA408UL*VG5	AOUA144UL*V5	AOUA144UL*V5	AOUA120UL*V5	64
36	432,000	AOUA432UL*VG5	AOUA144UL*V5	AOUA144UL*V5	AOUA144UL*V5	64

2.5. Optional parts

⚠ CAUTION

The following parts are optional parts specific to R410A refrigerant.
Do not use parts other than those listed below.

2.5.1 RB unit (for heat recovery system)

Model		UTP-RU01DH	UTP-RU01EH	UTP-RU01FH	UTP-RU04EH	UTP-RU08DH	UTP-RU12DH
Number of branches		1			4	8	12
Max number of connectable indoor units per branch		6	8		8	6	
Max capacity of connectable indoor units (Q)	Btu/h	Q ≤ 27,000	Q ≤ 60,000	Q ≤ 96,000	Q ≤ 191,000 (*1)	Q ≤ 245,000 (*2)	Q ≤ 324,000 (*2)
Max capacity of connectable indoor units per branch (Q)	Btu/h	Q ≤ 27,000	Q ≤ 60,000	Q ≤ 96,000	Q ≤ 60,000	Q ≤ 27,000	Q ≤ 27,000

*1: In case of 2 RB units connected in series (total 8-branches), maximum capacity of connectable indoor units is up to 191,000 Btu/h.
*2: In case of separation tube kit (UTP-EX060A, UTP-EX096A) connected, maximum capacity of connectable indoor units is up to 96,000 Btu/h.

2.5.2 Outdoor unit branch kit

Model		Total cooling capacity of indoor unit [kW]
For Heat Pump system (2 pipe)	UTP-CX567A	ALL
For Heat Recovery system (3 pipe)	UTP-DX567A	

2.5.3 Separation tube and header

For 2 pipe connection			Total cooling capacity of indoor units (x) (Btu/h)
Separation tube		UTP-AX054A	x < 66,000
		UTP-AX090A	x < 96,500
		UTP-AX180A	96,500 ≤ x < 193,000
		UTP-AX567A	193,000 ≤ x
Header	3 to 6 Branches	UTR-H0906L	x < 96,500
		UTR-H1806L	96,500 ≤ x < 193,000
	3 to 8 Branches	UTR-H0908L	x < 96,500
		UTR-H1808L	96,500 ≤ x < 193,000

For 3 pipe connection			Total cooling capacity of indoor units (x) (Btu/h)
Separation tube		UTP-BX090A	x < 96,500
		UTP-BX180A	96,500 ≤ x < 193,000
		UTP-BX567A	193,000 ≤ x
Header	3 to 6 Branches	UTP-J0906A	x < 96,500
		UTP-J1806A	96,500 ≤ x < 193,000
	3 to 8 Branches	UTP-J0908A	x < 96,500
		UTP-J1808A	96,500 ≤ x < 193,000

2.5.4 External connect kit

Model	Usage
UTY-XWZXZ6	For External input (CN131, CN132, CN133, CN134)
	For External output (Error status / CN136) (Operation status / CN137)
UTY-XWZXZF	For External input (CN135)

2.6. About unit of the length

This product is manufactured to metric units and tolerances. United States customary units are provided for reference only. In cases where exact dimensions and tolerances are required, always refer to metric units.

3. INSTALLATION WORK

Please obtain the approval of the customer when selecting the location of installation and installing the main unit.

3.1. Selecting an installation location

⚠ WARNING

Install the unit in a location that can withstand its weight, and where it will not topple or fall.

Calculate the proper refrigerant concentration if you will be installing it in an enclosed location.

$$\frac{\text{Total amount of replenished refrigerant in refrigerant facility [lb. (kg)]}}{\text{Capacity of smallest room where unit is installed [Mcf (m}^3\text{)]}} \leq \text{Refrigerant concentration [lb/Mcf (kg/m}^3\text{)] [25 lb/Mcf (0.39 kg/m}^3\text{)]}$$

If the results of the calculation exceed the concentration limit, increase the room surface area or install a ventilation duct.

⚠ CAUTION

Select an installation location by observing the following precautions:

Install the unit level. (Within 0.3 degrees)

Install this unit in a location with good ventilation.

If the 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 unit in an area 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 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 unit in an area that would not cause problems even if the drain water is discharged from the unit. Otherwise, provide drainage that would not affect people or objects.

Install the unit in an area that has no heat sources, vapors, or the risk of the leakage of flammable gas in the vicinity.

Install the unit in an area that is away from the exhaust or vent ports that discharge vapor, soot, dust, or debris.

Install the indoor unit, outdoor unit, power supply cable, transmission cable and remote control cable at least 40 in (1 m) away from a television or radio.
The purpose of this is to prevent TV reception interference or radio noise. (Even if they are installed more than 40 in (1 m) apart, you could still receive noise under some signal conditions.)

Keep the length of the piping of the indoor and outdoor units within the allowable range.

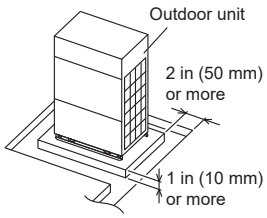
For maintenance purposes, do not bury the piping.

3.2. Drain processing

- The drain water is discharged from the bottom of the equipment. Construct a drain ditch around the base and discharge the drain water properly.
- When installing on a roof, perform floor waterproofing properly.

Drain processing:

- The drain water from the base of the outdoor unit may generate during operations. Perform drain processing, as necessary.
- When you want to prevent the drain water from leaking at the perimeter, construct a ditch for the drain water as shown in the figure.
- Provide a central drain pan, as necessary.



3.3. Clearance requirement

⚠ CAUTION

When installing the outdoor unit, pay attention to the following items.

Provide sufficient installation space, such as transportation route, maintenance space, ventilation space, refrigerant piping space, and passageways.

Pay attention to the specifications of the space requirement as shown in the figure. If the unit is not installed according to specifications, it may cause short circuit or poor performance. The unit may be prone to lapse into non-operation due to high pressure protection.

Do not place obstructions in the airflow outlet direction. If there is an obstruction in the outlet direction, install an outlet duct.

When there is a wall in front of the unit, provide a space of 500 mm or more as maintenance space.
When there is a wall at the left side of the unit, provide a space of 30 mm or more as maintenance space.

An outdoor temperature of 95°FDB (35°CDB) in air-conditioned operation is assumed for the space requirement in this item. If the outdoor temperature exceeds 95°FDB (35°CDB) and the outdoor unit is operating at a load exceeding its rated ability, provide a larger inlet space.

If you are installing more outdoor units than indicated here, please ensure sufficient space or consult your distributing agent as it may affect the performance due to short circuit and other problems.

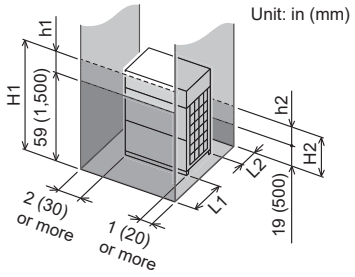
3.3.1 When install nearby limited height wall

(1) Single and multiple installations

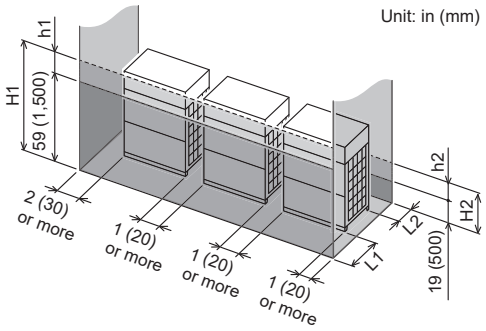
- There are no restrictions on the height of the side wall.
- Provide installation spaces L1 and L2 in accordance with the table below according to the wall height (front side, rear side) conditions.
- Provide installation spaces other than L1 and L2 in accordance with the conditions shown in the figure below.
- Ventilation resistance can be ignorable when the distance from a wall or product, etc. is larger than 79 in (2 m).

Wall height condition: in (mm)	Installation requirement : in (mm)
When H1 is 59 (1,500) or less	L1 ≥ 20 (500)
When H1 is 59 (1,500) or more	L1 ≥ 20 (500) + h1 / 2
When H2 is 19 (500) or less	L2 ≥ 4 (100)
When H2 is 19 (500) or more	L2 ≥ 4 (100) + h2 / 2

Single installation



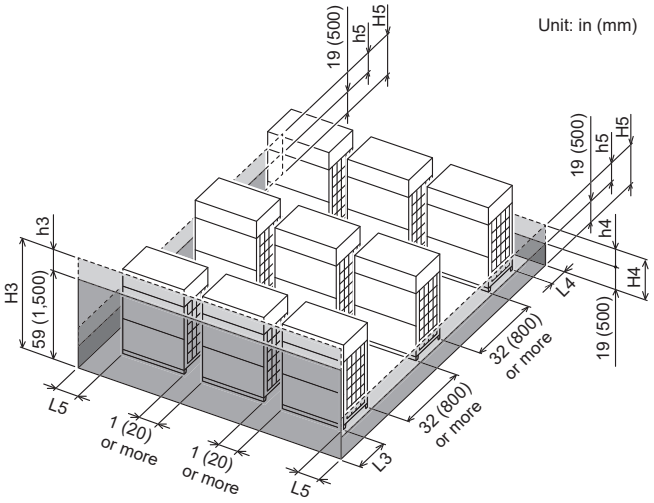
Multiple installations

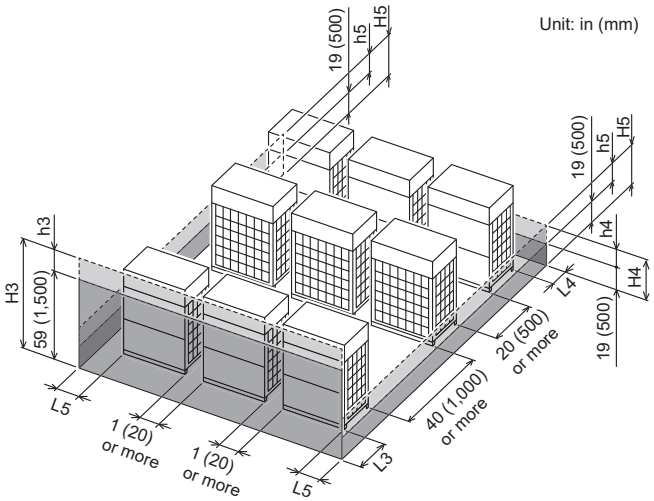


(2) Concentrated installation

- Provide installation spaces L3, L4, and L5 in accordance with the table below according to the wall height (front side, rear side) conditions.
- Provide installation spaces other than L3, L4, and L5 in accordance with the conditions shown in the figure below.
- Ventilation resistance can be ignorable when the distance from a wall or product, etc. is larger than 79 in (2 m).

Wall height condition: in (mm)	Installation requirement : in (mm)
When H3 is 59 (1,500) or less	L3 ≥ 20 (500)
When H3 is 59 (1,500) or more	L3 ≥ 20 (500) + h3 / 2
When H4 is 19 (500) or less	L4 ≥ 8 (200)
When H4 is 19 (500) or more	L4 ≥ 8 (200) + h4 / 2
When H5 is 19 (500) or less	L5 ≥ 8 (200)
When H5 is 19 (500) or more	L5 ≥ 8 (200) + h5 / 2





3.3.2 When install near unlimited height wall

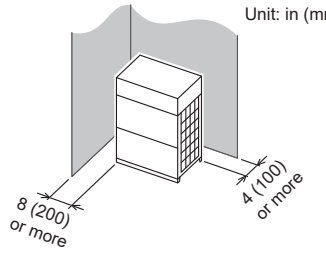
(1) Single and multiple installations

- There are no restrictions on the height of the wall.
- The wall (without height restrictions) must not exist on the both sides (left / right) of outdoor unit. Also, must not exist on the both sides (front / rear) of outdoor unit.
- Provide installation spaces other than L6 in accordance with the conditions shown in the figure below.
- Ventilation resistance can be ignorable when the distance from a wall or product, etc. is larger than 79 in (2 m).

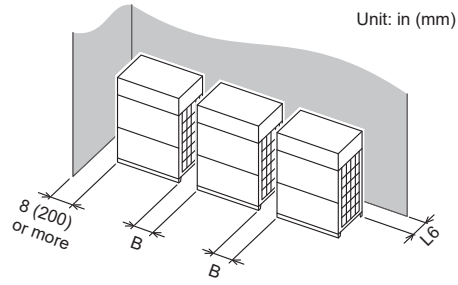
When installing with the rear of the outdoor unit facing the wall side:

Wall height condition: in (mm)	Installation requirement: in (mm)
When B ≥ 16 (400)	L6 ≥ 8 (200)
When 1 ≤ B < 16 (When 20 ≤ B < 400)	L6 ≥ 8 + (16 - B) × 3 (L6 ≥ 200 + (400 - B) × 3)

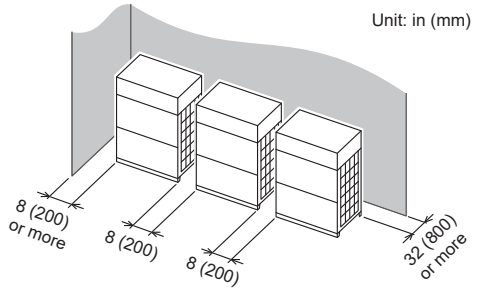
Single installation



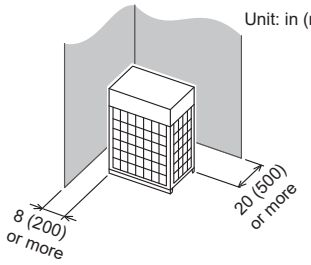
Multiple installations

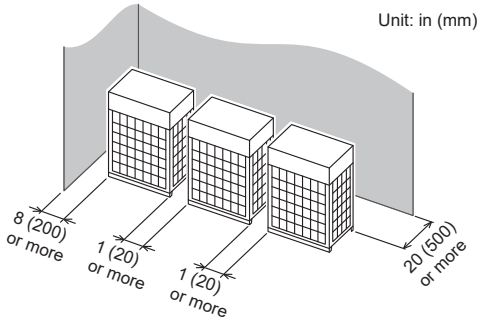


Example :
When B is made 8 in (200 mm)
L6 ≥ 8 + (16 - 8) × 3 = 32 in (L6 ≥ 200 + (400-200) × 3 = 800 mm)



When installing with the FRONT of the outdoor unit facing the wall side

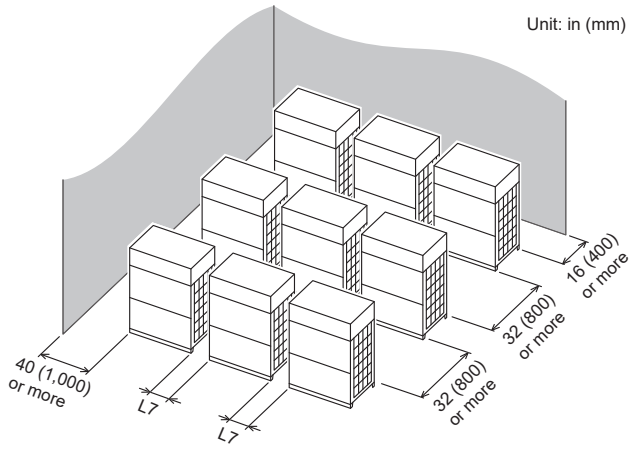


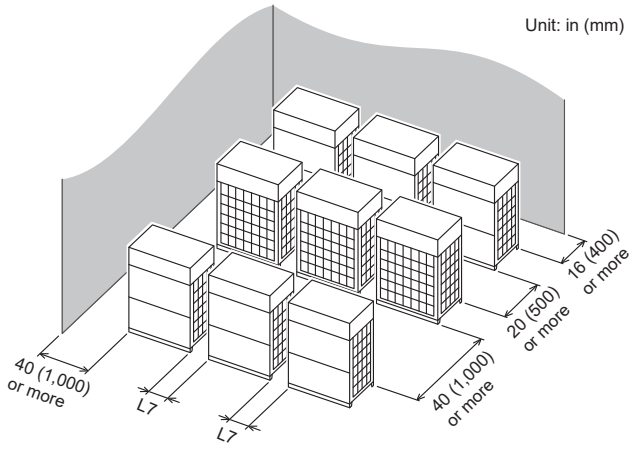


(2) Concentrated Installation

- The wall (without height restrictions) must not exist on the both sides (left / right) of outdoor unit. Also, must not exist on the both sides (front / rear) of outdoor unit.
- Ventilation resistance can be ignorable when the distance from a wall or product, etc. is larger than 79 in (2 m).

Installation condition: in (mm)	
When installing 3 units any of the model AOUA144/168/192 side by side	L7 ≥ 20 (500)
Other than the above	L7 ≥ 16 (400)





3.3.3 When there are obstacles above the product

- When there are obstacles above the product, keep the minimum installation height as shown in the figure and install the outlet duct.
- When installing the outlet duct, you must set the high static pressure mode with the push-button switch. (Similar when installing anti-snow hood)

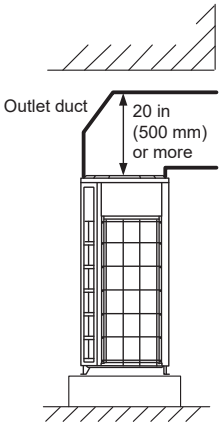
Setting high static pressure mode

The high static pressure mode is set with the push button on the PC board in the outdoor unit. For the setting method, refer to “8. FIELD SETTING”, and for the details of the setting, refer to No. 24 at “8.4.1 List of settings”.

Mode	Static pressure (SP) range (*1) [in WG (Pa)]
High static pressure 1	0 ≤ SP ≤ 0.12 (0 ≤ SP ≤ 30)
High static pressure 2	0.12 < SP ≤ 0.32 (30 < SP ≤ 80)
High static pressure 3 (*2)	0.32 < SP ≤ 0.44 (80 < SP ≤ 110)

*1: Static pressure is the airflow resistance that includes the discharge duct resistance & the other additional resistance like discharge grill and so on.

*2: Model AOUA72/96/120 cannot be enable this mode. Even if this mode is set, it will be the same as “High static pressure 2”.

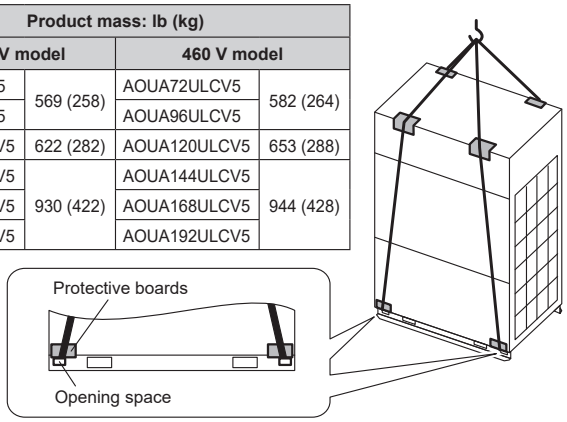


3.4. Transporting the unit

Hoisting method

- When hanging the outdoor unit and conveying it to installation location, hang the unit with rope by passing through the 4 opening holes on bottom of front and rear side as shown in figure.
- Use 2 ropes at least 27 ft (8 m) long. If used shorter length, it may cause to damage to the unit.
- Use the sufficiently strong rope to bear the unit’s weight.
- Place the protective board or filler cloth at the place where the cabinet may come into contact with rope to prevent from damages. Without using them, cabinet may cause to damage or deform.
- During the hanging unit, make sure to keep the unit level to prevent from falling.
- To prevent the unit swing accident or falling down of the unit, do not apply any impact to the unit when it is hanging.

Product mass: lb (kg)			
208/230 V model		460 V model	
AOUA72ULBV5	569 (258)	AOUA72ULCV5	582 (264)
AOUA96ULBV5		AOUA96ULCV5	
AOUA120ULBV5	622 (282)	AOUA120ULCV5	653 (288)
AOUA144ULBV5	930 (422)	AOUA144ULCV5	944 (428)
AOUA168ULBV5		AOUA168ULCV5	
AOUA192ULBV5		AOUA192ULCV5	



Lifting by forklift or hand forklift

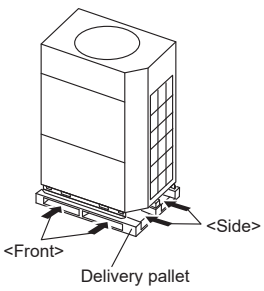
- When using the forklift to lift the unit, pass the forklift arms through the opening space as shown in below.

  Front: Fork entry of the wooden delivery pallet.

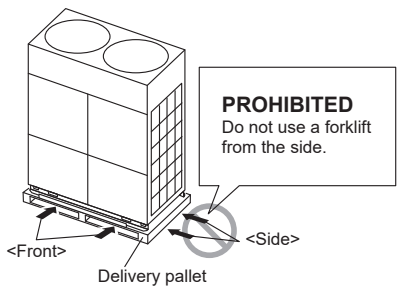
  Side: Space between pallet and cabinet. (Only for AOUA72/96/120) (Enable to remove the pallet from cabinet.)

- Be careful not to damaged.

AOUA72/96/120



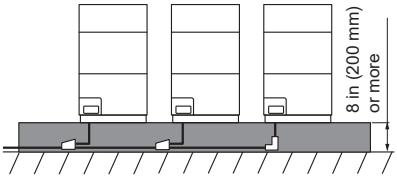
AOUA144/168/192



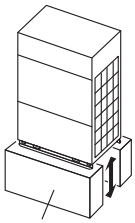
3.5. Installing the unit

- Install the unit level. (Within 0.3 degrees.)
- To minimize vibration, do not install the outdoor unit directly on the ground.
- The foundation base should be able to support the product and the foot width of the product should be more than 2 in (46.5 mm).
- Depending on the installation condition, vibration during the operation of the unit may cause noise and vibration.
  Install vibration-proofing materials (such as rubber pads).
- Consider the removal space of the connection piping when installing the foundation.
- Secure the equipment firmly with anchor bolts, washers, and nuts.

- When installing piping from the bottom of the outdoor units, the required space under the outdoor unit ≥ 8 in (200 mm).
  *Install the branch kit horizontally.



- Do not install directly on the ground, this may result in equipment failure. Provide ample space for ice buildup from condensate between the bottom of the unit and the flat surface on which it is mounted. Otherwise, there is risk that the drainage water will freeze between the device and the surface, disabling drainage.

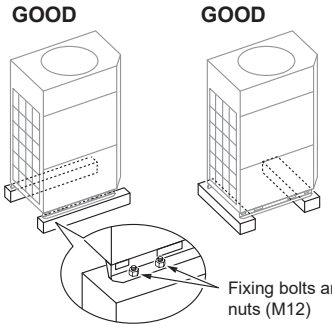


⚠ CAUTION

If the unit is installed in a region that is exposed to high winds, freezing conditions, freezing rain, snow fall or heavy snow accumulation, take appropriate measures to protect it from those elements.
To ensure stable operation, the outdoor unit must be installed on a raised stand or rack, at or above the anticipated snow depth for the region.
The installation of snow hoods and drift prevention fencing is recommended when blowing and drifting snow is common to the region.

AOUA72/96/120

- Install it on top of a firm platform (such as concrete block).



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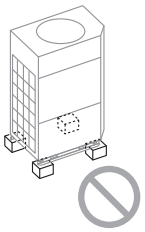
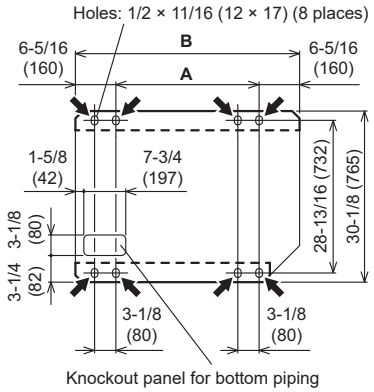


* Do not use a four-corner support foundation.

- Install 4 or more anchor bolts at the 8 locations indicated by arrows.
- Place the left and right anchor bolts at a distance further away than the dimensions of A in the following table. (Excluding the case where anchor bolts are installed at 8 places.)

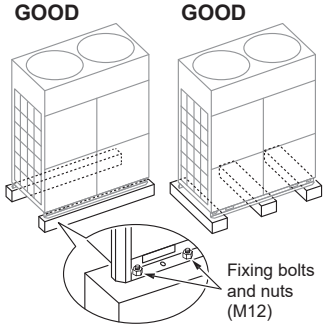


Unit: in (mm)

Model	A [in (mm)]	B [in (mm)]
AOUA72	24 (610)	36-5/8 (930)
AOUA96		
AOUA120	36-1/4 (920)	48-13/16 (1,240)

AOUA144/168/192

- Install it on top of a firm platform (such as concrete block).



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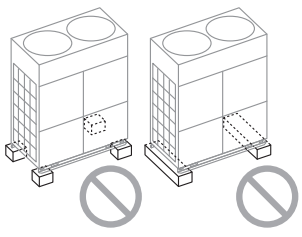
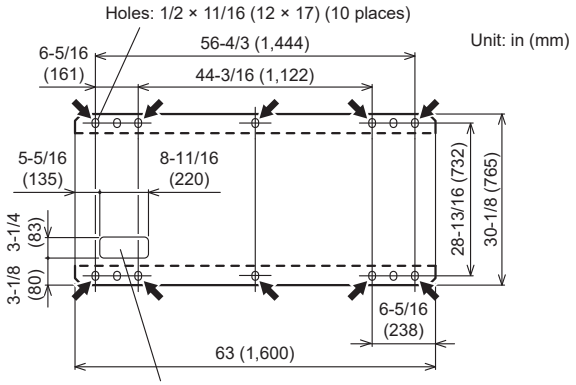


* Do not use a four-corner support foundation.

- Install 6 or more anchor bolts at the 10 locations indicated by arrows.



4. SYSTEM CONFIGURATION (for Heat Pump system)

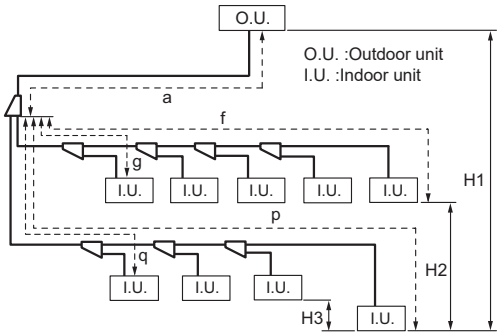
About for Heat Recovery system, refer to “5. SYSTEM CONFIGURATION (for Heat Recovery system)”.
For detailed information, refer to the Design & Technical manual.

4.1. System configuration (for Heat Pump system)

⚠ CAUTION

- When connecting multiple outdoor units, set the nearest outdoor unit to the indoor unit on the refrigerant pipe as the primary unit.
- When connecting multiple outdoor units, install the outdoor unit with the largest nominal system capacity nearest to the indoor unit on the refrigerant pipe, followed by those with less nominal system capacities.
  [Capacity: Primary ≥ Subordinate]
- Always keep to the limit on the total amount of refrigerant. Exceeding the limit on the total amount of refrigerant when charging will lead to malfunction.

4.1.1 In case of 1 outdoor unit connected



Allowable pipe length (actual pipe length)

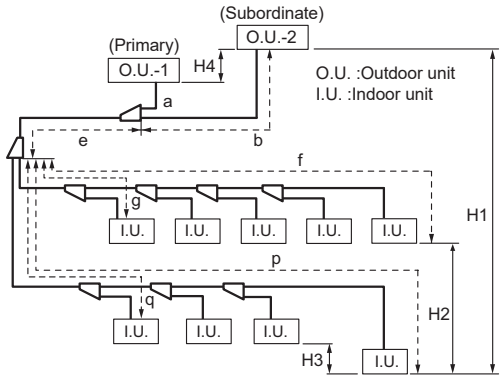
Between primary outdoor unit and the farthest indoor unit	541 ft (165 m) or less	**a + f a + p**
Between the first separation tube and the farthest indoor unit	295 ft (90 m) or less	**f, p**
(Farthest indoor unit) - (Closest indoor unit)	196 ft (60 m) or less	**f (p) - g (q)**
Total pipe length	2,296 ft (700 m) or less	**Total**

Allowable height difference

Between outdoor unit and indoor unit (When indoor unit is installed below)	164 ft (50 m) or less (*1)	**H1**
Between outdoor unit and indoor unit (When outdoor unit is installed below)	131 ft (40 m) or less	
Between indoor units	164 ft (50 m) or less	**H2, H3**

*1: For installations over 164 ft (50 m), refer to the Design & Technical manual.

4.1.2 In case of 2 outdoor units connected



Allowable pipe length (actual pipe length)

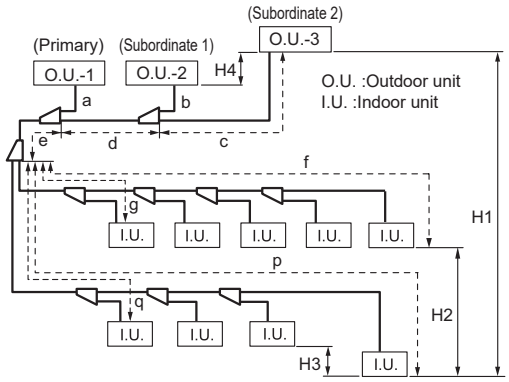
Between primary outdoor unit and the farthest indoor unit	541 ft (165 m) or less	**a + e + f** **a + e + p**
Between the first separation tube and the farthest indoor unit	295 ft (90 m) or less	**f, p**
(Farthest indoor unit) - (Closest indoor unit)	196 ft (60 m) or less	**f(p) - g(q)**
Total pipe length	3,280 ft (1,000 mm) or less	**Total**
Between outdoor unit and outdoor unit branch kit	9 ft (3 m) or less	**a, b**

Allowable height difference

Between outdoor unit and indoor unit (When indoor unit is installed below)	164 ft (50 m) or less (*1)	**H1**
Between outdoor unit and indoor unit (When outdoor unit is installed below)	131 ft (40 m) or less	
Between indoor units	164 ft (50 m) or less	**H2, H3**
Between outdoor units	1 ft (0.5 m) or less	**H4**

• Outdoor unit capacity: Primary ≥ Subordinate
*1: For installations over 164 ft (50 m), refer to the Design & Technical manual.

4.1.3 In the case of 3 outdoor units connected



Allowable pipe length (actual pipe length)

Between primary outdoor unit and the farthest indoor unit	541 ft (165 m) or less	**a + e + f** **a + e + p**
Between the first separation tube and the farthest indoor unit	295 ft (90 m) or less	**f, p**
(Farthest indoor unit) - (Closest indoor unit)	196 ft (60 m) or less	**f(p) - g(q)**
Total pipe length	3,280 ft (1,000 mm) or less	**Total**
Between outdoor unit and outdoor unit branch kit	9 ft (3 m) or less	**a, b, c**
Between the farthest outdoor unit and the first outdoor unit branch kit	39 ft (12 m) or less	**b + d** **c + d**

Allowable height difference

Between outdoor unit and indoor unit (When indoor unit is installed below)	164 ft (50 m) or less (*1)	**H1**
Between outdoor unit and indoor unit (When outdoor unit is installed below)	131 ft (40 m) or less	
Between indoor units	164 ft (50 m) or less	**H2, H3**
Between outdoor units	1 ft (0.5 m) or less	**H4**

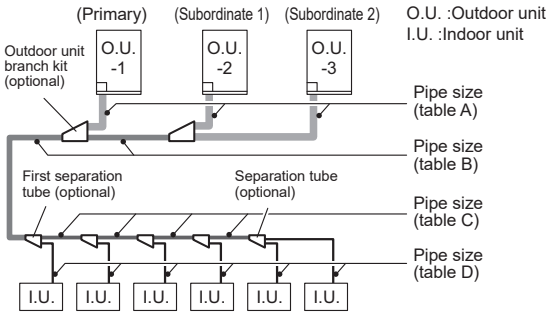
• Outdoor unit capacity: Primary ≥ Subordinate 1 ≥ Subordinate 2
*1: For installations over 164 ft (50 m), refer to the Design & Technical manual.

NOTE:
• If the outdoor temperature during cooling operation is expected to be 23°F (–5°C) or less, outdoor unit must be installed lower than 16 ft (5 m) or less from the indoor unit.
• Please refer to "9.3.2 Checking total amount of refrigerant and calculating the amount of refrigerant charge to be added" for the total amount of refrigerant.

4.2. Pipe selection (for Heat Pump system)

⚠ CAUTION

This unit is designed specifically for use with the R410A refrigerant. Pipes for R407C or R22 may not be used with this unit. Do not use existing pipes. Improper pipe selection will degrade performance.



(Wall thickness and pipe material for each diameter)

Outside diameter	in (mm)	1/4 (6.35)	3/8 (9.52)	1/2 (12.70)	5/8 (15.88)	3/4 (19.05)	7/8 (22.22)	1-1/8 (28.58)	1-3/8 (34.92)	1-5/8 (41.27)
Wall thickness (*1)		0.032 (0.8)	0.032 (0.8)	0.032 (0.8)	0.039 (1.0)	0.047 (1.2)	0.039 (1.0)	0.039 (1.0)	0.047 (1.2)	0.056 (1.43)
Material		COPPER (*2) JIS H3300 C1220T-O or equivalent				COPPER (*3) JIS H3300 C1220T-H or equivalent				

*1: Endurance pressure of the pipes 609 psi (4.2MPa)
*2: Allowable tensile stress ≥ 33 (N/mm²)
*3: Allowable tensile stress ≥ 61 (N/mm²)
Please select the pipe size in accordance with local rules.

Table. A (Between outdoor unit and outdoor unit branch kit)

* For the branch kit installation method, refer to "6.4. Multiple connections".

[Standard]

Ton	Nominal cooling capacity of outdoor unit [Btu/h]	Outside diameter [in (mm)]		Branch kit
		Liquid pipe	Gas pipe	
6	72,000	3/8 (9.52)	3/4 (19.05)	UTP-CX567A
8	96,000		7/8 (22.22)	
10	120,000	1/2 (12.70)	1-1/8 (28.58)	
12	144,000			
14	168,000	5/8 (15.88)		
16	192,000			

[Condition 1]

When one or more of the following apply:
• The distance between the outdoor unit (primary) and the farthest indoor unit is 230 ft (70 m) or more.
• If the outdoor unit is lower than the indoor unit and the height difference exceeds 16 ft (5 m); only for liquid pipes.

Ton	Nominal cooling capacity of outdoor unit [Btu/h]	Outside diameter [in (mm)]		Branch kit
		Liquid pipe	Gas pipe	
6	72,000	1/2 (12.70)	7/8 (22.22)	UTP-CX567A
8	96,000			
10	120,000		1-1/8 (28.58)	
12	144,000			
14	168,000	5/8 (15.88)		
16	192,000			

Table. B (Between outdoor unit branch kits or outdoor unit branch kit and first separation tube)

[Standard]

Ton	Total cooling capacity of outdoor unit [Btu/h]	Outside diameter [in (mm)]	
		Liquid pipe	Gas pipe
6	72,000	3/8 (9.52)	3/4 (19.05)
8	96,000		7/8 (22.22)
10	120,000	1/2 (12.70)	1-1/8 (28.58)
12	144,000		
14	168,000	5/8 (15.88)	
16	184,000		
18	216,000		1-3/8 (34.92)
20	240,000		
22	264,000		
24	288,000	3/4 (19.05)	
26	342,000		
28	336,000		1-5/8 (41.27)
30	360,000		
32	384,000		
34	408,000		
36	432,000		

[Condition 1]

When one or more of the following apply:
- The distance between the outdoor unit (primary) and the farthest indoor unit is 230 ft (70 m) or more.
- If the outdoor unit is lower than the indoor unit and the height difference exceeds 16 ft (5 m); only for liquid pipes.

Ton	Total cooling capacity of outdoor unit [Btu/h]	Outside diameter [in (mm)]	
		Liquid pipe	Gas pipe
6	72,000	1/2 (12.70)	7/8 (22.22)
8	96,000		
10	120,000		1-1/8 (28.58)
12	144,000		
14	168,000	5/8 (15.88)	
16	184,000		
18	216,000		1-3/8 (34.92)
20	240,000		
22	264,000		
24	288,000	3/4 (19.05)	
26	342,000		
28	336,000		1-5/8 (41.27)
30	360,000		
32	384,000		
34	408,000		
36	432,000		

Table. C (Between separation tubes)

* If the selected pipe diameter between separation tubes (based on table "C") becomes larger than the pipe diameter between outdoor unit branch kit and the first separation tube (based on table "B"), please select the pipe whose diameter is equal to the one between outdoor unit branch kit and the first separation tube.
(If pipe diameter C > B, select pipe size from table B)

* Total cooling capacity of indoor unit" is the total value for the cooling capacity of indoor unit connected downstream.

Total cooling capacity of indoor unit [Btu/h]	Outside diameter [in (mm)]	
	Liquid pipe	Gas pipe
8,000 ≤ x < 36,000	3/8 (9.52)	5/8 (15.88)
36,000 ≤ x < 48,000		3/4 (19.05)
48,000 ≤ x < 66,000	1/2 (12.70)	
66,000 ≤ x < 96,500		7/8 (22.22)
96,500 ≤ x < 153,000		1-1/8 (28.58)
153,000 ≤ x < 161,000	5/8 (15.88)	
161,000 ≤ x < 193,000		
193,000 ≤ x < 274,000		1-3/8 (34.92)
274,000 ≤ x < 325,000	3/4 (19.05)	
325,000 ≤ x		1-5/8 (41.27)

Table. D (Between separation tube and indoor unit)

* Use a standard separation tube for pipe branching. Do not use a T tube as it does not separate the refrigerant evenly.

[Standard]

Cooling capacity of indoor unit [Btu/h]	Outside diameter mm (in)	
	Liquid pipe	Gas pipe
4,000 / 7,500 / 9,500	1/4 (6.35)	3/8 (9.52)
12,000 / 14,000		1/2 (12.70)
18,000		
24,000 / 30,000 / 34,000	3/8 (9.52)	5/8 (15.88)
36,000		
48,000		
60,000		
72,000		3/4 (19.05)
96,000		7/8 (22.22)

[Condition 1]

When one or more of the following apply:
- The distance between the outdoor unit (primary) and the farthest indoor unit is 394 ft (120 m) or more.
- The distance between the first branch and the farthest indoor unit is 60 m or more.
- Pipe length of indoor unit (4,000 to 9,500 Btu/h, 48,000 to 60,000 Btu/h, 96,000 Btu/h) and branch is 66 ft (20 m) or more.
- If the outdoor unit is lower than the indoor unit and the height difference exceeds 16 ft (5 m); only for liquid pipes.

Cooling capacity of indoor unit [Btu/h]	Outside diameter mm (in)	
	Liquid pipe	Gas pipe
4,000 / 7,500 / 9,500	1/4 (6.35)	1/2 (12.70)
12,000 / 14,000		
18,000	3/8 (9.52)	5/8 (15.88)
24,000 / 30,000 / 34,000	3/8 (9.52)	
36,000		3/4 (19.05)
48,000		
60,000		
72,000	1/2 (12.70)	7/8 (22.22)
96,000		

Separation tube/Header

* For the installation method of separation tube and header, refer to “6.2. Indoor unit pipe connections”.

Total cooling capacity of indoor unit [Btu/h]	Separation tube (*1)	Header (*1)	
		3-6 Branches	3-8 Branches
x < 66,000	UTP-AX054A	UTR-H0906L	UTR-H0908L
x < 96,500	UTP-AX090A		
96,500 ≤ x < 193,000	UTP-AX180A	UTR-H1806L	UTR-H1808L
193,000 ≤ x	UTP-AX567A	—	—

Outdoor air unit

Connectable unit within 1 refrigerant system

Unit	Connectable cooling capacity range	Remarks
Only Outdoor air unit	50% to 100%	—
Outdoor air unit + Indoor unit	50% to 100%	The capacity of "Outdoor air unit" should be less than 30% of the outdoor unit capacity.

4.3. 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

5. SYSTEM CONFIGURATION (for Heat Recovery system)

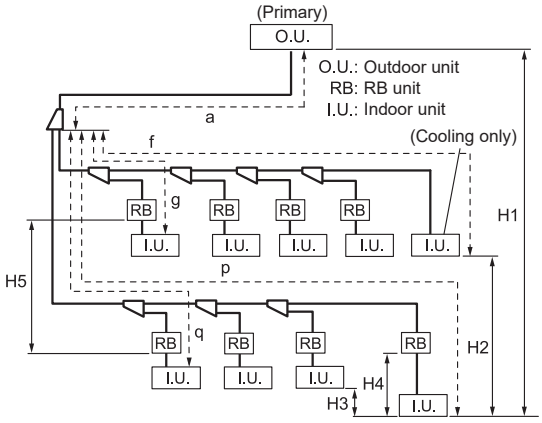
About for Heat Pump system, refer to “4. SYSTEM CONFIGURATION (for Heat Pump system)”.
For detailed information, refer to the Design & Technical manual.

5.1. System configuration (for Heat Recovery system)

⚠ CAUTION

- When connecting multiple outdoor units, set the nearest outdoor unit to the indoor unit on the refrigerant pipe as the primary unit.
- When connecting multiple outdoor units, install the outdoor unit with the largest nominal system capacity nearest to the indoor unit on the refrigerant pipe, followed by those with less nominal system capacities.
  [Capacity: Primary ≥ Subordinate]
- Always keep to the limit on the total amount of refrigerant. Exceeding the limit on the total amount of refrigerant when charging will lead to malfunction.

5.1.1 In case of 1 outdoor unit connected



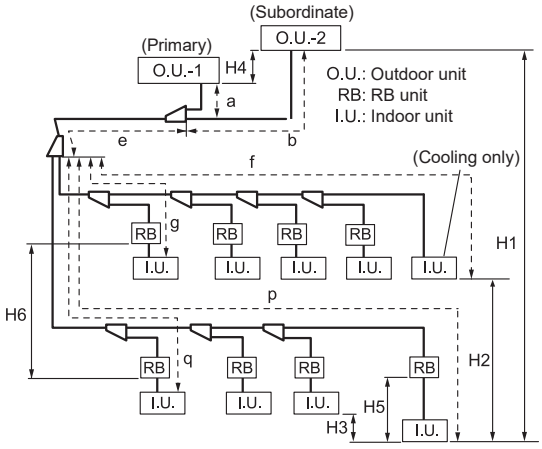
Allowable pipe length (actual pipe length)

Between primary outdoor unit and the farthest indoor unit	541 ft (165 m) or less	**a + f** **a + p**
Between the first separation tube and the farthest indoor unit	295 ft (90 m) or less	**f, p**
(Farthest indoor unit) - (Closest indoor unit)	196 ft (60 m) or less	**f(p) - g(q)**
Total pipe length	2,296 ft (700 m) or less	**Total**

Allowable height difference

Between outdoor unit and indoor unit (When indoor unit is installed below)	164 ft (50 m) or less	**H1**
Between outdoor unit and indoor unit (When outdoor unit is installed below)	131 ft (40 m) or less	
Between indoor units	49 ft (15 m) or less	**H2, H3**
Between RB unit and indoor unit	16 ft (5 m) or less	**H4**
Between RB units	49 ft (15 m) or less	**H5**

5.1.2 In case of 2 outdoor units connected



Allowable pipe length (actual pipe length)

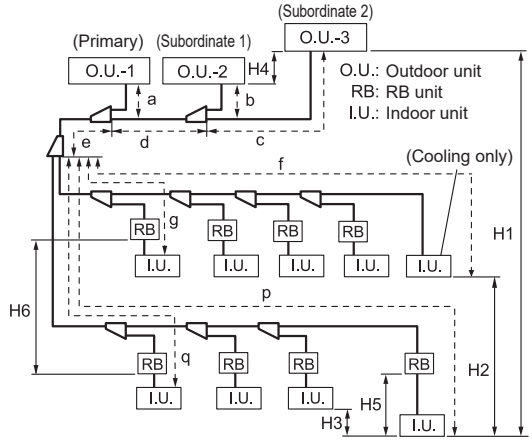
Between primary outdoor unit and the farthest indoor unit	541 ft (165 m) or less	**a + e + f** **a + e + p**
Between the first separation tube and the farthest indoor unit	196 ft (60 m) or less	**f, p**
(Farthest indoor unit) - (Closest indoor unit)	196 ft (60 m) or less	**f(p) - g(q)**
Total pipe length	3,280 ft (1,000 mm) or less	**Total**
Between outdoor unit and outdoor unit branch kit	9 ft (3 m) or less	**a, b**

Allowable height difference

Between outdoor unit and indoor unit (When indoor unit is installed below)	164 ft (50 m) or less	**H1**
Between outdoor unit and indoor unit (When outdoor unit is installed below)	131 ft (40 m) or less	
Between indoor units	49 ft (15 m) or less	**H2, H3**
Between outdoor units	1 ft (0.5 m) or less	**H4**
Between RB unit and indoor unit	16 ft (5 m) or less	**H5**
Between RB units	49 ft (15 m) or less	**H6**

• Outdoor unit capacity: Primary ≥ Subordinate

5.1.3 In the case of 3 outdoor units connected



Allowable pipe length (actual pipe length)

Between primary outdoor unit and the farthest indoor unit	541 ft (165 m) or less	**a + e + f** **a + e + p**
Between the first separation tube and the farthest indoor unit	295 ft (90 m) or less	**f, p**
(Farthest indoor unit) - (Closest indoor unit)	196 ft (60 m) or less	**f(p) - g(q)**
Total pipe length	3,280 ft (1,000 mm) or less	**Total**
Between outdoor unit and outdoor unit branch kit	9 ft (3 m) or less	**a, b, c**
Between the farthest outdoor unit and the first outdoor unit branch kit	39 ft (12 m) or less	**b + d** **c + d**

Allowable height difference

Between outdoor unit and indoor unit (When indoor unit is installed below)	164 ft (50 m) or less	**H1**
Between outdoor unit and indoor unit (When outdoor unit is installed below)	131 ft (40 m) or less	
Between indoor units	49 ft (15 m) or less	**H2, H3**
Between outdoor units	1 ft (0.5 m) or less	**H4**
Between RB unit and indoor unit	16 ft (5 m) or less	**H5**
Between RB units	49 ft (15 m) or less	**H6**

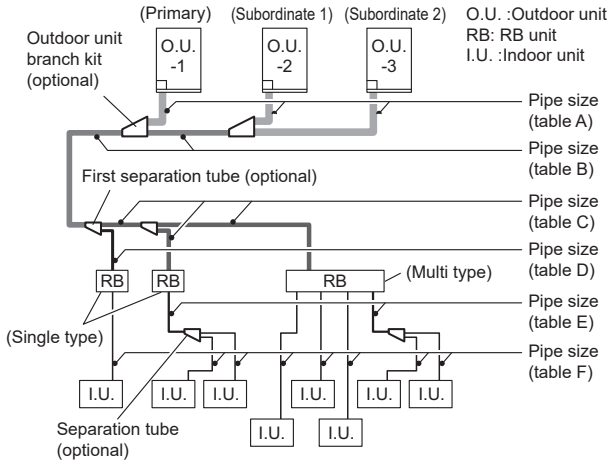
• Outdoor unit capacity: Primary ≥ Subordinate 1 ≥ Subordinate 2

NOTE:
- If the outdoor temperature during cooling operation is expected to be 23°F (–5°C) or less, outdoor unit must be installed lower than 16 ft (5 m) or less from the indoor unit.
- Please refer to “9.3.2 Checking total amount of refrigerant and calculating the amount of refrigerant charge to be added” for the total amount of refrigerant.

5.2. Pipe selection (for Heat Recovery system)

⚠ CAUTION

This unit is designed specifically for use with the R410A refrigerant. Pipes for R407C or R22 may not be used with this unit. Do not use existing pipes. Improper pipe selection will degrade performance.



(Wall thickness and pipe material for each diameter)

Outside diameter	in (mm)	1/4 (6.35)	3/8 (9.52)	1/2 (12.70)	5/8 (15.88)	3/4 (19.05)	7/8 (22.22)	1-1/8 (28.58)	1-3/8 (34.92)	1-5/8 (41.27)
Wall thickness (*1)		0.032 (0.8)	0.032 (0.8)	0.032 (0.8)	0.039 (1.0)	0.047 (1.2)	0.039 (1.0)	0.039 (1.0)	0.047 (1.2)	0.056 (1.43)
Material		COPPER (*2) JIS H3300 C1220T-O or equivalent				COPPER (*3) JIS H3300 C1220T-H or equivalent				

*1: Endurance pressure of the pipes 609 psi (4.2MPa)
*2: Allowable tensile stress ≥ 33 (N/mm²)
*3: Allowable tensile stress ≥ 61 (N/mm²)
Please select the pipe size in accordance with local rules.

Table. A (Between outdoor unit and outdoor unit branch kit)

* For the branch kit installation method, refer to "6.4. Multiple connections".

[Standard]

Ton	Nominal cooling capacity of outdoor unit [Btu/h]	Outside diameter [in (mm)]			Branch kit
		Liquid pipe	Discharge gas pipe	Suction gas pipe	
6	72,000	3/8 (9.52)	5/8 (15.88)	3/4 (19.05)	UTP-DX567A
8	96,000		3/4 (19.05)	7/8 (22.22)	
10	120,000	1/2 (12.70)		1-1/8 (28.58)	
12	144,000		7/8 (22.22)		
14	168,000	5/8 (15.88)			
16	192,000				

[Condition 1]

When one or more of the following apply:
- The distance between the outdoor unit (primary) and the farthest indoor unit is 230 ft (70 m) or more.
- If the outdoor unit is lower than the indoor unit and the height difference exceeds 16 ft (5 m); only for liquid pipes.

Ton	Nominal cooling capacity of outdoor unit [Btu/h]	Outside diameter [in (mm)]			Branch kit
		Liquid pipe	Discharge gas pipe	Suction gas pipe	
6	72,000	1/2 (12.70)	5/8 (15.88)	7/8 (22.22)	UTP-DX567A
8	96,000		3/4 (19.05)		
10	120,000			1-1/8 (28.58)	
12	144,000		7/8 (22.22)		
14	168,000	5/8 (15.88)			
16	192,000				

Table. B (Between outdoor unit branch kits or outdoor unit branch kit and first separation tube)

[Standard]

Ton	Total cooling capacity of outdoor unit [Btu/h]	Outside diameter [in (mm)]		
		Liquid pipe	Discharge gas pipe	Suction gas pipe
6	72,000	3/8 (9.52)	5/8 (15.88)	3/4 (19.05)
8	96,000		3/4 (19.05)	7/8 (22.22)
10	120,000	1/2 (12.70)		1-1/8 (28.58)
12	144,000		7/8 (22.22)	
14	168,000	5/8 (15.88)		
16	184,000			
18	216,000		1-1/8 (28.58)	1-3/8 (34.92)
20	240,000			
22	264,000			
24	288,000	3/4 (19.05)		
26	342,000			
28	336,000			1-5/8 (41.27)
30	360,000		1-3/8 (34.92)	
32	384,000			
34	408,000			
36	432,000			

[Condition 1]

When one or more of the following apply:
- The distance between the outdoor unit (primary) and the farthest indoor unit is 230 ft (70 m) or more.
- If the outdoor unit is lower than the indoor unit and the height difference exceeds 16 ft (5 m); only for liquid pipes.

Ton	Total cooling capacity of outdoor unit [Btu/h]	Outside diameter [in (mm)]		
		Liquid pipe	Discharge gas pipe	Suction gas pipe
6	72,000	1/2 (12.70)	5/8 (15.88)	7/8 (22.22)
8	96,000		3/4 (19.05)	
10	120,000			1-1/8 (28.58)
12	144,000		7/8 (22.22)	
14	168,000	5/8 (15.88)		
16	184,000			
18	216,000		1-1/8 (28.58)	1-3/8 (34.92)
20	240,000			
22	264,000			
24	288,000	3/4 (19.05)		
26	342,000			
28	336,000			1-5/8 (41.27)
30	360,000		1-3/8 (34.92)	
32	384,000			
34	408,000			
36	432,000			

Table. C (Between separation tubes or separation tube and RB unit)

* If the selected pipe diameter between separation tubes (based on table "C") becomes larger than the pipe diameter between outdoor unit branch kit and the first separation tube (based on table "B"), please select the pipe whose diameter is equal to the one between outdoor unit branch kit and the first separation tube.
  (If pipe diameter C > B, select pipe size from table B)

* Total cooling capacity of indoor unit" is the total value for the cooling capacity of indoor unit connected downstream.

Total cooling capacity of indoor unit [Btu/h]	Outside diameter [in (mm)]			Separation tube (for 3 pipes)
	Liquid pipe	Discharge gas pipe	Suction gas pipe	
15,000 ≤ x < 36,000	3/8 (9.52)	1/2 (12.70)	5/8 (15.88)	UTP-BX090A
36,000 ≤ x < 48,000			3/4 (19.05)	
48,000 ≤ x < 72,000	1/2 (12.70)	5/8 (15.88)	7/8 (22.22)	
72,000 ≤ x < 96,500		3/4 (19.05)		
96,500 ≤ x < 153,000			1-1/8 (28.58)	UTP-BX180A
153,000 ≤ x < 161,000	5/8 (15.88)			
161,000 ≤ x < 193,000		7/8 (22.22)		
193,000 ≤ x < 274,000	3/4 (19.05)	1-1/8 (28.58)	1-3/8 (34.92)	UTP-BX567A
274,000 ≤ x < 325,000			1-5/8 (41.27)	
325,000 ≤ x				

Table. D (Between separation tube and RB unit)

Use a standard separation tube for pipe branching. Do not use a T tube as it does not separate the refrigerant evenly.

[Standard]

Cooling capacity of indoor unit [Btu/h]	Outside diameter mm (in)		
	Liquid pipe	Discharge gas pipe	Suction gas pipe
4,000 / 7,500 / 9,500	1/4 (6.35)	3/8 (9.52)	1/2 (12.70)
12,000 / 14,000			
18,000		1/2 (12.70)	5/8 (15.88)
24,000 / 30,000 / 34,000	3/8 (9.52)		
36,000			3/4 (19.05)
48,000			
60,000		5/8 (15.88)	
72,000		3/4 (19.05)	7/8 (22.22)
96,000			

[Condition 1]

When one or more of the following apply:
- The distance between the outdoor unit (primary) and the farthest indoor unit is 394 ft (120 m) or more.
- The distance between the first branch and the farthest indoor unit is 60 m or more.
- Pipe length of indoor unit (4,000 to 9,500 Btu/h, 48,000 to 60,000 Btu/h, 96,000 Btu/h) and branch is 66 ft (20 m) or more.
- If the outdoor unit is lower than the indoor unit and the height difference exceeds 16 ft (5 m); only for liquid pipes.

Cooling capacity of indoor unit [Btu/h]	Outside diameter mm (in)		
	Liquid pipe	Discharge gas pipe	Suction gas pipe
4,000 / 7,500 / 9,500	1/4 (6.35)	3/8 (9.52)	1/2 (12.70)
12,000 / 14,000			
18,000	3/8 (9.52)	1/2 (12.70)	5/8 (15.88)
24,000 / 30,000 / 34,000	3/8 (9.52)		
36,000			3/4 (19.05)
48,000			
60,000		5/8 (15.88)	
72,000	1/2 (12.70)	3/4 (19.05)	7/8 (22.22)
96,000			

Table. E (Between separation tubes or RB unit and separation tube)

Total cooling capacity of indoor unit [Btu/h]	Outside diameter [in (mm)]		Separation tube (for 2 pipes)
	Liquid pipe	Gas pipe	
8,000 ≤ x < 36,000	3/8 (9.52)	5/8 (15.88)	UTP-AX054A or UTP-AX090A
36,000 ≤ x < 48,000		3/4 (19.05)	
48,000 ≤ x < 72,000	1/2 (12.70)	7/8 (22.22)	
72,000 ≤ x < 96,500			UTP-AX090A
96,500 ≤ x < 153,000		1-1/8 (28.58)	UTP-AX180A
153,000 ≤ x < 161,000	5/8 (15.88)		
161,000 ≤ x < 193,000			
193,000 ≤ x < 274,000		1-3/8 (34.92)	UTP-AX567A
274,000 ≤ x < 325,000	3/4 (19.05)		
325,000 ≤ x		1-5/8 (41.27)	

Table. F (Between separation tube and indoor unit or RB unit and indoor unit)

Cooling capacity of indoor unit [Btu/h]	Outside diameter mm (in)	
	Liquid pipe	Gas pipe
4,000 / 7,500 / 9,500	1/4 (6.35)	3/8 (9.52)
12,000 / 14,000		1/2 (12.70)
18,000		
24,000 / 30,000 / 34,000	3/8 (9.52)	5/8 (15.88)
36,000		
48,000		
60,000		
72,000		3/4 (19.05)
96,000		7/8 (22.22)

[Condition 1]

When one or more of the following apply:
- The distance between the outdoor unit (primary) and the farthest indoor unit is 394 ft (120 m) or more.
- The distance between the first branch and the farthest indoor unit is 60 m or more.
- Pipe length of indoor unit (4,000 to 9,500 Btu/h, 48,000 to 60,000 Btu/h, 96,000 Btu/h) and branch is 66 ft (20 m) or more.
- If the outdoor unit is lower than the indoor unit and the height difference exceeds 16 ft (5 m); only for liquid pipes.

Cooling capacity of indoor unit [Btu/h]	Outside diameter mm (in)	
	Liquid pipe	Gas pipe
4,000 / 7,500 / 9,500	1/4 (6.35)	1/2 (12.70)
12,000 / 14,000		
18,000	3/8 (9.52)	5/8 (15.88)
24,000 / 30,000 / 34,000	3/8 (9.52)	
36,000		3/4 (19.05)
48,000		
60,000		
72,000	1/2 (12.70)	7/8 (22.22)
96,000		

Separation tube / Header

* For the installation method of separation tube and header, refer to “6.2. Indoor unit pipe connections”.

• Separation tube

Total cooling capacity of indoor unit [Btu/h]	Separation tube	
	For 2 pipes	For 3 pipes
x < 66,000	UTP-AX054A	UTP-BX090A
x < 96,500	UTP-AX090A	
96,500 ≤ x < 193,000	UTP-AX180A	UTP-BX180A
193,000 ≤ x	UTP-AX567A	UTP-BX567A

• Header

Total cooling capacity of indoor unit [Btu/h]	Header			
	For 2 pipes		For 3 pipes	
	3-6 Branches	3-8 Branches	3-6 Branches	3-8 Branches
x < 96,500	UTR-H0906L	UTR-H0908L	UTP-J0906A	UTP-J0908A
96,500 ≤ x < 193,000	UTR-H1806L	UTR-H1808L	UTP-J1806A	UTP-J1808A

Outdoor air unit

Connectable unit within 1 refrigerant system

Unit	Connectable cooling capacity range	Remarks
Only Outdoor air unit	50% to 100%	—
Outdoor air unit + Indoor unit	50% to 100%	The capacity of "Outdoor air unit" should be less than 30% of the outdoor unit capacity.

5.3. 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

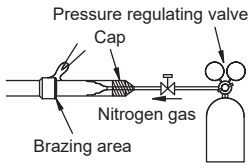
6. PIPE INSTALLATION

6.1. 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.
Nitrogen gas pressure: 2.9 psi (0.02 MPa) (= pressure felt sufficiently on the back of your hand)



If a pipe is brazed without applying nitrogen gas, it will create an oxidation film.
This can degrade performance or damage the parts in the unit (such as the compressor or valves).

Do not use flux to braze pipes. If the flux is the chlorine type, it will cause the pipes to corrode.
In addition, if the flux contains fluoride, it will affect the refrigerant piping system due to deterioration of refrigerant oil.

For brazing material, use phosphor copper that does not require flux.

6.2. Indoor unit pipe connections

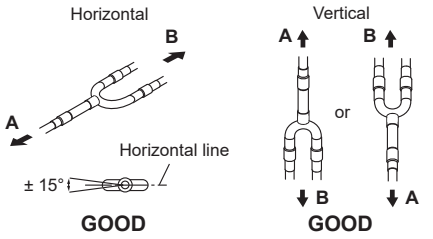
⚠ CAUTION

For details, refer to the Installation Instruction Sheet of each part.

Separation tube

A:
Outdoor unit or Refrigerant branch kit

B:
Indoor unit or Refrigerant branch kit



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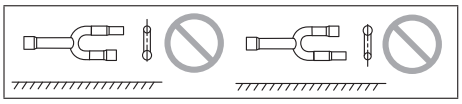
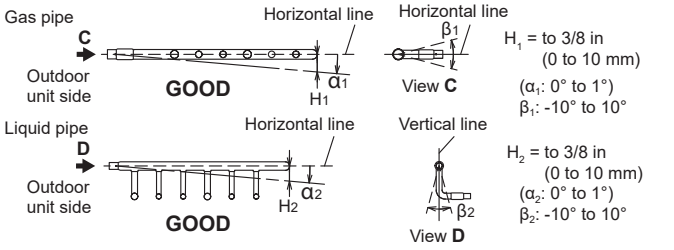


Header



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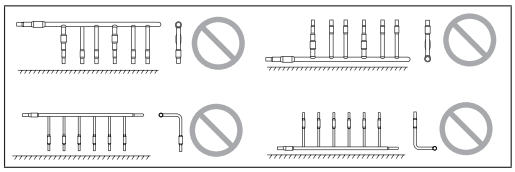
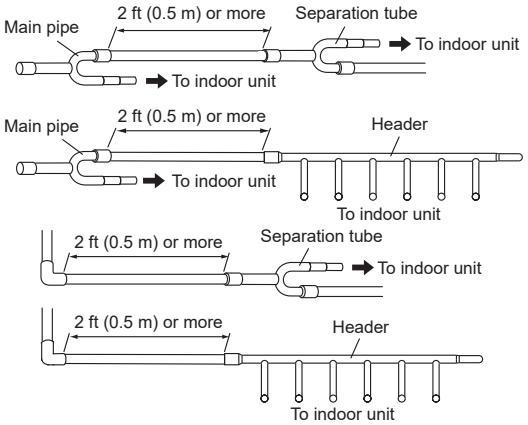


⚠ CAUTION

Do not connect a separation tube after a header.

Leave the distance 2 ft (0.5 m) or more for straight part to branch tube and header.



6.3. Piping method

6.3.1 Opening the knockout hole

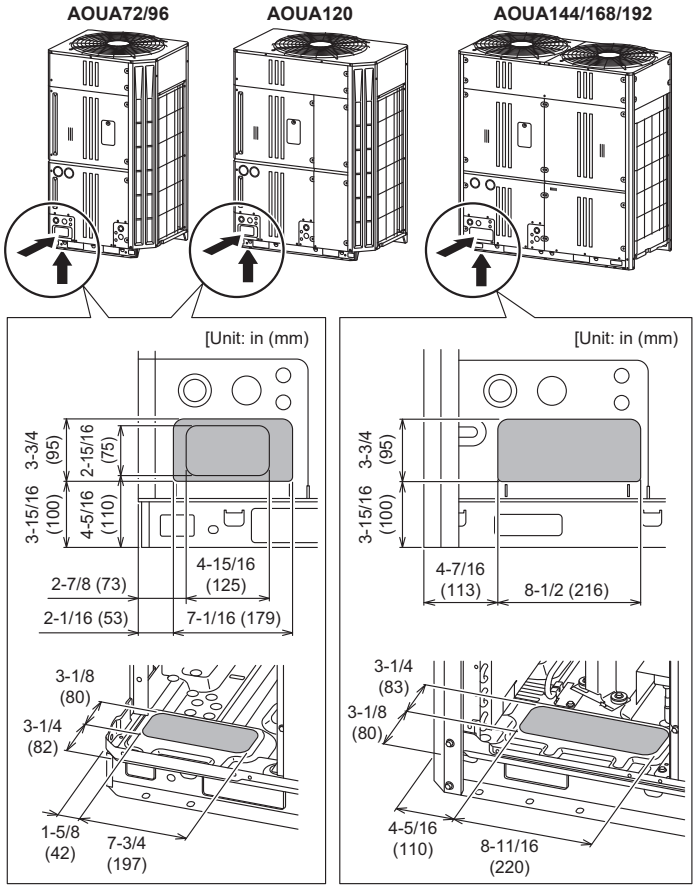
⚠ CAUTION

Be careful to prevent panel deformation or damaged while opening the knockout hole.

To prevent cutting of the wiring after the knockout hole was opened, remove the burrs along the edge.
In addition, to prevent rusting, painting the edge with rust preventive paint is recommended.

The piping can be connected from 2 directions; the front or the bottom.
(Knockout holes are provided so that the piping can be connected from 2 different directions.)

Knockout position and detail



6.3.2 Removing the pinch pipe

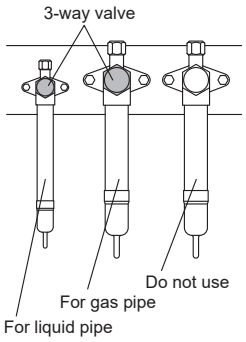
⚠ WARNING

Remove the pinch pipe only when the internal gas is completely drained as shown on the below instructions.
If gas still remains inside, the piping may crack if you melt the brazing filler metal of the junction area with a burner.

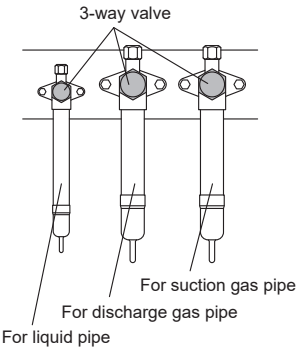
Before connecting the piping, remove the pinch pipe in accordance with the following instructions:

(1) Verify that the liquid side and gas side 3-way valves are closed.

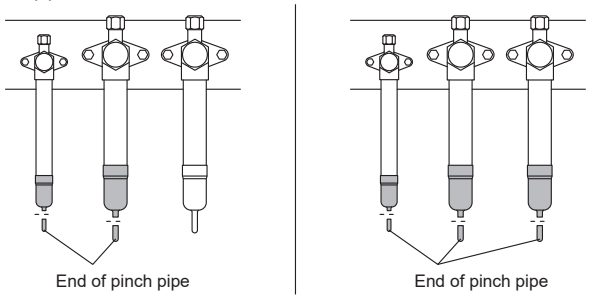
For Heat Pump system



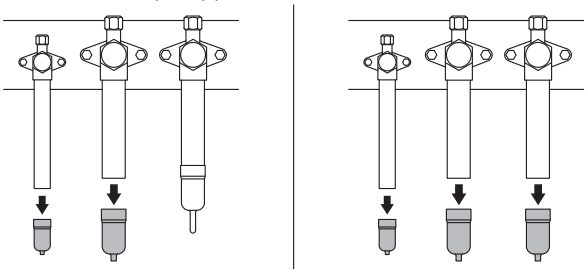
For Heat Recovery system



(2) Cut the end of the liquid side and gas side pinch pipe and vent the gas inside the pinch pipe.



(3) After all the gas is vented, melt the brazing filler metal on connecting part using a torch and remove the pinch pipe.



6.3.3 Pipe connection

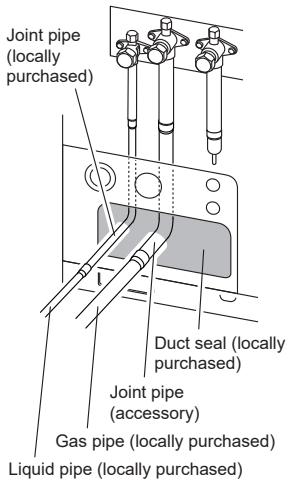
⚠ CAUTION
Seal the pipe route hole with duct seal (locally purchased) such that there are no gaps. Small insects or animals that are trapped in the outdoor unit may cause a short circuit in the electrical component box.
To prevent pipe damage; do not make sharp bends. Bend the pipe at a radius of 3 in (70 mm) or greater.
Do not bent pipe many times at same part to prevent break.
After completing all the pipe connection by brazing, perform the indoor unit pipe connection with a flare joint.
When removing the pinch pipe or brazing the joint pipe, carry out the work while cooling down the 3-way valve sufficiently.

- Braze the joint pipe onto the 3-way valves at the liquid, suction gas and discharge gas side.
  Install the joint pipe appropriately so that it can be connected easily with the main pipe.
- Braze the joint pipe and the on-site piping.

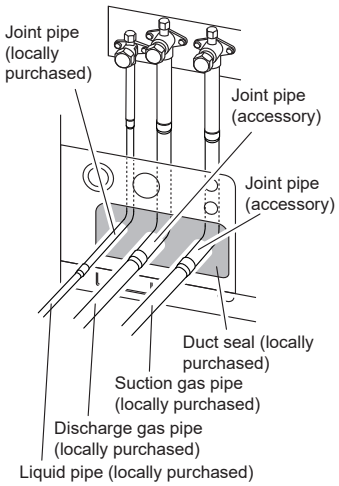
* Be sure to supply nitrogen when brazing.

Front piping

For Heat Pump system

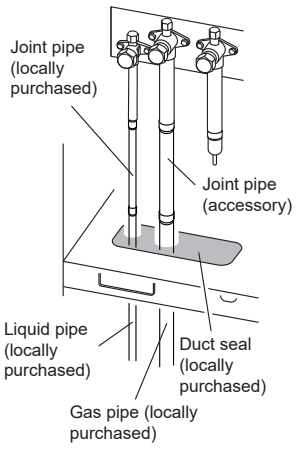


For Heat Recovery system

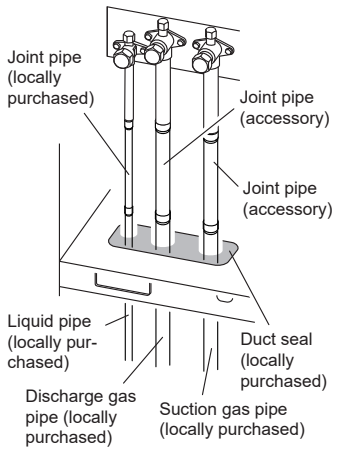


Bottom piping

For Heat Pump system



For Heat Recovery system



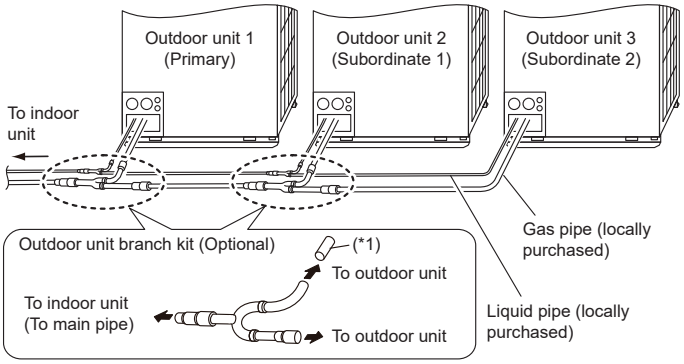
For details of the joint pipes, refer to “2.3. Accessories”.

6.4. Multiple connections

⚠ CAUTION
• When connecting multiple (maximum 3) units, be sure to install the unit with the largest capacity nearest to the indoor unit.
• When connecting multiple units, set the unit with the largest capacity as the primary unit, and the rest as the subordinate units. (Refer to “8. FIELD SETTING”)
• When connecting multiple units, use the optional outdoor unit branch kit.

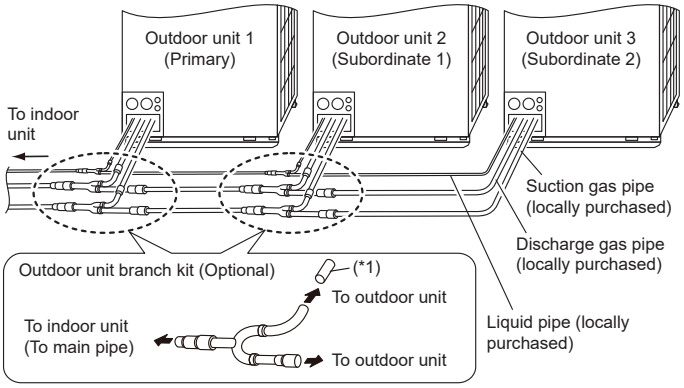
Outdoor unit capacity	2 Units : Unit 1 ≥ Unit 2 3 Units : Unit 1 ≥ Unit 2 ≥ Unit 3

For Heat Pump system



*1: If necessary, use the joint pipe (accessory) for the liquid pipe. However not used for AOUA144, and it is not included with the model AOUA120.

For Heat Recovery system



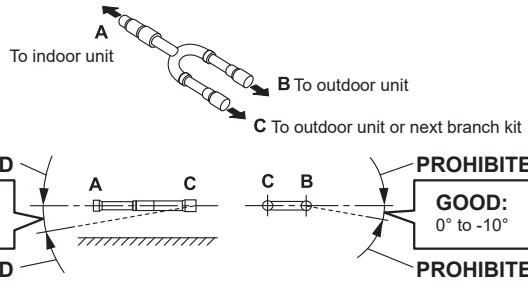
*1: If necessary, use the joint pipe (accessory) for the liquid pipe. However not used for AOUA144, and it is not included with the model AOUA120.

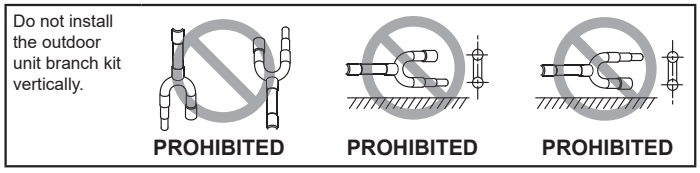
Branch kit restriction when install

Be sure following restriction.

(1) Installation angle

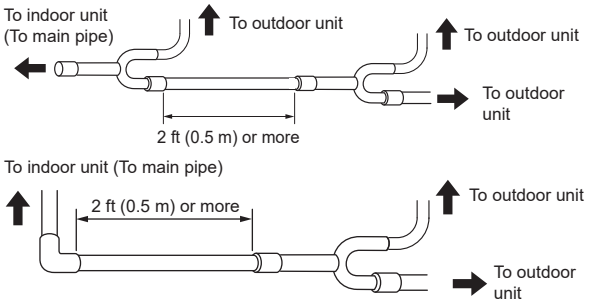
Install the outdoor unit branch kit horizontally level, within 0° to -10°, so that the refrigerant separates evenly.





(2) Straight pipe length

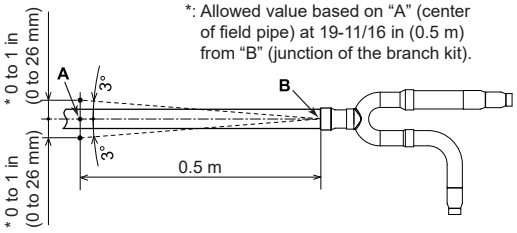
Leave the distance 2 ft (0.5 m) or more for straight part to outdoor unit branch kit.



(3) About the connecting curvature of field pipe and branch kit:

The field pipe should be connected to the branch kit so that the curved angle on each side is 3 degree or less.

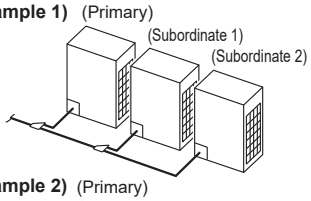
*: Allowed value based on "A" (center of field pipe) at 19-11/16 in (0.5 m) from "B" (junction of the branch kit).



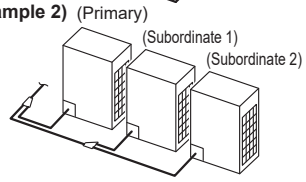
(4) For details, refer to the Installation Instruction Sheet of the outdoor unit branch kit.

Examples of multiple unit installation

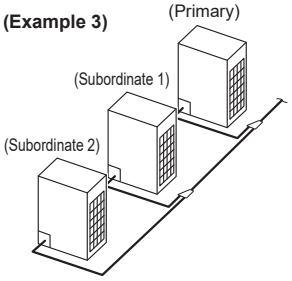
(Example 1) (Primary)



(Example 2) (Primary)



(Example 3)

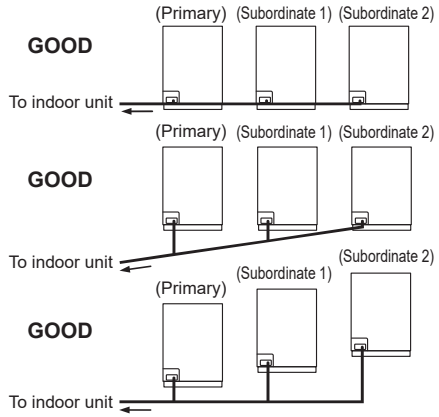


(5) Examples of multiple unit installation are shown below.

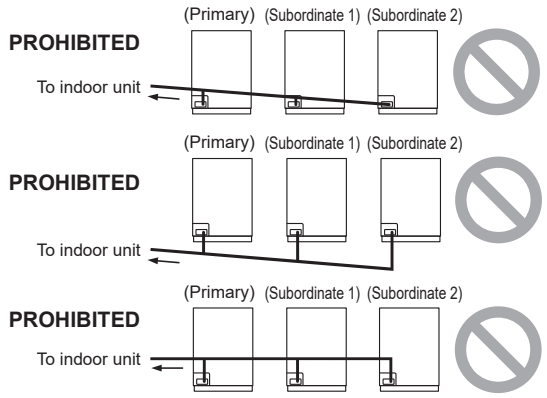
⚠ CAUTION

To prevent the oil from settling in the stopped unit, install the pipes between the outdoor units so that they are level or are tilted upward to the outdoor units.

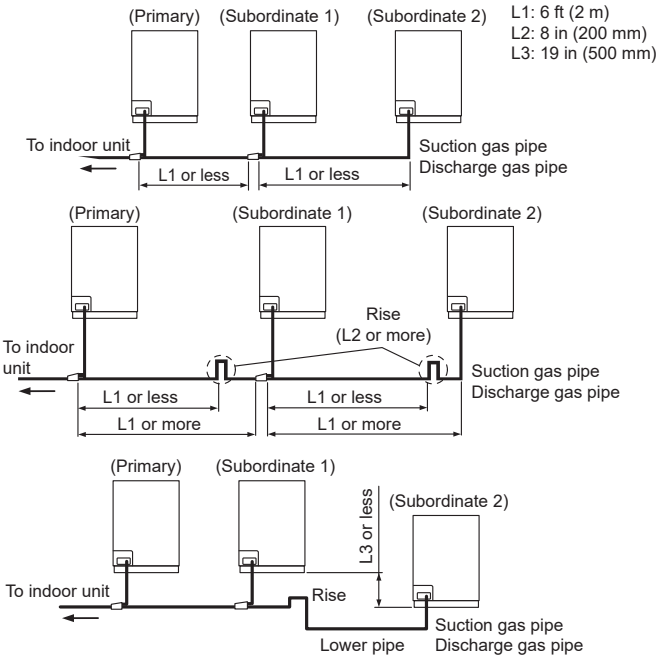
Installable patterns



Non-installable patterns



(6) If the pipe length between outdoor unit branch kit and outdoor unit branch kit (or subordinate unit) is longer than 2 m, or a lower pipe line exists between outdoor units, rise for gas pipe (in the heat recovery system, Discharge gas pipe and Suction gas pipe) should be arranged to eliminate oil from entering into and remaining at pipes and the stopped outdoor unit.
However, there is no need to provide a rise on the pipe connecting between the primary unit and the indoor unit even if the length exceeds 6 ft (2 m).



7. ELECTRICAL WIRING

7.1. The precautions of electrical wiring

⚠ WARNING

Wiring connections must be performed by a qualified person in accordance with specifications.

208/230 V model: AOUA72/96/120/144/168/192ULBV5
The rated supply of this product is 60 Hz, 208/230 V of 3-phase (3-cable system). Use a voltage within the range of 187 to 253 V.

460 V model: AOUA72/96/120/144/168/192ULCV5
The rated supply of this product is 60Hz, 460 V of 3-phase (3-cable system). Use a voltage within the range of 414 to 506 V.

Make sure to perform grounding (earthing) work. Improper grounding (earthing) work can cause electric shocks.

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

Be sure to install an ground (earth) leakage breaker. Otherwise, it will 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.

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

Connect the connector cord securely to the terminal.
Faulty installation can cause a fire.

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.

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

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

Before servicing the unit, turn the power supply switch OFF. Then, do not touch electric parts for 10 minutes due to the risk of electric shock.

Always use a separate power supply line protected by a circuit breaker operating on all cables with a distance between contact of 1/8 in (3 mm) for this unit.

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

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.

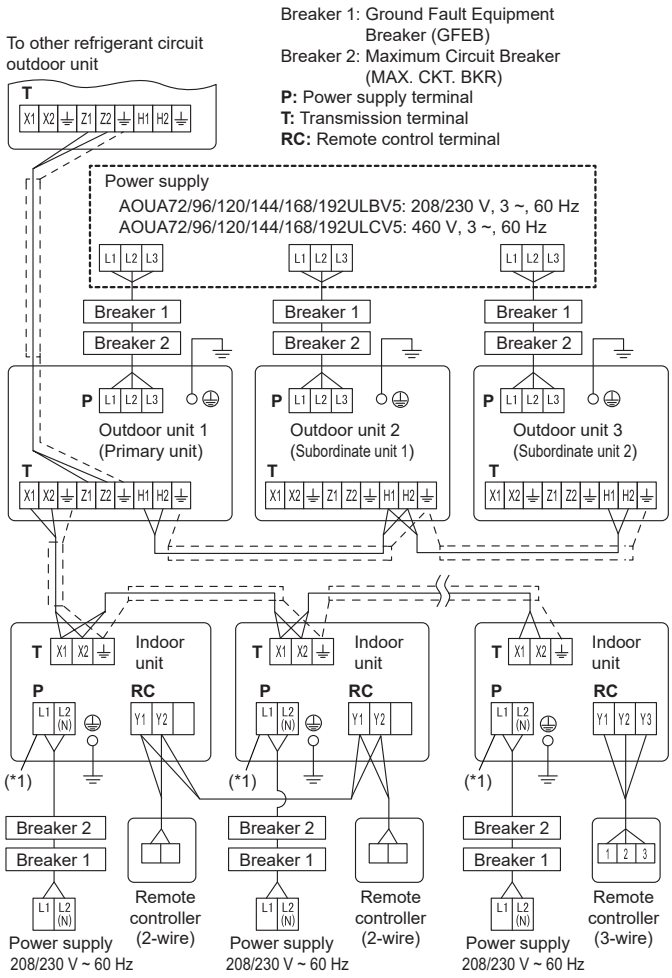
If the supply cable is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

⚠ CAUTION
The primary power supply capacity is for the air conditioner itself, and does not include the concurrent use of other devices.
Connect the power cables in positive phase sequence. Wrong wiring will lead to parts damage.
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 (Included with earth leakage circuit 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.
Use a breaker (Included with earth leakage circuit breaker) that is capable of handling high frequencies. Because the outdoor unit is inverter controlled, a high-frequency breaker is necessary to prevent a malfunction of the breaker itself.
When the electrical switchboard is installed outdoors, place it under lock and key so that it is not easily accessible.
Never bundle the power supply cable and transmission cable, remote control cable together. Separate these cables by 50 mm or more. Bundling these cables together will cause miss operation or breakdown.
Always keep to the maximum length of the transmission cable. Exceeding the maximum length may lead to erroneous operation.
The static electricity that is charged to the human body can damage the main PC board when handling the main PC board for address setting, etc. Please keep caution to the following points. Provide the grounding (earthing) 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.

7.2. Wiring method

The wiring example for outdoor units and indoor units is shown in the figure.

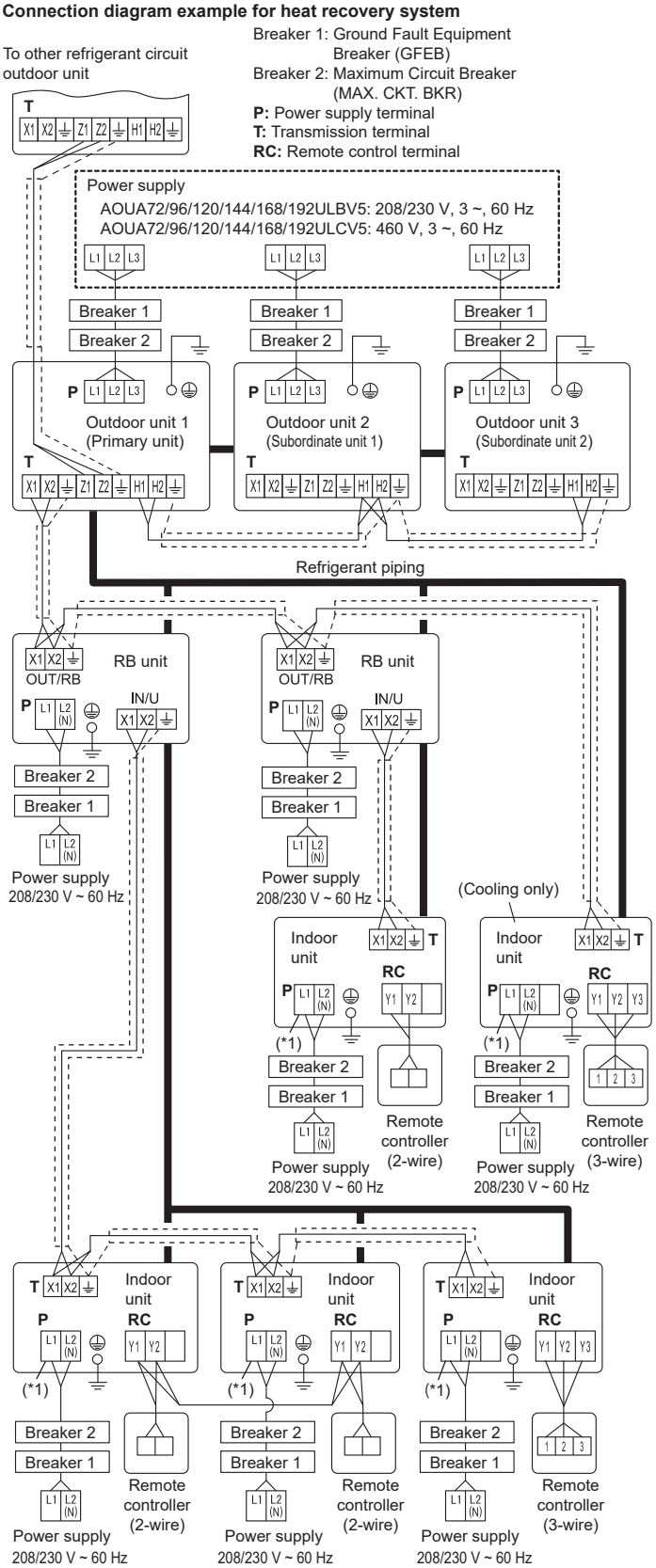
Connection diagram example for Heat Pump system



*1: The number of power supply terminals is different depending on the indoor unit model. For the wiring, refer to the indoor unit installation manual.

• There are two types of remote controller: the 2-wire type and the 3-wire type. For details, see the relevant remote controller installation manual. (When connecting the 2-wire type remote controller, Y3 is not used.)

Connection diagram example for heat recovery system



*2: The number of power supply terminals is different depending on the indoor unit model. For the wiring, refer to the indoor unit installation manual.

• There are two types of remote controller: the 2-wire type and the 3-wire type. For details, see the relevant remote controller installation manual. (When connecting the 2-wire type remote controller, Y3 is not used.)

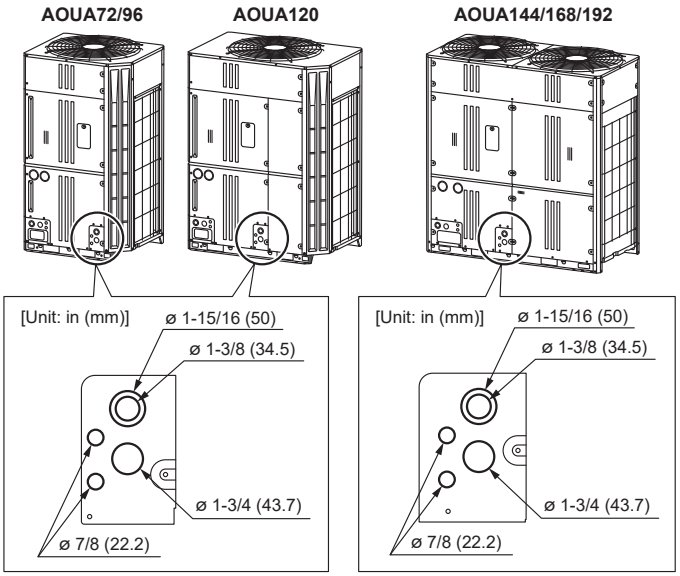
7.3. Knockout hole for wiring

⚠ CAUTION

Seal the wiring route hole with duct seal (locally purchased) such that there are no gaps. Small insects or animals that are trapped in the outdoor unit may cause a short circuit in the electrical component box.

Be careful not to deform or scratch the panel while opening the knockout holes.

After opening the knockout holes, remove burr on the edges to prevent damaging the cables. It is recommended to apply rust proof paint on the edges to prevent rust.



7.4. Selecting power supply cable and breaker

⚠ CAUTION

Obtain the distribution network operator's agreement about the power capacity of the power supply system, specification of the cable and etc. when you connect the outdoor unit with the power supply.

Regulation of wire size and circuit breaker differs from each locality, please refer in accordance with local rules.

- Select the power cable type and size in accordance with relevant local and national regulations.
- Make sure the specifications for local wiring power cable and branch wiring are in compliance with local code.
- Select the correct cable type and size according to the country or region's regulations.
- Use copper conductors only.
- Max. wire length: Set a length so that the voltage drop is less than 2%. Increase the wire diameter when the wire length is longer.

(1) Selecting power supply cable and breaker when connecting 1 outdoor unit.
Refer to the table for the wiring and breaker specifications of each installation condition.

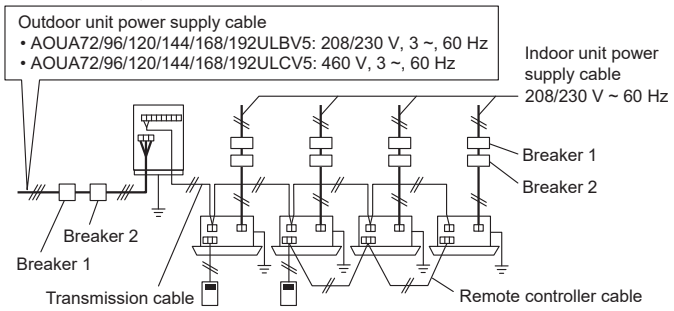
Model	Power source	MCA	MAX. CKT. BKR	GFEB
AOUA72ULBV5	208/230 V, 3~, 60 Hz	29.3 A	40 A	30-100 mA 0.1 s or less
AOUA96ULBV5		37.7 A	50 A	
AOUA120ULBV5		43.9 A	70 A	
AOUA144ULBV5		49.8 A		
AOUA168ULBV5		59.8 A		
AOUA192ULBV5		71.0 A	80 A	
AOUA72ULCV5	460 V, 3~, 60 Hz	17.3 A	20 A	
AOUA96ULCV5		21.9 A	25 A	
AOUA120ULCV5		24.9 A	30 A	
AOUA144ULCV5		29.8 A	35 A	
AOUA168ULCV5		34.8 A	40 A	
AOUA192ULCV5		41.5 A	50 A	

MCA: Minimum Circuit Amp.
MAX. CKT. BKR: Maximum Circuit Breaker
- 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.

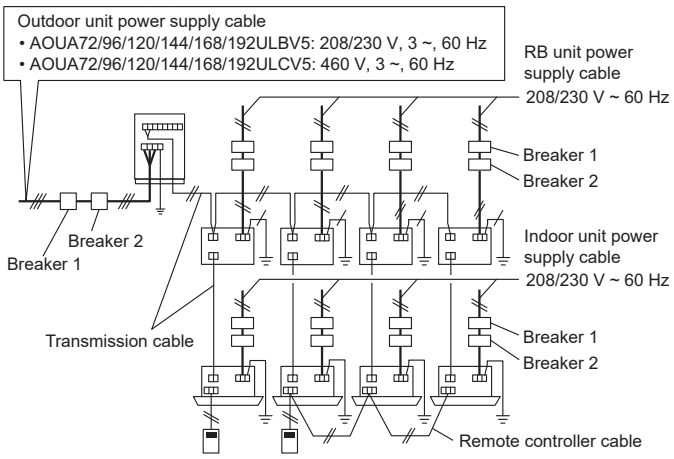
In case of connected outdoor unit

Breaker 1: Ground Fault Equipment Breaker (GFEB)
Breaker 2: Maximum Circuit Breaker (MAX. CKT. BKR)

For Heat Pump system



For Heat Recovery system

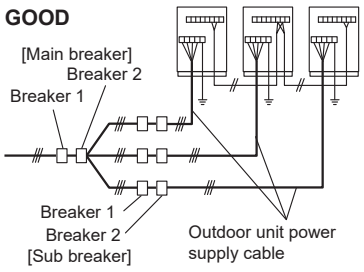


(2) Selecting main breaker and main power supply cable when connecting multiple outdoor units
- Be sure to use the sub-breaker.
- Select the main breaker capacity greater than the total of the capacity of the sub-breaker.
  Main-breaker ≥ Total of sub-breaker
  (Refer to the table in item (1) for the sub breaker capacity)
- Crossover wiring of power supply cable is prohibited.

In case of connected 3 outdoor unit

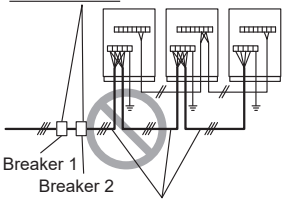
Breaker 1: Ground Fault Equipment Breaker (GFEB)
Breaker 2: Maximum Circuit Breaker (MAX. CKT. BKR)

GOOD



PROHIBITED

Installing a set of breaker with one line for multiple outdoor unit is PROHIBITED.



Crossover wiring of power supply cable is PROHIBITED.

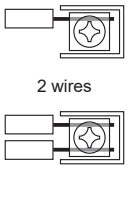
7.5. Transmission line

⚠ CAUTION

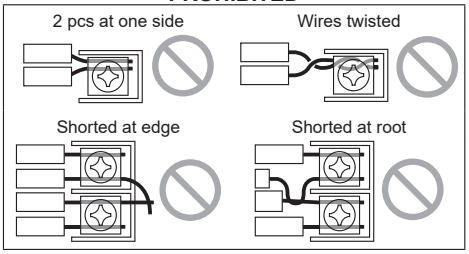
Caution when wiring cable:
When stripping off the coating of lead wire, always use the exclusive tool such as a wire stripper. If there is no exclusive tool available necessarily, carefully strip the coating by a cutter etc. so that the conductive wire is not damaged.
If it is damaged, it may lead to an open circuit and a communication error.

Pay attention to the following points while attaching wires on the terminal block.
- Do not attach 2 wires on one side.
- Do not twist wires.
- Do not cross the wires.
- Do not shorted at edge at root.

GOOD



PROHIBITED



7.5.1 Transmission wiring specifications

Follow the specifications below for the transmission cable.

Use	Size	Cable type	Remarks
Transmission cable	22AWG (0.33 mm²)	LEVEL 4 (NEMA) nonpolar 2-core, twisted pair solid core diameter 0.026 in (0.65 mm)	LONWORKS ® compatible cable

Twisted pair with shielded type.
Use the shielded wire specified and always ground it both ends.

7.5.2 Wiring rules for Heat Pump system

(1) Total length of transmission cable

Total transmission line length : maximum 11,811 ft (3,600 m)
EF + EG + GH + HJ + HK + KL < 11,811 ft (3,600 m) (Fig. 2)
In the following cases , Signal amplifier is required.
1) When the total length of the transmission line exceeded 1,640 ft (500 m).
AB + BC + BD > 1,640 ft (500 m) (Fig.1)
2) When the total number of units* is over 64.
3) Transmission line length between each unit* ≥ 1,312 ft (400 m)

(2) Length of transmission cable between 1 network segment (NS)

EF + EG + GH + HJ + HK ≤ 1,640 ft (500 m) (Fig.2)
KL ≤ 1,312 ft (400 m) (Fig.2)

(3) Length of transmission cable between outdoor units in a refrigerant system

MN ≤ 59 ft (18 m)
NP ≤ 59 ft (18 m)

Fig. 1

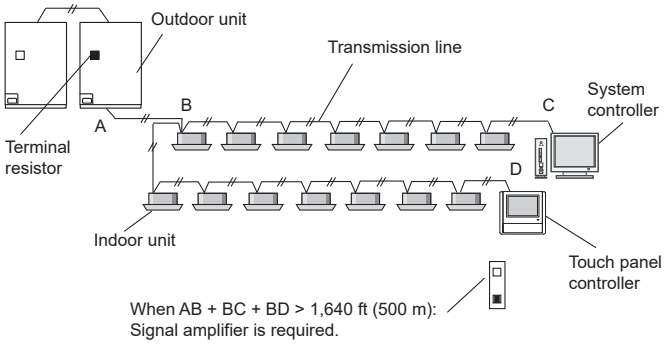
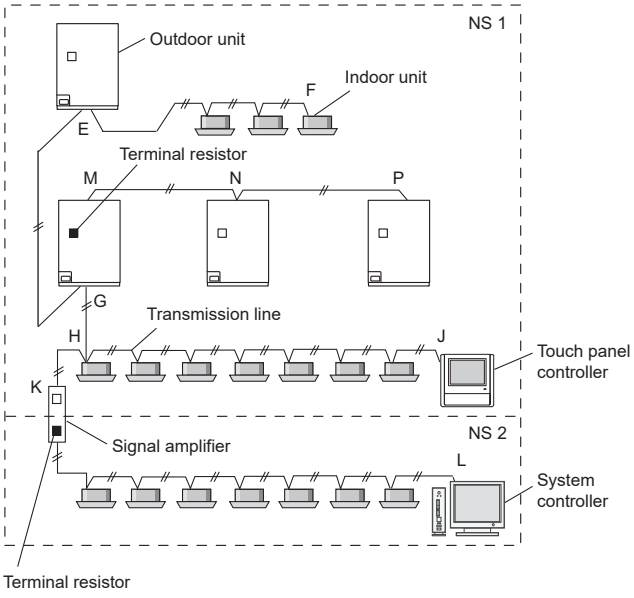
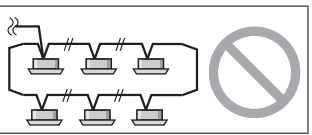


Fig. 2

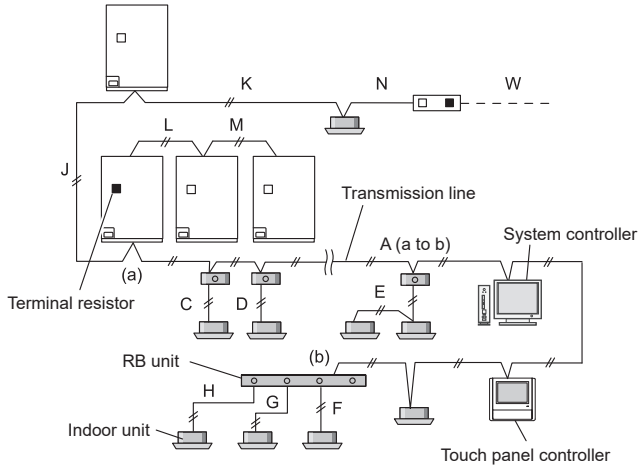


Do not use loop wiring. This may lead to parts damage and erroneous operation. 

7.5.3 Wiring rules for Heat Recovery system

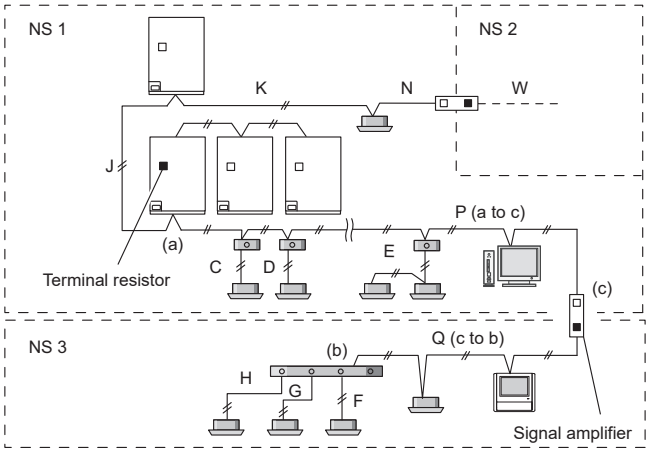
(1) Basic wiring rules

Total transmission line length: maximum 11,811 ft (3,600 m) (A + C + D + E + F + G + H + J + K + N + W ≤ 11,811 ft (3,600 m))
Transmission line length between each unit: maximum 1,312 ft (400 m)
Transmission line length between outdoor units in a refrigerant system: maximum 18 m (L ≤ 59 ft (18 m), M ≤ 59 ft (18 m))
Be sure to set 1 terminal resistor in a network segment.



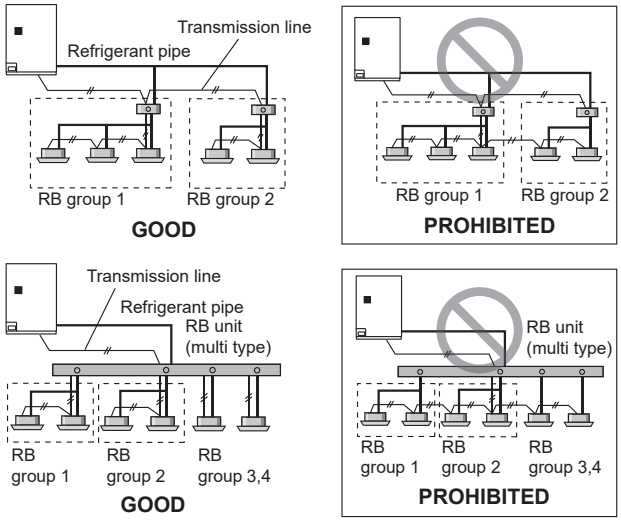
(2) In the following cases, Signal amplifier is required.

When the total length of the transmission line exceeded 1,640 ft (500 m) (A + C + D + E + F + G + H + J + K + N ≥ 1,640 ft (500 m))
When the total number of units is over 64.



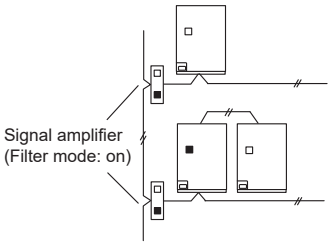
* P + C + D + E + J + K + N ≤ 1,640 ft (500 m), Q + F + G + H ≤ 1,640 ft (500 m)

The transmission cable connects indoor units belonging to the same RB group. The transmission cable cannot be used to connect indoor units belonging to different RB groups.

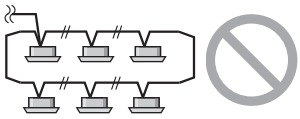


• If there are more than 321 units (*1) within the network system, a Signal amplifier (with the filter mode: on) must be installed between the primary outdoor units. See the Signal amplifier installation manual and Design & Technical manual for more information.

1: Unit means indoor unit, outdoor unit, Touch panel controller and System controller, Signal amplifier, single split adaptor, Network convertor etc.



Do not use loop wiring. This may lead to parts damage and erroneous operation.

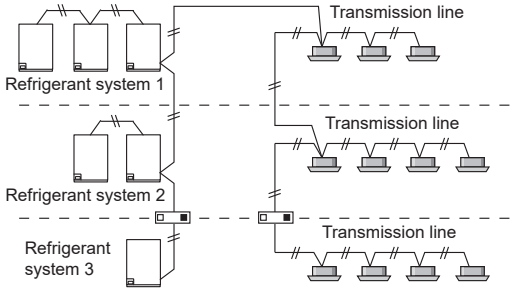


7.5.4 Enabling/Disabling automatic address setting

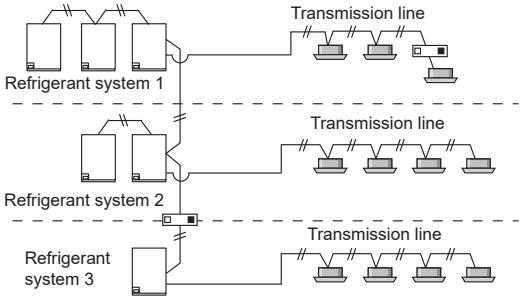
You can enable/disable automatic address setting for the indoor unit, RB unit (only for Heat Recovery system) and the Signal amplifier.
To enable automatic address setting for the indoor unit, connect the indoor unit to outdoor units under the same refrigerant system.

Example of Heat Pump system

Disable automatic address setting

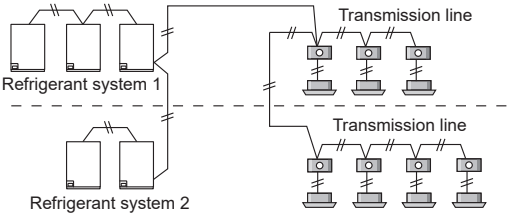


Enable automatic address setting

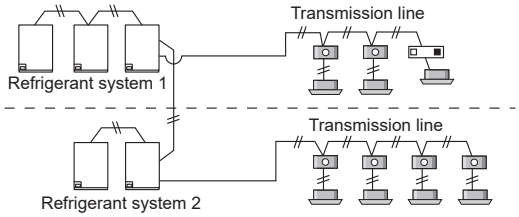


Example of Heat Recovery system

Disable Automatic Address setting



Enable Automatic Address setting

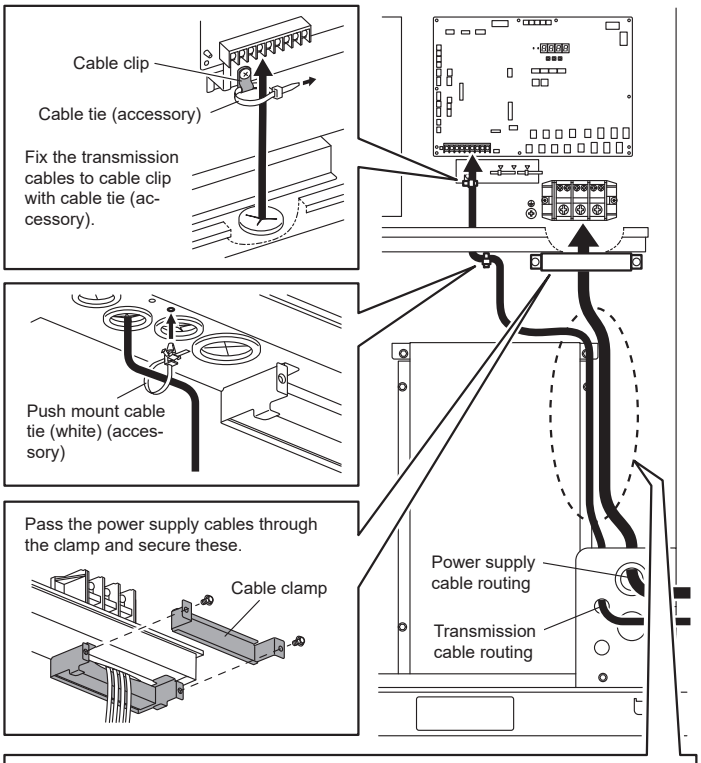


7.6. Wiring procedure

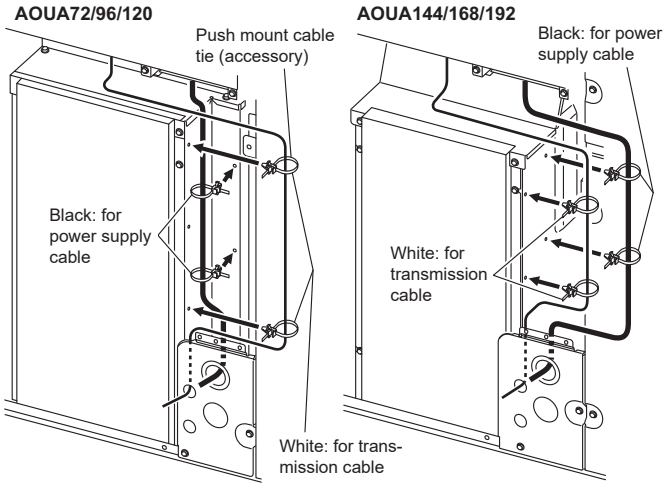
• Remove the cover of the electrical compartment and follow the terminal plate to connect the electric cables to the terminal.
• After connecting the cables, secure them with the cable ties.
• Connect the cables without applying excessive tension.

7.6.1 Cable routing

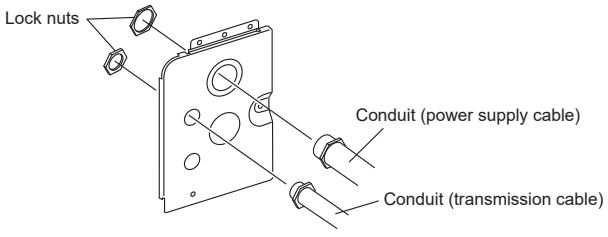
Secure with the cable clamp and cable ties as shown in the following figure.
* Tighten the cable clamp and cable tie firmly so that pulling force does not propagate to the terminal connection even if force of 100 N is applied to the cable.



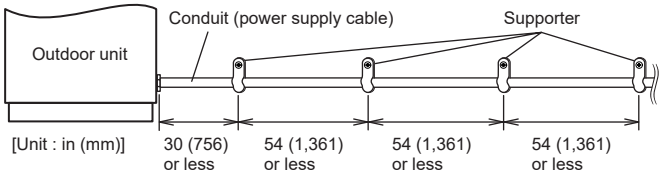
Fix the cables with push mount cable tie (accessory). The fixed position and number vary depending on the model.



7.6.2 Attaching the conduit



• Fix the conduit with the supporters as shown below.



7.6.3 Connecting cables to the terminals

⚠ WARNING

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

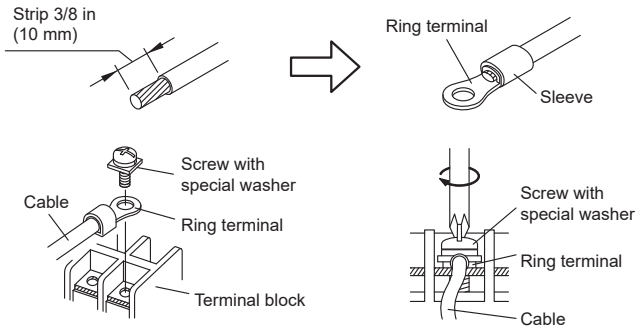
Be sure fill the holes of power supply cable and transmission cable with duct seal (locally purchased).
If small animals such as insects enter the electrical component box, a short circuit may be caused.

Tightening torque	
M3 screw	4.4 to 5.3 lbf·in (0.5 to 0.6 N·m)
M8 screw	44.3 to 62.0 lbf·in (5.0 to 7.0 N·m)

How to connect wiring to the terminal

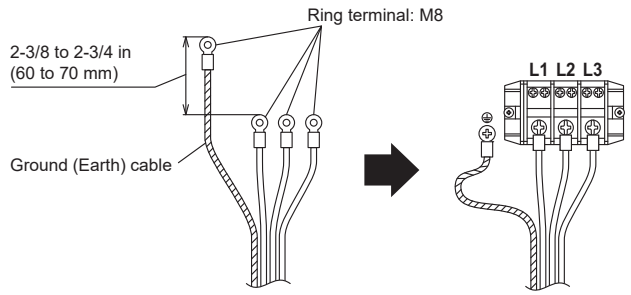
Caution when wiring cable

(1) Use ring terminals with insulating sleeves as shown in the figure to connect to the terminal block.
(2) Securely clamp the ring terminals to the cables using an appropriate tool so that the cables do not come loose.
(3) Use the specified cables, 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.



7.6.4 Connecting the power supply cable

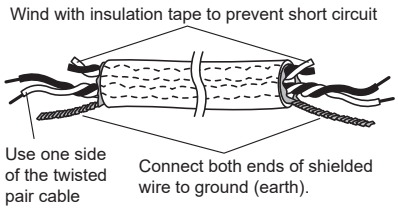
* Use a ring terminal to connect the electric cables to the power supply terminal block.

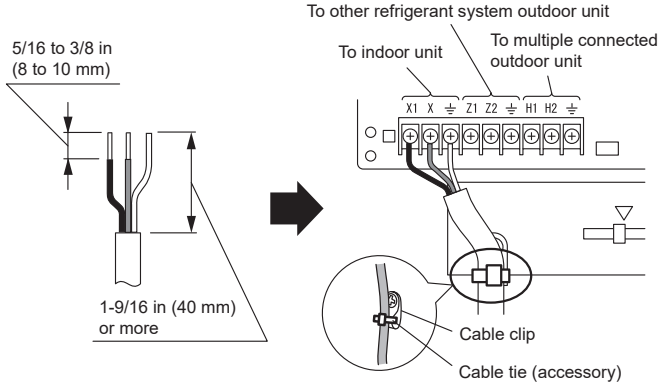


7.6.5 Connecting the transmission cable

Shielding the transmission cable

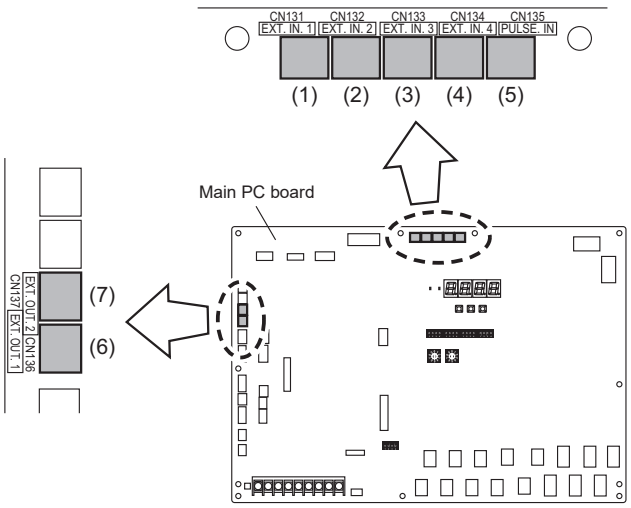
Connect both ends of the shielded wire of the transmission cable to the ground (earth) terminal of the equipment or to the ground (earth) screw near the terminal.
Be sure to use one side of a twisted-pair cable when using transmission cable with 2 sets of twisted-pair cables.





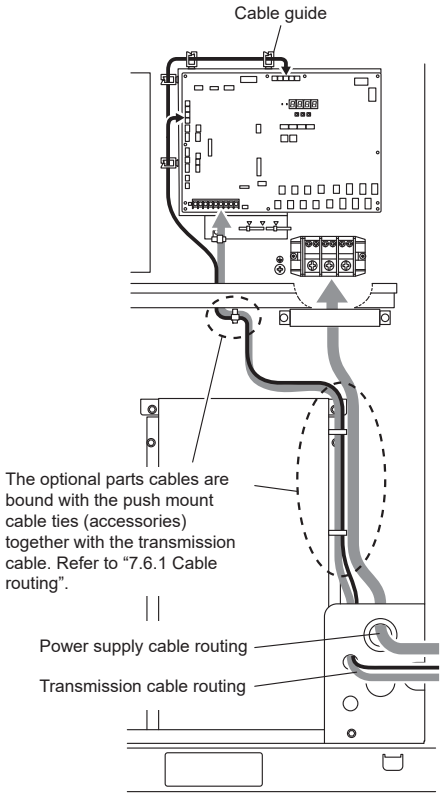
7.7. Optional parts wiring

7.7.1 Terminal positions



	Terminal			Application
	Number	Name	Color	
(1)	CN131	EXT. IN. 1	Yellow	For external input
(2)	CN132	EXT. IN. 2	Green	
(3)	CN133	EXT. IN. 3	White	
(4)	CN134	EXT. IN. 4	Red	
(5)	CN135	PULSE. IN	Orange	
(6)	CN136	EXT. OUT. 1	Black	For external output
(7)	CN137	EXT. OUT. 2	Blue	

7.7.2 Optional parts Cable routing

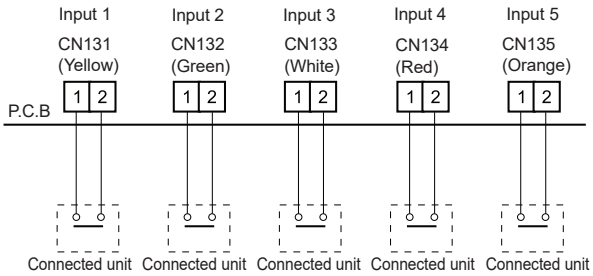


7.7.3 External input terminal

- Setting to low noise mode, outdoor unit operation peak control setting, emergency/batch stop and electricity meter pulse are possible from the outside.
- Except for wattmeter pulse reception (CN135) among external input terminals, only the primary unit is effective.

Wiring method and specifications

* A twisted pair cable (0.33 mm² (22AWG)) should be used. Maximum length of cable is 150 m.
* Use an external input and output cable with appropriate external dimension, depending on the number of cables to be installed
* For each input, pin No. 1 is of positive polarity and pin No. 2 is of ground level.



Operation behavior

Each input terminal works as follows.

Connector	Input signal	Status	Outdoor unit	
			Primary	Subordinate
Input 1 CN131 (Yellow)	OFF	Normal operation	O	×
	ON	Low noise mode operation		
Input 2 CN132 (Green) (*1)	OFF	Cooling priority	O	×
	ON	Heating priority		
Input 3 CN133 (White)	OFF	Normal operation	O	×
	ON	Outdoor unit operation peak control		
Input 4 CN134 (Red)	OFF	Normal operation	O	×
	ON	Batch stop or Emergency stop operation (*2)(*3)		
Input 5 CN135 (Orange) (*4)	No pulse	No information from electricity meter	O	O
	Pulse	Power usage information from electricity meter		

Subordinate unit can connect only input 5 (CN135).

The operations of each input terminal and the selection of function are set with the push button on the main PC board of outdoor unit. About the setting, please refer to “8.4. Push button setting”.

NOTES:

*1: The “external input priority mode” must be set by pressing push button on main PC board of outdoor unit. (Refer to “8. FIELD SETTING”.)
*2: Batch stop or emergency stop pattern can be selected by push button on main PC board of outdoor unit. (Refer to “8. FIELD SETTING”.)
*3: The emergency stop function mounted in this model does not guarantee the regulations of each country. For this reason, sufficient checking is necessary regarding use.
Especially, since the fact that the equipment may not be emergency-stopped in the case of breaking of the wiring to the external input terminals and communication line, communication error due to noise, VRF external input circuit trouble, etc. must be considered, the provision of double measures that add direct interruption of the power supply by switch, etc. is recommended as a precaution.
*4: Pulse input to CN135 must be width 50 ms or more, and must be interval 50 ms or more.

7.7.4 External output terminal (primary unit only)

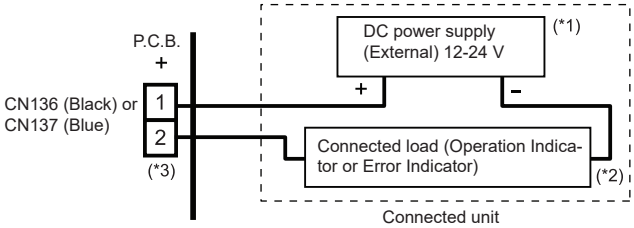
• You can detect the operation condition of outdoor unit and the unusual situation of both indoor and outdoor unit.
• The external output terminal is only valid for primary unit.

Wiring method and specifications

Error status
This output indicates the outdoor unit and connected indoor unit's “Normal” or “Error” status.

Operation status
This output indicates the outdoor unit's “Operation” status.

Connector	Output voltage	Status
Output 1 CN136 (Black)	0 V DC 12-24 V (*1)	Normal Error
Output 2 CN137 (Blue)	0 V DC 12-24 V (*1)	Stop Operation



*1: Provide a DC 12 to 24 V power supply.
Select a power supply capacity with an ample surplus for the connected load.
*2: The allowable current is 30 mA or less.
Provide a load resistance such that the current becomes 30 mA or less.
*3: Polarity is [+] for pin 1 and [-] for pin 2. Connect correctly.
Do not impress a voltage exceeding 24 V across pins 1-2.

* A twisted pair cable (22AWG (0.33 mm²)) should be used.
Maximum length of cable is 492 ft (150 m).
* Use an external input and output cable with appropriate external dimension, depending on the number of cables to be installed.

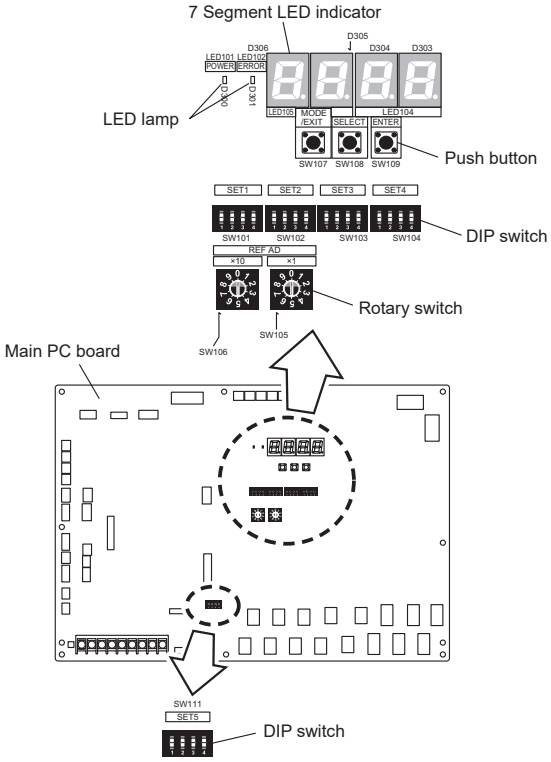
8. FIELD SETTING

⚠ CAUTION

Discharge the static electricity from your body before setting up the switches.
Never touch the terminals or the patterns on the parts that are mounted on the main PC board.

8.1. Field setting switches

Remove the service panel of the outdoor unit and the cover of the electrical component box to access the main PC board of the outdoor unit.
Switches for various settings and LED displays are shown in the figure.



8.2. DIP switch setting

8.2.1 List of Settings

SET2, SET3, and SET5 must be set for the DIP switch.
Configure the settings before turning on the power. Settings for SET1, and SET4 DIP switches are factory default ones. Do not change them.
*1: Pressure sensor kit (indoor unit optional parts)

DIP Switch		Function
SET1	1-4	Prohibited
SET2	1-2	System type setting
	3	Prohibited
	4	When use the UTY-SPWX (*1), turn this switch on.
SET3	1	Outdoor unit address setting
	2	
	3	Setting for number of subordinate units
	4	
SET4	1-4	Prohibited
SET5	1	Terminal resistor setting (H1, H2)
	2-3	Prohibited
	4	Terminal resistor setting (X1, X2, Z1, Z2)

8.2.2 System type setting

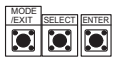
(1) DIP switch settings

Set the system type to heat recovery or heat pump.

SET2		System type
1	2	
OFF	OFF	Heat Recovery (factory setting)
ON	OFF	Heat Pump
OFF	ON	Prohibited
ON	ON	

(2) System type confirmation

Use the "MODE/EXIT", "SELECT", and "ENTER" buttons to configure settings according to the procedures below. (If no setting is made, the factory default setting will be displayed.)

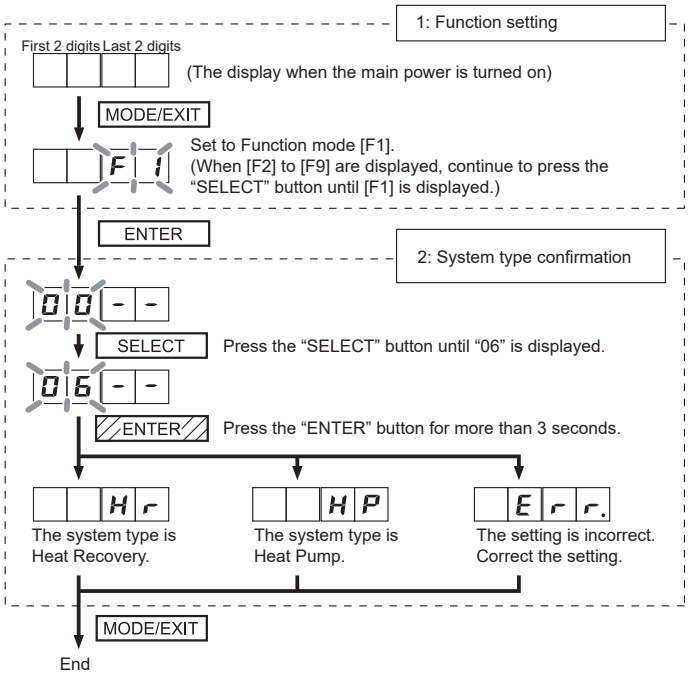


MODE/EXIT : Press the "MODE/EXIT" button

SELECT : Press the "SELECT" button

ENTER : Press the "ENTER" button.

ENTER : Press the "ENTER" button for more than 3 seconds.



8.2.3 Settings to be configured locally

(1) Outdoor unit address setting

When 2 or 3 outdoor units are installed to 1 refrigerant system, set the address for each outdoor unit.
Set the address for all outdoor units.

SET3		Outdoor unit address	Remarks
1	2		
OFF	OFF	0	Primary unit (factory setting)
OFF	ON	1	Subordinate unit 1
ON	OFF	2	Subordinate unit 2
ON	ON	-	Prohibited

(2) Number of subordinate units setting for outdoor unit

Set the number of subordinate units connected to 1 refrigerant system.
Set only the primary unit.

SET3		Number of connectable outdoor units	Remarks
3	4		
OFF	OFF	0	Primary unit only (factory setting)
OFF	ON	1	1 subordinate unit connected
ON	OFF	2	2 subordinate units connected
ON	ON	-	Prohibited

8.2.4 Terminal resistor setting

⚠ CAUTION

Be sure to set the terminal resistor according to specifications.
Set the terminal resistor for every network segment (NS).

If terminal resistor is set in multiple devices, the overall communication system may be damaged.
If terminal resistor is not set in a device, abnormal communication may occur.

- Be sure to set 1 terminal resistor in a network segment. You can set the terminal resistor at the outdoor unit or Signal amplifier.
- When setting the terminal resistor of a Signal amplifier, refer to the installation manual of the Signal amplifier.
- When setting multiple terminal resistors, take note of the following items.

(1) How many network segments are there in a VRF system?
(2) Where will you set the terminal resistors in a network segment? (Condition for 1 segment: Total number of outdoor and indoor units and Signal amplifiers is less than 64, or the total length of the transmission cable is less than 1,640 ft (500 m))
(3) How many outdoor units are connected to 1 refrigerant system?

Multiple outdoor unit setting

- The primary outdoor unit to the same refrigerant system subordinate outdoor unit. (Transmission terminal H1, H2)

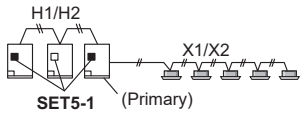
Number of outdoor units		1		2		3	
When use the UTY-SPWX (*1)		—	✔	—	✔	—	✔
SET5-1	Out door unit 1 (Primary)	Off	On	On	Off	On	Off
	Out door unit 2 (Subordinate 1)	—	—	On	On	Off	Off
	Out door unit 3 (Subordinate 2)	—	—	—	—	On	On

*1: Pressure sensor kit (indoor unit optional parts)

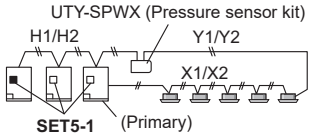
Setting example

Terminal resistor setting (SET5-1) ■ : Set to on □ : Set to off

3 outdoor units in a refrigerant system



3 outdoor units with UTY-SPWX in a refrigerant system

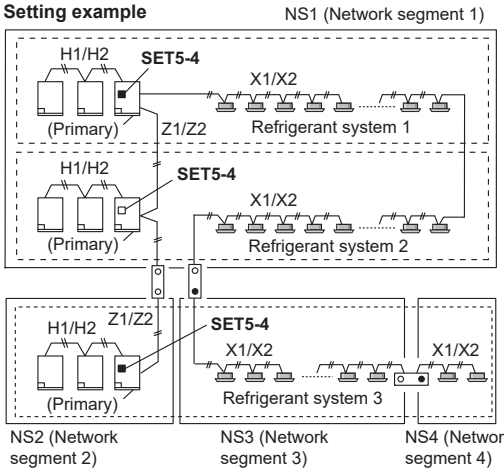


System communication setting

- The primary outdoor unit to the indoor units. (Transmission terminal X1, X2)
- The primary outdoor unit to the other refrigerant system primary outdoor unit. (Transmission terminal Z1, Z2)

SET5-4	Terminal resistor	Remarks
Off	Disable	(Factory setting)
On	Enable	—

Setting example



Terminal resistor setting

- Primary outdoor unit (SET5-4) (*1)
  - ■ : Set to on
  - □ : Set to off
- Signal amplifier
  - Resistor installed
  - Resistor not installed

*2: For all subordinate outdoor units, set SET5-4 to off.

8.3. Rotary switch setting

The rotary switch (REF AD) sets the refrigerant system address of the outdoor unit. Configure the settings only on the primary unit of a refrigerant system.
If multiple refrigerant systems are connected, set the rotary switch (REF AD) as shown in the table below.

Refrigerant system address	Rotary Switch Setting REF AD	
	×10	×1
0	0	0
1	0	1
2	0	2
⋮	⋮	⋮
98	9	8
99	9	9

Setting	Setting range	Type of switch		
Refrigerant system address	0 to 99	Setting example 63	 REF AD × 10	 REF AD × 1

Rotary Switch (REF AD × 1): Factory setting “0”
Rotary Switch (REF AD × 10): Factory setting “0”

8.4. Push button setting

Various functions can be set when necessary.
Perform settings after all indoor units have stopped operation.

8.4.1 List of settings

NOTE:
Code numbers not listed in the table blow are not available in this product. Do not set the unsupported code numbers.

No	Setting Item		7-segment display First 2 digits		7-segment display Last 2 digits		Factory default
00	Pipe length setting (*1)	Standard (131 to 213 ft) (40 to 65 m)	0	0	0	0	●
		Short (less than 131 ft) (less than 40 m)			0	1	
		Medium (213 to 295 ft) (65 to 95 m)			0	2	
		Long 1 (295 to 394 ft) (95 to 120 m)			0	3	
		Long 2 (394 to 541 ft) (120 to 165 m)			0	4	
		Prohibited			0	5	
	Pipe length means the length between primary outdoor unit and the nearest indoor unit.						
10	Sequential start shift (*1)	Normal	1	0	0	0	●
		21 seconds delay			0	1	
		42 seconds delay			0	2	
		63 seconds delay			0	3	
	The start-up timing of outdoor unit (compressor) can be set up so that it can delay several seconds. This feature is useful when multiple number of outdoor units are installed and turned on at the same time to limit the starting current.						
11	Cooling capacity shift (*1)	Normal mode	1	1	0	0	●
		Save energy mode			0	1	
		High power mode 1			0	2	
		High power mode 2			0	3	
		Prohibited			0	4	
	Set this item when necessary.						
12	Heating capacity shift (*1)	Normal mode	1	2	0	0	●
		Save energy mode			0	1	
		High power mode 1			0	2	
		High power mode 2			0	3	
	Set this item when necessary.						
13	Prohibited (Factory default)		1	3	0	0	●
14	Prohibited (Factory default)		1	4	0	0	●
15	Prohibited (Factory default)		1	5	0	0	●
17	Height difference between indoor units (*1)	Standard	1	7	0	0	●
		Prohibited			0	1	
		Height difference			0	2	
		Prohibited			0	3	
		Prohibited			0	4	
	This setting is for heat recovery system only. If installing the indoor units (even only one set) to a lower floor than the outdoor unit, and the height difference between the indoor units is 10 ft (3 m) or greater (i.e., if installing the indoor units on separate floors), set “02 (height difference)”.						
19	Prohibited (Factory default)		1	9	0	0	●
20	Switching between batch stop or emergency stop (*1)	Batch stop	2	0	0	0	●
		Emergency stop			0	1	
	This mode selects the pattern of the stop function to be operated by the external input terminal (CN134). • Batch stop: The stop of all indoor units connected to same refrigerant system due to input signal coming from CN134. • Emergency stop: When emergency stop is actuated, the indoor unit does not accept the operation command from the remote controller. On the other hand, when the emergency stop is released (no input from CN134), the air conditioner does not return to the original operation until the indoor unit is turned on by the remote controller.						
21	Operation mode selecting method (*1)	Priority given to the first command	2	1	0	0	●
		Priority given to external input of outdoor unit			0	1	
		Priority given to administrative indoor unit			0	2	
	This setting is for heat pump system only. Select the priority setting of the operation mode. • Priority given to the first command: Priority is given to the operation mode which is set first. • Priority given to external input of outdoor unit: Priority is given to the operation mode which is set by the external input terminal (CN132). • Priority given to administrative indoor unit: Priority is given to the operation mode of the administrative indoor unit which is set by the wired remote controller.						
22	Snow falling protection fan mode (*1)	Enable	2	2	0	0	●
		Disable			0	1	
	This mode operates the fans of outdoor units in order to prevent the units from stopping operation when they are covered by snow.						
23	Interval setting for snow falling protection fan mode (*1)	Standard (30 minutes)	2	3	0	0	●
		Short 1 (5 minutes)			0	1	
		Short 2 (10 minutes)			0	2	
		Short 3 (20 minutes)			0	3	
	When the snow falling protection fan mode is set, the operation interval of the fans of outdoor units can be selected.						
24	High static pressure mode	Standard	2	4	0	0	●
		High static pressure 1 (equivalent to 0.12 in WG (30 Pa))			0	1	
		High static pressure 2 (equivalent to 0.32 in WG (80 Pa))			0	2	
		High static pressure 3 (equivalent to 0.44 in WG (110 Pa))			0	3	
	When installing a duct to the blow-off outlet of an outdoor unit, set the high static pressure mode according to the static pressure of the duct to be installed. Furthermore, use this setting if the air blow of an outdoor unit is poor, such as when installed in a place with a low ceiling. * Model AOUA72/96/120 cannot enable “High static pressure 3”. Even if it is set, it will be the same as “High static pressure 2”.						
25	Prohibited (Factory default)		2	5	0	0	●
26	Prohibited (Factory default)		2	6	0	0	●
27	Prohibited (Factory default)		2	7	0	0	●
28	Change of unit (Temperature)	Celsius (°C)	2	8	0	0	●
		Fahrenheit (°F)			0	1	
29	Change of unit (Pressure)	Mpa	2	9	0	0	●
		psi			0	1	
30	Energy saving level setting (*1)	Level 1 (stop)	3	0	0	0	●
		Level 2 (operated at 40% capacity)			0	1	
		Level 3 (operated at 60% capacity)			0	2	
		Level 4 (operated at 80% capacity)			0	3	
		Level 5 (operated at 100% capacity)			0	4	
	The capacity limit can be selected by the external input terminal (CN133) when operating with the “Energy Saving Peak Cut function”. The lower the level, the more the effect of energy saving, but the cooling/heating performance will also drop.						
32	Prohibited (Factory default)		3	2	0	0	●
33	Prohibited (Factory default)		3	3	0	0	●
35	Presence of heater selection control using outdoor temperature (*1)	Invalid	3	5	0	0	●
		Valid			0	1	
	If “Heater selection control 1 or 2 using outdoor temperature” is used for any of the indoor units of the refrigerant system, select "Valid". For more details on settings for this item, see the Design & Technical manual.						
36	Outdoor temperature zone boundary temperature A (*1)	-4.0°F (-20°C)	3	6	0	0	●
		-0.4°F (-18°C)			0	1	
		3.2°F (-16°C)			0	2	
		6.8°F (-14°C)			0	3	
		10.4°F (-12°C)			0	4	
		14.0°F (-10°C)			0	5	
		17.6°F (-8°C)			0	6	
		21.2°F (-6°C)			0	7	
		24.8°F (-4°C)			0	8	
	For more details on settings for this item, see the Design & Technical manual.						

37	Outdoor temperature zone boundary temperature B (*1)	42.8°F (6°C)	3	7	0	0	●
		14.0°F (-10°C)			0	1	
		17.6°F (-8°C)			0	2	
		21.2°F (-6°C)			0	3	
		24.8°F (-4°C)			0	4	
		28.4°F (-2°C)			0	5	
		32.0°F (0°C)			0	6	
		35.6°F (2°C)			0	7	
		39.2°F (4°C)			0	8	
		42.8°F (6°C)			0	9	
		46.4°F (8°C)			1	0	
		50.0°F (10°C)			1	1	
		53.6°F (12°C)			1	2	
		57.2°F (14°C)			1	3	
		60.8°F (16°C)			1	4	
		64.4°F (18°C)			1	5	
	For more details on settings for this item, see the Design & Technical manual.						
40	Capacity priority setting (in low noise mode) (*1)	Off (quiet priority)	4	0	0	0	●
		On (capacity priority)			0	1	
	If the cooling/heating performance becomes insufficient when the low noise mode is set, it is possible to set “capacity priority” that automatically cancels the low noise mode (once performance is restored, the mode will automatically return to the low noise mode).						
41	Low noise mode setting (*1)	Off (Normal)	4	1	0	0	●
		On (Low noise mode)			0	1	
42	Low noise mode operation level setting	Level 1	4	2	0	0	●
		Level 2			0	1	
	Level 1: The operating sound lowers from about 5 to 10 dB(A) more than the rated value Level 2: The operating sound lowers from about 3 to 5 dB(A) more than the Level 1						
50	Prohibited (Factory default)		5	0	0	0	●
53	Prohibited (Factory default)		5	3	0	0	●
54	Prohibited (Factory default)		5	4	0	0	●
61	Prohibited (Factory default)		6	1	0	0	●
62	Prohibited (Factory default)		6	2	0	0	●
63	Prohibited (Factory default)		6	3	0	0	●
70	Electricity meter No. setting 1 (*2)	Setting number (x00)	7	0	0	0	●
		Setting number (x01)			0	1	
		⋮			⋮	⋮	
		Setting number (x98)			9	8	
		Setting number (x99)			9	9	
	Set the ones digit and tens digit of the No. of the electricity meter connected to CN135.						
71	Electricity meter No. setting 2 (*2)	Setting number (0xx)	7	1	0	0	●
		Setting number (1xx)			0	1	
		Setting number (2xx)			0	2	
	Set the hundreds digit of the No. of the electricity meter connected to CN135.						
72	Electricity meter pulse setting 1 (*3)	Setting number (xx00)	7	2	0	0	●
		Setting number (xx01)			0	1	
		⋮			⋮	⋮	
		Setting number (xx98)			9	8	
		Setting number (xx99)			9	9	
	Set the ones digit and tens digit of the No. of the electricity meter pulse setting connected to CN135.						
73	Electricity meter pulse setting 2 (*3)	Setting number (00xx)	7	3	0	0	●
		Setting number (01xx)			0	1	
		⋮			⋮	⋮	
		Setting number (98xx)			9	8	
		Setting number (99xx)			9	9	
	Set the hundreds digit and thousands digit of the electricity meter pulse setting connected to CN135.						

*1: Do not set this for the subordinate outdoor units.
*2: When electricity meter No. is set to “000” and “201 to 299”, the pulses input to CN135 become ineffective. Available setting number is "001" to "200"
*3: When the electricity meter pulse setting is set to “0000”, the pulses input to CN135 become ineffective. Available setting number is "0001" to "9999"

8.4.2 Setting procedure

(1) Turn on the power of the outdoor unit and enter standby mode.

When system is normal

POWER lamp lights up. (ERROR lamp is off.)

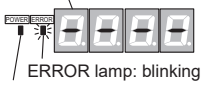
7 segment LED indicator: off

ERROR lamp: off
POWER lamp: on

When system is unusual

Check the settings as there is an error in the settings for outdoor unit address (DIP switch SET3-1, 2) or number of connected subordinate units (DIP switch SET3-3, 4).

7 segment LED indicator: “-” display

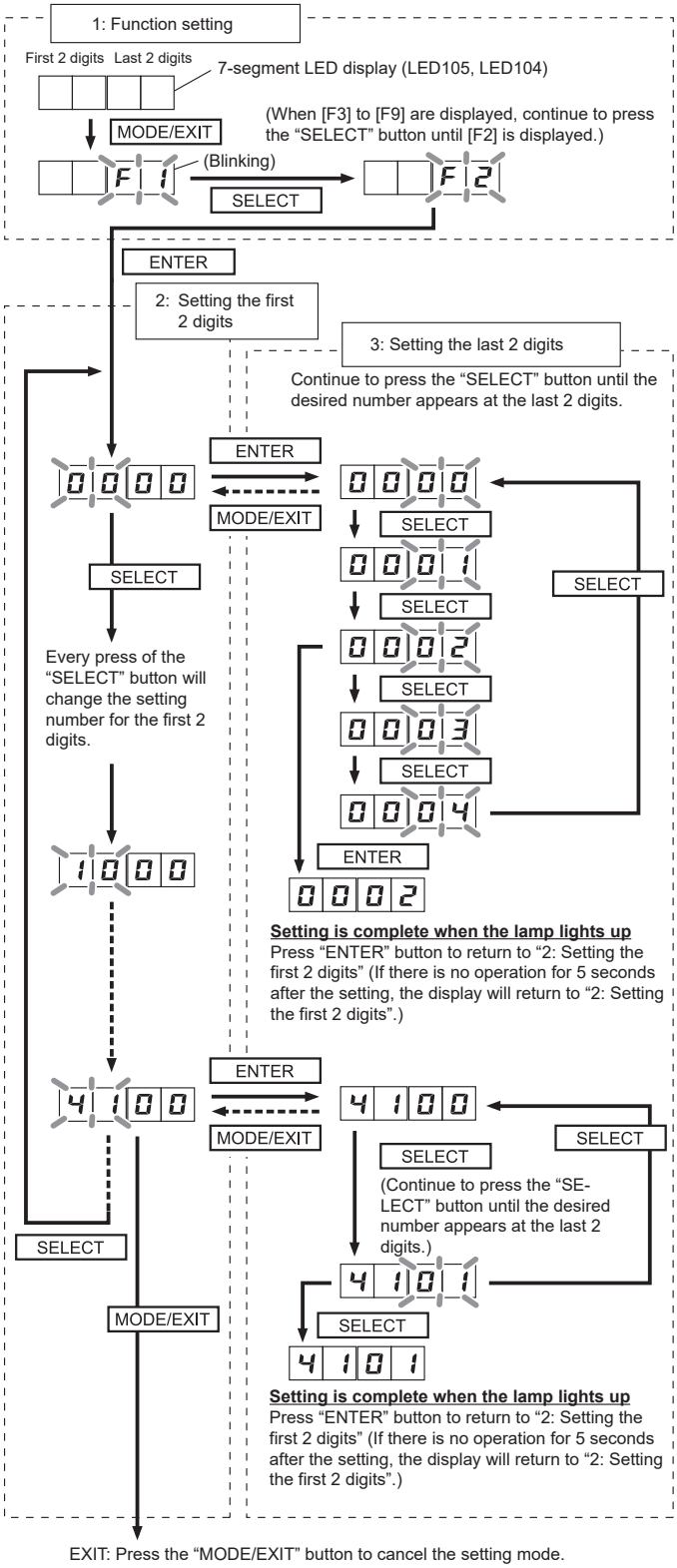


ERROR lamp: blinking
POWER lamp: on

(2) Setting method

Use the “MODE/EXIT”, “SELECT”, and “ENTER” buttons to configure settings according to the procedures below. (If no setting is made, the factory default setting will be displayed.)

MODE/EXIT : Press the “MODE/EXIT” button
SELECT : Press the “SELECT” button
ENTER : Press the “ENTER” button.
ENTER : Press the “ENTER” button for more than 3 seconds.



8.5. Address setting for Signal amplifiers

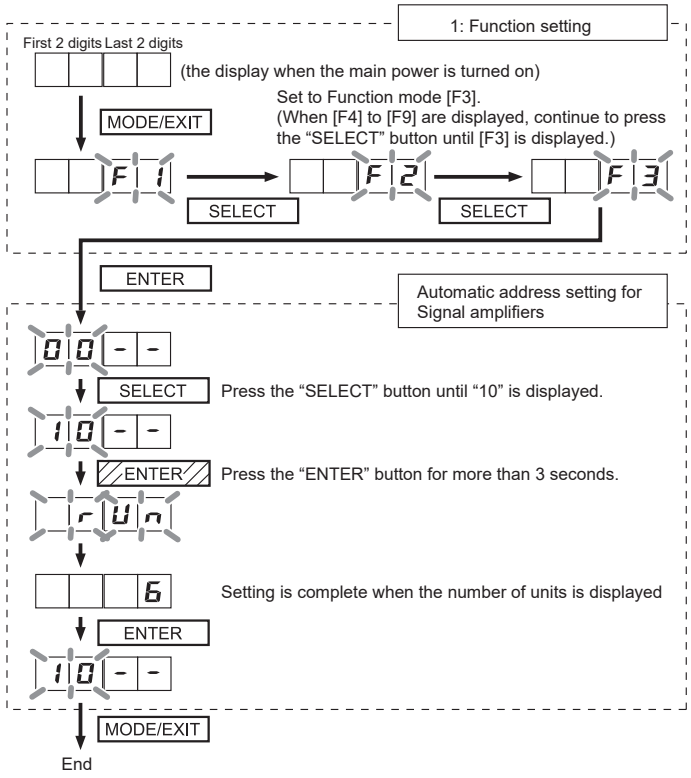
8.5.1 Address setting for Signal amplifiers

When using Signal amplifiers, the address for Signal amplifiers must be set.
The address for Signal amplifiers can be set automatically from 1 outdoor unit (primary unit) on the network.
Refer to “8.6.1 Indoor unit address setting” for the wiring example.
(For manual setting of address, refer to the Signal amplifier installation manual.)

8.5.2 Automatic address setting for Signal amplifiers

When setting the address of the Signal amplifier, please use the factory setting. (See the installation manual of the Signal amplifier)
• When the system is normal, nothing will be displayed on the 7-segment display.
• When ERROR is displayed, inspect the units.

Use the “MODE/EXIT”, “SELECT”, and “ENTER” buttons on the outdoor unit main PC board to configure settings according to the procedures below.



8.6. Indoor unit address setting

8.6.1 Indoor unit address setting

Address must be set for the indoor unit.

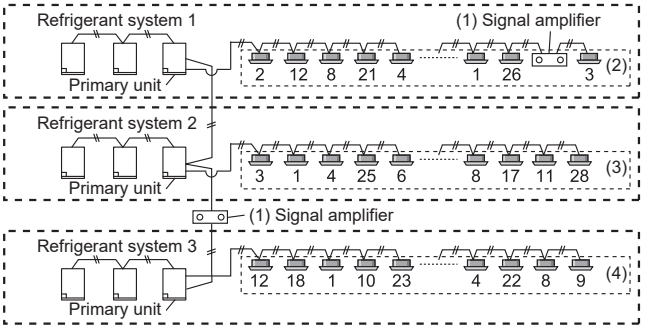
Manual setting → • When setting with the switch inside the indoor unit, refer to the indoor unit operation manual.
• When setting with a remote control, refer to the remote control operation manual.

Automatic setting → • Check that the wiring is as shown in the figure below. Operate using the primary outdoor unit of each refrigerant system.

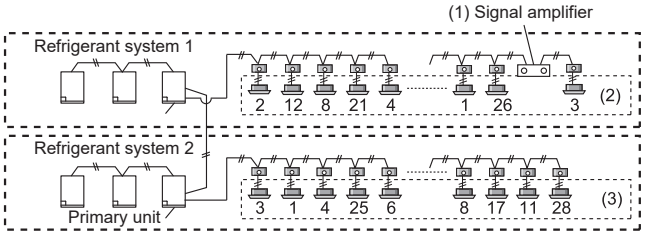
Wiring example for automatic address setting

(1): Signal amplifier wiring example
(2)(3): Indoor unit wiring example
(Connect the indoor and outdoor units of the same refrigerant system as shown below.)

Example of Heat Pump system



Example of Heat Recovery system



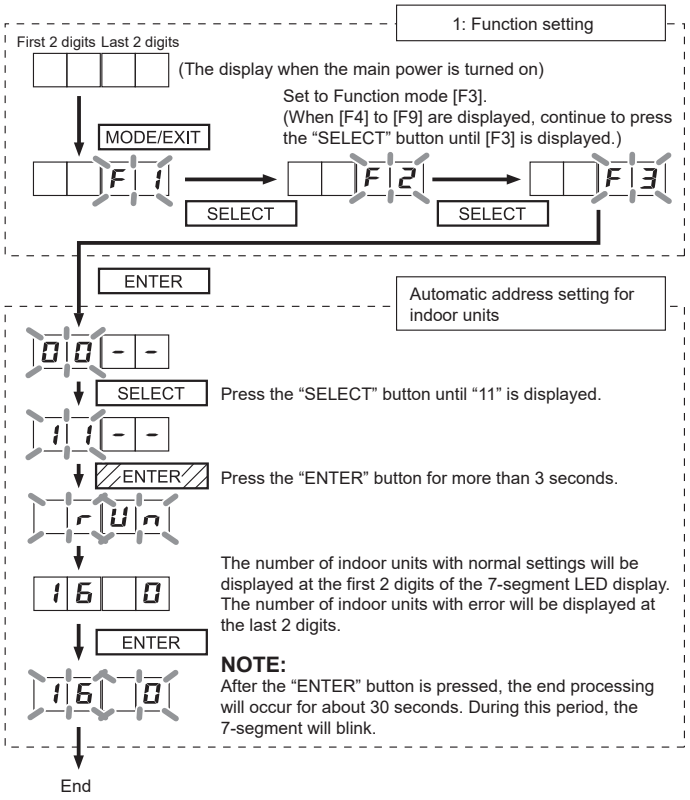
NOTES:
• When network is connected to other refrigerant systems, the automatic address function cannot be used.
• The addresses of indoor units that have been configured automatically cannot be assigned in the order when they are installed. (Refer to the indoor unit installation manual for the procedures to check the addresses.)

8.6.2 Procedures to enable automatic address setting on indoor units

Check that the rotary switch IU AD on the indoor unit PC board is set to “00”. If it is not set to “00”, it means the address of that device is not set. (Factory default is “00”).
Turn on the power of the indoor and outdoor units.

• When the system is normal, nothing will be displayed on the 7-segment display.
• When ERROR is displayed, inspect the units.

Use the “MODE/EXIT”, “SELECT”, and “ENTER” buttons on the outdoor unit main PC board to configure settings according to the procedures below.



8.7. Resistance measurement of transmission cable (Measure with breaker OFF)

⚠ CAUTION

Do not turn on the power if the resistance between the terminals of the transmission cable is unusual. Otherwise, the PC board may be damaged.

Measure the resistance between 2 terminals of a transmission cable.

(1) Transmission cable connecting indoor units, outdoor units, and Signal amplifiers
Measure the resistance of the Signal amplifier terminal and the terminal of the indoor and outdoor units connected farthest away from the device where terminal resistor is measured. A value from the table is displayed, depending on the distance from the Signal amplifier and the device where the terminal resistor is set.
This value is an estimate.

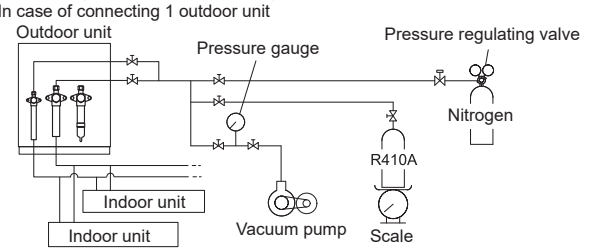
(2) Transmission cable connecting outdoor units in a refrigerant system
The resistance between the terminals of the transmission cable is 45-60 Ω.
This value is an estimate.

Approximate resistance (Ω)	Distance from termination resistor (m) 0~100	~200	~300	~400	~500
0 ~ 50	A short circuit somewhere or 2 or more termination resistors are connected				
50					
60					
70					
80					
90					
100					
110					
120					
130					
140					
150					
160					
170					
180					
190 ~	Faulty contact or wiring length over 500 m				
1K ~∞	Faulty contact, open circuit, or no termination resistor				

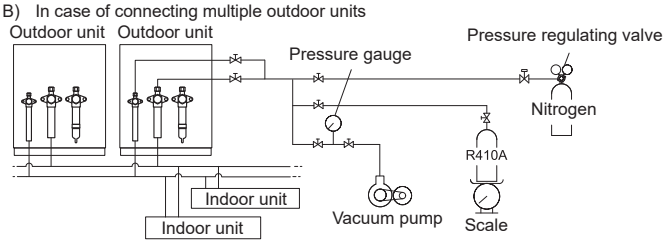
9. PIPE INSTALLATION II

Connection diagram for heat pump system

A) In case of connecting 1 outdoor unit

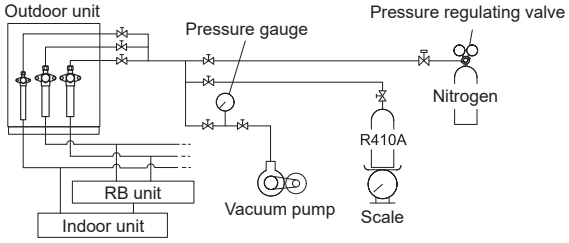


B) In case of connecting multiple outdoor units

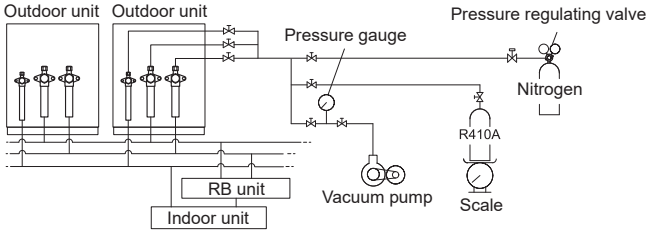


Connection diagram for heat recovery system

C) In case of connecting 1 outdoor unit



D) In case of connecting multiple outdoor units



Valve opening and closing operation

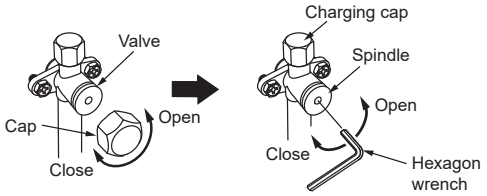


Table A (Tightening torque)

Valve type		Spindle	Cap	Charging cap
Liquid	AOUA72/96	4.0 to 4.9 lbf·ft (5.4 to 6.6 N·m)	10.0 to 12.2 lbf·ft (13.5 to 16.5 N·m)	8.4 to 10.3 lbf·ft (11.4 to 14.0 N·m)
	AOUA120	6.0 to 7.3 lbf·ft (8.1 to 9.9 N·m)	13.3 to 16.2 lbf·ft (18.0 to 22.0 N·m)	
	AOUA144/168/192	8.1 to 9.6 lbf·ft (11.0 to 13.0 N·m)	16.6 to 20.3 lbf·ft (22.5 to 27.5 N·m)	
Suction gas		19.9 to 24.3 lbf·ft (27.0 to 33.0 N·m)		
Gas/Discharge gas				

9.1. Sealing test

⚠ CAUTION

Use only nitrogen gas.
Never use refrigerant gas, oxygen, in flammable gas or poisonous gas to pressurize the system. (If oxygen is used, there is the danger of an explosion.)

Do not apply shock during sealing test.
It can rupture the pipes and cause serious injury.

Do not turn on the power unless all operations are complete.

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

After connecting the pipes, perform a sealing test.
Recheck that the 3-way valve are closed before performing a sealing test.
Pour nitrogen gas through both the liquid pipe and the gas pipe.
Pressurize nitrogen gas to 4.2 MPa to perform the sealing test.
Check all flare connection areas and brazed areas.
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 temperature changes 5 °C, the test pressure changes 0.05 MPa. If the pressure has dropped, the pipe joints may be leaking.

If a leakage is found, immediately repair it and perform a sealing test again.
* Decrease the pressure of nitrogen gas before blazing
After completing the sealing test, release the nitrogen gas from both valves.
Release the nitrogen gas slowly.

9.2. Vacuum process

⚠ CAUTION

Do not turn on the power unless all operations are complete.

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

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.

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.

- If moisture might enter the piping, follow below. (i.e., if doing work during the rainy season, if the actual work takes long enough that condensation may form on the inside of the pipes, if rain might enter the pipes during work, etc.)
- After operating the vacuum pump for 2 hours, pressurize to 7.25 psi (0.05 MPa) (i.e., vacuum breakdown) with nitrogen gas, then depressurize down to 500 microns (-100.7kPa) for an hour using the vacuum pump (vacuum process).
- If the pressure does not reach 500 microns (-100.7kPa) even after depressurizing for at least 2 hours, repeat the vacuum breakdown - vacuum process perform triple evacuation procedure as necessary to bring the vacuum down to 500 microns (-100.7kPa) or lower.

After vacuum process, maintain the vacuum for an hour and make sure the pressure does not rise by monitoring with a vacuum gauge.

9.2.1 Evacuation procedure

(1) Remove the caps of the gas pipe and liquid pipe and check that the valves are closed.
(2) Remove the charging cap.
(3) Connect a vacuum pump and a pressure gauge to a charging hose and connect it to the charging port.
(4) Activate the vacuum pump and vacuum the indoor unit and connection piping until the pressure gauge becomes 500 microns (-100.7kPa). Evacuate from both the gas pipe and the liquid pipe.
(5) Continue evacuating the system for 1 hour after the pressure gauge reads -500 microns (-100.7kPa).
(6) Remove the charging hose and reinstall the charging cap.

9.3. Additional charging

⚠ CAUTION

Do not turn on the power unless all operations are complete.

After evacuating the system, add refrigerant.

Do not charge the system with a refrigerant other than R410A.

Always keep to the limit on the total amount of refrigerant. Exceeding the limit on the total amount of refrigerant will lead to malfunction during charging of refrigerant.

Do not reuse recovered refrigerant.

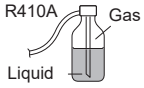
Use an electronic scale to measure the charging amount of refrigerant.
Adding more refrigerant than the specified amount will cause a malfunction.

Charge refrigerant using the liquid pipe.
Adding refrigerant through the gas pipe will cause a malfunction.

Add refrigerant by charging the system with the refrigerant in the liquid state. If the refrigerant cylinder is equipped with a siphon, it is not necessary to place the cylinder upright.

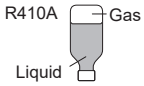
Check if the steel cylinder has a siphon installed or not before filling. (There is an indication "with siphon for filling liquid" on the steel cylinder.)

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 cannot 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.

9.3.1 Procedure for charging the system with refrigerant

(1) Remove the charging cap from the liquid pipe. Use standard refrigeration practices when charging refrigerant.
(2) Attach a charging hose to the refrigerant cylinder, and connect it to the charging port.
(3) Add refrigerant by calculating the additional refrigerant volume in accordance with the calculation formula indicated below.
(4) Remove the charging cap and install the charging hose.
(5) Remove the body caps (suction gas pipe, discharge gas pipe and liquid pipe), and open the valves.
(6) Close the body caps.
(7) After adding refrigerant, indicate the added charging volume on the unit.

* Tighten the body caps and charging caps to the specified torque. Refer to the Table A in "9. PIPE INSTALLATION II".
To open and close the valves, Use an M4 hexagon wrench for liquid pipe.
Use an M8 hexagon wrench for suction gas pipe and discharge gas pipe.

** If you cannot charge the specified amount of refrigerant with the above method, be sure to charge the refrigerant through the gas pipe while operating in cooling mode. In order to prevent liquid back-flow, carefully operate the refrigerant cylinder valve so that the refrigerant will flow in certain part at a time.

9.3.2 Checking total amount of refrigerant and calculating the amount of refrigerant charge to be added

• The amount of refrigerant charge to be added is the total value of the basic refrigerant charge amount and the value calculated from the length of the liquid pipe.
• Round up the value to 2 decimal places.

Model	Ton	d Factory charged amount [lb (kg)]	a Additional amount for outdoor unit [lb (kg)]
AOUA72	6	25.79 (11.7)	0 (0)
AOUA96	8	25.79 (11.7)	0 (0)
AOUA120	10	26.01 (11.8)	7.28 (3.3)
AOUA144	12	26.01 (11.8)	17.20 (7.8)
AOUA168	14	26.01 (11.8)	17.20 (7.8)
AOUA192	16	26.01 (11.8)	17.20 (7.8)

Diameter of liquid pipe [in (mm)]	b Additional amount for pipe length [lb/ft (kg/m)]
1/4 (6.35)	0.014 (0.021)
3/8 (9.52)	0.039 (0.058)
1/2 (12.70)	0.077 (0.114)
5/8 (15.88)	0.120 (0.178)
3/4 (19.05)	0.180 (0.268)

(1) Calculation of additional amount for outdoor unit.

A = [a Outdoor unit 1 additional amount for outdoor unit ____ lb (kg)] + [a Outdoor unit 2 additional amount for outdoor unit ____ lb (kg)] + [a Outdoor unit 3 additional amount for outdoor unit ____ lb (kg)]

= [Total ____ lb (kg)]

(2) Calculation of additional amount for pipe length.

B = [Total length of ø 3/4 in (19.05 mm) liquid pipe ____ ft (m)] × [b × 0.180 (× 0.268) [lb/ft (kg/m)]] = ____ lb (kg)
+ [Total length of ø 5/8 in (15.88 mm) liquid pipe ____ ft (m)] × [b × 0.120 (× 0.178) [lb/ft (kg/m)]] = ____ lb (kg)
+ [Total length of ø 1/2 in (12.70 mm) liquid pipe ____ ft (m)] × [b × 0.077 (× 0.114) [lb/ft (kg/m)]] = ____ lb (kg)
+ [Total length of ø 3/8 in (9.52 mm) liquid pipe ____ ft (m)] × [b × 0.039 (× 0.058) [lb/ft (kg/m)]] = ____ lb (kg)
= [Total length of ø 1/4 in (6.35 mm) liquid pipe ____ ft (m)] × [b × 0.014 (× 0.021) [lb/ft (kg/m)]] = ____ lb (kg)
+ [Total ____ lb (kg)]

(3) Calculation of additional charge refrigerant.

C = A+B = [____ lb (kg)] (Round up C to 2 decimal place)

(4) Calculation of factory charged amount.

D = [d Outdoor unit 1 factory charged amount ____ lb (kg)] + [d Outdoor unit 2 factory charged amount ____ lb (kg)] + [d Outdoor unit 3 factory charged amount ____ lb (kg)]

= [Total ____ lb (kg)]

(5) Total refrigerant amount check.

E = C+D = [____ lb (kg)]

NOTES:
Check the total refrigerant amount under the following conditions.

Number of outdoor units per refrigerant system	Model (Ton) S: AOUA72/96 L: AOUA120 LL: AOUA144/168/192	Upper limit of total refrigerant amount [lb (kg)]	Computational formula [lb (kg)]
1	S (6, 8)	77.2 (35.0)	E ≤ 77.2 (35.0)
	L (10)		
	LL (12, 14, 16)	108.0 (49.0)	E ≤ 108.0 (49.0)
2	L + S (18)	154.3 (70.0)	E ≤ 154.3 (70.0)
	L + L (20)		
	LL + L (22)		
	LL + LL (24, 26, 28, 30, 32)	216.1 (98.0)	E ≤ 216.1 (98.0)
3	LL + LL + L (34)	231.5 (105.0)	E ≤ 231.5 (105.0)
	LL + LL + LL (36)	324.1 (147.0)	E ≤ 324.1 (147.0)

<Calculation example>
When there are 3 outdoor units (AOUA144ULBV5, AOUA144ULBV5, AOUA120ULBV5) connected to 1 Heat Pump system.

(1) Calculation of additional amount for outdoor unit.
A = 6.61 lb + 6.61 lb + 6.61 lb = 19.83 lb
(A = 3.00 (kg) + 3.00 (kg) + 3.00 (kg) = 9.00 (kg))

(2) Calculation of additional amount for pipe length.
If liquid pipe piping length is the following.
ø 3/4 in: 164 ft, ø 5/8 in: 82 ft, ø 1/2 in: 0 ft, ø 3/8 in: 65 ft, ø 1/4 in: 49 ft
(ø 19.05 mm: 50 m, ø 15.88 mm: 25 m, ø 12.70 mm: 0 m, ø 9.52 mm: 20 m, ø 6.53 mm: 15 m)
Additional charge volume
B = 164 ft × 0.180 lb/ft + 82 ft × 0.120 lb/ft + 0 ft × 0.077 lb/ft + 65 ft × 0.039 lb/ft + 49 ft × 0.014 lb/ft = 42.581 lb
(B = 50 m × 0.268 kg/m + 25 m × 0.178 kg/m + 0 m × 0.114 kg/m + 20 m × 0.058 kg/m + 15 m × 0.021 kg/m = 19.325 kg)

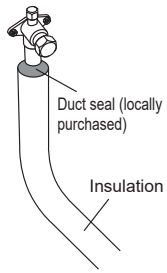
(3) Calculation of additional charge refrigerant
C = A + B = 19.83 lb + 42.581 lb = 62.411 lb → 62.41 lb
(C = A + B = 9.00 kg + 19.325 kg = 28.325 kg → 28.33 kg)

(4) Calculation of factory charged amount
D = 26.01 lb + 26.01 lb + 26.01 lb = 78.03 lb
(D = 11.80 kg + 11.80 kg + 11.80 kg = 35.40 kg)

(5) Check the total amount of refrigerant
When 3 outdoor units are connected to 1 system, the following condition must be satisfied.
Condition: E = C + D ≤ 231.5 lb (105.0 kg)
62.41 lb + 78.03 lb = 140.44 < 231.5 lb
(28.33 kg + 35.40 kg = 63.73 kg < 105.0 kg)
→ No problem if the above condition is satisfied.

9.4. Installing thermal insulation

- Install thermal insulation material after conducting the “9.1. Sealing test”.
- To prevent condensation and water droplets, install thermal insulation on the refrigerant pipe.
- Refer to the table to determine the thickness of the thermal insulation.
- If the outdoor unit is installed at a level that is higher than the indoor unit, the water that has condensed in the 3-way valve of the outdoor unit could travel to the indoor unit. Therefore, use duct seal (locally purchased) in the space between the pipe and the thermal insulation to prevent the entry of water.



Selection of thermal insulation

Use an thermal insulation with equal heat transmission rate or below 0.023 BTU/ft·h·°F (0.040 W/m·k)

Pipe diameter [in (mm)]	Thermal insulation minimum thickness per relative humidity [in (mm)]			
	≤ 70%	≤ 75%	≤ 80%	≤ 85%
1/4 (6.35)	5/16 (8)	3/8 (10)	1/2 (13)	11/16 (17)
3/8 (9.52)	3/8 (9)	7/16 (11)	9/16 (14)	11/16 (18)
1/2 (12.70)	3/8 (10)	1/2 (12)	9/16 (15)	3/4 (19)
5/8 (15.88)			5/8 (16)	13/16 (20)
3/4 (19.05)		1/2 (13)		13/16 (21)
7/8 (22.22)	7/16 (11)		11/16 (17)	7/8 (22)
1-1/8 (28.58)		9/16 (14)	11/16 (18)	7/8 (23)
1-3/8 (34.92)				15/16 (24)
1-5/8 (41.27)	1/2 (12)	9/16 (15)	3/4 (19)	1 (25)

* When an ambient temperature and relative humidity exceed 90 °F (32 °C), please strengthen heat insulation of refrigerant pipe.

10. TEST RUN

10.1. Pre-check for test run

Before the test operation, check the following items.

(1) Is there a gas leakage? (At pipe connections {flange connections and brazed areas})
(2) Is the system charged with the specified volume of refrigerant?
(3) Is the refrigerant system address correct?
(4) Is a breaker installed at the power supply cable of outdoor unit?
(5) Are the cable connected to the terminals without looseness, and in accordance with the specifications?
(6) Are the initial settings of the switches of the outdoor unit correctly configured?
(7) Is the 3-way valve of the outdoor unit open? (Gas pipe and liquid pipe)
(8) Is power supplied to the crank case heater for more than 12 hours? Electricity current in short period of time may result in compressor damage.
(9) Are all the indoor units within the same refrigerant system connected to the power? Operating indoor units which are not connected to the power may result in malfunctions.
(10) Is Indoor unit connection check performed? Test run doesn't operate if Indoor unit connection check is not performed.

After checking that the above items are all in order, refer to “10.2. Test run method” to test operation the unit.
If there are problems, adjust immediately and recheck.

10.2. Test run method

Be sure to configure test run settings only when the outdoor unit has stopped operating.

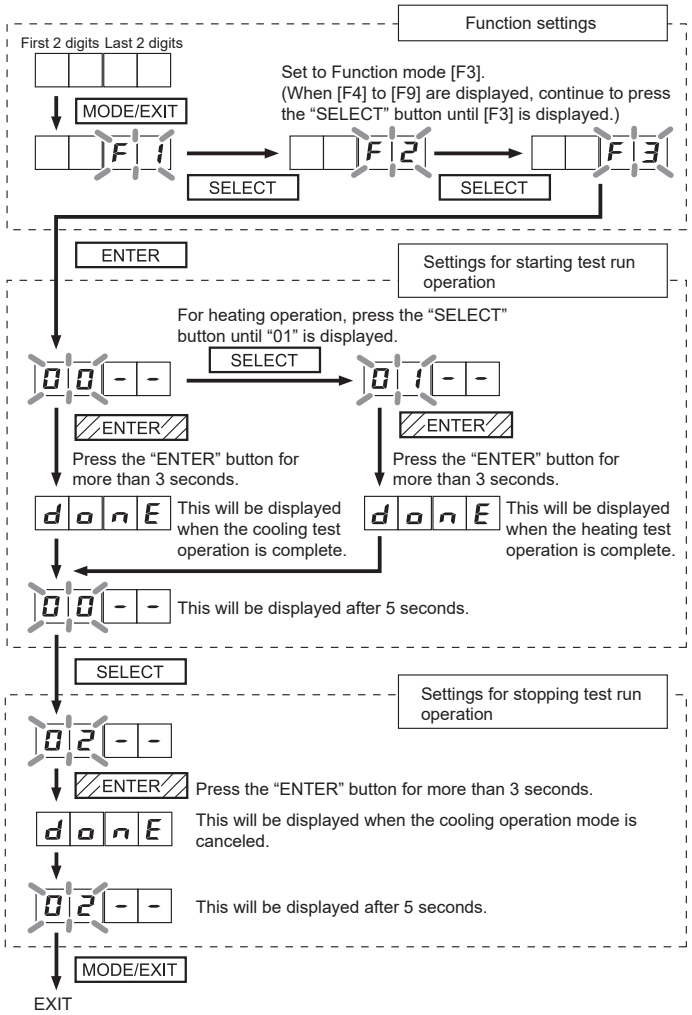
- Depending on the communication status between the indoor and outdoor units, it may take several minutes for the system to start operating after settings for the test run are complete.
- After the test run settings are complete, the outdoor unit and the connected indoor units will start operating. Room temperature control will not activate during test operation (continuous operation).
- If a knocking sound can be heard in the liquid compression of the compressor, stop the unit immediately and then energize the crank case heater for a sufficient length of time before restarting the operation.

Perform test operation for each refrigerant system.
You can set “cooling test operation" or “heating test operation” with the push button on the outdoor unit main PC board.

Test operation setting method

Use the “MODE/EXIT”, “SELECT”, and “ENTER” buttons on the outdoor unit main PC board to configure settings according to the procedures below.

MODE/EXIT : Press the “MODE/EXIT” button.
SELECT : Press the “SELECT” button.
ENTER : Press the “ENTER” button.
ENTER : Press the “ENTER” button for more than 3 seconds.



After the test operation is complete, turn off the power. Attach the cover of the electrical component box and the front panel of the outdoor unit.

NOTES:
- Check that the indoor and outdoor units connected to the same refrigerant system are operating normally.
- When indoor or outdoor units are not operating, or when the indoor and outdoor units of other refrigerant systems are operating, the indoor/outdoor unit address are not configured correctly.
- The system will not operate normally with an incorrect DIP switch setting. Stop the system immediately and recheck the DIP switch setting.

10.3. Checklist

	Check description	Check method	Criteria
1	High and low pressure values are normal.	Check it with a pressure gauge.	Cooling: low pressure approx. 0.8 MPa Heating: high pressure approx. 3.0 MPa
2	Drain water is discharged smoothly through the drain hose.	Check it by pouring water.	—
3	Indoor and outdoor unit fans are operating.	Check them visually.	—
4	Compressor operates after the indoor unit operates.	Check the operating sound.	—
5	Difference between inlet and outlet temperatures is normal.	Measure the inlet and outlet temperatures.	Temperature difference 10 degrees
6	Error is not displayed.	Check the 7-segment display.	Error blinking or no error code display

11. LED STATUS

You can determine the operating status by the lighting up and blinking of the LED display. Check the status using the table below.

11.1. Normal operation codes

Mode	CODE				DESCRIPTION
Operation	C	L			Cooling
	H	t			Heating
			o	r	During oil recovery operation
			d	F	During defrosting operation
			P	C	During power saving operation
			L	n	During low noise operation
			S	n	During setting of snowfall mode

11.2. Error codes

Mode	Code				Description
Communication error	E	1	3.	1	Communication error between outdoor units
	E	1	4.	1	Outdoor unit network communication 1 error
	E	1	4.	2	Outdoor unit network communication 2 error
	E	1	4.	5	The number of indoor unit shortage
Function setting error	E	2	8.	1	Auto address setting error
	E	2	8.	4	Signal amplifier auto address error
Indoor unit actuator error	E	5	U.	1	Indoor unit miscellaneous error
Outdoor unit PCB/electrical component/switch error	E	6	1.	2	Outdoor unit under voltage error
	E	6	1.	5	Outdoor unit reverse phase, missing phase wire error
	E	6	2.	3	Outdoor unit EEPROM access error
	E	6	2.	6	Outdoor unit inverters communication error
	E	6	2.	8	Outdoor unit EEPROM data corruption error
	E	6	2.	A	Outdoor unit inverters 2 communication error
	E	6	3.	1	Outdoor unit inverter error
	E	6	3.	3	Outdoor unit inverter 2 error
	E	6	7.	2	Outdoor unit inverter PCB power short interruption error
	E	6	7.	5	Outdoor unit inverter 2 PCB power short interruption error
	E	6	8.	2	Outdoor unit rush current limiting resister temp. rise error (protective operation)
	E	6	8.	3	Outdoor unit rush current limiting resistor temp. 2 rise error (protective operation)
	E	6	9.	1	Outdoor unit transmission PCB parallel communication error
Outdoor unit sensor error	E	7	1.	1	Outdoor unit discharge thermistor 1 error
	E	7	1.	2	Outdoor unit discharge thermistor 2 error
	E	7	2.	1	Outdoor unit compressor temp. sensor 1 error
	E	7	2.	2	Outdoor unit compressor temp. sensor 2 error
	E	7	3.	4	Outdoor unit heat ex. 1 gas temp. sensor error
	E	7	3.	5	Outdoor unit heat ex. 1 liquid temp. sensor error
	E	7	3.	6	Outdoor unit heat ex. 2 gas temp. sensor error
	E	7	3.	7	Outdoor unit heat ex. 2 liquid temp. sensor error
	E	7	4.	1	Outside air thermistor error
	E	7	5.	1	Outdoor unit suction gas thermistor error
	E	7	7.	1	Outdoor unit heat sink thermistor error
	E	7	7.	3	Outdoor unit heat sink thermistor 2 error
	E	8	2.	2	Outdoor unit sub-cool heat ex. gas outlet thermistor error
	E	8	3.	1	Outdoor unit liquid pipe thermistor 1 error
	E	8	3.	2	Outdoor unit liquid pipe thermistor 2 error
	E	8	4.	1	Outdoor unit current sensor 1 error (permanent stop)
	E	8	4.	3	Outdoor unit current sensor 2 error (permanent stop)
	E	8	6.	1	Outdoor unit discharge pressure sensor error
	E	8	6.	3	Outdoor unit suction pressure sensor error
	E	8	6.	4	Outdoor unit high pressure switch 1 error
	E	8	6.	5	Outdoor unit high pressure switch 2 error
Outdoor unit actuator error	E	9	3.	1	Outdoor unit inverter compressor start up error
	E	9	3.	4	Outdoor unit inverter compressor 2 start up error
	E	9	4.	1	Outdoor unit trip detection
	E	9	4.	3	Outdoor unit trip detection 2
	E	9	5.	5	Outdoor unit compressor motor loss of synchronization
	E	9	5.	6	Outdoor unit compressor 2 motor loss of synchronization
	E	9	7.	1	Outdoor unit fan motor lock error
	E	9	7.	5	Outdoor unit fan motor temperature error (protective action)
	E	9	7.	9	Outdoor unit fan motor driver error
	E	9	8.	1	Outdoor unit fan motor 2 lock error
	E	9	8.	5	Outdoor unit fan motor 2 temperature error (protective action)
	E	9	8.	9	Outdoor unit fan motor 2 driver error.
	E	9	A.	1	Outdoor unit coil 1 (expansion valve 1) error
	E	9	A.	2	Outdoor unit coil 2 (expansion valve 2) error
	E	9	A.	3	Outdoor unit coil 3 (expansion valve 3) error
	E	9	U.	2	Outdoor subordinate unit error
Refrigerant system error	E	A	1.	1	Outdoor unit discharge temperature 1 error
	E	A	2.	1	Outdoor unit discharge temperature 2 error
	E	A	3.	1	Outdoor unit compressor 1 temperature error
	E	A	3.	2	Outdoor unit compressor 2 temperature error
	E	A	4.	1	Outdoor unit high pressure error
	E	A	4.	2	Outdoor unit high pressure protection 1
	E	A	4.	3	Outdoor unit high pressure protection 2
	E	A	5.	1	Outdoor unit low pressure error
	E	A	6.	3	Outdoor heat exchanger 1 gas temperature error
	E	A	6.	4	Outdoor heat exchanger 2 gas temperature error
	E	A	C.	4	Outdoor unit heat sink temperature error
	E	A	C.	8	Outdoor unit heat sink 2 temperature error

7 segment LED indicator: